THE MUSCULOSKELETAL LEARNING NEEDS OF DOCTORS IN TRAINING FOR GENERAL PRACTICE

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Abstract

General practitioners must be able to respond appropriately to the full range of medical conditions that present to them during their surgeries. To do this they require adequate training in a variety of specialties. Concerns have been raised regarding general practitioners training in certain areas. One of these is the management of musculoskeletal conditions.

The overall aim of this study was to explore the musculoskeletal learning needs of trainee general practitioners by identifying the conditions they see during their day to day work and then asking them to reflect on these. A secondary aim was to create an educational package focused on one area of learning need and to evaluate this.

A questionnaire study initially performed in 1995, which highlighted concerns regarding training in this area, was repeated to see if the situation had changed. Thereafter thirteen trainees kept a diary documenting all of their musculoskeletal consultations for a month. They were also asked to document any perceived learning needs regarding these consultations. The trainees were then interviewed and their identified learning needs were further explored. Any others learning needs in musculoskeletal medicine were also discussed. Focus groups with a further two groups of registrars were performed, along with interviews with eight trainers, in order to triangulate the data and to explore their ideas.

An educational package on the management of shoulder pain, one of the areas identified by the trainees, was developed and trialled with a different group of doctors by using a pre- and post- knowledge test.

Confidence in managing musculoskeletal disorders in doctors currently training for a career in general practice remains poor. Learning needs were identified in a variety of different areas. It is possible to create an educational package focused on a specific area which can address these needs.

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Declaration

I certify that all the material in this submitted work which is not my own has been fully identified and that no material is included which has been submitted for any other award or qualification.

Signed:

Date:

Chapter 1 - Introduction

Background and Introduction

In the United Kingdom general practitioners perform a unique role within the National Health Service (NHS) and in the care of their patients. General practitioners can be defined as:

> "Specialist physicians trained in the principles of the discipline. They are personal doctors, primarily responsible for the provision of comprehensive and continuing care to every individual seeking medical care irrespective of age, sex and illness. They care for individuals in the context of their family, their community and their culture, always respecting the autonomy of their patients. They recognise they will also have a professional responsibility to their community. In negotiating management plans with their patients they integrate physical, psychological, social, cultural and existential factors, utilising the knowledge and trust engendered by repeated contacts. General practitioners / family physicians exercise their professional role by promoting health, preventing disease and providing cure, care, or palliation. This is done either directly or through the services of others according to health needs and the resources available within the community they serve, assisting patients where necessary in accessing these services. They must take the responsibility for developing and maintaining their skills, personal balance and values as a basis for effective and safe patient care." (The European Society of General Practice/Family Medicine. A regional organisation of the World Organisation of Family Doctors (WONCA Europe) 2005)

General practitioners have to be able to deal with any problem that is presented to them and either manage it themselves or act as a "gatekeeper" to other services including secondary care. It is estimated that they manage ninety percent of all illness along with the help of the other members of the primary care team (Joint Committee on Postgraduate Training for General Practice 1992). General practitioners now also have an important role in disease prevention and chronic disease management which has become formalised with the introduction of the new General Practice Contract and the Quality Outcomes Framework. They must therefore be sufficiently well educated across a wide field to allow them to fulfil these roles. It is unsurprising that at least one

commentator has noted that “the general practitioner must become the most educated, the most comprehensively educated, of all doctors in the Health Service.” (Sir Denis Hill cited in Royal College of General Practitioners 1977, p.1)

Health care systems that have a significant primary care focus, such as in the United Kingdom, are found to have:

- Higher patient satisfaction with the health care system
- A lower overall expenditure of health care
- Better population health indicators
- Fewer prescribed drugs taken per head of population

(Royal College of General Practitioners 200-)

This chapter looks at the history of general practice training and what it now comprises. It then goes on to focus on education in one specific area, the field of musculoskeletal medicine. Both undergraduate and postgraduate experiences of doctors in training for general practice in this field are examined, along with what curricula exist.

The overall aim of this study was to explore the musculoskeletal learning needs of doctors in training for a career in general practice and to develop a learning package focused on one identified area of need.

The history of general practice and general practice training

General practitioners have existed for far longer than the National Health Service and a career in general practice has historically been popular, especially for female doctors. Even now, around seventeen percent of male and thirty percent of female graduates choose a career in primary care (Lambert et al. 2003). Overall, this is less than the ‘golden age’ of primary care in the 1970s and 1980s, when forty to fifty percent of all qualifiers became general practitioners, but it has improved from around twenty percent in 1996.

Prior to the creation of the National Health Service in 1948, general practitioners used to work as private doctors treating patients who had the means to pay. In 1911, Lloyd George introduced compulsory health insurance for working people with a low income. This allowed local insurance committees to contract general practitioners to provide services, the doctors being paid a capitation fee for each insured patient registered with them.

With the advent of the National Health Service, the entire population became eligible for free medical care and general practitioners were initially overwhelmed by the demands of their patients. Morale amongst the doctors at this time dropped, as did standards of care. This was documented in a report by Joseph Collings in 1950 who said that "the overall state of general practice is bad and still deteriorating" (Collings 1950). A group of general practitioners were sufficiently concerned about the reputation of their profession that they founded an academic body tasked with the job of improving standards, education and research within primary care. This led to the Royal College of General Practitioners (RCGP) being established in November 1952 (Kmietowicz 2006). Working conditions for general practitioners changed in 1966 when a new contract, as a result of the Charter for the Family Doctor Service, began developments of the service. This contract altered the way in which general practitioners were paid and by doing so stimulated the development of group practices. Throughout this time the Royal College campaigned for a formal period of training for general practitioners. Vocational training, as it was known, was developed during the 1960s and 70s but only became compulsory with the National Health Service (Vocational Training) Regulations in 1979 following the passing of an act of parliament in 1976 (Royal College of General Practitioners 1988). These regulations came into force in England and Wales on the 16th February 1980 and made vocational training mandatory to any doctor who entered the profession as a principal after the 15th February 1981. Vocational training is recognised as having been a great success within the National Health Service and the apprenticeship model that it provides, where each registrar has one-to-one teaching and mentoring from their trainer, has been instrumental in improving standards in primary care (McEvoy 2003; Leach et al. 2004).

Until 2006 the Joint Committee on Postgraduate Training for General Practice oversaw general practice training and the NHS (Vocational Training for General Medical

Practice) Regulations (1997) were followed. These stated that trainee general practitioners must complete a minimum of three years training in approved posts following on from their pre-registration House Officer year. One of these years had to be as a general practice registrar (GPR) and one year in two of the following specialties:

- General Medicine (including acute medical experience)
- Paediatrics
- Geriatric Medicine
- Psychiatry
- Accident and Emergency medicine OR General Surgery OR Accident and Emergency Medicine with either General Surgery or Orthopaedic Surgery
- Obstetrics OR Gynaecology OR Obstetrics and Gynaecology

The other year in training could either be spent in general practice, a hospital setting or a community setting (Department of Health 2002).

In the main, general practice registrars spent one year in primary care and two years in hospital posts in spite of it being possible to spend more time in the community. This was due to a lack of availability of suitable training posts in the community. Prior to 2006, there were repeated calls for vocational training to be extended and the length of time spent in primary care to increase (Bain 1996; van Zwanenberg et al. 2001). The Royal College of General Practitioners suggested a five year period of post-registration training. This was, in particular, because there were repeated concerns raised regarding the relevance of hospital posts. It was also noted that it had been increasingly difficult to recruit newly qualified doctors to become general practice principals, possibly because trainees felt inadequately equipped (Kearley 1990; British Medical Association 2003; Dixon & van Zwanenberg 2001).

General practice training has recently changed with the introduction of Modernising Medical Careers, a new focused and streamlined training programme. Potential general practitioners will now have to complete five years of post-graduate training. All doctors will complete a two year Foundation Programme immediately after qualification and prior to entering their chosen specialty. General practice training will then consist of thirty six months in approved posts. Approved posts are now divided into List 1 and List 2 specialties. List 1 specialties are felt to be most likely to provide the

competencies required for general practice. Trainees must have spent at least twelve months in any of these posts with the shortest time allowed in any one post being three months and the longest six months (Postgraduate Medical Education and Training Board 2008).

List 1 Specialties:

- General Adult Psychiatry or Old Age Psychiatry
- Dermatology
- Emergency Medicine or Emergency Medicine in a paediatric setting
- General Medicine
- Geriatrics
- Genitourinary Medicine
- Obstetrics & Gynaecology
- Paediatrics (including Community Paediatrics)
- Palliative Medicine
- Rehabilitation Medicine

If the training programme is regarded as being "balanced", the assessors will now accept up to six months in the following specialties as counting towards general practice training:

- Cardiology or Medical Oncology or Clinical Oncology or Gastroenterology or Endocrinology and Diabetes Mellitus or Haematology or Nephrology or Respiratory Medicine or Rheumatology or Neurology or Infectious Diseases
- Child and Adolescent Psychiatry or Psychiatry of Learning Disability
- Opthalmology or Ear Nose and Throat Surgery or General Surgery or Paediatric Surgery or Urology or Trauma and Orthopaedic Surgery
- Intensive Therapy
- Public Health Medicine or Occupational Medicine

Currently schemes offer a variety of posts with registrars spending twelve to eighteen months in primary care. The ultimate aim though, is that all trainees will spend eighteen months in general practice with their final year of training being primary care

based. Of note, neither orthopaedics nor rheumatology posts feature prominently in the new general practice training programme and neither are regarded as mandatory.

The Postgraduate Medical Education and Training Board (PMETB) have, as of the 30th of September 2005, taken over responsibility from the Joint Committee on Postgraduate Training for General Practice (JCPTGP) for supervising the training of all junior doctors, and in particular general practice registrars. With this, the assessment of trainees has also changed. Whereas registrars used to have to complete the four sections of summative assessment (a multiple choice questionnaire, a project (e.g. an audit), a video assessment of their consultations and a trainer's report) in order to qualify to practice as a general practitioner, they now have to complete a work based assessment process as well as the two new external components of the new Membership of the Royal College of General Practitioners (nMRCGP). The two external components are the Applied Knowledge Test (AKT) and the Clinical Skills Assessment (CSA). The work based assessment process replaces the trainer's report from summative assessment. Trainers will be asked to judge their trainee's performance in twelve competency areas using methods such as case based discussion, observed consultations and multi-source feedback. The Applied Knowledge Test is going to be a three hour; two hundred item multiple choice paper, which will be taken on a computer. The majority (eighty percent) are going to be clinical medicine questions. The remainder will be on critical appraisal, evidence based medicine, health informatics and administrative issues. The Clinical Skills Assessment is going to be a thirteen station examination with role players acting as patients. This part of the exam will focus on communication skills, practical examination skills, problem solving skills etc., i.e. those which were previously covered by the video assessment (Royal College of General Practitioners 2006a).

Prevalence of Musculoskeletal Conditions

Musculoskeletal disorders are common, with estimates of their forming 15-20% and occasionally up to 30% of all United Kingdom general practice consultations (Office of Population Censuses and Surveys 1995; Department of Health 2006). See Figure 1.1. They also cause a significant amount of morbidity and disability (Sprangers et al. 2000).

The 2002/2003 General Household Survey showed that 35% of respondents reported having a longstanding illness with musculoskeletal conditions being the commonest cause of these (Rickards et al. 2004). The prevalence of musculoskeletal disorders is predicted to increase as the population ages and the prevalence of risk factors for some musculoskeletal disorders e.g. obesity, also increase (Khaw 1999). This has already been shown to have happened over the past thirty years with chronic conditions, and musculoskeletal disorders in particular, increasing in prevalence from the 1972 General Household Survey.

Respiratory Conditions	31%
Diseases of Nervous System and Sense Organs	17%
Musculoskeletal System	15%
Diseases of the Skin	15%
Infectious or Parasitic Diseases	14%
Injury or Poisoning	14%

Figure 1.1: Reasons for Consulting 1991/92 taken from the Fourth National Morbidity Study. Source: Fourth National Morbidity Survey cited in Palmer (1998, p.306)

At present, it is estimated that around 17.3 million people in the United Kingdom, which is over one third of the adult population, suffer from back pain. Up to 8.5 million people have joint pain with over 4.4 million having moderate to severe osteoarthritis and over 650,000 having inflammatory arthritis (Arthritis and Musculoskeletal Alliance 2004). Three percent of patients presenting to a children's admissions unit have a musculoskeletal complaint (Myers et al. 2004).

Unsurprisingly, given the large numbers of individuals involved, musculoskeletal conditions have significant resource implications. The total cost of back pain alone to the economy has been estimated at between one and two percent of gross national product with the National Health Service/Community Care Services spending over £1 billion on services for back pain. In 1999-2000, despite £2,148 billion being spent on Incapacity Benefit payments to people with arthritis and related conditions, it has been commented that these patients may not have received neither the support required nor

the most appropriate care (Department of Health 2006). In 2006, the Department of Health published the Musculoskeletal Services Framework, highlighting the important role of the primary care doctor in the care of these patients. The aims of the framework are: to improve communication between primary and secondary care in order to allow the development of shared care and more appropriate patient pathways, to increase the capacity in primary care and to try and ensure that patients are treated closer to their home or place of work. In order to achieve this, the authors suggest that numbers of general practitioners with a special interest in musculoskeletal medicine, physiotherapists and podiatrists need to increase.

This high burden of musculoskeletal disease is not purely limited to the United Kingdom. Musculoskeletal problems cause significant problems in both developed and developing countries. They are the highest cause of long term disability in the United States and chronic musculoskeletal pain is reported in one in four people in surveys based in the developing world. It is because of this and the fact that there is relatively little spending on musculoskeletal conditions that the United Nations and the World Health Organisation have declared 2000 – 2010 as the "Bone and Joint Decade" (Woolf & Akesson 2001). The overall aim is to try and improve the quality of life of patients with musculoskeletal conditions by raising awareness, increasing research within the field and empowering patients with musculoskeletal disorders to be involved in their own care. For this to occur, it is essential that education of health professionals be improved so that it reflects the burden of musculoskeletal conditions and meets the needs of patients (Woolf & Akesson 2007).

Musculoskeletal Skills – What is the problem?

For the musculoskeletal system, perhaps even more so than other systems, good clinical skills and a competent examination technique are essential for the assessment of patients. Unfortunately, United Kingdom based studies have shown that there are problems with the clinical assessment of the musculoskeletal system. Doherty et al. (1990) looked at the medical records of 200 general medical inpatients in a teaching hospital and discovered that documentation of musculoskeletal symptoms and signs was poor (present in only 14.4% and 5.5% of notes respectively). When these patients went

on to be assessed further by a rheumatologist, 42.5% of them were found to have symptoms and 53.5% signs of musculoskeletal disease, many of whom could have easily been treated. Examination of other systems was better documented: cardiovascular – 100%, respiratory – 99.5%, abdomen – 99%, nervous system – 77%, skin – 13%, female breasts – 13%. The authors felt that the neglect of the musculoskeletal system reflected "medical teaching philosophy and practice rather than incompetence or slackness on the part of the doctors."

Following on from this, a working party for the Arthritis Research Campaign (then the Arthritis and Rheumatism Council) developed and published a screening history and examination for the locomotor system called 'GALS' (Gait, Arms, Legs and Spine) to be taught to all medical students (Arthritis and Rheumatism Council 1991).

A further assessment of the documentation of musculoskeletal history taking and examination, following on from the introduction of the 'GALS' screen to medical student teaching, was published in 2003 (Lillicrap et al. 2003). They again looked at general medical admissions with each patient being assessed by a rheumatology Specialist Registrar at least 48 hours after their admission. The patients were asked the 'GALS' screening questions and the 'GALS' examination was performed with a further, more detailed examination, of the joints being performed if indicated. Documentation of locomotor symptoms and signs had improved (50% and 20% respectively) but a relevant history was missed in 49% of patients and clinical signs in 78%. In this series, 63% of the patients had active musculoskeletal problems and 42% of these would have benefitted from treatment of their complaints. Not all of the doctors originally assessing the patients remembered having been taught the 'GALS' screen. The doctors who recalled having been taught the screen reported a higher confidence at examining the musculoskeletal system although it was not possible to discover whether or not it was these doctors who had been documenting the symptoms and signs. Similar problems with failing to document a musculoskeletal examination have been noted in both general paediatric admissions and also psychiatric admissions (Myers et al. 2004; Rigby & Oswald 1986).

There are no equivalent studies looking at the musculoskeletal skills of primary care doctors although there is indirect evidence that poor skills may be found. General

practitioners have been found to use computer codes (Read Codes) with non-specific diagnoses for patients with shoulder problems and referral letters to hospital specialties rarely contain a possible diagnosis and so may be misdirected (Linsell et al. 2006; Speed & Crisp 2005). General practitioners also report that their confidence at assessing children with musculoskeletal conditions is poor (Jandial et al. 2008).

International studies looking at the knowledge of primary care physicians are more specific, showing that they often misdiagnose problems in spite of their patients having classical symptoms and that they perform poorly on musculoskeletal knowledge tests (Fowler & Regan 1987; Liesdek et al. 1997; Matzkin et al. 2005).

Undergraduate Teaching

Medical students are exposed to musculoskeletal problems during their undergraduate years in both hospital and primary care attachments.

Undergraduate Musculoskeletal Experience

Questionnaire studies regarding the amount of rheumatology teaching in the United Kingdom have been published a number of times over recent years (1971, 1979, 1990 and 2000) and all highlight concerns that undergraduate education may be inadequate. The latest questionnaire showed that, in five medical schools, up to half of the students may receive no clinical rheumatology teaching at all (Kay et al. 2000). Overall teaching, which was difficult to measure, was believed to have dropped from a median of four weeks to just two. In some medical schools only a proportion of students were taught rheumatological clinical skills and it was often in conjunction with other specialties, particularly orthopaedics. Combined teaching with primary care occurred in two medical schools. In five Universities a demonstration of rheumatological clinical skills was not required. Although this was of concern, it was actually an improvement from 1990. A similar study looking at orthopaedic medical school education revealed similar concerns with varying attachment lengths from three to twelve weeks. In some Universities there could be up to thirty medical students attached to a firm and five medical schools reported that the amount of time in the clinical course for trauma and

orthopaedics had actually decreased over the preceding five years (O'Dowd & Spencer 1992).

Again, the limited amount of time spent teaching musculoskeletal medicine to undergraduates appears to be an international problem (Pinney & Regan 2001).

Undergraduate General Practice Experience

Typically undergraduates' experience of general practice was a short attachment (two to four weeks) to acquaint students with the work of the general practitioner (Spencer 2005). This would often be supplemented by a series of lectures/tutorials in the medical school.

This does now appear to be changing with increasing medical student numbers in the United Kingdom demanding innovative ways of teaching. Students can now spend a significant part of their undergraduate training in primary care, for example in Newcastle upon Tyne, students now spend a half day a week in primary care throughout their third year and, in their fifth year, have a further two week attachment. Some medical schools have tried basing their students in primary care for their clinical training as opposed to being in teaching hospitals (Oswald et al. 2001). It was shown to be possible for this to occur but placement costs were higher than hospital based training.

Postgraduate Training

As mentioned earlier, musculoskeletal posts are not regarded as a core part of general practice training. Instead the majority of the general practice registrar's musculoskeletal education takes place within their primary care attachment. In these, both formal and informal teaching occurs. General practice registrars receive regular formal tutorials from their trainers. Joint Committee on Postgraduate Training for General Practice (JCPTGP) recommendations were for the equivalent of two sessions a week. They also attend vocational training scheme educational programmes which, in general, are the

equivalent of one half day per week. Training though, also takes place 'on the job' with registrars learning by discussing patients that they see with their trainer.

Formal General Practice Musculoskeletal Training

Concerns regarding general practitioners' musculoskeletal training have been raised for a number of years, particularly in secondary care literature. The Primary Care Rheumatology Society (PCR) was founded in 1986 by a group of interested general practitioners who recognised that musculoskeletal disorders formed a large part of their workload and that training in this area was deficient. Their aims were:

- To improve knowledge of rheumatology amongst general practitioners
- To improve standards of care provided for patients
- To undertake research

(Dickson 1986)

A survey of general practitioners, around the time that the Primary Care Rheumatology Society was founded, showed that general practitioners in the Staffordshire area were in concordance with the beliefs of these doctors. Fifty six percent of respondents (281/350 general practitioners responded = 80% response rate) reported that they felt that rheumatological conditions took up more than 20% of their working time and that there was inadequate undergraduate (68%) and postgraduate (68%) training (Dawes et al. 1990). A survey of general practitioners in Wiltshire in 1993 had similar findings with 69% of responding general practitioners (170/291 general practitioners responded = 58% response rate) reporting that too little time was devoted to teaching about musculoskeletal problems. Several general practitioners commented that musculoskeletal teaching was "more relevant to postgraduate training and should be a compulsory part of vocational training for general practice" (Morrison 1993).

A survey in 1990 looking at vocational training schemes reported that registrars in only half of the schemes surveyed had the opportunity to work in orthopaedics posts during their vocational training. Only one third of schemes contained accident and emergency posts where trainees are also commonly exposed to musculoskeletal conditions. The author was also concerned to find that, on average, only one of the compulsory half day

teaching sessions provided by the schemes over the year had focused on musculoskeletal disorders (Booth 1990). A survey of vocational training schemes in the North East of England (Northumbria, Cleveland and Cumbria) in 2000 revealed that none of the schemes had rheumatology or orthopaedic attachments. All of the schemes had rotations that included accident and emergency medicine but not every trainee would have had the opportunity to work in this area. The schemes all reported providing some musculoskeletal teaching in the trainees' half day sessions but the author, again, was concerned with the discrepancy between the amount of musculoskeletal disorders seen in primary care and the limited teaching that registrars receive both as undergraduates and on the vocational training schemes (Williams 2000).

A national survey by Lanyon et al (1995) looked at self reported rheumatology education and skills of all general practice trainees in United Kingdom general practice training posts in June 1992. Trainees at the end of their training year reported that their rheumatology education had been "inadequate" and that they were "under confident" in managing musculoskeletal conditions. Again, less than half (43%) reported receiving specific teaching in their half day release sessions and a significant proportion (35%) had not received any tutorials on musculoskeletal topics from their trainer. Lanyon et al suggested that the development of a musculoskeletal curriculum may help improve registrars' skills and confidence.

General practitioners are interested in further musculoskeletal training but often the continuing medical education available is less than ideal. For example, a survey of rheumatologists in 1987 showed that, of the education sessions they provided, 44% were focused on inflammatory arthritis whereas only 13% focused on back pain, i.e. the topics taught appear to be more important to the educator than to those being educated (Morrison 1993; Badley & Lee 1987; Marshall 1998).

As with the concerns raised regarding undergraduate and postgraduate teaching, general practice trainees in other parts of the world also highlight the fact that there is insufficient training in musculoskeletal medicine (Meier et al. 1985).

Sports and Exercise Medicine (SEM)

There is separate literature available looking at training in sports and exercise medicine in primary care. Sports and exercise medicine has traditionally been regarded as part of orthopaedics and rheumatology but has recently been recognised as a medical specialty in its own right. Similar training problems to musculoskeletal medicine in general have been identified. A questionnaire study by Cullen et al, documented that sports and exercise medicine is, by and large, not recognised as being a core part of the undergraduate curriculum with only 13/28 medical schools in the United Kingdom and Ireland providing teaching in this area. Only seven of these schools taught sports and exercise medicine in a formal context, the other six offering it is an optional course (Cullen et al, 2000). Concerns have also been highlighted that general practitioners are inadequately trained to manage these conditions. A questionnaire study by Buckler, in 1999, asked general practitioners in Northampton about their training in Sports and Exercise medicine. Buckler took "medicine for people who require treatment or advice as a consequence of their involvement in sport or medicine" as his definition of sports and exercise medicine, i.e. it covers a much wider range than only those conditions that affect elite athletes. There was an 87.6% response rate with the questionnaire being sent to 275 general practitioners in total. Buckler found that 72.7% of general practitioners felt inadequately trained to look after these patients. Seventy six percent of respondents said that they would welcome more training. Again, respondents (36.4%) highlighted concerns about their undergraduate training and said that "their undergraduate orthopaedic training was of no use in primary care." Only 7.2% of responding general practitioners felt skilled in the management of these patients.

Palliative Care / Dermatology / Ophthalmology

Concerns regarding general practice training have been highlighted in other specialty areas. Palliative Care, Dermatology and Ophthalmology are three areas where there are studies demonstrating these concerns.

In a study relating to Palliative Care (Lloyd-Williams & Lloyd Williams 1996), general practitioners were shown to receive little teaching and feel inadequately trained in the management of the dying. They also highlighted a desire to spend time during training

in a hospice. A more recent study from 2006 suggests that training in this area has improved but that general practice registrars still had mixed feelings about their palliative care training (Low et al. 2006). With Modernising Medical Careers, palliative care has now become a specialty prioritized by the Royal College of General Practitioners and the Postgraduate Medical and Education Training Board and is recognised as being an area that can provide the competencies required for general practice training. Palliative medicine does form a much smaller part of a general practitioners' workload than musculoskeletal disorders do, so it is possible that there are lessons to be learnt from how they have achieved this improvement in status.

Studies looking at primary care dermatology and ophthalmology training also highlight concerns that both postgraduate and undergraduate education is inadequate and that general practitioners may have a poor knowledge base and insufficient clinical skills in these areas (Kerr et al. 2006; Shuttleworth & Marsh 1997).

Informal General Practice Musculoskeletal Training

The clinical experience of general practice registrars in their registrar year has been investigated, although a number of the studies were conducted prior to the implementation of vocational training schemes and all are prior to the loss of the general practitioners' personal list (Carney 1979; Stubbings & Gowers 1979; Carney 1987; Richardson et al. 1974). During this time, there has been a shift away from patients having their "own" doctor. Patients may now see different doctors within a practice and their choice of doctor may depend on what medical problem they have. This could mean that, if these studies were repeated, differences would be seen. These studies looked at either an individual's or a small group's clinical work. They highlighted the fact that trainees, during their year in general practice, appear to see a younger population with more male patients, patient initiated consultations and less chronic illness as a percentage of their total workload when compared to their trainer. Chronic illness and its management has been both highlighted in the new Royal College of General Practitioners curriculum and also in the Royal College publication, 'The Future General Practitioner' as being an area that is important for trainees to become experienced in (RCGP 1972). Two of these studies noted that trainees appear to be

seeing significantly less musculoskeletal conditions when compared to their trainers (Carney 1979; Stubbings & Gowers 1979). See Figure 1.2.

	Trainee	Trainer
Carney (1979)	6.4%	10.9%
Stubbings & Gowers (April-June)	7.6%	10.2%
Stubbings & Gowers (July-September)	6.9%	10.0%

Figure 1.2: A comparison of trainees versus trainers' musculoskeletal workloads (% total per year)

The study by Carney highlighted that registrars saw less osteoarthritis whereas Stubbings and Gowers commented that registrars saw less chronic/acute arthritis. A study focusing on the work of trainees on the Oxford Vocational Training Scheme from 1976 to 1979 showed similar results; trainees saw significantly less rheumatoid arthritis than their trainer and often saw the patients only once or twice, i.e. the trainees lacked the continuity of care with their patients that their trainers had.

These studies do not relate how much the trainees see to what they learn. However as teaching in the general practice year of vocational training is often focused on cases that the trainee sees, does this mean that trainees are learning effectively about the management of these conditions if they haven't seen many patients with the condition in question? An Australian study looked at the informal teaching that registrars receive when discussing patients that they had seen, and estimated that trainees received at least an extra 37 minutes of teaching per week (Pearce 2003). This study also highlighted the importance of informal teaching. All these findings emphasise the need for the trainer to be aware of what their registrar is seeing, so that any gaps can be addressed.

Curricula

> Curriculum: A course of study, especially at school or university
> Syllabus: 1. A series of topics prescribed for a course of study.
> 2. A booklet or sheet listing these.
> (Chambers Harrap Publishers 2008)

NB: a curriculum defines course objectives (may be expressed as learning outcomes) and will also include how students will be assessed to see if they have met these outcomes.

Undergraduate

Both rheumatology and orthopaedics have published musculoskeletal curricula for undergraduates. United Kingdom rheumatologists published "Guidelines on an Undergraduate Curriculum" in 1992, emphasizing the importance of medical school education that reflects "morbidity load" and therefore focusing more on competencies relevant to primary care than those of secondary care (Doherty & Dawes 1992). They also highlighted the importance of education being regarded as a continuous process so that the undergraduate curriculum should be seen as a "foundation for future education". There was discussion in the document with regards to producing a combined musculoskeletal curriculum in conjunction with orthopaedics but it was decided that any collaboration should be local as there was concern that emphasis might be placed on the more acute problems seen in orthopaedics, relegating rheumatological problems to second place. It was considered that collaboration with general medicine or general practice might be more fruitful.

A joint orthopaedic/rheumatology document was published in September 2001 following on from the General Medical Council's publication of "Tomorrows' Doctors" (British Orthopaedic Association & British Society of Rheumatology 2001; General Medical Council 1993). See Figure 1.3. The General Medical Council recommended that a core curriculum be introduced to enable medical students to develop into enthusiastic and confident pre-registration house officers. The authors of the joint curriculum suggest that students receive a minimum of eight weeks teaching on musculoskeletal topics with the assumption that they will have already been taught the basic sciences and have had some exposure to clinical medicine. It is also suggested that the musculoskeletal course now combine both orthopaedics and rheumatology, unlike the proposal from 1992. As can be seen, the curriculum focuses on the student developing the basic clinical skills. There is a section pertinent to primary care where the student is expected to be aware of the primary management of musculoskeletal

disease. What effect this curriculum has had on undergraduate education has yet to be assessed.

Musculoskeletal Curriculum for the Undergraduate
British Orthopaedic Association & British Society of Rheumatology (2001)

Knowledge
The student will be expected:

- To demonstrate a basic understanding of the anatomy, function and physiology of the human musculoskeletal system;
- To demonstrate an understanding of the pathology of musculoskeletal tissue (bone, cartilage, synovium, muscle etc.);
- To be able to interpret the relevant haematological, immunological, biochemical and radiological investigations;
- To demonstrate an understanding that treatment is indicated to alleviate pain, improve function and to modify the natural history of a disease process or injury;
- To be aware of primary management of musculoskeletal disease and trauma and to be able to outline the strategies for the management of acute and chronic musculoskeletal disorders (including rehabilitation and pain management).

The above knowledge of diagnosis and management of the musculoskeletal disease and injury will provide a foundation from which to develop the following competencies.

Competencies
The musculoskeletal system provides a valuable opportunity to learn principles of clinical examination and to identify from the patient's history key points in the diagnosis of musculoskeletal disease and injury. In accordance with the GMC's "Good Clinical Practice" this allows the student to:

- Develop polite and considerate interaction with their patients and their families
- Listen to patients
- Learn to respect patients' views, privacy and dignity
- Learn to give patients information about their condition, its treatment and prognosis in a way they can understand.

This thus provides the student with a suitable environment in which to develop appropriate attitudes, good communication and trust – which form the cornerstones of a good doctor/patient relationship.

To identify, by examination, normality and abnormality of the locomotor system as a whole, for example using the GALS (Gait – arms – legs - spine) screen, and of individual joints. This will allow the student to:

- Make an adequate assessment of the patient's condition while respecting their privacy and dignity.
- Identify which investigations are indicated to support a clinical diagnosis or to assess activity/severity of disease, and to acquire the ability to interpret an X-ray and other relevant imaging techniques

This will assist the student:

- To identify where and which investigations are appropriate and necessary
- In making or confirming a diagnosis
- It is further believed that the musculoskeletal curriculum will offer the student, in line with GMC recommendations, a unique opportunity to:
    - Recognise and respect the right of the patient to be fully informed and involved in discussions about their case
    - Appreciate the multi-system presentation and the multi-disciplinary management of disorders of the musculoskeletal system, and so recognise the importance of teamwork as an essential part of medical practice
    - Assess fitness for surgery (particularly in the elderly) in patients with common musculoskeletal disorders – a generic skill with wide application
    - Refine appropriate attitudes while acquiring knowledge and competencies.

Figure 1.3: Musculoskeletal curriculum for the undergraduate

European and global recommendations for an undergraduate musculoskeletal curriculum have also been published in an effort to try and improve the confidence and competence of all doctors (Doherty et al. 1999; Woolf et al. 2004). Both of these documents highlight the importance of doctors being aware of how to manage common conditions and comment that it is essential to educate primary care/family practice practitioners. Local variations of these curricula are now being developed elsewhere in the world (Wadey et al. 2007). Again, these curricula have not yet been formally assessed although a study in Minneapolis showed that integrated orthopaedic, rheumatology and rehabilitation teaching does have a beneficial impact on students' knowledge, confidence and retention of examination skills (Saleh et al. 2004).

Postgraduate: General Practice

The Arthritis Research Campaign (**arc**) was the first to try and specify a musculoskeletal curriculum for general practice training. A 'Learning guide for general practitioners and general practice registrars on musculoskeletal problems' was developed by a multi-disciplinary group in 2000 and was published by the **arc** (Arthritis Research Campaign 2000). The document contains a list of core clinical musculoskeletal topics, a framework to use when considering these topics, a list of the principal drugs used for musculoskeletal disorders and other health care workers who may be involved. The **arc** distributed the guide to general practice trainers nationally but what its' uptake has been is unknown.

The Royal College of General Practitioners has frequently discussed the need for a curriculum for general practice but, until Modernising Medical Careers, no attempt had been made to write one. This was due to it being felt that primary care is such a broad subject that it would be impossible to define what topics should be included. In fact, the discussions around this topic were so frequent that the Royal College of General Practitioners quantified its own literature on the subject in 1995 as:

65 Occasional Papers
9 'Classic Texts'
25 Reports from General Practice
17 texts in the 'Clinical Series'

3 Policy Statements

(Royal College of General Practice 2006b)

When the Postgraduate Medical and Education Training Board (PMETB) took over responsibility for junior doctor training, they made it essential for all postgraduate specialties to have published curricula prior to the start of run-through training in August 2007.

The PMETB define a curriculum as:
A statement of the intended aims and objectives, content, experiences, outcomes and processes of an educational programme including:

- A description of the training structure (entry requirements, length and organization of the programme including its flexibilities and assessment system)
- A description of expected methods of learning, teaching, feedback and supervision.

The curriculum should cover both generic professional and specialty specific areas. The syllabic content of the curriculum should be stated in terms of what knowledge, skills, attitudes and expertise the learner will achieve.

The Royal College of General Practitioners therefore had to develop a curriculum for primary care following these specifications of the Postgraduate Medical and Education Training Board (Grant et al 2005). They document that there will be defined learning outcomes that trainees must reach at specified stages during their training. Concerns though have been raised about curricula that focus purely on outcomes and the development of competence, saying that the model is too simplistic and that accepting this approach may be “short sighted” for the profession (Talbot 2004). In particular, concern is raised that experts may struggle to define specific competencies for trainees as many aspects of their work have become intuitive and so difficult to express. This shall be discussed further in the literature review.

The Royal College of General Practitioners curriculum has now been published with “rheumatology and conditions of the musculoskeletal system (including trauma)” as one of the clinical management curriculum statements (Royal College of General Practitioners 2007). These statements were developed both by doctors with an interest

in the field but also staff from the Royal College curriculum development team. The Royal College aims to provide learning resources and support from experienced general practice educators for those involved with the implementation of the new curriculum. Some resources are now available to trainers and others are still in the process of being developed.

Conclusion

In spite of their high prevalence, musculoskeletal disorders continue to be poorly taught in both undergraduate and postgraduate settings and, in particular, in primary care. With general practitioners being the first point of access to the health care system for patients, it is imperative that they are adequately equipped to deal with the problems they encounter in order to function in their role as gatekeeper.

Aims

The specific aims of this project were therefore:

1. To repeat the questionnaire study used by Lanyon et al in a sample of four deaneries to see if, ten years on, general practice registrar teaching had changed.
2. To explore what musculoskeletal problems general practice registrars encounter in their day to day workload and to see what learning needs they identify with regards to these.
3. To identify preferred methods of addressing these learning needs.
4. To explore general practice trainers views on the above.
5. To develop and evaluate an educational package focused on one area of need identified by the registrars and trainers

Chapter 2 A Review of the Literature

Overview

In this literature review, I briefly look at different definitions of knowledge prior to focusing on two different theories about the development of expertise and some of the evidence in support of them. In becoming an expert, a trainee acquires new knowledge of different types and so, in order to understand this further, I must define what types of knowledge there are. This allows me, in the discussion chapter of this thesis, to examine at what level of expertise the registrars are functioning at and to look at ways of improving their education. It is hoped that if we are able to understand how doctors become experts, then it may be possible to focus educational interventions in such a way as to increase the efficiency of developing expertise.

A literature review was completed in December 2006 using Medline and Pubmed electronic databases, and revisited periodically thereafter. A number of the references were not able to be found on the electronic databases and, instead, were identified from reviewing the reference lists of other publications. It is recognised that this is not an ideal way in which to review the literature but a number of the publications included are not referenced on line.

Knowledge

Knowledge can be defined in many different ways, varying from that which is written in text books to wider definitions that encompass the use and application of knowledge. For example, Chambers 21st Century Dictionary describes knowledge as:

Knowledge (noun)

1. The fact of knowing; awareness; understanding
2. What one knows; the information one has acquired through learning or experience
3. Learning: the sciences – a branch of knowledge
4. Specific information about a subject.

(Chambers Harrap Publishers Ltd 2008)

Eraut, a Professor of Education at the University of Sussex, has written a number of texts on professional knowledge and learning and in particular has looked at medical knowledge and competence. He uses the term in its broadest sense, encompassing all the different forms – procedural knowledge (the knowledge of how to do something), propositional knowledge (a knowledge of facts, that which can be written in a text book), practical knowledge (knowing how in relation to a situation or behaviour), tacit knowledge (see below), skills and know how (Eraut 1994, p.16).

Tacit knowledge was originally defined by Michael Polanyi (1891-1976), a medical scientist working in the field of physical chemistry. A description of what he means by this term that is often quoted is "we know more than we can tell" (Polanyi 1983). Tacit knowledge is "unspoken and hidden. It is the expertise and assumptions that individuals develop over the years that may never have been recorded or documented" (McInerney 2002). It is implicit in this definition that tacit knowledge cannot easily be shared as it requires personal contact for it to be transmitted. In medicine there is a vast amount of knowledge that is tacit. An example that Henry gives is the skilled ultrasonographer who is able to know tacitly where their probe is whilst attending explicitly to the image they can see (Henry 2006). Polanyi considered that tacit and explicit knowledge (i.e. that which we can tell) were not discrete categories. He believed that tacit knowledge can be possessed by itself but that explicit knowledge has to be tacitly understood and processed for it to be of use i.e. "a wholly explicit knowledge is unthinkable" (Polanyi 1983). For example, it may be possible to describe a heart murmur explicitly but one could not identify a murmur in a patient unless this knowledge had been tacitly processed. An example that Polanyi himself gave was a medical student learning to read a chest radiograph.

> "At first the student is completely puzzled. For he can see in the X-ray picture of a chest only the shadows of the heart and the ribs, with a few spidery blotches between them. The experts seem to be romancing about figments of their imagination; he can see nothing that they are talking about. Then as he goes on listening for a few weeks..... a tentative understanding will dawn on him; he will gradually forget about the ribs and begin to see the lungs. And eventually, if he perseveres intelligently, a rich panorama of significant details will be revealed to him..... He still sees only a fraction of what the experts can see, but the pictures

> are definitely making sense now and so do most of the comments made on them. He is about to grasp what he is being taught; it has clicked. Thus, at the very moment when he has learned the language of pulmonary radiology, the student will also have learned to understand pulmonary radiograms. The two can only happen together. (Polanyi cited in Henry 2006)

As tacit knowledge cannot be explicitly expressed, it is not something that can be learnt in a formal situation, for example from a textbook or a lecture. Instead it can only be learnt informally and implicitly. Eraut describes a typology of current learning which shows how implicit learning differs from reactive and deliberative learning. In this way it is different from the experiential learning described by Kolb (Kolb 1984). See Figure 2.1.

Time of stimulus	*Implicit Learning*	*Reactive Learning*	*Deliberative Learning*
Past Episode (s)	Implicit linkage of past memories with current experience	Brief *near-spontaneous* reflection on past episodes, communications, events, experiences	*Review* of past actions, communications, events, experiences. More systematic reflection
Current Experience	A selection from experience enters the memory	*Incidental* noting of facts, opinions, impressions, ideas *Recognition* of learning opportunities	*Engagement* in decision-making, problem-solving, planned informal learning
Future Behaviour	Unconscious effects of previous experiences	Being prepared for *emergent* learning opportunities	*Planned* learning goals *Planned* learning opportunities

Figure 2.1: A typology of non-formal learning (Eraut 2000)

This tacit knowledge is important as it is the knowledge that underpins expertise and is developed by experience. Expertise itself is defined in the Chambers 21st Century Dictionary as a “special skill or knowledge” (Chambers Harrap Publishers Ltd 2008). I shall now go on to discuss two important theories regarding the development of expertise.

The Dreyfus and Dreyfus Model of Developing Expertise

The original theory of the development of expertise was developed and described by Dreyfus and Dreyfus in their book, 'Mind over Machine, the Power of Human Intuition and Expertise in the Era of the Computer' (Dreyfus & Dreyfus 1986). In it, they describe the five different stages that they believe exist in becoming an expert. The model was developed from their observations of chess players and airline pilots.

Level 1 Novice

- Rigid adherence to taught rules or plans
- Little situational perception
- No discretionary judgement

Level 2 Advanced Beginner

- Guidelines for action based on attributes or aspects (aspects are global characteristics of situations recognizable only after some prior experience)
- Situational perception still limited
- All attributes and aspects are treated separately and given equal importance

Level 3 Competent

- Coping with crowdedness
- Now sees actions at least partially in terms of longer-term goals
- Conscious deliberate planning
- Standardised and routinised procedures

Level 4 Proficient

- See situations holistically rather than in terms of aspects
- See what is most important in a situation
- Perceives deviations from the normal pattern
- Decision-making less laboured
- Uses maxims for guidance, whose meaning varies according to the situation

Level 5 Expert

- No longer relies on rules, guidelines of maxims
- Intuitive grasp of situations based on deep tacit understanding
- Analytic approaches used only in novel situation or when problems occur
- Vision of what is possible

Figure 2.2: A Summary of the Dreyfus Model of Skills Acquisition cited in Eraut (1994) p. 124

As can be seen in Eraut's summary of the Dreyfus and Dreyfus model, as a student becomes more proficient, they move through these five different stages and, as they do this, their behaviour changes in three ways.

The first is that the student begins to see situations as a whole as opposed to a collection of relevant parts and that they begin to use past experiences as exemplars. Medical schools teach students to take histories, examine, diagnose and manage patients according to rules. This enables them to recognise and deal with common medical conditions. As students become more experienced, they begin to focus their histories and examinations on what is important and develop the ability to recognise patterns of illness from their past experiences.

> "Usually the proficient performer will be deeply involved in his task and will be experiencing it from some specific perspective because of recent events. Because of the performer's perspective, certain features of the situation will stand out as salient and others will recede into the background and be ignored. As events modify the salient features, plans, expectations, and even the relative salience of features will gradually change. No detached choice or deliberation occurs. It just happens, apparently because the proficient performer has experienced similar situations in the past and memories of them trigger plans similar to those that worked in the past and anticipates outcomes that previously occurred." (Dreyfus and Dreyfus 1986, p. 28)

The second way in which behaviour changes is that, in many ways, it becomes automatic. The expert doctor is able to disregard the rules and guidelines and use their intuition. They are able to quickly recognise what is abnormal and then concentrate on this.

> "An expert generally knows what to do based on mature and practiced understanding..... An expert's skill has become so much part of him that he need be no more aware of it than he is of his own body..... the expert business manager, surgeon, nurse, lawyer, or teacher is totally engaged in skilful performance. When things are proceeding normally, experts don't solve

> problems and don't make decisions; they do what normally works." (Dreyfus and Dreyfus 1986, p. 32)

The third way in which behaviour changes is that the student develops from being an observer to being engaged in what is taking place. A good medical example of this could be in a cardiac arrest situation. The student may initially only observe but as they become more experienced they may start to become involved, for example by assisting with ventilation or cardiac compressions. As they become yet more experienced they will then eventually be able to lead and make the decisions for the arrest team.

Dreyfus and Dreyfus' model highlights the importance of tacit knowledge as expertise is acquired which, according to Eraut, is consistent with what professionals themselves describe (Eraut 1994, p. 129). It appears in their model in three different forms. The first form is as tacit understanding, i.e. an understanding of the situational context. The second form is as tacit procedures. This is where procedures, which may have initially been explicit, become routinised and increasingly tacit with repetition. The third form is the development of tacit rules. This is where the expert's decision making becomes intuitive and they start to respond rapidly due to the tacit application of tacit rules at the moment of use (Eraut 2000).

The model also emphasises the importance of learning from experience. As Adams et al state, "because expertise is gained in the context of practice, expertise cannot be achieved out of context or taught as an academic exercise" (Adams et al. 1997). Learning from experience was also highlighted as being good educational practice in the United Kingdom's Chief Medical Officer's "Review of Continuing Professional Development in General Practice" (Department of Health 1998, p. 5)

> "Generally good educational practice was seen to be: multiprofessional where appropriate, participative not passive; based on experience with patients, audit and forward planning, and using practice and personal development plans."

This model was applied to health professionals, and in particular nursing, by Patricia Benner in her book, "From Novice to Expert. Excellence and power in clinical nursing practice" (Benner 1984). Benner describes her results from performing paired

interviews with nurses at the start of their careers and their supervisors, nurses recognised for their expertise. The interviews were performed separately but focused on shared clinical situations that had stood out for them. Benner's aims were to try and see if there were obvious differences in the novice and expert's descriptions of the shared events. Further interviews were performed with nurses of varying experience to try and illustrate the characteristics of the different levels described by Dreyfus and Dreyfus in greater depth. Benner identified seven themes from her interviews, each of which has instances as to how nurses may progress through the five levels of expertise. She highlighted how expertise in a medical setting is situational, for example a nurse who functions as an expert in the coronary care unit may struggle to work to a competent level on a surgical unit. Benner also suggested that the Dreyfus and Dreyfus model has implications for educating nursing staff, for example: advanced beginners need help in setting priorities, competent nurses may benefit from decision making games and simulations that allow them to practice planning and co-ordinating complicated patient care demands and proficient nurses may be best taught using case studies where they can use their own methods of understanding and exploring clinical situations. Benner drew attention to the importance of medical staff, and in this case nurses, having an apprenticeship model of training, i.e. having on the spot clinical teaching from more experienced personnel.

This model has been discussed in relation to general practice registrar training by Bedi in Education for Primary Care (Bedi 2003). He suggests that when general practice registrars enter vocational training they are at the Advanced Beginner stage. This is because their hospital training gives them some experience of the conditions that are seen in primary care but, because it has been hospital based, the primary care context is lacking, i.e. the social aspects or impact of disease on the individual. The registrars become competent when they see their actions as being part of a long term plan for the patient and become to feel responsible for outcomes. Bedi suggests that, at this point in time, it may be better to teach the registrar using problem-solving scenarios. Proficiency is reached when the doctor is able to quickly form a provisional diagnosis during the consultation and then spends their time trying to prove or disprove their hypothesis. At this stage Bedi suggests that the registrar is best taught using clinical constructs, i.e. random and problem case discussion. This enables them to develop some understanding of their behaviour. Bedi suggests that general practice registrars

never reach the expert phase as this is only developed after time in autonomous practice. At this point the teaching should become more portfolio based and include methods such as critical event analysis, peer assisted learning and reflective practice. Bedi believes that Dreyfus and Dreyfus's model links the teaching and learning processes in a way that enriches the teaching experience and that, if shared with the registrar, can assist with more effective progress through the stages.

The second theory of the Development of Expertise is one that was specifically designed with medical staff, and in particular doctors, in mind.

Schmidt, Norman and Boshuizen's Theory of Developing Expertise

Schmidt, Norman and Boshuizen published a theory of expertise in 1990, different to that of Dreyfus and Dreyfus, which was specifically focused on the acquisition of medical expertise (Schmidt et al. 1990). Their theory relies on three assumptions:

1. As students become experts, they pass through a number of stages that are characterised by having different knowledge structures.
2. The different knowledge structures do not decay or become inert. Instead, they remain available for use when the situation requires.
3. Experienced doctors use knowledge structures called "illness scripts" when dealing with patients with routine problems. These are developed from experience and exposure to patients and will be discussed later.

The original model described by Schmidt, Norman and Boshuizen showed three stages (novice, intermediate and expert) with their knowledge structures being as follows:

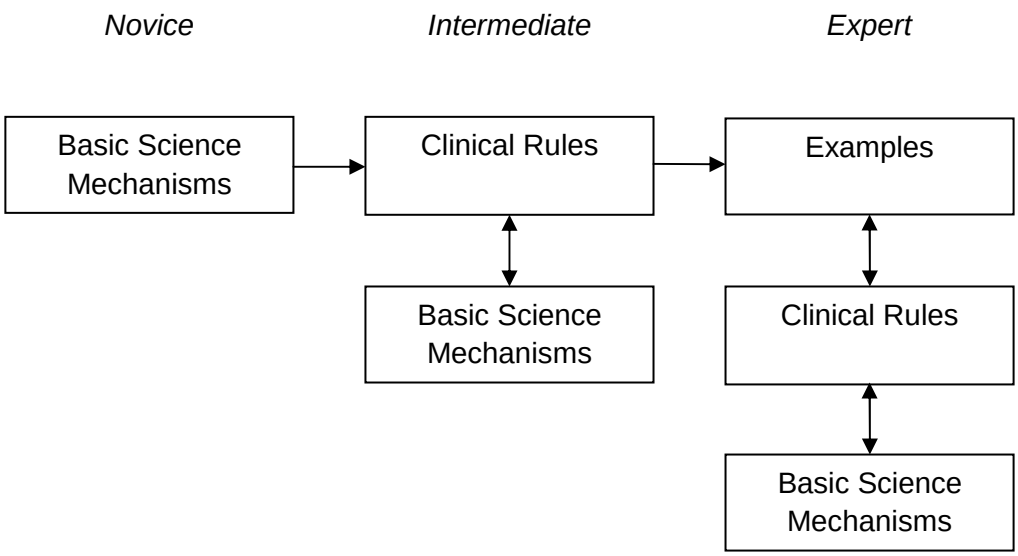


Figure 2.3: Schmidt, Norman and Boshuizen's original model of the Development of Expertise (Source: Norman 2005)

In this, a 'basic science mechanism' refers to what was traditionally learnt during the pre-clinical years at medical school, for example Starling's Law of the Heart or the Krebs Cycle. The term 'clinical rules' refers to the relationship between signs, symptoms and diagnoses, for example the causes of clubbing. Examples are memories of particular experiences with patients that can be drawn upon in the future when required.

Over the years, and in the light of results from many different observational studies, Norman et al have gone on to modify this model to:

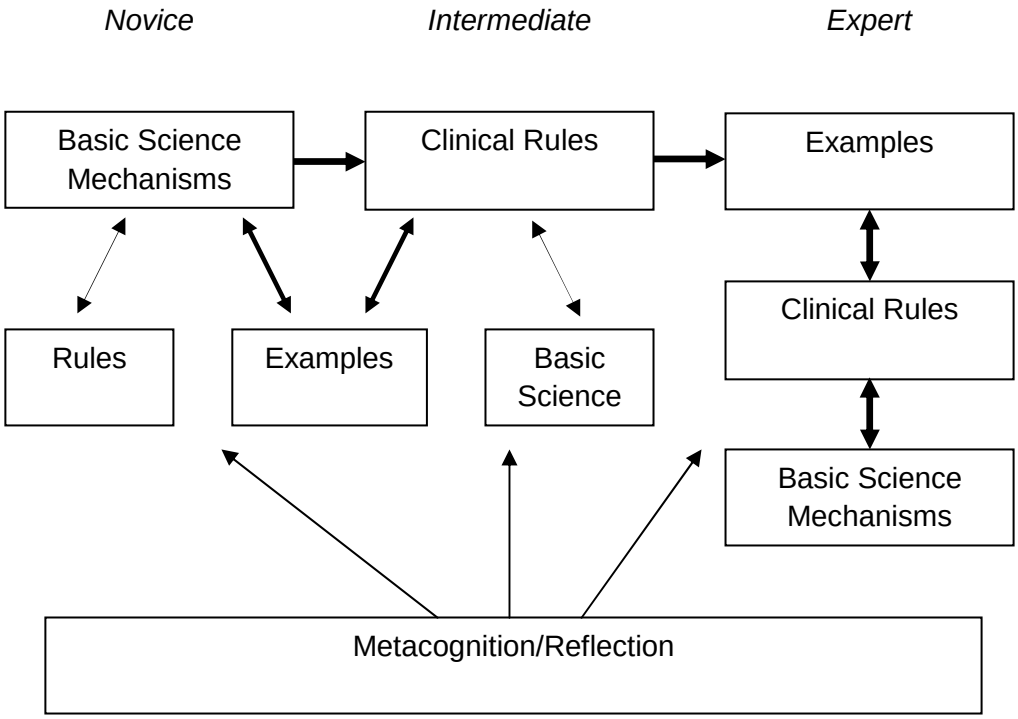


Figure 2.4: The modified model of the Theory of Expertise (Source: Norman 2005)

The structure of the trainee's knowledge changes in four ways as they progress from being a novice to becoming an expert (Schmidt et al. 1990).

Stage 1 The development of elaborated causal networks

The trainee creates a structure for the information that they are learning. It can be thought of as a set of nodes (facts), connected by links. The links represent the relationship between the facts and in medicine the relationship is often a cause, hence the name causal networks.

Stage 2 The compilation of elaborated networks into abridged ones

As the trainee is repeatedly exposed to patients and therefore frequently applying their knowledge, the networks become more complex. Each network tends to relate to a diagnosis and this allows the trainee to start

to use short cuts in their reasoning, i.e. they do not need to work their way through the patho-physiological causes every time they see a particular case.

Stage 3 The emergence of illness scripts

The patient exposures now become stored as part of the networks, which allow the exposures to develop into illness scripts (referred to as examples in the final column of Figure 2.4). These include background, contextual information. See below

Stage 4 Storing patient encounters as instance scripts

The expert stores memories of particular patients which they can access in the correct situation.

The expert can therefore deal with the majority of patients that they see by using illness scripts, and occasionally the instance scripts, that they have developed. This is why, when given the choice between a newly qualified doctor and a more experienced one, people consistently pick the one that is more experienced, i.e. they believe that experience is of benefit (Norman & Eva 2005). Similarly, if one asks doctors when they began to feel competent, most will say that it was several years after entering practice which is consistent with evidence from other fields. This vast memory bank of examples that an expert can readily call upon to assist them in formulating a diagnosis, allows them to use pattern recognition when seeing a patient which is much faster, and often more accurate, than working through a problem.

For example, Hobus et al presented 32 short case histories to novices and experts on three slides (Hobus et al. 1987). They observed that the experts were able to produce almost 50% more correct hypotheses as compared to novices and showed a correlation between diagnostic accuracy and expertise as +0.68.

If, however, the expert sees a patient who is more complex and who does not fit with the scripts that they have, they will return to their more basic knowledge, i.e. that of

clinical rules and basic science mechanisms. If experts, like novices, have to rely on the basic science mechanisms that they learnt in medical school there is a high likelihood that their knowledge of them will decline as time passes. Indeed, some authors have suggested that doctors who have been in practice for a number of years are less likely to follow set standards of care and may, in fact, have poorer patient outcomes (Choudhry et al. 2005). They also note that factual knowledge declines with age. Choudhry suggests that this could be due to a failure to update knowledge and that older doctors may be less receptive to new innovations. Closer inspection of the results of their systematic review reveals that, although all twelve of the studies looking at knowledge did demonstrate a decline with years from qualification, the evidence looking at performance was less definitive. Out of the 62 studies included, only half, 52% demonstrated the negative association between increasing experience and performance. Experience therefore appears to have some protective effect against this decline in knowledge.

The idea of a doctor storing their medical encounters and structuring their knowledge into "illness scripts" is only one of the many suggestions for how knowledge can be structured. Custers et al. divided the different proposed modes of knowledge structure into three main groups:

- The *Prototype Framework* (including semantic axes): i.e. knowledge is stored in model/typical presentations of illness.
- The *Instance-based Framework*: knowledge is stored as examples of conditions seen previously
- *Semantic network/Schema/Script Models*: knowledge is stored as a series of nodes (units of meaning) which are interlinked, i.e. there is a network of biomedical and clinical ideas which are interconnected. Making a diagnosis is by finding a path within this network.
  (Custers et al. 1996)

As discussed earlier, Schmidt, Norman and Boshuizen use illness scripts, an example of a semantic network, as the form in which knowledge is structured in their theory of expertise. Illness scripts were originally described by Feltovich and Barrows (1984)

and the definition in Schmidt and Boshuizen's review of developing expertise is as follows:

> "An illness script is a knowledge structure containing a wealth of clinically relevant information about a disease, its consequences (e.g. the complaint a patient brings to the doctor, or the signs and symptoms of a disease during the successive stages of its course) and enabling conditions, the context in which the illness develops (e.g. the physical characteristics of a patient's environment, his or her age, habits, medical history etc.). These consequences and enabling conditions are linked together with relatively little formal knowledge (compare to what experts have learned about the subject) about pathophysiological causes (the fault) or symptoms and complaints." (Schmidt & Boshuizen 1993)

These illness scripts are said to develop from exposure to patients and use both knowledge that has been learnt in formal situations, i.e. explicit propositional or codified knowledge, but also informal knowledge. These scripts can include perceptions and also tacit knowledge, for example the smell of a patient with diabetic ketoacidosis. Illness scripts can be linked as part of larger conceptual structures by common elements. Examples of these common elements include: diseases with common symptoms, diseases affecting the same organ and disease with a similar patho-physiological cause. Illness scripts can also vary in their generalisability from being an example of one patient seen previously to representing an entire disease category.

It is suggested that when expert doctors see a patient, they search for an appropriate illness script, looking for crucial factors in the information they acquire which are referred to as "enabling conditions". When they have selected one, they check the contents of the script with the information provided by the patient. This rapid homing in process is largely unconscious but it explains why experts are able to focus their history and examination so quickly. In the course of doing this, the expert acquires an additional patient example for their illness script and can so develop the script further.

Enabling conditions	→	Predisposing factors, boundary conditions, hereditary factors etc.
Predisposing factors	→	Compromised host factors, travel, drugs, etc.
Boundary Conditions	→	Age, sex, etc.
Fault	→	Invasion of tissue by pathogenic organism, inadequate nutrient supply, inability of tissue to survive etc.
Consequences	→	Complaints, signs, symptoms
Complaints	→	Etc.
Signs	→	Etc.
Symptoms	→	Etc.

Figure 2.5: An example of a generic illness script (Source: Schmidt, Norman and Boshuizen, 1990)

There is evidence looking at the development of expertise as described by this model. I shall therefore now go on to look at the evidence in two areas underpinning this theory: the importance of basic science mechanisms and whether or not expertise can be taught. I believe that these two areas are particularly pertinent to this study. The basic sciences, and in particular anatomy, play an essential role in the diagnosis of patients with musculoskeletal conditions and part of this project is looking at developing an educational package.

The importance of basic science mechanisms

It is tempting to believe that basic science mechanisms play little role in the expert doctor's reasoning, other than in very specific cases. This belief developed from observational studies where, when asked to think aloud whilst considering a case, experts were noted to rarely mention biomedical theories but were instead found to focus on the clinical features (Woods 2007a). Indeed Patel et al went on to say:

> ".....the basic sciences and the more practical clinical knowledge form two separate domains with their own individual structures and the clinical information cannot be embedded into the basic science knowledge structure." (Patel et al. 1988)

In certain specialties, such as anaesthetics and intensive medicine, this is quite obviously not the case and these doctors are seen to use their basic science knowledge in their day to day work and it is very much integrated with their clinical knowledge. Norman et al though demonstrated that doctors, who appear to use basic science knowledge rarely, will rely on it in specific situations (Norman, Trott, Brooks & Smith, cited from Norman 2005). They presented expert nephrologists with complex cases and asked them to discuss their way through the case and to come up with a diagnosis. When compared to non-experts in the field, the nephrologists were seen to be more accurate diagnosticians but also to rely on causal mechanisms (i.e. to use their knowledge of the basic sciences to explain what was happening) when considering the case. This led people to consider, if experts use basic science so infrequently why do students need to be taught it?

Woods et al took thirty six psychology students, therefore all novices when it comes to medicine, and split the students into two groups (Woods et al. 2005). Each group learnt about four neurological disease categories (muscle disorders, neuromuscular junction disorders, upper motor neurone lesions and lower motor neurone lesions) and about how these can cause the same complaint, in this case muscle weakness. One of the groups learnt basic neuro-anatomy and neuro-physiology and the symptom was described as resulting from specific pathology. The other group learnt the likelihood of specific features occurring for a given diagnosis, i.e. they learnt probabilities. The students were encouraged to learn the information and then were tested on fifteen cases both immediately and one week later. In the initial test both groups of students were equally successful but at week one a difference developed. See Figure 2.6. The students who had been taught the basic science mechanisms performed significantly better. It was felt that they showed enhanced retention and retrieval of the knowledge and that this was due to the students having developed a conceptual framework, i.e. a knowledge structure, with meaningful relationships between the symptoms, signs and diagnoses.

	Immediate		Delayed	
	Mean	SD	Mean	SD
Probability (n=18)	0.54	0.16	0.43	0.17
General Science (n=18)	0.52	0.16	0.52	0.21

Figure 2.6: Scores (percent correct) on the diagnostic test immediately after instruction and one week later. (Source: Woods et al. 2005)

Criticisms of this study included: a small sample size, testing a single knowledge domain only and the use of utter novices who did not even work in the field of medicine. With a view to answering these criticisms, Woods et al went on to repeat the study with a larger sample (58 participants), testing two knowledge domains (neurology and rheumatology) and used medical students in their first or second year who had not yet studied either of the topics going to be examined (Woods et al. 2006). Again the students were divided into two groups and were given written learning materials for eight conditions (four neurology conditions and four rheumatology conditions). The basic science group was given a leaflet that included the relevant anatomy and physiology and linked the symptoms to specific pathology. The other group was given a similar sized leaflet but theirs included epidemiological information such as disease prevalence and the prognosis for each condition instead of the basic science information. Once more the students were tested immediately and at week one. In each test they were presented with twelve different cases and were asked to come to a diagnosis. The students were also tested on their memory of the features of each condition, called the recall test. The results are shown in figure 2.7.

		Immediate		Delay	
		Mean	SD	Mean	SD
Diagnostic Test	Causal Learning (n=32)	0.71	0.15	0.62	0.15
	Feature List (n=26)	0.70	0.15	0.51	0.18
Recall Test	Causal Learning (n=32)	0.86	0.13	0.77	0.16
	Feature List (n=26)	0.80	0.15	0.76	0.15

Figure 2.7: Mean performance (percent correct) on diagnostic and recall tests administered immediately after learning and after a one week delay (Source: Woods et al. 2006)

This demonstrated that the students who were taught basic sciences had similar recall of clinical features but had less decay in their diagnostic skills over time. Woods et al postulate again that this is because there was "coherence to the relation between features and diagnoses."

Woods et al then took this one step further (Woods et al. 2007b). They increased the complexity of the cases by adding in irrelevant details, as patients often do, and also by using new, non-medical terminology. The same experiment as before was then performed, and again, the students who had learnt the basic science mechanisms performed better in that they appeared able to discount the irrelevant information and to work their way through a difficult case to come to an answer. This suggests that novices, like experts, may also revert to basics to help them in such circumstances.

Can expertise be taught?

I am now going to look at different experiments looking to see if expertise can be taught. As discussed earlier, the expert starts to use a form of pattern recognition when seeing patients, which is demonstrated in the first experiment. If students are encouraged to use this, does it have an effect?

In 1989, Norman et al took subjects at five different levels of expertise: pre-clinical medical students, final year medical students, residents, practising family physicians and practising dermatologists. Each subject was shown 100 slides consisting of two typical and three atypical presentations of twenty different common skin conditions. The slides were shown in random order and half of the subjects were given a brief patient history prior to being shown each slide. The subjects were asked to identify each lesion as quickly as they could. Time to arriving at a diagnosis and diagnostic accuracy were recorded.

As can be seen in Figure 2.8, there was an approximately linear relationship between correct diagnosis and expertise. As was also expected the proportion of slides labelled as “don’t know” decreased with expertise. There was still, though, a significant error rate for the experts.

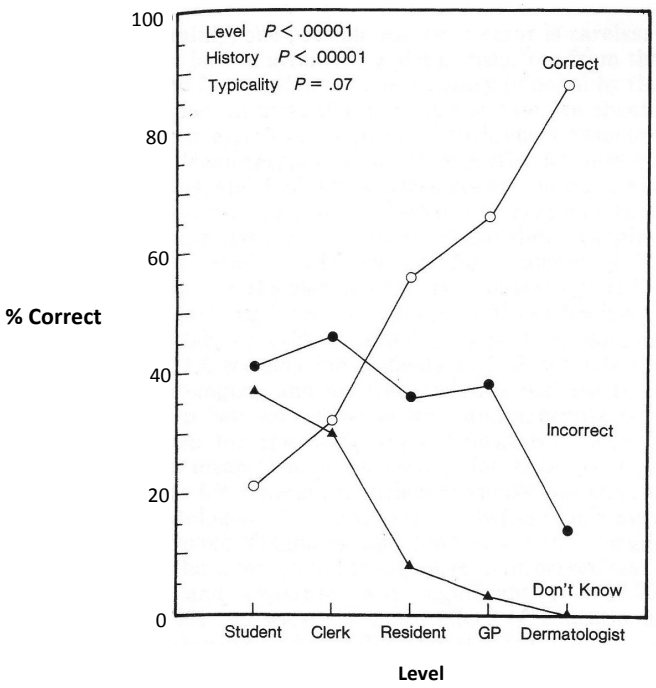


Figure 2.8: Mean percent of slides with correct diagnosis, incorrect diagnosis, and "don't know" response by level of expertise. GP indicates general practitioner. (Source: Norman et al. 1989)

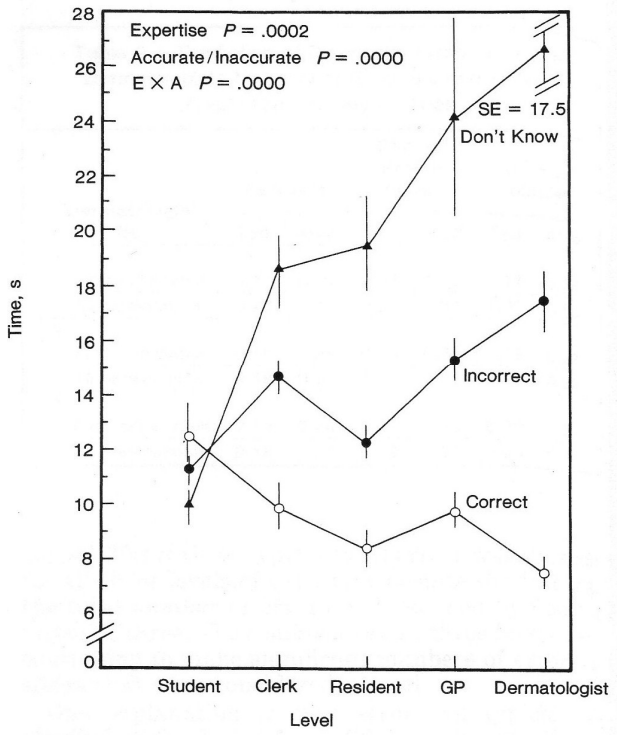


Figure 2.9: Mean response time (with SE) per slide, in seconds, by level of expertise. GP indicates general practitioner. E x A indicates expertise times accuracy interaction term. (Source: Norman et al. 1989)

Figure 2.9 shows the mean response time per slide. With increasing expertise, the time taken to respond when the answer was known (i.e. with a correct answer) reduced. When the answer was unknown (either incorrect or don't know), the time taken to respond increased with increasing expertise. Norman et al suggested that this demonstrated that pattern recognition was initially being used, i.e. prior experience was playing a role. But, that when the picture did not represent a pattern they recognised, the expert started to analyse the features of the rash separately, thus taking more time.

Following on from this experiment, Regehr et al. (1994) looked to see what would happen when relative novices were encouraged to try to identify patterns of rashes. They took 32 first year residents and trained them in the diagnosis of dermatological rashes by showing them a set of slides. Following on from the training, the residents were shown a set of test slides. Some of the slides were similar to those they had seen and some were different but showed the typical features of the specific rash. The other slides were totally different to those that they had seen or were an atypical presentation of the rash. The residents were split into two groups. One group was advised to look quickly at the slide and give their first impression as to what the diagnosis was, the other was told to argue for three alternative diagnoses and to highlight the features consistent with each. The results showed that there was no overall difference in accuracy of diagnosis but having seen the slide before had a significant effect in both groups. Residents were 40% more likely to get the correct diagnosis when the slide was similar to one they had seen in the past. They concluded that the implications of this for education was important, suggesting that it is not appropriate to advise students to avoid using pattern recognition.

In a similar study looking at the different strategies that can be used when teaching medical students to read ECGs, Norman et al. (1999) taught 16 novices to initially come to a diagnosis and then search backwards for the features that supported this. They then asked a further 16 novices to look at the separate features in given ECGs and then to formulate a diagnosis. Teaching the students to analyse the ECG and then come to a diagnosis appeared to not be of advantage and in fact seemed to reduce their diagnostic accuracy (by 10-20%). Ark et al. (2006) took this further and trained 48 novices to read ECGs. They then split them into four groups. The first two were the same as those in Norman et al's study, i.e. one group was told to analyse the ECG prior to coming to a

diagnosis whereas the other's were told to come to a diagnosis first and then look for the features. The other two groups were advised that they could use either strategy – i.e. to look for similarities or to look for the features first. All groups were better at diagnosing ECGs that they had seen before but the two groups who had been told to use both strategies together were more accurate in ECG diagnosis. This suggests that it may be possible to encourage students to behave in a similar to manner to experts which might facilitate their development.

Conclusion

In this literature review I have looked at three areas. The first area is the idea that there is knowledge which is tacit, or unable to be expressed. This cannot be learnt in a formal situation and, instead, is believed to be acquired through experience. Tacit knowledge is recognised as being an important component of an expert's knowledge. I then went on to look at two theories regarding the development of expertise as this is something that one would hope to facilitate when educating general practice registrars. The first theory was by Dreyfus and Dreyfus and this describes how behaviour changes as one becomes more experienced. The second theory was proposed by Schmidt, Norman and Boshuizen and focuses more on how the structure of knowledge changes as experience develops. I shall discuss these further, in light of my results in the discussion chapter.

Chapter 3: Methods

Overview

This chapter gives an overview of the project methodology with further detail being provided in the relevant chapters.

Aims

The aims of this project were to:

1. To repeat the questionnaire study used by Lanyon et al in a sample of four deaneries to see if, ten years on, general practice registrar teaching had changed.
2. To explore what musculoskeletal problems general practice registrars encounter in their day to day workload and to see what learning needs they identify with regards to these.
3. To identify preferred methods of addressing these learning needs.
4. To explore general practice trainers views on the above.
5. To develop and evaluate an educational package focused on one area of need identified by the registrars and trainers

In order to address these aims, different methodologies were used. The project divides into three main sections with different methodologies in each section.

Phase 1	A survey of GP registrars (quantitative methodology)
Phase 2	Identifying GP registrars' learning needs (qualitative)
Phase 3	Development and evaluation of an educational package (mixed)

Phase 2 formed the largest part of this study and it is the qualitative methods used in this section which are the main focus of this chapter. I shall give an overview of the methods here and then discuss them in more depth in the relevant chapters. The methodology for phase 3 is going to be included in chapter 8

As already described, concerns have been highlighted regarding musculoskeletal training for doctors in the United Kingdom and an apparent lack of confidence in managing these conditions. This research project was designed to investigate what musculoskeletal conditions general practice registrars are seeing in their day to day work, to explore their confidence with regards to the management of these and to create and trial an educational package focused on one identified area of need.

Looking at these aims properly and in depth required a predominantly qualitative methodology,

Quantitative versus Qualitative Research

It is difficult to find an accepted definition of quantitative research, i.e. the meaning of the term appears to be explicit.
The Oxford English Dictionary describes quantitative as meaning:

1. Possessing quantity, magnitude of spatial extent
2. That is, or may be, considered with respect to the quantity or quantities involved; estimated or estimable by quantity.
3. Relating to concerned with quantity or its measurement; ascertaining or expressing quantity.

In other words, suggesting that quantitative research is a form of research that is measuring specific quantities.

Qualitative research, on the other hand, is more frequently defined although the definitions vary widely as the term is used to describe a diverse range of theoretical perspectives, methodologies, data analysis techniques and ways of interpreting data.

A definition reflecting this diversity is:

> "Qualitative researchers seek a deeper truth. They aim to "study things in their natural setting, attempting to make sense of, or interpret, phenomena in terms of the meanings people bring to them"[1], and they use a "holistic perspective which preserves the complexities of human behaviour."[2]" (N. Black[1] and N.K. Denzin[2] cited in Greenhalgh, 2001, p.166)

Strauss and Corbin, proponents of "grounded theory", a methodological process looking at generating theories from data rather than gathering data to support a theory, describe qualitative research in terms of what is not:

> "By the term "qualitative research" we mean any type of research that produces findings not arrived at by statistical procedures or other means of quantification." (Strauss & Corbin, 1998)

In simple terms, some would say that quantitative research is hypothesis testing whereas qualitative research is hypothesis generating.

Qualitative research methods are therefore ideal for exploring areas in depth and for describing diversity. They can describe the area of interest and look for possible relationships that might be account for what is being seen. The strengths of qualitative research are described further in Figure 3.1.

- Research that delves in depth into complexities and processes
- Research on little-known phenomena or innovative systems
- Research that seeks to explore where and why policy and local knowledge and practice are at odds
- Research on informal and unstructured linkages and processes in organizations
- Research on real, as opposed to stated, organizational goals
- Research that cannot be done experimentally for practical or ethical reasons
- Research for which relevant variables have yet to be identified

Figure 3.1: The strengths of a qualitative methodology. (SOURCE: Marshall & Rossman, 1999)

Qualitative and quantitative researchers not only differ in the way in which they perform research. They also have very different views on knowledge and its acquisition (epistemology) and also the nature of the social world (ontology).

There are two main epistemological stances: positivism and interpretivism. Positivism corresponds to the more traditional, scientific view of knowledge and was originally described by Auguste Comte in the 19th Century. Positivists believe that knowledge, and in this case the social world, exists independently and that it can be measured by

strict scientific methods. This is because they believe that human behaviour follows patterns. Interpretivism is linked to the writings of philosophers and scientists such as Immanuel Kant and Max Weber. Interpretivists believe that how people interpret and understand knowledge and the social world is important. They often refer to knowledge of the social world as 'verstehen'. This is the stance more commonly associated with qualitative research. Interpretivists believe that the researcher and the social world have an impact on each other and so true objective research is not achievable. Traditional scientific methods are felt to be inappropriate for this type of research as the social world does not follow the regular patterns that they are generally used to measure.

A number of different ontological stances exist but I shall only mention four here for simplicity. The four stances are realism, materialism, idealism and relativism. Each stance has very distinct views of the social world (Ritchie & Lewis, 2004).

Realism

- An external reality exists independently of our beliefs or understanding
- A clear distinction exists between beliefs about the world and the way the world is

Materialism

- An external reality exists independent of our beliefs or understanding
- Only the material of the physical world is considered 'real'
- Mental phenomena (e.g. beliefs) arise from the material world

Idealism

- No external reality exists independent of our beliefs and understanding
- Reality is only knowable through the human mind and socially constructed meanings

Relativism

- Reality is only knowable through socially constructed meanings
- There is no single shared social reality, only a series of alternative social constructions.

As mentioned previously, qualitative research also has key methodological features which make it very distinct from quantitative research. These include the perspective taken, the design of the research, the nature of the data and data collection and the nature of the analysis or interpretation.

Perspective taken

Quantitative research looks at the world at a single point in time and often in an artificial research setting. The results will be presented from the point of view of the researcher. For example, a study looking at the use of a certain drug will pick patients with particular characteristics and will follow them regularly for a set time frame. In a real life situation, this drug may be used for a lot longer and in patients with co-morbidities other than those controlled for in the trial. Qualitative research, on the other hand, looks at the subject's perspective and is always set in context or the real world as it is often called. As is life, the real world is regarded as being dynamic, not static and so one of the tasks of the qualitative researcher is to reflect that in their results.

Research design

The design of qualitative research is quite flexible and can respond to what is found. A good example of this is 'grounded theory', a type of qualitative research where, as the analysis identifies emergent themes in the data, the researcher goes back to clarify or test them out further, i.e. they are responding to the results. This may involve them going to new subjects to look at the area further. Qualitative research is also naturalistic; this again refers to it taking place in the real world. The design of the research therefore has to include methodologies which are appropriate for use in the field.

Nature of data

Unlike quantitative research where the goal is to have large studies that have sufficient power to prove a hypothesis, qualitative research uses small sample sizes where the subjects taking part have been purposively sampled. The sampling strategy is to select subjects who will represent the diversity in the community being studied as the aim of

the research is to reflect and present this to the reader. The researcher is an instrument of their research. By this, I mean that they are part of the research themselves as they also participate in the interviews/focus groups/observations and have an effect on what takes place. The researcher has to respond and interact with the subject in order to collect data. Flexible methods of data collection are used to allow the researcher to be sensitive to the individual and the context.

Nature of analysis/interpretation

The aim of qualitative research is to explain the diversity of the social world and to map it out, i.e. to represent it. It does this by respecting the uniqueness of every case and by using in-depth analysis that reflects the detail, context and complexity of the data. The researcher looks for themes within the data itself instead of imposing their own ideas on to the results. In this way the researcher allows the data and the subjects to speak for themselves.

It is possible to combine quantitative and qualitative research and this can be done in a number of ways:

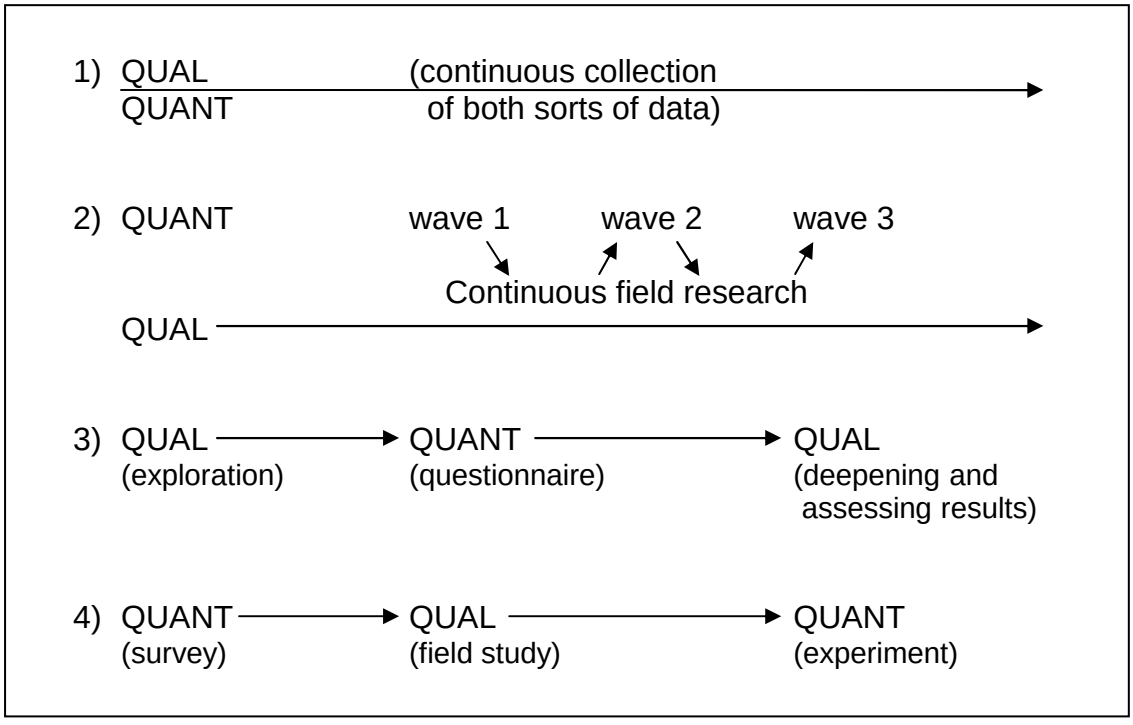


Figure 3.2: Research designs for the integration of qualitative and quantitative research. (Source: Flick 2002, p. 265)

This project was designed with an initial quantitative phase, then a qualitative phase.

Three methods of qualitative research data collection were used in this project and when discussing these I shall focus on two important features: validity and reliability. By validity, I am referring to how soundly reasoned the method in use is. Two types of validity in research are recognised: internal and external validity.

Internal validity describes how the instrument/method works in the population for which it has been designed and has been defined as, "the approximate validity (the best available approximation of the truth or falsity of a statement) with which we infer that a relationship between two variables is causal or that the absence of a relationship implies the absence of a cause." (Cook & Campbell 1979, p. 37)

External validity has been defined as: "the approximate validity with which we infer that the presumed causal relationship can be generalised to and across alternate measures of the cause and effect and across different types of persons, settings and times." (Cook & Campbell 1979, p. 37)

It is important to note that there is an inverse relationship between internal and external validity, i.e. if strict laboratory conditions are imposed in order to try to improve internal validity then the results are not generalisable to other contexts except for those similar to the initial experiment.

The meaning of the term "reliability" in its simplest sense is, "how much can we depend on the results obtained having used this method?" The sense or significance of the term may vary though when used in discussing quantitative or qualitative research. In quantitative research reliability is:

> "essentially a synonym for dependability, consistency and replicability over time, over instruments and over groups of respondents. It is concerned with precision and accuracy; some features e.g. height, can be measured precisely, while others, e.g. musical ability, cannot. For research to be reliable it must demonstrate that if it were to be carried out on a similar group of respondents in a similar context (however defined), then similar results would be found." (Cohen et al. 2007, p. 146)

In qualitative research the suitability of the term reliability has been challenged by many different researchers as studies are often such that they cannot be replicated, i.e. they are unique to that researcher, their interpretation of the data and that moment in time. Instead, qualitative researchers ask that their research be assessed on its own terms and not by the same criteria as quantitative research. The term dependability is often used in its place, i.e. can we put trust in the data reported? Qualitative researchers employ a number of tools to ensure dependability including: member checking/ respondent validation, triangulation, prolonged engagement in the field, negative case analysis, independent audits and leaving audit trails. A definition of reliability in qualitative research may therefore be that it:

> " includes fidelity to real-life, context and situation-specificity, authenticity, comprehensiveness, detail, honesty, depth of response and meaningfulness to the respondents." (Cohen et al. 2007, p.149)

It can therefore be seen that the methodological features of qualitative research discussed above, mean that the strength of qualitative research is its validity. The researcher is able to probe deeply in order to try to achieve 'the truth'. Quantitative research, on the other hand, is regarded as being more reliable as large numbers can be involved which improves generalisability, subject characteristics can be controlled for and research conditions can be strictly monitored.

Validity and reliability in qualitative research can be improved by a number of different methods. I am going to briefly discuss them here but will return to look at them further when discussing the methodology used in this project.

Methods of improving validity and reliability in qualitative research

Constant comparative methods – this involves the researcher generating hypotheses from the data and then testing them on other areas of the data by checking and comparing across individuals, cases, places, times etc.

Deviant case analysis – the researcher ensures that deviant, or negative cases are not ignored but are valued for their uniqueness and used to try and help in theory development.

Triangulation – triangulation refers to the use of different sources of information in order to confirm and clarify a research finding. Different types of triangulation exist.

Methods Triangulation – looking at data acquired by different methods (this could include both quantitative and qualitative methods)

Source Triangulation – using data acquired by using different qualitative methods e.g. interviews, documents, observation, focus groups

Analysis Triangulation – using different observers, interviewers, analysts to compare data collection and interpretation

Theory Triangulation – analysing the data from different theoretical perspectives

Respondent validation – also known as 'member checking'. This is where the investigator takes their findings back to the research subjects (who may be the original participants or a group with the same experience/characteristics) to ensure that the meanings/interpretation that they have formed are confirmed.

The reliability or dependability of qualitative research is also improved by the researcher providing a rich or 'thick' description of what the study involved. The researcher must also provide a transparent audit trail so that if someone else wished to perform the same study they would have enough information to allow them to do so.

An overview of the methodology

This project divided into three phases which are shown in diagrammatic form in Figure 3.3.

The first phase was a survey of general practice registrars from four deaneries. The second phase used qualitative research methodologies in the form of diaries, focus groups and semi-structured interviews with the aims of identifying what musculoskeletal conditions general practice registrars see in practice and what their

learning needs in this area. There were three parts to this part of the project. The first involved both first year and final year registrars completing a diary for one month prior to being interviewed. The second was where the data from the diaries and interviews were fed back to two focus groups for respondent validation but also to triangulate the data sources. The third was where eight trainers were interviewed to ascertain their opinions on what general practice registrars see in practice and what the registrars' learning needs are. A qualitative methodology was appropriate for this, the main body of the project, as the aim was to describe the learning needs of the registrars and the ways in which they would like to address these, i.e. there was no hypothesis to be generated.

This information was then analysed and the learning needs identified. From this one area of need was identified and an educational package looking at this area was developed and tested.

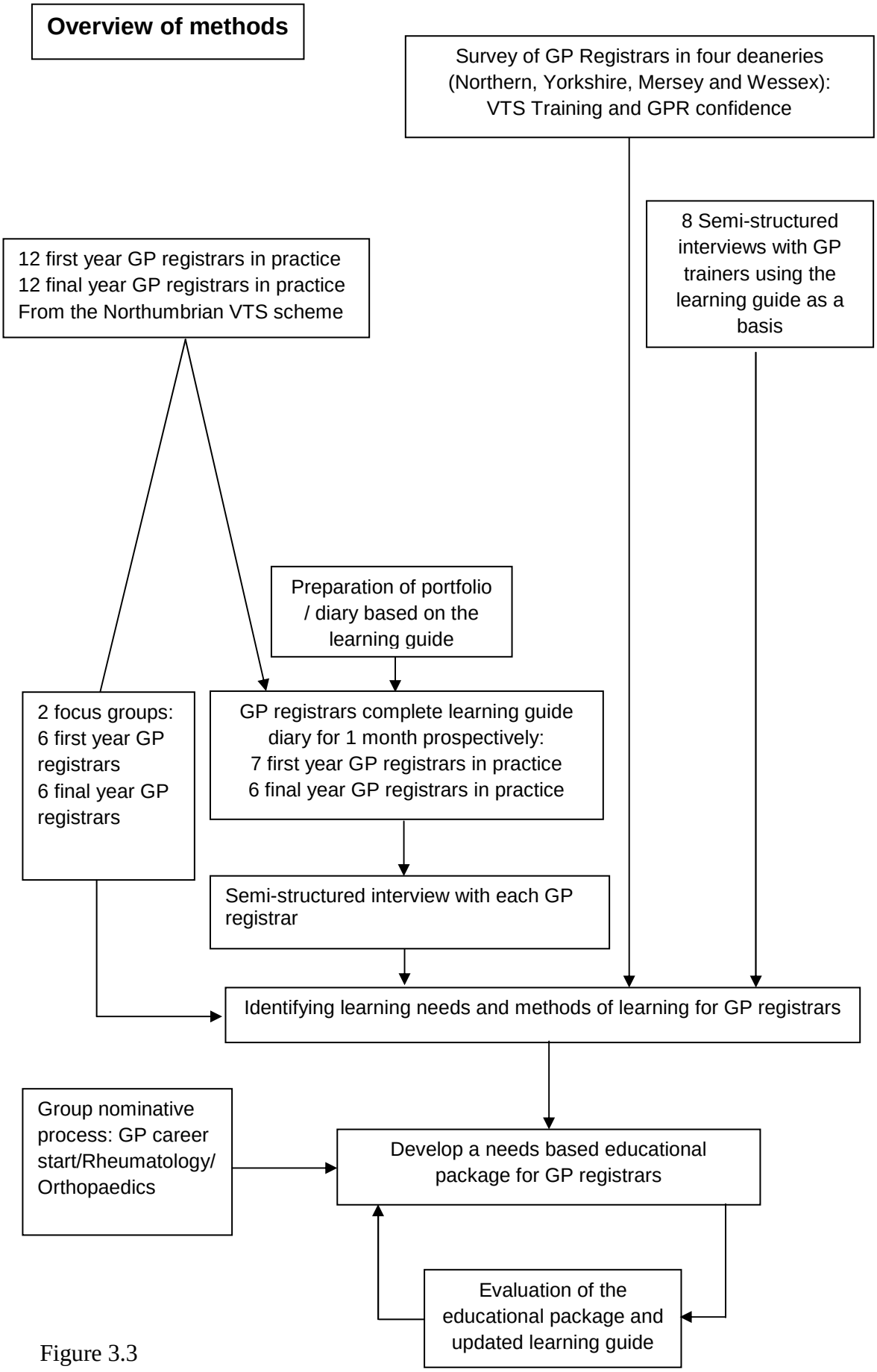

Overview of methods
Survey of GP Registrars in four deaneries (Northern, Yorkshire, Mersey and Wessex): VTS Training and GPR confidence
8 Semi-structured interviews with GP trainers using the learning guide as a basis
12 first year GP registrars in practice
12 final year GP registrars in practice
From the Northumbrian VTS scheme
Preparation of portfolio / diary based on the learning guide
2 focus groups:
6 first year GP registrars
6 final year GP registrars
GP registrars complete learning guide diary for 1 month prospectively:
7 first year GP registrars in practice
6 final year GP registrars in practice
Semi-structured interview with each GP registrar
Identifying learning needs and methods of learning for GP registrars
Group nominative process: GP career start/Rheumatology/ Orthopaedics
Develop a needs based educational package for GP registrars
Evaluation of the educational package and updated learning guide

Figure 3.3

Phase One: Survey of GP Registrars

The aim of phase one was to repeat Lanyon et al.'s 1995 study of general practice registrars where they demonstrated that trainees at the end of their training year reported their rheumatology education to be "inadequate" and that they felt "under confident" in managing musculoskeletal conditions. I.e. to evaluate current rheumatology education and skills during vocational training in general practice. The same instrument and method was therefore used. This was to see whether or not there had been any reported change over the past ten years.

A survey is a "method of collecting information from a sample of the population of interest, usually by personal interviews (face to face or telephone), postal or other self completion questionnaire methods, or diaries." (Bowling 2002)

In this case, a descriptive cross-sectional survey using a questionnaire was performed. These types of surveys collect data on variables of interest, e.g. the experience of general practice registrars during their training, at a particular point in time.

Morrison describes the benefits of a survey as being that:

- They are economical and efficient as they gather data on a one-off basis
- It is possible to represent a wide target population
- They generate numerical data
- They provide descriptive, inferential and explanatory information
- Manipulates key factors and variables to derive frequencies
- Gathers standardized information
- Ascertains correlations
- Presents material which is uncluttered by specific contextual factors
- Captures data from multiple choice, closed questions, text scores or observational schedules
- Supports or refutes hypotheses about the target population
- Generates accurate instruments through their piloting and revision
- Makes generalisations about, and observes patterns or response in, the targets of focus

- Gathers data which can be processed statistically
- Usually relies on large-scale data gathering from a wide population in order to enable generalisations to be made about given factors or variables.

(Cited from Cohen et al. 2007, p. 206)

A disadvantage of surveys is that they are generally weak on internal validity. This is because it is not possible to control any variables and so it has to be assumed that the variable being investigated is the cause of the effect observed.

The questionnaire used in this phase was the same one that had been used in Lanyon et al.'s 1995 study. It had therefore already been validated previously by having been piloted at the 1990 National Trainee Conference and amongst small groups of trainees (Lanyon et al. 1995). The validity was assessed by comparing the responses from the self administered questionnaire and by a later semi-structured interview. This meant that the numerous questions which should be taken into account when planning and designing a questionnaire did not need to be addressed again. When developing a de novo questionnaire decisions need to be made about: question content, wording of questions, the form of the response and the sequence of questions as studies have shown that these features can have a significant effect on the answers that people give. Also, if questions appear confusing it can have an adverse effect on the response rate. Other issues such as layout, quality and colour of paper used and whether or not a covering letter is included can also affect the response rate and so need to be taken into account (Calder 1998).

With a de novo questionnaire, piloting is essential to increase its' reliability and validity. A basic pilot would be to give the questionnaire to a group of people to see how they respond to the questions and what their opinion on the questionnaire is. More sophisticated pilots start with a large number of items or questions and, by using methods of statistical analysis such as Cronbach's alpha, can identify which questions are reliable.

Phase Two: Identifying the GP Registrars' Learning Needs

In phase two, the major part of the project, different qualitative methodologies were used with the aim of identifying GP Registrars' learning needs. The methods used were: diaries (a form of documentary evidence), semi-structured interviews and focus groups. I shall now discuss each of these separately.

Diaries

Diaries are a form of documentary evidence and are used in many different fields of qualitative research. Different types of diaries exist: intimate journals (not usually meant for publication), memoirs and logs or records. Diaries are useful as a primary source of data, i.e. they are written by the subjects being studied. This means that they have a direct relationship with the subject unlike secondary sources (Burgess 1984). They can also be used as an alternative to direct observation which is time consuming and obtrusive (Gibson 1995). Diaries can be used to gather quantitative data if sufficiently structured.

There are many different advantages of using diaries. A diary allows the data to be recorded chronologically closer to the events being studied and can be used to supply prospective data (Carp & Carp 1981; Richardson 1993). They can also be used to provide information over a period of time instead of relying on the individual's capacity of recall. They can help to go some way to prevent positive events from being over-estimated and negative events being underestimated. This is known as recall bias and can be a problem with interviews. All of these combine to improve the validity of the tool. Diaries can act as a possible alternative to direct observation when 'getting into the field' is difficult (Zimmerman & Wieder 1977). This helps make the method reliable. Diaries can be cathartic or therapeutic for the diarist and can be useful aide-memoires in later interviews which was what was used in this study (Francis 1997; Richardson 1993)

Diaries do have their disadvantages. It is often possible to see a decline in the reporting of events by the subject as time passes. This may be due to external factors such as any concurrent stress but may also be due to the diarist becoming fatigued. Making the

diary structured and checking on their process are recognised ways of trying to prevent this (Gibson 1995). It is accepted that diary data is not 100% accurate and this is often understated in studies that use diaries as a method of data collection. Certain types of individual are more likely to be willing to complete diaries than others which can be a source of bias. It is recognised that educated people, people in a 'white collar' job, people who are not tired or worn out, young to middle aged females, middle aged men and people who are at a stable point in their life are more liable to take part in diary studies (Verbrugge 1984). It is possible that the diary might sensitise the subject, i.e. the diary may encourage the subject to actually increase their rate of reporting the event under observation which may be due to their subconsciously trying to please the researcher (Robson 1993). Unstructured entries may lead to disappointing results but structuring the diary may bias the data (Richardson 1993; Robson 1993).

Diaries have been used as a form of log book in a number of different studies exploring doctors' workloads and the conditions medical students encounter in their attachments (Alderson & Oswald 1999; McKinstry 2000; Murray et al. 2001). They have also been used to look at the confidence or discomfort levels of general practice registrars when managing certain conditions (McKinstry 2000; Dodd et al 2002). In fact, in many areas, registrars are actively encouraged to complete a log book of what they see as part of a portfolio (Pearson & Heywood 2004; Snadden & Thomas 1998a; Snadden & Thomas 1998b; Snadden et al. 1996). The idea is that the evidence gathered by the registrar is used as a stimulus for discussion with their trainer. This can stimulate reflective learning, an essential stage in Kolb's experiential learning cycle (Kolb 1984). Completing all four stages is believed to allow the creation and development of knowledge and that if all four stages are not covered then true learning does not occur. Portfolio and logbook usage in general practice training has been shown to be popular with trainers, variably popular with general practice registrars and a useful tool for formative assessment (Pearson & Heywood 2004; Snadden & Thomas 1998; Snadden et al. 1996).

Semi-structured interviews

Interviews can be:

Structured	i.e. follows a set series of questions
Open	is an open discussion allowing the interviewee to respond and take the conversation in their desired direction.
OR	
Semi-structured	open questions are used based on a prepared topic guide are used but the interviewee is encouraged to freely express their ideas and beliefs

In this project semi-structured interviews were held with the same registrars who had kept the diaries in order to explore, in greater depth, what musculoskeletal conditions they see and how confident they feel in managing them. It also provided a chance to discuss what teaching they currently receive and what they would feel they would like to receive in order to help them manage musculoskeletal problems.

Interviews have the benefits of:

- Being a simple, efficient and practical way of getting data about things that cannot easily be observed
- Allowing the interviewer to probe deeper into the subject with the interviewee and permits clarification of any ambiguous areas. The flexibility of the method allows the researcher to explore areas that the responder may raise and about which the interviewer was previously unaware. The method therefore has a high validity.

The disadvantages of interviews are that:

- They can be time consuming and expensive
- The results can depend on the skill of the interviewer who may also be a potential source of bias. The interviewer may subconsciously guide respondents to answer in a certain way, e.g. by phrasing the questions in a particular way, prompting and probing in a biased way. Or, the respondent may deliberately say things to try to please the interviewer. This reduces the validity of the findings.

- They are not reliable, especially as sample sizes are often small
- The information obtained may be difficult to analyse as it is often large volume and in depth.

Focus Groups

Focus groups were originally developed in the field of market research before being adopted as a useful tool in the social sciences. Definitions of what a focus group consists of all highlight the importance of the interaction between members of the group and how this interaction stimulates the development of new data.

For example

> "Focus groups are a data collection technique that capitalizes on the *interaction* within a group to elicit rich experiential data." (Asbury 1995)

or

> "The hallmark of focus groups is the explicit use of the group *interaction* to produce data and insights that would be less accessible without the *interaction* found in a group." (Morgan cited in Flick 2002, p. 120)

Essentially, in a focus group, discussion occurs facilitated by the moderator. Data is generated by the participants presenting their own views but also by their listening to the views of others. This allows them to reflect on what they've said and alter their opinions if so desired. The moderator must try to ensure that the environment is such that people feel able to participate in the group and that the discussion remains focused on relevant areas. Often the moderator may be able to play a less prominent role in the discussion, as compared with interviews, as participants can start to ask questions of each other, i.e. can take over the role of the interviewer.

Focus groups are useful for helping to look at the range and diversity of opinions about a topic, for generating new ideas and for identifying key issues in the area. They can help the researcher understand how people think and talk about the subject area and, as subjects are able to discuss and reflect on the topic, a deeper insight about the matter can be obtained. It is important that they are only used when the subject is suitable to

be discussed in a group setting and when the participants have some shared experience to allow them to have a common position to start from.

Focus groups have a number of advantages over interviews:

- They are a relatively quick way of collecting data from a large number of participants as compared to interviews
- Focus groups are more naturalistic than interviews

  > "The focus group presents a more natural environment than that of the individual interview because participants are influencing and influenced by others – just as they are in real life." (Kreuger & Casey 2000, p. 11)
- The language used by the participants tends to be their own as they are discussing with their contemporaries.
- The group context may facilitate coverage of sensitive topics
- The researcher has less control over the situation so participants may focus on areas more pertinent to them.

The disadvantages of focus groups include:

- Practical/Organisational – It is often difficult to get a group to come together in the same place and at the same time, especially if the individuals involved are busy. This is particularly a problem in the medical setting.
- Structure/Moderation of the Group – The researcher has less control over a focus group and so irrelevant issues may end up being discussed which can waste time. Also some members of the group may find the context inhibiting and so do not express their full opinion.
- Limited Opportunities – It is difficult to cover personal issues in a group setting and, due to time constraints, there is limited opportunity to explore issues raised in much depth.

(Marshall & Rossman 1999)

In this project the focus groups provided an opportunity to validate the findings from the interviews (i.e. member checking) by allowing registrars from the same scheme and at the same point in training to comment on my understanding and interpretation of the

data from the interviews. They also allowed triangulation of data sources by being a different research method to the interviews.

Data analysis of the interviews/focus groups

Numerous ways of analysing qualitative data exist and, unlike quantitative research, there are no widely accepted rules as to the best way to approach data analysis. Approaches used include: ethnographic analysis, narrative analysis, conversation analysis, discourse analysis, content analysis, analytic induction, grounded theory, policy and evaluation analysis. Probably the most famous approach to analysing qualitative data is grounded theory which was developed by Glaser and Strauss in the 1960s. The aim of grounded theory is that the researcher allows their theories about the subject to emerge from the data and then they keep sampling until 'saturation' occurs, i.e. no new theories are generated (Strauss & Corbin 1998). This can involve needing to recruit significant numbers of volunteers in order to ensure that saturation is reached so it can be very time consuming.

The qualitative data obtained during phase two of the study has been analysed by a method known as framework analysis which was developed by Ritchie and Spencer during the 1980s at the National Centre for Social Research in London. This is a form of content analysis where the raw material from the diaries, interviews and focus groups is analysed without being disturbed in any way. The researcher then decides where the emphasis of the data lies. In framework analysis the raw data is inserted into a 'thematic framework' which has been developed by the researcher from both the data and the topic guides. The analyst has to become familiar with the data prior to creating the framework. The framework allows the data to be organised according to subject, themes, concepts and categories. This allows data to be analysed both within a subject and across subjects.

- Familiarisation with the data
- Identifying themes and ideas
- Development of a conceptual framework – i.e. recurrent themes are sorted and categorised so that there are main themes & subthemes
- Indexing of data – the framework is applied to the raw data
- Refining of the thematic framework
- Sorting & synthesising data – thematic charts are developed where the themes are plotted against the cases
- Links/associations/explanations and typologies are sought

Figure 3.4: Steps involved in data analysis using Framework (Ritchie & Lewis 2004)

Framework was chosen as the method of data analysis for a number of different reasons. Using the raw data within the frame increases the reliability of the method as it enables the analyst to remain as true to the data as possible. It is also a user friendly way of organising the data. The National Centre for Social Research runs a week course to teach researchers how to perform data analysis and so it was possible to learn how to use the tool from the people who developed it. Also, other members in the rheumatology department had used framework analysis in their own studies, meaning that there were other people experienced in its use available if required.

Phase Three: Development and Evaluation of an Educational Package

The development of the methodology for phase three occurred after the initial data analysis and so a full discussion of the methodology used will be included in chapter eight as that is the order in which it took place.

In brief, the registrars and trainers involved in the research project highlighted two areas in particular as being areas of need. These were the diagnosis and management of knee and shoulder pain. It was decided to create an educational package focused on shoulder pain. The reasons for this shall be discussed in detail in chapter eight. A group

nominative process was used to define the content of the package. The members of the group included general practice trainers, general practitioners with a special interest in musculoskeletal problems, a physiotherapist, a rheumatologist and a shoulder surgeon. The group were asked to reach a consensus as to what should be included. The package was then developed and trialled with five general practice registrars and their trainers. It was then modified and given to a group of thirteen registrars who underwent a pre- and post- clinical skills assessment.

Researcher Background and Biases – A Personal Statement

In qualitative research it is recognised that the researcher brings their own beliefs and opinions to a study which may affect data collection, interpretation and reporting. It is therefore important that the researcher is open about their own background and beliefs so that these can be taken into account.

I come from a non-medical family, both of my parents being teachers. I was educated at the local comprehensive school in County Durham before going to medical school at Cambridge. The course, at that time, was very traditional with a three year pre-clinical and a two year and a term clinical division. This suited me at the time. My clinical training included both orthopaedics and rheumatology but no sports medicine. My orthopaedics attachment was for two weeks in my second clinical year. This included time in outpatient clinics and the operating theatre with a knee specialist. There were also a number of educational sessions during the week and I recall having an afternoon on shoulder problems with the shoulder surgeon. Rheumatology teaching was included in the first and third year medical attachments and was meant to consist of weekly clinical teaching and occasional clinics. My first year of rheumatology teaching unfortunately did not follow the timetable. For the first session, one of the rheumatology specialist registrars attended and gave each student a copy of the GALS screen (Gait-Arms-Legs-Spine). We then had twenty minutes discussing it and that was the end of our first and only teaching session as the doctor who was meant to be teaching did not attend for any of the further tutorials. Following pre-registration house office posts, I had a six month Senior House Officer attachment in Accident and Emergency which included management of musculoskeletal trauma. I then went on to a

medical rotation for eighteen months, the final two months of which was spent in the rheumatology department at the Freeman Hospital, Newcastle upon Tyne. During my first general practice registrar post I realised that, in spite of my experience, I felt ill-equipped to manage the musculoskeletal conditions that I saw, especially the soft tissue problems that should be easily managed within primary care. This was further brought home to me in my second general practice attachment. I started this research project immediately after qualifying as a general practitioner and having no special knowledge. This has been beneficial when recruiting and interviewing registrars. The communication skills training which is a part of general practice teaching was also valuable for moderating the semi-structured interviews and focus groups as, in both, there is a significant focus on using open questions. In qualitative studies the issue of the power of the researcher is often raised, i.e. the interviewer may often be perceived to be in a position of power by the subjects and this can alter the results obtained. As someone who had just finished general practice training, hopefully the general practice registrars did not perceive me to be in a significant position of power and so felt comfortable in telling me their thoughts and feelings about the subject. Two of the registrars made a comment of me to this effect.

Chapter Four: Results (Survey of general practice registrars)

Overview

In 1995, Lanyon et al. published a study looking at general practice registrars' musculoskeletal education. They showed that trainees reported receiving little formal teaching: by the end of their trainee year, 35% of responding registrars had not received any tutorials on rheumatology topics from their trainer and only 43% had had any rheumatology teaching on their central teaching sessions from the vocational training scheme. Trainees reported that they were under-confident at managing musculoskeletal disorders and rated their rheumatology education as inadequate. This chapter describes repeating this survey in four deaneries to look at the current situation.

Aims

To repeat the questionnaire study used by Lanyon et al (1995) in a sample of four deaneries to see if, ten years on, general practice registrar teaching had changed.

Methods

The theory supporting the use of questionnaires as a means of generating data about an area of interest has already been discussed in chapter three. I shall now just briefly recap the specific methodology involved in this part of the project.

The previously validated questionnaire looking at musculoskeletal education and management skills was reviewed and three questions were added (Appendix A). Two of these were to investigate further the registrars' experience of injecting joints and soft tissue lesions. It was noted that, in the original study, 84% of registrars reported that they had injected or aspirated the knee. This seemed a large number from the authors' own experience and from the prevalence of knee disorders in primary care. In order to explore this further, we therefore asked that, if they had answered yes to injecting/aspirating a joint or soft tissue lesion, had they performed the injection in

general practice? The third question was added at the end of the questionnaire, to ask if the registrars were aware of the **arc** Learning Guide which had been published and disseminated in response to the original study, and if they were had it been used in their training/teaching? This was to try and assess the effect that the production and dissemination of the guide had had (Arthritis Research Campaign 2000).

The new four page questionnaire was distributed to registrars in general practice posts (including innovative posts with a general practice component) in June 2004 in four deaneries. The deaneries (Northern, Mersey, Yorkshire and Wessex) were chosen for their ease of access and each used their preferred method of distribution. The need for ethical approval was discussed with a member of the local ethics committee (Professor John Isaacs) and the chair (Mr Len Key) and, as the questionnaires were anonymised, it was decided that this was not required. This did mean though that it was not possible to determine who had not responded and to send a reminder to them.

Results

Questionnaires were sent to 571 registrars in the four deaneries and responses were received from 251 (44%). Response rates were similar across the deaneries.

There was representation from the majority of medical schools within the country and a range of years of qualification. Due to changes in general practice training that has occurred since the original study, results from registrars at different points will be presented, unlike the 1995 study which reported results from registrars in their final months of training.

Undergraduate Teaching

77% of registrars reported receiving specific clinical rheumatology teaching at medical school as compared to 90% in 1995. They rated the teaching in terms of its' relevance to general practice as 5 (median) on a scale of 1 to 10 with 1 being not relevant at all and 10 being very relevant.

Postgraduate Teaching

General practice registrars may receive musculoskeletal teaching from different sources and at different times: from the scheme, from hospital posts or from their trainer. 39 registrars (15.7%) had a rheumatology post as part of their vocational training and an additional 45 (19%) were able to attend rheumatology outpatient clinics. Only 104 (42%) registrars had received teaching on musculoskeletal conditions on vocational training scheme day release courses. 77 (32.1%) had attended additional teaching in the form of regional study days on the topic. On average registrars estimated that they had spent an average of one half day on rheumatological topics.

There was some variation across the deaneries, with trainees in Yorkshire being more likely to have had rheumatology experience both as a senior house officer (26% of registrars compared to the average across all deaneries of 15.7%) and as part of their day release sessions (70.7% compared to the average of 41.8%) although this may not be significant given the 44% response rate.

70% of registrars recalled having tutorials on musculoskeletal conditions with a median of only two hours teaching. Back pain was the most commonly reported tutorial topic. See Table 4.1. Conditions such as childhood locomotor disorders and the management of musculoskeletal disability were less frequently discussed. The overall ranking was very similar to that found in 1995.

Tutorial Topics	**Percentage (no.)**
Back pain	87.3 (151)
Joint Injection Techniques	52.6 (91)
Osteoarthritis	43.9 (76)
Osteoporosis	42.8 (74)
Gout	39.3 (68)
Soft Tissue / Periarticular Disorders	38.2 (66)
Rheumatoid Arthritis	33.5 (58)
Sports injuries	20.2 (35)
Soft tissue Injection Techniques	19.7 (34)

Tutorial Topics	**Percentage (no.)**
Management Of Musculoskeletal Disability	11.6 (20)
Locomotor Disorders In Childhood	10.4 (18)

Table 4.1: Tutorial topics reported by respondents (% of registrars who reported teaching, n=173)

Acquisition of Injection Skills

Joint injection techniques were mainly taught by the trainers. A significant number of registrars claimed to be self taught in both areas (10.7% soft tissue, 8.7% joint injections). This had actually halved since 1995 (22% soft tissue, 16% joint injections). Other sources of teaching included: Accident and Emergency registrars/consultants, general practitioners other than the trainer, courses (e.g. minor surgery courses) and other medical staff.

It was noted that in the original study, 84% of registrars reported that they had injected or aspirated the knee. This seemed a large number from the authors' own experience and from the prevalence of knee disorders in primary care. As an additional question we therefore asked that, if they had answered yes to injecting/aspirating a joint/soft tissue lesion, had they performed the injection in general practice?

Most registrars in this study (174, 70%) had injected/aspirated the knee joint during their training although less than half of these had injected/aspirated the joint in a primary care setting. The most common soft tissue injection performed was for tennis elbow. See Table 4.2. When looking at injections performed in primary care, the order of frequency changed with soft tissue disorders being more prevalent. See Table 4.3. These findings are virtually unchanged when compared to the 1995 study. See Figure 4.1.

Injection Site	**Trainees (n= 251) (give injection)**	
	No (%)	**Rank**
Knee Joint	174 (69.6)	1
Shoulder: Glenohumeral Joint	76 (30.4)	2
Tennis Elbow	68 (27.3)	3
Shoulder: Subacromial	50 (20.0)	4
Elbow Joint	49 (19.6)	5
Shoulder: Acromio-clavicular Joint	48 (19.3)	6
Plantar Fasciitis	31 (12.4)	7
Golfers Elbow	27 (10.8)	8
De Quervains Tenosynovitis	22 (8.8)	9
Bicipital Tendinitis	17 (6.8)	10

Table 4.2: Injection sites reported by trainees

Injection Site	**Trainees (n=1075) (give injection)**	
	No (%)	**Rank**
Knee Joint	897 (84)	1
Tennis Elbow	596 (56)	2
Shoulder: Glenohumeral Joint	416 (39)	3
Shoulder: Subacromial	361 (34)	4
Elbow Joint	292 (28)	5
Plantar fasciitis	277 (27)	6
Acromioclavicular Joint	251 (24)	7
Golfer’s Elbow	236 (23)	8
Bicipital Tendinitis	142 (14)	9
De Quervain’s tenosynovitis	123 (12)	10

Figure 4.1: Injection sites reported by trainees from Lanyon et al, 1995.

Injection Site	**Trainees (n=251)**	
	No (%)	**Rank**
Knee	55 (21.9)	1
Tennis Elbow	53 (21.1)	2
Shoulder: Glenohumeral	42 (16.7)	3
Shoulder: Subacromial	27 (10.8)	4
Plantar Fasciitis	24 (9.6)	5
Shoulder: Acromioclavicular	23 (9.2)	6
Golfers Elbow	20 (8)	7
Elbow	13 (5.2)	8
Bicipital Tendinitis	9 (3.6)	9
De Quervains Tenosynovitis	9 (3.6)	9

Table 4.3: Injection sites reported by trainees. Injection performed in a primary care setting

Registrars were most confident at knowing when to inject the knee and at performing knee injections which correspond with the knee being the most commonly injected site:

	Confidence at knowing WHEN to inject	**Confidence at PERFORMING injections**
Gleno-humeral	5	4
Acromio-clavicular	4	3
Subacromial bursa	4	3
Knee	7	7
Elbow	4	2.5
Tennis Elbow	5	-
Golfers Elbow	4	-
De Quervains	2	-
Bicipital Tendonitis	2	-
Plantar Fasciitis	3	-

Table 4.4: Confidence at knowing when to inject joints/soft tissue lesions and confidence at performing joint injections. (1= not confident at all/ 10 = very confident)

At each injection site, confidence scores were lower in those who had never injected compared to those who had injected (mean confidence throughout of 2 at knowing when to inject and 1 at performing injections). Registrars who had completed a Senior House Officer post in rheumatology were, on average, more confident about both knowing when to inject and at performing injections. Again this was a similar finding in the 1995 study.

Regional musculoskeletal examination

Registrars' perceived self-confidence at the regional examinations was high with median ratings of 8 for examination of the back and knee, 7 for the shoulder and hip and 6 for the foot. (1 = not confident at all/ 10 = very confident). The results from the 1995 study were practically the same (8 for examination of back, hip and knee: 7 for shoulder: 6 for the foot). The trainer was reported as being the person who predominantly taught registrars how to examine and treat shoulder pain (27.9% compared to 26% (1995)) although a significant number were self taught (20.1% compared to 31% (1995)). Fewer registrars reported having been taught by hospital consultants than in 1995:

Rheumatologist	11.7% compared to 26% (1995)
Orthopaedic Surgeons	15.1 % compared to 35% (1995)
General Physicians	7.3% compared to 6% (1995)

Management strategies

Registrars' perceived confidence at managing specific musculoskeletal conditions was generally high and equivalent to their confidence at managing asthma and hypertension. See Table 4.5

Conditions	**Confidence**	
	2004	**1995**
Gout	7	8
Back pain	8	8
Sports injuries	5	6
Osteoarthritis	7	7
Soft tissue/periarticular lesions	6	6
Locomotor disorders in children	5	5
Diagnosing inflammatory arthropathies	6	6
Safety monitoring of second line drugs (DMARDS)	5	6
Osteoporosis	7	6
Asthma	8	9
Hypertension	8	8

Table 4.5: Confidence at managing the following conditions (1 = not confident at all / 10 = very confident)

Educational Methods

Preferred educational methods were similar to those in 1995: trainer tutorials, small group teaching, rheumatology outpatient clinics and Senior House Officer Posts. Distance learning and attending symposia were the least popular. General practice registrars rated their overall Vocational Training Scheme teaching on musculoskeletal conditions as inadequate, with the same score as in 1995 with a median response of 4 (1 = totally inadequate, 10 = completely adequate). Only 10% of all respondents were aware of the **arc** 'Learning guide for general practitioners and general practice registrars on musculoskeletal problems' (Arthritis Research Campaign, 2000).

Discussion

There appears to have been no significant change in the level of rheumatology teaching in primary care in the ten years since the original 1995 study and the reported level of undergraduate teaching appears to have reduced from 90% in 1995 to 77%. The teaching that had been received was regarded as not being particularly relevant to general practice. This is consistent with the results of studies specifically looking at undergraduate musculoskeletal education (Kay et al 2000).

More registrars reported having had a rheumatology Senior House Officer post during training than previously and these were perceived to be of educational value. These trainees were more confident in the use of soft tissue and joint injections. Other studies, as discussed in Chapter One, have questioned the relevance of hospital posts and have suggested that the content of teaching is not always appropriate to primary care trainees (Kearley 1990). This may be improved with the advent of innovative posts where registrars divide their time between a hospital speciality and general practice. There are however, differences between the range of musculoskeletal disorders seen in secondary care and those managed in primary care and this must be taken into account and provision made. This is particularly important as the research surrounding the theories of the development of expertise have shown this is very context specific. Having general practitioners with a special interest in musculoskeletal conditions providing the general practice input to these posts may help with this problem.

An ideal time and location to improve musculoskeletal education is in the general practice part of a registrar's training. This can be through the half-day release teaching sessions and tutorials but also opportunistically during surgeries. In general this teaching is case based teaching which is both effective and valued by trainees (Spencer & Jordan 1999). Unfortunately only 42% of registrars reported having teaching during their day-release sessions and only 32.1% had attended regional study days. It may be that the terminology used in the questionnaire, i.e. 'regional study day' was an issue and affected the response. These results are analogous to those already discussed in Chapter One, where a questionnaire survey of twenty vocational training schemes showed that on average, only one half day release teaching session was allocated to musculoskeletal topics in a year (Booth 1990). In many vocational training schemes the half-day

teaching is informal and the agenda is determined by the registrars. It may therefore be that they are not aware of musculoskeletal medicine having a high priority or being a learning need.

Only 70% of registrars reported having tutorials on musculoskeletal conditions. This could be an underestimate as they are being asked to recall formal teaching and so this would not include the opportunistic case discussions/problem case analysis that occurs – estimated at about 37 minutes of teaching per week (Pearce 2003).

Joint injections, as recognised in the 1995 survey, are not necessarily the most important outcome of training but are an identifiable endpoint. As in the original study there was a high level of acquisition of knee injection skills but, according to the results shown here, these skills do not appear to be being used in their general practice attachments. This is probably indicating that experience is being gained in hospital posts but is then possibly being lost as the opportunity to use the skills in general practice doesn't arrive. In comparison, shoulder injection skills are less commonly learnt which may reflect the fact that 20% of registrars report that they are predominantly 'self taught' in the management of shoulder pain. A survey of general practitioners in the 'Wessex' region in 2005 revealed that 66.4% of respondents carry out injections in primary care with tennis elbow, glenohumeral joint, knee, supraspinatus tendonitis and carpal tunnel syndrome being the most common injections performed (Liddell et al. 2005). This is similar to the results shown from this survey.

General practice trainers are therefore a major teaching resource for registrars. What is interesting is that the respondents in the 1995 survey may now be trainers themselves. If these doctors weren't confident at managing musculoskeletal disorders then, have they gained enough knowledge and skills since to make them proficient trainers? Are we perpetuating poor musculoskeletal training for general practitioners? One intervention which has occurred since the original study, the production and dissemination of the **arc** learning guide, appears to have had little impact.

Conclusion

In conclusion, despite the introduction of compulsory vocational training, a highlighted need for improved education in 1995 and the efforts of the **arc**, rheumatology education for general practice registrars still appears to be inadequate.

Limitations of this work

The 1995 study had been a national survey of general practice training. This survey was performed in four deaneries only and whether or not they are representative of all the deaneries throughout the United Kingdom is unknown. There is no evidence though to suggest that they are not. A response rate of 44% is low although this is comparable to response rates in other studies and is a recognised problem with surveys carried out in primary care (McAvoy & Kaner 1996). Had reminders been sent this may have improved the response rate slightly although it is unlikely that it would have increased dramatically. Response rates at this level do raise the question as to whether or not the responses are more likely to be from registrars interested in musculoskeletal conditions and so there could be bias. It may be that these respondents were more likely to have requested teaching, or conversely be from registrars who feel that their education is lacking.

Chapter Five: Results (Identifying Learning Needs – Diary Data)

Overview

General practice registrars appear to lack confidence in managing the musculoskeletal conditions they encounter on a daily basis. A significant amount of teaching in primary care settings is opportunistic, i.e. it occurs during surgeries or in informal discussions at other times. Prior to the development of vocational training, studies suggested that general practice registrars mostly tended to see patients with acute musculoskeletal conditions rather than more chronic conditions such as rheumatoid arthritis or osteoarthritis. It is therefore important to examine what trainees are actually encountering during their surgeries, as they learn most from actual experience.

Aims

To explore what musculoskeletal problems general practice registrars encounter in their day to day workload and to see what learning needs they identify with regards to these.

Methods

As described in Chapter Three, diaries are a form of qualitative, documentary evidence which can be used as an alternative to direct observation. In this study they were used as a way of recording musculoskeletal consultations, the registrar's confidence in managing these presentations and to document learning needs identified at the time. The benefit being that the registrars were able to record their entries contemporaneously as recall may be poor or influenced by subsequent events.

Recruitment

At the time of recruiting for this project, general practice registrars on the three year Northumbria Vocational Training Scheme (NVTS) spent a year in general practice attachments. The year was split into a six month attachment at the start of their scheme

(phase one) and six months at the end of their scheme (phase two). The aim for this project was to recruit six registrars from phase one and six from phase three as this would produce a sample reflecting the range of experience of registrars in training. In the event, seven registrars from phase one volunteered and so a total of thirteen registrars (seven in phase one and six in phase three) were recruited.

Recruitment was pragmatic in nature. It was recognised that recording all musculoskeletal consultations in a diary for one month and then having an hour long interview would be a significant commitment on behalf of the registrars. In view of this, two specific seminar groups (one phase one group and one phase three group) of registrars were approached as it was felt that they would encourage each other to take part and to continue with the project. The characteristics of the registrars and the surgeries they were based in are included in Appendix B. The two groups covered different geographical areas within the scheme and the registrars were of a range of ages, genders, type of practice, length of time since qualification and previous experience. Participants received £100 of book vouchers for taking part in the project.

Data Collection and Analysis

The diary was piloted with four general practice registrars and one salaried general practitioner prior to commencing the project and was found to yield sufficient information for our purpose and for entries to not take a significant time to complete (Wise et al. 2004). The diary was A2 in size and all data was anonymised. Each registrar was visited prior to data collection to discuss how to complete the diary entries. There was weekly follow up by telephone and, at the mid-point of data collection, the registrars were visited in their practices to review the data already collected, to discuss any issues and to encourage completion.

Date

Diagnosis _____

Duration of Consultation ____mins

Age of patient _____years Sex M/F

Confidence in managing

Need to know more?

Figure 5.1: Diary Template

The diaries were reviewed following completion and prior to being used as an aide memoire in the semi-structured interviews which are discussed in chapter six. The diaries were not formally analysed prior to the interviews as this would have taken time and it was felt to be best to interview the registrars as soon as possible to try to capture the issues that the diaries raised. The diary data was formally analysed when all of the diaries were completed. Analysis of the content of the diaries was by framework analysis which was discussed in chapter three. This allows the researcher to look for themes within the data both within and across subjects.

Ethical Approval

Ethical approval for phase two was obtained from the Northern and Yorkshire Multi-Centre Research Ethics Committee in 2004 (04/MRE30/2). This included approaching the registrars through the Vocational Training Scheme, distributing a participant information sheet and asking them to actively contact me if they wished to take part. The registrars' written consent was obtained at the first meeting and they were given a copy of the signed consent form on Newcastle University headed notepaper to keep. The registrars were informed that they were free to drop out of the study at any stage should they wish to do so.

Results

A total of 478 consultations were recorded with registrars recording between 30 and 47 consultations each. The consultations could have been grouped in a number of different ways, e.g. by presenting complaint, working diagnosis or location of problem. I have grouped them by location of problem except for paediatric consultations. See Table 5.1. Musculoskeletal problems in children are, by nature, different from those seen in adults and less common. The numbers were (predictably) small and further categorisation by location was unlikely to be helpful.

Location of problem	**Number of consultations**
Back Pain	141
Knee Pain	53
Lower Limb Pain	46
Neck Pain	43
Arm Pain	40
Shoulder Pain	33
Hip Pain	29
Chest Pain	19
Others	42
Paediatric Consultations	32
Total	478

Table 5.1: Musculoskeletal consultations recorded by the registrars

The categorisation was double-checked by an independent observer.

Prevalence data on musculoskeletal disorders in primary care are generally based on more disease specific classification groups but it was impossible to use these with the data obtained as the diagnoses given by the registrars were predominantly non-specific. The data was therefore classified by the region affected. The “others” group includes generalised musculoskeletal conditions such as “rheumatoid arthritis”, “polymyalgia rheumatica”, “fibromyalgia”, “osteoporosis” and “gout”.

A number of the registrars gave additional details of the consultations in the diary entries which have enabled me to identify learning needs that were potentially not recognised by the registrars. These, of course, must not be taken as being definitive but they do give an insight into what might have missed by the registrars.

	Home Visits	**Telephone Triage**	**Average length of consultation (mins)**	**Range (minutes)**
Back Pain	6	4	11	2-22
Knee Pain	1	0	11	2-20
Lower Limb Pain	0	0	11	5-20
Neck Pain	1	0	10	2-20
Others	3	1	13	5-35
Arm Pain	0	0	10	5-15
Shoulder Pain	0	0	11	4-15
Paediatric Consultations	0	0	12	5-21
Hip Pain	1	1	11	5-20
Chest Pain	0	0	9	4-18

Table 5.2: The basic diary data

As can be seen in Table 5.2, the consultations lasted on average just over ten minutes. The average time for general practice consultations across the United Kingdom is now ten minutes. Registrars are generally scheduled longer for their consultations, often up to twenty minutes for phase one registrars. In the case of shorter consultations (lasting two to five minutes) the registrars commented frequently that the patients had mentioned their musculoskeletal problem during a consultation for a different reason.

Diary results by category

Back Pain

Further data was given regarding the back pain consultations. This included:

	Number of consultations
Consultation resulting in admission	2
"Sciatica" recorded	20
"Red flags"* recorded	25 (by 7 of the registrars)
Patient pregnant	3
Thoracic back pain	7

(* The term "red flags" refers to a number of features that, if present, indicate possible serious spinal pathology)

A number of different outcomes to the consultation were documented:

Referral for investigation	5
Referral to back pain clinic	1
Referral to Neurosurgery	6
Referral to Accident and Emergency	1
Referral to Haematology	1
Referral to Physiotherapy	15

This information was not specifically requested from the registrars, but was offered by them in their diary entries. It therefore may not be comprehensive.

Confidence at managing back pain appeared high with registrars using terms such as: "straight forward", "reasonable confidence", "fine", "moderate", "quite" and "fairly".

"Feel quite OK as see this regularly"	Registrar 02
"Acute. Mechanical. Confident."	Registrar 11
"Short term back pain. No red flag symptoms. Poor posture. Reasonable confidence."	Registrar 05

Confidence was reported as being low in only a small number of consultations (4/141). Three different registrars were involved and they used terms such as: "not very", "poor" and "not too confident". These four consultations were not especially long, lasting between 10-15 minutes in contrast to the two consultations that involved the patient being referred urgently which, on average, lasted 20 minutes. The registrars involved were also quite experienced having worked in accident and emergency or general medicine prior to general practice. In this instance, lack of confidence did not necessarily seem to be related to inexperience.

Date *23/11/04*
Diagnosis *Low back pains*
Duration of Consultation *12* mins
Age of patient *59* years Sex M/F
Confidence in managing
Several months hx. Tender SI joints.
Has OA elsewhere
Confidence poor
Need to know more?
When should I X-ray?
Any other important diagnoses except OA, inflammatory arthritis to consider?

Registrar 02

Date *19/11/04*
Diagnosis *Back pain + Scoliosis*
Duration of Consultation *10* mins
Age of patient *46* years Sex M/F
Confidence in managing
Not too confident. Saw 5 days ago. Muscular pain but marked scoliosis - given
Need to know more? *diazepam and analgesia but no better.*
X-ray done - to look for bony abnormalities (? Needed)
Refer ortho (?reasonable)
Already awaiting physio

Registrar 07

Date *29/11/04*
Diagnosis *Chronic Lower Back Pain*
Duration of Consultation *15* mins
Age of patient *43* years Sex M/F
Confidence in managing
Fortunately was due to see orthopaedic surgeon next day for assessment ; would have been very difficult if there wasn't any specialist involvement as he has had to be seen in the
Need to know more? *pain clinic before and has been referred to physiotherapy. Was on meptazinol. I was not very confident in managing him.*

Registrar 12

Date *2/11/04*
Diagnosis *? Muscular pain*
Duration of Consultation *15* mins
Age of patient *34* years Sex M/F
Confidence in managing
Not very. 4 year history of right sided upper back pain. Otherwise well. Pain on rotation of back. Trying NSAIDs which helps.
Need to know more?
Posterior CXR requested then review.
Can muscular pain last 4 years?
Difficult as uncertainty.
Thought better to X-ray to see if any bone pathology - unsure!

Registrar 01

Figure 5.2: Examples of back pain diary entries

Back Pain – Learning Needs

Learning needs identified by the registrars can be divided into general (i.e. applicable to many conditions) and specific (i.e. applicable to specific consultations). They can also be divided according to the stages of a consultation, i.e. history, examination, investigations, diagnosis and management. The majority of the learning needs identified were related to management which would be predicted given the phrasing of the diary template i.e. "confidence in managing". In the following sections, summaries of the learning needs are presented along with examples of some of the specific learning needs identified.

Consultation Stage	**Learning Needs**
History	Red flags
Examination	Examination of the hip joint and dermatomes.
Investigations	Indications for radiological investigations Investigations for inflammatory conditions
Diagnosis	Differential diagnoses of buttock pain radiating to leg How to diagnose "slipped discs"
Management	Analgesia options and what to do if options limited Gastric protection Indications for physiotherapy and when to refer? The role of alternative/complimentary treatments (chiropractic, osteopathy, acupuncture)? How to advise re back care – work & home. Who to refer to and when? (i.e. rheumatology or orthopaedics) Frequency of review in primary care.

Table 5.3: Back Pain Learning Needs

Three registrars also raised the issue of addiction to prescribed medication:

> "problems with low back pain since 2 years, undergoing regular physio and came for repeat of dihydrocodeine. Insistent that this is only tablet that works. Issue about addiction discussed with patient." Registrar 12

> "Ongoing low back pain. Drug abuse, alcohol, depression . Demanding Tylex. Wants sick note. Says LBP proves he can never work. Prescribed low dose co-codamol. Refused Tylex." Registrar 05

This was also commented on in a consultation for rheumatoid arthritis and one for hallux valgus pain.

Knee Pain

Confidence in managing knee pain was good with registrars using terms like: "moderate", "OK", "good", "high" and "straightforward". In only two consultations did the registrars report their confidence as being low.

Date 5/11/04 *Home Visit*
Diagnosis *Gout R knee*
Duration of Consultation *10* mins
Age of patient *76* years Sex M/F
Confidence in managing
Recently discharged hosp Δ joint made.
Now joint effusion + pain. On NSAID. Poor confidence.
Referred
Need to know more?
How urgently to refer?
Anything else apart from NSAIDs + analgesia?

Registrar 02

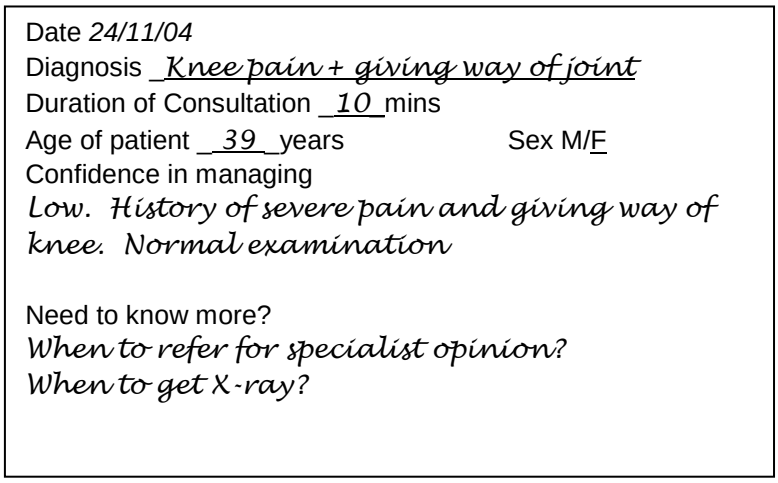


Figure 5.3: Examples of knee pain diary entries

In 32 out of 53 cases specific diagnoses were given and these included:

Osteoarthritis	11
Post injury	8
Anterior knee pain	4
Pre-patella bursitis	3
Post operation	3
Possible meniscal injury	3

Confidence appeared likely to be greater where a specific diagnosis was made or had been made previously.

> "OA knee. Previous MRI. Confident." Registrar 11

> "Bilateral knee pain. OK. Recent orthopaedics – MRI – OA changes" Registrar 04

> "?OA knees. Quite – seen by physio already for chronic painful knees" Registrar 01

Knee Pain – Learning Needs

In this case no needs were acknowledged related to history taking

Examination	Acceptable & appropriate knee examination for general practice.
Investigation	Indications for radiological investigations Appropriate investigations for knee pain.
Diagnosis	Patterns of knee injuries Causes of knee pain/anterior knee pain in different ages.
Management	Appropriate referrals including physiotherapy. Indications for joint aspiration and injection? Physiotherapy treatment options Treatment options for chronic knee pain Fitness for work and the duty of the GP with regards to this

Table 5.4: Knee pain learning needs

Lower Limb Pain

Confidence for lower limb problems was generally good with registrars using terms such as “quite”, “fairly”, “confident”, “high”, “OK” and “reasonable”. In only four consultations did the registrars report their confidence as being poor, using terms such as “little” and “not very confident”.

Specific diagnoses included:	Injury	18
	Plantar fasciitis/Achilles tendonitis	5
	Bunion/Hallux valgus	4
	Osteoarthritis	2

Lower Limb Pain Learning Needs

Learning needs identified in the lower limb section were generally specific to the actual consultation rather than being more generic. No learning needs related to investigations were acknowledged.

History	Presentation of nerve root pain.
Examination	Ottawa ankle rules.
Diagnosis	Differential diagnosis of soft tissue pain, foot pain, ankle pain, lumps and bumps. "What is the difference between a bunion and a corn?" Registrar 01 "Swelling over web space 2nd/3rd Metatarsal. Unsure of diagnosis." Registrar 03 "Foot pain. ?stress fracture. X-ray was normal. What is the differential diagnosis?" Registrar 11
Management	Referral threshold for patients with osteoarthritis. Appropriate referrals to secondary care and allied health professionals e.g. physiotherapy/chiropody/ podiatry/orthopaedics Evidence for topical treatments Post fracture/sprain/strain advice Indications for soft tissue injections e.g. Achilles Tendonitis Appropriate use of splints/orthoses

Table 5.5: Lower limb pain learning needs

Neck Pain

Confidence was good for the neck pain consultations with terms such as, “quite”, “fairly”, “fine”, “good”, “confident”, “very confident”, “moderate”, “straightforward”, and “okay” used. In six consultations confidence was reported as low with the registrars using terms like, “poor”, “fairly low” and “low”.

> “I seem to see a lot of these” Registrar 02

Specific diagnoses included:	Cervical Spondylosis	4
	Whiplash	3

Neck Pain Learning Needs

No learning needs relating to investigations were identified.

History	Features of the history which could help identify risk of osteoporosis Features of atlanto-axial subluxation
Examination	Legal aspects of the examination
Diagnosis	What causes torticollis? How long would trapezius strain last?
Management	Appropriate management of “spondylosis” including medical treatment and referral Indications for physiotherapy referral for whiplash/cervical spondylosis? Use of diazepam in muscular spasm Advice leaflets on neck problems/working position and posture? Documentation of whiplash for legal purposes

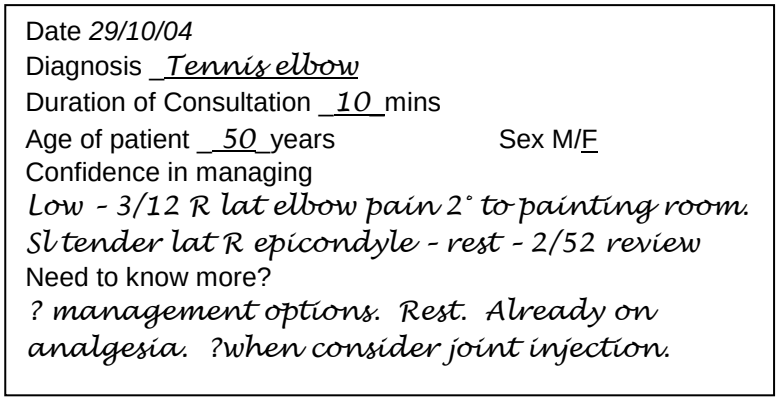
Table 5.6: Neck pain learning needs

Arm Pain

Confidence for managing consultations relating to arm pain was varied (15 positive, nine negative). Terms such as "quite", "fine", "fairly", "moderate", "high" and "straightforward" were used to describe consultations where the registrar felt confident, for example:

> "Very straight forward as under care of hospital."
> Registrar 6 describing a 39 year old patient with carpal tunnel syndrome.

"Unsure", "poor", "not too confident", "low" and "not sure" were used where the registrar didn't feel confident. In some of these consultations the registrar was confident enough to make a specific diagnosis but not confident about the management of the condition. See Figure 5.4.


Date *29/10/04*
Diagnosis *Tennis elbow*
Duration of Consultation *10* mins
Age of patient *50* years Sex M/F
Confidence in managing
Low - 3/12 R lat elbow pain 2° to painting room. Sl tender lat R epicondyle - rest - 2/52 review
Need to know more?
? management options. Rest. Already on analgesia. ?when consider joint injection.

Registrar 6

Figure 5.4: An example of an arm pain diary entry

In spite of what appears to be a straightforward consultation, the registrar reported that their confidence was "low". Whereas, another registrar faced with a similar problem reported:

> Confidence: "high since I cheated and used the PIL to help decide what to do."
> Registrar 5 (PIL = Patient Information Leaflet)

Diagnoses included:	Trauma	13
	Olecranon Bursitis	5
	Golfers Elbow	2
	Tennis Elbow	2
	Carpal Tunnel	2
	Ganglion	1
	Tenosynovitis	1

Arm Pain Learning Needs

Learning needs in this section tended to be specific to the conditions encountered.

Examination	Examination of the hand – esp. the Carpo-metacarpal joint Examination useful in persisting pain post injury
Investigation	Timing of X-ray post injury if persistent symptoms Investigations to rule out inflammatory arthritis Investigations for bilateral paraesthesia in hands/forearm
Diagnosis	Causes of elbow pain Differential diagnosis of carpo-metacarpal joint pain
Management	Carpal Tunnel Syndrome – indications for hospital referral and nerve conduction studies Management options for olecranon bursitis including antibiotics and aspiration. Management options for golfers/tennis elbow including physiotherapy, injection and advice re rest Treatment of De Quervains Treatment of carpo-metacarpal joint pain

Table 5.7: Arm pain learning needs

Shoulder Pain

The confidence of registrars in managing shoulder pain varied. Registrars used terms such as “okay”, “yes”, “straightforward”, “moderate” and “good” for consultations where they were confident. For ones where they weren’t, expressions such as “so, so”, “low”, “poor” and “not overly confident” were used. Registrars who had worked in Accident and Emergency or who had had a pre-registration House Officer post in Orthopaedics did not appear to be any more confident than their less experienced colleagues.

Few specific diagnoses were given for causes of shoulder pain

Painful arc/rotator cuff	3
Frozen shoulder	3
Bicipital tendinitis	2
Acromioclavicular joint osteoarthritis	1

(Confidence “good – Patient knew what helped” Registrar 11)

Date *7/01/05*
Diagnosis _*Lt shoulder pain*
Duration of Consultation _*10*_mins
Age of patient _*23*_years Sex M/F
Confidence in managing
Clicking noise and mild ache in Lt shoulder joint since last 3-4 years, worried that she would develop arthritis in future. Examined
Need to know more? *NAD, tried to reassure pt but wanted to be referred to orthopaedic surgeon. Suggested trying physio first but will rather see orthopaedic surgeon*

Registrar 12

Date *13/01/05*
Diagnosis _ *Shoulder pain*
Duration of Consultation _*13*_ mins
Age of patient _*51*_ years Sex M/F
Confidence in managing
Stiff left shoulder, painful, depressed with pain, not sleeping. Has lost 2 stone in weight over 6 months but not yet Ix. Pain main issue. Smoker. Problems with shoulder 3 years
Need to know more?
Paracetamol & codeine analgesia
A/W Joint Assessment Clinic
Jt not examined

Registrar 08

Figure 5.5: Examples of shoulder pain diary entries

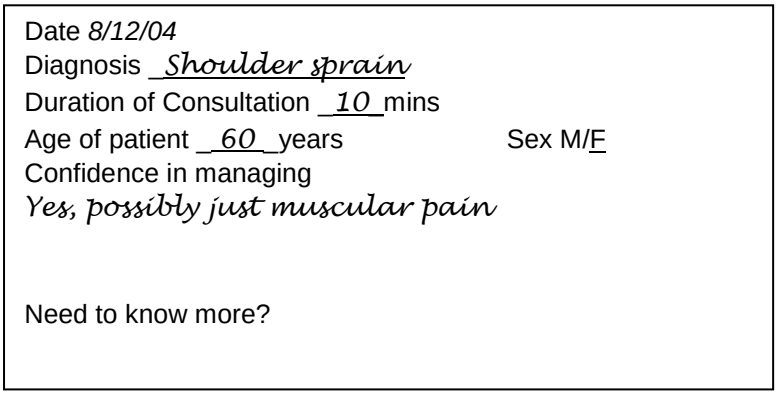
Shoulder Pain Learning Needs

Learning needs in this section appeared to be more basic.

History	Patterns of common shoulder problems More about common shoulder problems, especially frozen shoulder
Examination	Examination of the shoulder How to differentiate between different muscle groups
Investigations	Indications for radiological investigations Investigations for inflammatory shoulder pain
Diagnosis	Differential diagnoses of shoulder pain
Management	Appropriate use of steroid injections Injection techniques. Timing of referral to physiotherapy Frequency of patient review in primary care How long should I give a sick note for? Natural history of shoulder problems

Table 5.8: Shoulder Pain Learning Needs

One registrar was identified who diagnosed all shoulder problems as "muscular shoulder pain" (5 consultations) and when all other consultations were reviewed, it seemed to be a consistent pattern independent of the area affected. See Figure 5.5.


Date *8/12/04*
Diagnosis *Shoulder sprain*
Duration of Consultation *10* mins
Age of patient *60* years Sex M/F
Confidence in managing
Yes, possibly just muscular pain

Need to know more?

Figure 5.5: Example of Registrar 10's diary entries for shoulder pain

Hip Pain

Twenty nine consultations for hip pain were recorded. Seven of these had a specific diagnosis of osteoarthritis of the hip and one patient was post hip replacement. Only one registrar (Registrar 03) recorded any diagnoses of trochanteric bursitis. Confidence at managing hip pain appeared less than for back pain with registrars using terms such as "moderate" and "reasonable" most frequently. Other consultations reported confidence using terms such as "low", "not very" and "OK" and only a couple used the phrases "high", "confident" or "fairly confident".

Hip Pain Learning Needs

Learning needs appeared to be focused more on the diagnosis and management of hip pain.

History	Symptoms of mild osteoarthritis/osteoporosis
Investigations	Indications for radiological investigation
Diagnosis	What to do if the X-ray is normal? "*Difficult consultation has had problem with hip for 2 years, subjectively worse but X-ray showed mild osteoarthritis.*" – Registrar 12 Features of sacro-ileitis
Management	Indications for hip replacement Appropriate referrals to orthopaedics Use of nutraceuticals e.g. glucosamine Initial management in primary care *"? Best initial assessment (in 10 mins)"* Registrar 05

Table 5.9: Hip Pain Learning Needs

Chest Pain

Registrars appeared to be very confident at managing musculoskeletal chest pain with all consultations described using words like, "quite", "fairly", "straightforward" and "confident". Many of the patients seemed to present with a history of trauma or injury and the suggestion was that the registrars were focusing on ruling out a more serious cause.

> "Reassured. (Worried about heart)" Registrar 8

Only a few learning needs were identified:

> "How long does a fractured rib take to heal? When to review?" Registrar 1
>
> Costo-chondral pain – "Will physio help?" Registrar 3 and "Time scale for recovery (?more than 6 wks)" Registrar 1
>
> "Management of musculoskeletal sounding chest pain that doesn't settle with time + NSAIDS. How long to give it?" Registrar 14

Others

This section included generalised specific musculoskeletal conditions and diagnoses where the registrars had not specified a location, for example with gout.
The following were included:

Possible inflammatory arthritis	8
Gout	6
Rheumatoid Arthritis	4
Polymyalgia Rheumatica	3
Fibromyalgia	2
Psoriatic Arthritis	1
Ankylosing Spondylitis	1
Reiters' Syndrome	1
Osteoporosis	1

Confidence at managing these conditions was mixed. Some registrars appeared comfortable being able to recognise a possible inflammatory cause, arrange basic investigations and refer, whereas others did not.

Date *1/11/04*
Diagnosis *Small joint arthralgia - ?RA*
Duration of Consultation *10* mins
Age of patient *38* years Sex M/F
Confidence in managing
Mod. Yrs hx - painful small jts hands
Lost grip when carrying due to pain. Tender MCPs. No diurnal variation. O/E Swan neck deformity 2nd R. ? Early/moderate RA.
ESR/RhF/AutoAbs/FBC + xray hands
Need to know more?
Other Ix?
Refer if Ix normal?

Registrar 4

Date *24/11/04*
Diagnosis *?Rheumatoid Arthritis*
Duration of Consultation *10* mins
Age of patient 46 years Sex M/F
Confidence in managing
Fairly. Swollen + painful fingers - getting worse - uses co-codamol. Slight restriction of finger movements. Refer rheumatology
Need to know more?
Current guidelines for referral state to refer without doing baseline bloods - is that general consensus?

Registrar 1

Date *30/11/04*
Diagnosis *Synovitis ? new inflammatory arthritis*
Duration of Consultation *10* mins
Age of patient 66 years Sex M/F
Confidence in managing
Not very. Had seen with fungal infection between fingers 2 weeks earlier. Now swelling MCP - morning stiffness + ⇩ROM
Need to know more?
Have made early referral to rheumatology. ?appropriate

Registrar 7

Figure 5.6: Examples of diary entries for inflammatory joint disease

With more complex presentations, confidence was reported as being low or poor. Examples of these include when patients already under the care of specialists presented with an exacerbation of their disease, or when a patient who was unable to tolerate non-steroidal anti-inflammatory drugs presented with gout.

Learning Needs – Others

History	Diagnosis of the acute hot joint Presentation of rheumatoid arthritis
Examination	Appropriate examination for an acute hot joint or possible rheumatoid arthritis
Investigation	Appropriate investigations for inflammatory arthritis Value of urate measurement in gout
Diagnosis	Features of fibromyalgia
Management	Timing of bloods and referral in inflammatory presentations. Use of physiotherapy in inflammatory back pain. Treatment of gout including dietary advice Side effects of steroid injections Management and pathophysiology of fibromyalgia.

Table 5.10: Learning Needs (Others)

Paediatric Consultations

Thirty two musculoskeletal consultations were recorded in children under the age of 18. Fourteen of these consultations were related to minor injuries. The consultations can also be divided by affected body part:

Back pain	6 (4 related to injury)
Knee pain	6
Neck pain	3
Hip pain	2
Chest pain	1
Normal variants	3 (flat feet, pigeon toes and congenital overlapping toes)

Confidence again varied widely both within registrars and across the different presentations. Those registrars who had previously held an accident and emergency post were confident at managing the minor injuries. Those who had not, were not confident and reported that they had called in their trainer for assistance. They identified learning needs in this area. Only three consultations for recognition and management of normal variants were recorded but confidence for all three of these was reported as being low. Two of these consultations involved registrars who had worked in paediatrics or community paediatrics. Registrars were not confident at managing unusual problems such as scoliosis, juvenile idiopathic arthritis and atypical arthritis.

The issue of there being three people in a consultation, i.e. the patient, the parent and the doctor, and how this affects the dynamics of the process was highlighted by two registrars.

Paediatric Learning Needs

Back Pain	Indications for referral for back pain in children. Treatment options for scoliosis other than surgery
Knee Pain	Access to physiotherapy Indications for radiological investigation
Hip Pain	The limping child – patient pathway
Lower Limb	Causes of heel pain in children Use of orthoses in plantar fasciitis Soft tissue problems in children Achilles tendonitis – "*would be useful to know more about this. ?is it common in 10 year olds*" Registrar 02 Normal variants Pigeon toed – Confidence "*Low. Luckily already seeing paediatricians about speech delay and I suggested they bring it up with them*" Registrar 05
Inflammatory Arthritis	Juvenile Idiopathic Arthritis – diagnosis and prognosis Indications for referral in a patient previously diagnosed as having inflammatory arthritis but discharged from follow up

Table 5.11: Learning needs identified for paediatric musculoskeletal conditions

The diary entries for these consultations were reviewed by a consultant in paediatric rheumatology who highlighted the following issues:

- A poor knowledge of hypermobility
- Knowledge of what is normal
- Knowledge of local referral pathways
- Use of investigations in children – when and what to request
- If asking for X-rays, are the registrars aware of what views are required?
- Are registrars aware of how to interpret investigations in children? They may be receiving false reassurance

Discussion

The registrars recorded a reasonable number of consultations during the data collection period, around the number that would be expected for the published prevalence data for musculoskeletal conditions. Confidence at managing musculoskeletal conditions appeared to be good in certain areas: back pain, knee pain, lower limb pain, neck pain and chest pain, whereas it appeared more mixed for arm pain, shoulder pain and paediatric conditions.

It was noted that the diagnoses, on the whole, tended to be vague and reflected the anatomical area affected. This was observed to be particularly the case for one registrar. These results are in concordance with the results of a study looking at the prevalence of shoulder pain in the United Kingdom (Linsell et al. 2006). Linsell et al examined the data from the General Practice Research Database and reported that, of the 426 shoulder pain computer codes available, ten were used in particular and seven of these were non-specific. These were: “shoulder syndrome”, “sprained shoulder”, “shoulder joint pain”, “sprain shoulder/upper arm”, “arthralgia – shoulder”, “plain X-ray shoulder” and “O/E shoulder joint abnormal”. This led the authors to suggest that there may be an educational need although would better educated doctors who were able to recognise the cause of the shoulder pain have better patient outcomes? One’s instinct would be to say yes as it might affect patient management but, a recent study by Watson et al looked at this particularly with regards to shoulder pain and showed that training general practitioners in the diagnosis and treatment of shoulder pain did not make any difference in terms of pain and disability. (Watson et al. 2008). There have not been any similar studies looking at musculoskeletal conditions affecting elsewhere. There was a suggestion in this study that having a specific diagnosis did improve registrar confidence. As there is no good prevalence data for musculoskeletal conditions in the United Kingdom, it is difficult to tell whether or not the registrars were possibly missing diagnoses. There was a hint, in the paediatric data, that the registrars may not be as aware of specific conditions such as hypermobility, as it is reasonably common and was not commented on.

The identified learning needs were often very specific to the particular consultation although some general needs were identified including: examination of the hip

joint/knee joint/hand and shoulder joint. Issues regarding when and how to investigate particular conditions and how to refer appropriately were raised. These were discussed further in the semi-structured interviews.

Limitations of this work

Keeping a diary of all musculoskeletal conditions for one month was a significant task for the registrars. It is therefore possible that the subjects who volunteered are not entirely representative of their colleagues, i.e. there may have been a bias towards a certain type of individual taking part. There was nothing observed to suggest this but it must be considered when reviewing these results. As discussed in the literature review, using log books or diaries is now a recognised method of teaching used with general practice registrars so it is possible that the volunteers had already used this with their trainer, or that they were aware of the benefits of keeping a record of their consultations for their own learning. It is likely that some consultations were missed, particularly if the diary was not filled in straight away. However, the number of consultations recorded does seem reasonable for the registrars' workload and they were regularly reminded to complete the diary which may go some way to prevent this from occurring. The format of the diary was also possibly leading in that the term "confidence in managing" was used. This may have biased the registrars to provide learning needs related to management issues. Leaving the diary entries unstructured would have run the risk of the specific areas being studied not being addressed. The registrars may also have been stimulated to create learning needs where none existed in order to please the researcher.

Chapter 6 – Results (Registrar Interviews and Focus Groups)

Overview

The data from the registrars' diaries showed that their confidence in managing musculoskeletal disorders appeared to be good, but that they tended to use vague diagnoses. In order to explore this further, the registrars who completed the diary were interviewed. Two further groups of registrars also took part in focus groups. This chapter describes the results of these interviews and focus groups.

Aims

The aims of this part of the project were to:

- Explore the areas identified in the diaries further
- Explore the General Practice Registrars' experience of musculoskeletal problems throughout their training
- Identify the Registrars' learning needs and ideal ways of addressing these

Methods

The methods used in this chapter have already been discussed in chapter three. Two different qualitative research methodologies including semi-structured interviews and focus groups were employed. The interview and focus group guides were developed following a meeting with my supervisors and Miss N. Marshall ((NM) a research nurse at the Freeman Hospital, Newcastle upon Tyne, who is experienced at using qualitative research techniques). See Appendix C. The aim was to cover areas highlighted in the diary as well as other subjects such as their previous experience of musculoskeletal disorders and the education they had received in this area.

Recruitment

The semi-structured interviews were conducted with the thirteen registrars who had been recruited for the diary phase and took place shortly after completing the diaries. Recruitment of these registrars has already been discussed in chapter five. The two focus groups were conducted with a separate group of phase one and phase three registrars from the Northumbria Vocational Training Scheme. Access to the scheme was through the scheme organiser and my supervisor. As with the diaries, two seminar groups were approached to ask for volunteers. Eight phase one registrars (focus group 1 = FG1) and three phase three registrars (focus group 2 = FG2) volunteered to take part. The ideal number of participants in a focus group is around six to eight to stimulate debate and generate a variety of opinions (Ritchie & Lewis 2004). It is recognised that the numbers in the phase three group were below the desired level and this can mean that the focus group becomes similar to an interview (Richie & Lewis 2004). In order to try to avoid this, the moderator must encourage the individuals to function as a group. The registrars all received book vouchers for taking part in the project. Ethical approval was obtained (see chapter 5).

It is recognised that this sampling is opportunistic and therefore may not have included a breadth of opinions and experiences, but it was felt that a significant amount of effort on behalf of the registrars was being requested and that this would be the most successful way of generating the data. It was considered that it was beneficial for the focus groups to have registrars from the same seminar group. They would therefore know each other and the group dynamics would already be established, permitting full and open expression of opinions.

Data Collection

The registrars who were going to be interviewed had already been in contact with the researcher prior to the interview during the diary part of the project. At the final meeting where the diaries were collected, a time was arranged for the registrars to attend the Freeman Hospital for an interview at their convenience. All of the interviews were facilitated by EW and NM. The interviews were taped and then transcribed verbatim. The focus groups were held at Coach Lane Campus in Newcastle upon Tyne

which is where the registrars meet for their half day teaching. A suitable time was arranged by e-mail and the focus groups were both facilitated by EW. These were also taped and then transcribed verbatim.

Data Analysis

The anonymised interview and focus group transcripts were analysed using framework analysis. The frames were developed in Microsoft Excel after thorough reading and re-reading of the transcripts looking for themes and subthemes. Relevant extracts of the data were then inserted into the frames prior to analysis. This allowed the data both within and across registrars to be reviewed easily and exemplar quotes to be identified.

Results

The results are divided into two main areas: the Registrars' Clinical Experience and their Educational Experiences. See Figure 6.1

Registrars' Clinical Experience

Musculoskeletal conditions seen
- Amount
- Variety
- Paediatric musculoskeletal conditions

Musculoskeletal Skills
- History
- Examination
- Diagnosis
- Investigations
- Management
    - Use of non-steroidal anti-inflammatory drugs (NSAIDS)
    - Referral to allied health professionals
    - Referral to secondary care
    - Joint injections
    - Alternative/Complimentary medicine
    - Sick notes
    - Medico-legal issues
    - Managing sports injuries
    - Chronic problems and chronic pain
    - Psychological issues
    - "End of the track"
    - General practitioners with a special interest
    - Difficulty of co-morbidities
    - Using time
    - Local services
    - Guidelines

Educational Experiences

How they learn currently
- Keeping the diaries stimulated learning
- Learning from follow up and experience
- Learning from feedback
- Learning from patient information leaflets
- Learning from textbooks
- Learning from own personal experience
- Learning from their friends' experiences
- Learning from their trainer
- Courses/External teaching attended

Effect of this education
- Effect of good teaching from their trainer
- Bad learning experiences
- Confidence
- Perceived importance of musculoskeletal conditions

Desired Learning
- What would you like to learn?
- Importance of anatomy
- How would you like to be taught?
- Experienced teachers
- Pressures on learning

Figure 6.1: Themes and subthemes identified

Each of these areas will now be looked at in turn.

Results – Clinical Experience

Musculoskeletal conditions seen (Amount)

The registrars who had completed diaries commented on the amount and variety of musculoskeletal conditions they had seen in the month and on how confident they felt in managing them. This appeared to have been stimulated by the act of keeping the diary as the registrars taking part in the focus group did not mention this.

> "We saw quite a variety I think really. We see a lot of stuff, stuff that the specialists are looking after and then the stuff that is fairly straightforward. It makes you aware that, you know, gosh, you see so much stuff in general practice and that was only a month. That, plus everything else you see in all the other different specialties you must have seen tons really." Registrar 1

> "Especially because we have been doing this diary, it has made me realise how much I see that is musculoskeletal and then I thought "God, I am really rubbish at musculoskeletal. Oh no! That means I am really rubbish at like 30% of my job!"" Registrar 2

> "I think there is an awful lot out there which I didn't appreciate before, so there is sort of quite a big portion of the workload that is musculoskeletal!" Registrar 9

> "Sometimes it feels like the whole clinic is back pain problems but then, when you look at it..... I don't know, there didn't seem as many when I was looking through." Registrar 9

Musculoskeletal conditions seen (Variety)

The act of completing the diaries also appeared to stimulate the registrars to consider what conditions they had seen during the month and during their time in general

practice. They appeared surprised that they hadn't seen patients with conditions commonly encountered in a secondary care setting and vice versa.

> "I was surprised I didn't see anything like SLE or scleroderma and those sort of things that are, you know, you don't see but I have seen them on the wards." Registrar 1

> Were there any conditions that you expected you were going to see? "Lupus... Yeah, because you get taught quite a lot about it in medical school."..... "I thought I would probably see somebody with a new diagnosis of rheumatoid arthritis but I didn't because, well,....., there was one that I referred up with a high rheumatoid factor but actually I don't think he was." Registrar 7

> Discussing gout "I have not actually come across that many people in general practice with it." Registrar 9

> "I think I expected to see someone with rheumatoid arthritis. I haven't seen anyone with rheumatoid arthritis."..... "I don't know. I think it is bizarre. I thought I would have seen at least a couple of patients who had that as a diagnosis." Registrar 11

> "I didn't see a lot of Paget's disease and stuff ..... I didn't see a lot of all this, you know, like secondaries or primary bone malignancies. I didn't see that at all." Registrar 12

> "I am surprised at how much spondylosis there is. I didn't realise that it was common but everyone who has kind of a cervical neck X-ray seems to have some kind of spondylotic changes." Registrar 11

The focus groups also commented that there were conditions which they hadn't seen, although they mentioned more unusual problems such as the musculoskeletal problems associated with congenital childhood problems, e.g. muscular dystrophy or cerebral palsy, tumours such as sarcomas and the vasculitidies (FG 1).

> "I haven't seen any of the rare vascular diseases. Well I haven't seen any vasculitis, I haven't seen any Wegeners since I left Cambridge because I used to think it was quite common but apparently it is rare." FG 1 Registrar 1

Two registrars commented that they hadn't seen much in the way of chronic disease.

> "Chronic disease. I haven't seen very much kind of really chronic rheumatoid. I suppose you see lots in hospital and in hospital clinics but you forget that it is actually quite a rare disease," ..... "I would have expected to see more kind of old ladies with bad hips and osteoarthritis, whereas I haven't seen very much of that at al." Registrar 14

> "Because I think that maybe the chronic patient don't come back to me and that's the reason. Because I'm being GP registrar here, the temporary doctor and the main reason is the stuff you see acute because your appointment will be filled in the last minute and whoever has acute problem cannot see their own GP they come to see you" Registrar 10

Paediatric Musculoskeletal Conditions

A number of the registrars had seen children with musculoskeletal problems during their month of completing the diaries.

> "I think in general the paeds consultations stand out more in my mind because I didn't expect to see so many of them"...Why surprised? "Well, I thought that musculoskeletal problems would generally be of a wear and tear nature and that they would be the older working generation or people that had been in heavy manual labour." Registrar 8

On further questioning the registrars reported that they felt less confident at managing children and had a much lower threshold for referral this appeared to be due to the potential risk of missing something serious.

> "You know, obviously I do the exam and you know but when do you refer? I mean is it more serious in children just because they are growing and if there is something wrong you should get them seen" Registrar 1

> "Not confident at all." Why? "I think because of the age that I think like…… they are smaller…… they have a different aetiology for the pain"…….. "It is always at the back of my mind like if I should have missed a diagnosis. If I do then that would not be good for them." Registrar 6

> "I think with children anyway I have a much lower threshold for referral…….I have got an idea about how to sort of follow adults a little bit better, whereas kids I don't. I don't know their sort of thresholds." Registrar 3

> "I am not too confident. To be honest, for kids, I just refer and I think they need to go urgently." Registrar 12

One of the registrars highlighted the difficulty of there being three people involved in a consultation where children are involved, i.e. the doctor, the parent and the child.

> "Because the difficult thing is that you have to deal with two different persons in the consultation. One of the parent and the other one is the child. You know, obviously if you are in pain then you are going to be worried so I don't want the child to be...the child's life to be affected by the pain and the parents as well, they keep asking you questions you know" Registrar 6

Another of the registrars who was interviewed had worked in paediatrics prior to training as a general practitioner. They appeared to be more confident at managing paediatric complaints and seemed happy to pick up what is normal and what is abnormal but reported that they had had little experience of children with musculoskeletal conditions.

> "I mean that is difficult because I think I have got the kind of book knowledge about it whereas in terms of practically seeing a child... in terms of managing it myself and reaching a diagnosis myself, I don't think I would feel that confident

just with the theoretical bits there from the revision I have done but I haven't seen children with rheumatological problems." Registrar 14

Results – Musculoskeletal Skills

History

Registrars appeared to be confident at taking a musculoskeletal history. Only the registrar with a trainer who had a special interest in musculoskeletal conditions highlighted that there may be omissions in their history taking (registrar 8).

Talking about knee pain. "History? I mean I feel I could take a good history. I know how to ask certain questions, walking and all that but then what does it all mean? So, you know, OK, that is local, does that mean it is a meniscal tear? That sort of thing." Registrar 1

Re patients with knee pain - "Yeah I am happy with history and mainly like examinations" Registrar 9

"I think they are quite easy because it is quite an easy history and examination so usually with a musculoskeletal problem it is quite easy to keep to the time." Registrar 9

"Common sensey sort of stuff really. Pain, stiffness, patterns, swelling, restriction ." FG 1 Registrar 4

"I mean that was almost a kind of, you know, a lesson in having an open mind when you are taking a history. You know, I hadn't gone..... it hadn't occurred to me that, you know, to go into that much depth about how.... what exercise he was doing and how he was doing it and how long for" Registrar 8

Examination

Registrars highlighted the importance of the examination as part of the diagnostic process but also because it is something that patients expect when they see a doctor.

> "I think I would still go more on the history and the patient's expectations as to whether to refer or not unless there was.... I don't think I could pick up subtle signs on examination but if there is something obvious or something I am not happy with then I would..... that would perhaps increase my confidence in referring." Registrar 8

> "Because patients want you to do it and that is obviously important." Registrar 5

> "It would have to be a very gross abnormality to be picked up on the sort of cursory, rapid examination that I essentially do on back pain as being completely honest so that the patient can't then turn around and say to me, "and she never even examined me!"" FG 1 Registrar 4

Two of the registrars in the interviews commented on the time it takes to examine and the difficulty of exposing certain joints fully.

> "If they complain that their back is really sore then getting them to take their shoes and socks off so I can do their plantars is really. . . and roll their trousers up or take their trousers off so I can have a proper look at their legs then it can take a while." Registrar 2

> "I think I am actually maybe over examine which I don't think is necessarily a bad thing actually and I don't really ..... it doesn't bother me that I do that but because of that I feel that if I am stressed and I am short of time I perhaps, to fit everything in, rush everything whereas rather than concentrate on maybe what I should concentrate on and get them back if I feel that I need to do anything else." Registrar 11

> "I think the one thing I should do more is expose the.....I mean with knees and elbows and shoulders it is quite easy to expose the joint but often kind of an eight-six year old man with hip problems doesn't want to take his trousers off and I think you have got to respect that to a certain extent." Registrar 11

Registrars' confidence at examining the musculoskeletal system in general and for specific joints varied although they didn't appear particularly confident overall. There were a couple of exceptions. The registrars who had had some extra specific musculoskeletal experience during their training appeared to be much more confident.

General Examination

> "I think I know how to examine but then there are these little tests that the orthopaedic surgeons would do and they tell you about and you think "oh, that is really good" but then you forget them." Registrar 1

> "I don't mind examining joints so much. That is something that I have got from the paeds that I have done and the clinics I have sat in. I fell quite confident in a quick screening examination." Registrar 14

> "The other hard thing for me..... it is one thing you sort of, you do your look, feel, move and look for any swelling and you feel all the bits and what have you, but the special tests, the McMurray and this and that, I did them ages ago. I am not sure I can do them because I have always seen them done by 7' tall orthopaedic surgeons and I can't do the same thing that they do and I am not even sure I am doing these things the right way." FG 1 Registrar 5

Specific Examinations: The Back

The registrars appeared to be relatively confident at examining the back and in including a neurological examination.

> "Examination of back pain I am never quite sure how..... I always look at their back and get them to do some movements and then I do a kind of lower limb

neuro exam as well mainly of sensation and reflexes and I am not sure if that is enough or if there is something more I need to be doing or if that is too much as well. Because I look at other peoples' histories on the computer for back pain and they don't seem to have done their reflexes and I am thinking "Oooh, I am going maybe through too much."" Registrar 2

"I think I am OK in terms of basics. You know, checking their range of movement, checking for tenderness, straight leg raising." Registrar 4

"Although I knew how to examine a back thoroughly, it is what you do when that I wasn't clear about" FG 2 Registrar 1

Specific Examinations: The Neck

"We had no teaching about that at medical school, and I think I can't remember really being told how to examine someone's neck, whereas you got much more advice about examining people's backs." Registrar 5

Specific Examinations: The Shoulder

The registrars did appear to be much less confident at examining the shoulder than some of the other joints. They seemed to link this to the complex anatomy of the shoulder joint.

"I think it is examination...it is not knowing if they are tender over such and such a point then it is more likely to be this. Or the movements, and which movements are sore to work out."....."I think we did probably get taught how to examine shoulders at some point but it is not something I really remembered and it wasn't something that I really learned for finals ...." Registrar 2

"Objective wise in examination I must say I am not 100%. You know, I give it a good try really, my best at the time." Registrar 12

> "I am happy examining them and realising something is not right but I don't really know which muscle group is responsible for the problem and so probably that is more of an anatomy thing than anything else." Registrar 9

> "The most difficult one is the shoulder. Anyway you move it they say "Ow it is hurting". It is difficult because too many.... a couple of joints and muscles.... so many things to examine so I tend to get confused." FG1 Registrar 8

> "With the shoulder, probably more than the others, I don't actually know whether I am doing the right thing or what other things that I could examine that would be helpful in a practical sense." FG 02 Registrar 1

Specific Examinations: The Hip

> "I don't feel very confident about examining hips and foot pains as well." Registrar 4

> "I find hips easier to examine, easier to differentiate and, I don't know, then ankles, knees." Why? "I don't know. Maybe because I have come across more hip problems in general and house jobs. Seeing lots of fractured hips and things." Registrar 9

Specific Examinations: The Knee

> "Normally I am quite confident about. Sometimes when you are sort of assessing the ligaments and things I am not brilliantly happy about that and that is just more.... you need to see more knees" Registrar 9

One registrar had seen a patient during the diary month that had been diagnosed as having hypermobility by secondary care. She was not sure what the examination findings should be in a hypermobile patient

> "No, she told me about it and her joints didn't seem particularly hypermobile to me when I saw her and I wasn't sure"...."I have not seen anybody with hypermobile joints so I don't know." Registrar 9

Registrars appeared willing to revise the examination if they realised that they had a learning need and were happy to either look it up in a text book or ask their trainer to observe them examining.

> "I am quite good at reading up about things if I have not known what to do or have been a bit stumped. I am quite good at going away afterwards and having a read and seeing if there is anything else I should have done or looked for on examination." Registrar 11

> Discussing learning about joint examinations "If I have had a patient, I have asked him to come through." FG 1 Registrar 8

The registrars who had seen children with musculoskeletal complaints during the month collecting the diary data mentioned examining children

> "I mean my kids' musculoskeletal examination is based on A&E completely. Is that sore? No. Can you wiggle it? Yes. Can you walk on it, if it's a foot or a knee? Or, ... and that is about it really." Registrar 2

> "I don't have the adequate skills to examine kids." Registrar 12

Registrars commented that they would appreciate a revision of the examination, in particular looking at the special tests that the orthopaedic surgeons often use:

> "I think I know how to examine but then there are these little tests that the orthopaedic surgeons would do and they tell you about and you think "Oh, that is really good" but then you forget them. I think part of that may be because it was done in third year and it was no use then. Maybe because it should have been later or it may be, I don't know, if we had a little bit of revision on it, it would have been a bit better." Registrar 1

> "I am a foreign graduate really, so we get the basic examinations of joints, so you check for the range of movement and check for any sort of limitations and then specific examinations for different joints. I think apart from the basic clinical examination skills, I do not really have any, you know, other ones. I think for this other specialised test, I need to sort of, you know, in a way if there was any refresher thing as well. I have definitely forgotten most of the special tests." Registrar 12

Only one of the focus groups mentioned the Gait Arms Legs and Spine screen (GALS) with varying opinions:

> "It triggers back how I am meant to hopefully examine the joints, because we were taught the whole thing with the GALS screen and it is meant to trigger you into thinking "Now this is what I do."" FG 1 Registrar 3

> "But even then in general practice, they are presented with one thing, so that screen... well I haven't found that helpful" FG Registrar 1

Diagnosis

How to diagnose knee pain and shoulder pain were repeatedly discussed by the registrars in both the interviews and the focus groups with them appearing to struggle to make specific diagnoses.

Shoulder pain

> "I am just really rubbish with shoulders. Again they are like knees. I don't have any specific history for shoulders and yet I know there is loads of stuff that can go wrong with shoulders that I am aware that I am ignorant of it. So sometimes somebody will give me a really good story and I will think I am sure that is meant to be something. I am sure I am meant to know what that is the story of but I don't, so again, shoulders always go into the...you know non-steroidals...and come back and see me" Registrar 2

“I don’t think I’ve ever diagnosed frozen shoulder. I think I have just seen people who have a diagnosis of it from someone else. Again, that is difficult, because if you don’t really know what you’re looking for, then you can’t check.” Registrar 2

“Things like elderly people with shoulder pain. So you have got... I mean it could be nothing, it could be osteoarthritis, it could be frozen shoulder, it could be rotator cuff, it could be all sorts of different things. It could be rheumatoid arthritis. But because I am not good enough at discriminating those things, I therefore can’t... and even if I could, I am probably not that confident at deciding what would be the best treatment for them” Registrar 5

“Shoulder pain again, I always confuse with, like, rotator cuff syndrome and the adhesive capsulitis completely different, I always forget about this and get really confused.” Registrar 6

“I have seen a few kind of frozen shoulders and painful arc syndromes.”... “I am not overly confident at putting a diagnosis on those.” Why? “I don’t know. I just... it seems stupid because it is in my head and I will often get my trainer in and he will say, “Oh yeah, that is a classic frozen shoulder.” You know when you think you know? I was sure it was that, but I am not quite sure why I don’t like to label people with those things.” Registrar 11

“I have been trying to kind of read up about all the kind of painful arcs and frozen shoulders and I would probably feel a little bit better about doing that now, but I still get very confused and I certainly don’t feel my anatomy is good enough to be able to work out an isolated infrapinatus problem compared to something else necessarily at all. That is one area I feel really ropy on.” Registrar 4

“I would say I am a bit limited to my expertise, if I have any at all, in managing shoulder joint pains or whatever the musculoskeletal symptoms are. An example being I think my limitations would be, like, to what extent have I examined? You know, examination skills? Which is especially in about ten

> minutes and what do I hope to achieve when I examine the joint and how I can help in terms of pain relief after that? So you tend to see that with, for example shoulder joints, someone comes and it is shoulder pain. I think the foremost thing that comes in my mind is, is it broken? Is there any muscle displacement I can deal with? Basically what can I do now or should I refer on, you know?" Registrar 12

Only one of the registrars reported that they were confident in diagnosing shoulder problems. This registrar had worked on a rheumatology ward as a Senior House Officer.

> "The shoulders I mean.....I am fairly confident with the shoulder. Just like a shoulder pain on its own; just because there are not as many structures as on a knee, so you are kind of more....you know what capsulitis is. You know they can't do all this and you know tendonitis or whatever. It is a bit more clear-cut I find anyway." Registrar 1

On further discussion though, the registrar mentioned that they had already had a tutorial on shoulder pain and its causes.

> "I think just because one day, I think...when I first started doing practice, I sat in with one of the partners in the first week and he saw a painful...well it was a painful shoulder. A lady with that. And he asked me. I kind of just moved it around and didn't really know. Then he said "What do you think it is?", and I said it was probably a sprain. Then he said "Well, I think it is more of a capsulitis" and I said "OK" and then he gave me a very small sort of tutorial on it, and he said you know because it is sore in all directions. I was alright and then I remembered it, so now I remember that is how capsulitis is, and she couldn't move it in any direction." Registrar 1

Knee Pain

Knee pain was also a commonly discussed area where the registrars appeared to be less confident at giving a diagnosis.

> "There are not really any patterns of knee pain that I would recognise particularly, I don't think. So, if somebody said their knee pain was at the front or at the back, I would know that there must be a difference there, but I wouldn't quite know what the difference was." Registrar 2

> "I think, again I can think that something is wrong with the knee but I am not always sure which, whether it is a ligament problem or whether....I can tell if the joint is stable, but then possibly wouldn't be able to say exactly where the problem was in the knee." Registrar 9

> How do you feel about knee pain in general? "Not hugely confident to be honest. I feel relatively OK about examining in terms of checking for joint instability and, obviously, if there is kind of locking and giving way, you are wondering about a foreign body or kind of meniscal injury. In that respect, I suppose the kind of gritty stuff I feel alright on, but we see a lot of people with maybe slight swelling but nothing like an effusion or a bursitis or just a bit like this, you know,.... bilateral pain, no clear history." Registrar 4

> "I have seen a lot of knee pain and that has been.....you know, because I know how to examine a knee, but knowing how to examine a knee and knowing what you have found at the end of it I think, is very different." Registrar 7

For one registrar, their confidence in making a diagnosis was made worse when a second or third opinion also struggled with coming up with a definitive answer.

> "They had some pain in the arm, or in the shoulder, and they had seen..... I think they had seen a second, Tier 2 level service. I think they had said initially she was making it up and it was all very inconsistent, and then she had gone back to see someone else in rheumatology and she said "Oh, this is clearly bicipital

> tendonitis". So that doesn't inspire you with confidence, you know, that one person says they are making it up and they are mad, and another person says well that is 'barn door'. So I did examine her and I said "Can I examine you? Not for any benefit to you, but for me so that I can know what bicipital tendonitis is."" Registrar 5

The registrars described having a structured approach to making a diagnosis, i.e. having a list of causes of shoulder / knee pain that they could mentally cross off.

> "...also a bit like shoulders and knees, it is knowing what there is to pick from and mentally crossing them off as you go down. If you know that your list is pretty comprehensive and you have crossed them all off, it makes you more confident to say that there is nothing more major going on. I think that is how I work in most things. I have got major things that I need to check down – likely things and then dangerous things. If it is not any of them, then I am pretty happy to sit on it for a bit longer" Registrar 2

Diagnosing problems in other areas were discussed although were not highlighted as frequently by the registrars.

> Regarding back pain: "In terms of diagnosis, I think I am probably a bit woolly in terms of, you know, quite often they have got a bit of paraspinal tenderness and I am assuming it is some sort of muscular strain probably rather than anything else..... If it sounds like they have got nerve compression, I am more happy that it sounds like it is a prolapsed disc, but I am probably not so specific sometimes." Registrar 4

> Examining the neck – "I think I have got limited, like, I said that would be in what every way I could to examine to make sure it is stable, but I don't really have..... I am not 100% confident." Registrar 12

> "I wouldn't be happy to say that somebody had fibromyalgia."..... "I think it is because it is a diagnosis of clinical symptoms rather than, you know, a test you can do to say you have got it." Registrar 7

> Polymyalgia Rheumatica – "At the beginning I thought I didn't really ..... I never knew such a common diagnosis in general practice, and the more I have spoken to people about it, the more they seem to see. It is not something I have seen as a student before in hospital. I always thought it was a bit of a misdiagnosis with when you don't really know what something is, and you kind of say "Ah, polymyalgia!" but there does seem to be a definite criteria for it." Registrar 14

> "The pigeon toed child. That is what the parents called it – pigeon toed. Was somebody who was already seeing paediatricians for other developmental problems and really, to be honest, I felt completely 'at sea'. I had no idea what the differential diagnosis was. No idea what sort of examination to do and I completely said, "I don't know. You need to ask the paediatricians", because they were seeing them in a day or two or something." Registrar 5

The registrars highlighted that sometimes psychological problems can present as musculoskeletal symptoms.

> "She had these other worries in her mind and I think sometimes that can cloud a lot of issues. People come in with musculoskeletal symptoms or sort of muscle pains, but then it is not that...they have perceived it as pain, but there is no actual obvious cause for it." Registrar 9

Being able to make a formal diagnosis appears to be important with it having a significant effect on the registrars' confidence. The registrars felt that patients would be able to pick up on this, which would affect the patient-doctor relationship and also the outcome of the consultation. It was also commented that they perceive that patients expect to be given a specific diagnosis.

> "Once I got that information, it made everything... I felt much more confident then in those consultations because I knew... because you know the pathology, you know the natural history and you know what they can do for themselves, and when you step in with the other interventions, which is what made that more comfortable compared with lots of other things." Registrar 5

“Personally, I find it difficult to treat something that I can’t give a d... you know I saw this, but then it could be this, this and this”..... “You would feel more comfortable, and I just wonder if some of the insecurity comes over to the patient that I haven’t given them a name, and yes it is...you know, we should do this, but I haven’t actually told you what it is. Do they pick up on that and know it is, because you don’t know what to call it?” Registrar 7

“I don’t like to just leave things. I like there to be a medical cause for things rather than for me to say “Oh, it is just mechanical.”” Registrar 14

“My trainer said “Oh, it’s wear and tear”, and so I am using labels like that which is a lot more general, and patients seem to be quite happy that that is the cause of it, but you don’t know exactly what bit of the back is affected but, sort of, my trainer is quite happy just to give that as an explanation and the patient seems quite happy with that, so I have started to use labels like that a lot more, which I didn’t in the beginning.” Registrar 9

“The kind of painful joint and you can’t just pin down what it is. It is not obviously the cruciate ligaments or the collaterals or whatever, and maybe there is a history of injury that you just can’t find exactly what is causing it and they want to know “What is it?”, “How long is going to take?” and “What treatment do I need?” And you just don’t know.” FG 1 Registrar 2

“I think what is going through my mind is that somebody else, more experienced or whatever, would be able to say, “Well, I think it is this tendon” or “I think it is this exactly” and the fact I can’t do that, I don’t think is making a difference to management, because the management would be the same. But from my personal point of view, I would like to know the name, or whatever it is, and also the patient often does as well.” FG 1 Registrar 3

“The patients are happy with the label.” FG 1 Registrar 1

“I understand that things aren’t particularly black and white, but things get labelled because patients like it.” FG1 Registrar 3

One registrar expressed a concern that failure to make a diagnosis early on in the course of a patient's condition could affect the long term outcome

> "Just because the patients that I have seen with frozen shoulder have it for years and years, and it really affects their function and it is a kind of.....if there is anything I can do when they first present that is going to limit that happening or reduce their risk of that happening, then I really want to be doing it rather than just dealing with them when they come to me with a frozen shoulder." Registrar 2

Investigations

Registrars appeared to use investigations as a way of reassuring themselves and the patient that they had not missed anything serious. If everything was found to be normal, registrars appeared comfortable simply to observe the patient's progress. Registrars commented that they sometimes felt that patients expected to be investigated further, requesting X-rays in particular. They highlighted that, because of this, they might be over-investigating and sometimes appeared to use investigations to replace the reassurance that they would get from making a definitive diagnosis.

> "I remember seeing this 40 year old with right knee pain. A month of just shooting pain on one side of his knee that was worse on certain movements. I wasn't very happy with that one. I just didn't know what it was really. There wasn't anything obvious, just a bit of tenderness around it. I don't know whether I was right. I probably was wrong, but I sent him for an X-ray to see if there was anything to see, really, and a bit of time on it. I think it came back fine, actually, but then what do you do if it has still got pain and X-ray is fine?" Registrar 1

> "I wasn't sure whether it was a bit of osteoarthritis of the hips, but with the history of osteoporosis, I was thinking "I don't know too much about that and I wonder whether that can cause pain." So that was my impression, but I didn't know. I think I just did something. I don't know whether.... I think I would

probably just do X-rays and things just to reassure her, but I did get X-rays of the hips." Registrar 1

"What do I do if it is normal and she has still got this ache and I have X-rayed her? What do I do then? I mean will it just be... even if the X-ray is normal, can it still be mild arthritis?.....If it was abnormal in that it showed 'wear and tear', then I could see that the X-ray has shown that there is 'wear and tear' of the joints, and I would explain what it is and that it happens when you get a bit older and you know, unfortunately, we treat with pain-killers." Registrar 1

"I saw one child with knee pain. Just, not actually pain like knee pain, but like, only the proximal part of the tibia so, I think that is growing pain, I think. All the X-rays are normal and I think I overdone it, probably because I am anxious not to miss anything myself." Registrar 6

Discussing why they are confident at managing hip pain. "Usually because they have either had an X-ray which has shown they have got arthritis and it is something that is being followed up and they just need review of their analgesia, or, if they have been seen by an orthopaedic surgeon and whatever and are being, sort of, on their waiting list for hip replacement, then it is just kind of review." Registrar 9

"I think the woman herself was quite keen to get it X-rayed and I probably wasn't clear enough in my own mind whether it would be helpful, and so the easiest thing at the time was to get the X-ray done, but no, it was probably not that helpful." Registrar 9

"A lot of my friends have done things about sports injuries as students and they feel much more confident with kind of mechanical back pain, whereas I am always looking for the missed myeloma or the kind of ankylosing spondylitis, and I think I probably do too many blood tests for it." Registrar 14

"I am still a bit kind of need to know everything now, and so I often get a few blood tests and do an X-ray, and I think I might actually hammer these people

with too many investigations when they probably don't need it, and that this probably actually causes them even more concern." Registrar 11

"I think I over X-ray" FG 1 Registrar 3

"I still find it quite difficult to know when to X-ray, especially patients pushing on that they want an X-ray that is absolutely pointless. I find that quite difficult knowing when to X-ray things like knees and things." FG1 Registrar 5

A couple of the registrars had access to Magnetic Resonance Imaging scans (MRI) and had requested them in their patients, but they appeared unsure what to do with the results once available to them.

"I am never quite sure when to send someone for an MRI scan. I kind of know what I want to see in the MRI scans, if that makes sense? But I seem to have a slightly ...especially with knee problems, when you think they have got some kind of meniscal tear or cartilage damage or something like that, where you know the X-ray is not really going to show you anything, and I rightly or wrongly, I seem to have picked up the impression from my seniors in the practice that we have to send someone for an X-ray first before we can get an MRI, which seems absolutely ludicrous if you don't think you are going to see anything in the X-ray"....."People with back problems, you know, when you think that some of the nerve roots are involved and things... I am not sure whether you send all those people for MRI or some of them or... I find that a bit of a grey, hazy area and then of course, when you do and they come back and it says, you know, L5 nerve root has been squashed then you, kind of, right, "Well do I send this person to the neurosurgeon or not?"" Registrar 11

"I think it is, like, again, it is a way of giving them, I don't know, it is false hope or hope that they find something in the scan that will account for the degree of pain that they have. I think for two thirds of the cases I refer, I wasn't, you know, confident enough to say what we are looking for. I mean, on examination you know, ligaments look fine and what are we going to see? You know what I mean? But again, just refer, and if the consultant felt there was anything they

> could do from it, and so I am not totally confident when I sent for a scan." Registrar 12

One of the registrars who had access to MRI imaging mentioned that they had used it for investigating a patient presenting with shoulder pain, which is not common practice.

Management

The registrars tended to focus on three management options only. These were:

- Using analgesia and in particular non-steroidal anti inflammatory medication
- Referring to a physiotherapist
- Referring to secondary care

Joint injections were also discussed but appeared to be considered less frequently. There were incidences where, even when a definitive diagnosis had been made, the registrar seemed unsure as to what to do.

> "I could get a diagnosis, but then I didn't know what to do with the diagnosis." Registrar 3

Looking at these three management areas in more detail:

Management – Use of Non Steroidal Anti Inflammatory Drugs (NSAIDs)

Registrars appeared to use non-steroidal anti inflammatory drugs (NSAIDs) as their first line of management in many cases and as a way of "buying time".

> "I mean back pain...that kind of back pain like the history of injury and the pulling feelings... they very much fall into my category of giving people non-steroidals and bringing them back in a couple of weeks." Registrar 2

> "I think the thing is, because a lot of the musculoskeletal stuff is anti-inflammatories and review if it is not getting better and that is actually the right management for lots of it, it is relatively easy to kind of just do that and kind of

> have a think about it, and if it is not settling, they will be back and it might be clearer when they are back." Registrar 2

> "I suppose a lot of... what I am realising is that a lot of the low back pains that we see that we prescribe are non-steroidals and what have you, and physio after six weeks or what have you, and they do come back and I don't seem to have helped them very much." Registrar 4

> "In terms of pain, I mean, the options are limited as well. Most of the time my first choice would just be non-steroidals really, and then whether that is a method of buying time and seeing your own fixed ways of doing things." Registrar 12

> "What about when they have had a few weeks on pain-killers and it hasn't helped and often you have not got much else in the bag? You could try physio. There is an eight week waiting list. They are not very happy. They are talking about X-rays and surgeons and all the stuff, and you know that an X-ray is not going to help." FG 01 Registrar 4

One of the registrars who took part in the focus group had done a degree in physiotherapy prior to training as a doctor, and commented that, perhaps the couple of weeks of non-steroidals is insufficient time to allow the natural healing process to occur.

> "But then again, the time frame I think, often..... I hear people going to time frames for back pains along the lines of a week and I always tell them six to ten weeks before.... you know I saw, within the first two weeks it will be starting to get better and then over the next six to eight weeks it will be resolving slowly and may recur during that time. So I think if you talk a realistic time frame for the recovery of musculoskeletal conditions, you are going to have much less.... much better expectations." FG 01 Registrar 1

At the time of completing the diaries and performing the interviews the newer anti – inflammatory drugs (the cyclo-oxygenase 2 inhibitors (COX 2)) were being discussed in

both the medical and national press due to there having been a study suggesting that one of the class (Rofecoxib) was associated with an increased risk of heart attacks and strokes. This was therefore at the front of the registrars' minds and a number of them mentioned this, with some of their surgeries making concerted efforts to take patients off this class of medication. The registrars commented about how difficult it is to take patients off medication which is suiting them and treating their pain.

> "Then you get to the point where they are well. I don't mind risking it and I find that quite difficult, because I am not comfortable with that and I...I understand there is an issue of patient consent and Celecoxib is now kind of having...I don't know whether it is going to end up being withdrawn, but is having lots of extra contraindications put on, but that is quite difficult when someone else comes in and says "Well nothing else has worked and I don't mind risking it and I know the risks" and you are kind of, like, well I am not really satisfied." Registrar 11

> "And this is awful isn't it, because it is kind of like a personal...it is how comfortable you feel with it, rather than letting the patient go away kind of knowing that he will be pain free or something? But, you know, if I said "Yeah, OK, that's fine, we will try it very cautiously." then I just sit there and just worry myself sick for the next, you know, few weeks until they have a heart attack and then blame myself." Registrar 11

> "I find it really difficult kind of saying to somebody, "Yes, you are on this medication and you are fine on it and your symptoms are under control, but we are going to change it."" Registrar 14

> "We did sort of sit and discuss it at one of the practice meetings and a decision was that...they pulled a lot off of all the ischaemic heart disease and then they pulled off a list of sort of the stroke patients as well, because a letter had come around from the Primary Care Trust saying that they thought it was increased risk for angina and stroke and amaurosis fugax, but nobody knew where the evidence had come from for strokes, so they were looking into that, but we were pulling all those patients first and then trying to get everybody else off it." Registrar 7

Management – Referral to Allied Health Professionals

Of the different Allied Health Professionals available: social services, occupational therapy, physiotherapy, podiatry and chiropody, the registrars mainly mentioned referring patients to physiotherapy (physio) and it appeared that they had the most experience at using them. Most of the registrars had good access to physiotherapy with a number of the practices having in house physiotherapists. A number of issues were raised with regards to physiotherapy. The registrars mentioned using physiotherapists to make or confirm a diagnosis and to therefore provide them with a second opinion.

> "I kind of rely on physios as well because, I think...I know the physios that we had in Blyth, because I spent a session with her, was really good at reviewing the diagnosis because very often, she would just get people with shoulder pain and no actual diagnosis, so she would actually try and work out what was going on." Registrar 2

> "I have to say I am probably over-relying on the physios to the point that, sometimes, I explain to the patients that, you know, they really are the experts that can assess joints fully" Registrar 4

> "I wondered if they were getting wrist pain because of repetitive stress injury and I referred that to the physio. More from a physio assessment point of view to see whether they thought it was or whether they actually thought it was something else, and if they could advise them as to the movement that they should then avoid." Registrar 7

> "I have found that physiotherapists are really good actually. Particularly they are very good at sort of recognising whether something is mechanical and they will be quite happy to see somebody with that, and so I often find that quite reassuring if they have seen them and done their examination and they are not worried. I mean, the only example I can think of that is one patient I have sent to them that I was worried about that they were also worried about that made me feel much happier about referring them" Registrar 14

> "Ours is a bit about presumptive diagnosis and history and stuff and they were like ... you know, they are really not that bothered about what you write, because I always try and write everything and try and be clever and know what is wrong with the patient, but they will just do everything from the start anyway, so..."
> "Because they know you don't know every time you refer them a shoulder?"
> "Yes, yes" (FG 02 Registrars 3,1,2)

A number of the registrars had sat in with the practice physiotherapist as part of their training or had personal experience of having seen a physiotherapist and had found it both interesting and useful for their work.

> "When I sat in with her at the beginning, she was interesting because she says "You know, don't bother with the whole description of what muscle is doing what"....."You have spent five years looking at all these different systems, I have spent three." and whatever, I think she is much more senior now, but you know, she has spent all her time on the musculoskeletal system. You know, she will know a whole different level of sophistication." Registrar 8

> "Myself, I had a chondromalacia, well I had a sort of patella tracking problem and after running and when I went to the physio, she gave me exercises to re-educate the vastus medialis and it was extremely effective within a few days, so I know that they can do things and that they know much more than me about these things." Registrar 8

> "I went and spent a day with the physios but that was just really to see what they did and make sure I was sending the right things. Watching them examine and you think "Oh my god!" You know, they have an hour and they strip them all off and do everything properly." FG 02 Registrar3

One of the registrars was very influenced by evidence based medicine and queried the evidence base behind using physiotherapy.

> "It is more about what the evidence says about what physios are going to be helpful with. If that makes sense? Because I thought physios would be good at

> everything, but then talking to them, they sort of said "Well, there is no evidence that physio actually helps."" Registrar 9

> "I am not sure if there is that much evidence that physio actually helps. I know there was that article in the BMJ, not that I am saying that, just the fact sheet itself is probably as useful as having actual physio." Registrar 9

Other issues raised included the timing of referral to physiotherapy, in particular because access to services appears to vary widely with patients often having to wait a number of weeks to see them

> "I wasn't sure how many weeks like, you know, when they are seen in general practice. How many weeks should we wait? And who should we refer for the back pain or not? As soon as I got, like, a bit more experience, I got a bit of an idea. When I read about information a bit more and I start seeing more back pain." Registrar 10

> "One of the other issues I have had which is more a kind of management thing, is the guidelines say you have to be aggressive with acute back pain at an early stage, and we have just discovered that there is a six month waiting list for the physiotherapy. That is the in-house physiotherapy and we have been ... everyone had been referring to physio and nobody realised they weren't getting appointments, but now we know that now what do we do?" FG2 Registrar 1

Registrars appeared to be frustrated that they rarely received any communication from physiotherapists which they could use as feedback regarding their referrals.

> "I think that is what is partially annoying about the whole system is that the only way I tend to get any communication is when they have seen someone for a long course of contact, and they feel they need referral onto a specialist and at that point, they will give us a summary of what has happened and query diagnosis of so and so, please re-refer on for arthroplasty or whatever... It would be useful, I think, to actually get a bit of communication at the end to say, "Yeah, I think

> you are on the right track", or "Physio doesn't seem to make much difference." Registrar 4

One of the registrars had had a patient referred back to them by a private physiotherapist with a request for further investigation. Again the lack of formal communication was highlighted.

> "I was, bit, a little bit annoyed actually. Initially, when he said the physio is suggesting we do and have this scan and go to speak to a GP to refer. I think that physio, the first thing.... I mean, it is not the first time ever it has happened. I remember a few cases actually, and the physio has suggested to have an X-ray and I said "Well, if the physio is thinking some of the problem there, they should advise you and give you an information letter about what they're suspecting." Then you know that there was a problem and what scan they're looking for. They should have given more information. "That I have found on examination blah blah blah these, err, findings. Would you please investigate these things further?" Like the time opticians actually find something, and they send a letter and ask "Would you please refer to the Ophthalmologist? I have found these findings on ophthalmology examination, and am giving you the information."" Registrar 10

Management – Referrals

The registrars appeared to have only made a couple of referrals to secondary care during each six month attachment in general practice. They discussed the dilemma of when to refer patients to secondary care, and in particular orthopaedic surgery. They appeared concerned that they may not be referring patients appropriately and what the response of the team would be if this were to occur.

> "Yeah, I mean you live your whole...especially when you have been in hospital medicine, you spend time listening to people whingeing about this crap referral from a GP and how they are wasting your time. It is more difficult I think, with professionals, who you have not got as much experience with. So people like physiotherapists, occupational therapists who, you know, I don't understand,

you know, in as much detail as consultants in how they work, what they can do and what they are happy to deal with." Registrar 5

"So sometimes referring to the orthopaedic surgeons is a bit of a...I find it a bit of a dilemma whether to and nobody seems to ... although I haven't asked but nobody will tell you whether they want to see people sooner or later." Registrar 3

"I think from the orthopaedic side of things, I thought that, I don't know, GPs were always sending, you know, every joint pain up to you and you know that there was... that the orthopaedic departments always seem really busy, but it is not like that." Registrar 8

Regarding back pain: "If you do find a slightly reduced reflex, or whatever, it is then "Right, how quickly do I need to refer them and what is the pathway for it?", and that is never very clear, and so you end up referring people. And we don't have direct access to scans and things at my practice so, you know, you end up referring them and it is like, "How urgent do you make it?"".... "It is that grey area of it is not quite right, but it is what pathway to take and how to be safe with that." FG 02 Registrar 3

"You just feel that you are wasting the time of the orthopod, but you are still thinking for the patient's sake if you don't do this, you are just losing the lost battle or fighting a lost battle." Registrar 12

Having worked in either an orthopaedic post or a rheumatology post appeared to increase their confidence at knowing when to refer.

"Generally having worked for some orthopaedic surgeons and knowing that they operate on most people, I think really if they want to go, and if you feel that there is a chance that the orthopaedic surgeon might be able to do something for them and they feel that they would like to discuss it anyway, then I am happy to send them." Registrar 11

> "I did four months in Ward x with Dr X and I just kind of did a bit of rheumatology there. We didn't do a huge amount. It was just a medical ward really, but we had lots of rheumatology patients so, I think I knew that, you know, that sort of patient we would see in the clinic there." Registrar 1

One registrar mentioned referring patients to secondary care for reassurance.

> Discussing patients with symptoms of the menopause and joint aches: "I think there has been two ladies that I have ended up referring. But more probably through my inability to completely reassure them that there is nothing more serious going on." Was it them asking for the referral or were you? "No, probably me. Probably me because I wasn't able to say with certainty there was definitely not joint pathology going on, although everything is pretty negative." Registrar 14

Registrars appeared to have a lower threshold for referring children with musculoskeletal conditions than adults.

> "I think with children they don't tend to complain about, well less than with adults, they don't tend to complain of things unless it is really a problem. So if a child came in complaining of back pain, I would be much more likely to either refer or investigate than if an older person did." Registrar 9

Some comment was made about what investigations should be performed prior to referring a patient to secondary care.

> "I think there was something that came through the post the other day about doing certain bloods before you refer. I don't do any bloods before I refer, I just refer, so I am thinking, now maybe I should start doing, you know, just full blood count and ESR and checked for those things and then refer probably would be better." Registrar 1

Management – Joint Injections

Two of the registrars in the interviews and one taking part in the focus groups mentioned joint injections, in particular, as an important management tool that they would consider and they appeared comfortable to offer these to patients with trainer discussion and supervision. Both of the registrars who were interviewed were more experienced doctors, both in their final six months of training: one having worked in Orthopaedics and Accident and Emergency before doing a medical rotation, the other having worked as a staff grade in Rheumatology. They seemed to consider injections more frequently and at an earlier stage in patient management.

> "A lot of things, or some things, seem to come down to a trial of a joint injection and then you hit a stumbling block, because you know in your own mind you can offer it to a patient but you technically can't do it, or you need to do it under supervision and it would just be nice to sort of be at that confident stage of "Right, let's try a joint injection." or "Do you want to try a joint injection?" "Fine, we'll sort it out for you, and come in and we will inject it." Done and dusted." Registrar 3

> Regarding tennis elbow: "So I manage with a pain-killer, and if it is still going on and it stops....I also raise as soon as it is disturbing your daily life style, then injection." Registrar 6

> Regarding shoulder pain: "A lot of my approach is a very simplistic one, is that a lot of things improve with time. Non-steroidals are a first line, joint injections after that and referral if appropriate." FG 02 Registrar 1

Other, less experienced, registrars only considered joint injections where other management strategies had failed.

> Regarding steroid injections: "I will use that as one of the last GP resorts" Registrar 12

Joint injections are generally only performed by a subgroup of general practitioners. Some of the registrars were unsure as to whether or not they would like to be able to provide them themselves whereas others were more enthusiastic about learning.

> "I am not really sure what things as a GP I am wanting to do as, you know, extra, and at the moment I feel quite uncertain about joint injections and, you know, when you wouldn't want to do them, and so it is not something I would want to particularly learn and do now but, maybe in the future." Registrar 7

> Would you like to learn? "Oh, definitely."..... "I would want to inject the shoulders and then the elbows." Registrar 12

Some of the other registrars had already had experience of injecting joints in a secondary care setting but did not appear comfortable with performing them on their own in a primary care setting.

> "I did it with her watching but I never actually did it on my own.....It was good, I mean, getting aspirate and things, and I had been taught but, you know, I haven't had the practice, and I think it is something if you don't have the practice, then you don't feel confident." Registrar 1

> "I did a fair amount of joint aspirations and injections during rheumatology but.... I feel comfortable doing it, I know where to stick the needle and I just don't feel the options are very available to me in my surgery." FG1 Registrar 6

All of the registrars felt that joint injections were useful but expressed concerns about not being adequately trained, injecting the wrong area and side effects of steroids.

Use of injections:

> "I liked doing the injections. I like injecting people, because it often has quite a good effect and pretty quickly, although I know most of that is just the Lignocaine working." They all come back in a few weeks later about something else and they say "Oh my shoulder? Excellent you know." I like that, and I like it when people..... you know, when something works for people." Registrar 11

Training:

> "I like to do the course and the other thing I like to see first, before I started doing it. I like to be, have some attachment with some specialist or any person who is doing it. Just to see if, even I did minor surgery course – that's fine, but it's not practical. You've got the model they providing you, injecting the thing. You're not that conscious you know. You can inject anywhere you know. But injecting practically, the patient, you can't do like that, you know. You taking out the needle, sticking, taking out, "No it's not the right place, light not green in fact."" Registrar 10

> "Well I was asking my trainer about this, and he went on one course I think, and then has kind of taught himself about how to do it, but it becomes so much more difficult now when you have got to get competencies for things and you can't just have a go and get on with it. I wouldn't know how to go about learning to be honest." Registrar 14

> "Having more clear guidelines as to... these are the joints you can inject and if these signs are there, then it is suggested that this... therefore you are not going to do any harm by injecting it." Registrar 14

Side effects of steroids and concern of infection:

> "I am also scared, I mean, you know you need such a sterile technique and say you do introduce one little bug and it becomes septic? I would feel awful" Registrar 1

> "When I was a house man, I was told, oh, my consultant was very much against steroid joint injections because certainly, for shoulders, he felt it thinned the tendons and they were more likely to rupture when he came to operate on them." Registrar 3

> "If I knew that it was appropriately indicated, I would not have a problem doing it. It is just I have still got this conflict in the back of my mind that I know that a

lot of arthritic knees potentially end up being replaced, and if you are doing that, then you are potentially not helping the surgeon." Registrar 3

"I am very cautious of steroids in general, and I know that I am.... I mean I don't want to completely wear away their bone by giving them too many injections, basically. Everything has side-effects, and I think it is not.....often people find it works for a couple of months and then they are back to being in pain again, and they can't have another injection straight away, and so often it is ..... although it seems to work and gives some relief for a while, it is not really a long-term solution as far I can see, with a lot of people and therefore sometimes it is better to try and find something that might be able to last a bit longer or give a bit more relief for a longer period of time but that is only from my own experience. You know, people say "Oh yeah, it worked grand for two months."" Registrar 11

"I don't know. Maybe I should feel more comfortable about aspirating it in the surgery but I don't..... I don't have any aseptic stuff really. All I have got is a green needle and a syringe." FG 1 Registrar 6

Injecting the wrong area:

"I would be worried about hitting the wrong place." Registrar 9

"I wouldn't feel comfortable doing injections I haven't done, because it is quite easy to hit the wrong place and it is not very nice for the patients."..... "I still leave it to kind of more my latter options, and I don't know if that is the right or wrong thing to do, but I try other things first. I don't know. I think that is because I am not overly confident at prescribing things and often people have had them, you know, three or four months ago, and as far as I am aware, you are allowed about four a year to the same joint, but I am not overly confident at prescribing that kind of thing and saying "Come back in", and I still like to get my trainer in to say "Do you think an injection would help this?"" Registrar 11

> "I think in general practice you haven't got the back up of sometimes knowing this is definitely the right diagnosis, so if it is definitely this, I know that a steroid injection is going to help, whereas in more tertiary care you have got that back up, so that would worry me." Registrar 14

Management – Alternative Medicine

Alternative medicine was also a commonly discussed area. Different forms of alternative medicine were mentioned with oral glucosamine being the most common. A number of the registrars said that they had had patients ask for glucosamine during consultations for musculoskeletal conditions and they felt relatively comfortable regarding this although appeared to differ in how they responded to this request. This appeared to be because glucosamine is much more commonly used and discussed in mainstream medicine when compared to other complementary medicines. A few registrars mentioned other forms such as chiropractic/osteopathy and acupuncture. Three registrars worked in a surgery where one of the doctors performed acupuncture and one registrar worked in a surgery where one of the partners performed manipulations. Opinions differed as to the benefit of alternative medicine and whether or not they felt it was something they should discuss with patients.

> "I haven't got a lot of knowledge about chiropractors so I am reluctant to advise therapy. I don't know what they do. I know they do manipulating and like local massage type of thing, I think, but not exactly what they do. So I am not quite sure what type of patient is suitable for that treatment." Registrar 6

> "She come back in a couple of weeks. She says she want to, she have seen chiropractor and he did whatever the treatment he have done to her and that's made a huge difference ,and I think the painkiller is not right thing for her. The chiropractor is the right thing for her" Registrar 10

> "I don't know much about alternative therapies and I don't know if any of those are useful and I wouldn't like to advise people to do anything that I don't know anything about really." Registrar 11

"It is something that when I have got some time I would really like to learn a bit more about. I would like to do something, you know, that just gives me a basic rate of knowledge, so that I have something else that I can do with people" Registrar 11

"I think one of the big things with medicine is that.....it is changing all the time and so are peoples' expectations, and I think complimentary therapies are becoming more prominent, and people are kind of grabbing hold of these things and coming to us for advice, and I think.... I do have a belief that they are complimentary therapies and they can complement other kind of medications, but I think a little bit of knowledge is quite dangerous." Registrar 11

Regarding acupuncture: "He started to explain about different points and targets. It just all sounds magical!" Registrar 11

"For people in X, the popular therapy at the moment is the local Chinese herbal shop that has opened up, who offer you anything you like for about 100 quid! Acupuncture, some balm to run on and some pills and potions to take. People are doing it and they are spending money. It is quite shocking actually, and really how much.... I guess you know how desperate people are, because they are parting with significant sums." FG 02 Registrar 1

The GP registrars on the whole, identified this as an area which they would like to know more about. In particular they wanted to know about how alternative medical practitioners are regulated, what the potential benefits and risks are.

"I have said, some people have said acupuncture helps, but that would be good if there was something that said, not biased, it just says the facts. It showed this to be effective and whatever and advice to patients. That would be good." Registrar 1

"I think we should, yeah, because, you know, I know what opticians and dentists do, so I don't see why I shouldn't know what chiropractors do and the private physios as well." Registrar 2

> "I have heard some bad stories about chiropractors particularly doing more harm than good and being unregulated and that kind of thing. It does make you slightly less willing to suggest them to people..... and maybe have an idea of what some of the local ones are like, local to where you are working, so that you can actually recommend or not recommend as the case may be." Registrar 2

> "The other people are the sort of chiropractitioners, the alternative people, because all of these patients are seeing those people and they ask you what you think, and I basically say I don't know, and I couldn't say anything against them and couldn't say anything for them, and if they think it is helping then I think it is perfectly reasonable, unless there is something really stupid going on, and I think that is another difficult thing is that they are often getting lots of other attention from other people." Registrar 5

One of the registrars had had some teaching about acupuncture as part of the therapeutics module in their vocational training. They had found this quite useful.

> "Yeah, at least I can explain, if someone asks me, what it is like. Does it hurt or what have you? At least I can say "Well it doesn't hurt normally, and it may work, it may not."" Registrar 4

One of the other registrars discussed how, if patients wished to avail themselves of complementary medicine then the onus should be on them to do the research about it.

> "It would probably be sensible if we did know more, but I don't think it is something that you necessarily need to know a huge amount. Yes it is an option, but it is almost because it is outside, it is complementary medicine, I think the patient has to do the research about it and not necessarily the GP, just because there is no way we can advise them on the risks of it, and I think if you are suggesting something to somebody, you have got to take responsibility for that suggestion, which is why I think it is much better if the patient says "What about...?" and you say "Well, this is what I have heard from the medical side but I have no objection to doing that." I think that is a better way." Registrar 3

A final comment on the subject from one of the registrars.....

> "But we know medicine is a lot of quackery as well!" FG 02 Registrar 1

Management – Sick Notes

A few of the registrars mentioned issuing sick notes to patients for musculoskeletal problems and the concerns that they have regarding these. In particular they highlighted their concern that the patient may be manipulating the doctor to their own means and the internal conflict that this creates.

> "It will probably be better if, as a GP, or it wasn't a GP doing it (signing them off). If it was actually somebody probably from work, who probably had a better idea about how long you can sign people off for longer term and also, then you will have somebody who is involved in getting the patient back to work. The trouble with the GP is that you are almost on the patient's side, which is, don't go to work and then you get into this whole of, well, I have got to protect my patients, so don't go to work. Whereas if you could put or if you did have somebody who was happy to sort of liaise and get them on light duties and that sort of thing and it was done through a work environment, it would be so much easier." Registrar 3

> "I find that quite often I feel like I am not actually getting very far with people and I am, you know, writing sick notes constantly and am actually not making much progress. That is not very satisfying." Registrar 4

> "Then there are the people who want sick notes who use, sort of, very nebulous symptoms and you feel quite frustrated by them, because you know they are wasting your time and you also feel quite frustrated because, you think, well there is probably.....you feel that examining them is actually a waste of time, because you know that you are not going to find anything. But at the same time, occasionally there is going to be somebody who has got a real problem you don't want to miss. There is that conflict between.....if it is someone who is

manipulative and needing sick notes, they are likely to be the sort of person who is going to need a long-term relationship with a doctor, because they are going to run into all sorts of problems. But at the same time you don't want to.....in an effect you are an agent of the State and it is probably also better for them to be at work than off work for their health as well. So that is where the conflict arises and then when you are not confident about ruling things in and out, that makes things very difficult." Registrar 5

"I think if someone says they are not fit to work and is quite adamant about that then, you know, you need to take them at their word to start with." Registrar 8

Management – Medico-Legal Issues

Two of the registrars who took part in the interviews and one from the focus groups highlighted concerns about musculoskeletal problems being caused by accidents and therefore their actions having legal ramifications. This raised questions about how this would affect their management, the assessment these patients require and what the patients might want out of the consultation.

"There are a lot of people who have come in and have just been shunted from behind. Some of them are honest and say "The insurance company told me to come and tell you.....and I have to come every time I get any symptoms", which I find frustrating." Registrar 5

"If for example a court decided, that a case came to court, and they called me as a witness. What would the court feel have been reasonable for me to have done at the time? So that the court doesn't turn around and say "That was a ridiculous examination" and "You couldn't possibly have made a diagnosis on your history and examination."" Registrar 5

"The other thing I feel with those patients is, if they do proceed with that sort of prosecution or whatever, that they are going to come to probably psychological harm and the neck pain is going to last longer. And so you want to try and help

them with that, if possible, and not say “I think you are stupid to bring this case because that is not going to help” but try and....it is really hard to try and play it down but at the same time be sympathetic.” Registrar 5

Regarding consultation for whiplash: “I felt that the legal side of it and the financial side of it was upper most in her mind. She had seen other people before me and she had also been referred via, I don’t know whether it was an insurance company or something, but not via the practice to see a physio and get a full insurance report and this kind of thing ....and someone along the line said “Oh, it might take six months to get completely better” and she had latched onto this and I was giving her sick notes for sort of two weeks / three weeks.” Registrar 8

“I think that is also to do with the compensation culture, you know, looking at the worst thing that could happen and the most urgent thing to deal with, rather than you know, playing with time and exercises” Registrar 8

“You know, they start asking about compensations and sick notes and all that kind of stuff. You are thinking... sometimes you think “Where did that come from?”, because it seems that they really have got a real problem and you think “Well it is not going to be an issue”, but some people you do wonder if.... oh well, I did it, it happened, it started at work and I think you wonder how much you have written down in the notes, and in five years time, will they be suing their employer for money and stuff like that?” FG 02 Registrar 2

Management – Managing Sports Injuries

A couple of registrars particularly mentioned issues regarding the management of sports injuries. One of the registrars had encountered a couple of patients with these problems whereas the other had a trainer with a special interest in sports medicine. Neither registrar appeared confident at managing these problems and felt that they should be managed in a different way to the same problem in a non-sports person.

> "From a sort of history and examination point of view, I could do the diagnostic bit. That was fine, but actually the important thing for her wasn't that. It was the fact that she is a long distance runner and how long should she be resting for before it was going to go, and that sort of thing." Registrar 3

> "In the context of a sports person, when they can get back to using it, because Joe Bloggs in the street, it is not so much of an issue, because he will probably rest it and then when it is not quite as painful, or when he wants to, he will start using it again. Whereas these people are coming from a different angle." Registrar 3

> "Knowing that if I gave her the wrong advice and she went and ran on it and it got worse, then I would be in trouble really." Registrar 3

> Managing sports injuries – "not terribly confident. No, fairly hesitant, but I think it is something that I can look at in the future and you can..... I think I would be able to take a better history now than before, which might give you clues. Really there would only be kind-of clues to me." Registrar 8

In the focus groups, some of the registrars expressed the opinion that, as patients opted to perform sports, they ought to be willing to pay for private medical care for any injuries they sustained.

Management – Chronic problems and chronic pain

During their general practice attachment, the majority of the registrars had seen patients with chronic pain. They described how difficult they find managing these patients and how they can be left feeling helpless and frustrated.

> "I have seen people who have been sent a long time ago, and they have been put on Gabapentin and various other things, and they are still on those things and they are still complaining of back pain, so I don't know. I suppose it is like anything else; you are going to get people that you are not going to find an

answer and not going to able to sort of help them with." And how do you feel about those? "Often quite frustrating, but usually they come to see me about something else, so I just ignore it." Registrar 9

"You have seen the patient – young gentleman who was only 35 or 39 and he had anxiety, depression and then and he is on disability allowance you know. And it has been, never got better, years and years. He was so frustrated about his back pain and.... like, you know. He had been seeing different partners, different doctors in the practice and he came in to see one day and he was so, couldn't sleep due to serious low back pain. Not doing very well and couldn't, not able to walk very much. I think that sometimes the back pain can be completely disable to them and that's the one patient I really make me bad." Registrar 10

"I think it is really difficult and it is not much I have had much experience in. I don't feel that confident with it. I feel quite confident in sort of looking for other sort of contributing symptoms and talking about low mood and depression, but it is something I do find quite hard." Why? "Just because of the multi-facetted nature of it and there are so many things contributing. There is the patient's perception of pain, sort of illnesses going on, social implications, the fact that they are off work and it is just such a huge thing to deal with in a short consultation in a patient that you don't know." Registrar 14

Management – Psychological Issues

The registrars demonstrated an awareness of how psychological issues can affect musculoskeletal conditions or can be a cause of musculoskeletal pain.

"You know those kind of patients where the patients are inconsistent, but they complain of terrible generalised joint pains. Really functionally impaired. I think sometimes you do have to step back and think "Well, is there another overlay of something psychological or social going on?" And I think it is quite

easy to get caught up and forget about, when everyone is giving you kind of physical symptoms to cope with." Registrar 4

"A lot of the musculoskeletal problems I have seen often do have psychological component to it, either because they are living with chronic pain, which you can understand that can get them down if you can't get on top of the pain, but then can....you know when depression presents as other things and that was something that struck me." Registrar 7

"I am a bit more aware... since doing general practice I am a lot more aware of things like depression playing a role in chronic pain, and the pain does seem to get better when people's depression is treated, but probably still just need a bit more experience of it." Registrar 9

"People come with musculoskeletal symptoms or sort of muscle pains, but then it is not that.....they have perceived it as pain, but there is no actual obvious cause for it." Registrar 9

"I feel quite confident in sort of looking for other sort of contributing symptoms and talking about low mood and depression, but it is something I do find quite hard." Registrar 14

Management – End of the track

Three registrars highlighted that they find it hard to explain to patients that there is nothing more that can be offered to them. This can occur in patients with musculoskeletal conditions and in particular osteoarthritis and chronic back pain.

"I am not very good at actually saying, "Look, we are the end of our kind of path here. You should carry on with all that good advice you have been given and I am afraid there is not much more that we can do." I don't like it when people come in saying they are in pain or functionally impaired, and I always think there must be something. Probably often there isn't." Registrar 4

> Regarding a patient the registrar saw on a home visit: "One of the trainer said that he/she knows well actually. I only met once or twice but he said that "There's not a lot you can do. He/she's 89. He/she has severe arthritis. Nothing you can offer very much, you know, and you did the right thing. Nothing else we can do." That's exactly his words." How do you feel? "I feel very disappointed. I try to help them and try to bring them to the normal life, but I feel very disappointed because I cannot do this." Registrar 10

> "I get the impression as you get older, you get a bit more blasé about things and they kind of like, well, you know, you have tried everything, and that is just really unsatisfactory to me, because this patient is obviously in a lot of pain and he/she is young and it is just..... I mean, I know it often is the case where you kind of can't do anything else to help someone, but I am still coming to terms with that." Registrar 11

Management – General Practitioners with a Special Interest

Only a couple of the registrars had experience of general practitioners with a special interest in musculoskeletal medicine although a number of the registrars had worked in surgeries where a particular doctor might perform joint injections. These registrars discussed how they might direct particular patients to see these doctors and at times use them to provide a second opinion.

> "And again if I had any doubts about diagnosis and if you have got negative investigations, blood tests and stuff, you clinically suspect that he has still got rheumatoid, then I just get a second opinion from this guy and this is what I will use him for." Registrar 12

One registrar suggested that having GPs with special interests may reduce the need for other doctors to learn about a particular area and that they could become deskilled.

> "There was a patient with funny shoulder pain when I was a Phase 1 registrar, who I got the partner with an interest in musculoskeletal medicine to have a look

at. I think that is probably the reason why I am not very strong on this either is that he was there in my Phase 1, and all the other partners and other doctors in the practice used to rely on him really for stuff they weren't sure about. And we also had a really good physio, who didn't mind you referring kind of undiagnosed stuff. She would have a crack at working out what was going on. So there is not really that need, is there, to learn? Because you have got these other experienced people to refer to." Registrar 2

Management – Difficulty of co-morbidities

One of the registrars highlighted the difficulty of many patients with musculoskeletal conditions having other medical problems and how this can affect their management.

"The other thing that really stands out to me is older people with osteoarthritis that has been shown on X-rays, that have got a million co-morbidities, are on a million drugs, not suitable for any kind of surgery and their choice of analgesia is so limited that they seem to get no relief. I don't know where to go with those people." Registrar 11

Management – Using Time

Using time as a therapeutic tool is a common management strategy employed by general practitioners although it was not discussed frequently by the registrars. As mentioned earlier it was possible that the registrars were using a course of non-steroidal anti-inflammatory drugs in this way.

"I probably should be using time a little bit more well." Registrar 14

"I think the time they have had the problem makes a difference to me. If it started yesterday, then I would wait and see and I say "Well any sprains, they take about six weeks and if it is still a problem after that, then come back and we will think about what to do then." So I kind of bide time a little." Registrar 1

One of the registrars mentioned using time as a delaying tactic which is often used by junior doctors:

> "It is really one of those ones where they have left the room and you thought "Please don't come back and see me; please come back in February"" Registrar 2

Management – Local Services

A common problem that registrars face is, not knowing what the local services are. This is something that they often have to discuss with their trainer. The registrars mentioned that it would be useful for them to know more about what is available.

> "I wouldn't know much about what kind of services there were and what are the common conditions there might be that they would be happy to see, so that might be something else that would be useful about." Registrar 4

> "You know everywhere is different and I didn't realise.... that is one of the other general problems about musculoskeletal things is that there are so many different places people can go, and you have got no idea where is appropriate to send who, at what time, and what they can expect to get out of that. You don't want to....I am very desperate not to waste people's time, both the patient and the other professional." Registrar 5

> "The other thing that would be helpful is what services are available and who should go where and when." Registrar 5

Management - Guidelines

Registrars revealed a desire for guidelines about managing musculoskeletal problems. They felt that these would be reassuring as they could be confident that patients are receiving a specific standard of care.

> "I don't like guidelines like the one this consultant has described to my friend, saying that you have not done this so I am not seeing them, because that is really unhelpful, because there might be lots of other reasons why you want them to see that particular person. But it is quite nice to have guidelines to support you in doing something that you might have felt out on a limb doing before." Registrar 2

> "Definitely a good system for back pain. It would be good to have a flow chart in my head which I have almost got now, but it would be good to have someone talk through that and what advice you can give to people." Registrar 14

> Regarding cervicalgia: "I think honestly, from my point of view, I think that I need a what would you call guidelines or something to deal with that, because you see quite a lot of them".....Why a guideline? "Because you see them and I mean I saw quite a good amount, and it is actually a Read Code. I think essentially for the patient, for myself, you need to be sure that it is universal or uniform treatment. Everyone is doing the same. It is very common. It needs, I feel, it needs some guidelines so you know exactly what you are doing, everyone else is doing for this." Registrar 12

Results – Educational Experiences

The second theme of the interviews and focus groups was surrounding medical education, covering the education the general practice registrars had already had along with the education that they would wish to have. As mentioned previously, some of the registrars had not had much in the way of musculoskeletal education.

> "Given how much of the consultations they take up, I think what is really lacking is education in musculoskeletal problems. It is just not something that really gets taught very well at medical school. I don't know, it may get taught very well, it is just I don't think as a medical student you are particularly receptive to it, because it isn't the kind of stuff you need as a house officer, so particularly in fifth year, your brain is just focused on what you are going to need to be able to do the job in August," Registrar 2

> "I think it is difficult in a way, partially because there are obviously so many different joints. You know, part of the kind of the hazard is you have got to examine them, work out vaguely what is going on and there are so many bits that could be differentials, so that is one difficulty. I suppose, partially our exposure to some things are quite minimal, so that when you actually see things, it is quite unusual, and then we are not very competent at knowing quite what to do about things. I suppose when you compare it, something like respiratory, when there are maybe five things that we see loads of and of course there are the weird and wonderful things, but people tend to be quite ill with them, and we know to refer them in straight away, whereas musculoskeletal, I just feel it is a bit of a big abyss, and although I should know about differentiating, you know, degenerative from something inflammatory and recognising the important red flag conditions, it just feels there is a whole load out there, and a lot of it I have never knowingly seen." Registrar 4

Only one registrar brought up the concept that there might be an issue of "unknown unknowns" in the area of musculoskeletal medicine, i.e. the registrar not knowing what it is they don't know. In general practice, registrars are encouraged to develop their own curriculum and identify what it is they would like to learn about. There might therefore be learning needs that they are not recognising and they might be not best placed to decide where their level of knowledge should sit.

> "If you don't know what else there is, then it is really hard to know what else you might be missing." Registrar 2

> "I like to have a list of things. I can tick off the really important stuff. If you don't know what you are missing, you don't know what everybody else is missing either, so it is difficult to know where your level of knowledge should sit." Registrar 2

> "I don't really know what a normal GP should and shouldn't know, and so it is easy to kind of go, it is not just me being rubbish, or 'should' or 'is that' too much." Registrar 2

How they learn currently

The registrars discussed the different stimuli to learning and methods by which they learn at present.

How they learn currently – Keeping the diaries stimulated learning

Keeping a log book or diary of consultations and reflecting on this is a recognised method of learning (see Chapter 1). Some trainers use this routinely with their registrars as a way of identifying learning needs. The registrars did comment about how the act of keeping the diaries for this study had affected them.

> "I mean, it taught me that I should really revise a little bit." Registrar 1

> "I think it was useful, because it made you sort of look out why something felt difficult that you would expect. Sometimes you see a patient and you think "well that is not really difficult", and I wasn't sure what I was doing, but I am not quite sure why and having to put a reason for it, that was quite difficult but useful." Registrar 9

> "And this time you actually gave me, actually, the diary and that's actually changed my mind that I'm not very good rheumatology. Why should I not have some tutorial?" Registrar 10

> "It helped me look at things a lot more. There was a chap who had low back pain but he was kind of twenty-three, had possibly some neurological features and possibly some symptoms suggestive of ankylosing spondylitis and kind of writing things down, not only in the notes but writing it down in the diary made me really reflect what am I more worried about, what is the most serious thing to do first of all." Registrar 14

It was recognised, when planning this project, that asking registrars to keep a diary of all their musculoskeletal conditions for a month was going to be a significant task for them. The main aim of the diary was to try to prevent recall bias although the registrars commented that it was difficult to complete the diary entries straight away and at times they found themselves completing previous day's entries. This problem would probably also apply when diaries are used for educational purposes.

> "Initially, when I started, it was fine because, what I would do is see something and then write it straight after, but then I don't know what happened. Then I think my surgeries got busier and I began not having time to write straight after the consultation, so then I would have to write it during a break and then other times, I think there was a couple of days that I forgot, but I remembered that I thought, "Oh gosh. I haven't written" and then I had to go back and look through the actual patients." Registrar 1

> "It is difficult to write it in your diary straight away, and so I don't know whether I have recorded all the information as accurately as if I would have just written it down straight after the consultations." Registrar 9

> "The only problem was because, sometimes I didn't actually do the diary until next day, because I was running already late and it's very busy practice. I didn't have much time and end of the, when you've finished your consultation and you're so exhausted you have no actually. And the other thing, but I go next day I need to completely forgetting because I didn't actually know the patient name and I knew that I saw yesterday knee pain and I saw one of the back pain. I have to look every single patient." Registrar 10

> "I was good at first but then it became ..... I was kind of really good at doing it after each patient and then as it went on to ten minute appointments it became more difficult, and I was having to write it at the end of the surgery." Registrar 14

How they learn currently – Learning from follow up and experience

The registrars discussed how following up patients they saw is an important method by which they learn. This enables them to learn the natural history of conditions and to see whether their management plans have been effective or not. They also use the experience of working to develop their knowledge further.

> "There are certain things that you just need to, probably with experience really.... the more knees I see, the more backaches I see the better, and I will become to feel a bit more certain." Registrar 1

> "Obviously, I am still learning you know, every day something, and without actually seeing how the management plans that we start pan out. You know, I could be reinforcing the same stuff for months but I may not be quite hitting the mark, and the only way you learn is when people say "Oh, yeah, that did make a difference", "That helped" or "Actually, I had problems with that" or "That wasn't possible." So I think it is really valuable." Registrar 4

> "One of the things I have noticed, after leaving medical school and starting to work, you realise that actually the things we read about do happen and the drug you give does work and you find..... I don't know, when you don't have any experience of anything, you are so nervous about doing something. Even though you have read that, that is what you are supposed to do, it is quite nice to see the things to see how they kind of actually work in practice." Registrar 11

> "I have come across quite a lot since and have seen them, reviewed them and they seem to be ..... they seem to get better, so I think my confidence has grown

> just from having experience of seeing a few and actually seeing them afterwards." Registrar 9 regarding shoulder pain

> "He saw a patient and he thought it was a facet joint problem, and he did get pain that radiated around to the chest wall which is what made me think of it in this lady, but it was quite interesting, because the person that I saw with facet joint problems, it was when I was doing out of hours, and one of the nurses who suddenly got this pain, and when the doctor sort of made her do different movements, it kind of put it back into place and was quite interesting."....."Because they have obviously got so much experience that they see these things all the time, and a lot of the time you think "Ah, that could be whatever", they say could actually be related to another patient I have seen." Registrar 9

> "Like one of the GPs said, once you have been practising for twenty years, it is quite straight forwards, because there is hardly anything you haven't ever seen, and so once you have seen something and you have treated it and you know that has worked and you know that hasn't worked, then you know where to go with the next person." Registrar 11

> Regarding allopurinol titration: "When I looked at the BNF to start, it said 100 and then titrate up as needed to 300. It doesn't give you any timescale as to when to do that and how to do it, so when I asked partners, they all said "Oh!" and it was all a bit waffly and vague, and I guess it is just with experience you get used to what patients will tolerate." Registrar 4

The registrars often bring patients back to allow them to use the time in between appointments to read up around a condition and learn more about it.

> "Now, because I have got less time in the appointment slots, sometimes I might say to the patient "I need to sort of read around the subject or ask somebody else about it" and I just write them a letter and say what I have found or send them the information themselves, just because I don't have time to do it and concentrate properly." Registrar 9

> "Sometimes between consultations, if I feel I need to do more information gathering, I will send them away and, you know, with kind of half a plan and get them and come back and complete the plan." Where do you get the plan from? "Well, from a variety of sources. You talk to your trainer, talk to other people, and textbooks and things as well." Registrar 8

Unfortunately, in some cases, the practice appointment system appeared to prevent the registrars from seeing their follow ups and so learning from them.

> "I have told them but unfortunately I don't know whether it is just the practice I am in and because of the appointment system and the fact that they book on the day, so I don't see a lot of the reviews that I would hope for." Registrar 4

How they learn currently – Learning from feedback

The registrars use letters from secondary care and physiotherapy as a means of identifying their learning needs and to learn more about the management of particular conditions. Unfortunately they didn't seem to receive as many letters as they would like which could be due to time reasons, the letters being addressed to a different doctor or, in some cases, no letters being sent which appeared to be a particular problem with physiotherapy.

> "It would be useful I think to actually get a bit of communication at the end to say "Yeah, I think you are on the right track" or "Physio doesn't seem to make much difference." That is the only way you learn isn't it, but I guess that is a lot of extra paper work for them, but that would be ideal." Registrar 4

> "If they did lots and lots of other tests to come to that diagnosis and think, well I should have done then, or I should have referred early to get that done. So getting the feedback of what other people do to make that diagnosis." Do you find getting feedback in letters useful? "I find you only get the feedback if you actually put the question in the referral letter. So if you say "I think this is what it is" then the letter will either say "I don't think it is, I think it is this instead" so

> they are sort of helping you as to why you were wrong or why they don't agree with you, but if you just send up the letter, then they will just say back what they think it is." Registrar 7

> "I think it would be useful if I had, like, all patients which I have like referred to the physio. If I have follow up after at least to give me the feedback - what exactly happened with the physio? Had they a lot better? They didn't get better? Either they give up? What exactly they happened? It would actually be, it's a good thing that it should happen, but it didn't actually happen unfortunately." Why would it be a good thing? "Well at least, if I referred somebody to physio, you know, and he's got better, at least I have idea I did the right thing, you know. If somebody didn't get better physio or there was no benefit, they didn't get any benefit from the physio, what is the point, like, of referring to physio then?" Registrar 10

How they learn currently – Learning from patient information leaflets

Registrars seemed to like having patient information leaflets available to be able to hand to patients and found them useful in supporting their management plans.

> "It would be great if there were some sort of leaflets that would say, you know "Back pain. This is what is helpful." I know that I don't tell people, you know, "Just don't rest", because that won't help. I know that, but if there are any specific exercises. Knees – is there anything they could do at home? So that would be helpful, and it would be useful to just give them a leaflet on that in the meantime, yeah, before they actually get physio." Registrar 1

> "I love written information and I think that is really helpful for patients, so that would be good." Registrar 4

Yet they also appeared to use them as a learning resource for themselves.

> Regarding tennis elbow: "I wasn't really sure what to do and so I just pulled up the prodigy patient information leaflet and said "Right, I will show you this information leaflet." As we were reading through it, I was learning about what we should do." Registrar 4

> Regarding plantar fasciitis: "Well I had a leaflet to tell them, you know, like an advice thing. So we went through why they got it and what their job was and about supports in the shoe, anti-inflammatories and, you know, we offered "You can have an injection but you can see how this goes first."" Registrar 7

> "Rotator cuff, I suppose, was one that I quickly skimmed through before and I said "Well we'll try physio, we will try non-steroidals, but joint injection is an option." Registrar 14

> "You know the first time I had a really bad ankle sprain come in, I, you know sort of hesitated and felt my way a bit and printed off the Prodigy leaflet and went through it together and things. The next time, you know, I was much more confident in giving the advice and starting to pick up, you know, more sort of individual cues, but until I had seen an ankle sprain, I mean, you could have told me, you know, "Oh well, you need to check this, this and this", but I don't know that I would have retained it quite so much." Registrar 8

How they learn currently – Learning from textbooks

It is part of the requirements of a training practice that they have a library of relevant books available for registrars to use. The registrars discussed using books for reference but also appeared to use the internet as a source of information. The Oxford Handbook of General Practice was frequently mentioned.

> "I had in my room the Oxford Clinical Handbook and I had the GP one and the medicine one and the specialities one, so I would often have a quick look in there, but I didn't tend to look at them with the patient in. It would either be before, if I knew what they were coming in with, or after once they had gone,

and that tended to be to make sure you are covering all of the blood tests that are recommended." Registrar 7

"The library in our practice is quite out of date. I have quite a few of my own books in my room, but generally they are the kind of Oxford Handbook type of things, and it is normally when I get home and I look at my old ..... my old clinical examination textbooks and things like that, that ..... I don't have any of those in the surgery really. It is just every time you read it, you realise that you are always forgetting something, and then you remember something and forget something else." Registrar 11

"I am quite good at searching on the search engines for things and when we get the new Mims every month, my seniors have told me it is always useful to look through the first few pages and look at the new drugs and things. That is quite useful and I have all my kind of textbooks to refer back to, but the problem with those is that they go out of date so quickly." Registrar 11

"I am not the most skilled internet user. I am getting better. I often just kind of put the drug name in and I appreciate that quite a lot of this stuff.... I think I am reasonable that kind of looking to see if the information is valid or not." Registrar 11

Regarding internet resources – "There are a couple of good ones. GP notebook is pretty good. E-medicine is quite good – e.medicine.com – it is an American one so it is a bit American, but there is some useful stuff in it. What else? Ah, yes, Prodigy is "the best thing since sliced bread", and then you could just use Google if you haven't found what you are looking for." Registrar 5

The Oxford Handbook series of books are commonly used by junior doctors for reference purposes. Two of the registrars commented that the musculoskeletal section in the Oxford Handbook of General Practice was not especially helpful.

"Sometimes I use the Oxford Handbook for that, but it is difficult because of the way it works. It is not symptom based, so you have actually got to flick

through wrist pains and read them all until you find a one that rings a bell." Registrar 2

"The Oxford Handbook is not much information to be honest. Because when I looked, it doesn't give you too much information. It doesn't give you to, what to examine and like, you know, how to examine the patient. All examinations and things like that?" Registrar 10

One of the registrars in the focus groups remarked that textbooks may not cover the common problems seen in primary care.

"You know you can read about rheumatoid arthritis and get an idea of what that is all about but the minor pulled strains, ligaments, tendons, all that sort of stuff..." FG 1 Registrar 3

How they learn currently – Learning from their own personal experience

The registrars learn from their own personal experience of medical problems and often apply the knowledge they gain to the patients they see.

"I have had back problems myself and have been to see a physio for the back, so I know what they offer and that sort of thing" Registrar 3

"I think that was more me speaking common sense rather than anything else and I don't know, dare I say, having done a few half-marathons myself and been walking up a few mountains, I have personally got an idea of what you can do and what you can't do and the little aches and pains you get and all the rest of it. So it was very easy for me to sort of give out....she was almost after practical advice." Registrar 3

"Myself, having done the Great North Run and got severe pain in ..... afterwards. I went to see my GP. She told me she had, I had chondromalacia patella, which I now realise you can diagnose more or less on the history, but she didn't examine me at all, and at the time I was a medical student and I was expecting to

> be examined, so I kind of have that in my mind as well, but she said "Oh, take some pain-killers and that should sort itself out." So I went to see a physio, who gave me vastus medialis strengthening exercises and, you know, before I had great difficulty walking down stairs and after only a few weeks of doing exercises..... well a few days, I noticed a big difference." Registrar 8

> "I think part of it is just practising it and I do something.... if there is something I always forget on the examination, I stick it on a post-it note so if I know I am going to do that examination I glance at it." Registrar 11

How they learn currently – Learning from their friends' personal experience

Registrars often discuss with either their peers or their friends, patients they have seen and what their options are.

> "We have a group from the first GP group and we just keep in touch with each other. So if I have a problem with the paediatrics, I speak to my friend, who have been GP in paediatrics. He has been a registrar for a long time, so I ask their advice. Generally we just discuss with each other and ask advice of what we can do sort of differently." Registrar 6

> More awareness of biomechanics "Yeah, I mean, I have got another friend, who did sports medicine as her intercalated degree and you know she has similar..... she gets anterior knee pain when she runs, so she needs to be careful what footwear she chooses." Registrar 8

How they learn currently – Learning from their trainer

The registrars discussed the different ways in which they learn from their trainer:

During surgeries:

Registrars either ask their trainer to review patients during surgeries or may call their trainer to ask for advice. In particular, they appeared to appreciate the chance to examine the patient with their trainer present or watch the trainer examine the patient they have just seen.

> "There are things where you just pop down to your trainer and say "What would you do about this?" and they say "Well fine, OK, we will do that"" Registrar 3

> "I had seen the chap with the swollen ankle before, and then he had come back with a digital photograph of when it was really bad, and I said "Oh, it doesn't look that bad now", and I have just waited until the partner has finished with the patient he has been on, and he has come down and seen him." Registrar 14

> "My trainer pulls me in, particularly for rheumatoid and osteo and musculoskeletal problems. Like, tells me to come and see stuff, because I think he identifies it as an area I might not have actual experience in." FG 1 Registrar 3

> "Lots of occasions of wanting to sort of go over my examination of knee pain, examine joint, can't really work out exactly what is going on, so, for a second opinion to come in and look at it, examine it and see what they think also. I have done that quite a few times." FG 1 Registrar 5

> "The first chap I saw who had it had really vague symptoms. It didn't all seem to be fitting together and he had a lot of other chronic illness as well, but his was a more difficult diagnosis to come to, and after speaking to my trainer, we decided that was probably it. He had raised ESR and CRP. They came down with steroids and he has been much better." Registrar 14

Discussing whether to refer a patient and if so when and where was an area where registrars appeared to telephone their trainer to ask for advice.

> "I called yesterday. I am not sure, but I think this person needs referring now, but I have got to be able to sell this to somebody on the phone, so I just need to confirm that this is the right thing to do. For anything else, I would probably say

> "You know, we need to get you back in a few days' time. I need to do some research, talk to somebody and do a bit more history and examination then and try and build on the story." So I delay most of my stuff to the tutorial, which is once a week, and then go through stuff unless I think ... well the question is do I need to send him in now?" FG 02 Registrar 1

Teaching could also be on an opportunistic basis for example at coffee time or at the end of the day.

> "It has been quite specific sort of almost case....if a problem has come up with a patient, then sort of quite focused, sort of little bits of information rather than anything else." Registrar 3

During tutorials:

> Teaching on back pain from trainer: "An e-mail including references to articles, so the Bandolier Back Pain page, the Prodigy back pain page, which I have read both and got them bookmarked. The (what else did we do?) articles or well photographs which had been scanned in, what I think my trainer had used on previous teaching which demonstrated exercises and also showed the positions and the asymmetry.....examples of asymmetry to look for. They didn't actually come out terribly well on the picture that he had done, but you know he had gone to a lot of effort really. He is quite an enthusiast. Then, you know, Powerpoint presentation on the screen and then discussed the exercises with demonstrations." Registrar 8

> "I have talked about individual cases but we have sort of concentrated a lot on consultation skills and things, as you have done in your phase 1." Registrar 8

> "Yes I did speak to one of my trainer actually and usually we have a tutorial twice a week and he said "well, what you want to discuss about?" I say "I probably like to do some rheumatology."...What did you do in the teaching? "Well I did rheumatology knee. How to examine the knee, somehow those

> things, knee pain and neck pain and back pain."....."Well, I'm quite confident after all the reading, after the tutorials and things. Picked more confidence up." Registrar 10

> "You know, I think this is what is going on and where ... you know, who is the best person to send this to? Or sometimes, you know, what are the appropriate investigations to do, you know?" FG 02 Registrar 1

During surgery teaching sessions

> Regarding 'The Back Book': "The partners are brilliant actually and they will try and do little talks about certain topics, and one of things one of them brought in one day was the book, and said "Oh look, we can get this for 25p. Let's send off for a whole bunch. Would people agree?" Registrar 4

Registrars discussed that, at times, they felt that it was not practicable to ask their trainer for assistance during surgeries. They gave different reasons for this including: not wanting to run behind in their surgery and how acute they perceive the patient's presenting problem to be.

> "Well it is just.... it is minor stuff, it comes in all the time, they are busy, I am busy and it isn't sort of a practical thing to do." FG 1 Registrar 4

> "I just think, well if I don't know, they are not going to know..... But I am not going to run my own practice like twenty minutes late, running late waiting for my trainer to come in. It just is not going to happen." FG 01 Registrar 4

> Comparing musculoskeletal to dermatological problems. "They can come in, see a rash and make a fairly quick spot diagnosis. Rheumatology is a bit more convoluted. The history is more important and you are.... it is time isn't it? If they are going to come in and try and help you with the diagnosis, they are going to have to review the history with you and that is not just a case of seeing a rash and saying that is tinea or something, or ringworm or whatever." FG 01 Registrar 6

> "The severity of it, sort of the history as well if it was quite an acute thing. I don't know. It depends on how happy you are with something or not, so a combination of your confidence and your ability to examine them and decide what it is versus how severe or what you feel is going on. You know, do they need to be seen straight ... do they need to be referred or is it something that you can manage? So they would be factors that would influence it" FG 02 Registrar 3

> "I have, basically, there have been lots of occasions similar to what you have just mentioned, but I have never actually asked my trainer because I have felt, I don't know quite what it is. I would like to, but I feel really it is a very minor thing and shouldn't be really asking anyone else so I end up not having mentioned that I want, but I know it won't make any difference to the management, so I haven't been asking." FG 1 Registrar 4

One of the registrars commented that they may not have tutorials on specific topics

> "It is not like topic based things. It is better for you to go and learn about that from a book. That is why we decided that I should go to the physiotherapist for that kind of thing and go to the chiropodist because that is the best ... not the best way to learn about disease or unless you were doing random cases and the random case came up to be something musculoskeletal then he might..... it hasn't come up as a topic, just more with sort of time limitations and things and getting a combination between topic based seminars and, you know, videos and communication skills and things like that" FG 02 Registrar 2

How they learn currently – Courses/External Teaching Attended

General practitioners and in particular registrars, have access to external teaching provided by different sources. The registrars mentioned attending the minor surgery course which includes a section on joint injections and is run by the Vocational Training Scheme. The only other musculoskeletal teaching that was mentioned was by one of the registrars who had attended a drug company meeting.

> "It was a drug sponsored talk and I don't actually go to many drug sponsored things at all, but it was one of the Mediproof talks, and I had actually missed the first one that was set up because I was away travelling, and so many of my friends went and recommended it, so I just decided to go to the next one and I kind of loathe those kind of things. I went for the talks and it was actually Dr "X" that did it and I found it really helpful, and I would have loved it to go on for another hour. He was too short of time and had to kind of rush off, but that is the kind of thing that I would find helpful." Registrar 4

Effect of this education

Effect of this education - Effect of good teaching from their trainer

A few of the registrars had had some teaching sessions on musculoskeletal topics from their trainer or other general practitioners and they discussed the effect that good teaching has had on them. It appeared to increase their confidence in examining patients, making a diagnosis and managing the problems that they see.

> Following a session on back pain. How do you feel? "More confident. Less helpless. Less inclined just to say "Oh, take a leaflet and some painkillers and, you know, a week off work and come back and see us.""".... "I am more confident about giving advice for preventing it. Simple things like "If you sit at a computer, you don't have your mouse way out with your arm extended because of the weight on your shoulder""..... "That is what I am aiming at. That they take their own responsibility for their own back care and that they feel able to influence the future of their back." Registrar 8

> "He saw a patient and he thought it was a facet joint problem, and he did get pain that radiated around to the chest wall, which is what made me think of it in this lady, but it was quite interesting because the person that I saw with facet joint problems, it was when I was doing out of hours, and one of the nurses who suddenly got this pain, and when the doctor sort of, made her do different movements, it kind of put it back into place and was quite interesting."......

> "Yeah because they have obviously got so much more experience that they see these things all the time, and a lot of the time you think, "Ah, that could be"..whatever they say... "could actually be related to another patient I have seen." Registrar 9

> Regarding shoulder pain teaching: "It was useful in the fact that at least you know you knew that there were specific things to look at. I mean you know..... and to him, he said examination was also a form of reassurance and a way of actually telling the patient the limitation to what you can do really, because most of the pains end up, may be like 75% or 80%, end up being chronic, so it was a way of demonstrating to the patients that, yeah, you could do this to a level and do that to a level and then that is actually good.." Registrar 12

The registrar, whose trainer has a special interest in sports medicine, particularly seemed to appreciate that there may be many management options available that others are unaware of.

> "When people, when people say there is nothing that can be done, I am less inclined to believe them. It is more that.....my trainer uses his phrase "bankrupt expertise" that they don't know what can be done." Registrar 8

Effect of this education - Bad learning experiences

Two of the registrars recalled musculoskeletal learning experiences which they had found off putting. One of these experiences had resulted in the registrar learning whereas the other two experiences had not.

> "I mean, I hated being told "Right you, you show me how to examine the knee" but they did that and it makes you scared, and you know that tomorrow they are going to ask you that and then the next day you have to do. When someone is watching you, you make sure you are doing it right. So that has definitely taught me." Registrar 1

> Talking about using a doctor in the surgery who had an interest in musculoskeletal problems: "The only shoulder one that I ever referred actually was referred to him, and then he injected it and it got a lot better. And he did try and explain to me what he had done but I..... You know, he was a really good doctor but he was very, very ..... he was really, really clever and he always used to explain things in a far too complicated way, that if you like assume a basic level of knowledge, you feel like you don't have that basic level and you have just gone way over my head, but he just didn't seem to be able to bring it back down and explain it." Registrar 2

> "I do remember having a really, really horrible exam in musculoskeletal examination where they were getting us to do Trendelenberg's and everybody got it wrong, and the guy was mad with us because nobody got it right. So rather than saying "Right, you have all got it wrong, this is how you actually do it. We have obviously taught you wrong.", he shouted and so I have never.....I have always had a thing and haven't had a clue how to do it because I get really confused." Registrar 2

Effect of this education – Confidence

A number of factors appear to have an effect on registrar confidence at managing musculoskeletal conditions.

Confidence appeared greater in registrars who had had experience in Orthopaedic (three of the registrars taking part in the interviews) / Rheumatological (two interview registrars) / Accident and Emergency (four interview registrars) posts. The registrars themselves linked their confidence to having had this experience. Although they also reported that the jobs, especially orthopaedics, were not particularly relevant for general practice training and that accident and emergency did not prepare them for the longer term management of patients.

> Registrar 03 had had an orthopaedic post as a house officer: "The bottom line is a lot of it was getting patients ready for theatre, which is actually irrelevant to

> general practice. You do get an idea of what needs to get operated on, so I have sort of got my sort of flags for when operation is indicated, so when to refer almost..... the other thing was that he was a stickler for examining joints, so I know how to examine every joint."
>
> "Actually having known how to examine joints and that sort of thing, it then followed on really nicely and consolidated it a hell of a lot. I have taken a hell of a lot from doing A&E." Registrar 2
>
> "You tell them to go away and if it is not getting better in four to six weeks, to go and see their GP type of thing. The acute management is fine, but what I then didn't know was the sort of physiotherapy and now, of course, it then rolls on almost to joint injection and that sort of thing. I didn't know the sort of longer term management of these sort of conditions." Registrar 3
>
> "I generally got grilled on X-rays, but the teaching we had was much more on surgical techniques and certainly over my head anyway, and about different sort of joint replacements and things." Registrar 9
>
> "Whereas something like back pain, until I had started working, had been covered very slightly in orthopaedics but it is not their favourite topic, so they don't like to teach you about it, and yet it is so common that if I hadn't done A&E, I would have found general practice very difficult because of the number of back pains that you do see." Registrar 7

During the interviews, one of the registrars who hadn't had any musculoskeletal experience also commented about how experience affects confidence.

> "In my two house jobs I did, I didn't have any musculoskeletal experience so it is very new, and it is difficult knowing exactly how to manage the problems I have come across." Registrar 9

Two of the registrars taking part in the focus groups also commented about how not having had any experience beyond medical school affected their confidence.

> "But I have certainly had no teaching on how to examine joints outside of medical school, despite the fact of being in a position to have to teach this skill to people, which I find quite concerning." FG 1 Registrar 1 (NB this registrar did three years at university studying for a degree in physiotherapy before starting medical school)

> "Coming up with systems, I think because of the PRHO, you get into your routines with all your examinations so you like, OK you do "de de de" and you kind of just get used to that, and you just don't do joint examinations as a PRHO" FG1 Registrar 3

Good undergraduate teaching was also recalled as being an important factor in their confidence at managing musculoskeletal conditions. Although a couple of the registrars commented that they hadn't received much teaching as undergraduates or that it had been at an inopportune time.

> "I actually had a lot of repetition throughout sort of the pre-clinical years, and I think that is what has stood me in good stead is that it has been drummed in so many times that eventually it has sort of finally stuck." Registrar 3

> Regarding rheumatology attachment: "This was our first attachment, so it was really exciting and new. You always remember your first attachment. So, we got a lot of teaching and the staff there were really good and they made you learn things. You also as a student there, as well, you wanted to kind of learn, so that really helped. You know I found it interesting, but that was very helpful, but then after that there wasn't a huge amount." Registrar 1

> "We did all these things in third year so, by the time you reach final year, you kind of forget a little bit……I wish we had done it a bit later, so we could remember it better." Registrar 1

> "On the resource day, we were sort of in the department and we went around different rooms and so we met the patient teachers and things, and those have

> stuck in my mind a lot more and I have remembered that a lot better, and it would be quite nice to go back and do that again." Registrar 9

> "My orthopaedics attachment in finals was the week before the exams, so I didn't really do much orthopaedics at the time." Registrar 2

> "The other thing is that teaching at medical school is practically useless – well it was in X anyway."....."No, it is completely useless going to stand in theatre watching them replace hips. It doesn't tell you anything about what you need to know for general practice." Registrar 5

> "It may get taught very well, it is just, I don't think, as a medical student, you are particularly receptive to it, because it isn't the kind of stuff you need as a house officer. So, particularly in fifth year, your brain is just focussed on what you are going to need to be able to do the job in August." Registrar 2

Registrars who recalled having had specific teaching from their trainer also reported how it had improved their confidence.

> "The same for the knee pain, back pain, neck pain. All of them really, to be honest. I wasn't very confident at taking it.... but when I started to look at and read about it a bit more and have a discussion with my trainer and things about ... I started to be more confident." Registrar 10

There were suggestions that the registrars may be more confident at managing conditions that are seen in secondary care as compared to conditions that are managed in primary care and that being able to give the patient's problem a label was important.

> "Well I was fairly confident that it was an enlarged olecranon bursa and it was inflamed, but I didn't have the confidence to say "Well this is common and sometimes it comes up for no reason" or "This is common because you do this job and this is what we would normally expect to happen and this treatment might be helpful or you should have antibiotics", and I just didn't know what the natural history was and what the best treatments would be." Registrar 05

"I am not unconfident about picking up serious pathology and I am fairly confident about picking up absolute rubbish at the other end of the spectrum"……. "but it is the stuff in between where they might have a musculoskeletal problem that might be amenable to some kind of treatment, either medication or physio or lifestyle advice. That is why carpal tunnel and plantar fasciitis are satisfying, because you can work out what is wrong and you can tell them how to make it better, whereas with a lot of other things, you find you might be missing something, not serious, but something that you can actually help with." Registrar 05

"Personally, I find it difficult to treat something that I can't give a d….you know I saw this but then it could be this, this and this……you would feel more comfortable, and I just wonder if some of the insecurity comes over to the patient that I haven't given them a name and yes it is…..you know we should do this, but I haven't actually told you what it is. Do they pick up on that and know it is, because you don't know what to call it?" Registrar 07

"You don't see any straight forward things in hospital really, because people don't complain about them and so a lot of things I have had trouble with are the more straight-forward things, because it is kind of like .... if you came in with crashing heart failure, I would feel quite, you know?" Registrar 11

"I think, generally, it is the straight forward, the kind of low back pains, the arthritis, things that you are seeing all the time that are harder to treat, because they don't need any kind of secondary referral, and you are just trying to manage them with the kind of services you have got available and the analgesics you have got available and your knowledge rather than the things that need to be referred, because then it is almost like well, you know, we will make sure you are kind of pain free, but we are going to ask him to see what we are going to do next." Registrar 11

"I haven't seen much of the kind of rotator cuff type injuries and tennis and golfer's elbow and that sort of thing. I haven't seen much of that at all. That would be useful to see, because that is the sort of thing I don't feel as confident

> in. Whereas joint problems, I know which bloods to do if I am worried about an inflammatory process and I know that ultimately they need to be seen if we are worried about rheumatoid, whereas golfer's elbow and tennis elbow it is self limiting. You see them a lot in general practice and I ain't seen them!" Registrar 14

Registrars appear to perceive that musculoskeletal conditions seen in primary care are unlikely to have a serious or "sinister" cause which means that the risk involved in their management is less. This also is a factor in their confidence.

> "I think obviously with hip pain it is likely it is going to be, well in my mind, it is less likely there is going to be a sinister reason for it." Registrar 09

> "I guess it is the one other thing that makes me more confident about necks in the GP setting, is that you would be very unlucky for somebody to come into the surgery with a big fracture and an unstable c-spine. It is just unlikely to happen." Registrar 02

In many cases patients had seen different health care professionals with their presenting condition. This second or sometimes third opinion improved confidence in the diagnosis. For example, a registrar who reported that they are not confident at managing patients with rotator cuff problems had seen a patient during the diary month that they said they were confident at managing. They were asked why.

> "Because he had been seeing a physio about it and knew that it was a rotator cuff already and it had already been diagnosed. I was quite happy that his symptoms were the same." Registrar 14

The availability of widely accepted definitive advice as to how to manage a condition also played a role.

> Talking about back pain – "you have got fairly clear guidelines available to follow….. you know to look for red flag symptoms and if you haven't found

those then you can be reasonably confident that this is not something sinister." Registrar 05

"with ischaemic heart disease and hypertension, you have got such clear guidelines and it is such a priority with everybody that it is almost written down in black and white for you what you should be doing. Whereas, with musculoskeletal problems, there is nothing that described about them. There are no set protocols. That makes it more difficult." Registrar 14

It is recognised that confidence does not necessarily relate to competence, and, in some of the interviews registrars who reported that they were not confident did appear to be relatively competent.

Effect of this education - Perceived importance of musculoskeletal conditions

The registrars who took part in the interviews appeared to perceive that musculoskeletal conditions are of lower priority than other conditions, that they are "dull" and that they can be dealt with relatively easily.

"I mean the thing about them is there is nothing generally that needs an urgent, like on the day, admission really. So, in that way, you feel a little bit more comfortable, whereas someone who comes in with a chest pain or somebody short of breath, then obviously those things need to be sorted out like pretty soon on the day. So that way, when somebody comes in with a sore knee or something like that, generally you can be .... you can kind of bide time, but the other thing about it there is a little bit of uncertainty, whereas I think with things like chest pain and breathlessness that was a big worry." Registrar 1

"From a registrar point of view, it is very much stuff which you kind, sort of "fire fight" and then forget about type of thing and actually not get involved" Registrar 3

"I think a lot of musculoskeletal stuff gets pushed to the side." Registrar 3

> Referring to a possible week of musculoskeletal teaching during vocational training - "If I had seen that, I would have thought "Oh, that is going to be really dull and I don't want to do that." I would rather do palliative and paeds or something. But actually now, on reflection, I would have grabbed a week doing that." Registrar 4

> "I feel often there is less urgency..... you know it is not going to kill you." Registrar 8

One of the registrars commented how his trainer had never highlighted musculoskeletal conditions as an area that they needed to focus on.

> "Even for the all three general practices. That none of the trainer actually mentioned "Can we cover this area?" They all cover, OK, ischaemic heart disease, diabetes, blah blah blah blah. That's all on the top of the list we need to do these, these, these topics you need to cover. None of the trainers, believe me, actually said "we need to do rheumatology"." Registrar 10

Another registrar mentioned how they had intended to have a seminar on musculoskeletal problems but that other things would often come up instead.

> "I have always meant to ask him to do a seminar on the back and I think that was one of my aims when I started, but we have not actually had that opportunity, because every week something else comes up and it is a different ..... a difficult case or something but I'm sure he would." Registrar 1

Desired Learning

Desired Learning – What would you like to learn?

The registrars were asked what they would like to learn with regards to musculoskeletal conditions. Unsurprisingly a wide variety of topics were discussed. A number of the participants mentioned that they would like the chance to revisit the basics early on

during their time in general practice. They accepted that this would not be appropriate for all and that some would find this a "waste of time" (Registrar 3).

> "So I think for GPs coming into practice, it would be really helpful to kind of recap the major joints, examination , history and examination of the major joints and also kind of major rheumatology problems. To go over and make sure that people, either, you know, could remember it or are learning about it for the first time." Registrar 2

> "I would want to practice a normal examination of all the major joints and then probably the obvious abnormalities would be useful. You know the obvious rheumatology abnormalities would be useful to see, so that they would become more recognisable." Registrar 2

> Regarding examination: "I know there are some short cuts that we can take as GPs and that would be really useful to go through. What would be kind of valid and acceptable to do? Because I have been told various short cuts along the way and they are not always the same from different people, and it can be a bit confusing in terms of what you are actually looking for with certain things. That would be useful for a start, so just a kind of broad revision of how to examine, and then what I would really find useful is just a brief differential of the main conditions that can affect shoulders that we will be seeing in general practice and, you know, vaguely where we should be heading in terms of management plans for each of them. I think I could extend that to talking about that for the knees as well. I don't feel very confident about examining hips and foot pains as well. I don't see a huge amount of them but when I do I haven't got that much knowledge about arches and muscular things and plantar fasciitis and all the differentials there, and that would be useful to go through feet." Registrar 4

> "I think it is difficult because everyone has a different level of experience, so I don't know whether I have just got (because I have not got very much experience) I feel that I would benefit..... I would have benefited from some teaching at the beginning but then obviously some people won't need that, so

maybe it would have been better just to have the session with the trainer earlier." Registrar 9

"I think just a kind of refresher.... I think..... it is really difficult, isn't it? I think it is always nice to have refresher courses just so you know the examinations you are doing are correct and you know the histories you are taking are accurate and correct and that you are probably obtaining the information you need to take the next step from those. Any kind of reminder is always useful to either consolidate your knowledge or makes you realise that you actually don't know very much about that and you need to kind of put a bit more work in." Registrar 11

"I think joint examination because I think if we are not ... for me, if I am not actually examining it properly, then I am not going to get the diagnosis and you are just left with the symptoms and it would also be ... it would be reassuring for me to know that either someone has watched me do it and said "Yes, you are doing it and you need to do this as well.", or I have sat and watched somebody doing it and I think "Yes, well I do pretty much of that." and therefore I know I am doing the right thing, and therefore I know I am more likely to get the right diagnosis. And particularly if you talked about face-to-face, I think. The other stuff you can read it up if you take your time in the books, but it is harder to learn how to examine a joint from a book, because it is a dynamic process." FG2 Registrar 1

Specific topic areas that the registrars would like to cover were also discussed. These seem to divide into two – the management of primary care problems and the threshold at which to refer to secondary care. The range of musculoskeletal conditions seen in primary care appeared to be covered.

"It is just sort of management in general practice, what can we actually do and when should we be referring you know. It is sort of that" FG02 Registrar 3

"I think, yeah, just knees and ..... just knees and back really." Why? "Probably, yeah, there are a lot of backs. I mean lots of these are about knees and lots about backs." Registrar 1

"I am not sure, 'cause I would have said back pain but I was kind of happy with that, but if I hadn't, if it was my first job out of house officer, but definitely I would want, you know, teaching on back pain and to know really what to do with that. I would definitely have benefited from some teaching on shoulder pain and differential examination and what you do with it, that kind of thing. It might have been useful before I started to have known about plantar fasciitis, because it was relatively common and I hadn't really heard about it" Registrar 7

"I think the things that you would like to be able to deal with....well the common things that seem to come up is knee pain, shoulder pain, foot pain, back pain, neck pain. They are the things that I think are the commonest things that you see, and what I would like to have is an idea of the underlying..... the differential diagnosis and the underlying pathology. I still don't understand what people mean when they say a strain or a sprain. You know, the molecular or cellular or organ terms? I don't know what that means and then given one of those symptoms, what sort of things you would look for in the history to help narrow that down, and then what sort of things you do in the examination to think about ruling it in or out." Registrar 5

"I think easy things to deal with would be complex shoulder problems, because it seems a lot clearer cut and there seems to be a lot of evidence of physiotherapy and things. And also they tend to be younger and they tend to get better. Whereas with the back pains, people tend to be older and there are a lot more lifestyle factors that are contributing to it which are harder to change, and that is why I found back pain more frustrating than things like joint pains in particular." Registrar 9

"Maybe sort of an overview of the general management of musculoskeletal problems like sort of back pain, investigation and management actually but with

joint pain and back - that would be quite useful because they are so common." Registrar 9

"I would put shoulders, the neck. I would definitely put knees and then back and so on. Those would be sort of making sure you have the examination techniques you know. So examination of, let's just say major joints from representation and then you would also do..... I mean analgesic - maybe a lot of people have their own ideas and it is just going to be uniform to try and describe this is when you are meant to do this, and saying OK - when do you sort of not give up or when do you sort of think about referring this patient, and you are happy that the consultants are happy that you have done.... the hospital consultants are happy that you are doing a maximal test in the GP surgery?" Registrar 12

"I think it would just have been really useful to have a quick broad recap of inflammatory conditions in terms of, and I know we have been told this several times, but the more you are told it the more it sticks. Just the main features of the history.... You just think "well how do I unravel that?"... So although I think we probably do know the basics, I think sometimes, because the reality is that general practice patients aren't textbooks, it would be useful to maybe have the kind of key points that we really should be asking and maybe some little tips about, well if it looks like a complex mixed history, these are the things you should be really looking for and listening for." Registrar 4

"Simple things I would want to know: when to send people off for X-ray and that sort of acutely with injuries, and then also with arthritis and sort of OA of the knees and hips and that sort of thing. I would want to know when you think it is an inflammatory arthritis and sort of blood tests to do to help guide you whether or not. I would want to know about analgesic management of problems going through things like sort of rest, elevation, splints, through sort of anti-inflammatories and that sort of thing. And then that goes into sort of joint injections and that and then the indications for joint injections and how often. I would then want to know a bit about what physiotherapists offer and for common things how long should you give patients before you refer them. Do

> you refer them immediately? Do you say come back in four weeks if it is no better? And then I would also like to know when people can return to using the injured or the affected part of the body and that comes down to a) from the sick note and occupational health point of view and also b) from the sports injury point of view. The simple things like can you return to normal activity. I think then you can get into more specialist things." Registrar 3

> "I think when to refer kind of thing for rheumatoid and osteo because we knew, getting taught in the hospital, you are seeing cases that are in the hospital and they are obviously quite serious and you know there are inpatients as well who are unwell, but in general practice people aren't that unwell generally." Registrar 1

One registrar highlighted the importance of including red flags in the teaching content.

> "Knowing all the red flags, so when people do tell you a story ... because I think once you have heard so many stories so many times, you think that's ... there is something about that that doesn't sound right, and I am not quite sure what it is." FG 02 Registrar 2

This part of the project took place before the publication of the Royal College of General Practitioners curriculum for general practice. A couple of the registrars mentioned their desire for a curriculum or a set standard that they ought to achieve.

> "I think it is very sensible to have a basic syllabus, not syllabus but, you know, the core topics, because then you have got an idea of what you should cover." Registrar 3

> "I think it definitely would be useful to get some sort of standardisation of what we are taught because, I know, just from, you know, completely random discussions with other people at my stage, some people had hardly any training at all and I feel I have had relatively little, but I have probably had a lot more than some people, so to have some sort of check list for a start of common conditions that you at least know you have covered theoretically or know that

you should be discussing when you see them cropping up, that would be useful for a start." Registrar 4

Desired Learning – Anatomy

A couple of the registrars specifically mentioned anatomy and alluded to it being included in musculoskeletal teaching.

"The shoulders I mean.....I am fairly confident with the shoulder. Just like a shoulder pain on its own, just because there are not as many structures as on a knee so you are kind of more....you know what capsulitis is. You know they can't do all this and you know tendonitis or whatever. It is a bit more clear-cut I find anyway." Registrar 1

"I have forgotten quite a lot of my specific anatomy." Registrar 4

Regarding shoulder anatomy: "I think it would be quite easy to.... if you were taught it, I think it would be easy to remember and it probably would help quite a lot to differentiate between the different causes of pain." Registrar 9

"When he talked about examining shoulders, it was mainly shoulders he was talking about and about joint injections into shoulders and it was mainly for the GPs that currently are doing joint injections, but it was quite interesting because he talked a lot about the anatomy so that was quite useful." Registrar 9

Desired Learning – How would you like to be taught?

A common theme throughout both the interviews and the focus groups was that the registrars would appreciate any teaching regarding musculoskeletal conditions to be divided into the different anatomical areas affected. I.e. for it to be joint based. This reflects how patients generally present.

> "Sometimes it is nice to group it in the different joints themselves so you produce something looking at the shoulder, looking at the back, looking at the knee and all the different." FG1 Registrar 2

> "Yeah – you have got a shoulder. What do you need to be thinking about? What are you saying in the points in your history? What are the key bits of the examination? What bits do you skip? You know if that is not in the history you don't need to examine that bit, or you do still need to do it or.....that would be quite helpful and then a kind of.....yeah, they are the main things. But joint based I think for musculoskeletal because looking through my diary, everything is pretty localised" Registrar 2

> "I think I tried to look up plantar fasciitis and I don't think.....was it that it didn't come up with anything? There were a couple of common things that I thought were quite common, that actually there was no information about at all and I am quite sure I spelt it correctly and you know..... and it would have been useful to have typed in something like heel pain and to come up with.....quite often if you put in, you know, just vague...it wouldn't come up with anything at all." Why would you have liked to put in something like heel pain? " To make sure that you have got your differential list that you know..... I know that plantar fasciitis causes heel pain but actually what other things do?" Registrar 7

One of the registrars in the focus groups suggested grouping conditions according to their severity.

> "Sometimes it is helpful to do sort of common-minor, ser..... common-serious and rare but not to be missed." FG1 Registrar 5

Another registrar recalled teaching that they had had in the past and in particular lectures which they had not found beneficial.

> "I think we had a bit of teaching they did on, like I think it was a Wednesday afternoon or something in the lecture theatre. That was in the "General". That was the people who run the MRCP and I used to just go because it was quite

> good teaching. I think there were one or two sessions on rheumatology and orthopaedics but, funnily enough, I am not very good at remembering those. I can remember the things that were done in the third year and I don't know why that is!.....Because they were lectures, you know, and obviously there is a lot of information coming towards you and you are writing notes, and I remember writing those but I can't remember what they were about, but definitely third year stuff really sticks in your head. How we practiced on each other and how we remembered the joints and what patients were like." Registrar 1

When asked what the ideal teaching method would be, the registrars repeatedly said hands on teaching that was either case histories or with real patients. They reported that when this has been used in the past, they find it much easier to recall the information and to relate it to the patients in front of them.

> "I always remember how we were taught examination, because it is visual. I find that easier to remember, like, something you have seen, and the people who taught us examination, they always made us do it in front of the group and if you are put in a spot you remember it because you are scared and you know." Registrar 1

> "They do help me remember if there is something that has a typical presentation, then a case history helps me remember it, particularly if you know it if is linked in some way." Registrar 2

> "They did quite a good teaching session based on case histories. I think it is always much more helpful than factual learning because it deals with real problems that come up, and the real world being grey rather than black and white." Registrar 5

> "I remember the teaching day that I had in third year was actually quite a good day, and it would have been really helpful to have done that before I went into general practice, to go around the different rooms and meet somebody with rheumatoid arthritis and examine their hands, or you know, talk about the significant things in the history and that kind of thing," Registrar 2

> "When I have had a patient to relate it to rather than any theory.... you know any talks, cases – always cases. To have a visual picture, to have a story to hang it on is a much better of remembering things rather than..... and repetition you know a similar case." Registrar 8

> "Clinical cases. I think it is a lot easier to remember it – I definitely learn better that way." Registrar 9

> "On the resource day, we were, sort of, in the department and we went around different rooms and so we met the patient teachers and things, and those have stuck in my mind a lot more and I have remembered that a lot better, and it would be quite nice to go back and do that again, because you probably would pay more attention at this stage." Registrar 9

> "If you go and read in the book 'polymyalgia rheumatica', you probably have read ten times, but if you ask me, I probably know nothing about it. I couldn't tell you any single word about it but if it has something like, you know, like the case study and the case discussions and everything, I probably would never forget it." Registrar 10

One of the registrars mentioned that they would like a handout or something else that they could refer to after the teaching.

> "I think, me personally, I would quite like a little book. Particularly if I had gone on a course and we had gone through all the different examinations and the different histories, a little book would be really helpful." Registrar 2

Registrars emphasized that they would like the teachers to be experienced, approachable and good teachers.

> "Just good solid chunks of the main conditions you are looking at. Just someone who is accessible and approachable to say, you know, to answer questions that you may feel are very basic, but actually they are quite important questions that

everyone has but we just don't ask them, and we don't reflect much in our practice." Registrar 4

"If you can find a consultant who is a good teacher, is approachable and you get the impression that they don't mind being asked anything in a small group, that is how I like to learn."..... or GPSI "Yeah, that definitely in terms of, you know, they are the ones who see what we see and they would know "at the coal face" what is useful and what works.." Registrar 4

In particular, registrars expressed a desire to be taught by physiotherapists both because they are experts at examining joints but also because they wanted to ensure that they use the service appropriately. This would not replace any other teaching, i.e. that from a consultant or their trainer but would complement it.

"I think maybe physios as a first-line review, really useful just in terms of the basic easy exercises that we could teach and, you know, even during the last six months in terms of kind of knee pain, I have been taught about quadriceps exercises. I have heard about quads exercises, but you know we never get told basically the logistics of how to do things, so that would be quite helpful; maybe some basic joint exercises for the main areas of the body." Registrar 4

"I think it is useful to actually..... probably to speak to them more. Get more of an opportunity to speak to them and possibly for them to say "Well you know our role – we are very good at this and good at this but really can't do much with that"" Registrar 9

"Perhaps something which would be sensible which has just occurred to me, actually going to see a physiotherapist and saying "Look, right" and perhaps writing down what I have seen in a week or whatever and then saying, "Look, right, when do you want these people? When don't you want these people?" and that sort of thing. That would have been useful to do." Registrar 3

"I mean, I arranged a teaching session with a physio in that..... the practice physio just... they went through what they would consider to be a basic

> assessment of joint problems, what they would do and in any one session you can't go into much more than that.....Yes, it was extremely helpful. Yeah, it was excellent. It was really good, but you can only do so much in an hour and, really, if you wanted to follow that up, you would be needing to see people fairly regularly and discussing with them what they thought and what you thought. You know, they are much better at coming up with a differential or a fairly accurate clinical diagnosis based on history and examination alone than I am and I am sure most GPs are." Registrar 5

They mentioned the different times at which teaching could be provided. It appeared that they felt it would be more efficient to be taught as a group, for example by the vocational training scheme, and also that they would require a reasonable length of time to cover the area. It was felt that the teaching should take place whilst the registrars are in their general practice attachments as it is then more relevant.

> "I don't think a half-day or a day is enough in that context and I think there would be plenty to cover in a week." Registrar 4

> "The scheme would be one option. The only problem there is if you have got someone who is very experienced in that and is going to find that session useless. I don't think there would be many people like that. I think the majority of people would value that kind of teaching, but you would have to discuss that at a group level and decide whether or not it was going to be appropriate.....I don't think it needs to be done on a one-to-one basis because I think that is quite wasteful of people's time, especially if you are going to involve other professionals, and I think you can do it in group teaching. The central scheme would be a good place to do it if it was agreed amongst the group that it would going to be helpful." Registrar 5

> "I think you are more focused when you are actually in general practice and seeing a lot of it. You are more focused about what you need to know, so you actually get something from it rather than just thinking." Registrar 2

Desired Learning – Experienced teachers

Trainers are an important educational resource for the registrars during their year in general practice. They provide support during surgeries and also teach the registrars during tutorials. One of the interviewees had a trainer who has a special interest in musculoskeletal medicine. A couple of the other registrars queried whether or not their trainers are adequately experienced to teach them about this area.

> "I think, because, even at the beginning, when I sat in with my trainer who is very proactive, if someone comes in with hip pain you know, sort of eyes light up with enthusiasm. "On the bed and let's try this. Let's try this. Let's try this. Oh right, it must be your piriformis. You need to do these exercises, rest in this way and see the physiotherapist" kind of thing. So yes, I mean he kind of gave.....it is a whole different level of sophistication." Registrar 8

> "I think I have gained a critical eye for perhaps secondary care or even physiotherapy care at times. When people, when people say there is nothing that can be done, I am less inclined to believe them. It is more that.....my trainer uses his phase "bankrupt expertise". That they don't know what can be done. And it is a question of knowing someone who knows someone, who might know someone who has experience in that area." Registrar 8

> "I am not sure trainers are the best people to do it, because I think often they are sometimes just as in the dark as we are. " Registrar 5

> "I think the difficult thing is that very often your trainer doesn't know a great deal either, so even if you try and address it during your own tutorials and stuff, it is tricky." Registrar 2

Desired Learning – Pressures on learning

The registrars have a number of competing interests on their time. Not only do they have to learn about all of the different clinical areas they are encountering and to develop their consultation skills but they also have examinations to focus on. One of the registrars mentioned how they struggled to get time to arrange a joint clinic with their trainer in order to learn joint injections.

> "I think I didn't have much time really. The reason I did my minor surgery course after I was so busy doing my exams because I did everything – my full summative assessment in last month. I did my MRCGP in last 6 month. So a lot of pressure for the making videos and all those things and when the other partners were doing minor surgeries, the patient they usually do in the morning, so I didn't actually get around as I was already booked for my own surgeries." Registrar 10

Discussion

The registrars appeared to be surprised by the number and variety of musculoskeletal conditions that they saw. In particular they were surprised that they didn't see more of the disorders that are commonly seen in hospital, such as rheumatoid arthritis, lupus erythematosis etc.. This probably reflects the undergraduate and postgraduate training they have received being weighted towards these and minimal time being spent on learning about the common conditions seen in primary care such as osteoarthritis and soft tissue disorders. As a significant proportion of trainees become general practitioners (Lambert et al 2004), should medical schools change the focus of their teaching?

Comment was made about the trainees seeing slightly less chronic disease than expected which has been highlighted in studies in the past (Carney 1979; Stubbings & Gower 1979). Trainers need to be aware that this is a possibility and may need to make special allowances for this.

The registrars reported that they felt more confident at managing these disorders when they were able to give it a label and felt that patients may be able to detect the doctor's concern when they couldn't. It may be that, if the registrars know enough about a condition to be able to make a diagnosis, they are demonstrating that they already have an "illness script" for it which will include the management of the condition. According to Norman (1989) this would also increase speed of diagnosis, an important benefit for primary care where doctors only have around ten minutes with a patient. However, a primary care based study where general practitioners were trained in the diagnosis and management of patients with shoulder pain, the SAPPHIRE study, demonstrated that being able to give a label to a condition may not affect its' outcome (Watson 2008).

Paediatric musculoskeletal disorders were mentioned more frequently than their actual prevalence would suggest. The registrars also appeared much less confident in managing these conditions. They hinted that this is almost certainly due to their concern that the symptoms could be the presentation of something more serious and that, if missed, could have significant repercussions for the child.

When asked about Allied Health Professionals, the registrars predominantly mentioned physiotherapists. This is possibly again due to their experiences in hospital posts where they will have had little exposure to podiatry, chiropody and occupational therapy. The limited discussions surrounding the topic of joint injections confirmed the belief mentioned in chapter four that registrars experience injecting joints in hospital posts and develop the necessary skills but then are not confident enough to use them in primary care.

The discussions regarding what education the registrars have received and what they would like highlighted the important fact that they much prefer to learn in a real life situation and from people who are experienced in this area. These educational experiences appear to be much more pertinent and memorable for the registrars. It appears that they probably learn most when seeing a patient in conjunction with someone else and it was discouraging that comment was made that at times they did not want to ask for assistance during surgeries. Educationalists have commented on this being an important issue (Stewart 2007: Eraut 2003)

> "Then, there are many "naive" questions which they are reluctant to ask because they feel that they ought to know the answers and that asking will show up their ignorance. These can be slipped in when working alongside someone you know well, especially if they are only a few months ahead of you and still remember what it was like at your stage. But, if it entails a special visit or an intrusive appearance in someone else's space, asking questions may require a lot of courage..... The busier the environment, the more difficult it will be to interrupt." (Eraut 2003)

This is particularly important as it may hinder their development of illness scripts.

> "If the novice practitioner, lacking tools for integrating the abstract and particular, is unable to determine what an exemplar is an instance of s/he will be unable to learn from it ways to revise his/her practice." (Leinhardt et al. 1995)

They highlighted the importance of the basic sciences, and in particular anatomy, and suggested that revising the topic would not be unwelcome. An important point was made about how registrars will all have different backgrounds and so not all will want a revision of what they should know. It may be that vocational training schemes need to offer their trainees more choice when it comes to teaching programmes although there will be many who will gain from going over areas they believed they knew about.

Limitations of this work

There are a number of limitations to this part of the project.

Only a small number of registrars were involved in both the interviews and the focus groups and they were all from one vocational training scheme in the North of England. This may mean that the views expressed are not generalisible to general registrars across the United Kingdom. The second focus group with the phase three registrars only had three participants. The ideal number of participants for a focus group is seven to eight and so this may mean that this group worked more like an interview with three members which was not its' intended function. The members of the focus group were

all from the same vocational training scheme seminar group and so the dynamics had developed prior to the meetings taking place. This may have been beneficial in that time did not need to be spent establishing the group dynamics but, if the dynamics were inhibitory in any way this could have been a disadvantage. There was no evidence at any time during the sessions that there was an issue with the group dynamics.

The interviews and focus groups were all moderated by an interviewer inexperienced in qualitative research methods. I had attended a two day course on moderating focus groups and a week long course on interview methods, both run by the National Centre for Social Research which included holding a mock interview and facilitating a focus group. I also recognised that the communication skills courses that I have attended as part of my general practice training were beneficial as they train interviewers to use open questions, an essential part of qualitative interviewing. It may be though, that my inexperience led, at times, to biased questions being asked which would affect the data.

It must also be recognised that the interviewer/analyser has their own opinions on the research subject and so is biased and will have interviewed/analysed and presented the data from this biased view point. By including a personal statement in the methodology chapter, I hope to have declared what my positional position is and by including quotes in this chapter, I hope to demonstrate that the themes have developed from the data. The registrars had got to know the researcher reasonably well prior to the interviews due to the repeated contacts during the diary data collection period and were aware of the reason for the research. They may therefore have tried to answer the questions in a way that would please the interviewer. Conversely, the researcher being recognised as being a newly qualified general practitioner may have enabled the registrars to feel confident enough to express their true opinions.

These limitations must all be taken into account when considering the results.

Chapter Seven: Results - The Trainer's Data

Overview

This chapter describes the methodology and the results of the semi-structured interviews that took part with the trainers.

Aims

The aims of this part of the research were to:

- Triangulate the data obtained from the registrars
- Obtain the views of the trainers and explore whether these differed from, or were similar to, those of the registrars

Methods

As with the registrars, semi-structured interviews were used to explore the trainers' views. A topic guide (Appendix D) was developed following the registrar interviews. This enabled not only areas originally thought to be of interest but also those highlighted in the registrar interviews to be covered, allowing triangulation of the registrar data. The topic guide was developed by myself, my supervisors and Miss Nicola Marshall who assisted with the registrar interviews.

Recruitment

Eight trainers were recruited from the Northern Deanery. The trainers were purposively sampled for particular characteristics to try to obtain a breadth of views. The main features looked for were:

- A new trainer
- An experienced trainer
- A trainer with a special interest in musculoskeletal problems

- A trainer with a special interest in a non-related field
- A trainer who is also involved in organising small group teaching for the Vocational Training Scheme (a Course Organiser)

The selected trainers also incorporated doctors with other characteristics: an academic General Practitioner, a Royal College of General Practitioners' examiner, a medical student teacher and a trainer who also runs a 'Career Start Scheme' for newly qualified salaried general practitioners. The trainers also worked in different geographical areas: rural, semi-rural/urban and inner city. See Appendix E.

The trainers were initially approached by Professor T van Zwanenberg, Director of Postgraduate General Practice Education, prior to being invited by letter to take part. All the trainers initially approached, agreed to be interviewed. Ethical approval was obtained from the Northern and Yorkshire Multi-Centre Research Ethics Committee in 2004.

Data Collection

Interviews took place at times and locations chosen by the trainers. Six interviews took place in the trainers' surgeries and two took place at the trainer's homes. Each interview lasted approximately an hour and the trainers received £100 in book vouchers for taking part. Each interview was conducted by myself and was recorded prior to being transcribed. Written consent was obtained from the trainers and the transcripts were anonymised.

Data Analysis

The data was analysed by framework analysis as described in chapters five and six. In brief the transcripts were read and re-read until the data became familiar and themes/subthemes could be identified. A frame was then developed within Microsoft Excel and applied to the raw data. This allows comparison of the content of the interviews within and between interviewees for similarities and differences.

Results

The themes identified have been divided into three groups: registrar related themes, trainer related themes and educational themes. Each group is discussed separately.

Registrar related themes

- Registrars' musculoskeletal skills
- Shoulder pain and knee pain
- Management Issues
    - Use of Non Steroidal Anti Inflammatory Medications
    - Referral to Secondary Care
    - Referral to Allied Health Professionals

Trainer related themes

- Case mix
- Musculoskeletal training the trainer had attended
- Where the trainers learnt their musculoskeletal skills
- Trainers Confidence

Educational Themes

- Trainer-trainee interactions during surgeries
- Tutorials
- Referrals
- Resources
- Amount of teaching received
- Ideal teaching for registrars
- Current teaching on the vocational training scheme
- Complimentary/Alternative medicine

Figure 7.1: Themes and subthemes identified

Registrar related themes

Registrar related themes – Registrars' musculoskeletal skills

Registrars' ability at managing musculoskeletal conditions was felt to vary quite widely between registrars. Trainers perceived that those who had not had any prior experience appeared to struggle, particularly when compared to other areas, and their skills were felt to be inadequate. In general though, they were felt to be "safe" with regards to identifying more serious and life threatening conditions.

> "It is never a strong suite unless they have actually done a job in rheumatology. I think they struggle a bit harder than, for example, cardiology or respiratory or gastro, which are kind of the main themes in patient care that they have been exposed to in terms of jobs, usually." Trainer 2

> "I do not think they are as adequately equipped to deal with musculoskeletal problems from their undergraduate training as they are at some other areas, no." Trainer 5

> "I think it probably is one of the higher questioned areas of practice.... I think that there is a significant lack of confidence with musculoskeletal assessment and I see this through the third years and I would see it in the trainees, the registrars, and I also see it in the career start docs who are post vocational training." Trainer 7

Previous experience of managing musculoskeletal problems from having worked in areas such as rheumatology, orthopaedics or accident and emergency was felt to have a significant beneficial effect, especially with regards to their management skills. These registrars were felt to be more confident and were more likely to consider management options such as joint and soft tissue injections. One trainer commented though, that previous experience may not help with managing patients with chronic musculoskeletal conditions as these patients may not be encountered when working in these posts.

> "Oh yeah, there is quite a big difference. We have had some who are quite happy to inject knees and other joints and, yeah, I think the difference is quite striking." Trainer 2

> "They are initially better equipped. Very few of them may have the experience of dealing with the chronic side of musculoskeletal disorders and they may well have seen rheumatoid arthritis, they may be well equipped to make that diagnosis. The care of that person twenty years on is less likely to be something that they have experienced." Trainer 1

In order to try to understand where registrars' skills were lacking I explored this area further.

Registrars were felt to have good history taking skills although it was highlighted that they may focus on symptoms and may not cover important areas such as social and occupational factors.

> "I don't think enough people look at occupational history and predisposing factors, so I don't think it is emphasised enough. On the whole it is done moderately well, tending to concentrate on pain and characters of pain." Trainer 4

One trainer commented that history taking skills seemed better in medical students.

> "There is a fascinating corollary here because, having had final year medical students in the practice, one sees that the majority of final year medical students are very good at taking histories and perhaps not quite as good at the examination..... Now that might be about the time that they are given as medical students in this practice to do it and the much shorter time, even though it is longer than a normal consultation, trainees or registrars are given to take histories. But there seems to be a loss of history taking ability within musculoskeletal conditions." Trainer 1

Examination skills were felt to be basic.

> "I think joint examination isn't good often in registrars and I think it sounds like I am harking back to days of yore, but I don't think they know the anatomy as well as older generation doctors do. Not that that necessarily matters, because it is functional anatomy that really matters, isn't it? But, I think that they often seem to have quite a stereotypical way of looking at joints, which will often miss out some kind of key tests." Trainer 2

> "I think they have been exposed to the look / feel / move sort of orthopaedic examination, which has been fairly basic." Trainer 4

Comment was made that trainers often learn from their registrars and may be reminded of things that they have forgotten.

> "This is not an area I feel that I am being reminded in and taught in, and the perception of that is that they are not examining and saying "But look this patient has this sign, this patient has this" that I can perceive." Trainer 1

The trainers suggested that registrars appeared better at managing the initial, acute musculoskeletal problem but were unaware of the options available for managing more chronic conditions. In particular they relied on the use of analgesics and were less likely to consider the social and psychological issues associated with musculoskeletal conditions. They were also less likely to refer to members of the multidisciplinary team.

> "I think probably they are much keener to use non-steroidals initially than I am for many things." Trainer 5

> "They most probably had dealt with acute conditions before and I think that they can to a certain extent; they have a battery of treatments or strategies that are available to them for the acute conditions. Few of them will have had experience of treating the chronic conditions.... and therefore, will not perceive the involvement of a whole multidisciplinary team that might be far more

> important to this condition than actually an acute anti-arthritic drug or steroid or whatever that acute therapy may be." Trainer 1

The trainer with a special interest in musculoskeletal conditions identified an increased reliance on investigations and a perceived inability to formulate a diagnosis although he extended this criticism to other general practitioners also.

> "I would say on the whole they have a basic approach which reflects the style of managing musculoskeletal problems in general practice as a whole, so I wouldn't want to be too down on registrars..... I think there is an over-reliance upon investigations. Investigations really should confirm your working diagnosis and I don't think there are enough working diagnoses made." Trainer 4

One trainer's current registrar at the time of the interviews was an overseas (European Union) graduate and they highlighted an issue that these registrars may have experienced very different training to United Kingdom graduates. This might mean that their skills are not to the same standard of United Kingdom graduates and that allowances may need to be made for this.

> "It does sound like he / she had less clinical experience across the board than we do in the UK."...." In view of the history, he / she took a very medicalised history. He / she didn't really ask how it was affecting them, sort of involve their job and how was that affecting their job, how it was affecting their life. And in terms of examination he / she was just initially saying "I don't know what to do!" You know, sort of really, really struggling, so it was very much talking about the basics of how to examine. And then in terms of formulating a diagnosis again, whether it was just nerves with starting, but again it was very much struggling to make a sort of diagnosis and sort of thinking about how to manage it." Trainer 3

This could have implications for postgraduate training in the United Kingdom with the influx of European graduates.

Registrar related themes – Shoulder pain and knee pain

The registrars had highlighted that management of shoulder and knee pain were particular areas of educational need. This was both in the diaries, where they were seen to be not only common presentations, but also in the interviews where the registrars discussed further their lack of confidence in managing these conditions. This was reflected back to the trainers to see whether or not they agreed. The trainers agreed that these two particular presentations seemed to be areas where the registrars appeared less confident.

> "That doesn't surprise me." Trainer 6

> "These are the ones they often talk to me about." Trainer 8

A number of different reasons for this were identified. The most common, being that shoulder and knee pain are frequent presentations in primary care.

The belief that registrars' musculoskeletal clinical skills are somewhat inadequate recurred with trainers commenting that their examination skills, especially in this area, are basic. Insufficient undergraduate education was acknowledged as a possible cause.

> "I think they are things that don't get taught very well at Medical School" Trainer 3

Making a clear cut diagnosis of the cause for shoulder pain, in particular, was felt to be a contributing factor to their poor confidence.

> "I mean, shoulders are pretty common and I think that they often get jumbled into one sort of amorphous diagnostic mass of shoulder syndrome, and I think there are quite specific things in there that you can pick out." Trainer 2

As this can impact on patient management.

> "I think it is, you know, not having a clear cut diagnosis maybe but having a management skill or plan or knowing when it is safe to deal with uncertainty and when it is not" Trainer 6

The question of chronic disease in general again recurred as a possible area where confidence is lacking.

One trainer highlighted a point that had been noted in the registrars diaries - that some doctors focus on the bones as a possible cause for pain.

> "There seems to be a perception in them that if an individual has a shoulder pain, they are assessing the shoulder joint, meaning the bones of it, and it tends to be less of an awareness of this significant soft tissue contribution to "joint problems"." Trainer 7

Management Issues – Use of Non Steroidal Anti Inflammatory Medications

A management option that seemed to be frequently used by the registrars was using anti-inflammatory medication for two weeks and then reviewing the patient if the hadn't settled. This was reflected back to the trainers to see what their opinions were regarding this strategy.

Trainers commented that they felt that this strategy was "reasonable" (Trainer 2), "not particularly wrong" (Trainer 3), or "a fairly pragmatic approach" (Trainer 8). One trainer commented that experienced GPs can also use this management option at times.

> "That is the strategy that many principals use as well, because the vast majority of these things are actually self-limiting conditions" Trainer 5

Although a number of reasons why this should not be used indiscriminately was raised:

> "The problem is, that in 20%, it may well mask things, it may well miss things, some important development of the history might be missed." Trainer 1

> "It is basically putting the problem off, isn't it?" Trainer 3

Another method of "putting off the problem" which was mentioned by the GPRs was asking the patient to come back when they would no longer be available e.g. "come back in February". This was something that was part of "human nature" (Trainer 5) and possibly something that had been learnt in hospital practice. The trainers felt that this suggested that the registrars had learning needs in this area and had missed an opportunity to discuss the patient with their trainer and learn from it.

Other options, such as using simple analgesics, time or mechanical treatments were felt to be not considered as frequently.

The General Practitioner with a special interest in musculoskeletal conditions felt that this approach may not be in the best interests of patients:

> "If we're putting ourselves in a position of just giving a strategy of try this, and sifting out the ones that are better or don't come back, is unacceptable because who is to say that the ones who don't come back are actually better?..... I don't know if that would necessarily inspire a great deal of confidence in me, so I would then choose elsewhere to seek advice and help." Trainer 4

One trainer also commented that this may reflect how important trainees perceive musculoskeletal disorders.

> "Some registrars see these as quick cases in which they take a short history, give non-steroidal anti-inflammatories and the patient leaves and that is all they have done with that case. I think it is because of this perception that perhaps this is "less important medicine"." Trainer 1

Management Issues – Referral to Secondary care

Registrars were perceived to be high referrers to secondary care.

> "I think they sometimes (and again this is an assumption really) but I think they often will over-refer, so that people with things that might well not be managed much differently in hospitals might be referred" Trainer 2

> "Some registrars, it would appear, and again this is a perception for which there is no proof, refer alternate patients." Trainer 1

Referrals were considered to be educational for the registrars. Trainers mentioned discussing referrals with their trainees (either at the time or in a specific tutorial), ensuring that letters went back to the trainee if they had referred the patient and getting the registrars to keep a log book of referrals so that they could follow them up themselves.

Management Issues – Referral to Allied Health Professionals

The trainers had identified that registrars seemed less likely to refer to members of the multidisciplinary team. This was explored further. Trainers reported discussing referrals with their registrars as an educational tool and referrals to physiotherapy were no exception. A particular issue seemed to be that registrars were uncertain as to what different allied health professionals may offer.

> "I think they do because they are possibly less sure of what those professionals have to offer" Trainer 7

> "Issues around, you know, what are the roles of people like physios and chiropractitioners." Trainer 5

One trainer commented that there was possibly an inverted U shaped curve of referrals to physiotherapy in particular.

> "I think that, initially, they refer fewer people to the physio. As they realise it is available, they start to refer. They then find the limitations of physiotherapy as a

> referral because of waiting times and therefore it drops off again, and that is about the service that is provided." Trainer 1

Trainer Related Themes

Trainer related themes – Case mix

The trainers were split in their opinions as to whether or not they see the same case mix as the registrars. Four trainers felt that they tended to see more chronic musculoskeletal conditions, especially patients with chronic inflammatory conditions who regularly attend the surgery and who therefore develop a relationship with a particular doctor. Chronic diseases such as osteoarthritis, osteoporosis, gout and polymyalgia rheumatica were felt to be more likely to be seen by the trainers.

> "I suspect that partners or long-term doctors in the practice see more than the registrars, just because people build up long-term relationships with you and it is difficult, even if you actively encourage people to go and see a registrar, to get patients to do that." Trainer 5

Other trainers felt that there was no significant difference in the cases seen, although it was commented that there might be differences in other specialist areas.

> "I think that the registrars here see pretty much the same sort of things that I see, certainly in terms of musculoskeletal conditions. If we were talking about psychiatric conditions then they might see a different group of patients, but I think with musculoskeletal conditions, they probably see the same ranges as I do." Trainer 8

Trainer related themes – Musculoskeletal training the trainer had attended

Trainers discussed three different types of teaching that they had attended. The first was joint injection teaching which tended to involve using models although, some

courses allowed the attendees to bring their own patients in so that they could learn on a live model. One trainer had had a teaching session within the surgery requested by one of the partners as they were the only doctor doing joint injections and they wished other doctors to take on the workload. This session had also involved reviewing joint examination. Another trainer had had teaching from their in house physiotherapist.

> "We were learning how to manage more stuff without referral and, you know, giving basic exercises and joint care and written information." Trainer 6

The third type of teaching was that arranged by the pharmaceutical companies. A common complaint was that this teaching was biased although it still could be valuable.

> "The rheumatologist had done a quick session.....I think that was more about inflammatory arthritis or something like that. It was good because it wasn't...it was drug company sponsored but the drug wasn't in your face quite so much." Trainer 8

Trainer related themes – Where the trainers learnt their musculoskeletal skills

The trainers reported that they had learnt their musculoskeletal skills predominantly during their general practice training and whilst working as a general practitioner. They described learning from colleagues within the surgery, colleagues from other surgeries, from physiotherapists and from specialists.

> "Mainly in general practice itself. My trainer and then my senior partner and then one of my other partners was quite keen on musculoskeletal medicine and its treatment. So I initially learnt most of what I know from my two partners, in a very old fashioned way – watch one, do one, start teaching – as well as a book that is still in the library." Trainer 1

The undergraduate training that the trainers had received was felt to be insufficient to prepare doctors to be general practitioners.

> "It wasn't well taught to me initially either at undergraduate or in the VTS, so it was learnt on the job." Trainer 7

> "After my undergraduate training, I didn't feel that confident. I did my house jobs and as part of my house jobs I did two months of orthopaedics, so I learnt a little bit about hip problems and knee problems then, particularly osteoarthritis and then mainly through GP training really." Trainer 3

The general practitioner with a special interest received more specific training and reported doing a distance learning course and then a month's residential course at a rehabilitation unit. He then went on to run the rehabilitation unit for two years and describes developing his skills further on the job and learning more from colleagues.

> "I realised when I went back that there's an exam in Bath that I had done just the once, but that the qualification is insufficient. It is the application of that knowledge that is important and unfortunately a lot of these people were using the qualification as setting themselves up as an expert.....I learnt from one or two people who had been doing it for a long time and was able then to put what I knew into some sort of perspective." Trainer 4

Trainer related themes – Trainer's Confidence

Confidence within the trainers varied with the more senior reporting that they felt less confident. Different terms were used:

> "On a score of one to ten – three." Trainer 1

> "I don't think that I feel as confident as I would like to." Trainer 2

> "I don't feel that confident sometimes and I have been doing it a long time" Trainer 8

Various reasons were given: poor undergraduate musculoskeletal training, no musculoskeletal jobs, poor contact with secondary care and musculoskeletal conditions being regarded as being low priority.

The trainers identified different areas where they felt they were under confident. These included: the musculoskeletal examination, making a specific diagnosis, differentiation and management of inflammatory arthritis, management of osteoarthritis, management of osteoporosis and management of shoulder, knee, back and neck pain.

"My heart sinks when somebody comes in with knee pain." Trainer 8

The issue of "unknown unknowns" was raised by two trainers. (See Chapter 9)

"There are many areas that I have not perhaps recognised myself because of my own lack of knowledge." Trainer 1

The other trainer referred to it as "bankrupt expertise" (Trainer 4) but returned to the concept of unknown unknowns when describing what he meant.

Trainers who appeared more confident used terms such as: "reasonably" (Trainer 5) "moderately" (Trainer 6), "fairly" (Trainer 7). These trainers reported that they believed themselves to be safe and cited the red flags and having close contact with colleagues (physiotherapy and rheumatology) as reasons. The trainer with a special interest in musculoskeletal disorders reported his skills as being "adequate" (Trainer 4). The reason he gave being:

> "I think because it is such a big area that if I said confident, then that would imply that I knew more than I think I probably do know."

Educational Themes

Different ways in which registrars can be educated in the practice were discussed including during surgery, tutorials and by discussing referrals

Educational themes – Trainer-trainee interactions during surgeries

Registrars must always work alongside a qualified general practitioner, who is there to provide them with support if required. One way in which a registrar can learn about musculoskeletal problems is to call the supervising general practitioner into their consultation to review the patient with them. The trainers reported that the frequency which they are called at can vary between registrars depending on their experience. I.e. it is more common in a registrar at the beginning of their first general practice attachment than one at the end of their final general practice attachment. Trainers reported that they are generally called in once or twice a week to review patients with their registrar and that dermatology, ophthalmology and rheumatology are the common areas where they are asked for their advice. This was felt to be because registrars have less experience in these specialties and are consequently less confident. The trainers recounted that they tend to be called for acute problems such as an acutely painful shoulder or an inflamed joint rather than more chronic issues.

> Why do registrars call you in? "I think the urgency of formulating a plan there and then and telling the patient something, so that the patient has got an idea of what is going on. So often it is when they get to a point where "What am I going to do with this? I need to tell the patient something and I don't know what I am going to tell them. Either because I don't really know what it is or I don't know what resources we have to got refer them to, so I need a hand with sorting that out."" Trainer 8

Three trainers felt that they were not called as frequently as they should be:

> "I think they ask for help less with these conditions than they perhaps should." Trainer 1

One trainer commented about this in relation to registrars referring musculoskeletal problems that could have been managed in primary care. The reasons why they were not called were felt to be: because registrars are perhaps not aware that they need help, that they are concerned that the doctors are busy and would not want to be interrupted and because the registrars perceived that the problems will wait until later i.e. they will not cause the patient any harm by discussing the problem at a later date with the trainer.

Two trainers mentioned that they would be more concerned about a registrar that did not call for help rather than one that called on a regular basis.

Educational Themes - Tutorials

The trainers discussed two different types of tutorials on musculoskeletal topics: the first being a review of cases that they have seen which may include musculoskeletal conditions and the second being a topic on a specific subject. Tutorials are generally registrar led, i.e. the registrar identifies what it is they wish to cover. Trainer 6 commented "It doesn't feel that it is something that we commonly talk about actually"

Case reviews can be run in different ways – two of the trainers asked their registrars to keep a discomfort log or a diary of the problems that they see which is then used as a basis for discussion. Other trainers reported doing random case analysis which is where all the notes for one surgery are reviewed and the cases discussed.

> "I think the tutorial is just a way into helping the registrar assess their own level of competence in these things because what they do obviously is they grade it against your own, and if they feel that they have got a big gap to make up, then they often need more help this way." Trainer 2

Three trainers reported having specific musculoskeletal tutorials requested by their trainees. Shoulders and knees were covered by all 3 of these trainers. The trainer with a special interest in musculoskeletal problems also ran a tutorial on back pain for his trainee. The trainees had asked for these areas to be covered due a lack of confidence at managing these problems. All three trainers covered history points, symptom patterns

and examination. One trainer also covered joint injections in a tutorial on shoulder pain. A trainer with a special interest in education described that he often uses cases as a basis to cover a topic and may use two or three scenarios in one session.

> Why case based scenarios? "Because the registrars have said they like it and I think it works better to kind of hang it on a case. They remember things more. I mean it is better if it is their case, if they come along with a problem, because then it sticks more and they remember it more, because it has got more emotional impact for them than a book and they remember it more. But it works with a made up case as well." Trainer 8

Educational themes - Referrals

Trainers also use referral letters as a basis for discussion in a tutorial. This can be used as a way of identifying a registrar's learning needs and also to educate the registrar. Two trainers specifically ran tutorials on referrals and tried to also include the letter back from the hospital as feedback.

> "Yeah, well, we review their referrals each six months. So we will get their referral letters and look at them and look what has happened…….. We will do it maybe half way or three or four months through so there is some time for perhaps some feedback." Trainer 6

Educational themes – Resources

Trainers used different resources to assist them in their teaching. This varied from textbooks through to web based evidence.

Educational themes – Amount of teaching received

The questionnaire study of general practice trainees in 1995 suggested that trainees receive, on average, only two hours of teaching on musculoskeletal topics during their training (Lanyon et al 1995). Repeating this study as part of my project revealed no significant change in the amount of teaching reported (Chapter Four). This fact was fed back to the trainers for their opinions.

One trainer stated that they were surprised by this whereas the others were not. The trainers noted that this would not include all the incidental learning that takes place, e.g. in surgery, in the corridor or coffee room and during case analysis sessions. Generally it was felt to be a small amount of time considering the prevalence of musculoskeletal conditions and their lack of confidence, although competing interests on the registrars' time were acknowledged.

> "I am surprised really but there may be some reasons for that. It may not be just what they are…. I find that year-on-year to get registrars to think ahead for their formal tutorial session it is…it is variable, but sometimes it is like drawing teeth or getting blood from a stone" Trainer 7

> "Well it doesn't sound like an awful lot, but then when you consider the breadth of the curriculum that has to be covered, I think you have to put it into context and my feeling is that probably they don't get much more specific time devoted to very much else either, because of the amount of things that have to be covered." Trainer 5

> "I would hazard a guess that they have either come in with a very good knowledge or they are going out with an inadequate knowledge!" Trainer 4

Educational themes – Ideal teaching for registrars

The trainers were asked what they felt registrars should be taught about musculoskeletal conditions and what would be the best way to implement the teaching.

Trainers felt that there was a need to return to and revisit the basics, i.e. taking a history and performing an examination. With regards to the history the issue of red flags and their usefulness was raised again. It was felt to be important that registrars are systematic in their history taking and that they are directed to cover areas such as occupation and mechanism of injury.

> "Clarifying major points that are of benefit, things that are of value within the history, questions to ask, things that are common and things that should not be missed, you know the red flag type things." Trainer 4

It was hoped that joint examination would have been adequately taught in medical school but it was felt that it would be beneficial to review it.

> "Well, I think the practical things of how to examine people properly and with a rationale for the way you examine them." Trainer 8

The importance of being able to use the information gained from the history and examination in diagnosing and formulating a management plan was raised.

> "You know, you can ask somebody why something has happened and you can get an in depth understanding of why it has happened. That is of no earthly help whatsoever by the person, unless it allows you to formulate a plan ahead. So then the registrars need to know what can be done for these people and therefore need to have a working knowledge of what is available, what is appropriate as far as treatment and investigation and onward referral and management of the condition." Trainer 4

The trainers wanted the breadth of musculoskeletal conditions to be covered from the minor self-limiting illnesses that are seen to the chronic debilitating conditions and from common disorders to more serious and rare problems.

> "I think the important things are the common things and that she doesn't miss anything serious. I would want to know that she was safe, that she would be able to pick up any serious bone or joint problems. So infections, malignancies, fractures and those sorts of things. In terms of common conditions that we see, she needs to have a decent grasp of how to make a diagnosis and manage them." Trainer 3

One trainer felt that including a self evaluation of confidence was important. This would allow a registrar to first of all identify where their strengths and weaknesses are and then focus their time and effort on areas of need. Another trainer suggested that all of the content should be focused around cases and would divide them into children, young adults and old adults, acute and chronic conditions. This would allow the package to be work focused and practical.

> "We would just be talking I think, talking about your approach to the patient and trying to build up a repertoire of differential diagnoses and going through as you are trying to make a diagnosis. ……This is the case of a child that is limping or something. What is your approach? What do you think is happening and how are you going step by step. I think they are the types of things that would work and then some practical with, you know, people and how to examine." Trainer 8

There was a consensus amongst the trainers that lectures were not an ideal format for educating registrars about a practical topic and that the teaching should be primary care based, i.e. it should be focused on primary care topics, ran by primary care staff and should take place when the registrars are in primary care attachments. Other than that a variety of opinions and options were expressed. Having a check list for the registrars to be able to use to identify areas that they had covered and those that they needed to cover was felt to be beneficial. One trainer also suggested that a curriculum would be of benefit although this has now been developed by the Royal College of General Practitioners and is available to all.

Different methods such as short courses, covering it on their half day release, doing shared surgeries or joint visits with their trainer, looking at videos, doing random case analysis, sitting in with specialists including physiotherapists and doing topic based tutorials were all identified as potential means by which registrars could be taught. The importance of the registrars getting their "hands on" and involving patients to make the experience more real was identified. Distance learning was also mentioned although not as frequently as the other methods. The necessity of tailoring the education to the learner was discussed.

> "I think they need to identify the gaps that they have in their knowledge by critically and continually reviewing what they are doing, and then you need to be identifying those problems and then discussing with them their most effective way of learning, because everybody has different learning styles and, depending on what they way they learn best, you need to identify solutions to the problems they have got, which is easy with a good registrar who is evaluating the problems. I think it is slightly more tricky when someone thinks they know everything there is to know about musculoskeletal problems and they don't, you know." Trainer 3

Registrars often have frequent demands on their time with preparing for the membership of the Royal College of General Practitioners examination taking up a significant proportion of the general practice attachment. Making allowances for this was felt to be imperative for any educational intervention to be successful.

> "I think, like all of general practice, it has a problem because it is general practice and, therefore, there are so many calls on their time as to what you learn and how you learn it and when you learn it. So part of it is to learn that it is about continuing medical education and this isn't something that will be done in three years and finished at the end of a three year vocational training course and it is an on-going thing." Trainer 1

Educational themes – current teaching on the Vocational Training Scheme

One of the trainers interviewed is involved with arranging the specific scheme teaching that the registrars receive whilst in their hospital posts. This involves week long courses in specialist areas such as palliative care, therapeutics and paediatrics and also a half day conference which takes place once a year. Rheumatological topics are covered in the half day conference. The trainer was asked what is covered and why.

> "I think the workshop that X has been doing so far has covered things like gout, first presentation of inflammatory arthropathy and, you know, going on and teaching the different forms of that – psoriatic and quite technical stuff, you know, the background information that might be important for those things." Trainer 2

> Why? "Well I think it was initially his / her impression on what GPs sent to him / her which is a good place to start. I think another good place to start is the things that are sent to him / her that he doesn't think he / she should be seeing." Trainer 2

> "Certainly when we are setting up clinical modules, one of the things we say to the specialist clinicians is, you know, what is around the interface of working between general practice and secondary care? What is it that we can do differently? What do you think we should be doing more of in general practice? Less of in general practice? What do you see that you think is appropriate and inappropriate? And so on. Their perspective of our role is an important influence on the content of the thing." Trainer 2

Educational themes – Complementary/Alternative medicine

A few of the trainers touched on the issue of complementary medicine and whether or not registrars should be taught about it. The four trainers who mentioned it all felt that registrars should receive some teaching about what therapists can offer, what evidence

there is for their interventions, what qualifications therapists should have and what interactions there may be with conventional treatment.

> "I think they need to be aware what these people can do and what they can offer and what their limitations are." Trainer 1

> "I would expect them to have an idea that there is some evidence and then they might find that and what that might say. I would also expect them to understand what the parameters are about referring to alternative practitioners. So, you know, make sure that the qualifications are OK, not mentioning people by name unless you know they are good, making sure that there are no contraindications for referral before you do it. Those sort of things." Trainer 5

> "I think one has to learn the ethics of referral there, or open, or even covert, agreement that the patient seeks these up……I think it is something that we are often very wary about, because so many of these people have things to sell and therefore they have an agenda that is not just about patient care." Trainer 1

Discussion

The trainers reported that they had concerns about registrars' musculoskeletal clinical skills in general and, in particular, their examination skills. There was also a suggestion that the level of examination skills has degraded over time. No comment as to why this might have occurred was made and it is, in fact, contrary to the evidence that shows that teaching of musculoskeletal clinical skills has, if anything, improved over recent years. The trainers agreed that there may be an over reliance on the part of the registrars on non-steroidal anti-inflammatory drugs and on the value of investigations. They also highlighted that registrars can struggle to make a clear cut diagnosis and that this may be important.

It is impossible to say, from the data, what level of expertise the trainers are functioning at. They hinted that it took them some time in practice before they felt confident at managing musculoskeletal problems. Consideration needs to be given as to whether or

not this is reasonable. Should vocational training schemes be changing the training they offer so that registrars are confident clinicians prior to qualifying as general practitioners?

The trainers identified learning needs were not dissimilar to those of the registrars and in particular they also highlighted the management of shoulder and knee pain. They did, however, include back pain and neck pain which were areas where the registrars appeared relatively confident. It may be that with experience the trainers have identified learning needs that were not initially apparent.

The trainer involved with arranging teaching for the vocational training scheme commented that he/she had asked the specialist to include topics that are at the primary-secondary care interface. This is somewhat at odds with the evidence mentioned in the literature review where general practitioners highlighted that they prefer to be taught about subjects directly applicable to their work (Badley & Lee 1987; Marshall 1998). It is possible that the scheme may be best advised to focus on conditions seen and managed within primary care instead of those at the interface.

Limitations of this work

The limitations of this part of the project include:

- The trainers interviewed were only from the Northern Deanery and in particular are trainers allied to the Northumbria Vocational Training Scheme.

  Different deaneries and vocational training schemes will have different jobs included on their scheme for registrars, different educational sessions arranged and so their registrars will have different educational needs. For example, until recently the Yorkshire Deanery has provided a number of innovative musculoskeletal posts for GP registrars, along with running a week long Yorkshire Summer School on musculoskeletal problems. This is due to one of the trainers involved in the deanery management having a special interest in musculoskeletal problems. Trainers in such an area may have had very different

opinions to those interviewed in this study, i.e. the results may not be generalisable.

- There are probably many more trainer features that could have been sampled for.

  For example, scheme directors or armed forces trainers (patients with different medical needs) could have been interviewed had other deaneries been included. All of the trainers were Caucasian and British trained which again could have affected the results. Only eight trainers were interviewed and so it is probable that data saturation was not achieved. The views of these trainers are though, interesting and valid.

Chapter 8: Developing and Evaluating the Educational Package

Overview

In this chapter, I describe the development and evaluation of an educational package focused on the diagnosis and management of shoulder pain. I explain why shoulder pain was chosen as the topic to cover and discuss the methodology behind creating the package. I then go on to explain how the package was evaluated.

Aims

To develop and evaluate an educational package focused on one area of need identified by the registrars and trainers

Background to developing the package

The diary, interview and focus group data identified three main areas of educational need: shoulder pain, knee pain and hip pain. It was decided to focus the educational package on the management of shoulder pain.

This was for a number of reasons:

1. Shoulder pain is a common presentation in general practice
2. The registrars had identified this as an area of need
3. The trainers had also identified this as an area of need not only for their trainees but also for themselves
4. We had noticed that this was an area where diagnoses were vague suggesting that the registrars were under-confident in coming to a definitive diagnosis
5. Shoulder pain, unlike knee and hip pain, was an area where it was more likely that it would be possible to reach a consensus on diagnosis and management and what general practice registrars should know

Looking at these areas in more detail.....

The registrars had identified this as an area of need

During the discussions with the registrars about the diary entries and what education they would like to receive, shoulder pain was repeatedly identified as an area where further training was felt to be necessary. Hip pain and knee pain were also noted, but to a lesser extent, as being areas where the registrars reported their confidence in managing problems as being poor.

> "I don't think I have ever diagnosed frozen shoulder. I think I have just seen people who have a diagnosis of it from someone else. Again that is difficult because if you don't really know what you are looking for, then you can't check. I could be signing a sick note for somebody with frozen shoulder, but I can't actually examine them properly really to check that that is actually the diagnosis, that there isn't something else going on." Registrar 2

When asked what they would have liked to have been taught early on in the general practice job:

> "I would have definitely benefitted from some teaching on shoulder pain and differential examination and what you do with it, that kind of thing." Registrar 7

The trainers had also identified this as an area of need

> "Shoulder pain in particular tends to be one that I think people don't feel confident with" Trainer 4

> "I think something simple about the shoulder and trying to differentiate all the different things that can happen with the shoulder would be really useful with some nice, clear diagrams and the kind of aide memoire about what you get with different things..... You know, a sort of idiot's guide to shoulder problems and how you sift through that to come up with a proper diagnosis." Trainer 8

> "There seems to be a perception in them that if an individual has a shoulder pain, they are assessing the shoulder joint, meaning the bones of it and it tends to be less of an awareness of this significant soft tissue contribution to "joint problems". That is my perception of what comes through. So they don't feel confident about them and there are two key areas that, even for the more experienced doctors who have finished their vocational scheme, two key areas are knee and shoulder." Trainer 7

Other studies have also shown that general practitioners and specialists identify shoulder pain as being an area of educational need for primary care (Petrella & Davis 2007; Liesdek et al. 1997)

Diagnoses were vague

> "I think generally speaking for myself, I would say I am a bit limited to my expertise, if I have any at all, in managing shoulder joint pains or whatever the musculoskeletal symptoms are..... with, for example, shoulder joints, someone comes and it is shoulder pain. I think the foremost thing that comes in my mind is: is it broken? Is there any muscle displacement I can deal with it? Basically, what can I do now or should I refer on? You know, and then based on that." Registrar 12

> "I mean shoulders are pretty common and I think that they often get jumbled into one sort of amorphous diagnostic mass of shoulder syndrome, and I think there are quite specific things in there that you can pick out." Trainer 2

In general, terms such as "shoulder pain" or "shoulder sprain" were used, i.e. symptom based rather than diagnosis based. Out of the 33 shoulder consultations recorded in the diaries there were only three definite diagnoses of rotator cuff pain and three of frozen shoulder recorded. Unpublished data from the SAPPHIRE study, a study where general practitioners were given specific training in how to examine the shoulder and how the different causes of shoulder pain present, suggests that in primary care, 48% of

presentations with shoulder pain are caused by rotator cuff pathology and 18% are due to adhesive capsulitis (Personal communication, Dr P Helliwell). The prevalence of these conditions as recorded by the registrars therefore appears low.

The use of vague diagnoses for shoulder problems in primary care has been commented on in other studies (Linsell et al. 2006). In Linsell et al they searched the mediplus database for any coded problems related to shoulder pain during a year (1st January to 31st December 2000). The Mediplus database accesses data from 211 United Kingdom general practice surgeries, representing 1,700,000 patients. They found that general practitioners tended to use a limited number of codes: five codes accounted for 74.6% of the diagnoses recorded. The codes used were generally non-specific e.g. shoulder syndrome, sprained shoulder, shoulder joint pain, sprain shoulder/upper arm and arthralgia shoulder. They concluded that this could reflect a lack of confidence in applying a precise diagnosis to the shoulder conditions seen.

Areas of possible consensus

The results of the interviews and focus groups were presented to the members of the Primary Care Working Group of the Arthritis Research Campaign (**arc**), whose members include general practitioners, rheumatologists and allied health professionals. The group felt that the management of knee pain was an area where an educational package would be extremely useful. Unfortunately, further discussion highlighted that it might be difficult to achieve a consensus on what should be included in such a package. A secondary output of the recently-completed SAPPHIRE study was a set of data relating to the prevalence of specific shoulder problems in primary care, and it was felt that these results would be useful in determining the contents for a training package in this area (Watson 2008). No such data for knee conditions has been published. It was therefore decided to create an educational package on shoulder pain.

Developing the Package

When developing educational materials, it is important to take into account how students learn and what methods they may use when learning. A number of educational theories focus on both learning and teaching but I am going to briefly discuss three that I considered when creating this package.

Adult Learning Principles

A number of educationalists have developed theories regarding how adults learn. The best known of these is Knowles' theory which is referred to as "andragogy". Knowles described five assumptions, which are:

1. As a person matures, his or her self-concept moves from that of a dependent personality toward one of a self-directing human being. Adults are capable of determining their own learning needs, and of finding means to meet them.
2. An adult accumulates a growing reservoir of experience, which is a rich resource for learning. This experience can be brought to bear on new learning, and enhance the new learning significantly. It can also provide an effective context for the acquisition of new knowledge and skills.
3. The readiness of an adult to learn is closely related to the developmental tasks of his or her social role. Adults value learning that integrates with the demands placed upon them in their everyday life.
4. There is a change in time perspective as people mature – from future application of knowledge to immediacy of application. Thus an adult is more problem – centred than subject – centred in learning. Generally, adults value learning that can be applied to authentic problems that they encounter in everyday life.
5. Adults are motivated to learn by internal factors rather than external ones. The internal desire to succeed, the satisfaction of learning, and the presence of personal goals have a greater effect on motivation than external incentives and rewards.

(Cited in Kaufman et al. 2007)

It is accepted that these five assumptions are more a description of how adults learn rather than a theory in their own right. Merriam for example, comments:

> "....while not really a theory of adult learning, andragogy does capture general characteristics of adult learners, and does offer guidelines for planning instruction with learners who tend to be at least somewhat independent and self-directed." (Cited in Kaufman et al. 2007)

Experiential Learning

This was formally described by Kolb in his book "Experiential Learning. Experience as the source of learning and development" (Kolb 1984). The definition that he used of learning has experience as an essential feature.

> "Learning is the process whereby knowledge is created through the transformation of experience." (Kolb 1984, p. 38)

Kolb described experiential learning as a cycle with four stages: concrete experience, reflective observation, abstract conceptualisation and active experimentation. In order to learn best, the student must pass through these four stages in turn although it doesn't matter which stage of the cycle they start at.

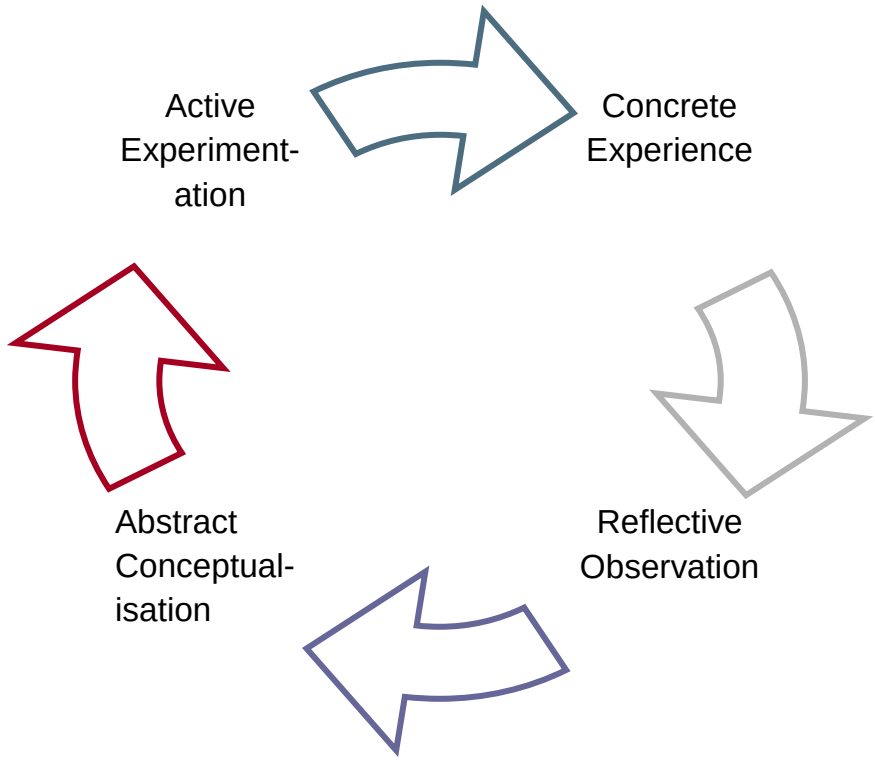


Figure 8.1: A diagrammatic representation of Kolb's Learning Cycle. Source: Kolb 1984

Learning Styles

A learning style is: "a description of the attitudes and behaviour which determine an individual's preferred way of learning" (Honey & Mumford 1992, p. 1)

Various authors have described and created their own different classification of learning styles. One of these was Kolb who developed a 'Learning Style Inventory' from his experiential learning cycle. His learning style inventory is reported to have low face validity and is rarely used. I am therefore going to briefly describe the learning styles identified by Honey and Mumford, a psychologist and a manager in a chemical organisation, in their 1992 book, the Manual of Learning Styles (Honey & Mumford 1992). They are more widely used and recognised.

Honey & Mumford define four different learning styles:

Activists: people who learn by throwing themselves in at the deep end and trying things out

Reflectors: like to consider a subject in depth before coming to an opinion

Theorists: like to understand why something happens, i.e. the theory behind what has occurred

Pragmatists: are regarded as being very practical people who like to try ideas out. They dislike long, open-ended discussions

Honey and Mumford recognise that no-one's learning style is fixed and that they may be "modifiable at will" or by "changes in circumstance" (i.e. they are situational). They also acknowledge that the labels they use are an oversimplification but they feel that they help explain how people, of similar age, intelligence and need, e.g. general practice registrars, may react differently to the same educational experience. They feel that learning styles should be used to initiate discussion on how people learn to enable learners to recognise why they may prefer certain educational methods to others and to allow learners to develop.

Activists react positively to:	• Action learning • Business game Simulations	• Job rotation • Discussion in small Groups	• Role playing • Training others • Outdoor activities
Reflectors react positively to:	• E-learning • Learning reviews	• Listening to lectures or presentations • Observing role plays	• Reading • Self-study/self directed learning
Theorists react positively to:	• Analytical reviewing • Exercises with a right answer	• Listening to lectures • Self-study/self directed learning	• Solo exercises • Watching 'talking head' videos
Pragmatists react positively to:	• Action learning • Discussion about work problems in the organization	• Discussion in small groups • Problem-solving Workshops	• Group work with tasks where learning is applied • Project work

Figure 8.2: Activities and preferences according to learning style. Source: Coffield et al. 2004

Any educational material should therefore take into account that people may wish to use it in different ways according to their learning style: for example for self study or as a resource for small group work.

Relevance to the production of educational materials and to this project

During the interviews both the registrars and trainers discussed and identified a number of the points highlighted by these three theories. In particular the importance of learning as being self directed, experiential and the method being unique to the individual.

Self directed

> "I saw a few people with symptoms that could have been carpal tunnel syndrome and I went to use the internet to try and find extra information and there are lots of useful things you can do. Then talking with my trainer and with the patient services co-ordinator in the practice to work out where they actually go." Registrar 5

Experiential

> "I have come across quite a lot since and have seen them, reviewed them and they seem to be … they seem to get better, so I think my confidence has grown just from having experience of seeing a few and actually seeing them afterwards" Registrar 9

> "Well I think, and this is my personal belief, I think for registrars that the best learning is always experiential and that going on courses or sitting and listening to lectures is only ever an adjunct, and the only way you are really going to get to grips with any of it... is to see patients and then to have somebody with whom you can talk about, reflect, get feedback, get help, get direction about what you have seen. But I don't think there is any substitute for experience." Trainer 5

Learning method being unique to the individual

. "I think they need to identify the gaps that they have in their knowledge by critically and continually reviewing what they are doing and then you need to be identifying those problems and then discussing with them their most effective way of learning, because everybody has different learning styles and depending on what the way they learn best, you need to identify solutions to the problems

> they have got, which is easy with a good registrar who is evaluating the problems." Trainer 3

The educational package therefore had to take these points into account, i.e. it must be an attractive resource that they can access when required, contain information relevant to the patients that they're seeing and be able to be used in different ways.

A recurring theme from the registrars was that they often accessed information from the internet during the consultation. They not only used educational sites such as General Practice Notebook (www.gpnotebook.co.uk) but also accessed guidelines (Prodigy – now known as NHS Clinical Knowledge Summaries, http://cks.library.nhs.uk) and patient information sheets (www.patient.co.uk) for information on how to manage the patient in front of them. These resources appear to be attractive to the registrars – possibly because of ease of access. Creating an internet based resource is costly, so for this study the package was created on a CD ROM. The package can be downloaded onto the registrar's computer and accessed when required, as per the internet and could be set up on a website on the internet in future.

To be relevant to the registrar the package had to be based in primary care and focus on primary care problems.

Creating a CD ROM allows the information on it to be used in different settings and in several ways. For example the registrar could access it during a consultation as they do the internet resources, a trainer could use the package as a basis for discussion in a one to one tutorial, or the information on it could be used in a more formal teaching session such as small group work or lectures.

Would registrars use such materials?

The registrars reported using internet resources frequently, especially in order to access patient information leaflets, but also to look at guidelines e.g. Prodigy (now known as NHS Clinical Knowledge Summaries, http://cks.library.nhs.uk) or educational sites e.g.www.gpnotebook.co.uk.

Research evidence suggests that this is also true nationally with studies showing that roughly 80% of general practitioners access the internet for a number of reasons including to look at information regarding diseases, new medical information and data about drugs but also to access online journals (Wilson 1999; Doney et al. 2005). A study evaluating the use of a CD ROM as a training resource for primary care research revealed that participants appreciated the flexibility and self-direction that the method allows. They also found it cost effective and highlighted that they found the ability to have direct links to journal papers or websites was also useful. (Shaw et al. 2004)

The Royal College of General Practitioners have also developed CD ROM material such as the PEP CDs (PEP = Personal Educational Programmes) which has recently been updated to the nPEP online interactive resource which contains an applied knowledge test for general practice registrars to assist them in identifying specific educational needs. The Department of Health are in the process of developing e-learning material in conjunction with the Royal College and so general practice registrars will become more and more used to accessing computer based educational material.

Content of the package

Registrars identified a need to go 'back to basics' and to enable them to 'refresh' the information that they've already learned.

> "If you, like, assume a basic level of knowledge, you feel like you don't have that basic level and you have just gone way over my head, but he just didn't seem to be able to bring it back down and explain it." Registrar 2 (Discussing what had happened when they had spoken to another doctor about a patient they had both seen)

> "A kind of broad revision of how to examine, and then, what I would really find useful is just a brief differential of the main conditions that can affect shoulders that we will be seeing in general practice and, you know, vaguely where we should be heading in terms of management plans for each of them." Registrar 4

> When discussing what shoulder pain teaching they would want....."That is the problem at the moment. You haven't got that clear differential in your head and you don't know what examination to do to rule in or rule out, because you don't know what to rule in or rule out. If somebody comes in with a chest problem, you can easily do a truncated version of your examination because you know exactly what you are looking for, what you are thinking about and there are specific signs you want to look for or specific symptoms you want to ask about, and you can short cut things very easily, because you know a lot of it is chaff and you don't need to worry about it. Whereas with a musculoskeletal problem, you have either got to do it all or do everything but still not really that confident in interpreting the history or examination, or you do very little which is probably useless." Registrar 5

They appreciate information being case based, i.e. relevant to their clinical practice.

> "They do help me remember if there is something that has a typical presentation, then a case history helps me remember it, particularly you know if it is linked in some way. Like somebody is washing their windows and the next day they get … that kind of thing helps me remember more easily so, yeah, but that is me. I am quite a visual kind of hands-on and I do learn better from stories than from lists of things." Registrar 2

> "The registrars have said they like it and I think it works better to kind of hang it on a case. They remember things more." Trainer 8

And, also symptom focused, i.e. starting with the symptom of shoulder pain and then taking the user through to a diagnosis.

> "You know, those ones that I said, sometimes somebody will tell you something and you think "I am sure that is meant to be something really obvious." Sometimes I use the Oxford Handbook for that, but it is difficult because of the way it works. It is not symptom based, so you have actually got to flick through wrist pains and read them all until you find a one that rings a bell." Registrar 2

The Group Nominative Process

The areas to be covered in the educational package were determined not only from the registrar and trainer interviews, i.e. history, examination, diagnosis, management and anatomy but also from relevant available information e.g. textbooks, reviews of the management of shoulder pain etc. Red flags are not classically described in shoulder pain texts but were to be included as the registrars repeatedly mentioned their usage in the management of back pain and how they enabled them to be more assured in their management.

> What is it about back pain that makes you confident in managing it? "You have got fairly clear guidelines available to follow … you know to look for red flag symptoms and if you haven't found those, then you can be reasonably confident that this is not something very sinister." Registrar 5

There is now a curriculum for general practice but it does not specify the level of knowledge that a GP registrar requires in this area. Therefore the actual content of the package needed to be determined prior to its creation. This could have been decided by someone felt to be "the best person", although this creates questions: Who is the best person? Do they have access to all the relevant information to be able to determine what general practice registrars need to know about shoulder pain? Are they credible? Similar issues are faced when creating guidelines where there is an insufficient evidence base. Having a group of interested parties / "experts" is a recognised way of trying to tackle this problem. This is felt to be advantageous as:

- A wider range of direct knowledge and experience is brought to bear
- The interaction between members stimulates consideration of a wide range of options and debate that challenges received ideas and stimulates new ones
- Idiosyncrasies are filtered out
- The group as a whole may carry more weight than any one individual

(Cited from Murphy et al. 1998)

It was possible that these participants might struggle to come to a consensus as to what should be included in the package and so a consensus method, the group nominative technique, was used.

The group nominative technique uses a structured meeting to gather information from relevant experts. There are usually nine to twelve members in the group and they are asked to rate, discuss and then re-rate a series of items. The group is facilitated by an expert or a credible non-expert and follows a set format:

- Participants spend several minutes writing down their views about the topic in question
- Each participant, in turn, contributes one idea to the facilitator, who records it on a flip chart
- Similar suggestions are grouped together, where appropriate. There is a group discussion to clarify and evaluate each idea
- Each participant privately ranks each idea (round 1)
- The ranking is tabulated and presented
- The overall ranking is discussed and re-ranked (round 2)
- The final rankings are tabulated and the results fed back to participants

(cited from Jones & Hunter 1995)

Other consensus making methods exist: consensus can be arrived at by informal debate or more formal methods can be used, the Delphi process and the consensus development conference being two of these.

The Delphi process involves recruiting expert participants to provide their opinions on a specific matter. The opinions are then converted into a limited number of statements, are grouped together under headings and then are circulated back to the participants. The participants rank their agreement with each statement in the questionnaire. These rankings are summarised and the questionnaire is sent back to participants with the rankings included. The participants are then allowed to re rank their agreement with each statement. The re rankings are then summarised and assessed to see if a consensus has been reached, if it hasn't then the third round (i.e. the re ranking of their agreement with the previous ranks provided) is repeated. (Jones & Hunter 1995)

Conference development conferences are generally only used by large groups such as the King's Fund in the United Kingdom or the National Institute of Health in the United States. They are likened to the judicial process as a selected group of individuals listen to interested parties present evidence. They then retire to consider the evidence presented and try to reach a consensus.

The group nominative technique was used in this instance as the Delphi process and conference development conferences were felt to be too expensive and time consuming.

Selection of participants

There are no rules about who should be included as participants in consensus development methods although it must be possible to justify their inclusion. It is recognised that there is a potential for bias in the selection of participants. Who is included is important as the composition of the panel can affect the results obtained.

The ideal size for a consensus development group is felt to be between six and twelve members as, below six reliability declines and above twelve the group becomes difficult to manage. There is concern that heterogeneity can lead to conflict within the group although evidence suggests that a mix of group members can lead to better performance of the group. Concern also exists that people of higher status may try to "take over" the group. Weighting the group in favour of general practitioners helped to address this issue (Murphy et al. 1998). Other issues are also believed to affect the functioning of the group e.g. setting of the meeting, characteristics of the facilitator.

The group nominative process meeting was held at the Royal York Hotel in York in June 2006. Nine participants were invited to cover a range of desirable characteristics including general practitioners with a special interest in musculoskeletal problems, general practice trainers, a Royal College of General Practitioners examiner, Vocational Training Scheme group leaders, consultant rheumatologists, orthopaedic surgeons and physiotherapists.

The group was specifically weighted in favour of general practitioners to ensure that a primary care focused package could be produced. Seven participants were able to attend. They included:

- A Consultant Orthopaedic Shoulder and Elbow Surgeon (trained at the Oxford Shoulder Clinic)
- A Consultant Rheumatologist (involved in the SAPPHIRE study as mentioned previously)
- Two general practitioners with a special interest in musculoskeletal medicine (one of whom runs a Vocational Training Scheme group)
- Two general practice trainers (one with an interest in research who has also been a Vocational Training Scheme group leader, the other also runs a career start scheme)
- A physiotherapist who works in a community musculoskeletal service

Results

The group worked well together and achieved a consensus easily as to the content of the package and what the "red flags" for shoulder pain should be. The longest discussion was about whether or not GP registrars should be advised to X-ray a "stiff shoulder". This was due to the majority of patients with a stiff shoulder in orthopaedic clinics having osteoarthritis. The results of the SAPPHIRE study showed that adhesive capsulitis is a significantly more common cause of a stiff shoulder in primary care and that osteoarthritis is actually quite rare. It was therefore agreed to advise against requesting X-rays.

The content of the package was therefore defined as: (see Figure 8.3)

Content of the package

It was agreed that the following content would be covered within the package:

Anatomy

The shoulder would be referred to as the shoulder mechanism. Registrars would be expected to have a knowledge of the following structures:

Bones – humerus, scapula, clavicle

Joints – glenohumeral, acromioclavicular, scapulothoracic

Muscles – rotator cuff (separate muscles for reference only), trapezius, deltoid, biceps

For reference only: the muscles of the rotator cuff (supraspinatus, infraspinatus, teres minor, subscapularis), pectoralis major, serratus anterior, triceps and the axillary nerve.

History

Highlight that use of time is a powerful therapeutic tool

History of the Presenting Complaint

Start with the following four questions:
- Where does it hurt and where does the pain radiate to?
- What were you doing when it started?
- When is it worse?
- What makes it worse?

Reference the full set of pain questions
Rule out that the pain could be arising from elsewhere
Check for systemic symptoms

Past Medical History

Visit 1 – check for a past history of malignancy/gastro intestinal disorders

Visit 2/3 – Consider checking for other problems e.g. previous musculoskeletal problems, psoriasis, diabetes mellitus and other auto-immune conditions, renal disease and neurological disorders (CVA)

Red Flags

Consider the red flags once the history has been taken. Yellow and blue flags at visit 3 or at 4 weeks (whichever comes soonest)

Examination

Undress the patient – consider asking for a chaperone

Ask the patient to point to where the pain is

Check for a stiff shoulder: Active and passive elevation, active and passive external rotation

Resisted abduction – if reproduces the pain is a good indicator that the pain is muscular and not bony

Reminder of the medical student examination. Do not describe a specific examination for all general practice consultation.

Examination Continued

Special tests - for reference only
Speeds Test
Scarf Test
Hawkins Test
Neer's Test/Sign
Jobes Test
Belly Press Test
Yocum's Test
Yergason's Test
Anterior Apprehension Test
Jobe's Relocation Test

Diagnoses

Diagnose and manage:	Rotator Cuff Disorders
	Frozen Shoulder/Adhesive Capsulitis
	Referred Pain
	Acromio-clavicular Pain
	Bicipital Tendonitis
	Polymyalgia Rheumatica
Recognise and Refer	Malignancy
	Fracture
	Dislocation
	Inflammatory Arthritis
	Acute hot joint – sepsis/gout
	Shoulder instability
Recognise and not refer	Acromioclavicular joint dislocation
	Rupture of long head of biceps

Investigations
Do not use bloods for screening for problems
Include: full blood count, glucose, C reactive protein, rheumatoid factor, auto antibodies, urate, calcium, creatine kinase, serum electrophoresis, urine electrophoresis.

Radiological investigations – refer to the Royal College of Radiology Guidelines. Only X-ray if it is going to alter the management

Management
Drugs & the World Health Organisation analgesic ladder
Non-drug management including advice/exercises, physiotherapy, advice booklets
Advice on steroid injections
Suggest that if the patient returns for a third time with the shoulder pain or if the problem has persisted for 4 weeks (treatment failure/no significant improvement) consider asking for a second opinion in primary care and consider that the pain could be arising from the neck.

Figure 8.3: Content of the educational package on shoulder pain

Creating the Educational Package

The content of the package was further developed by myself following the guidance of the Group Nominative Process. It includes text, anatomical images and video clips of the examination.

The package was created using Microsoft Power Point as the software allowed us to embed the images and clips within the text.

Video clips of the examination were created at the Audio-Visual Department in Newcastle University. The shoulder examination for medical students, i.e. what junior doctors starting in general practice should be aware of, has already been defined in a previous Arthritis Research Campaign project and is published elsewhere. We were able to include the clip for reference in the package. General practitioners often simplify their examination and pick and choose parts that they feel will help them in discriminating what the diagnosis is. It was felt that it would be inappropriate to suggest a simplified examination; instead, the part of the examination which was felt to be essential for all general practice consultations for shoulder pain, i.e. demonstrating whether or not a shoulder is stiff, was filmed and demonstrated by a general practitioner (EW). The special tests for shoulder pain which were included for information only were demonstrated by a consultant Orthopaedic shoulder surgeon in order to try and create an obvious demarcation in the mind of the observer as to what a general practitioner would be expected to know. The video clips have been produced as individual computer files and can be run through Microsoft Windows media player.

Anatomical images were created by Mr Torben Hudson, a graphic designer, and include both surface anatomy images and illustrations of the musculature of the shoulder girdle.

The package starts with the home page and users are able to navigate through the package by clicking on the hyperlinks. For an example see Figure 8.4

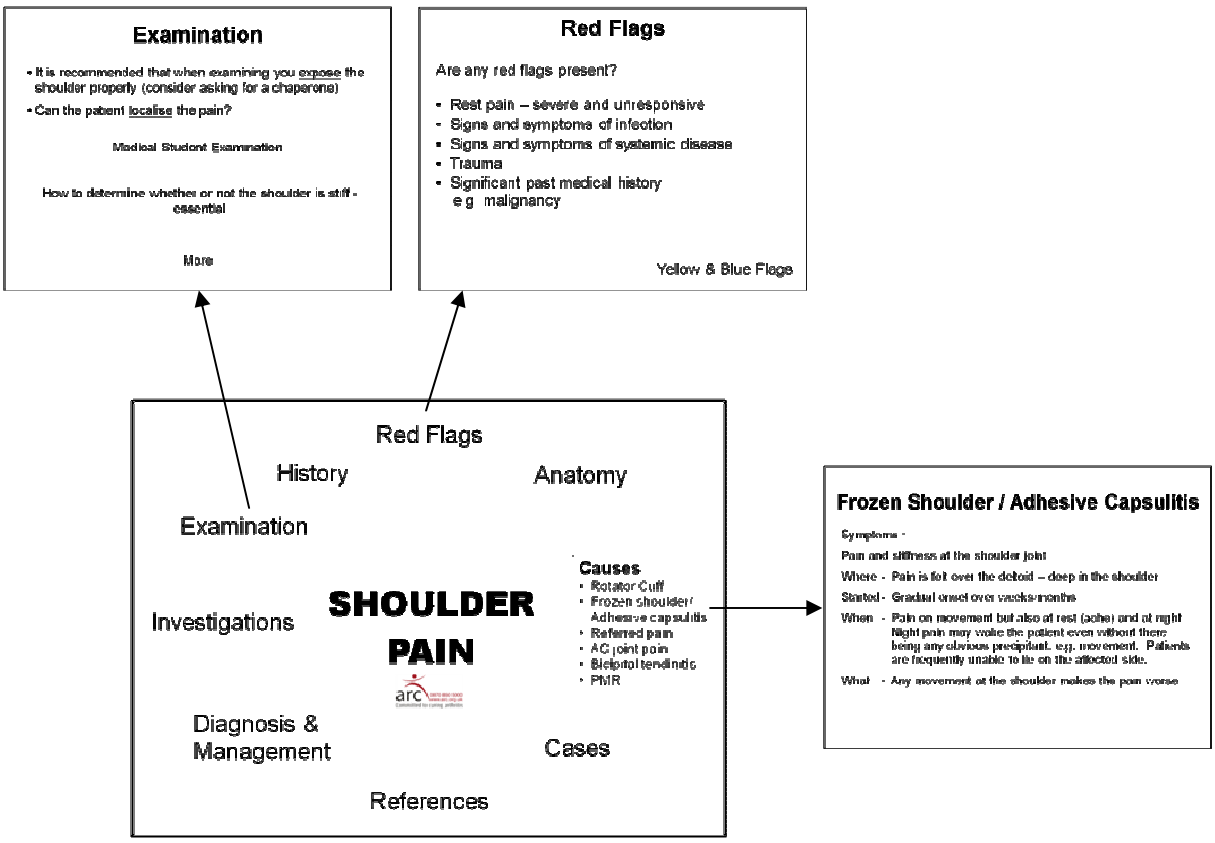


Figure 8.4: Example of the educational package

Figure 8.5: Example of surface anatomy illustration

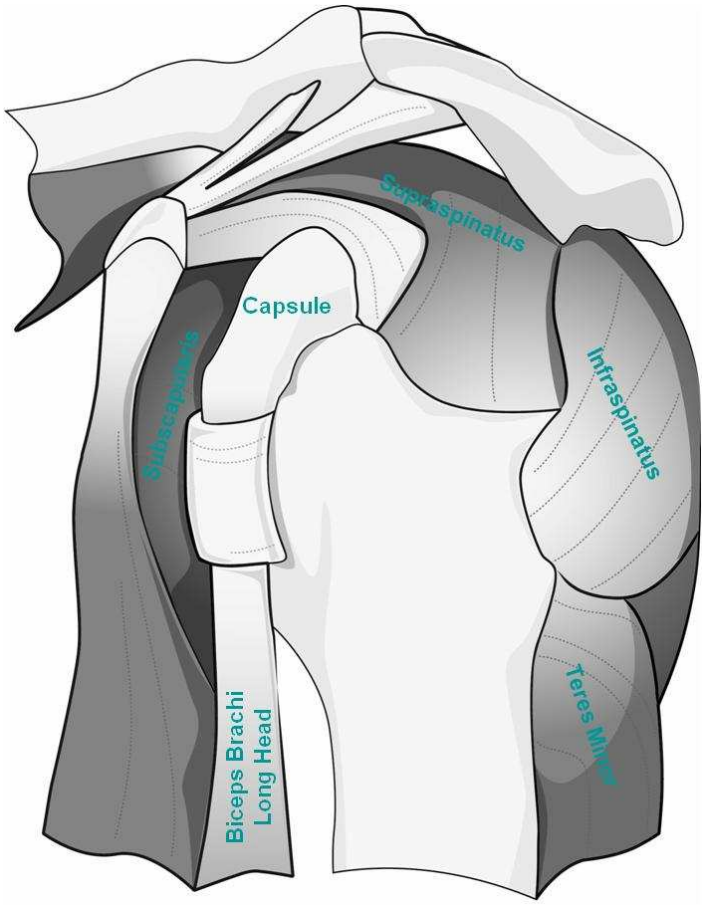


Figure 8.6: Example of rotator cuff anatomy illustration

The package was created with the two theories of developing expertise in mind and, in particular, the idea of illness scripts. The theories highlight the importance of basic anatomy and science mechanisms, and these were included in separate areas within the package, so that the user could refer to them if desired. Examples of case histories for each of the conditions mentioned were also included and the symptoms related back to the anatomy and pathology in order to assist the user with developing their own illness scripts.

Modifying the package

The package was given to five pairs of trainers and registrars for initial feedback. The need for ethical approval for this was discussed with my supervisors and deemed unnecessary. The trainers and registrars were shown how to use the package and were given a list of questions to consider.

These were: Do you like the layout of the package?
Did you find it easy to navigate your way through the package?
What areas did you like about the package?
What areas did you not like about the package?
In what way could we alter this to make it better?

The trainers/registrars were then contacted by telephone two weeks later for their feedback.

There were a few comments about the layout made e.g. making the links more obvious and adding in an index page. It was mentioned that the package is quite slow to use and that it would be helpful if it loaded automatically.

In general the trainers and registrars were complimentary about the package and remarked that they would like to see it produced and available.

"I wish I'd had one before I'd started" – registrar A

The content of the package was altered according to the comments although unfortunately it was impossible to make the package work faster due to the amount of information it contains. This could be overcome by making the package web based.

Evaluating the Educational Package

Educational initiatives have often been employed without evidence to support their utility and research in this field is often ignored by policy makers (Wass et al. 2003). The 'Best Evidence Medical Education' initiative has been developed to create systematic reviews of educational interventions (www.bemecollaboration.org). This is a difficult task as interventions often have diverse topics and subjects with different methodologies used in their assessment.

In particular, papers on educational interventions are looking to show improvement in learning/performance and a way of classifying this is to use Kirkpatrick's Hierarchy:

Level 1: Participation
Covers learners views on the learning experience, its organization, presentation, content, teaching methods, and aspects of the instructional organization, materials, quality of instruction.

Level 2a: Modification of attitudes/perceptions
Outcomes here relate to changes in the reciprocal attitudes or perceptions between participant groups toward intervention/simulation

Level 2b: Modification of knowledge/skills
For *knowledge*, this relates to the acquisition of concepts, procedures and principles, or *skills* this relates to the acquisition of thinking/problem-solving, psychomotor and social skills

Level 3: Behavioural change
Documents the transfer of learning to the workplace or willingness of learners to apply new knowledge and skills

Level 4a: Change in organizational practice
Wider changes in the organization/delivery of care, attributable to an educational program

Level 4b Benefits of patients/clients
Any improvement in the health and well being of patients/clients as a direct result of an educational programme

(Cited from Best Evidence Medical Education, n.d.)

The best level of Kirkpatrick's hierarchy that could be hoped to be attained in assessing this package for this project is level 2b – that of demonstrating modification of the registrar's knowledge and skills in the management of shoulder pain. This is the equivalent of "shows how" in Miller's pyramid (Miller 1990)

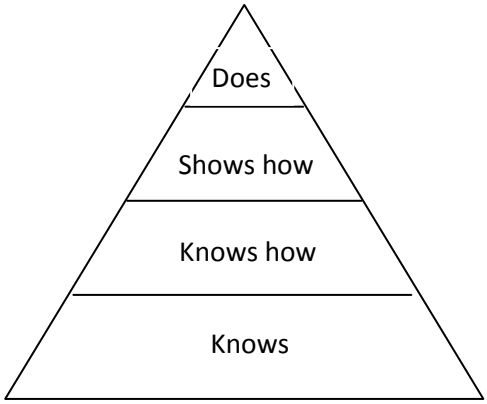


Figure 8.7: Miller's pyramid

Work based methods of assessment such as videoing consultations, mini – Clinical Evaluation Exercises (mini – CEX) and Direct Observation of Procedural Skills (DOPS) target the "does" level of the pyramid. More commonly used methods such as multiple choice questions, objective structured clinical examinations (OSCE) and simulation tests are looking at the lower levels of the pyramid.

The decision was made to use a clinical skills assessment methodology, as used in the new Membership of the Royal College of General Practitioners exam (see Introduction). This was because it was a realistic assessment to arrange, is targeted at the "shows how" level of Miller's pyramid and level 2b of Kirkpatrick's hierarchy and would be felt to be relevant to the registrars taking part. The Royal College define the clinical skills

assessment as being “Clinical consulting skills examination, based on cases from general practice, with role players as ‘patients’, and experienced assessors; provides a pre-determined, standardised level of challenge to candidates” (RCGP, 2006a) This has been recently added to the membership of the Royal College of General Practitioners exam as it allows “an assessment of a doctor’s ability to integrate and apply appropriate clinical, professional, communication and practical skills in general practice.”

The marking of each of the cases in the exam will be focused across three domains:

- Data gathering, examination and clinical assessment skills (as part of this domain the registrars will be expected to demonstrate proficiency in performing a physical examination)
- Clinical management skills
- Interpersonal skills

Five sample cases are currently available on the Royal College of General Practitioners website (RCGP 2006a) with a summary of the case and an explanation as to why the case has been chosen. A sample marking schedule is not available.

Reportedly the first students to sit the Clinical Skills Assessment section of the new Membership of the Royal College of General Practitioners’ exam performed poorly with the pass rate for trainees being 50%. The trainees who have taken it so far are purportedly felt to not be representative of general practice trainees as a whole and it has been found that when they sit the exam for the second time the pass rate increases to approximately 85%. It is felt that the main difficulty the registrars are facing is completing the task in ten minutes. (Personal communication, Dr Adrian Dunbar, Associate Postgraduate Director of General Practice, Yorkshire Deanery)

The Cleveland Vocational Training Scheme are experienced at arranging clinical examinations (objective clinical skills assessment) and allowed access to their trainees. General practice registrars who were in their general practice posts (both in their first six months and in their final six months) in October 2007 were invited to attend 2 educational afternoons, one month apart, but only if they were able to attend both of the sessions. They were warned:

"The afternoons will include a chance to practice for the nMRCGP (Clinical Skills Assessment module)." They were advised that the assessment was to be formative and that the marks would not be used by the scheme in any way. After the first assessment, the registrars were given the educational package and advised that it focused on shoulder pain and covered the conditions encountered in the clinical stations.

It was decided to have five clinical stations as part of the clinical skills assessment, covering the common causes of shoulder pain in primary care and a red flag case, i.e. rotator cuff pain, adhesive capsulitis, polymyalgia rheumatica, acromio-clavicular joint pain and shoulder pain with red flag symptoms. The diagnoses are covered in the shoulder educational package with the cases used being very similar.
Case 1: Rotator Cuff Pain
Case 2: Acromio-clavicular Joint Arthritis
Case 3: Red Flags
Case 4: Adhesive Capsulitis
Case 5: Polymyalgia Rheumatica

Registrars were allowed 10 minutes per station, this is the same as in the nMRCGP exam and also the rate at which they would be expected to work when qualified. The registrars were provided with information regarding the patients they were going to see. These printouts would be similar to the summaries obtained from surgery software. The registrars stayed in the same room whilst the patients rotated.

A rest station and an anatomy station were included to help timings.

The need for ethical approval for evaluating the package was discussed with my supervisors and was deemed unnecessary.

13 registrars attended both sessions. 2 registrars attended who were only able to come to 1 of the afternoons. Their results are not included. Details of the registrars are included in Appendix F.

The "patients" were played by physiotherapists with a special interest in musculoskeletal problems/shoulders, specialist rheumatology nurses and doctors. They

had been given information regarding the patient they were going to be two weeks prior to the afternoon along with a marking schedule. As the nMRCGP marking schedule is not available, a different schedule published by the Royal College of General Practitioners for the use in observed consultations was used. This schedule covers the same areas that the Clinical Skills Assessment schedule reportedly covers. See Appendix G.

Our interest was to see how the registrars performed at taking a history, performing an examination and in making a diagnosis, so the criteria in these areas were very specifically defined:

History Taking

Borderline for completion: Have covered the 3 areas but not enquired about general health

Completion: Have asked about the 3 following areas

Location of pain and radiation
Any precipitating factors?
Worsening features (when and what?)

And a "general health" question

Any other joints affected?
Any systemic symptoms?

Are you otherwise well?

Above expectation: Have covered the above but also work/home issues. Ideas, concerns and expectations

Physical Examination (Acromioclavicular joint osteoarthritis)

Insufficient evidence – does not perform an examination

Borderline for completion: The registrar checks the basic movements of the shoulder but does not check the 4 basic movements for a stiff shoulder or does not ask you to localise the pain.

Completion:
They ask you to localise the pain i.e. point to where it is (NB might have covered it in the history)

The registrar checks for a stiff shoulder

Active AND passive abduction
OR active AND passive elevation

AND active/passive external rotation

Above expectations:
The registrar checks specific special tests e.g. the Scarf test for acromioclavicular joint osteoarthritis

Clinical Judgement (Acromioclavicular joint osteoarthritis)

Borderline for completion:
The registrar diagnoses that you have a problem with the bones but appears unsure as to what the problem may be. They may offer you an X-ray.

Completion:
The registrar diagnoses that you have a problem at the acromioclavicular joint.
They offer you a choice of suitable treatment: analgesia.

Above expectation: The registrar diagnoses that you have a problem at the acromioclavicular joint. They explain the problem and discuss possible causes. They advise re analgesia.

Figure 8.8: Example marking schedule for Acromioclavicular Joint Osteoarthritis

Communication skills, Professionalism and Organisation/Efficiency were less rigidly defined allowing the "patients" to use their own judgement in marking.

Results of the clinical skills assessment

Median scores for all the registrars' pre (Table 8.1) and post (Table 8.2) receiving the teaching package have been calculated and are included below:

1 = Above expectation

2 = Meets expectations for completion

3 = Borderline for completion

4 = Below expectations

5 = Insufficient evidence

	History Taking	Physical Examination Skills	Communication Skills	Clinical Judgement	Professionalism	Organisation/ Efficiency	Overall Clinical Care
Rotator Cuff Pain	2	2	2	2	2	2	2
Acromioclavicular Joint Pain	2	**3**	2	**3**	2	2	2
Red Flag History	1	2	2	1	2	2	2
Adhesive Capsulitis	1	**2.5**	2	**3**	2	2	2
Polymyalgia Rheumatica	1	2	2	2	2	2	2

Table 8.1: Median Scores Pre-Teaching Package

As can be seen from the table above, registrars were below the “pass” mark for physical examination skills in both the acromioclavicular joint pain case and the adhesive capsulitis case. Their clinical judgement in these cases was also on average, borderline.

	History Taking	Physical Examination Skills	Communication Skills	Clinical Judgement	Professionalism	Organisation/ Efficiency	Overall Clinical Care
Rotator Cuff Pain	2	2	1	2	1	2	1.5
Acromioclavicular Joint Pain	2	2	2	2	2	2	2
Red Flag History	1	2	2	1	2	2	2
Adhesive Capsulitis	2	2	2	2	1	2	2
Polymyalgia Rheumatica	1	1	1	1	1	1	1

Table 8.2: Median Scores Post-Teaching Package

In the second assessment registrar’s scores in these areas improved to meet the requirements for “passing”.

As a test of difference in ordinal, non-parametric data, the Wilcoxen Sign Test was applied in order to determine whether or not there was a significant difference in the pre and post scores. See Table 8.3

Condition	Assessment Category	P Value
Rotator Cuff	History Taking	n/s
	Physical Examination Skills	n/s
	Communication Skills	0.034
	Clinical Judgement	n/s
	Professionalism	0.002
	Organisation/Efficiency	0.014
	Overall Clinical Care	0.014
Acromioclavicular Joint Pain	History Taking	n/s
	Physical Examination Skills	**0.009**
	Communication Skills	n/s
	Clinical Judgement	**0.008**
	Professionalism	n/s
	Organisation/Efficiency	n/s
	Overall Clinical Care	n/s
Red Flag History	History Taking	n/s
	Physical Examination Skills	n/s
	Communication Skills	n/s
	Clinical Judgement	n/s
	Professionalism	n/s
	Organisation/Efficiency	n/s
	Overall Clinical Care	n/s
Adhesive Capsulitis	History Taking	n/s
	Physical Examination Skills	**0.014**
	Communication Skills	n/s
	Clinical Judgement	**0.034**
	Professionalism	0.014
	Organisation/Efficiency	n/s
	Overall Clinical Care	n/s
Polymyalgia Rheumatica	History Taking	0.020
	Physical Examination Skills	n/s
	Communication Skills	0.004
	Clinical Judgement	0.014
	Professionalism	0.003
	Organisation/Efficiency	0.023
	Overall Clinical Care	0.023

Table 8.3: Applying the Wilcoxen Sign Test to the pre- and post-package Clinical Skills Assessment Scores.

As can be seen, the improvement in scores was significant ($p<0.05$) in four areas:

Acromioclavicular Joint Pain	Physical Examination Skills
	Clinical Judgement
Adhesive Capsulitis	Physical Examination Skills
	Clinical judgement

Eight registrars reported that they had used the educational package during the month between the two assessments. Their results were analysed separately from those who hadn't used the package to see if any obvious differences were seen. In the group who didn't use the package, significant differences in pre- and post- scores were in the following categories:

- Rotator cuff communication ($p=0.014$)
- Rotator cuff professionalism ($p=0.014$)
- Rotator cuff overall clinical care ($p=0.046$)
- Adhesive capsulitis professionalism ($p=0.046$)
- Polymyalgia history taking ($p=0.025$)

In the group who used the package, the only significant differences were in the rotator cuff professionalism ($p=0.046$) and acromioclavicular joint physical examination ($p=0.038$) categories. There is little difference between the results for registrars who used the package and those who did not. It is not clear that any conclusions can be drawn from these results, given the small number of registrars involved.

Limitations of this work

Creating the package

As discussed in the introduction to this thesis, there are no written down standards in any area of medicine by which general practice registrars are judged. This is partly because general practitioners see such a wide variety of presentations and conditions that it would be incredibly difficult to decide what a safe level of knowledge is. It may be that the opinions of our group were not representative of the wider interested

community. The ideal way to have defined the content of this package would have been to have sampled a greater breadth of opinion, perhaps by using a Delphi technique.

Feedback regarding the package was obtained from five registrars/trainers. Ideally a much larger group would have been approached to give feedback on the project and also with representatives from outside the Northern Region. This would have been difficult to manage though, as the participants had the package demonstrated to them at a face to face meeting. Also, feedback from a larger group would have created a longer list of possible changes which could have been difficult to incorporate.

Registrars and general practitioners do use web based resources and preferably this package would have been made available on line. The cost of doing this was prohibitive in this study.

Evaluating the package

Arranging the clinical skills assessment was difficult for a number of reasons as mentioned previously. First of all was finding a suitable venue where the afternoon could take place. We needed a venue that had a number of small rooms that could act as consulting rooms where the patient could be interviewed and examined. Fortunately examination couches were not required. Another consideration was finding a group of registrars who would be willing to take part in a mock examination. The Cleveland Vocational Training Scheme has run such examinations in the past and has suitable rooms available and trainees who expect assessment as part of their training.

The patients /assessors were given their case history and marking schedule a week prior to the assessment. Review of the results and discussion with some of the assessors after the event revealed that, in some cases, the registrars were being marked as competent across the board if they got the diagnosis right, even if they had not satisfied the defined criteria. This was most noticeable in the examination section where the registrars were marked as competent, even though the assessor commented in the free text section of the marking schedule that the registrar had omitted to check passive movements. This issue is demonstrated in the results for the examinations of patients with rotator cuff

pain and adhesive capsulitis. The marking schedules for both examinations were exactly the same and it would be expected that the registrars would have performed to the same standard in both stations, yet the grades given by the assessors for the two conditions were slightly different.

Analysing the results

The number of registrars involved in the assessment was low and when looking at those who used the package, even lower still. The results should therefore be treated with some scepticism although they do highlight some potentially interesting points, i.e. physical examination skills and clinical judgement do appear to be problem areas and this is consistent with published data in similar areas (see Introduction). The improvement in the results at the second assessment may be due to an effect of the previous assessment rather than an improvement due to the package, i.e. a variation of the Hawthorne Effect (a temporary change in their behaviour due to the attention and feedback they were given.)

The registrars were aware that they were going to have a second assessment but were not specifically warned that they were going to be assessed for a second time on shoulder pain. This was because we did not want to deliberately direct them to use the package as we wanted to see if they would use it of their own accord. Unfortunately, when asked, only eight of the thirteen registrars had used the package. The other registrars commented about the competing interests that there are on their time, for example completing the e-portfolio for their trainer. It may therefore have yielded stronger results if we had given the registrars more specific instructions.

It may also have been worthwhile to allow longer between the two assessments. This would have reduced the beneficial effect of the first assessment and the improvement seen may then have been more readily attributable to use of the package. The registrars though, may have received other teaching on shoulder pain in the interim which would also affect the results.

Although there are limitations to this work, it does highlight that the registrars' clinical examination skills in this area may be below the level they would be expected to be at and that providing an intervention such as a Clinical Skills Assessment, or an educational package, does seem to temporarily improve their performance.

Chapter 9 Discussion

Overview

This chapter reviews the pertinent findings of this project and discusses these in relation to the theories of the development of expertise. Potential ways of addressing the deficiencies highlighted are also discussed.

Musculoskeletal disorders are a common cause of morbidity and disability in the United Kingdom. General practitioners are the first port of call for patients with medical problems and, as already discussed, have limited undergraduate and postgraduate training in this area. Trainees, in 1995, reported that their training was inadequate for the job that they have to do and stated that they were "under confident" in managing these problems.

The aims of this project were:

1. To repeat the questionnaire study used by Lanyon et al in a sample of four deaneries to see if, ten years on, general practice registrar teaching had changed (Lanyon et al. 1995).
2. To explore what musculoskeletal problems general practice registrars encounter in their day to day workload and to see what learning needs they identify with regards to these.
3. To identify preferred methods of addressing these learning needs.
4. To explore general practice trainers views on the above.
5. To develop and evaluate an educational package focused on one area of need identified by the registrars and trainers

To achieve these aims, the questionnaire study, originally performed in 1992 and published in 1995, was repeated in four deaneries. Although this was not a national survey, the four deaneries chosen were large in size and covered all types of training practices. There was no reason to believe that they would not be representative of the other deaneries in the United Kingdom. The response rate was 44%, which is low, but this is a recognised problem with questionnaire surveys both in general but also more specifically in primary care. The results of the survey were similar to those from 1995

with trainees again reporting that their training was inadequate and that they felt "under confident" at managing musculoskeletal conditions. This may reflect responder bias or it could be a true reflection of registrar opinion. A possible cause for this lack of confidence could be that the registrars, who originally responded to the survey in 1995, are now General Practice trainers, i.e. it has become the 'blind leading the blind' or, as Eraut describes it, "perpetuating the weaknesses of the previous generation." (Eraut 1994, p. 40) No focused national interventions to improve registrar education have occurred during this time and it would have been up to the individual to address any learning needs that were identified.

To explore this lack of confidence further, both registrars and trainers were interviewed. The registrars having been stimulated to think about the area in more depth prior to the interview by having been asked to complete diaries for one month documenting all of their musculoskeletal consultations. From both the interviews and from reading the diary data, it was possible to get an idea as to how the registrars were managing the conditions seen.

In the literature review, I discussed the theories regarding the development of expertise and focused on two in particular. I shall now review these theories before applying them to the results. The theory proposed by Dreyfus and Dreyfus (1986) in their book "Mind over Machine, the Power of Human Intuition and Expertise in the Era of the Computer", suggested that trainees must progress through five stages in order to become an expert in their given field. These stages are: Novice, Advanced Beginner, Competent, Proficient and Expert. Whilst doing this, Dreyfus and Dreyfus argue that a trainee's behaviour changes in three ways. They become more involved in the situation, begin to see patterns in circumstances, and start to use their intuition and begin to disregard rules and guidelines, i.e. the experts learn from their experiences.

> "When things are proceeding normally, experts don't solve problems and don't make decisions; they do what normally works." (Dreyfus & Dreyfus 1986, p. 32)

This model was developed with the rise of artificial intelligence in mind and tries to go some way to explain how computers can never replace experts.

This summary of Dreyfus' model describes the behavioural changes that occur at the different stages. See Figure 9.1

Level 1 Novice

- Rigid adherence to taught rules or plans
- Little situational perception
- No discretionary judgment

Level 2 Advanced Beginner

- Guidelines for action based on attributes or aspects (aspects are global characteristics of situations recognizable only after some prior experience)
- Situational perception still limited
- All attributes and aspects are treated separately and given equal importance

Level 3 Competent

- Coping with crowdedness
- Now sees actions at least partially in terms of longer-terms goals
- Conscious deliberate planning
- Standardised and routinised procedures

Level 4 Proficient

- See situations holistically rather than in terms in aspects
- See what is most important in a situation
- Perceives deviations from the normal pattern
- Decision – making less laboured
- Uses maxims for guidance, whose meaning varies according to the situation

Level 5 Expert

- No longer relies on rules, guidelines or maxims
- Intuitive grasp of situations based on deep tacit understanding
- Analytic approaches used only in novel situation or when problems occur
- Vision of what is possible

Figure 9.1: A Summary of the Dreyfus Model of Skills Acquisition. Source: Eraut 1994, p. 124

Dreyfus and Dreyfus do not give an explanation how this learning from experience occurs in practice, and do not specifically discuss their theory in relation to medicine. Patricia Benner (1984) went on to apply their model to nursing and Bedi (2003), as discussed in the literature review, looked at it with regards to general practice training.

The second theory was that proposed by Schmidt, Norman and Boshuizen (1990) who explored the development of expertise with particular reference to medical professionals. They described three stages: novice, intermediate and expert and discussed how they believe the way in which knowledge is structured changes as an individual becomes more experienced.

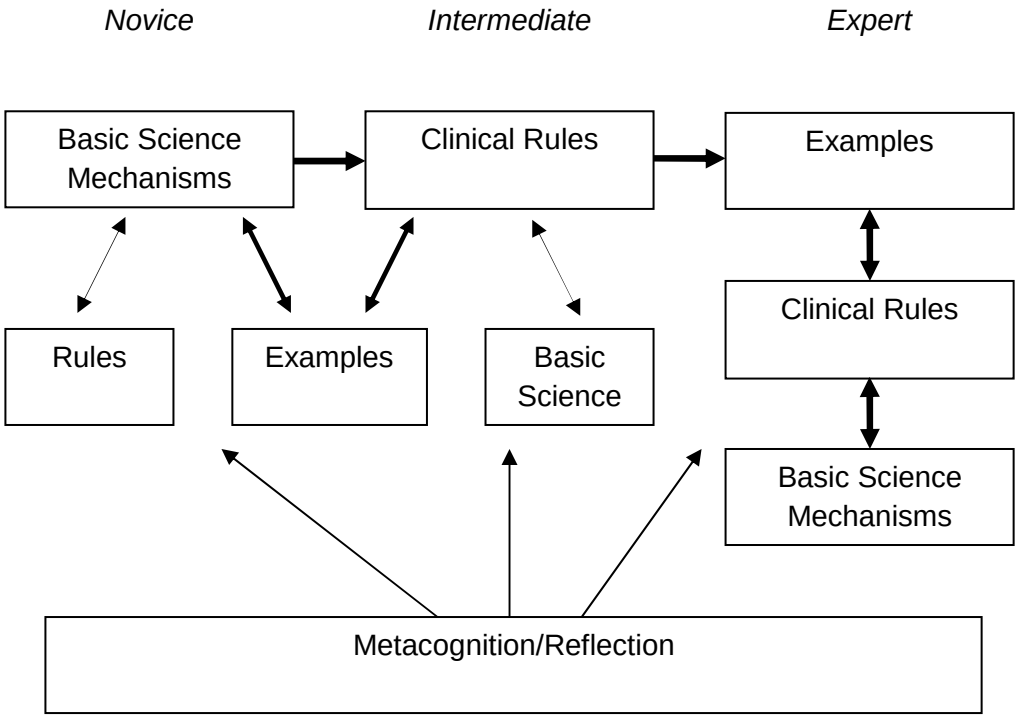


Figure 9.2: The modified model of the Theory of Expertise (Source: Norman 2005)

Schmidt, Norman and Boshuizen suggest that, as doctors become experts, they begin to develop “illness scripts”, a structure that includes a wealth of information about medical conditions that has been refined by experience and contains little formal knowledge.

> "An illness script is a knowledge structure containing a wealth of clinically relevant information about a disease, its consequences (e.g. the complaint a patient brings to the doctor, or the signs and symptoms of a disease during the successive stages of its course) and enabling conditions, the context in which the illness develops (e.g. the physical characteristics of a patient's environment, his or her age, habits, medical history etc.) These consequences and enabling conditions are linked together with relatively little formal knowledge (compared to what experts have learned about the subject) about pathophysiological causes (the fault) or symptoms and complaints." (Schmidt & Boshuizen 1993)

'Illness scripts' are specific to each doctor, i.e. they are personalised forms of memory which depends on their character, but also the examples of the illnesses they have seen whilst developing them. This model is very different to Dreyfus and Dreyfus's model as it focuses on how the structure of knowledge changes as a person becomes more experienced rather than how their behaviour changes.

Schmidt, Norman and Boshuizen suggest that the novice medical student comes to clinical practice knowing the basic science mechanisms and rules which they learnt at University. As they come into contact with patients, they see actual examples of what they have learnt in theory and begin to develop clinical rules, for example possible causes of shortness of breath. As the trainee reflects further on the patients that they see and become more experienced, they begin to develop these illness scripts. The scripts encompass knowledge about the clinical rules and basic mechanisms that they considered as less experienced doctors. If an expert comes into contact with a patient who does not fit one of the many illness scripts that they are aware of, the expert returns first to the clinical rules, and then to their basic knowledge to try to find an answer. Schmidt, Norman and Boshuizen do not suggest that knowledge is lost but rather that it is transformed by its use to be represented in a different, more clinically relevant, way.

> "...we are not implying that experts work at some "deeper" level of processing but rather that expertise is associated with the availability of knowledge representations in various forms, derived from both experience and formal education." (Schmidt, Norman and Boshuizen, 1990, p. 618)

The different stages of expertise described by Dreyfus and Dreyfus are appealing in that it is possible to see oneself progress through these distinct stages as different behaviours are acquired or lost. Schmidt et al's model however, with its three stages, appears to make the development of expertise something that appears to be inappropriately simple or easy. It is practically a binary model in nature, i.e. expert/non-expert, with limited stages for the trainee to pass through. In many cases, it may not be appropriate for a person to be an expert in all areas, for example one might only expect a GP to be proficient at examining eyes unlike opticians or ophthalmologists, whom one would expect to be experts. Dreyfus and Dreyfus' model allows for this in a much better way.

Relating the theories to the results

I shall now discuss the results of this project with reference to these two theories about the development of expertise.

The registrars taking part in this study appeared to be functioning at different levels depending on the amount of musculoskeletal experience they had had in their previous undergraduate and postgraduate training. Those who had worked in areas such as orthopaedics, rheumatology or Accident and Emergency did appear to be more confident in specific areas and to be functioning at a higher level.

At best, the registrars appeared to describe that they were functioning at a 'Competent' level of the Dreyfus model, in that they seemed to be aware of longer term goals and were following standardised procedures. This corresponds with Bedi's observations, as he suggested that registrars begin at the Advanced Beginner and hopefully progress to being proficient by qualification.

Examples of registrars behaving at a competent level:
Aware of longer term goals:

> "If I knew that it was appropriately indicated I would not have a problem doing it. It is just I have still got this conflict in the back of my mind that I know that a lot of arthritic knees potentially end up being replaced and if you are doing that then you are potentially not helping the surgeon." Registrar 3

Following standardised procedures:

> "I mean back pain.....that kind of back pain like the history of injury and the pulling feelings, They very much fall into my category of giving people non-steroidals and bringing them back in a couple of weeks." Registrar 2

There were areas though where the registrars did not seem to perform at this level, e.g.

> "The most difficult one is the shoulder. Anyway you move it they say "Ow, it is hurting". It is difficult because too many..... a couple of joints and muscles..... so many things to examine so I tend to get confused." FG1 Registrar 8

i.e. in this case, the registrar appears to be struggling to follow the standardised examination.

Schmidt et al defined their three levels: novice, intermediate and expert depending on how the trainee's knowledge was organised. As they become more experienced, the trainees develop "illness scripts", a knowledge structure that includes a multitude of facts about a condition.

The registrars discussed how they had very little experience of seeing basic primary care conditions such as tennis elbow, plantar fasciitis etc. and that this affected their confidence when managing them. This would correspond to them having not yet developed an illness script for these conditions. The registrars had to then return to their basic science principles and rules to determine what was wrong, which appeared to make them feel uncomfortable.

For example:

> "Well, I was fairly confident that it was an enlarged olecranon bursa and it was inflamed but I didn't have the confidence to say well this is common and sometimes it comes up for no reason or this is common because you do this job and this is what we would normally expect to happen and this treatment might be helpful or you should have antibiotics and I just didn't know what the natural history was and what the best treatments would be." Registrar 5

As the registrars became progressively more experienced at seeing these common conditions, they appeared to develop these "illness scripts" which corresponded with their becoming increasingly confident at managing the presenting problem.

> "You know, the first time I had a really bad ankle sprain come in I, you know, sort of hesitated and felt my way a bit and printed off the Prodigy leaflet and went through it together and things. The next time you know I was much more confident in giving the advice and starting to pick up you know, more sort of individual cues but until I had seen an ankle sprain I mean you could have told me you know "oh well, you need to check this, this and this" but I don't know that I would have retained it quite so much." Registrar 8

It is should be noted that these are only the perceptions of the analyst from having read the diaries, interviewed the registrars and read the interview transcripts.

The trainers also agreed that registrars function at different levels according to their previous experience but again suggested that they were at an Advanced Beginner/Competent level in general.

> "I don't think enough people look at occupational history and predisposing factors so I don't think it is emphasised enough." Trainer 4

> "Few of them will have had experience of treating the chronic conditions..... and therefore, will not perceive the involvement of a whole multidisciplinary team that might be far more important to this condition than actually an acute anti-arthritic drug or steroid or whatever that acute therapy may be." Trainer 1

> "I think that they often seem to have quite a stereotypical way of looking at joints which will often miss out some kind of key tests." Trainer 2

With regards to Schmidt et al's model, there was a suggestion that registrars were still following rules in order to help them assess and manage the patient, but also that their basic knowledge was lacking.

> "I think joint examination isn't good often in registrars and I think it sounds like I am harking back to days of yore but I don't think they know the anatomy as well as older generation doctors do. Not that that necessarily matters because it is functional anatomy that really matters, isn't it? But, I think that they often seem to have quite a stereotypical way of looking at joints which will often miss out some kind of key tests." Trainer 2

The trainers themselves also appeared to be functioning at different levels of expertise. When asked how they felt about managing musculoskeletal conditions, the more senior trainers were open about having gaps in their knowledge and their reported confidence appeared to be below expected. In particular, the trainer with a special interest in the area (Trainer 4) reported that "if I said confident then that would imply that I knew more than I think I probably do know". My perception, as the interviewer, was that the trainers who reported their confidence to be low were probably more knowledgeable about musculoskeletal disorders although this could not be corroborated.

An educational package on shoulder pain was developed with both the feedback of the registrars and these theories in mind. The registrars identified that their preferred teaching would be primary care focused, hands on, categorised by anatomical location and from experienced teachers. Using either case histories or real patients was felt to be best and having either doctors or physiotherapists as teachers would make the teaching more effective. The registrars considered that it would be ideal to be taught as a group and particularly during their general practice attachment. Acknowledged drawbacks of group teaching included the varying levels of expertise, with some registrars having spent time in orthopaedic and rheumatology posts whereas others may have had no experience at all. This makes it difficult to determine at what level to pitch the content of any teaching. The registrars also recognised that they appreciated the opportunity to access information during their working day so that they could address any unmet needs that had arisen during consultations. Comment was made that some of the textbooks available are far from ideal, as the way in which they present information makes it difficult to find potential diagnoses.

In discussion with my supervisors, it was felt that creating an educational package which allowed for different levels of baseline knowledge and which was easily accessible during surgery may be most effective both in cost and time. The package created discussed the different causes of shoulder pain seen in primary care and gave some advice regarding their prevalence which the registrars had suggested they may find helpful. It included example case histories which was hoped would encourage illness script development. Video clips of the examination, demonstrated by experts, were also incorporated to try to go some way to address the registrars' wishes for hands on teaching. The content of the package was layered so that either simple or more complex information could be accessed as desired. Creating a computer based package meant that the registrars could have it within reach on their computer desktop and it could be accessed easily whenever they wished, particularly around the time of consultations so that they could link their learning to what they had seen. It was also hoped that the contents of the package could be used in other teaching sessions, for example during tutorials or on scheme based teaching.

The package appeared to be simple to use and feedback was complimentary. In evaluating the package, a pre- and post- knowledge test were performed which did appear to show an improvement in the registrars' performances, although the numbers involved were small. Further evaluation would be needed to demonstrate whether or not interventions like this could go some way to help improve general practitioners' level of expertise.

A career in general practice is a continuous learning curve, with doctors developing throughout their working life. The trainers felt that they were safe doctors, which would suggest that they believe that they are at least proficient. This raises the following questions:

- How much should GPs know and which level should they be functioning at?
- At which level should GP registrars be aiming to be at the end of their training?

In an ideal world, it would be expected that all GPs would be proficient on the Dreyfus and Dreyfus scale as was suggested by Bedi. In Schmidt et al's model, it is more difficult to determine the expected performance level. I would suggest that all GPs

should be experts at managing specific conditions to a certain standard, i.e. they should be effective gatekeepers (Mathers & Hodgkin 1989).

For example:
With conditions that are generally managed in secondary care e.g. inflammatory arthritis, it would be hoped that a generalist GP would become an expert at identifying when a patient with specific symptoms should be assessed by a specialist. Once a diagnosis had been established the generalist would then have further input as a member of the multidisciplinary team.

With conditions that are mainly managed in primary care, for example tendinopathies or osteoarthritis, a generalist GP may be expected to become an expert at knowing what interventions should be offered to their patients prior to referring to a specialist GP/extended scope practitioner or to secondary care for other options e.g. joint/soft tissue injections.

It would be hoped that GPs' knowledge would improve with experience and that some would develop an interest and become an expert at primary care musculoskeletal problems. These doctors could then act as a resource for their colleagues and assist with difficult cases. It would be unrealistic to expect all GPs to become experts in all specialties represented in primary care, but it shouldn't be unreasonable to expect them to become proficient in all areas. This should be the aim of vocational training schemes – to produce "proficient" GPs or doctors who are at least approaching this by the end of their training. According to the information gained in this project it would appear that current medical training is possibly failing in this aim, as the registrars appear to be lacking when it comes to their basic medical knowledge, and they do not report much external input to allow or encourage them to develop their illness scripts or tacit knowledge in this area.

It is our responsibility, as professionals, to ensure that registrars receive adequate training and are competent to work as general practitioners.

> "Individually and, in association, collectively, the professions 'strike a bargain with society' in which they exchange competence and integrity against the trust of client and community, relative freedom from lay supervision and interference,

> protection against unqualified competition as well as substantial remuneration and higher social status." (Rueschemeyer, 1983 cited in Eraut 1994, p. 2)

Why is this happening?

Medical school training

As already discussed in the introduction to this thesis, studies have shown that medical school training in musculoskeletal disorders is poor with little time or emphasis placed upon them. One of the trainers highlighted an often discussed concern about a decline in knowledge of the basic science mechanisms, and in particular anatomy. Traditionally medical education had a strong emphasis on the basic sciences but, over the past ten to fifteen years, there has been a shift in medical school teaching away from splitting the course into a pre-clinical section, where the basic science mechanisms are taught and a clinical section where the students start to come into contact with patients. Instead, courses are now "integrated" with students learning about both the scientific basis and the clinical features of a disease at the same time. This has raised concerns that students may be getting an insufficient grounding in the basic sciences although there is no formal evidence to confirm this. It is imperative for the development of 'illness scripts' that trainees have a thorough grounding in the basic sciences to allow them to have this base of knowledge on which to build. The current situation has developed though, in spite of what was regarded as thorough basic training and so, if this is true and the basic science mechanisms are not being learnt at medical school, will the situation deteriorate further?

Postgraduate training

Until recently, and while this project was running, there was no curriculum for general practice. Registrars developed their own educational programme with their trainers according to their perceived learning needs. This was also commonplace on vocational training schemes where groups again decided their timetable with the assistance of the Course Organiser. The aim of this being that it encourages the GP registrars to behave as adult learners, i.e. they set the agenda and therefore should be motivated to learn. In

reality, it is difficult to decide what to learn about with having no experience of the job and being unaware as to what level they should be functioning at. Some GPRs may have been aware of learning needs in musculoskeletal medicine, but many may not have been. This is equivalent to the "blind spot" area of the Johari Window (Figure 9.3). There are tools available to help registrars identify their learning needs and they do have their trainers for guidance but, are these tools sufficient and, as the trainers discussed, are they adequately experienced and aware to help with this? I.e. the trainers also have their own blind spots and so, between both trainee and trainer there may be a significant area of "unknown".

		Me	
		Aware	Unaware
You	Aware	Arena = information both you and I share	Blind spot = things you have noticed about me, about which I am unaware
	Unaware	Facade = things I am aware of and have not yet disclosed to you	Unknown = area of which we are both unaware

Figure 9.3: The Johari Window

> "As we know, there are known knowns. There are things we know we know. We also know there are known unknowns. That is to say we know there are some things we do not know. But there are also unknown unknowns, the ones we don't know we don't know." Briefing for United States Department of Defense, Feb 12 2002 by Donald Rumsfeld, United States' Defence Secretary

I would suggest that there could be another dimension to the Johari Window. Many people have areas of knowledge that they are unaware of but that they can bring into use in particular situations when they have been appropriately stimulated to remember. This was described by Polanyi as "tacit knowledge." (see Literature Review) and is

developed with experience. It is difficult to share tacit knowledge as, by nature, it can only be transmitted by contact, thus highlighting the importance of an apprenticeship model of training. These are not areas that a registrar could identify during a discussion with their trainer. Instead it requires the trainee to observe their trainer in action and to have time to reflect upon this. This is not necessarily something that routinely occurs during training.

This could result in registrars failing to develop illness scripts regarding certain conditions or developing inaccurate scripts.

For example:
A basic illness script for gout could be:

Enabling conditions
Predisposing factors:

- Diet high in meat/game and red wine
- Drugs including diuretics

Boundary conditions:

- Male
- Older age
- Obese

Fault:

- Deposition of urate crystals in tissues and synovial fluid

Consequences
Complaints:

- Exquisitely painful and swollen joint.
- Generally affects the first metatarsophalangeal joint.
- Cannot bear anything touching it.

Signs:

- Slow and antalgic gait.
- May be a home visit.
- Takes time to get to the consulting room.

- Possibly wearing slippers as cannot tolerate shoes.
- Red, hot, tender first metatarsophalangeal joint.

A more complex illness script could include:

Enabling conditions

Predisposing factors:

- Diet high in meat / game and red wine.
- Drugs including diuretics.
- Psoriasis, surgery, infection, trauma.
- Starting allopurinol without NSAID / steroid / colchicine cover.

Boundary conditions:

- Generally males affected.
- Unlikely females if pre-menopausal and not on diuretics.
- Protective effect of certain medications e.g. losartan.

Fault:

- Deposition of urate crystals in tissues and synovial fluid.
- Serum uric acid may be normal.

Consequences

Complaints:

- Exquisitely painful and swollen joint.
- Generally affects the first metatarsophalangeal joint but distal interphalangeal joints commonly affected in diuretic induced gout.
- Cannot bear anything touching the joint.

Signs:

- Slow and antalgic gait.
- May be a home visit.
- Takes time to get to the consulting room.
- Possibly wearing slippers as cannot tolerate shoes.
- Red, hot, tender joint.
- Tophi may be present.

As can be seen, these illness scripts are different with the second being richer and containing more detail. Some of these additions would not be found written in a text book and the differences may affect patient management.

What can be done?

Musculoskeletal medicine remains a "Cinderella specialty", i.e. one which is not highly prioritised by either teachers or learners. Even though musculoskeletal conditions form a significant part of a GP's workload, they are not life threatening and are often seen as a natural part of aging or a person's lifestyle. This was recognised by the trainers:

> "It has always been a Cinderella specialty and to change it will be a major achievement." Trainer 01

Other areas of medicine that are much less prevalent appear to be more successful at raising their profile, and political lobbying is common in general practice education. For example, Alzheimer's disease has recently been identified as an area where general practitioners will have specific training in order to enable them to identify the condition early and then refer potential cases to specific "Memory Clinics" to enable diagnosis (Sugden 2008). Only around 700,000 people in the UK suffer from some form of dementia; the National Institute for Clinical Excellence guidance advises that the only treatments potentially applicable to early Alzheimers (the anticholinesterase inhibitors: donepezil, galantamine and rivastigmine) should not be used in the early stages of the condition, and should only be commenced when the patient has "moderate Alzheimers", defined as a Mini Mental State Examination score between 10 and 20 (normal being 27 to 30). Therefore, early referral of this condition may not actually significantly benefit the patients.

This lobbying is recognised by general practitioners:

> "We have this from every single specialty. General practice could do it better and yes, of course we could, but we have to be able to take the broad view. We are not rheumatologists and I think sometimes people have an unrealistic expectation of what general practice can deliver and how specialised should the generalist be. To my mind, the strength of general practice is that we are

> generalists and that when people say “Yes, we could be doing it better”, I think that sometimes they are right and I think that sometimes it is a misunderstanding about what general practice should be doing.” Trainer 05

As already discussed in the Introduction, palliative care has managed to raise its profile, such that it is now considered an important part of general practice training. This appears to have been through increased media publicity relating to this area, for example, the use of morphine as an analgesic in terminal care and the cases of assisted suicides.

This would suggest that people with an interest in musculoskeletal disorders need to increase both political and public lobbying in order to raise the status of this area. Yet this is already occurring, so where are they going wrong?

Improving current education for both undergraduates and postgraduates could help raise the status of musculoskeletal conditions. Eraut suggests that there are three central questions that need to be addressed by every profession regarding education:
1) What is our professional knowledge base?
2) What is best learned in higher education, what is best learned in professional practice and what is best learned through an integrated course involving both contexts?
3) What has to be learned before qualification, and what is best postponed until after qualification?
(Cited in Eraut 2004, p. 119)

Looking at each of these areas in turn:

Undergraduate curricula exist for both orthopaedics and rheumatology and the musculoskeletal knowledge base for primary care doctors has now been defined as one of the new Royal College of General Practitioners Curriculum Statements. Unfortunately the curriculum is not specific or explicit enough to help address these “unknown unknowns”. One reason for this is that, as already discussed, the prevalence data for the musculoskeletal conditions seen in primary care in the UK is very vague. (Linsell et al. 2006).

There is currently little evidence looking at what is best learnt prior to and during professional practice. If medical schools are failing, as suggested, to teach the basic science mechanisms, will this need to be covered once registrars begin their general practice training? There are arguments both for and against this. Basic science does not become part of professional knowledge unless and until it is used in a professional context. If the time gap between learning it and using it is too large then it can be forgotten and so is being taught at the wrong time. It is probable though, that registrars would not appreciate having to return to book learning once in practice and they would not prioritise it as an area to focus on. Should we therefore accept that there could be a decline in medical students' basic scientific knowledge and try to develop ways to circumnavigate this?

Clinical rules are currently widely used in the form of guidelines. Should general practice be focusing on developing guidelines and disseminating them to registrars, and would this help replace the poor knowledge of basic science? Guidelines are "systematically developed statements to assist practitioner and patient decisions about appropriate health care for specific clinical circumstances" (Field & Lohr 1990, p. 8). In the United Kingdom it is the role of the National Institute for Clinical Excellence to create guidelines for all areas of medicine. They suggest that their guidelines are helpful in four ways:

1) They should improve patient care by making recommendations for the treatment and care of people by health professionals;
2) They should be used to develop standards to assess the clinical practice of health professionals;
3) They should be used in the education and training of health professionals
4) They should help patients to make informed decisions, and improve communication between the patient and health professional. (www.nice.org)

Unfortunately there is little evidence to demonstrate that this does occur in clinical practice. Guidelines are generally disease specific and do not cover difficult situations for example patients with multiple conditions. They are often written by experts in the field and not primary care doctors and so they do not reflect the conditions in which we work. Naive doctors who strictly follow guidelines may run into problems as was

discussed in a recent case report in the Lancet (Beggs et al. 2005) Guidelines are also, by nature, based on the available evidence for the management of the specific condition. A significant amount of medicine has been developed from observations and experience (i.e. is personal knowledge) and so cannot be included in guidelines. This could result in useful interventions being lost.

Schmidt, Norman and Boshuizen's model depends on the trainee having time in the clinical situation in which they are going to work with appropriate trainers to allow them time to develop their knowledge appropriately, i.e. they should be learning in context. They require sufficient space to allow them to reflect on what they have seen to allow them to develop their tacit knowledge. Currently GP registrars spend twelve months in either one or two practices. There have been repeated calls from both trainees and trainers for this to be extended, particularly as the registrars often spend six of these months preparing for and taking their Membership of the Royal College of General Practitioners examination. (Bain 1996; Van Zwanenberg et al. 2001). Recent suggestions are for training to be extended to five years which would allow the registrar to spend longer in primary care posts during their training (British Medical Journal Careers 2008). In order to try and allow this within the current three year scheme, some areas have offered "integrated posts" where the registrar spends half of their time in a hospital specialty and half of their time in primary care. Unfortunately this may not necessarily improve the registrars' knowledge as it is essential that they learn the correct information for their place of work and in the context in which it is going to be used. For example, if a registrar were doing an integrated post with rheumatology as their hospital specialty this may not necessarily improve their knowledge of the musculoskeletal conditions seen in primary care as the hospital part of their job will be focusing on those conditions seen in secondary care, i.e. predominantly inflammatory joint disease.

What is currently happening?

The Royal College of General Practitioners in conjunction with the Department of Health are in the process of developing learning modules for GP registrars that will be available to all trainees on line. Trainees would be expected to complete these as part of their training and this will help stimulate discussion and thought as to what trainees

should be aware of. Each area of the curriculum has an editor – a doctor with an interest in the particular area, and it is their role to ensure that the standard is set correctly. How this will function in practice remains to be seen but these modules may help registrars identify their learning needs and stimulate reading around a topic. Unfortunately the e-Learning modules will not be able to provide what the learners appear to want, which is what they didn't receive at medical school i.e. an apprenticeship model or the chance to see patients with pathology with an expert present. This would be much more difficult to provide to trainees although if integrated posts were carefully planned and used GPs with a special interest, it may be possible to provide this. These integrated posts appear to be popular with trainees.

What will be available for doctors who are already working as GPs and who therefore may be unable to access the e-Learning modules?

Different educational initiatives are currently in progress both nationally and locally. Large companies who provide education are starting to develop an interest in musculoskeletal problems. An example being the British Medical Journal Publishing Group who has, over the past year, developed a "Musculoskeletal Masterclass", a single day of teaching aimed at the generalist GP. The Masterclass in its first year was popular and oversubscribed (personal communication from the organisers).

The registrars identified patient information leaflets as one of the methods by which they educate themselves about the conditions that they see. These are widely available either through the surgery computer software or through relevant websites such as patient.co.uk. The quality of the content of these information sheets is variable although some excellent ones exist. Improving the content of these in general or directing primary care doctors to the most suitable ones available would be a simple way to enhance current primary care management of musculoskeletal conditions. This is currently being looked at by the Arthritis Research Campaign.

The Arthritis Research Campaign, a national charity with a particular emphasis on developing educational initiatives for general practitioners has recently reviewed its' educational strategy and so new programmes may be forthcoming.

Conclusion

Concerns have been raised repeatedly by health education professionals with an interest in musculoskeletal medicine that education in this field is lacking. Primary care education has been highlighted as being a particular area of need. In order for the situation to improve, musculoskeletal conditions need to be recognised by both educators, and those being educated, as a priority area. This will be a difficult task to achieve, particularly in primary care education, as there are many calls on a GPs time and effort. Initiatives currently in place, such as the RCGP's e-Learning modules and the British Medical Journal's "Masterclass" series, may go some way to improve the situation especially with using e-Learning modules becoming a core part of a registrar's training. Developing educational packages to complement these initiatives, such as the one created for this project, is possible and may be worth looking at.

I would suggest though, that further effort still needs to be made, in order to improve the education of GP registrars in this area. My recommendations are to:

1) Identify, where possible, the true prevalence of musculoskeletal conditions in primary care. This could be done by asking interested and specifically trained GPs to document what conditions they see in their day to day work.
2) Update the curriculum accordingly. I.e. ensure that it reflects the diversity of conditions seen and that it focuses on common conditions that can easily be managed in primary care along with highlighting the rare conditions that need to be referred urgently.
3) Develop a core, 'hands on' teaching course for all GP registrars which can be available to all GPs as a refresher. Ideally this course would enable trainees to revisit and practice the examination in a safe, non-threatening environment and would also give them the opportunity to examine patients with interesting pathology.
4) If time spent in general practice during training is increased, registrars should be encouraged to spend time focusing on neglected clinical areas. They could be advised to attend relevant hospital clinics and to sit in with General Practitioners with a Special Interest, physiotherapists etc.

5) Special effort should be made to train the trainers, so that they are more confident in their own knowledge and that both the formal and informal teaching that the registrar receives is beneficial.

APPENDICES

APPENDIX A: LANYON'S QUESTIONNAIRE

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Trainee Year? _____

Please ☑ or write where indicated to answer the following questions:

EDUCATION

1. In what month did you start your Trainee year?
   - August ❒
   - February ❒
   - Other ❒ *(Please specify_____)*

2. Does your VTS include a Rheumatology SHO post?
   - Yes ❒
   - No ❒

   If NO did any of your hospital posts include any rheumatology teaching?
   (i.e. attendance at rheumatology clinics)
   - Yes ❒
   - No ❒

3. Have there been any rheumatology components to your local half-day release scheme?
   - Yes ❒
   - No ❒

   If YES please state number of half-days which have been devoted to rheumatology:
   ___ half-days

4. Have there been any local Regional Study Days on the management of rheumatological/musculoskeletal disorders?
   - Yes ❒
   - No ❒

5. Have you had any tutorials with your Trainer on the management of Rheumatological/musculoskeletal disorders?
   - Yes ❒
   - No ❒

   If YES, how many hours? _____ hours

   If YES, what subjects were covered?
   - ❒Back pain
   - ❒Soft tissue/periarticular disorders
   - ❒Sports injuries
   - ❒Locomotor disorders in childhood
   - ❒Rheumatoid Arthritis
   - ❒Gout
   - ❒Osteoporosis
   - ❒Joint injection techniques
   - ❒Soft tissue injection techniques
   - ❒Osteoarthritis
   - ❒Management of musculoskeletal disability

6. Did you have any specific clinical rheumatology teaching at medical school?
   Yes ❒
   No ❒

7. Name of the Medical School you attended? _____
   Year of qualification? _____

8. How would you rate your medical school teaching in this area in terms of its relevance to General Practice on a scale of 1-10 *(1 = not relevant at all/10 = very relevant)*? __

MANAGEMENT SKILLS

9. Have you ever injected the following soft tissue lesions?

Tennis Elbow	Yes ❒	No ❒
Golfers Elbow	Yes ❒	No ❒
DeQuervains Tenosynovitis	Yes ❒	No ❒
Bicipital Tendonitis	Yes ❒	No ❒
Plantar Fasciitis	Yes ❒	No ❒

   If YES to any of the above, who taught you to inject soft tissue lesions?
   Trainer ❒
   Self taught ❒
   Rheumatologist ❒
   Orthopaedic Surgeon ❒
   Physician ❒
   Other *(Please specify_____)*

   If YES have you injected them in General Practice?
   Tennis Elbow ❒
   Golfers Elbow ❒
   DeQuervains Tenosynovitis ❒
   Bicipital Tendonitis ❒
   Plantar Fasciitis ❒

10. How would you rate your confidence at knowing WHEN to inject the following soft tissue lesions, on a scale of 1-10 *(1=not confident at all/10 = very confident)*?
    Tennis elbow __
    Golfers elbow __
    DeQuervains tenosynovitis __
    Bicipital tendonitis __
    Plantar fasciitis __

11. Have you ever injected/aspirated the following joints?

Shoulder–Glenohumeral Joint	Yes ❒	No ❒
Shoulder–Subacromial Bursa	Yes ❒	No ❒
Shoulder–Acromioclavicular joint	Yes ❒	No ❒
Knee	Yes ❒	No ❒
Elbow	Yes ❒	No ❒

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If YES to any of the above, who taught you the procedures?

- Trainer ❒
- Self taught ❒
- Rheumatologist ❒
- Orthopaedic surgeon ❒
- Physician ❒
- Other *(Please specify_____)*

If YES have you injected them in General Practice?

- Shoulder-Glenohumeral joint ❒
- Shoulder-Subacromial bursa ❒
- Shoulder-Acromioclavicular joint ❒
- Knee ❒
- Elbow ❒

12. How would you rate your confidence at knowing WHEN to inject/aspirate the following joints on a scale of 1-10?
(1 = not confident at all / 10 = very confident)

- Shoulder–Glenohumeral Joint __
- Shoulder–Subacromial Bursa __
- Shoulder–Acromioclavicular joint __
- Knee __
- Elbow __

13. How would you rate your confidence at PERFORMING injections/aspirations of the following joints on a scale of 1–10?
(1 = not confident at all / 10 = very confident)

- Shoulder–Glenohumeral Joint __
- Shoulder–Subacromial Bursa __
- Shoulder–Acromioclavicular joint __
- Knee __
- Elbow __

14. How would you rate your confidence at examining the following joints, on a scale of 1–10?
(1 = not confident at all / 10 = very confident)

- Back __
- Shoulder __
- Knee __
- Hip __
- Foot __

15. Who predominantly taught you how to examine and treat shoulder pain?

- Trainer ❒
- Self taught ❒
- Rheumatologist ❒
- Orthopaedic surgeon ❒
- Physician ❒
- Other *(Please specify_____)*

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16. How would you rate your confidence in managing the following on a scale of 1–10 *(1 = not confident at all / 10 = very confident)*?

Gout	__
Back pain	__
Sports injuries	__
Osteoarthritis	__
Soft tissue/periarticular lesions	__
Locomotor disorders in children	__
Diagnosing inflammatory arthropathies	__
Safety monitoring of 2nd line drugs	__
Osteoporosis	__
Asthma	__
Hypertension	

17. How would you describe the amount of training which you have received in management of rheumatological/musculoskeletal disorders during your V.T.S. on a scale of 1–10 *(1 = totally inadequate / 10 = completely adequate)*? __

18. How would you rate the following as educational methods in terms of their relevance and usefulness to you on a scale of 1–10 *(1 = not at all useful / 10 = very useful)*?

Lectures by consultants	__
Tutorials with trainer	__
Small group teaching with other trainees	__
Attendance at rheumatology OPD clinics	__
Rheumatology SHO post	__
Distance learning courses	__
Attending symposia	__

19. Are you aware of the Arthritis Research Campaign Learning Guide for General Practice Trainees? YES ❒ NO ❒

If YES has it been used in your training / teaching?

YES ❒ NO ❒

THANK YOU FOR YOUR TIME IN ANSWERING THESE QUESTIONS

APPENDIX B: REGISTRARS' CHARACTERISTICS (4 MALE, 9 FEMALE)

Registrar 01

Trained in Glasgow. Completed six month posts in accident and emergency, paediatrics and obstetrics and gynaecology along with a twelve month medical rotation (included four months of general medicine/rheumatology) prior to starting the vocational training scheme. Currently in Phase Three and is working in a deprived urban practice in Newcastle upon Tyne. The trainer has an interest in musculoskeletal medicine and is a clinical assistant in the musculoskeletal department at the Freeman Hospital.

Registrar 02

Trained in Newcastle upon Tyne. Completed six months in accident and emergency and 12 months of general medicine (with no rheumatology) prior to starting the Northumbria Vocational Training Scheme. On the scheme registrar 02 has spent six months in general practice (phase one), six months in an innovative public health/general practice post and six months in obstetrics and gynaecology prior to starting their phase three post. Is currently working in a deprived inner city practice in Newcastle upon Tyne with a relatively high student population.

Registrar 03

Trained in Bristol and had three months of orthopaedics in their surgical house job. Worked in accident and emergency for six months prior to a two year general medical rotation (London) which did not include any rheumatological experience. Then went on to work in paediatrics and obstetrics and gynaecology prior to starting their year of general practice with the vocational training scheme. Is currently working in a practice in an affluent urban area in Newcastle upon Tyne.

Registrar 04

Trained in Newcastle upon Tyne and has worked in psychiatry, accident and emergency, community paediatrics, obstetrics and gynaecology and an innovative dermatology/general practice post prior to their phase three general practice attachment. Has also taken some time out to travel. Is working in a deprived urban area with a high proportion of asylum seekers and some patients with addiction problems (both drug and alcohol).

Registrar 05

Trained in Oxford and completed a two year medical rotation in Newcastle upon Tyne including haematology/cardiology/gastroenterology/chest medicine/dermatology and neurology (has MRCP) prior to starting vocational training. Is currently in phase one and is working in a deprived, semi-rural area where a large number of the patients are ex miners.

Registrar 06

Trained in Burma and spent two years working in hepatology and one year as a research officer in a medical research centre prior to coming to the UK. In the UK has spent three years in medical posts (including six months as a locum staff grade in rheumatology) prior to starting the vocational training scheme. On the scheme has worked in paediatrics and obstetrics and gynaecology prior to starting their phase three general practice post. Is currently working in a deprived inner city practice with a high student population (many from overseas) and a number of refugees.

Registrar 07

Trained in Newcastle upon Tyne. Following the pre-registration year, worked in medical posts (no rheumatology) for 20 months and in accident and emergency for four months. Is currently in phase one and is working in a deprived semi-rural area with high unemployment levels.

Registrar 08

Trained in Newcastle upon Tyne. Spent two months as an orthopaedic PRHO and following their pre-registration year spent six months in medicine and six months in paediatrics. Is currently in phase one and is working in a “new town”. The patients are mainly social class III. The trainer has a special interest in musculoskeletal medicine having done the Diploma in Rheumatology and an MSc in sports medicine.

Registrar 09

Trained in Newcastle upon Tyne and has started vocational training straight after their pre-registration year. Is currently working in an urban deprived area with a high level of unemployment and drug addiction.

Registrar 10

Trained in Pakistan and spent a year working in Pakistan prior to coming to the United Kingdom. Has spent three years in medical posts (not including any rheumatology) prior to starting the vocational training scheme. Whilst on the scheme has spent six months in phase one general practice, six months in obstetrics and gynaecology, six months in an innovative prison medicine post and six months of paediatrics prior to starting phase three. Is currently working in an affluent urban area.

Registrar 11

Trained in Newcastle upon Tyne. Did three months of orthopaedics as part of their pre-registration jobs prior to joining the vocational training scheme. Is working in a deprived urban area and is learning joint injections from their trainer – has now performed a sufficient number of injections to get on the minor surgery list.

Registrar 12

Trained in Nigeria. Worked for one year as a PRHO in Nigeria prior to doing a PRHO year in the UK. Did one year of a medical rotation in Newcastle upon Tyne covering respiratory/care of elderly/gastroenterology/liver transplant medicine before joining the Vocational Training Scheme. Is currently in phase one, working in a "new town" with a relatively high level of unemployment and drug addiction.

Registrar 14

Trained in Newcastle. After house jobs went onto a paediatric rotation and worked in general paediatrics/neonates/paediatric surgery/paediatric cardiothoracics (Has MRCPaed) prior to joining the vocational training scheme. Works in a relatively affluent rural area where a number of commuters live although they have patients who live and work in the area.

APPENDIX C: REGISTRAR TOPIC GUIDE

Musculoskeletal Learning Needs of General Practice Registrars

Topic Guide

Key Objectives

- To evaluate and validate the previously identified core curriculum amongst GP trainees and trainers
- To identify how GP trainees are currently learning their musculoskeletal clinical skills and knowledge
- To identify areas of the learning guide which are currently not being met and to identify areas of priority
- To produce and evaluate a model educational package
- To produce and evaluate an updated learning guide.

1. **Introduction**
   - Introduction to the interview
   - Explain about confidentiality and tape recording

2. **Diary Collection**
   - What aspects did you find difficult to manage?
     - History
     - Examination
     - Diagnosis/Investigation
     - Management
   - What problems did you find easy to manage?
     - History
     - Examination
     - Diagnosis/Investigation
     - Management

Core Clinical Topics

Acute back/neck pain
Chronic back/neck pain
Shoulder pain
Knee pain
Soft tissue disorders
Osteoarthritis
Osteoporosis
Somatisation/fibromyalgia and allied syndromes
Pain management
Acute arthropathies
Chronic inflammatory arthropathies
Polymyalgia rheumatica and allied conditions
Awareness of rare diseases

3. **Past Experience**
   - Any presentations of musculoskeletal conditions that you find difficult/easy?
   - Any musculoskeletal problems that you've discovered with your trainer?
   - Do you inject? Why/why not? Do you intend to? Which would you be prepared to perform?

4. **Referral**
   - What are the sort of musculoskeletal problems that lead you to make a referral to secondary care? (Orthopaedics/Rheumatology)
   - When would you refer and why?
   - What PAMs/AHPs are available and do you refer? Why?
   - What problems do you refer to physio and why?
   - Is there anyone else who you would refer to/recommend?
   - What are the patients asking for? (Physio/Chiropractor/Osteopath)

APPENDIX D: TRAINER TOPIC GUIDE

Musculoskeletal Learning Needs of General Practice Registrars

Topic Guide

Key Objectives

- To evaluate and validate the previously identified core curriculum amongst GP trainees and trainers
- To identify how GP trainees are currently learning their musculoskeletal clinical skills and knowledge
- To identify areas of the learning guide which are currently not being met and to identify areas of priority
- To produce and evaluate a model educational package
- To produce and evaluate an updated learning guide.

Introduction
Introduction to the interview
Explain about confidentiality and tape recording

Trainees Experience of Musculoskeletal Disorders
Range of conditions
What conditions do you think your registrar sees?
(Difference to trainer/principal? – Same for other specialties?)

Perceived need/problem – safety

Case Mix
Are you involved in what your registrar sees?
Do you think they're seeing chronic disease (sufficient?)
Strategies identified by trainees "Come back in Feb"
"NSAID for 2/52"

Core Clinical Topics

Acute back/neck pain
Chronic back/neck pain
Shoulder pain
Knee pain
Soft tissue disorders
Osteoarthritis
Osteoporosis
Somatisation/fibromyalgia and allied syndromes
Pain management
Acute arthropathies
Chronic inflammatory arthropathies
Polymyalgia rheumatica and allied conditions
Awareness of rare diseases
Chronic disability

Referrals
Do your trainees discuss referrals with you?
Referring to physio/MRI
Issue re feedback from hospital letters/letters from AHPs

Are your registrars treating conditions differently to how you would?

Learning Opportunities
Do your trainees ask for help with regards to musculoskeletal disorders?
How often? (WHY?) (Tutorials/consultations/informally)
Questionnaire shown that registrars receive on average only 2 hours teaching on musculoskeletal conditions – your opinion?
What do you think they should be learning about? Any areas that are not being covered?
How do you think they should be learning? – time, method, usefulness of existing material.
Are you aware of the **arc** learning guide?

Trainers
How confident are you at managing musculoskeletal disorders (esp. Shoulder/Knee)?
Where (and how) did you learn your musculoskeletal skills?

Are you confident in managing musculoskeletal disorders?
External influences - QOF

APPENDIX E: TRAINERS' CHARACTERISTICS

Trainer 01

Has been a trainer for 29 years (since 1976) although has not been fully active throughout this time as there are 2 other trainers in the practice. Was initially involved in running the half day vocational training scheme teaching for registrars in the area. Has also worked as a hospital visitor for the Royal College of General Practitioners and has been involved in approving hospital posts for general practice training. Works in a semi-rural practice in a market town. Also, has an academic interest and has a doctorate in medicine.

Trainer 02

An experienced trainer (>20 years) who works in a rural practice, the nearest district general hospital being 17 miles away. This means that a significant amount of care of patients with chronic illnesses is undertaken within the practice, including patients with chronic musculoskeletal conditions such as rheumatoid arthritis. Has also worked as an examiner for the Royal College of General Practitioners for 16 years and was involved with the Northumbria Vocational Training Scheme as a course organiser since the 1990s.

Trainer 03

A new trainer. Currently has her first registrar who has been with her for two months. Is a registered GP with a Special interest in Diabetes which involves working two sessions a week in her own health centre seeing patients from her own and other local practices. The clinic is a one stop clinic where they develop action plans for the patients. The job also involves strategic planning and organising local services.

Trainer 04

Qualified as a trainer in 1996. Worked as a course organiser in the armed forces for three years. Has a special interest in musculoskeletal medicine, in particular sports medicine, having taken an MSc in sports medicine. Now working in the NHS but does not have an active special interest. Works in a new town with significant unemployment.

Trainer 05

Has been a trainer for 14 years and also works as a course organiser looking at training development in particular. Since being interviewed has been appointed as Acting Scheme Director for the Vocational Training Scheme. Works in a suburban practice in a deprived area.

Trainer 06

Has been a trainer for 2 ½ years and has had 2 registrars during this time. Currently looking after their 3rd. Is the antenatal lead in the practice and works in a suburban practice.

Trainer 07

An experienced trainer, having qualified 12 years ago, who works in an inner city practice. Is the convenor for the local trainers group. The trainers meetings are part business, part education and as the convenor is involved in putting together the programme. Also runs the local "Career Start" Scheme which is a two year salaried post for doctors who have completed their vocational training. The scheme includes protected educational time for doctors on it. Trainer 07 has an interest in respiratory medicine and in particular COPD but has not developed this into a GPSI position.

Trainer 08

Has been a trainer for 8 years and currently has a full time trainee and a trainee in an innovative post (half time general practice and half time psychiatry). Trainer 08 has a special interest in both general practice and undergraduate medical student education and is the Senior Medical Tutor for one of the base units at Newcastle University. Trainer 08 is also a tutor on the Certificate of Clinical Education Course.

APPENDIX F: REGISTRARS' CHARACTERISTICS (EDUCATIONAL PACKAGE)

Registrar 01

In their 3rd year of general practice training. Attended Manchester University and qualified in 1997. Recalls receiving specific musculoskeletal teaching in medical school. Registrar 1 has worked for a year in orthopaedics and in Accident and Emergency. They also had musculoskeletal teaching as part of their basic surgery training and for their Membership of the Royal College of Surgeons.

Registrar 02

In their 3rd year of general practice training. Attended Newcastle University and qualified in 2002. Recalls receiving "a little" musculoskeletal training in medical school in orthopaedic attachments. Registrar 02 has, to date, had house jobs, been an F2 in Australia and then worked as a senior house office in Obstetrics & Gynaecology, Accident & Emergency, Paediatrics and Old Age Psychiatry.

Registrar 03

Is in their 1st year of general practice training. They attended Ayub Medical College in Pakistan and qualified in 1997. They recalled receiving specific musculoskeletal training in medical school and have worked in both paediatrics and medicine. They did not report receiving any other musculoskeletal teaching or training.

Registrar 04

Is in their 3nd year of general practice training. They did not recall receiving any musculoskeletal training in medical school although has worked as a senior house officer in rheumatology in James Cook University Hospital in Middlesbrough. They have not had any other musculoskeletal teaching or experience.

Registrar 05

Is in their 1st year of general practice training. They attended Barts and the London Hospital, qualified in 1993 and recall receiving specific musculoskeletal training during their time there. They completed a surgical rotation and have also worked as a staff grade doctor in Accident and Emergency.

Registrar 06

Different registrars in the 1st and 2nd session

Registrar 07

Is in their 2nd year of GP training. They attended Ayub Medical College in Pakistan having qualified in 1995. Reported that they did have musculoskeletal training in medical school – "But if you expect me to remember any!!" Prior to this they have worked in Cardiology, Nephrology, Rheumatology, Dermatology, Accident and Emergency and Elderly Care.

Registrar 08

Is in their 2nd year of GP training. They qualified in 1999 and reports having had 2 weeks of orthopaedics and 2 weeks of rheumatology training whilst at medical school. They have worked for one year in Obstetrics and Gynaecology, six months in Psychiatry and spent two weeks as a House Officer in Orthopaedics.

Registrar 09

Is currently in their first year of general practice training. They attended Aberdeen Medical School in 2005 and reports having had musculoskeletal teaching throughout their undergraduate training. Starting with one to two weeks of musculoskeletal anatomy in the first year which included dissection, two to three weeks of clinical

lectures and tutorials in the second year and finally a week of both rheumatology and orthopaedic attachments in their fourth year. Since leaving medical school they have worked as a foundation doctor in gastroenterology, general surgery, respiratory medicine, general medicine, urology and general practice.

Registrar 10

Is in their second year of general practice training and recalls having had specific musculoskeletal training at medical school. They had some post graduate exposure to musculoskeletal problems during a six month post in accident and emergency which included some teaching on an Advanced Trauma and Life Support course and also an Accident and Emergency Induction course.

Registrar 11

Is in their second year of general practice training having qualified in Newcastle in 1999. They recall having received specific musculoskeletal training at medical school and have worked in Accident and Emergency, General Medicine, Paediatrics, Obstetrics and Gynaecology prior to their current post.

Registrar 12

Is currently in their third year of general practice training and qualified in 1996 from Madras Medical College in India. They received teaching on the theory of the musculoskeletal system and had an orthopaedic attachment during medical school. Since qualifying they have worked in Paediatrics, Accident and Emergency, Psychiatry and General Practice and have had some specific musculoskeletal teaching on a minor surgery course which they have attended.

Registrar 13

Is currently in their second year of general practice training. They qualified overseas in 2000 and recall receiving specific musculoskeletal teaching at medical school. They have previously worked in Accident and Emergency, General Practice, Paediatrics and General Medicine.

Registrar 14

Is in their second year of general practice training and qualified in 1990 from Punjab Medical School in Pakistan. They recall receiving specific musculoskeletal teaching at medical school but "not much detailed hands on experience." They have worked in Obstetrics and Gynaecology, Paediatrics, Accident and Emergency and General Practice during their General Practice training. They received some postgraduate musculoskeletal teaching whilst working in Accident and Emergency.

APPENDIX G: MARKING SCHEDULE

Registrar's Number ☐☐

Year of GP training ○ 1 ○ 2 ○ 3

Date (DD/MM/YY) ☐☐ ☐☐ ☐☐

Patient problem/Diagnosis:

Please grade the following areas using the scale below.

1. History Taking				
○ Insufficient evidence	○ Below expectations	○ Borderline for completion	○ Meets expectations for completion	○ Above expectation
2. Physical Examination Skills				
○ Insufficient evidence	○ Below expectations	○ Borderline for completion	○ Meets expectations for completion	○ Above expectation
3. Communication Skills				
○ Insufficient evidence	○ Below expectations	○ Borderline for completion	○ Meets expectations for completion	○ Above expectation
4. Clinical Judgement				
○ Insufficient evidence	○ Below expectations	○ Borderline for completion	○ Meets expectations for completion	○ Above expectation
5. Professionalism				
○ Insufficient evidence	○ Below expectations	○ Borderline for completion	○ Meets expectations for completion	○ Above expectation
6. Organisation/Efficiency				
○ Insufficient evidence	○ Below expectations	○ Borderline for completion	○ Meets expectations for completion	○ Above expectation
7. Overall Clinical Care				
○ Insufficient evidence	○ Below expectations	○ Borderline for completion	○ Meets expectations for completion	○ Above expectation

Assessor's comments on trainee's performance on this occasion

Suggestions for development

GLOSSARY

Term	Abbreviation	Description
Arthritis Research Campaign	**arc**	A charitable organisation that raises funds to: promote research, improve education of health care professionals and provide information to the general public about musculoskeletal conditions
Auto Antibodies	AutoAbs	
Awaited	A/W	
British Medical Association	BMA	The professional medical association and trade union for doctors and medical students
British Medical Journal	BMJ	A weekly journal published by the British Medical Association
British National Formulary	BNF	A joint publication of the British Medical Association and the Royal Pharmaceutical Society of Great Britain which aims to provide prescribers, pharmacists and other health care professionals with up to date information about the use of medicines
British Orthopaedic Association	BOA	A professional association for trauma and orthopaedic surgeons in the United Kingdom
British Society of Rheumatology	BSR	A professional association for people with an interest in arthritis and musculoskeletal conditions
Carpo Meta Carpal	CMC	
C Reactive Protein	CRP	

Term	Abbreviation	Description
Clinical Skills Assessment	CSA	A component of the MRCGP examination which aims to provide 'an assessment of a doctor's ability to integrate and apply clinical, professional, communication and practical skills appropriate for general practice'
Chest X-Ray	CXR	
Department of Health	DH	
Diagnosis	Δ	
Erythrocyte Sedimentation Rate	ESR	
Gait, Arms, Legs and Spine	GALS	
General Medical Council	GMC	The independent regulator for doctors in the United Kingdom whose role is to ensure proper standards in the practice of medicine
General Practitioner	GP	
General Practice Registrar	GPR	
General Practitioner with a Special Interest	GPSI	A GP with additional training and experience in a specific clinical area, who can take referrals for the assessment and treatment of patients, who may otherwise have been referred to secondary care
History	hx	
Investigations	Ix	
Joint Committee on Postgraduate Training for General Practice	JCPTGP	A medical regulatory body whose role was to ensure the quality of general practice training. It has been superseded by the PMETB
Joint(s)	Jt(s)	

Term	Abbreviation	Description
Lower Back Pain	LBP	
Left	Lt	
Metacarpo Phalangial	MCP	
Modernising Medical Careers	MMC	A programme to improve quality of care of patents through enhanced postgraduate medical education and training
Membership of the Royal College of General Practitioners	MRCGP	The forerunner of the nMRCGP. Was a route to membership of the Royal College of General Practitioners but was not required to allow doctors to practice independent general practitioners
Membership of the Royal College of Physicians	MRCP	A level of membership of the Royal College of Physicians achieved through examination, which is recognised as an entry qualification for higher specialist training.
Magnetic Resonance Imaging	MRI	
Metatarsal	MT	
No Abnormality Detected	NAD	
Neurological	Neuro	
National Health Service	NHS	
New Membership of the Royal College of General Practitioners	nMRCGP	Is the assessment during training which, along with approval from the Postgraduate Medical and Education Training Board, allows doctors to practice as general practitioners. It is also a route to membership of the Royal College of General Practitioners

Term	Abbreviation	Description
Non Steroidal Anti Inflammatory Drugs	NSAIDS	
Northumbria Vocational Training Scheme	NVTS	Provides training for GP specialty trainees from the North Tees region to the Scottish Border and from the North East Coast to the Lake District.
Osteoarthritis	OA	
On Examination	O/E	
Orthopaedics	Ortho	
Paediatrics	Paeds	
Personal Education Programme	PEP	
Postgraduate Medical and Education Training Board	PMETB	The independent statutory body that regulates postgraduate medical education and training in the United Kingdom
Pre-Registration House Officer	PRHO	
Primary Care Rheumatology Society	PCR	
Physiotherapy	Physio	
Patient Information Leaflet	PIL	
Polymyalgia Rheumatica	PMR	
Pre-Registration House Officer	PRHO	
Quality and Outcomes Framework	QOF	A voluntary annual reward and incentive programme for all GP surgeries in England
Rheumatoid Arthritis	RA	
Royal College of General Practitioners	RCGP	A membership organisation responsible for setting standards in general practice
Rheumatoid Factor	RhF	

Term	Abbreviation	Description
Range of Movement	ROM	
Senior House Officer	SHO	
Sacro Iliac	SI	
Systemic Lupus Erythematosis	SLE	
Vocational Training Scheme	VTS	Schemes that provide specialty training for General Practice

REFERENCES

Adams, A., Pelletier, D., Duffield, C., Nagy, S., Crisp, J., Mitten-Lewis, S. and Murphy, J. (1997) "Determining and discerning expert practice: a review of the literature" Clinical Nurse Specialist, 11 (5), 217-222

Alderson, T. St J. and Oswald, N.T. (1999) "Clinical experience of medical students in primary care: use of an electronic log in monitoring experience and in guiding education in the Cambridge Community Based Clinical Course" Medical Education, 33 (6), 429-433

Ark, T.K., Brooks, L.R. and Eva, K.W. (2006) "Giving Learners the Best of Both Worlds: Do Clinical Teachers Need to Guard Against Teaching Pattern Recognition to Novices?" Academic Medicine, 81 (4), 405-409

Arthritis and Rheumatism Council (1991) *An introduction to the musculoskeletal system. A handbook for medical students*. Chesterfield: The Arthritis and Rheumatism Council.

Arthritis Research Campaign (2000) *Learning guide for general practitioners and general practice registrars on musculoskeletal problems*. Chesterfield:The Arthritis Research Campaign.

Asbury, J-E. (1995) "Overview of Focus Group Research" Qualitative Health Research, 5 (4), 414-420

Badley, E.M. and Lee, J. (1987) "The consultant's role in continuing medical education of general practitioners: the case of rheumatology" British Medical Journal, 294 (6564), 100-103

Bain, J. (1996) "Vocational training: The end of the beginning?" British Journal of General Practice, 46 (407), 328-330

Bedi, A. (2003) "Student profiling: the Dreyfus model revisited" Education for Primary Care, 14 (3), 360-363

Beggs, A.D., Al-Rawi, H. and Parfitt, A. (2005) "Chest pain and fleeting neurological signs" Lancet, 365 (9469), 1514

Benner, P. (1984) From Novice to Expert: Excellence and Power in Clinical Nursing Practice. Menlo Park, California: Addison-Wesley

Best Evidence Medical Education (n.d.). BEME Coding Sheet. Available from: http://www.bemecollaboration.org/beme/files/starting%20reviews/Appendix%20IIIA%20BEME%20Coding%20Sheet.pdf (Accessed: 10/01/09).

Booth, A. (1990) "General practice training in musculoskeletal disorders" British Journal of General Practice, 40 (338), 390

Bowling, A. (2002) Research methods in health. Investigating health and health services. 2nd ed. Maidenhead: Open University Press

British Medical Association (2003) Survey of GP registrar training. London: BMA Press Office

British Medical Journal Careers (2008) Extending GP training Programme. Available from: http://careers.bmj.com/careers/advice/view-article.html?id=3166 (Accessed 31/01/10)

British Orthopaedic Association and British Society of Rheumatology (2001) Musculoskeletal curriculum for the undergraduate. Available from: www.boa.ac.uk/site/showpublications.aspx?ID=59 (Accessed: 6/03/07)

Buckler, D.G. (1999) "General practitioners' training for, interest in, and knowledge of sports medicine and its organizations" British Journal of Sports Medicine, 33 (5), 360-3

Burgess, A. (1984) In the Field. An Introduction to Field Research. London: Unwin Hyman Ltd

Calder, J. (1998) Survey research methods. Medical Education Research Booklet. No. 6. Edinburgh: Association for the Study of Medical Education

Carney, T.A. (1979) "Clinical experience of a trainee in general practice" Journal of the Royal College of General Practitioners, 29 (198), 33-37

Carney, T.A. (1987) "Trainee Workload – Are We Winning the Battle?" Horizons, 481-484

Carp, F. and Carp, A. (1981) "The validity, reliability and generalizability of diary data" Experimental Aging Research, 7 (3), 281-296

Chambers Harrap Publishers Ltd (2008) *Chambers 21st Century Dictionary*. Available at: www.chambersharrap.co.uk/chambers/index.shtml (Accessed: 5/01/09)

Choudhry, N.K., Fletcher, R.H. and Soumerai, ScD. (2005) "Systematic Review: The Relationship between Clinical Experience and Quality of Health Care" Annals of Internal Medicine, 142 (4), 260-273

Coffield, F., Moseley, D., Hall, E. and Ecclestone, K. (2004) Learning styles and pedagogy in post-16 learning. A systematic and critical review. Learning & skills research centre. Available at: http://www.lsda.org.uk/files/PDF/1543.pdf (Accessed: 8/03/06)

Cohen, L., Manion, L. and Morrison, K. (2007) Research Methods in Education. 6th ed. London: Routledge

Collings, J.S. (1950) "General practice in England today: a reconnaissance" Lancet, 1, 555-85

Cook, T.D. and Campbell, D.T. (1979) Quasi-experimentation: Design and analysis issues for field settings. Chicago: Rand McNally

Cullen, M., McNally, O., O'Neill, S.O. and Macauley, D. (2000) "Sport and exercise medicine in undergraduate medical schools in the United Kingdom and Ireland" British Journal of Sports Medicine, 34 (4), 244-245

Custers, E.J.F.M., Regehr, G. and Norman, G.R. (1996) "Mental representations of Medical Diagnostic Knowledge: A Review" Academic Medicine, 71 (10), S55-S61

Dawes, P.T., Shadforth, M.F., Hothersall, T.E. and McGuinness, B. (1990) "Primary care – the educational need" British Journal of Rheumatology, 14 (5), 401

Department of Health (1998) A Review of Continuing Professional Development in General Practice. London: The Stationary Office

Department of Health (2002) The GP Registrar Scheme. Vocational Training for General Medical Practice. The UK Guide. London: The Stationery Office

Department of Health (2006) The Musculoskeletal Services Framework. London: The Stationary Office

Dickson J.D. (1986) The aims of the Primary Care Rheumatology Society [e-mail] (Personal Communication 2007)

Dixon, H. and van Zwanenberg, T. (2001) 'GP registrars' views on extending the general practice element of vocational training and higher professional education: a questionnaire study in the Northern Deanery', Education for General Practice, 12 (2), 177-184

Dodd, M., Rutt, G. and Suchdev, M.S. (2002) 'Identifying and addressing registrars' concerns using a discomfort log', Education for Primary Care, 13 (4), 490-496.

Doherty, M., Abawi, J. and Pattrick, M., (1990) "Audit of medical inpatient examination: a cry from the joint" Journal of the Royal College of Physicians of London, 24 (2), 115-118

Doherty, M. and Dawes, P. (1992) "Guidelines on an Undergraduate Curriculum in the UK" British Journal of Rheumatology, 31(6), 409-412

Doherty, M. and Woolf, A. for the EULAR Standing Committee on Education and Training (1999) "Guidelines for rheumatology undergraduate core curriculum" Annals of the Rheumatic Diseases, 58 (3), 133-135

Doney, L., Barlow, H. and West, J. (2005) "Use of libraries and electronic information resources by primary care staff: outcomes from a survey" Health Information and Libraries Journal, 22 (3), 182-188

Dreyfus, H.E. and Dreyfus, S.E. (1986) Mind over Machine: The Power of Human Intuition and Expertise in the Era of the Computer. New York: Macmillan

Eraut, M. (1994) Developing professional knowledge and competence. London: Routledge Falmer

Eraut, M. (2000) "Non-formal learning and tacit knowledge in professional work" British Journal of Educational Psychology, 70 (1), 113-136

Eraut, M. (2003) Editorial, Learning in Health and Social Care, 2 (3), 117-122

Eraut, M. and du Boulay, B. (2001) Developing the attributes of medical professional judgement and competence. Available at: http://www.cogs.susx.ac.uk/users/bend/doh (Accessed: 11/01/01)

Feltovich, P.J. and Barrows, H.S., (1984). "Issues of generality in medical problem solving." In: Schmidt, H.G. and deVolder, M.L. (eds) Tutorials in Problem-Based Learning. Assen: Van Gorcum, 128-142

Field, M.J. and Lohr, K.N. (1990) Clinical Practice Guidelines: Directions for a New Program. Washington DC: Academy Press

Flick, U. (2002) An Introduction to Qualitative Research. 2nd ed. London: Sage Publications.

Fowler, P.J. and Regan, W.D. (1987) "The patient with symptomatic chronic anterior cruciate ligament insufficiency. Results of minimal arthroscopic surgery and rehabilitation" American Journal of Sports Medicine, 15 (4), 321-325

Francis, G. (1997) "The use of a patient diary in health-care research" British Journal of Therapy and Rehabilitation, 5 (7), 362-364

General Medical Council (1993) Tomorrows' Doctors. Recommendations on undergraduate medical education.
Available at http://www.gmc-uk.org/education/undergraduate/tomorrows_doctors.asp (Accessed: 6/03/07)

Gibson, V. (1995) "An analysis of the use of diaries as a data collection method" Nurse Researcher, 3 (1), 66-73

Grant, J., Fox, S., Kumar, N. and Sim, E. (2005) Standards for curricula. Postgraduate Medical and Education Training Board. Available at: http://www.pmetb.org.uk/fileadmin/user/QA/Curricula/Standards_for_Curricula_March_2005.pdf (Accessed: 13/03/07)

Greenhalgh, T. (2001) How to Read a Paper. The basics of evidence based medicine. London: BMJ Books

Henry, S.G. (2006) "Recognizing tacit knowledge in medical epistemiology" Theoretical Medicine and Bioethics, 27 (3), 187-213

Hobus, P.P., Schmidt, H.G., Boshuizen, H.P. and Patel, V.L. (1987) "Contextual factors in the activation of first diagnostic hypotheses: expert-novice differences" Medical Education, 21 (6), 471-476

Honey, P. and Mumford, A. (1992) The Manual of Learning Styles. Maidenhead: P. Honey

Jandial, S., Myers, A., Wise, E. and Foster, H.E. (2009) "Doctors likely to encounter children with musculoskeletal complaints have low confidence in their clinical skills" The Journal of Pediatrics, 154 (2), 267-271

Joint Committee on Postgraduate Training for General Practice (1992) Training for General Practice. London: Joint Committee on Postgraduate Training for General Practice

Jones, J. and Hunter, D. (1995) "Qualitative Research: Consensus methods for medical and health services research" British Medical Journal, 331 (7001), 376-380

Kaufman, D.M., Mann, K.V. and Jennett, P.A. (2007) Teaching and learning in medical education: how theory can inform practice. Edinburgh: Association for the Study of Medical Education

Kay, L.J., Deighton, C.M., Walker, D.J. and Hay, E.M. (2000) "Undergraduate rheumatology teaching in the UK: a survey of current practice and changes since 1990" Rheumatology, 39 (7), 800-803

Kearley, K. (1990) "An evaluation of the hospital component of general practice vocational training" British Journal of General Practice, 40 (339), 409-414

Kerr, O.A., Walker, J. and Boohan, M. (2006) "General practitioners' opinions regarding the need for training in dermatology at undergraduate and postgraduate levels" Clinical and Experimental Dermatology, 31 (1), 132-133

Khaw, K.T. (1999) “How many, how old, how soon?” British Medical Journal, 319 (7221), 1350-1352

Kmietowicz, Z. (2006) “A century of general practice” British Medical Journal, 332 (7532), 39-40

Kolb, D.A. (1984) Experiential Learning: Experience as a source of learning and development. New Jersey: Prentice-Hall

Kreuger, R.A. and Casey, M.A. (2000) Focus Groups: A Practical Guide for Applied Research. 3rd ed. Thousand Oaks, CA: Sage Publications

Lambert, T.W., Goldacre M.J. and Turner G. (2003) “Career choices of United Kingdom medical graduates of 1999 and 2000: questionnaire surveys” British Medical Journal, 326 (7382), 194-195

Lanyon, P., Pope, D. and Croft, P. in collaboration with the Primary Care Rheumatology Society (1995) “Rheumatology education and management skills in general practice: a national study of trainees” Annals of the Rheumatic Disease, 54 (9), 735-739

Leach, N., Baker, K., Rowe, M., Heap, B., Vaughan, M. and Smith, T. (2004) “Training threatened by its own success” British Journal of General Practice, 54 (503), 465

Leinhardt, G., McCarthy Young, K. and Merriman, J. (1995) “Integrating professional knowledge: the theory of practice and the practice of theory” Learning and Instruction, 5 (4), 401-408

Liddell, W.G., Carmichael, C.R. and McHugh, N.J. (2005) “Joint and soft tissue injections: a survey of general practitioners” Rheumatology, 44 (8), 1043-1046

Liesdek, C., van der Windt, D.A.W.M., Koes, B.W. and Bouter, L.M. (1997) “Soft-tissue disorders of the shoulder. A study of inter-observer agreement between general

practitioners and physiotherapists and an overview of physiotherapeutic treatment" Physiotherapy, 83 (1), 12-17

Lillicrap, M.S., Byrne, E. and Speed, C.A. (2003) "Musculoskeletal assessment of general medical in-patients – joints still crying out for attention" Rheumatology, 42 (8), 951-954

Lincoln, Y. and Guba, E.G., (1985). Naturalistic Inquiry. London: Sage Publications

Linsell, L., Dawson, J., Zondervan, K., Rose, P., Randall, T., Fitzpatrick, R. and Carr, A. (2006) "Prevalence and incidence of adults consulting for shoulder conditions in UK primary care; patterns of diagnosis and referral" Rheumatology, 45 (2), 215-221

Lloyd-Williams, M. and Lloyd-Williams, F. (1996) "Palliative care teaching and today's general practitioners – is it adequate?" European Journal of Cancer Care (English), 5 (4), 242-245

Low, J., Cloherty, M., Wilkinson, S., Barclay, S. and Hibble, A. (2006) "A UK-wide postal survey to evaluate palliative care education amongst General Practice Registrars" Palliative Medicine, 20 (4), 463-469

McEvoy, P. (2003) "General practice vocational training – a victim of its own success?" British journal of General Practice, 53 (494), 675-676

McEvoy, B.R. and Kaner, E.F.S. (1996) "General practice postal surveys: a questionnaire too far?" British Medical Journal, 313 (7059), 732-733

McInerney, C. (2002) "Knowledge management and the dynamic nature of knowledge" Journal of the American Society for Information Science and Technology, 53 (12), 1009-1018

McKinstry, B. (2000) "Management confidence and decisions to refer to hospital of GP registrars and their trainers working out of hours" British Journal of General Practice, 50 (450), 37-39

Marshall, M.N. (1998) "Qualitative study of educational interaction between general practitioners and specialists", British Medical Journal, 316 (7129), 442-445

Marshall, C. and Rossman, G.B., (1999) Designing qualitative research. 3rd ed. London: Sage Publications

Mathers, N. and Hodgkin, P. (1989) "The Gatekeeper and the Wizard: a fairy tale" British Medical Journal, 298 (6667), 172-174

Matzkin E., Smith, E.L., Freccero, D. and Richardson, A.B. (2005) "Adequacy of education in musculoskeletal medicine" Journal of Bone and Joint Surgery (Am), 87 (2), 310-314

Meier, R.S., Krause, N.M. and Young, P.R. (1985) "Family Practice Curriculum: How well does it reflect family practice?" Family Medicine, 17 (4), 147-150

Miller, G.E. (1990) "The assessment of clinical skills/competence/performance" Academic Medicine, 65(9), S63-7

Morrison, M.C. (1993) "Teaching of musculoskeletal medicine: a survey of general practitioners and deans" Medical Education, 27 (3), 245-249

Murphy, M.K., Black, N.A., Lamping, D.L., McKee, C.M., Sanderson, C.F.B., Asham, J. and Martineau, T. (1998) "Consensus development methods and their use in clinical guideline development" Health Technology Assessment, 2, (3), 1-88

Murray, E., Alderman, P., Coppola, W., Grol, R., Bouhuijs, P. and van der Vleuten, C. (2001) "What do students actually do on an internal medicine clerkship? A log diary study" Medical Education, 35 (12), 1101-1107

Myers, A., McDonagh, J.E., Gupta, K., Hull, R., Barker, D., Kay, L.J. and Foster, H.E. (2004) "More 'cries from the joints': assessment of the musculoskeletal system is poorly documented in routine paediatric clerking" Rheumatology, 43 (8), 1045-1049

Norman, G.R., Rosenthal, D., Brooks, L.R., Allen, S.W. and Muzzin L.J. (1989) "The development of expertise in dermatology" Archives of Dermatology, 125 (8), 1063-1068

Norman, G.R., Brooks, L.R., Colle, C.L. and Hatala R.M. (1999) "The benefit of diagnostic hypotheses in clinical reasoning: Experimental study of an instructional intervention for forward and backward reasoning" Cognition and Instruction, 17 (4), 433-448

Norman, G.R., (2005). The role of experiential and analytical knowledge in the development of medical diagnostic expertise. Association for the Study of Medical Education Annual Conference, Newcastle upon Tyne (11th-13th July 2005). Association for the Study of Medical Education

Norman, G.R. and Eva, K.E. (2005) "Does clinical experience make up for failure to keep up to date?" Evidence Based Medicine, 10 (3), 66-68

O'Dowd, J.K. and Spencer, J.D. (1992) "An audit of university education in trauma and orthopaedic surgery in Great Britain" Journal of the Royal Society of Medicine, 85 (4), 211-213

Office of Population Censuses and Surveys (1995) Morbidity Statistics from General Practice – Fourth National Study. 1991/92. London: HMSO

Oswald, N., Alderson, T. and Jones, S. (2001) "Evaluating primary care as a base for medical education: the report of the Cambridge Community-based Clinical Course" Medical Education, 35 (8), 714-715

Palmer K.T. (1998) Notes for the MRCGP. 3rd ed. Oxford: Blackwell Science

Patel, V.L., Groen, G.J. and Scott, H.M. (1988) "Biomedical knowledge in explanations of clinical problems by medical students" Medical Education, 22 (5), 398-406

Pearce, C. (2003) “Corridor teaching. ‘Have you got a minute...?’” Australian Family Physician, 32 (9), 745-747

Pearson, D.J. and Heywood, P. (2004) “Portfolio use in general practice vocational training: a survey of GP registrars” Medical Education, 38 (1), 87-95

Petrella, R.J. and Davis, P. (2007) “Improving management of musculoskeletal disorders in primary care: the Joint Adventures Program” Clinical Rheumatology, 26 (7), 1061-1066

Pinney, S.J. and Regan, W.D. (2001) “Educating medical students about musculoskeletal problems. Are community needs reflected in the curricula of Canadian Medical Schools?” The Journal of Bone and Joint Surgery, 83A (9), 1317-1320

Polanyi, M. (1983) The tacit dimension. Gloucester, MA: Peter Smith

Postgraduate Medical Education and Training Board (2008) Guidance about applying for a Certificate of Eligibility for General Practitioner Registration (CEGPR) under Article 11. Available at: http://www.pmetb.org.uk/fileadmin/user/Certification/CEGPR_guidance_and_forms/Guidance_CEGPR_Article_11_April_2008.pdf (Accessed: 04/01/09)

Regehr, G., Cline, J., Norman, G.R. and Brooks, L. (1994) “Effect of processing strategy on diagnostic skill in dermatology” Academic Medicine, 69 (10), S34 -S36

Richardson, A. (1994) “The health diary: an examination of its use as a data collection method” Journal of Advanced Nursing, 19 (4), 782-791

Richardson, I.M., Howie, J.G.R. and Berkeley, J.S. (1974) “A further study of trainee general practitioners” Journal of the Royal College of General Practitioners, 24 (146), 661-665

Rickards, L., Fox, K., Roberts, C., Fletcher, L. and Goddard, E. (2004) Living in Britain. No 31. Results from the 2002 General Household Survey. London: TSO

Rigby, J.C. and Oswald, A.G. (1987) "An evaluation of the performing and recording of physical examinations by psychiatric trainees" British Journal of Psychiatry, 150 (4), 533-535

Ritchie, J. and Lewis, J. (2004) Qualitative Research Practice. A Guide for Social Science Students and Researchers. London: Sage Publications

Robson, C. (1993) Real World Research. A Resource for Social Scientists and Practitioner-Researchers. Oxford: Blackwell Publishers

Royal College of General Practitioners, (1972). The Future General Practitioner: Learning and Teaching. London: RCGP

Royal College of General Practitioners, (1977). Occasional Paper 4. A system of training for general practice. London: RCGP

Royal College of General Practitioners, (1988). Occasional paper 30. Priority objectives for general practice vocational training. London: RCGP

Royal College of General Practitioners (200-) Valuing General Practice. One in a series of papers in response to the NHS Plan for England. Available at: http://www.rcgp.org.uk/Docs/Corp_valuing_gp.doc (Accessed: 13/03/07)

Royal College of General Practitioners (2006a) nMRCGP: The CCT and the new Membership Assessment. Available at: http://www.rcgp-curriculum.org.uk/examinations_and_assessment.aspx (Accessed: 04/01/09)

Royal College of General Practitioners (2006b) Annex 2. Training general practitioners: literature as a guide to action. Available at: www.rcgp-curriculum.org.uk/PDF/curr_PMETB_SUB06_ANNEX1to6.pdf (Accessed: 13/03/07)

Royal College of General Practitioners (2007) Rheumatology and Conditions of the Musculoskeletal System (including Trauma). Available at: http://www.rcgp-curriculum.org.uk/pdf/curr_15.9_Rheumatology_and_Musculoskeletal_System2.pdf (Accessed: 05/01/09)

Saleh, K., Messner, R., Axtell, S., Harris, I. and Maholwald, M. (2004) "Development and evaluation of an integrated musculoskeletal disease course for medical students" The Journal of Bone and Joint Surgery, 86 (8), 567-580

Schmidt, H.G., Norman, G.R. and Boshuizen, H. (1990) "A cognitive perspective on medical expertise: Theory and implications" Academic Medicine, 65 (10), 611-621

Schmidt, H.G. and Boshuizen, H.P.A. (1993) "On Acquiring Expertise in Medicine" Educational Psychology Review, 5 (3), 205-221

Shaw, S., Kerr, R., Carter, Y.H., Leighton-Beck, L. and Farnham, M. (2004) "Evaluation of an interactive educational tool for primary care researchers" Medical Teacher, 26 (5), 483-386

Shuttleworth, G.N. and Marsh, G.W. (1997) "How effective is undergraduate and postgraduate teaching in ophthalmology?" Eye, 11 (5), 744-750

Snadden, D. and Thomas, M. (1998a) "The use of portfolio learning in medical education" Medical Teacher, 20 (3), 192-199

Snadden, D. and Thomas, M. (1998b) "Portfolio learning in general practice vocational training – does it work?" Medical Education, 32 (4), 401-406

Snadden, D., Thomas, M.L., Griffin, E.M. and Hudson, H. (1996) "Portfolio-based learning and general practice vocational training" Medical Education, 30 (2), 148-152

Speed, C.A. and Crisp, A.J. (2005) "Referrals to hospital-based rheumatology and orthopaedic services: seeking direction" Rheumatology, 44 (4), 469-471

Spencer, J. (2005). "What can undergraduate education offer general practice?" In: Harrison, J. and van Zwanenberg, T.D. (eds) GP Tomorrow. 2nd ed. Oxford: Radcliffe Medical Press, 49-66

Spencer, J.A. and Jordan, R.K. (1999) "Learner centred approaches in medical education" British Medical Journal, 318 (7193), 1280-1283

Sprangers, M.A., de Regt, E.B., Andries, F., van Agt, H.M., Biji, R.V., de Boer, J.B., Foets, M., Hoeymans, N., Jacobs, A.E., Kempen, G.I., Miedema, H.S., Tijhuis, M.A. and de Haes. H.C. (2000) "Which chronic conditions are associated with better or poorer quality of life?" Journal of Clinical Epidemiology, 53 (9), 895-907

Stewart, J. (2007) "'Don't hesitate to call' – the underlying assumptions" The Clinical Teacher, 4 (1), 6-9

Strauss, A. and Corbin, J., (1998). Basics of Qualitative Research. Techniques and Procedures for Developing Grounded Theory. London: Sage Publications

Stubbings, C.A. and Gowers, J.I. (1979) "A comparison of trainee and trainer clinical experience" Journal of the Royal College of General Practitioners, 29 (198), 47-52

Sugden, J. (2008) GPs will be trained to spot dementia. Available at: http://www.timesonline.co.uk/tol/news/uk/health/article5382975.ece (Accessed: 22/01/09)

Talbot, M. (2004) "Monkey see, monkey do: a critique of the competency model in graduate medical education" Medical Education, 38 (6), 587-592

Van Zwanenberg, T., Pringle, M., Smail, S., Baker, M. and Field, S. (2001) "The case for strengthening education and training for General Practice" British Journal of General Practice, 51 (466), 349-350

Verbrugge, L., (1984). "Health diaries – problems and solutions in study design." In: Cannell, C. and Groves, R. (eds). Health Survey Research Methods. Maryland: National Centre for Health Services Research, 171-192

Wadey, V.M.R., Tang, E.T., Abelseth, G., Dev, P., Olshen, R.A. and Walker, D. (2007) "Canadian multidisciplinary core curriculum for musculoskeletal health" The Journal of Rheumatology, 34 (3), 567-580

Wass, V., Richards, T. and Cantillon, P. (2003) "Monitoring the medical education revolution" British Medical Journal, 327 (7428), 1362

Watson, J., Helliwell, P., Morton, V., Adebajo, A., Dickson, J., Russell, I. and Torgerson, D. (2008) "Shoulder acute pain in primary healthcare: is retraining effective for GP principals? SAPPHIRE – a randomized controlled trial" Rheumatology, 47 (12), 1795-1802

Williams, J.R. (2000) "The teaching of trauma and orthopaedic surgery to the undergraduate in the United Kingdom" Journal of Bone and Joint Surgery (Br.), 82-B (5), 627-628

Wilson, S.M. (1999) "Impact of the internet on primary care staff in Glasgow" Journal of Medical Internet Research, 1 (2), E7

Wise, E.M., Coady, D.A., van Zwanenberg, T.D. and Walker D.J. (2004) "The use of prospective diaries to capture which musculoskeletal conditions general practice registrars (GPRs) see" Rheumatology, 43 (suppl. 2), ii95

WONCA Europe, 2005. The European definition of General Practice/Family Medicine. Available at: http://www.woncaeurope.org/Web%20documents/European%20Definition%20of%20family%20medicine/Definition%202nd%20ed%202005.pdf (Accessed: 03/01/09)

Woods, N.N., Brooks, L.R. and Norman, G.R. (2005) “The value of basic science in clinical diagnosis: creating coherence among signs and symptoms” Medical Education, 39 (1), 107-112

Woods, N.N., Neville, A.J., Levinson, A.J., Howey, E.H.A., Oczkowski, W.J. and Norman, G.R. (2006) “The value of Basic Science in Clinical Diagnosis” Academic Medicine, 81 (10), S124-S127

Woods, N.N. (2007a) “Science is fundamental: the role of biomedical knowledge in clinical reasoning” Medical Education, 41 (12), 1173-1177

Woods, N.N., Brooks, L.R. and Norman, G.R. (2007b) “The role of biomedical knowledge in diagnosis of difficult clinical cases” Advances in Health Sciences Education, 12 (4), 417-426

Woolf, A.D. and Akesson, K. (2001), “Understanding the burden of musculoskeletal conditions”, British Medical Journal, 322 (7294), 1079-1080

Woolf, A.D., Walsh, N.E. and Akesson, K. (2004) “Global core recommendations for a musculoskeletal undergraduate curriculum” Annals of the Rheumatic Diseases, 63 (5), 517-524

Woolf, A.D. and Akesson, K. (2007) “Education in musculoskeletal health – how can it be improved to meet growing needs?” The Journal of Rheumatology, 34 (3), 455-457

Zimmerman, D.H. and Wieder. D.L. (1977) “The Diary. Diary-Interview Method” Urban Life, 5 (4), 479-498