



Musculoskeletal Rehabilitation

**Report of a working party convened by the British Society of
Rehabilitation Medicine**

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Chair: Dr Vera Neumann

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Musculoskeletal Rehabilitation

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1. Summary of findings and recommendations

Main findings – General

- 1.1 Musculoskeletal disorders (MSKD) are common and their consequences such that half of all disability in the UK can be attributed to their presence. The resulting economic burden is considerable and rising as the population ages. However, relatively little attention is focussed on common MSKD such as osteoarthritis and their consequences. Instead, there is a tendency to regard the resultant disability as an inevitable consequence of ageing for which little can be done.
- 1.2 Services for those with MSKD conditions are poorly planned. Currently patients with similar Musculoskeletal problems are referred to a range of different hospital services including orthopaedic, pain, rheumatology and therapy services. These services may use several different approaches to manage the same clinical problem.
- 1.3 Services for those with MSKD remain too focused within secondary care and have not kept pace with improvements in community-based rehabilitation. However, both hospital and community services are poorly developed for those with severe disabling MSKD.
- 1.4 Multidisciplinary teamwork is a cardinal feature of the management of complex Musculoskeletal disability. These teams may embrace specialist nurses and therapists but need both psychological and medical support.

Main findings – specific

Inflammatory arthritis

- 1.5 Despite the introduction of more effective and better tolerated disease modifying agents for the inflammatory arthritides, these diseases, particularly rheumatoid arthritis (RA), remain major causes of disability and loss of independence.

Osteoarthritis

- 1.6 Osteoarthritis (OA) is extremely common, and the major cause of pain, physical disability and restricted activities and participation amongst older people. Despite this, access to appropriate interventions such as exercise programmes and provision of simple aids and appliances is patchy.

Joint replacement surgery

- 1.7 Although joint replacement surgery has revolutionised the lives of many arthritis sufferers, the potential benefits are often constrained by a failure to recognise the effect that such surgery will have on adjacent joints. For example, the strains subjected to upper limbs if these are required to withstand additional loading following lower limb surgery. Discharge from hospital may also be needlessly delayed because a transient increase in dependence has not been anticipated and planned for.

Osteoporosis

- 1.8 Patients with disabling MSKD are at increased risk of osteoporosis. Reduced mobility is a risk factor for many. Those with inflammatory arthritis or polymyalgia rheumatica may also be taking glucocorticoids.
- 1.9 There are inadequate facilities for bone densitometry to screen high-risk groups such as those on steroids.

Regional problems and spinal pain

- 1.10 Spinal problems are a major cause of pain, disability and loss of independence world-wide with major economic implications for western economies. Disabling spinal pain, however, appears to be a feature of caring societies. Pain, which cannot be managed in primary care, is often complicated by physical and psychosocial comorbidity.

Shoulder problems

- 1.11 Shoulder problems account for 5% of GP consultations. The associated pain and disability due to 'inability to reach' are frequently underestimated.

Soft tissue problems

- 1.12 Soft tissue problems may also arise in those with joint hypermobility and those who place excessive and/or repetitive mechanical demands on their joints through work or leisure activities. Professional sportsmen and women and musicians are at particular risk of the latter, and indeed may have self-selected for these professions because they are unusually flexible. Those subjecting their limbs to repetitive mechanical loading eg in employment involving repetitive tasks, are an additional group at risk.

Other painful conditions

- 1.13 Both fibromyalgia and complex regional pain disorder (CRPS) are poorly defined conditions often characterised by intense pain resulting in referral to the secondary sector. They can have a huge impact on functional independence and lifestyle. Currently services are patchy for both conditions and management very variable.

Environmental access

- 1.14 Poor environmental access in those with MSKD increases vulnerability to a range of other problems:
 - injuries through falls
 - delayed hospital discharge
 - difficulties returning to work, etc.
- 1.15 Legislation has acted as a spur to change and, for example, public transport and buildings are gradually becoming more accessible to those with mobility problems. However, as indicated in the Audit Commission report 'Better Equipped', statutory providers of relevant equipment such as wheelchairs are usually under-resourced, given low priority and often poorly managed. There are also large regional variations in provision. Information about relevant benefits is complex and often difficult to follow, and those who develop mobility problems over 65 years are specifically excluded from certain benefits (the mobility component of Disability Living Allowance).

Main recommendations – general

- 1.16 Commissioners of services and local providers should meet to review the overall provision of services for those with MSKD and how they can be provided most cost-effectively. Such reviews will need to focus specifically on the major causes of disability and lost participation eg:
- osteoarthritis
 - osteoporosis
 - pre and peri-operative care for those needing elective surgery and postoperative rehabilitation
 - rheumatoid arthritis and other inflammatory conditions
 - soft tissue injuries and chronic disorders
 - spinal pain.

Specific recommendations

Osteoarthritis

- 1.17 Patient education regarding weight reduction and exercise; and the provision of appropriate simple orthoses, aids and appliances may do much to alleviate distress and disability and systems should be in place to ensure all have access to these.
- 1.18 Joint replacement is an important option for the few people with the most severe forms of OA. As part of their ‘overall strategy for the provision of Musculoskeletal services’, localities should develop consensus with local stakeholders (including patients), on the indications for referral for primary joint replacement surgery.

Rheumatoid arthritis

- 1.19 Impact on function, self-efficacy, physical and psychological status and pain should be lessened by a co-ordinated management programme including screening for those at greatest risk of loss of independence and/or employment.
- 1.20 Rehabilitation services should then be targeted at these groups and include patient education, joint protection training, exercise therapy, and appropriate provision of orthoses, mobility aids and environmental adaptations. Psychological interventions should also be available. Intensive co-ordinated in or day patient rehabilitation should be available for people with active or severe RA.

Joint replacement surgery

- 1.21 A holistic approach is needed to address the complex issues regarding pre-operative care through to post-operative rehabilitation. They should include a pre-operative assessment, and adequate provision of peri-operative and post-operative therapy. With current trends in sub-specialisation, orthopaedic correction for inflammatory polyarthritis can involve four or five different surgeons. Hence, there is a role for a physician, either rehabilitationist or rheumatologist, to co-ordinate overall management.
- 1.22 Ideally surgery on individuals with inflammatory joint disease should be based from a rheumatology ward to minimise disruption to disease management and to optimise post-operative rehabilitation.

Osteoporosis

- 1.23 Adequate bone densitometry should be provided to ensure the screening of all high-risk groups.

- 1.24 Osteoporosis and fracture services should work together to ensure high risk groups presenting with fractures are appropriately screened and osteoporosis treatment initiated when indicated.
- 1.25 Other secondary health problems associated with poor mobility such as thrombo-embolic disease and pressure sores need to be considered and appropriate preventative strategies introduced. A combination of poor mobility and cultural factors in South Asian women may also make this population particularly vulnerable to osteomalacia and increased risk of fractures.

Regional problems and spinal pain

- 1.26 Patients with 'red flags' denoting risk of serious underlying pathology should be given prompt access to appropriate investigations.
- 1.27 Orthopaedic, pain, rehabilitation (therapy) and rheumatology services within a locality should work together to facilitate appropriate triage into relevant services for those not managed in primary care.
- 1.28 Those with acute spinal pain need adequate pain relief and advice to keep as active as possible. For those with subacute or chronic pain, rehabilitation should include postural re-education, a graded exercise programme, and access to psychological interventions including cognitive behavioural therapy and vocational rehabilitation.

Shoulder problems

- 1.29 Patients with complete rotator cuff tears or other significant underlying (rheumatological or neurological) problems need referral for investigation and/or surgery. There is little evidence to guide choice of treatment for the remainder. Some 40-50% have persistent pain and disability. In particular, aspects of personal care may be hampered. These aspects require early recognition and intervention, if necessary with aids as well as home and/or workplace adaptations.
- 1.30 Commonest sites of soft tissue injury are the ankle (5,000 per day in UK), and neck (nearly 700 per day). Whilst spontaneous recovery is to be expected in the majority of cases, a minority will have persistent or recurrent problems leading to pain and disability often affecting work and lifestyle.
- 1.31 After initial triage to identify those who may require immobilisation or surgical repair, PRICE (protection, rest, ice, compression, and elevation) should be used for the first 72 hours to alleviate early inflammation. This needs to be followed by a carefully co-ordinated programme of rehabilitation, which encourages mobilisation and addresses risk factors (eg vulnerability to falls in the elderly), thus reducing the likelihood of chronicity.

Soft tissue problems

- 1.32 As well as providing symptom relief, physiotherapy (and in some cases orthoses to stabilise unstable joints), the role of rehabilitation is to identify trigger situations and develop strategies to alter/reduce mechanical demands. This will usually involve task observation. Psychological factors and concerns, which might impede recovery eg impact on income, will also need to be considered.

Other painful conditions

- 1.33 In both fibromyalgia and CRPS, the severity of the disabling pain needs to be acknowledged and factors likely to interfere with symptom resolution eg compensation claims for prior injuries in CRPS, need to be identified and addressed.
- 1.34 In CRPS, strategies to alleviate pain are seldom effective long-term, but the use of local treatments eg regional nerve blocks, protective and/or off-loading orthoses, may facilitate

commencing rehabilitation. Cognitive behavioural therapy (CBT) combined with rehabilitation to promote independence and return to normal lifestyle are the mainstays of treatment.

- 1.35 For fibromyalgia, initial management should include patient education supplemented by physiotherapy, particularly graded aerobic exercise programmes, but CBT again plays a crucial role.
- 1.36 Local agreement needs to be reached about appropriate care pathways for these patients. These are conditions where success is probably more dependent on the interest and commitment of treating clinicians than their professional background and speciality. Pain management requires a multidisciplinary team using biopsychosocial models of care.

Environmental access factors

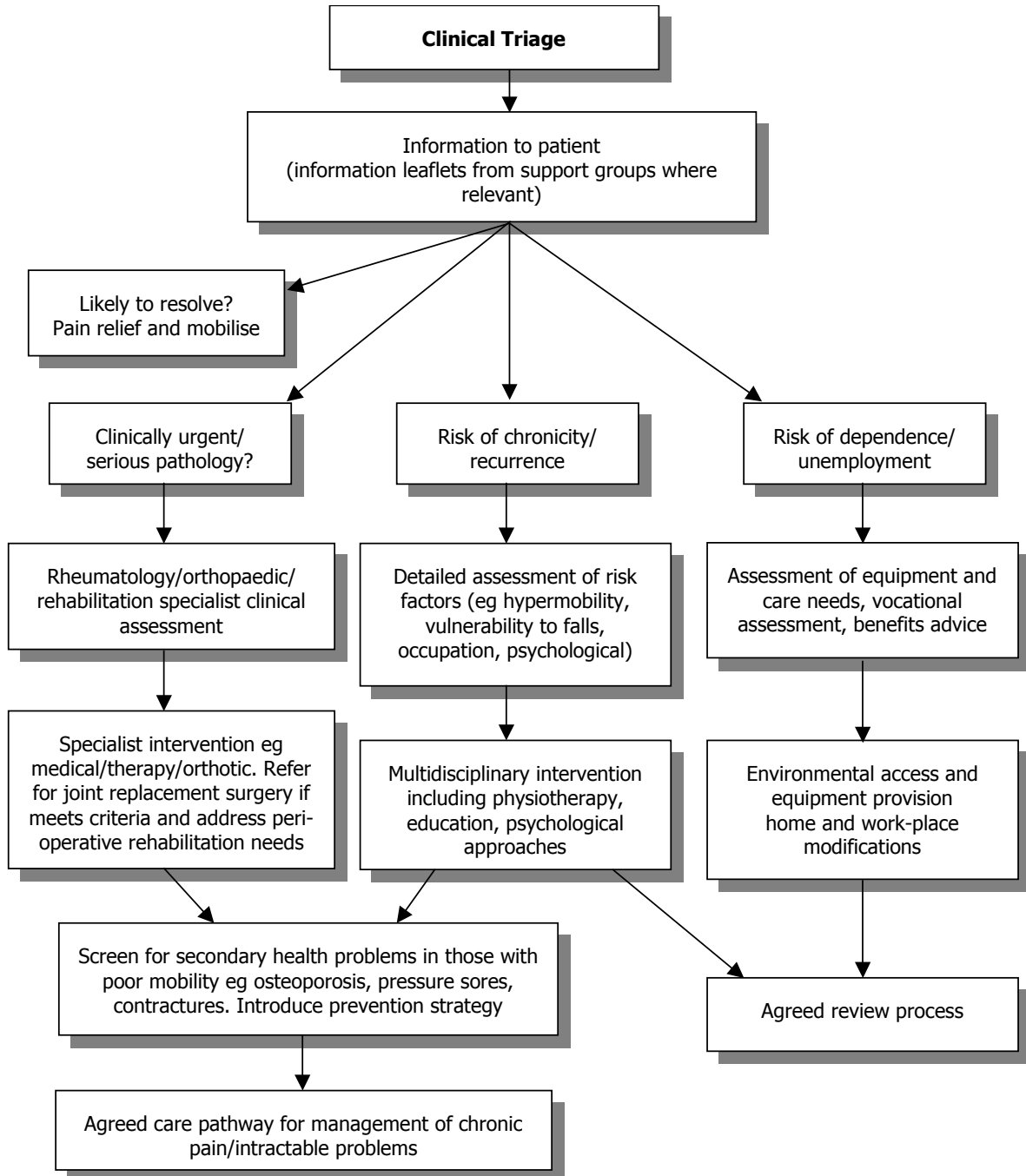
- 1.37 Rehabilitation services have a responsibility to ensure that those who require equipment and/or environmental adaptations to facilitate environmental access receive appropriate advice and provision. Disabled Living Centres and a number of voluntary organisations are useful sources of information.
- 1.38 Those with deteriorating conditions eg severe disabling RA, need regular review to ensure adequate community support for their changing needs. Assistive technology (powered wheelchairs or environmental control units) may greatly facilitate independence and quality of life for those needing them.

The future?

- 1.39 The impact of MSKD on lifestyle cannot be lessened by the introduction of new medicines and surgical techniques alone. Developments also need to focus on the following areas:
 - Public health interventions to reduce the future risks of developing MSKD (eg obesity, occupational factors).
 - Better understanding of the risk factors for longer-term disability with clear routes for early the early assessment and intervention for those with severe progressive conditions or severe pain in particular.
 - Rigorous evaluation of rehabilitation interventions, such that resources can be focused on giving the most effective treatments to those who will derive the most benefit.
 - Better training for all clinicians working in this area. Training programmes should be developed via close collaboration between all the relevant professional groups and specialities.
 - Better use of information systems and technologies and better design of public buildings and private housing to promote independence and self-respect.

Figure 1

Service Design for Musculoskeletal rehabilitation



2. Introduction and scope

Introduction

- 2.1 Many people experience painful Musculoskeletal (MSK) episodes that interrupt work or leisure activities. Fortunately most such episodes are brief. However in a significant proportion of the population, such problems are sufficiently severe, disabling and persistent to lead to loss of employment, long term pain and dependence. Musculoskeletal problems are the most prevalent cause of long-term disability in the United Kingdom (UK).
- 2.2 The British Society of Rehabilitation Medicine (BSRM) represents doctors committed to supporting people with physical disabilities in all aspects of their life and work.
- 2.3 Traditionally in the UK, services for Musculoskeletal disorders (MSKD) are under the umbrella of Rheumatology and Orthopaedic departments. This differs from Europe, North America and Australasia, where Rehabilitation specialists (often termed 'physiatrists' or 'physical medicine specialists') are closely involved in the MSK care pathway. There is some concern that the disabling aspects of MSKD are less well dealt with by the UK model. Consequently the BSRM has opted to explore this area of rehabilitation.
- 2.4 This document has been produced by a working party co-ordinated and financially supported by the BSRM with the aim of:
 - providing guidance to health professionals managing MSK problems
 - encouraging the development of appropriate and appropriately linked services for those affected by MSKD.
- 2.5 The working party has been derived from:
 - professional bodies involved in addressing such problems
 - representatives of patient support groups and service users.
- 2.6 The names and affiliations of working party members are listed in Appendix 1. A Department of Health observer was in attendance.
- 2.7 Many documents and articles have been written on the management of MSKD. Perhaps this reflects the paucity of clear evidence for the best course of action to deal with many such problems. This document cannot hope to fully resolve this issue. However, where robust evidence for efficacy and cost effectiveness is available, this has been indicated. Where evidence is less robust, but where commonsense and a consensus view indicates a best course of action, this too has been indicated. In many instances, working party members have drawn on expertise from elsewhere before reaching such a consensus. (These additional sources are acknowledged at the end of this report). Finally, where no clear guidance can be given this has been stated.
- 2.8 The working party regards the latter as an important function for this document; hopefully it will both encourage the targeting of inevitably limited resources to efficacious treatments, and act as a spur to further research and more rigorous evaluation of 'unproven' remedies.

Scope

- 2.9 This document is not a comprehensive review of MSK diagnoses and their medical management nor does it provide a comprehensive service review. Instead the approach is problem orientated, and certain clinical conditions are used to illustrate how particular difficulties affecting

independence and lifestyle can be tackled (or prevented from developing) even when the underlying MSKD cannot be eradicated. The document considers interactions between medical and surgical interventions addressing impairments, interventions (often physical) to maintain health and reduce disability and interventions (often both environmental and psychosocial) to allow maximal participation in society.

- 2.10 This report highlights key components of service structure and discusses how best to integrate these components. Potential barriers to an integrated service and advice on how to overcome these are discussed.
- 2.11 Service users have been asked to comment on the whole report but, in particular on service access and how to make it easier for users to find their way around the service maze. They have also contributed useful information sources.
- 2.12 Finally, this report discusses what an ideal service should comprise. This has been strongly influenced by users' views on the present shortfalls as well as highlighting what we regard as achievable targets.
- 2.13 The BSRM plans to review and update this report (at three-yearly intervals) and hopes that subsequent modifications may demonstrate that some of these 'achievable targets' have been reached and new goals can be set.

3. Epidemiology of musculoskeletal disorders

Summary

- 3.1 Musculoskeletal disorders (MSKD) and their consequences are common, such that half of all disability in the UK can be attributed to their presence. Impact on participation is variable, but can be substantial, as in the case of rheumatoid arthritis (RA). The economic burden of MSKD is considerable and rising. If the changing demographic profile of the population is also taken into consideration, in particular the growth in numbers of the very elderly in western societies, and ageing of the population in developing countries, then the consequences of MSKD will present a formidable challenge to our society, not only during this current Bone and Joint Decade of 2000-2010, but well beyond.

Introduction

- 3.2 Approximately one-in-six of the adult population in the United Kingdom (UK) reports long-standing MSK condition¹. The consequences of any disease or injury can be best understood through the International Classification of Impairment, Functioning and Health². The disease or injury may give rise to an impairment of body structure or function. These may then give rise to limitations in activities (Disability), and restriction in participation (Handicap). The latter may be mediated by environmental or personal factors. For those with MSKD, approximately half will have some form of activity limitation, and one-quarter will experience participation restriction³. Viewed from a different perspective, almost half (46%) of all activity limitation in the UK is attributable to MSKDs⁴.
- 3.3 The epidemiological literature on MSKD can be grouped into those population studies that provide prevalence estimates and clinical epidemiological studies that provide, for example, morbidity proportions among patients with a given MSKD. Table 3.1 presents these data in the form of estimates, where available, for incidence and prevalence, and for consequent impairments, activity limitations and participation restriction.
- 3.4 In a population study in northern England, back pain was the most commonly reported symptom in those aged under 65 years, and knee pain in those aged 65 years and over⁵. In women, the prevalence of MSK pain increased with age up to the age of 75 years, and then reached a plateau. In men, the prevalence was similar in all age groups over 45 years. Ethnic minority groups have been found to have a considerably higher crude prevalence of 'pain in most joints' compared to the white population⁶. However, disability prevalence was not significantly different. Social deprivation was also found to be linked to morbidity, particularly so with back pain⁵.

Osteoarthritis

- 3.5 Much of the activity limitation in the population can be attributed to osteoarthritis (OA) and low back pain. Generalised OA is largely a condition found in older people. Onset of the common form of 'primary' OA peaks in the sixth and seventh decades⁷. While it should be noted that even by 40 years of age 10-20% of people have evidence of severe radiographic disease of their hands or feet^{8,9}, such evidence of underlying disease does not generally translate into manifest symptoms¹⁰. Incidence has been reported at 26 per 1000, with peak incidence at 75-84 years¹¹. Despite the common nature of the disease, relatively few major studies of prevalence have been undertaken. The Royal College of General Practitioners survey of consultations found a consultation-based

prevalence of OA as 47 per 1000 General Practitioner consultations¹², but these figures are lower than population surveys as many people with symptomatic OA do not consult¹¹.

- 3.6 The recent epidemiological evidence for OA also comes in the form of joint-specific prevalence estimates. Hand OA has been reported in 62 per 1000 and symptomatic knee OA at 102 per 1000¹³. The potential need for knee arthroplasty, which will largely be attributable to OA, has been reported at 20 per 1000 aged 55 years and over¹⁴. Most recently a study in England, using a New Zealand Score¹⁵ with a cut-off point of 55, estimated a population prevalence of knee disease requiring total joint replacement of 27.4 joints per 1000 aged 35 years and over¹⁶. This estimate excluded those who indicated that they did not wish to undergo surgery, a factor that has been shown to considerably reduce the actual level of demand¹⁷. Estimates of hip disease, or pain and disability of sufficient severity to be considered for arthroplasty range from 13.5 per 1000 aged 55 years and over, to 15.2 per 1000 aged 35-85 years^{18, 19}. The estimated rate for females is about twice that of males. Non-ambulant adults with cerebral palsy also seem particularly vulnerable; prevalence of hip pain in this population has been estimated at 47.2%²⁰.
- 3.7 A general health survey from a mixed urban rural primary care practice reported an 11.7% prevalence of unilateral shoulder pain²¹. Over half of those with shoulder pain are likely to have persistent problems three years later²².
- 3.8 The majority of those with OA will only experience mild or moderate disability. However, the prevalence is sufficiently high such that, in the first UK national survey of disability, published some 30 years ago, the prevalence of people living in the community with severe disability associated with OA was similar to those from a stroke²³.

Spinal pain

- 3.9 Low back pain has an annual incidence in the adult population of between 10-15%: point-prevalence ranges between 15-30%; period prevalence between 25-42%; and lifetime prevalence between 49-70%²⁴. This is higher than the 47 per 1000 reported in a study in Bradford²⁵ and characterises the variability of evidence, often attributed to different case ascertainment procedures. The natural history of non-specific low back pain is usually relapsing and remitting. The average time to functional recovery is seven days; to symptom recovery seven weeks, but seven in ten patients will experience a recurrence within about seven months^{26, 27}. Consultation with primary care is driven by different factors at each stage. Consultation for episodes lasting less than two weeks are driven by pain; over two weeks by disability, and over three months by depression²⁸.

Rheumatoid Arthritis

- 3.10 Rheumatoid Arthritis (RA) incidence rates are thought to be in decline. A population survey in 2002 found 0.35 per 1000, although with a significant difference between males and females, 0.27 per 1000 and 0.56 per 1000 respectively¹¹. A recent population study in Norfolk found a prevalence of 8 per 1000. However, another study in Manchester found the prevalence of only 3 per 1000 amongst Afro-Caribbeans²⁹.
- 3.11 Though much less common than OA and spinal pain, by comparison, RA can have considerable impact upon participation. In a cohort of 160 patients who were working at the time of onset of RA, 14.4% had stopped working on health grounds within 12 months; 26.3% within two years, and 41.6% within 9 years³⁰. In another 10 year follow-up study, 19% of the cohort had undergone at least one large joint replacement³¹.

Table 3.1

Prevalence of disease or symptom, impairment, activity limitation and participation restriction associated with Musculoskeletal disorders. Expressed as rates per 100,000 amongst adults aged 16 years and over, unless otherwise indicated.

Condition/Symptom/ Impairment	Incidence (Annual)	Prevalence	Impairment	Activity Limitation	Participation Restriction
DIAGNOSIS					
Inflammatory joint disease	115				
Rheumatoid arthritis	40	800		320	320
Reactive arthritis	28				
Juvenile arthritis *	7	15			
Osteoarthritis	2,600	20,000		3000	
Back pain	4700	39,000	17,800	2500	
Ankylosing spondylitis	7	40			
Systemic lupus Erythematosus	4	50			
Psoriatic arthritis	8				
Fibromyalgia		2000			600
Osteoporosis	4.1**				
Major trauma (ISS 16+)****	139			37	
SITE-SPECIFIC					
Hand Osteoarthritis		6200			
Shoulder pain		11,700			
Hip fracture	14				
Knee problems***		10,200		2040	
Hip problems***				1350	

See text for source of each individual estimate.

Proportionate levels of impairment, activity limitation and participation restriction are converted to prevalence estimates for comparability.

* Under 16

** aged 20-44

*** consideration for arthroplasty

**** all ages

Other Musculoskeletal problems

- 3.12 There are many other disorders that can be grouped under the heading of MSKD, the more common of which are shown in Table 3.1. The pattern of impact on impairment, activity limitation and participation restriction is variable. For example, in a study of 175 patients with Ankylosing Spondylitis (AS) in the United States of America (USA), the most prevalent concerns were stiffness (90.2%), pain (83.1%), fatigue (62.4%) and poor sleep (54.1%)³². Older age and smoking were found to be associated with more rapid progression of the disease, while frequent back exercises and good social support were associated with improvement in disability over time³³. In contrast to RA, work disability appears to be minimal, with rates from 3% at 18 years duration³⁴.
- 3.13 Work-related upper limb disorders (WRULD) are common. Amongst physical therapists, the lifetime prevalence of WRULD has been reported at 91%, with one in six moving within, or leaving the profession as a result³⁵. One fifth of responders in a survey of newspaper employees reported moderate or worse upper limb pain recurring at least monthly or lasting more than a week over the previous year³⁶. A relationship exists between performance at work and the occurrence of neck and upper limb MSKDs³⁷.
- 3.14 Fibromyalgia is a common form of non-articular rheumatism that is associated with chronic generalised MSK pain and fatigue affecting approximately 3% of the adult population^{38, 13}. There is a 3:1 female to male ratio with prevalence rising up to 8% amongst females aged 55-64, and declining thereafter³⁹. High rates of work disability have been reported, (up to 30%), suggesting considerable impact on participation⁴⁰.
- 3.15 Soft tissue rheumatism manifests itself in many other forms, including painful back, painful restricted shoulder syndrome and epicondylitis and prevalence in adults tends to be high for these, at about 22%, 16% and 7% respectively⁴¹. Soft tissue rheumatism, including fibromyalgia, can account for up to 25% of referrals to rheumatologists. At the present time little accurate epidemiology is available for soft tissue rheumatism, and it has been argued that a better term for this may be regional and widespread pain disorders⁴².
- 3.16 A link has been observed between soft tissue rheumatism and hypermobility. Generally females display higher mobility than males, and there is a general decrease by age^{43, 44}. However, there is a continuum of joint mobility in the population with a Gaussian distribution and the prevalence of hypermobility depends on what cut-off point in a scoring system is used to define 'abnormal'. As discussed later, (see Chapter 10) its impact on activity limitation and participation is often more dependent on which joints are affected, and how severely, rather than the overall number of joints with hypermobility.

Osteoporosis

- 3.17 Osteoporosis is a systemic skeletal disease characterised by reduced bone mass and a change in the microarchitecture of the bone tissue⁴⁵. Without symptoms, its presence is assessed through Bone Mineral Density (BMD) and its morbidity is expressed through fractures. Fractures are not usually manifest until bone mass is 30%-40% below normal values⁷. The lifetime risk of osteoporosis related fractures of the spine (symptomatic), hip and distal radius, together, has been reported at 40% for white women and 13% for white men aged 50 years and over in the USA⁴⁶. The lifetime risk for osteoporosis-related fractures in Europe has been estimated at 14% and 3% for hip, female and male respectively; 11% and 2% for spine, and 13% and 2% for wrist⁴⁷.

Co-morbidity

- 3.18 Co-morbidity amongst the adult population with MSKDs can be very high. One study reported that in a population disabled by rheumatic disorders, 30% reported more than one rheumatic condition, and 63% reported non-rheumatic co-morbidity³. Another study found that 27% of patients with RA had a least one chronic coexisting disease⁴⁸. Significantly elevated odds-ratios have been found for functional decline with the presence of comorbid conditions such as diabetes [OR 1.26 (CI 1.02-1.57)]; hypertension [OR 1.29 (1.04-1.60)], lung disease [OR 1.52 (1.13-2.06)] and psychiatric disorders [OR 1.54 (1.04-2.29)]⁴⁹.

Socio-economic burden

- 3.19 The economic burden of MSKDs is high, typically accounting for somewhere between 1-2% of the Gross Domestic Product of western countries^{49, 50}. In some cases, this reflects the specific impact of MSKDs on ability to work. For example, WRULD were responsible for eleven million working days lost in the UK in 1995⁵¹. Moreover, arthritis can exert very long-term effects on disability, reducing the disability-free life-expectancy by 8.8 years for females and 6.5 years for males⁵².
- 3.20 The cost of RA in England has been estimated at £1.25 billion in 1992, 52% of which represented production loss caused by RA disability⁵³. Most recently, in the USA, the average costs per patient were \$10,419, with 30% being indirect costs. The level of disability (as expressed through the HAQ score), inability to perform household tasks, and permanently disabled from work were all predictors of high costs⁵⁴.
- 3.21 It has also been found that the economic costs of back pain are equivalent to heart disease or diabetes but, interestingly, a small proportion of low back pain patients account for a high proportion of costs⁵⁵. Of considerable concern is that the costs of rheumatic disease are substantial and rising. The costs of RA alone have recently been estimated at 1% of GNP⁴⁹.

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4. Inflammatory Arthritis

Summary

- 4.1 Despite the introduction of more effective and better tolerated disease modifying agents for inflammatory arthritides, these diseases, particularly rheumatoid arthritis (RA), remain major causes of disability and loss of independence.
- 4.2 Impact on function, self-efficacy, physical and psychological status and pain can be lessened by a co-ordinated management programme including:
 - early referral to a Rheumatology Service
 - screening for 'at risk' factors (eg for work disability, severe psychological distress, early hand and foot problems, early moderate or severe functional difficulty).
- 4.3 Rehabilitation services should then be targeted at these groups and include:
 - patient education using behavioural approaches
 - Occupational Therapy and Joint Protection training using behavioural methods
 - dynamic exercise therapy and hydrotherapy
 - orthoses and supportive footwear
 - psychological interventions (cognitive-behavioural therapy) - in people with poorer psychological status.
 - Intensive co-ordinated in - or day patient rehabilitation - for people with active or severe RA .

Introduction

- 4.4 Rheumatoid Arthritis is the commonest inflammatory arthritis treated in Rheumatology departments (up to 60% of a Consultants' caseload). Others include ankylosing spondylitis, psoriatic arthritis, systemic lupus erythematosus and reactive arthritis. Peak age of onset for most of these is 20-50 years. Much of this chapter relates to evidence-based practice in RA, but the same team approach is applicable to other inflammatory arthropathies. Specific additional needs for other conditions are addressed near the end of the chapter.

Impact of Rheumatoid Arthritis

- 4.5 Rheumatoid arthritis (RA) is chronic, unpredictable, but usually causes persistent joint pain, progressive joint damage (especially in the hands and feet) and long-term disability. Five years after diagnosis, whilst 40% still have relatively normal function (13% in remission), 44% have mild to moderate and 16% marked functional disability. In working people 15% are work disabled at one year, 27% by five years, rising to over 50% by ten years, leading to serious financial consequences for the person, their family and increased Social Security costs¹. The impact on ability to carry out household duties and childcare can also be huge.
- 4.6 In the longer term, 80% are moderately or severely disabled by 20 years. The disease can also lead to multiple organ involvement (eg heart, liver, skin). The annual cost of treating RA in the UK is £0.8-1.3 billion². Most costs come from long-term care and hospital admissions, with drug therapy (including monitoring and management of toxicity) only 15% of costs³. This is estimated

to rise by £55-75 million per annum with the increased use of new biological therapies, even though these are applicable to only a small minority of severely ill patients (6-8%)⁴.

- 4.7 Red flags (ie high risk factors) for poorer functional outcome and morbidity are:
- moderate functional disability already evident at diagnosis^{1,2,5}
 - requiring hospital admission early^{1,2,5}
 - poorer psychological status ie poor self-efficacy, greater helplessness, passive coping and depression⁶.
- 4.8 Yellow flags (ie moderate risk factors) are:
- younger at disease onset⁷
 - socio-economic deprivation, possibly due to co-morbid disease, lifestyle factors (eg poorer diet, smoking), later presentation with disease and poorer access to services⁷.
- 4.9 Two-thirds of people with RA could potentially benefit from rehabilitation services to reduce disability. Half of those of working age could benefit from vocational rehabilitation to prevent work disability. The authors of this report consider people with the above red and yellow flags in particular require rehabilitation services early.

Management

Early referral to Specialist Care, Drug Therapy and Rheumatology Nurse Practitioners

- 4.10 Specialist secondary care from dedicated rheumatology teams gives better outcomes in RA than general or primary care services⁸. People suspected of having RA should be seen by a Consultant Rheumatologist within 12 (preferably six) weeks of referral for diagnosis and to start Disease Modifying Anti-Rheumatic Drug (DMARD) therapy. DMARDs limit joint damage, maintain function and reduce later disability. Delaying DMARDs adversely affects functional outcome.
- 4.11 Sulphasalazine and methotrexate have more favourable efficacy/toxicity profiles than other DMARDs. Within 2-4 years over 50% change to a second DMARD, as the first is no longer effective^{5,9}. Biologic therapies are available for those with severe disease; these markedly improve functional ability but are expensive and provision varies considerably throughout the UK. A third of Rheumatologists are currently unable to prescribe biologics to all applicable patients, either due to lack of funding from Primary Care Trusts, nursing support or day unit facilities⁴. However, drug therapy does not cure and rehabilitation is essential in addition.
- 4.12 Following medical diagnosis, Rheumatology Nurse Practitioner (RNP) follow-up is significantly more effective than either junior doctor or Consultant care in providing patient education and psychological support, maximizing concordance with drug therapy, referral for rehabilitation services, and resulting improvements in health status¹⁰. RNPs are essential team members.

Drug Therapy

Analgesics and non-steroidal anti-inflammatories (NSAIDS)

- 4.13 Inflammatory arthritis is rarely controlled by analgesics or non-steroidal anti-inflammatory drugs (NSAIDS) alone. Analgesics can be useful for 'on demand' dosing in combination with an NSAID. NSAIDS relieve inflammation though frequently causing gastric side effects requiring concomitant gastro-protective therapy. They sometimes also cause renal side effects. They can be classified by family (of some relevance to side effects), half-life (relevant to the frequency of

dosing) and by pharmacological effect. The oldest are available in generic formulation. Low dose ibuprofen is now available over the counter.

- 4.14 Pharmacologically, NSAIDs are divided into non-specific inhibitors of cyclooxygenase, partial COX-2 inhibitors and selective COX-2 inhibitors (the coxibs). The more expensive highly selective COX-2 inhibitors are claimed to have fewer gastric side effects and cause less renal damage so may have a place in the elderly or patients who have previously suffered severe gastrointestinal problems. With time, however, more side effects may yet emerge with these newer drugs.

Disease Modifying Anti-Rheumatic Drugs (DMARDs)

- 4.15 In the last ten years, early introduction of DMARD treatment has become the norm. Sulphasalazine and methotrexate are the drugs of first choice, supplanting earlier compounds such as injectable gold, penicillamine, anti-malarials and azathioprine. Less commonly used drugs include cyclosporin and minocycline. The average period on a DMARD before side effects occur or before disease control is lost is only two-three years. The use of several drugs is often required, normally one at a time. In the last few years, new DMARDs have been introduced. Leflunomide is a pyrimidine antagonist (raising the potential of combined potent use with methotrexate, which is a purine antagonist). The cost of such therapy is around £700/year in the average patient, which is significantly more than any of the earlier drugs.
- 4.16 Drugs are normally titrated against acute phase reactants, sometimes against radiological progression. If a single drug fails to help, drugs can be used in combination. All DMARDs carry side effects so monitoring is required for their safe use and traditionally they are only prescribed under hospital supervision.

Biologic therapies

- 4.17 Anti-TNF α blockade has been shown to have significant efficacy in RA and two such biological compounds are now available. Infliximab is given by intravenous infusion in combination with methotrexate and etanercept is given by subcutaneous injection as a sole drug. Their respective costs are approximately £8,500/year and £9,500/year, which has introduced a new dimension to the cost of rheumatology care. Currently these are recommended as treatment options for people with clinically active RA which has not responded adequately to at least two DMARDs, including methotrexate (unless otherwise indicated)⁵². These must be prescribed following British Society of Rheumatology Guidelines⁵³. Different trusts and health authorities have reacted in different ways with the effect that these drugs are currently rationed in many parts of the country⁴.

Future trends

- 4.18 The next five years is likely to see the introduction of biological agents blocking alternative interleukins (eg IL-1) and the second generation of TNF α blocking drugs, with, hopefully, fewer adverse effects than the existing preparations.

Patient Education and Self-Management

- 4.19 Patient education programmes improve use of self-management, disability, pain and psychological status in the short term^{11,12}. People who use more active coping strategies have less functional disability long-term⁶. Written information from the Arthritis Research Campaign (ARC), Arthritis Care, National Rheumatoid Arthritis Society (NRAS) as well as websites, book lists, and information about local/national arthritis organisations can help considerably¹³.
- 4.20 However, behaviourally based interventions (ie including goal-setting, contracting and feedback) are significantly more effective in improving health status than information and/or counselling

alone^{11,12}. Programmes should emphasise healthy lifestyle management and provide training in exercise, joint protection, pain and fatigue management, effective communication, and include disease and drug therapy education. Group behavioural programmes are more cost-effective than individual education. However, only 50% of people with RA consider attending group education useful¹⁴. Many prefer one-to-one education from health professionals and self-study programmes¹⁴. The former are less effective - improving knowledge and patient satisfaction but not self-efficacy, health behaviours or health status^{11,15}. Self-study programmes are effective when individualised but require health professional input to support people through change^{16,17}.

- 4.21 Community based trained user-led group self-management programmes are also effective (“Challenging Arthritis”, run by Arthritis Care¹⁸) and are currently being rolled out in the UK Expert Patient Programme. NRAS is also establishing a national Expert Patient Programme providing individual education and support.

Occupational Therapy

Joint protection/fatigue management

- 4.22 There is good evidence that, when administered as a behavioural group programme, this reduces pain, early morning stiffness, maintains functional ability, improves grip and reduces number of visits to a doctor for arthritis one year after education in early RA¹⁹.

Assistive devices

- 4.23 Assistive devices reduce pain and difficulty in activities of daily living (ADL)^{20,21}. Provision is patchy nationally. Many Local Authority Social Services (LASS) and NHS Occupational Therapy (OT) departments require people to purchase small devices (eg kitchen and personal care aids) due to budget constraints but provide larger devices and adaptations free. Others provide all devices free. Waiting lists for OT assessment vary considerably due to staff shortages - particularly in LASS. People on lower incomes are often unable to afford smaller devices and may not ask for help purchasing these.

Hand Splinting

- 4.24 Wrist splints reduce pain, improve grip and functional ability during wear²². Resting splints reduce pain at night²². There is no evidence as yet that splinting maintains function long-term or prevents deformity. Staff trained in their use must correctly fit all splints, clearly instruct in their use and regular review is recommended to ensure maximum therapeutic effect²³.

Comprehensive Occupational Therapy programmes

- 4.25 These include ADL assessment and training, splinting, joint protection, assistive devices and environmental modification, fatigue and pain management, counselling, patient education, work and leisure rehabilitation.
- 4.26 There is good evidence OT is effective in improving functional ability in people with moderate to severe established RA²⁴. In early RA (< 2.5 year post diagnosis) OT leads to some increase in self-management but no discernible effect on physical, functional or psychological status²⁵. However, educational-behavioural approaches, now known to be more effective^{11,19} were not included in this early OT programme.
- 4.27 A recent systematic review concluded there is limited but encouraging evidence that comprehensive OT has a positive effect on functional ability and pain²².

Exercise and Physical Therapies

- 4.28 **Comprehensive physiotherapy** (education, exercise and pain relief modalities) improves knowledge, self-efficacy and early morning stiffness for up to one year²⁶⁻²⁸.
- 4.29 **Aerobic and strengthening exercise.** Two systematic reviews conclude this leads to significant improvements in physical (muscle strength, aerobic capacity, endurance and function) and psychological status (self-efficacy and well-being) and does not exacerbate disease activity^{29,30}. People with arthritis should be taught an effective exercise programme, of moderate (60-85% of maximum heart rate) aerobic exercise three times per week for between 30-60 minutes cumulatively, combined with moderate strengthening (50-80% of maximal voluntary contraction) two to three times per week³⁰.
- 4.30 **'Exercise on Prescription' schemes** (ie free/ reduced rate exercise facilities available in leisure centres following referral by a GP for health reasons) should also be available for people with arthritis.
- 4.31 **Hand exercise** (provided by both Occupational Therapist and Physiotherapist (PT)). A combination of range of motion and strength exercises is more effective than range of motion or wax therapy alone in improving grip and pinch strength, reducing pain and maintaining hand function²⁶.
- 4.32 **Hydrotherapy.** There is some evidence that this helps maintain activity levels reduces the need for hospital admissions³¹. However it is costly and limited in availability.
- 4.33 **Thermotherapy:** there are no significant benefits from heat and ice pack applications, cryotherapy or faradic baths apart from short-term relief of symptoms. Paraffin wax baths combined with exercises have beneficial short-term effects for arthritic hands^{26,32}.
- 4.34 **Electrical stimulation (ES)** aims to improve muscle strength and endurance training in people unable to voluntarily recruit muscles actively. However, only one small good quality study shows ES aids grip strength and fatigue resistance in the hand³³.
- 4.35 **Low level laser therapy and acupuncture.** These are beneficial in reducing pain in the short-term but have no other effects. However trials are few and small in size^{34,35}.

Foot and Lower Limb Care

- 4.36 Podiatry provides a combination of patient education, exercise, foot joint protection, and splinting and footwear advice. Semi-rigid foot orthoses are more effective in reducing metatarsalgia than soft orthoses or supportive shoes alone³⁶. Extra-depth shoes or off-the-shelf orthopaedic footwear combined with moulded insoles decrease pain in standing, and improve walking and stair-climbing, physical function, gait velocity, and gait stride length^{37,38}. For those with more severe and/or proximal problems such as knee or hind-foot mal-alignment which deteriorates on weight-bearing, ankle-foot-orthoses (AFO's) or knee-ankle-foot-orthoses (KAFO's) can considerably enhance comfort and mobility.
- 4.37 Multidisciplinary foot and lower limb care services (podiatry, orthotics, PT and OT) are considered by the authors of this report to be an effective, essential mode of service delivery.

Psychological interventions

- 4.38 Multimodal cognitive behavioural therapy (CBT); relaxation, imagery, stress management, cognitive coping skills, biofeedback, psychotherapeutic interventions - group and individual, significantly improve pain and functional disability in the short but not long-term. However there are often sustained improvements in anxiety, depression, self-efficacy and coping skills. Interventions seem more effective with people with shorter disease duration³⁹.

- 4.39 CBT is most applicable for people ‘at risk’ ie with severe pain, little social support, who feel helpless about coping with their disease and become disabled even though seemingly having mild to moderate disease.
- 4.40 A combination of Tai Chi, relaxation and stress management improves range of motion and disability in the short-term⁴⁰.

Vocational rehabilitation

- 4.41 The prevalence of work disability is high, job problems arise quickly and job loss can often occur before the person is referred to hospital or started on DMARD therapy. Factors affecting work disability are primarily work factors (eg physical demands of the job, degree of autonomy) and employee factors (eg age, education, work motivation). Disease factors (eg disability, flare-up frequency, degree of pain and fatigue) are less important. Work loss is common in those with physically demanding jobs who are unable to change to lighter work and have little control over their work pace⁴¹. There is good evidence that work rehabilitation can reduce sickness absence, early retirement, increase productivity, continue payment of taxes and reduce state benefits payments⁴².
- 4.42 Key strategies to maintain people in work include:
- rapid communication with employers and the employee with arthritis at disease onset and during flare-ups
 - openness between the two parties
 - job modification,
 - reorganising work schedules
 - reducing access barriers
 - enabling people to stay in their current workplace and changing to more appropriate duties if necessary⁴¹.
- 4.43 OTs or PTs trained in ergonomics and vocational rehabilitation can assess whether there is a mismatch between the demands of the workplace and the current physical capabilities of the individual with arthritis, and can advise on workplace adaptation. Disability Employment Advisors at Job Centres assist financially and practically. Vocational retraining or intensive work rehabilitation is effective for people needing to change job or after extended sick leave^{42,43}.
- 4.44 Good evidence indicates introducing a simple work problem-screening tool into rheumatology clinics assists early identification of work problems⁴³. Early work assessment reduces work problems, maintains people in work and results in high levels of satisfaction from workers with RA⁴⁴.

Practical help in the home

- 4.45 Social work intervention can support people and their families in adjusting to living with a chronic disease through:
- counselling
 - family support
 - organising provision of home care, meals on wheels and/or day care
 - social housing when necessary for people with more severe disability
 - providing assistance with benefits available and liaising with employers.
- 4.46 Although the effect of social work intervention in arthritis has not been evaluated, the authors of this report regard it as an essential component of team management, especially for people with more severe disease.

Multidisciplinary Rehabilitation

- 4.47 Co-ordinated intensive multidisciplinary rehabilitation programmes are important for people with active RA or moderate-severe RA and multiple functional problems. Intensive medical treatment and rehabilitation provided in well structured, co-ordinated day care and in-patient rehabilitation are similarly beneficial, with day care being slightly cheaper⁴⁵⁻⁴⁷. It is likely that local geographical and service factors influence the most effective method of providing multidisciplinary care for those with more severe problems.

Other inflammatory arthropathies

- 4.48 Ankylosing spondylitis (AS) is the commonest seronegative arthritis (others include psoriatic and reactive arthritis). It primarily affects the spine and entheses (where tendons join bones). It is more frequent in men than women and starts in the sacroiliac joints, typically spreading up the spine to stiffen and fix it, ultimately leading to kyphosis. The knees and ankles can also be affected. Pain, stiffness and fatigue are major problems and 25% also have eye inflammation. The latter need to be treated promptly to avoid visual impairment. Seventy-five per cent of people with AS can remain in work, but this should be physically undemanding, minimize bending, lifting and sitting and early work assessment is essential.
- 4.49 Management is largely similar to RA, initially with analgesics and NSAIDs, and later with DMARDs. A daily home programme of exercise designed to stretch ligaments and strengthen muscles to maintain mobility and good posture should be followed, accompanied by regular aerobic exercise. A recent systematic review concluded intensive exercise programmes (eg three weeks of PT supervised daily exercise plus thrice weekly hydrotherapy) led to short-term improvements in spinal mobility, pain and stiffness compared to home exercise only, although this was no different at six months⁴⁸. Best practice recommends people with AS attend intensive exercise residential programmes periodically. The National Ankylosing Spondylitis Society (NASS) supports such programmes and has a network of local groups providing 'out of hours' PT-led exercise classes. Where these are unavailable, people should have free access to appropriate exercise facilities.
- 4.50 Sometimes surgery is needed, particularly if there is both lumbar spine and hip involvement. A possible post-operative complication is stiffness and ankylosis, necessitating even more vigorous post-operative PT than in other conditions.
- 4.51 Systemic lupus erythematosus (SLE) is the commonest example of inflammatory conditions of connective tissues (others include polymyositis, dermatomyositis, systemic sclerosis). It typically affects young women, and can affect multiple organs including skin (rashes, sun-sensitivity), joints, kidneys, heart, lungs and the central nervous system (CNS). Early detection and aggressive treatment with DMARDs are needed to limit organ damage. Early self-management education and OT and PT as functional problems develop are necessary. Continued disease monitoring is vital, as neuropsychiatric symptoms particularly must be identified early. Impaired cognitive function (including memory loss and confusion) and frank psychosis can occur in some people and hence, good links need to be established with psychiatric/psychological services.

Current services and their limitations

- 4.52 Whilst specialist rheumatology teams give better outcomes than general or primary care services⁸, provision of services is patchy, especially in rural areas. Many units have insufficient OT and PT, orthotic, podiatry and specialist rheumatology nurse practitioner (RNP) support to provide fully co-ordinated care. Psychology support and work rehabilitation are rare. There are reducing numbers of rheumatology beds to provide in-patient rehabilitation when this is needed.
- 4.53 A recent survey of members by the NRAS identified only 63% had access to a RNP, 57% to PT, 48% to OT and 39% to podiatry. This is likely to be an optimistic picture of national provision⁴⁹.

- 4.54 It is the consensus of this working party that the increasing trend to generic community therapy provision can deny people access to expert rheumatology patient education and rehabilitation. Dedicated, properly funded and staffed rheumatology teams are essential - either hospital or community based. For example, the Fife Community Rheumatology Service provides high quality, expert rheumatology therapy at a local level. Extended role practitioners also improve co-ordination of care⁵⁰.

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5. Osteoarthritis

Summary

- 5.1 Osteoarthritis (OA) is extremely common, and the major cause of pain, physical disability and restricted activities and participation amongst older people.
- 5.2 These problems are widely seen as inevitable and untreatable by the public as well as by many health professionals, resulting in negative attitudes and little help being offered.
- 5.3 Evidence shows that much can be done to improve the quality of life of individuals with OA through simple procedures such as education and empowerment, exercise, and appropriate simple aids and appliances.
- 5.4 Joint replacement is an important option for the few people with the most severe forms of OA, but professionals need more guidance on whom to refer.
- 5.5 Application of attainable benefits for a huge number of people requires improved knowledge amongst professionals and a co-ordinated service.
- 5.6 There is no organised, integrated service for people with OA, in spite of its frequency and economic importance. A new model of a service for the UK is proposed.
- 5.7 As part of their 'overall strategy for the provision of **Musculoskeletal** services', localities should develop consensus with local stakeholders (including patients) on the indications for referral for primary joint replacement surgery.
- 5.8 Consideration should be given to pilot studies for triage for those with OA, using therapists from either orthopaedic or rheumatology teams.

Introduction

- 5.9 Osteoarthritis (OA) is the most common form of joint disease. It is characterised by areas of destruction of the articular cartilage that forms the load-bearing surfaces of joints. When symptomatic, this joint damage leads to pain on movement, restriction of joint motion and stiffness of joints. Lower limb joints, including knees and hips, are especially vulnerable to the disease, but it frequently affects the hands, feet and other joints as well.

The Community burden of osteoarthritis

- 5.10 OA is strongly age-related, being uncommon in younger people, but affecting over 10% of all adults over the age of 55¹. It is becoming a major social and economic burden in the developed world^{2,3}.
- 5.11 The WHO/World Bank report on the burden of disease estimates that OA will become the fourth most important health condition to affect women in the world and the eighth most important in men⁴.
- 5.12 Most hip and knee joint replacements are done because of OA⁵.
- 5.13 OA is the major cause of pain and physical disability in older people, and therefore the major reason for use of pain-killers and physical therapy in that age group.

5.14 OA is a major cause of lost work in people over the age of 50³.

Prevention

5.15 The major risk factors for OA^{6, 1} include:

- Increasing age
- Obesity (hugely important for knee disease)
- Joint trauma
- Selected activities, such as work involving lifting and knee bending
- Weak muscles.

5.16 The major opportunity for prevention comes with reducing obesity. Though there is no direct evidence for obesity causing OA, the incidence of knee OA in particular is apparently reduced in those who lose weight. It has been estimated that some 30% of knee OA could be prevented this way⁶. Keeping generally fit and active throughout life, and maintaining good use of joints and strength of muscles would probably also be very beneficial. (“What is good for the heart is good for the joints”).

Treatment

5.17 There is no cure for OA, and, as yet, no treatment that can reverse joint damage. Addressing biomechanical problems such as misalignment or instability may slow its progression. However, most treatment concerns reducing pain and improving function. The most important elements of management are:

- **Empowering** people to manage their own problems – this involves education and encouragement to keep active in spite of pain, as well as provision of help to aid function where joints are compromised.
- **Exercise** (see below).
- **Pain relief:** a variety of tablets and topical preparations are available on prescription or over the counter. The major issue here concerns the toxicity of widely used prescription drugs. Other, non-pharmacological ways of relieving pain, such as acupuncture or trans-cutaneous nerve stimulation (TENS), are sometimes appropriate.
- **Aids and appliances** to help relieve pain and improve function (see below).
- **Dietary supplements** such as glucosamine, chondroitin and vitamins. The medical value of these is controversial at present, but they are widely used. People with OA use complementary and alternative therapies extensively.
- **Surgery.** The only effective treatment for people with a lot of pain from an osteoarthritic hip or knee is joint replacement (see below).

5.18 The evidence base for these interventions has been reviewed elsewhere^{7, 8}. In view of their relevance to service provision, the only three interventions to be considered in more detail in this report are exercise, aids and appliances and surgery.

Exercise and other physical therapy for mild to moderate osteoarthritis

5.19 It is likely to be beneficial to maintain a good range of joint motion and maintain muscle strength throughout life. Of current concern is the trend to an increasingly sedentary life, particularly

amongst younger people, as this may lead to a massive increase in the prevalence of both osteoarthritis and osteoporosis in future generations.

- 5.20 If an individual has developed OA, it is still beneficial to them to keep fit and physically active, even though activity will cause pain. The idea that you can ‘wear out your joints’ through activity is a dangerous myth, which results in many people becoming inappropriately disabled to the detriment of their general health as well as their joints. It has been shown, for example, that increasing general aerobic activity (more walking) decreases pain, improves function and helps the general sense of well being of people with OA⁹.
- 5.21 Formal, supervised programmes of physical therapy have been shown to be one of the most beneficial interventions that we have for established OA of the knee joints⁹, and similar benefits probably accrue to people with hip disease. Trials have also shown that home-based exercise programmes are effective¹¹⁻¹³, particularly if supported and monitored¹⁴.

Aids and appliances for mild to moderate osteoarthritis

- 5.22 Because of the high prevalence of OA in feet, knees and hips in older people, a major proportion of our aging population has difficulty getting around, with restrictions in walking distance, getting up and down steps or stairs, getting up from chairs or toilet seats, and getting in and out of cars, for example.
- 5.23 Aids and appliances can help enormously. A stick (of the right height, with a good ferrule and held in the hand on the opposite side of the worst affected hip or knee) can make a big difference by partly off-loading the arthritic joint.. Foot and ankle orthoses, such as shoe wedging or insoles can be hugely beneficial again by redistributing loading through affected joints¹⁵. Braces or simple bandages applied to the knee can relieve pain and increase the sense of security walking^{16, 17} but need to be used intermittently; continuous use will lead to muscle wasting and may thus make the knee unstable. In more advanced cases other walking aids, including frames, with or without wheels, may be appropriate.

Orthopaedic surgery referral for severe osteoarthritis, unresponsive to the above interventions

- 5.24 Hip and knee replacement surgery rates in England are rising¹⁸. This is largely due to the increasing prevalence of OA in our aging population, but improved surgical techniques, making the operation appropriate for a wider range of people (including the very elderly), are also contributing.
- 5.25 However, it remains difficult to decide when an individual should have surgery⁷. If done too early in the course of arthritis or at too young an age the benefits might be less, and the risk of the prosthesis needing complex revision surgery higher. If done too late, then one has deprived the individual of years of pain relief and improved mobility and the benefits may be less than usual¹⁹. If the individual has already resorted to using a wheelchair, it may no longer be possible to regain independent walking after surgery.
- 5.26 Some guidelines for referral and surgical prioritisation have been produced, based on consensus conferences²⁰⁻²². They stress the levels of pain and disability, but also take account of other issues, such as psychosocial circumstances.

Summary of the New Zealand Priority Scoring System for Surgery for Knee or Hip Osteoarthritis.

Points are awarded out of 100

40 points depend on severity of pain

20 points depend on disability

20 points depend on the severity of joint damage

10 points depend on the presence of arthritis in other joints

10 points depend on other factors such as social circumstances

A score of 45 or more suggests the need for surgery, a score of 55 or more suggests that this should be a priority.

Services for people with osteoarthritis

- 5.27 At present, in the UK, there is no specific service for OA, and no single profession that takes responsibility for the co-ordination of services. As a result, what happens to different individuals is a 'hit-or-miss' affair, and highly dependent on the variable knowledge or interest of local people, particularly General Practitioners.
- 5.28 The situation is made worse by the fact that there is no specific patient interest group, although Arthritis Care have recently highlighted the extent of the problem, (The OA Nation). Management strategies have been influenced by pressures on clinicians from pharmaceutical firms or those that make appliances and joint prostheses.
- 5.29 Possible reasons for this unfortunate state of affairs likely include the fact that joint pain and stiffness in older people, and consequent disability, have been seen as an inevitable part of the ageing process by the public and health professionals. An associated issue is the fact that patients do not present to health professionals with 'OA' but with joint pain.
- 5.30 Current services for OA are, with a few notable exceptions, characterised by the lack of formal structure. Consequential problems for those intending to provide or utilise services include:
- Poor long term access to services and treatments
 - Lack of early treatment resulting in long-term problems
 - Ineffective use of treatments, caused in part by limited knowledge
 - Poor staff motivation to manage OA long term.
 - Poor staff knowledge of treatments and services provided by other health professional groups
 - Poor patient compliance with treatments
 - Poor co-ordination of different services used to manage OA - particularly primary care/secondary care interface and NHS/Social services interface.
- 5.31 However, there are many positive features of existing services:
- Most individuals are able and willing to self-manage the condition without outside help
 - Standards of most health professional services are high
 - High level of teamwork and integration within many departments
 - Good communication between staff and patients
 - Staff training and education is good within relevant specific fields such as Rheumatology and Orthopaedics.
- 5.32 The result of the above situation is that patient management and outcome, especially for mild to moderate OA not requiring surgery, is generally sub-optimal. There is certainly scope for

improving service structures, which could result in significant improvements in the management and outcome of people with OA. A planned and co-ordinated service could overcome most of the current problems associated with services (or the lack of them) for OA.

5.33 The key recommendations are:

- Early triage such that those needing surgical intervention are referred for this treatment rapidly. For the remainder, a well-defined care pathway to ensure rapid access to specific interventions such as joint injections, orthoses and a guided exercise programme.
- The responsibility for specific interventions, such as use of injections and analgesics, could be given to extended role practitioners.
- Extended role practitioners would operate across several GP surgeries (or a PCT), providing expertise in diagnosis, overall management and specific interventions, so that individuals would be able to access most treatment locally.
- The majority of treatment provision would take place within primary care or the community. The use of group sessions in the community would greatly improve efficiency and effectiveness of service
- Individuals would be empowered to improve their self-management. The service would do this by providing resources, support and help as needed. This should lead to fewer requirements for direct health professional treatment provision.
- The service should be called a 'joint/OA service' to encompass the way in which the problem presents and is perceived by many in the community.

5.34 These recommendations would not be without costs: extra funding would be needed for staffing, training and facilities. However, there would be potentially huge savings from existing services with a likely reduction in the demand for costly interventions such as joint replacement.

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6. Peri-operative and post-operative care - rehabilitation

Summary

- 6.1 Joint replacement surgery, particularly in the hip and knee, has revolutionised the lives of many with arthritis. However, outcome is determined by many other factors in addition to the quality of the surgery and the joint prosthesis used.
- 6.2 Many patients submitted to joint surgery have concomitant pathology or are on a variety of medications. These can affect fitness for surgery and their impact on stamina, etc, may only become evident after a damaged joint which has affected mobility has been replaced.
- 6.3 As a general rule, drugs for inflammatory arthritis should not be discontinued at the time of surgery as this renders patients susceptible to disease exacerbation.
- 6.4 Once the function at certain joints is improved by surgery, there is a risk of more rapid deterioration at other joints that, until surgery, were protected by the previous lack of function^{1,2}.
- 6.5 This increased use should be anticipated and the patient offered a pre-operative exercise programme to promote good function in these joints.
- 6.6 The incapacity produced by poor hand function while the patient is convalescing from hand surgery can be even more incapacitating than the temporary loss of ability to walk. Upper limb surgery can have a profound effect on mobility (short term) in those reliant on using walking aids.
- 6.7 The benefit from operations is significantly reduced by the lack of availability of subsequent physiotherapy and occupational therapy. Therapy is needed to address issues such as problems in other joints also affected by arthritis, and stamina.
- 6.8 With current trends in sub-specialisation, orthopaedic correction for inflammatory polyarthritis can involve four or five different surgeons. Here, there is clearly a role for a physician, either rehabilitationist or rheumatologist, to co-ordinate overall management.

Introduction

- 6.9 Total joint replacement has been hailed as one of the great advances of the last half-century. It is used to relieve pain at severely damaged joints and, to a lesser extent, to restore function. The longest established operation is total hip replacement. This was followed by total knee replacement. Subsequently shoulders, elbows and ankles have been replaced. Small silastic joints in the hands also substantially improve disordered hand function. Tendon transplant and replacement surgery has also been developed to restore function where tendons have been ruptured as a consequence of disease or trauma.
- 6.10 Joints are most often replaced in degenerative arthritis (OA) and inflammatory arthritis (usually RA). Since OA is more prevalent in the elderly and RA involves organs other than the joints, many patients submitted to joint surgery have concomitant pathology or are on various medications. This requires careful integration, particularly if the programme for any individual patient involves the replacement of more than one joint. The sequence of surgical procedures needs to be considered carefully, bearing in mind biomechanical changes that may occur as the

function at certain joints is improved. There is a risk of more rapid deterioration at joints that were previously asymptomatic, protected by the previous lack of function^{1,2}.

- 6.11 A multidisciplinary approach is desirable, the rheumatologist liaising closely with the orthopaedic surgeon and the rehabilitationist and with other health professionals including physiotherapists, occupational therapists and podiatrists.

Pre-operative assessment

- 6.12 The order in which damaged joints are to be replaced requires careful planning. Consideration should be given to whether both hip or knee joints are to be replaced simultaneously or one after another. A common biomechanical pattern is involvement of one hip and secondary involvement through strain of the opposite knee joint, both of which may ultimately require replacement. Home circumstances (eg Does the patient live alone? Will help be available? Is access to bathroom, kitchen, etc, level?) should be considered prior to surgery. Any modifications needed to make things easier for the convalescing patient can then be started pre-operatively, hopefully avoiding the need for an extended hospital stay. These considerations do not only apply to weight-bearing joints. The incapacity produced by poor hand function while the patient is convalescing from hand surgery can be even more incapacitating than the temporary loss of ability to walk.
- 6.13 Careful anaesthetic assessment is also required, particularly in respect of heart and lungs, not only in the elderly patient with osteoarthritis but also in rheumatoid patients who may have heart or lung involvement from their disease or through drug toxicity. Rheumatoid involvement of the cervical spine can make intubation hazardous. Operation under epidural anaesthesia may be preferable in some patients^{3,4}.

Peri-operative management

- 6.14 Patients with RA may be taking disease-modifying agents. There has always been a theoretical risk that some of this may impair wound healing. Drugs that have an effect on the bone marrow or the platelets may additionally predispose to haemorrhage, but the risk is generally low and outweighed by the advantages of continuing medication. Currently the 'gold standard' for the treatment of RA remains methotrexate. Although this has previously been implicated in delayed wound healing, this is not now felt to be a risk but the drug is still discontinued by a minority of orthopaedic surgeons embarking on surgery, often for seven days, rendering the patient susceptible to disease exacerbation as a result of withdrawal of treatment. This in turn means that any benefit produced by the operation is minimised through the flare in adjacent joints. Penicillamine, now infrequently used, reduces the strength of collagen and steroids reduce the total amount of collagen, rendering the joint more vulnerable.
- 6.15 Patients with RA are more susceptible than average to infection and any infection detected in the weeks prior to operation should be treated vigorously.

Post-operative management

- 6.16 Pain control is important post-operatively particularly to allow adequate early physiotherapy to commence. At an early stage the transfer can be made to oral analgesics, though if an intravenous line is left in, 'on demand' intravenous analgesic dosing can be provided. Initially, potent oral analgesics may be required such as tramadol and dihydrocodeine. Later patients may be weaned through co-codamol or co-proxamol towards paracetamol. Although the parallel prescription of anti-inflammatory agents may be irrational, many patients derive benefit from this as well.
- 6.17 Early mobilisation is feasible eg within days of inserting a cemented total hip replacement and has many advantages. In particular, risks of thromboembolic disease is reduced. Physiotherapy is

essential at this stage and should pay attention to the other joints involved. The benefit from some operations, with the insertion of expensive prostheses, has been significantly reduced by the lack of availability of subsequent physiotherapy. Patients receiving joint replacement for ankylosing spondylitis need particularly intensive physiotherapy in the post-operative period. As the patient becomes more mobile, additional strain is placed on other joints^{5,6}. Such problems may affect adjacent joints, and may also affect upper limb joints if weight bearing through walking aids is needed after lower limb joint replacement surgery. Any resulting inflammation may need to be alleviated with intra-articular steroid injections to allow physiotherapy to proceed at an adequate pace. Replacement of other joints previously postponed, may need to be expedited if their deterioration interferes with overall progress. Occupational therapists would also need to advise on changes in requirement for aids to daily living as the patient convalesces. A temporary increase in dependency may also necessitate the provision of home care services.

- 6.18 If localised problems have been cured by surgery, the rheumatologist may be able to consider reducing or stopping drugs that were required prior to surgery. The increased ability to exercise following large joint surgery in the leg may also have implications for the patient's cardiac and respiratory capacity, which in turn may need assessment and further treatment.
- 6.19 With the increased trend for orthopaedic surgeons to work in groups at major centres and with the subsequent division of work such that each surgeon tends to concentrate on a particular site or even individual joint, a programme of orthopaedic correction for inflammatory polyarthritis can involve the use of up to four or five different surgeons. Here, there is clearly a role for a physician, either rehabilitationist or rheumatologist, to co-ordinate overall management, ensuring the patient does not fall between several stools.

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7. Osteoporosis

Summary

- 7.1 Osteoporosis is a common problem with considerable morbidity and mortality. Health service costs, including hospital care of fractures, rehabilitation and social care, are very high. The causes of osteoporotic fracture are many, combining genetic risk, lifestyle and diet (including calcium and vitamin D deficiency), ill health and vulnerability to falls and medication, particularly glucocorticoids.
- 7.2 Population screening is not cost-effective at present but it is recommended that individuals at risk are assessed and treated. There is an increasingly wide choice of effective medication for the prevention and treatment of fracture.
- 7.3 Health professionals and people at risk of osteoporosis need to be aware of the problem and have access to diagnostic services, particularly bone densitometry, and treatment advice.
- 7.4 Resources for this are inadequate in many areas of the UK, and in consequence many people at high risk of osteoporosis eg people with Colles fracture and those receiving glucocorticoids are not receiving appropriate advice and treatment. Further research is needed to determine the optimum treatment of elderly people with hip fracture.
- 7.5 Certain sectors of the population, notably South Asian women and those who are elderly, infirm and/or in institutional care with limited sunlight exposure are also particularly vulnerable to metabolic bone disease with increased risk of fracture and hence warrant screening for these.

Introduction

- 7.6 Osteoporosis is defined as a progressive systemic skeletal disease characterised by low bone mass and microarchitectural deterioration of bone tissue, with a consequent increase in bone fragility and susceptibility to fracture¹. There are no symptoms until fracture occurs. Typically wrist (Colles) or hip fractures occur after relatively low trauma, eg a fall from standing height or less. Vertebral fractures may occur insidiously, with only one third of patients coming to medical attention at the time of fracture due to pain². The incidence of other fractures, particularly humerus, pelvic and rib fractures may also be increased in people with osteoporosis³.
- 7.7 Asymptomatic people with osteoporosis may be identified before fracture by measuring their bone mineral density (BMD) by a variety of techniques, the most reliable of which is dual energy X-Ray absorptiometry (DXA), which measures BMD at the lumbar spine and hip, both potential fracture sites. However, measurements of BMD can only predict the risk of fracture, which increases as BMD decreases, and fractures may occur in people with normal BMD. Other factors, such as risk of falling are also important⁴. As the occurrence of one osteoporotic fracture predicts further fractures, people with osteoporosis may be identified and treated after their first fracture, commonly a Colles fracture.

The impact of Osteoporosis

- 7.8 This is considerable. It can be considered in terms of the morbidity and mortality of the individual and of the economic cost to society. For the person with osteoporosis, hip fracture has the most serious consequences with an increased risk of death of 10-20% in the first year⁵. Mortality is

higher in men⁶. As this fracture occurs mainly in frail elderly individuals who fall, much of this excess mortality may reflect the poor state of health leading to fracture. However, survivors are more dependent, and of those previously able to walk, 50% have reduced ability to walk independently. Approximately half of survivors require long term care or help with activities of daily living^{7,8}. Vertebral fractures cause both acute and chronic pain, kyphosis and height loss, and have an increased mortality which to some extent is associated with underlying chronic disease, and affect physical function, body image and self esteem⁷. Wrist fractures interfere considerably with work and domestic activities and may make the difference between independent living and temporary care in an elderly person already having functional difficulties.

- 7.9 Osteoporosis is very common, more so in women than men. The lifetime risk of hip fracture is approximately one in six for white women, similar to the risks of clinically apparent vertebral fracture and wrist fracture^{7,9}. The cost of medical and social care of osteoporotic fractures in the United Kingdom has been estimated as £1.7 billion per year¹⁰.

Prevention of Osteoporosis

Population prevention

- 7.10 The risk of osteoporotic fracture is determined by the amount of bone at adulthood (peak bone mass), the rate at which it is lost through the menopause and old age, the quality of bone mineralisation, and the risk of falls which increase with age. Seventy-eight per cent of bone mass is genetically determined and the rest may be influenced by environmental factors such as diet, in particular calcium intake, and exercise¹¹. Adequate vitamin D to maintain bone mineralisation is important, particularly in housebound elderly people and those of South Asian origin¹².
- 7.11 Whilst there is good evidence that high dietary calcium intake and exercise in growth and adolescence is beneficial to the skeleton, it is difficult to prove that this will prevent children having fragility fractures when they reach old age. Exercise in adulthood has only a small effect on bone mass and the effect is lost when exercise ceases¹³. Exercise in elderly people may improve muscle strength and co-ordination and reduce the risk of falls without much benefit to bone mineral density¹⁴. Fall prevention programmes have in some cases been successful in reducing the amount of falls, but as only a small percentage of falls result in fracture, effects on fracture rate are less easy to show¹³. Hip protectors in elderly people at risk of falling reduce the incidence of hip fracture if worn¹⁵ but compliance is poor and the cost is approximately £40 per pair, with at least three pairs per user required to allow for washing. There is good evidence that calcium and vitamin D supplementation in institutionalised elderly people helps prevent fracture¹⁶. A recent study of oral vitamin D supplementation given once every four months in community living people over the age of 65 showed a 30% reduction in osteoporotic fracture¹⁷. The intervention was safe and cheap but required 250 people to be treated for one year for every fracture prevented.
- 7.12 The widespread use of hormone replacement therapy (HRT) at the menopause to reduce post-menopausal bone loss and the risk of future fracture has been advocated in the past, but uptake has been poor. Recent studies have shown a small but significantly increased risk of coronary heart disease and stroke, as well as the previously known increases in risk of breast cancer and thrombosis¹⁸ and the use of HRT for the prevention and treatment of osteoporosis is no longer routinely recommended.
- 7.13 Population screening by BMD measurements at present is not recommended as although these measurements have high specificity, sensitivity is low and could not be justified in terms of cost effectiveness⁹.

Targeting the individual at risk

- 7.14 Risk factors for osteoporosis are well established and indications for bone densitometry (DXA) have been produced by the Royal College of Physicians (Table 7.1). However, the physician who may be assessing the individual for other reasons needs to be alert to the possibility of osteoporosis and needs access to bone densitometry. At present access to bone densitometry is inadequate in the United Kingdom. However, not all individuals with risk factors or fractures require densitometry. For example an elderly person with multiple vertebral fractures should be offered treatment irrespective of BMD measurement.

Table 7.1⁹

Risk factors providing indications for the diagnostic use of bone densitometry

Presence of Strong risk factors	
Oestrogen deficiency	Premature menopause (age <45 years) Prolonged secondary amenorrhoea (>1year) Primary hypogandism
Corticosteroid therapy	
Maternal family history of hip fracture	
Low body mass index	
Other disorders associated with osteoporosis	Anorexia nervosa Malabsorption syndromes Primary hyperparathyroidism Post-transplantation Chronic renal failure Hyperthyroidism Prolonged immobilisation* Cushing's syndrome
Radiographic evidence of osteopenia and/or vertebral deformity	
Previous fragility fracture, particularly of the hip, spine or wrist	
Loss of height, thoracic kyphosis (after radiographic confirmation of vertebral deformities)	

* the working party considers that any persistent mobility problem sufficiently severe to hamper outdoor walking should be included here

Glucocorticoid Induced Osteoporosis

- 7.15 New guidelines on the assessment and treatment of glucocorticoid (corticosteroid) induced osteoporosis have recently been published by the Royal College of Physicians, in association with the Bone and Tooth and National Osteoporosis Societies and are summarised in Table 7.2¹⁹.

Table 7.2

Summary of Guidelines for the treatment of glucocorticoid (corticosteroid) induced osteoporosis

(i) Individuals at high risk of fracture eg those aged 65 years or over and those with a previous fragility fracture should be advised to start bone protective treatment at the time of starting glucocorticoids.

(ii) Bone densitometry (DXA) should be considered in people under 65 years of age without a previous fragility fracture where oral glucocorticoid treatment is planned for 3 months or more, and bone protective treatment should be considered in people with a T-score of -1.5 or lower on densitometry.

(iii) Individuals with a T-score above 0 may be reassured and advised about lifestyle. Monitoring by DXA is not indicated unless glucocorticoid doses are very high.

(iv) Individuals with a T score of 0 to -1.5 require monitoring by DXA at intervals of 1-3 years if glucocorticoids continue.

(v) Investigation and treatment of people with fragility fractures occurring during glucocorticoid treatment is recommended.

(vi) A number of treatments have been used for the prevention and treatment of glucocorticoid induced osteoporosis. Alendronate, cyclical etidronate and risedronate are licensed for this indication. Calcium and Vitamin D are generally regarded as adjuncts to treatment.

- 7.16 The use of glucocorticoids is widespread, with a prevalence of 1% of the adult population, and is associated with rapid loss of bone mineral density, greatest in the first year of treatment, and a dose dependent increase in the risk of fracture. Even modest doses of prednisolone of between 2.5-7.5mg per day may double the risk of hip and vertebral fracture. Epidemiological data suggest that the vast majority of glucocorticoid treated individuals have not been assessed for osteoporosis risk or treated for fracture prevention.
- 7.17 It is recommended that healthcare commissioners ensure adequate resources are available for the full implementation of these guidelines in primary and secondary care. Funding will be required in primary care to provide the resources for the identification and management of patients at risk. Provision of bone densitometry services (DXA) is currently inadequate to enable implementation of the guidelines in all parts of the UK and it is recommended these resources are increased¹⁹.

Treatment of Osteoporosis

- 7.18 This can be divided into the treatment of the fracture and its consequences and the reduction of risk of future fracture.

Hip fracture

- 7.19 The management of hip fracture generally involves pain relief, surgical fixation and rehabilitation. Recovery may be complicated by coexistent medical problems. Attention to nutritional state is important²⁰. Studies on prevention of further fracture in elderly people with hip fracture have not been performed. Ideally each person should be assessed individually for risk factors for both osteoporosis and falls, investigated where appropriate and given advice, tailored to their needs, on calcium and vitamin D intake, physical exercise and hip protectors. For some people bisphosphonates or HRT may be appropriate and routine calcium and vitamin D supplementation in all people should be considered where intake is low. Studies of efficacy and cost effectiveness however, have not yet been done, and further research is needed.

Vertebral fractures

- 7.20 People with vertebral fracture require pain relief, physiotherapy and postural advice, assessment for risk factors for osteoporosis or underlying disease, lifestyle advice and treatment to prevent further fracture. A number of effective drugs are available for this purpose, with good evidence for benefit²¹.

Colles fracture

- 7.21 Although this fracture is commonly associated with osteoporosis, generally investigation and assessment of people for osteoporosis after a Colles fracture is inadequate. Approximately one third of people with a Colles fracture under 66 years of age are osteoporotic, rising to two thirds over the age of 66²². Bone densitometry and appropriate investigation and treatment are recommended for this group of people as the fracture alone is not sufficient to make the diagnosis of osteoporosis. Assessment of people with Colles fracture by a specialist osteoporosis nurse in a fracture clinic, followed by bone densitometry where appropriate and recommendations for further treatment to the general practitioner, is an efficient system available to relatively few hospitals at present and would require further resources and staffing.

Recommendations

- 7.22 Each Primary Care Trust should look at their local services for osteoporosis and ensure there is adequate, co-ordinated primary and secondary care provision for osteoporosis prevention and management.
- 7.23 This should include agreed protocols for:
- indications for bone densitometry
 - assessment of osteoporosis risk following colles and other potentially osteoporotic fractures
 - assessment of osteoporosis risk in people receiving glucocorticoids
 - investigation and management of established disease.

- 7.24 Funding for appropriate local services:
- bone densitometry (DXA)
 - osteoporosis specialist nurses. The precise role of specialist nurses can be determined according to local need but the examples include:
 - assessment of osteoporosis risk in orthopaedic fracture clinic, eg colles fracture
 - secondary prevention in hip fracture
 - liaison with general practitioners
 - advice on glucocorticoid osteoporosis for hospital specialities and general practitioners.

Vitamin D deficiency and osteomalacia

- 7.25 Vitamin D₃ (cholecalciferol) is produced in the skin by the action of sunlight on its precursor, 7 - dehydrocholesterol. Dietary vitamin D (comprising both D₃ and D₂) is of secondary importance and alone is insufficient in the United Kingdom to protect against vitamin D deficiency in the absence of sunlight exposure²³. There is seasonal variation in plasma 25 (OH)₂ D levels in the United Kingdom with a nadir in the winter months²⁴.
- 7.26 Vitamin D is metabolised in the liver to 25 (OH)₂ then hydroxylated further in the kidney to the active metabolite 1,25 dihydroxy vitamin D. Renal insufficiency causes a decrease in renal 1 – hydroxylase activity and this is important in elderly people due to the age related decline in renal function²⁵ as well in people with renal disease. Vitamin D deficiency in elderly people leads to calcium malabsorption, secondary hyperparathyroidism and accelerated bone turnover, contributing to age related bone loss²⁶, and supplementation with calcium and vitamin D is generally recommended as an adjunct to osteoporosis prevention and treatment in people over the age of 65²⁷.
- 7.27 Although certain disease states eg malabsorption, alcoholic liver disease and chronic renal failure may give vitamin D deficiency and osteomalacia, the main groups at risk in the United Kingdom are elderly infirm people with inadequate exposure to sunlight and people of South Asian origin, particularly those whose traditional dress results in decreased sunlight exposure and those who are vegetarian.

Vitamin D deficiency in the elderly

- 7.28 Housebound elderly people and those living in care homes are at particular risk of vitamin D deficiency due to lack of sunlight exposure, declining renal function and dietary inadequacy. Vitamin D deficiency may lead to muscular weakness and increased risk of falling, with bone loss and impaired mineralisation contributing to the risk of fracture when the fall occurs²⁸. Approximately 10% of people with hip fracture met stringent histological criteria for osteomalacia in one study in the North of England²⁹.
- 7.29 Supplementation with 1.2g calcium and 800iu vitamin D₃ daily has been shown to reduce hip and non-vertebral fracture in elderly women³⁰ and 1g calcium and 800iu vitamin D₃ to correct biochemical vitamin D deficiency and secondary hyperparathyroidism in institutionalised elderly people³¹.

Vitamin D deficiency in people of South Asian origin

- 7.30 Vitamin D deficiency has been recognised as a problem in Asian people living in the United Kingdom for over 30 years³² and is still being reported from Hindu vegetarian populations in

Leicester³³ and London³⁴ as well as being seen regularly in clinical practice in Birmingham³⁵ and in the Muslim non-vegetarian population of West Yorkshire (personal communication).

- 7.31 Vitamin D deficiency has the potential to affect all age groups. Maternal vitamin D deficiency may affect the developing foetus and neonate. In children hypocalcaemic fits, rickets and dental enamel hypoplasia can occur and head and linear growth may be affected. Adults may have a range of problems from **Musculoskeletal** aches, myopathy and pseudo fractures. As vitamin D deficiency is common, it may co-exist with other illnesses, and as in the elderly housebound of Caucasian origin, the housebound Asian person with other illness or disability may be at increased risk. Vitamin D deficiency has been associated with a higher risk of tuberculosis³⁶ in one Asian population in London, and it is postulated that vitamin D deficiency may influence the development of other illnesses including osteoarthritis and some types of cancer^{37,38}.

Prevention of vitamin D deficiency and osteomalacia

- 7.32 There is uncertainty about the optimum dose of vitamin D for routine supplementation for elderly people³⁹. There is good evidence that 800iu vitamin D daily is safe and in conjunction with calcium 1g per day helps prevent fracture^{30,31,40}. Four monthly oral supplementation of 100,000 units of vitamin D₃ has been shown to be safe in community living elderly people in Britain⁴¹.
- 7.33 Similarly recommendations for supplements for prevention of vitamin D deficiency in South Asian people are uncertain. One author recommends all pregnant Asian women should receive vitamin D supplements of either 400iu daily from booking clinic appointment or 1000iu daily during the last trimester and all Asian infants should receive 400iu vitamin D daily³⁵.
- 7.34 The recommendations of the Committee on Medical Aspects of Food Policy⁴² is that Asian women and children in the UK should take supplementary vitamin D, and also that elderly people (over the age of 65), pregnant and lactating women and adults confined indoors of all races should receive supplementary vitamin D of 10µg/day (400iu).

Recommendations

- 7.35 Greater public and health professional awareness of the importance of vitamin D deficiency is needed.
- 7.36 Specific education programmes are needed for at risk groups:
- elderly people
 - people housebound or living in institutions due to disability
 - South Asian people living in the United Kingdom.
- 7.37 Further research is needed into:
- The optimum vitamin D requirements for different age and ethnic groups
 - The optimum mode of administration (eg daily, four monthly or annually) of vitamin D supplements
 - The formulation of cheap, convenient and palatable supplements to encourage uptake and increase compliance.

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8. Regional problems

Summary

- 8.1 This review concentrates on mechanical and degenerative spinal pain in the absence of nerve or root compression.
- 8.2 Rehabilitation begins in primary care with a holistic assessment including a physical examination, exclusion of 'red flags', employment and psychosocial assessments and the eliciting any specific fears the patient experiences.
- 8.3 There are no major differences in the management of neck or low back pain although trauma should be considered a 'red flag' for neck pain.
- 8.4 In *acute* spinal pain, advice to 'keep going' with assistance of analgesia and/or non-steroidal anti-inflammatory drugs is the mainstay of treatment.
- 8.5 For those in employment, efforts must be made to keep them at their workplace by liaison with employers and modifying the nature and duration of the working day as needed.
- 8.6 In the *sub-acute* stage, addressing psychosocial issues combined with physical approaches offer the best chance of avoiding chronicity, with formal cognitive behavioural approaches for those not responding to physical management alone, or with clear psychosocial issues.
- 8.7 For those with *intractable* back pain, evidence supports intensive rehabilitation programmes involving multi-professional physical, psychosocial, educational and vocational components. These should include; learning to function in spite of pain, cognitive behavioural therapy; and the development of physical tolerance in both fitness and vocational areas.
- 8.8 Like spinal problems, shoulder problems are very common accounting for some 5% of GP consultations. Those who have had a recent stroke are particularly vulnerable to shoulder problems on the hemiplegic side.
- 8.9 Prevention by careful positioning, lifting and handling is the key to management in the latter, in particular.
- 8.10 Many treatment options are used, including exercises, manipulation, physical modalities such as electrical stimulation, heat and ultrasound and intra-articular steroid injections. Some evidence supports the use of these treatments in specific shoulder disorders, but, generally, clinical trials have been inconclusive.
- 8.11 In the majority of cases, shoulder problems resolve. However, a significant minority have persistent shoulder dysfunction interfering with independence and ability to work. These individuals require rehabilitation to develop strategies to circumvent the shoulder problems.

Low back pain

- 8.12 Low back pain is the second most frequent cause of long-term sickness absence for much of the UK¹, particularly so for those in manual occupations². "The direct healthcare costs and the costs resulting from sick leave and early retirement due to back pain reach an annual sum which is over three times higher than the corresponding costs for all cancer diseases. Against this background, it is remarkable that research on back pain, particularly research related to prevention, pain relief, and rehabilitation is relatively limited in scope"³.

Prevention

- 8.13 Low back pain can be prevented in the workplace. Trials suggest that:
- workplace exercise is effective
 - braces and education are ineffective
 - workplace modification plus education is of unknown value⁴.
- 8.14 Although there is no evidence supporting risk factor modification for preventing low back pain (smoking cessation and weight loss), there are other reasons to recommend such interventions. Regular physical training or exercise is the only proven physical method of prevention of backpain³, and subsequent sickness absence⁵.
- 8.15 A population-based strategy of provision of positive messages about back pain improves population and general practitioner beliefs about back pain and seems to influence medical management and reduce disability and workers' compensation costs related to back pain⁶.

Management

The acute phase (0-10 days)

- 8.16 Several bodies have issued guidelines for the initial (primary care) management⁷. All recommend initial triage of patients into three groups:
- non-specific low back pain
 - back pain with nerve root (or cauda equina) compression
 - other diseases presenting as low back pain.
- and all use 'red flags' to alert clinicians to serious pathology.

Table 8.1

Red flags for risk of serious underlying pathology

Constant unremitting pain in atypical or multiple sites
 Pain unrelated to movement / posture
 (non-mechanical pain)
 Thoracic pain
 Systemic/constitutional symptoms
 Age less than 20 or over 55* with no previous similar episodes of pain
 Past history of steroid use, HIV infection or carcinoma
 Widespread neurology
 Structural deformity
 * Frequently modified to 65 in practice

From Clinical Standards Advisory Group, 1994⁸

- 8.17 For non-specific low back pain, a wide range of treatments is available, but for many of these, evidence for efficacy is limited. As part of the UK BEAM trial, optimal care from primary care physicians has been formulated and widely agreed. The so-called 'active management' incorporates into clinical practice the concepts of red flags, uses the 'Back Book'⁹ as the cornerstone of information given to patients and reinforces aggressively the advantages of keeping going and disadvantages of rest/inactivity. Bed rest should be avoided particularly in the absence of nerve root compression or other pathology. Reassurance that clicks are not harmful and that severity of pain does not equal severity of cause (serious illness) is recommended.
- 8.18 Simple questions should be used to elicit the fears many patients experience. Mostly these concern disability or its consequences. Fears of severe disease, even in secondary care, are unusual.
- 8.19 Good evidence supports the use of non-steroidal anti-inflammatory drugs (NSAIDs) and analgesics. Reasonable evidence supports the use of muscle relaxants to facilitate activity¹⁰ and use of manual therapy or manipulation in acute low back pain^{11, 12}. There is inconsistent evidence that specific exercise programmes are better than advice to simply keep active^{11, 13}. Evidence does not support the use of acupuncture¹⁴ or transcutaneous electrical nerve stimulation (TENS)¹⁵ in acute back pain. There are no studies of injections in acute low back pain in the absence of sciatica.
- 8.20 Early physiotherapy, including education and activity for acute episodes of back pain (seen within three days instead of ten) has shown that 57% of patients returned to work within ten days compared with 36% of the control group¹⁶. The risk of developing chronic pain was eight times lower for patients in the early intervention group, with only 2% remaining out of work at seven month follow-up¹⁶ compared with 15% in the other group. A study of 14,000 US postal workers using an early treatment protocol implemented if the worker was off work for more than seven days, reduced costs by 55% and days lost by 60%¹⁷.
- 8.21 Fordyce compared traditional and behavioural methods of treating acute back pain of 10 days duration or less. After 9-12 months those given more supervision and planned withdrawal of treatment (behavioural group) were 'less sick' and claimed 'less impairment' than the group able to control their own schedules of medication, activity, exercise and follow up¹⁸.

The subacute phase (10 days to 3 months)

- 8.22 Strong evidence supports multidisciplinary rehabilitation approaches and exercises⁷, manipulation and manual therapy¹³ and muscle relaxants if clear evidence of muscle spasm is found on examination¹⁰. Workplace visits increase the effectiveness of rehabilitation⁷. There is inconsistent evidence to support massage.
- 8.23 Patients attitudes and beliefs about back pain, behaviours, compensation and emotional issues can all be noted early during the subacute period^{7, 19}. Psychological factors may inhibit resolution of symptoms. These 'yellow flags' given in Table 8.2 are amenable to psychological or psychiatric intervention.
- 8.24 Delays in obtaining specialist advice contribute to non-resolution of acute/subacute back pain, increasing the risk of pain becoming intractable. This is costly for employers and the state²⁰. Multi-professional integrated programs within three months can abort this process²¹.

Table 8.2

Yellow flags for risk of chronicity in unresolved low back pain
Presence of a belief that back pain is harmful or potentially severely disabling
Fear-avoidance behaviour (avoiding a movement or activity due to misplaced anticipation of pain) and reduced activity levels
Tendency to low mood and withdrawal from social interaction
An expectation that passive treatments rather than active participation will help
Suggested questions (phrased in treatment providers own words)
Have you had time off work in the past for low back pain?
What do you understand is the cause of your back pain?
How are your employer/co-workers/family responding to your back pain?
What are you doing to cope with back pain?
Do you think you will return to work? When?
<i>From Kendall NAS et al¹⁹</i>

The chronic phase

- 8.25 Exercise regimes aim to increase range of movement, strengthen muscles, stretch tightened structures or toughen up physically and mentally. Exercises combined with behavioural methods are more effective than exercise alone at reducing sickness behaviour and getting people back to work quicker^{21,22}. Intensive outpatient physical retraining consisting of pain relief and mobilisation, increasing movement and muscle strengthening and work conditioning reduces sickness absence. In North America, health care costs were offset by savings in ‘wages loss cost’²³.
- 8.26 Manual therapy including manipulation is effective in reducing chronic pain¹³. There is inconsistent evidence to support the use of lumbar corsets²⁴.
- 8.27 Outcome is enhanced if workplace visits are performed⁷. There is no evidence that analgesia or NSAIDs give benefit beyond short-term symptom relief. There is inconsistent evidence to support the use of tricyclic antidepressants in the use of non-neurogenic back pain in the absence of depression.

Intractable back pain

- 8.28 A few patients have persisting disabling pain despite the above management. Up to 10% or more of such referrals to the secondary sector may have an underlying medical problem^{25, 26}. In the absence of an underlying disease, however, both physical and psychological factors are likely to be influencing symptoms and both aspects must be addressed.

Physical management

- 8.29 Clues that physical aspects are important lie in the pain pattern which is typically episodic and related to movement or posture. Sleep patterns are important. After checking bedding, it must be established whether sleep loss is due to insomnia, pain or depression. Unvarying pain suggests that depression may be present. If pain disturbs sleep, long-acting analgesics are needed. If the pain is post-traumatic, flashbacks and nightmares need to be excluded. Convincing evidence is lacking regarding the effects of injection therapy on low back pain²⁷.

Psychosocial management

- 8.30 There is strong evidence that cognitive behavioural therapy (CBT) has a moderate positive effect on pain intensity and small positive effects on functional status and behavioural outcomes²⁸.
- 8.31 Usually both physical and behavioural approaches are combined simultaneously^{18,21,22}. Pre-existing psychopathology is frequent in those requiring intensive rehabilitation and does not militate against a successful outcome²⁹.
- 8.32 ‘Back Schools’ may mean any programme with an educational content varying from one outpatient session to an inpatient programme. They are particularly effective in occupational settings.
- 8.33 Intensive rehabilitation programmes involve multi-professional physical, psycho-social, educational, pain management and vocational components⁷ which include learning to function in spite of pain, CBT, and developing physical tolerance in both fitness and vocational areas, eg the Helsinki³⁰, Texas³¹, Copenhagen³² and Turku³³ programmes. Such programmes embrace the concepts of:
- back school education
 - work hardening
 - sports injury approach
 - functional restoration.
- 8.34 Results may be better if the programme is inpatient³⁰.

Return to work

- 8.35 A key rehabilitation strategy addresses those factors that prevent individuals from working²⁰.
- 8.36 Employers may incorporate:
- stress management programmes
 - ergonomic practice in work
 - injury prevention programmes
 - occupational health programmes eg on-site first aid and a ‘keep working’ approach.
- 8.37 There is little evidence to support education by itself; initiatives that include participation of the workforce and organisational change are more effective⁷.
- 8.38 Co-morbidity may determine whether an individual will return to work²⁶.
- 8.39 Risk factors for chronicity and sickness absence, so-called ‘blue flags’ are:
- Job dissatisfaction, eg job demands, job content (including repetitiveness), limited control over work patterns
 - perceived lack of support from supervisor/colleagues
 - role factors (eg future career issues)
 - technology and organisational/management issues³⁴.
- 8.40 So-called ‘black flags’ are obstacles to recovery that affect all workers equally and relate to nationally established policy and working conditions eg pay rates or benefits. Local issues may include sickness policy, management style and organisational issues³⁴.
- 8.41 Although treatment has generally been evaluated for symptom control, evidence on effective ways of helping patients back into employment has recently been reviewed⁷. For those having difficulties in returning to normal activities at 4-12 weeks, changing the focus from symptomatic treatment to a Back School approach to rehabilitation can:

- expedite return to work
 - reduce chronic disability
 - reduce sickness absence.
- 8.42 Temporary provision of lighter or modified duties also facilitates return to work. Whilst such programmes can reduce sickness absence^{23, 30}, cost-effectiveness has not been established in the UK. The Canadian studies, however, showed savings in terms of:
- days lost from work
 - wage-loss benefits costs
 - total costs of treatment
 - less costly permanent disability awards and less pensions awarded to the intervention group²³.
- 8.43 Similar results were not found in Finland³³. One explanation could be that the social security background of the country concerned influences outcome. Benefits available in many European countries may remove the incentive to return to work whereas in the USA some state payments cease after a period giving a strong incentive to get back to work quickly.

Neck pain

- 8.44 Neck pain is estimated to affect up to 40% of the population each year³⁵. It may persist over 10 years and consequently may be referred to physiotherapy, rheumatology and orthopaedic departments. It is seen as the ‘poor cousin of low back pain’, has received much less attention by way of research³⁶, but has considerable economic importance. It accounts for 1% of total health care expenditure and 0.1% of the Gross Domestic Product in the Netherlands³⁷.
- 8.45 Most neck pain is mechanical/degenerative, but a substantial minority of individuals experience it following road traffic accidents and in relation to work. As with low back pain, it is triaged into:
- non-specific neck pain
 - neck pain with cord or nerve root compression
 - other diseases presenting as neck pain.
- 8.46 Trauma should be considered as an additional ‘red flag’ in view of the potential for missed fractures and psychological morbidity³⁸⁻⁴⁰. For patients referred to the secondary sector, comorbidity is a major factor, usually low back pain or another **Musculoskeletal** problem⁴⁰.
- 8.47 Few good quality randomised controlled trials of neck pain management exist^{3,36,41}. One review states “the only firm evidence is that acupuncture is not effective”³. Another³⁶ found that the only treatment for acute neck pain showing more lasting benefit than passive therapies is a home exercise programme. There is some evidence to support manual therapy or manipulation^{42,43}. It is unlikely that there is a significant difference between manipulation offered by chiropractors or physiotherapists⁴⁴.
- 8.48 Recent studies have confirmed the place of strengthening exercises⁴⁵⁻⁴⁹ with only one study not showing statistically significant improvements in pain scores⁵⁰. There is some evidence that exercises learned from a brochure without being monitored by physiotherapists are done less effectively⁵¹. No difference was shown between intensive training, physiotherapy or manipulation in a large study of patients with chronic neck pain⁵². However an active treatment programme of proprioceptive exercises, relaxation and behavioural support is superior to a home exercise programme, which in turn, is superior to advice alone⁵³. Exercises are also effective for preventing neck pain (as well as low back pain)⁵⁴.
- 8.49 In those with ‘whiplash’ neck pain (following a road traffic accident), advice to continue to ‘act as usual’ produces better outcomes than immobilisation and taking sick leave⁵⁵.

- 8.50 As with low back pain, the risk for long-term sickness absence with neck pain was lowered nine-fold with CBT when compared to information alone⁵⁶.
- 8.51 Apart from the finding that Amitriptyline and Fluoxetine are both effective in the relief of whiplash-associated pain⁵⁷, there are no data on pharmacological interventions³⁶.
- 8.52 There is some evidence that pillows that offer firm support for the neck lordosis^{58,59} or are water-based⁶⁰ are helpful. A systematic review of radiofrequency neurotomy⁶¹ concluded that there is some evidence of the efficacy in relieving facet joint pain after flexion-extension injury. There is some evidence to support electromagnetic therapy⁶².
- 8.53 There is limited evidence supporting the use of:
- ‘micro-breaks’ at work⁶³
 - Botulinum Toxin-A^{64,65}
 - Thermo-magnetic cervical bandages⁶⁶.
- 8.54 There is evidence on the lack of effectiveness of:
- neck schools in preventing neck pain
 - collars
 - low-power laser therapy.
- 8.55 Currently many services lack:
- speedy referral from primary care
 - priority of rehabilitation services in many acute trusts
 - psychological support for chronic pain services
 - multidisciplinary pain/rehabilitation programmes.
- 8.56 Well-co-ordinated services have triage policies constructed after discussion between the orthopaedic, pain, physiotherapy, psychology and rheumatology services. This ensures that those with:
- ‘red flags’ are triaged into the appropriate service
 - specific indications (eg root compression) see medical teams
 - complex chronic pain get appropriate psychological assessment and multidisciplinary therapy
 - employment difficulties are referred to the appropriate employment or charitable services and suitable liaison occurs with employers when needed.
- 8.57 Such triage should take place within three months of onset of pain.
- 8.58 Sources of further information are given in Appendix 2.

The Shoulder

- 8.59 Shoulder problems are common, accounting for 5% of all GP consultations⁶⁷ and a cumulative annual incidence of between 7 and 25 per 1000 GP consultations⁶⁸. The impact of shoulder pain and limitation in movement can be considerable, affecting personal care (particularly ability to wash and dress) as well as other aspects of lifestyle (household and work-related tasks). Amongst older people, the development of shoulder pain and stiffness may trigger the loss of independence⁶⁹.
- 8.60 The shoulder is crucial to personal independence because of the role it plays in allowing the hand to be positioned optimally for function. However, to achieve this, the shoulder must allow a huge range of movement. This relies on the interaction of several different articulations: the glenohumeral joint (GHJ); the acromioclavicular joint; the sternoclavicular joint; and the rotation of the scapula on the thoracic cage. In the GHJ in particular, this freedom of movement is achieved at the

expense of stability. The latter is provided by the surrounding soft tissues rather than bony congruity. These soft tissues may be injured by relatively minor trauma (falls, sporting injuries).

- 8.61 Following stroke associated with hemiparesis, vulnerability to damage from minor trauma may be hugely increased by a number of interacting factors. Weakness of the rotator cuff musculature may be associated with reduced (or increased) muscle tone allowing the humerus to ‘drop’ with gravity or be pulled out of its normal alignment. Movement of the hemiparetic limb may be reduced by weakness, poor coordination or reduced awareness of the hemiparetic side of the body. In these circumstances the shoulder may stiffen. Other problems associated with stroke, such as difficulty with communication may hamper the affected individual from alerting someone who is trying to help him/her to discomfort in the shoulder during, say, lifting or handling.
- 8.62 As already indicated, shoulder problems are very common throughout the population. However in those affected by stroke, over 60% are reported to develop shoulder pain within the first six months following discharge from hospital after a stroke⁷⁰. Shoulder pain delays functional recovery and affects quality of life in stroke patients⁷¹. The key to successful management in the stroke population is prevention by careful positioning and handling of the patient. Intervention with local electrical neuromuscular stimulation has been advocated, but there is inadequate evidence to judge its efficacy as a preventative strategy⁷².
- 8.63 In the majority of those presenting with shoulder pain to General Practice or Accident and Emergency Departments, the pain resolves without serious consequences. However, those with pain on elevation, rotation or lying on the shoulder require more specialist assessment, preferably in a Shoulder Clinic with access to ultrasound and/or MR imaging and surgical intervention.
- 8.64 Examination and investigation must identify other possible diagnoses: referred pain from the neck; inflammatory arthritis; polymyalgia rheumatica; referred pain from other internal organs; gross structural or neurological abnormalities affecting the shoulder including complete rotator cuff ruptures, previous fractures or dislocations. Inability to actively abduct the shoulder should raise suspicion of a serious shoulder disruption.
- 8.65 A wide array of treatments has been tried but in general, evidence has been inconclusive about their clinical and cost effectiveness.
- 8.66 Physiotherapy approaches were reviewed by van der Heijden et al⁷³. They concluded that ultrasound was ineffective and that trials of other physical treatment approaches (pulsed electromagnetic fields, laser therapy, heat and cold treatment, exercise and mobilisations) were inconclusive, usually because studies were carried out on small sample sizes and trial designs were flawed. More recently, a Cochrane review by Green et al⁷⁴ found some evidence to support the use of exercise plus mobilisation for rotator cuff disease, laser therapy for adhesive capsulitis and ultrasound for calcific tendinitis, but, like van der Heijden, commented on the poor methodology and quality of trials to investigate physiotherapy interventions.
- 8.67 Intra-articular steroid injections were thought to yield better results, but a study of 207 subjects in primary care with shoulder pain, randomised to either sub-acromial methylprednisolone (40mg) or physiotherapy (advice, active shoulder exercises 8 times 20 minutes, home exercise programme - additional manual therapy & ultrasound allowed) yielded few differences in outcome. Those assigned to physiotherapy had fewer consultations and a (non-significantly) better outcome with respect to disability at six months than those assigned to injections⁷⁵.
- 8.68 In severe impingement or tear with severe symptoms, subacromial decompression and rotator cuff repair may be indicated. Older age or large tears can give poor results. As with complete tears or possible fracture, severe impingement needs urgent referral. Irrespective of whether surgery is planned, the need for analgesia should not be under-estimated. For example, regular tramadol may be required.
- 8.69 Between 50 and 60% of those presenting with shoulder pain recover within 12-18 months⁷⁶. For the remainder, the resulting limitations and impact on lifestyle and independence need to be

recognised. Home and/or workplace adaptations can reduce the need to strain a painful and stiff shoulder and an early OT referral should be considered.

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9. Soft tissue injury

Summary

- 9.1 Soft tissue injuries are very common, accounting for 5% of Accident & Emergency (A&E) consultations and a significant proportion of General Practitioner (GP) consultations. Commonest sites of injury are the ankle (5,000 per day in UK), neck (250,000 per annum) and shoulder. Whilst spontaneous recovery is to be expected in the majority of cases, a minority will have persistent or recurrent problems leading to pain and disability, affecting work and lifestyle.
- 9.2 Initial assessment should be followed by triage into those:
- who need advice, a programme of exercises to mobilise or stabilise the affected area, and a contact point in case of further problems
 - who need specialist assessment and investigations
 - who require expert assessment to determine whether immobilisation or surgical repair is required.
- 9.3 Protection, Rest, Ice, Compression, Elevation, (PRICE) is recommended for the first 72 hours to alleviate early inflammation. However, this needs to be followed by a carefully coordinated programme of rehabilitation that encourages mobilisation and addresses risk factors (eg vulnerability to falls in the elderly), thus reducing the likelihood of chronicity.

Introduction

- 9.4 A soft tissue injury (STI) is a disruption in the structural integrity of skin, fascia, muscle, tendon or ligament that occurs due to a single instance of trauma or due to the cumulative effects of repeated micro trauma resulting in pain and functional impairment¹. Published work on STI indicates that:
- it is the most commonly sustained pathology in sport, recreation and during activities of daily living
 - such injuries account for 5% of all presentations at A&E departments
 - it impacts on persons of all ages and activity levels and presents in a wide range of ways
 - it has significant cost implications to both individuals and the state.
- 9.5 The overriding aims of STI management should be:
- to provide effective early management of the injury and thus maximise recovery of function
 - to minimise the socio-economic costs of lost working days (not necessarily paid employment) and prolonged morbidity.
- 9.6 The majority of publications in this field focus on sports-related soft tissue injury and injury following road traffic accidents (RTA). There is a paucity of literature addressing the management of children, the elderly or those sustaining a soft tissue injury during normal activities and for all groups further research is required into the long-term outcomes of interventions.

- 9.7 This chapter presents an outline of the management of soft tissue injuries. Current service delivery is discussed and the following areas are briefly considered to present a rationale for suggested changes to this:
- nature and location of the presenting condition
 - nature and timing of intervention
 - management pathways
- 9.8 The natural history of acute soft tissue injury is spontaneous recovery in most cases. A small number will need treatment to:
- promote healing
 - relieve pain
 - prevent contractures
 - rehabilitate to restore function.
- 9.9 Medical practitioners, patients and carers need to be aware of the most appropriate management and how it should be accessed. To be effective the choice of treatment and timing of intervention should be influenced by the physiological and biomechanical properties of the injured tissue during the three overlapping phases of soft tissue repair and remodelling. Inappropriate management is the biggest risk factor in sustaining a new or recurrent injury¹. Problems such as instability, proprioceptive disturbance and muscle weakness predispose an individual to recurrence¹. To ensure optimal conditions for the body's healing any underlying pathology such as osteoarthritis or predisposing factors such as recurrent falls need addressing to prevent initiating, prolonging or sustaining the inflammatory process.

Management

- 9.10 The majority of individuals will either self manage or seek medical advice from their GP or A&E department. Others will seek advice from physiotherapists, exercise specialists, osteopaths or chiropractors privately, in their place of work or sports club.
- 9.11 A number of methods for STI classification have been used to guide management. These may rely on aetiology or perceived severity², but, in practice, these may be difficult to use since they may be reliant on a pathological diagnosis which is not immediately available. However, some general principles can be used to guide management. Although the severity of the condition will largely determine initial management, this should also be influenced by:
- the characteristics (eg age) and specific needs of the subject
 - predisposing conditions
 - locally agreed protocols and management pathways
 - availability of services.

Management options

- 9.12 Where there is no functional problem it is appropriate to self-manage². Indeed, it is likely that many of these patients will not present to a medical practitioner at all and those who do present are likely to be discharged with advice.
- 9.13 This group require the following information:
- appropriate advice to progress to full function eg exercises
 - details on the nature of the condition and predicted recovery
 - when and where to seek help should the problem not resolve.

- 9.14 Information should be:
- widely accessible ie from NHS Direct, sports and leisure clubs, GP, A&E and other local services
 - available in a range of suitable formats
 - consistent
 - evidence-based
 - agreed by all those involved with patient care.
- 9.15 Those who present for medical advice following a STI which interferes with function are likely to present to their GP, A&E or an independent practitioner and will require:
- early and appropriate diagnosis and treatment
 - access to specialist care, probably in an orthopaedic or fracture clinic
 - access for further investigations and management or supervised rehabilitation as indicated.
- 9.16 Patients with severe injuries will typically present via A&E and require:
- identification of those requiring immediate tissue repair or immobilisation
 - access to an orthopaedic specialist for an assessment and intervention as indicated.
- 9.17 A range of options for intervention have been advocated once the initial problem has been managed.
- 9.18 Protection, Rest, Ice, Compression, Elevation, (PRICE) has been endorsed by the Chartered Society of Physiotherapy for use during the first 72 hours².
- 9.19 Modalities recommended for use in conjunction with PRICE include:
- non-steroidal anti-inflammatory drugs
 - electrotherapeutic modalities
 - manual therapy
 - taping
 - rehabilitation²
 - peri-articular and intra-articular injections³.
- 9.20 The therapeutic value for corticosteroid injection in certain peripheral soft tissue conditions has been shown to be good, but is associated with high rates of recurrence⁴.
- 9.21 Movement is considered to be crucial to the healing of soft tissues and should form part of treatment. Mobilisation guided by pain responses promotes return to full functional recovery. Progressive resistance exercises are helpful to restore muscle and joint function. Rehabilitation is only complete when injured and adjacent tissues are restored to full pain free functional capacity. A programme of supervised rehabilitation should address each of these factors.

Soft tissue injuries around the ankle

- 9.22 The most common STIs amongst those attending their GP or A&E department are those affecting the ankle. It is a very common injury in sport⁵. The injury can be graded I-III according to severity⁶. The outline of management is:
- assess severity of injury
 - note swelling, bruising, ability to weight bear, and signs of instability
 - determine grade of injury and most appropriate location of treatment.
 - avoid chronic ankle instability

Grade I

mild swelling, pain or tenderness
 can weight bear
 early, spontaneous recovery.

- 9.23 Those in this group are likely to self-treat if progress is clear. Those who seek advice should be given information regarding self-management, circumstances in which further help should be sought and prognosis. Persistent pain or difficulty weight-bearing should prompt seeking secondary help.

Grade II

persistent severe pain, swelling and difficulty weight bearing
 needs skilled assessment of injury.
 exclude instability and syndesmosis defect⁷
 treatment: rest, ice, compression, elevation (RICE)⁶
 may need period of protected mobilisation
 can be treated in A&E or Primary Care.

- 9.24 This group are likely to seek clinical advice and should be offered supervised rehabilitation following assessment.

Grade III

more serious symptoms with probable instability of the joint
 protected weight bearing with controlled rehabilitation
 in severe cases immobilisation or surgical stabilisation
 needs skilled hospital care by physiotherapy and orthopaedic team.

- 9.25 In general early mobilisation is the aim^{8,9}. Recurrence rates can be high^{10,11}. This can be reduced by specific care, eg physiotherapy using wobble boards to develop ankle stability¹². Up to 50% of those with ankle sprains will continue to have chronic symptoms. These will need specialist assessment and treatment. It must be hoped that better care of the initial injury, as described in the Ottawa Ankle Rules¹³ will reduce this number.

Service limitations

- 9.26 The main limitations in current services are:
- insufficient capacity to respond rapidly to the demand
 - poor dissemination of information, particularly regarding self-assessment and self-management
 - variation in clinical protocols, both between locations and between professional groups.

Conclusion

- 9.27 Although STIs are common, their management remains very variable, and outcomes are difficult to predict because of a dearth of published evidence on which to base management principles.
- 9.28 Perhaps because of their name, STIs are often regarded as innocuous and of little lasting effect. Whilst it is true that many such injuries resolve without long-term functional implications, persistence and/or recurrence of symptoms is a problem.
- 9.29 At present, NHS services are patchy in quality and overstretched, and there is a clear need for extra resources and staff training. Agreed guidelines for management of common injuries should be established and include 'red flag' warnings. There should be easy access and agreed care pathways to allow seamless care between Primary Care, A&E and the Trauma and Orthopaedic departments.

Clear information should be available to those injured, whether attending these services or self-managing.

- 9.30 Rehabilitation of injury is given much less prominence than is required for good practice. It is as important as any other aspect of care and essential in completion of all other treatments. A skilled physiotherapy service with staff acting in extended roles and in the correct locations should make a major difference to outcome^{14, 15}.

Table 9.1

Soft tissue injury classification (Kerr et al, 19982)

Degree of Severity	Pathology	Objective findings
First	The result of; mild stretch of ligament or capsular structures, over-stretch or direct blow to muscle	Minimal swelling and bruising Mild pain at the end of range of movement or on stretch or contraction of muscle. No joint instability, minimal muscle spasm and no loss of function.
Second	A tearing of some fibres as a result of: moderate stretch of ligament or capsular structures or excessive stretch or direct blow to muscle	Moderate swelling and bruising Moderate pain felt on any movement which interferes with the ability of the muscle to contract or lengthen. May be some joint instability with ligament/capsular injuries and muscle injuries. Interference with function due to the tearing of some fibres and a decrease in the tensile strength of ligament/capsule or a decrease in the contractile strength of muscle.
Third	Complete tear of the injured structure as a result of: severe overstretch, or excessive stretch or direct blow to muscle	Significant swelling and bruising with severe pain even at rest which significantly interferes with function. Ligament injuries result in gross instability and significant decrease in tensile strength, with muscle injuries causing severe muscle spasm and 'splinting', while the injured muscle is incapable of exerting force. Function is severely impaired.

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10. Other soft tissue problems

Summary

- 10.1 Hypermobility of joints is a common but often overlooked cause of rheumatic symptoms.
- 10.2 Affected individuals may require physiotherapy focussed on exercises to strengthen the muscles around the loosest joints and stabilise them. The judicious use of stabilising orthoses may also be useful to facilitate function and protect excessively mobile joints from secondary damage. Analgesics are helpful, particularly if taken before activities that strain the joints.
- 10.3 People with hypermobile joints may need vocational advice to minimise the risk of (further) joint problems at work. There is an increased prevalence of hypermobility (due to self-selection) amongst certain professional groups, notably sportsmen and women and performing artists; these may be at increased risk of soft tissue and joint injury.
- 10.4 Whilst these factors may also play a role in the development of work-related Musculoskeletal disorders, the nature of mechanical demands placed on the worker and certain work-related psychological factors certainly influence the likelihood of developing such problems. Task analysis, appropriate provision of information and support is effective in prevention and management of these work-related disorders.
- 10.5 Performance or sports placing unusual demands on posture and stamina and repetitive movements (eg during practice prior to a competition or performance) may also trigger injuries. Over-use syndromes, nerve entrapments, dystonias and spinal pain, are all seen in sports/performance related problems and early degenerative disease may occur particularly if soft tissue injury has led to joint instability.
- 10.6 Rest alone will not prevent recurrence (and may not be an acceptable option if income depends on continued performance); modification of technique and practice regimes are needed.

Joint hypermobility

Introduction

- 10.7 The range of movement at a given joint varies with a Gaussian distribution throughout the population. A small proportion at one end will have joints that are particularly 'supple'¹. They may consider themselves double-jointed. A small proportion at the opposite end will have joints that are capable of only limited movement, though since these are less susceptible to injury, this has been less well studied. Scoring systems exist to determine the extent to which hypermobility is present^{2, 3}. Generally a score of 7/9 would be regarded as abnormal in childhood, 5/9 in a younger adult and 2/9 or 3/9 would be regarded as abnormal over the age of 50³. However, such abnormal scores do not have a clear relationship to resulting disability, which in some individuals may be determined by the involvement of only one or two joints. In some with generalised hypermobility, involvement of other organs may occur (eg incompetence of the heart valves) and the recently introduced Brighton scoring system takes account of this, superseding the earlier Beighton modification of the Carter and Wilkinson scoring system⁴.
- 10.8 Perhaps of greater clinical relevance is consideration of the anatomical and physiological features that have caused joint hypermobility. These comprise the shape of the bony articulating surfaces (almost entirely inherited), the structure of the collagen that forms the joint capsule and ligaments

(in large part inherited though also subject to stretching, which is acquired), the neuromuscular tone (largely acquired though some inherited as in Down's syndrome) and, most recently recognised, joint proprioception. In any one individual several of these pathogenetic factors contribute, often at quite separate sites.

- 10.9 The majority of patients with joint hypermobility are classified as having 'benign joint hypermobility syndrome'. A small minority have more serious and usually easily identifiable inherited abnormalities of connective tissue that are sometimes associated with hypermobility such as Ehlers-Danlos syndrome, Marfan's syndrome and osteogenesis imperfecta⁵⁻⁷. These more rare conditions are outside the scope of this chapter.

Clinical features

- 10.10 The principal symptom is of pain, particularly at the lax joints and often (though not exclusively) after their use or exercise. However, patients are also aware of joint instability leading to difficult or inefficient use of the joint and rendering them susceptible to injury, so joint stabilisation is normally a second priority.
- 10.11 In the absence of adequate joint control, more serious injury may occur. Providing the collagen is not too abnormal this is likely to be a tear, perhaps of the joint capsule, leading to subluxation but eventually healing by fibrosis, though sometimes with inadequate scar formation. If the collagen is more seriously involved, subluxation will be accompanied not by a tear but by a deforming stretch of the collagen (comparable to a deflated balloon), which is less likely to heal. Sometimes bony fracture on minimal trauma occurs and recently patients with joint hypermobility have been shown to have higher incidence of osteopenia (perhaps even implying some overlap with osteogenesis imperfecta) and an increased frequency of respiratory symptoms, particularly those resembling asthma. It is not yet certain whether these problems result from collapse of collagen structures in the lung or are indicative of a more basic abnormality in endothelia, common to both conditions.
- 10.12 Hypermobile subjects often display sporting prowess, particularly for sports requiring substantial joint flexibility such as gymnastics, though it is important to control the range of movement to avoid injury and the participation of hypermobile subjects in team sports can be problematic. Joint hypermobility may also be advantageous to musicians and dancers, a topic dealt with elsewhere⁸.

Management

- 10.13 Frequently the joint laxity is not recognised by physicians as the cause of symptoms. Patients may therefore be passed from one doctor to another in search of a diagnosis. Once the diagnosis is established, reassurance should be given. The Arthritis Research Campaign provides a useful information booklet and the Hypermobility Syndrome Association has a useful and comprehensive website (www.hypermobility.org).
- 10.14 Analgesics may be helpful. The mildest should be used first, with attention to half-life since often exercise or activity causes symptoms of hypermobile joints so rational therapy is the use of an analgesic of short half-life a little time before the offending activity.
- 10.15 Paracetamol is safest and available over the counter for 'as required' dosing up to a maximum of 8 tablets/day. Compound generic analgesics such as Co-proxamol, Co-codamol and Co-dydramol (probably prescribed in that order) represent the next step. If there is a substantial inflammatory component as judged by the presence of an effusion after trauma, non-steroidal anti-inflammatory drugs of short half-life may also be used, though these carry more side effects. The risk of side effects is less if these are given by the more expensive topical formulation. Sometimes there is still a need to resort to more potent analgesics such as meptazinol or tramadol.
- 10.16 Comprehensive assessment by a physiotherapist with experience of this condition is invaluable. A variety of physiotherapy remedies have been suggested, some to relieve pain but the majority to

stabilise lax joints by increasing muscle power through the use of isometric exercises^{9, 10}. This is particularly effective with ball and socket joints such as the shoulder and hip. Occasionally a normal joint that has stiffened in compensation may need to be loosened by stretching. This is more easily accomplished than stabilisation. The recent demonstration that joint proprioception is impaired in hypermobile joints (compared to age and sex matched controls) has stimulated physiotherapy interest in methods of enhancing proprioception. This has already been shown to improve the healing of traumatic stretching injuries of the ankle joint¹¹.

- 10.17 Occupational therapy also has a role^{12, 13}. An ergonomic assessment is invaluable in keeping these patients at work, which has substantial psychological benefit. Orthoses may be appropriate at severely affected joints, particularly to stabilise them during use, though the continuous use of orthoses for longer periods may produce harmful muscle wasting. However, some joints are difficult to stabilise orthotically, particularly the shoulder where stability is so dependent on muscle strength and integrity. Upper limb orthoses or slings can be used, but compromise upper limb function to such an extent that they are seldom acceptable for longer-term use. The value of the multidisciplinary team, including nurses and psychologists, is also established in alleviating persistent intractable pain.
- 10.18 Usually these simple measures suffice but where disability is still prolonged, surgical intervention might be considered. There are a variety of operations available (eg to re-track patellae that sublux) and recently most interest has been directed in laser capsular shrinkage, currently the subject of controlled trials.

Work-related upper limb disorders

- 10.19 Work-related upper limb disorders (WRULD) have been given a number of different names including 'repetitive strain injury'. Both terms are misleading, since both imply a distinct aetiology. In fact, upper limb pain associated with impaired function, weakness, cramp and muscle tenderness for which no clear-cut diagnosis or pathology can be identified, is not related exclusively to repetitive movements or to work. Such symptoms are found in 10-20% of the general population. Increased incidences reported in industry in the 1980's and early 90's may well reflect increased awareness and litigation in this area.
- 10.20 Risk factors include mechanical factors (tasks which require a the worker to generate a high force, often in an abnormal posture, or require frequent repetition). There may well be an interplay between these and patient characteristics influencing their vulnerability to eg ligamentous injury or stretch, muscle fatigue or nerve entrapment syndromes.
- 10.21 However, as with low back pain, psychological factors have also been shown to contribute. These include need to carry out tasks which are monotonous, where the worker feels pressured, feels he/she lacks control over the character and pace of work and feels unsupported.
- 10.22 Certain principles have proved effective in industry as strategies for prevention and management. These include:
- acknowledgement of risk
 - detailed assessment of tasks
 - forewarning workers of risk situations and warning them that problems may arise particularly during the first 2 weeks of a new job
 - rapid response to any symptoms.

Musculoskeletal problems in musicians and performing artists

- 10.23 Performing artists fall prey to a variety of Musculoskeletal problems. These are not unique in themselves but result from the unusual demands that they place on the neural, muscle, tendon and

joint structures of their bodies. Epidemiological data are unfortunately lacking, due to a reluctance on the part of performers to admit to problems which could potentially jeopardise their future employability. However, figures suggest that up to three-quarters of musicians suffer from Musculoskeletal problems at some stage in their career¹⁴. Women and school-aged performers are especially affected¹⁵⁻¹⁹.

- 10.24 In musicians, problems mostly arise in the upper limbs, neck and back, and arise from the repetitive movements of playing, together with prolonged muscular effort of supporting the weight of the instrument – often in an unnatural position²⁰. Playing conditions are often cramped and poorly lit, and individual susceptibility is also determined by posture, technique, body habitus and joint laxity²¹. Any change of practice or playing habit, such as a change of instrument or playing style, may introduce unaccustomed strain on the Musculoskeletal system and result in symptoms. Stress and competition introduce a further challenge, often prompting a step-up in practice and rehearsal time.
- 10.25 In other performing artists such as ballet dancers²², cardiovascular fitness is crucial and the major demand is on the lower limbs and trunk, demanding stamina and strength. Flexibility is a key attribute so that dancers are self-selected for joint laxity, and further damage their particular soft tissues by over-stretching. Injuries to the ankle and foot are particularly common²³.
- 10.26 Both groups function in a highly competitive environment. They require precise neuromuscular control; even the slightest impairment may be sufficient to reduce their standard such that they can no longer compete with their rivals and lose their place in the ranking²⁴. The resulting loss of confidence and self-esteem further diminishes their performance, and very quickly leads to loss of livelihood. This in turn produces social, financial and emotional consequences.
- 10.27 A list of common problems experienced by musicians and performing artists is given in Table 10.1. It should be remembered that not all injuries are occupation-related. Sports-related and other injuries also occur in musicians.
- 10.28 The majority of these conditions are common in the general population. However the approach to their management needs to differ in performing artists in a number of ways.
- 10.29 While the key to over-use injuries may be rest, rest is not an option for most performing artists. The majority are self-employed – if they don't work, they can't pay the bills²¹. A compromise must be reached, and a programme of graded activity agreed upon.
- 10.30 In addition, rest by itself will not solve the problem, it is necessary to understand its causation and take active steps to avoid recurrence when activity is resumed. The clinician must either have a detailed understanding of the technical demands of that particular instrument or activity, or must work with someone (for example a teacher or trainer) who does²⁴. They must be able to observe the individual performing, identify the movements which appear to precipitate the problem (video analysis may help), and by bringing them to the attention of the individual and their teacher help them to find technical solutions.
- 10.31 Physical and occupational therapists should also have expertise in the management of performers' injuries. They should be aware of the likelihood of hypermobility and the need to retain this for functional playing. Restrictive splints are rarely useful except to support the joint in non-artistic activities.
- 10.32 Except in very unusual circumstances, surgical intervention rarely results in functional restoration and should be avoided unless clearly indicated – eg for entrapment, ganglion cysts, compartment syndromes etc.
- 10.33 In turn, the performer must understand that there is unlikely to be a magical solution to their problem. Its resolution will require their commitment and self-discipline as much as the skills of the treating clinicians.

10.34 The onset of Musculoskeletal problems has ended the career of many great musicians. Early proactive management is crucial, but even then is not always successful. Appropriate career planning from an early stage may help to develop non-performing aspects of their work which will carry them into the future when performing opportunities evade them.

Table 10.1

Common Musculoskeletal problems experienced by musicians and performing artists

Musicians

Nerve compression or compartment syndromes – due to entrapment by hypertrophied muscles or traction from unnatural playing postures

Tendinitis – due to repetitive strain injuries

Over-use syndromes – almost always accompany a change in practice regimen.

Soft tissue injury – eg rotator cuff tears in the bowing arms of string players

Osteoarthritis – degenerative change due to excessive load and wear

Focal motor dystonias – specific local disorders of movement occurring only when playing the instrument

Hypermobility – generalised and specific acquired joint laxity due to excessive traction

Spinal pain – neck and upper thoracic spine – due to posture and muscular tension

Other performing artists

Ligamentous injuries – ankle, knee, groin

Hypermobility – generalised and specific acquired joint laxity due to excessive traction

Osteoarthritis – degenerative change due to excessive load and wear

Tendinitis – due to repetitive strain injuries

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11. Fibromyalgia and complex regional pain disorders

Summary

- 11.1 Both fibromyalgia and complex regional pain syndrome (CRPS) are poorly defined conditions characterised by pain which can have a huge impact on functional independence and lifestyle.
- 11.2 In fibromyalgia pain is diffuse, particularly in and around muscles, and there is no associated inflammatory synovitis or myositis, whereas in CRPS, the affected part of the body may manifest profound physical changes including altered skin colour and swelling.
- 11.3 In both conditions, pain needs to be acknowledged. Other factors likely to interfere with symptom resolution eg compensation claims for prior injuries in CRPS, need to be identified and addressed promptly.
- 11.4 For CRPS, local treatments eg regional nerve blocks, protective and/or off-loading orthoses, may facilitate commencing rehabilitation. However cognitive behavioural therapy (CBT) combined with rehabilitation to promote independence and return to normal lifestyle are the mainstays of treatment.
- 11.5 For fibromyalgia, initial management should include patient education supplemented by physiotherapy, particularly aerobic exercise, but CBT again often plays a crucial role.
- 11.6 currently services are patchy for both conditions and management is very variable. Local agreement needs to be reached about appropriate care pathways for these patients. These are conditions where success is probably more dependent on the interest and commitment of treating clinicians than their professional background and speciality.
- 11.7 Even with a well co-ordinated approach to management, prognosis is variable. Seventy per cent success rates have been reported with some programmes for fibromyalgia but the limited population data available for both conditions suggests generally poorer outcomes both in terms of pain and function.

Complex regional pain syndrome

What is CRPS and why does it matter?

- 11.8 Complex regional pain syndrome (CRPS) is a complex and poorly-understood condition characterised by:
 - pain and altered sensation
 - motor disturbance and soft tissue change
 - vasomotor and autonomic changes and
 - psychosocial disturbance.
- 11.9 Neurological symptoms typically do not conform to any particular pattern of nerve damage. Usually, the pain is intensely unpleasant and distressing, so that it is often described in graphic images. In the acute stages the affected limb is discoloured (red or purple), shiny, swollen and excruciatingly tender to touch. This hypersensitivity results in protective guarding postures and learned disuse which quickly lead to wasting and contracture.

11.10 Many different names have been ascribed to this condition, including ‘Reflex Sympathetic Dystrophy’ and ‘Sympathetically Maintained Pain’. However, the role of the sympathetic system is not well understood, and the term ‘Complex Regional Pain Syndrome’ has been coined to emphasise the complex interaction of somatic, psychological and behavioural factors and the regional (ie non-localised) distribution of symptoms¹. The International Association for the Study of Pain (IASP) has recently attempted to develop criteria to improve the diagnosis of CRPS. However, these have not been fully validated and are still subject to debate. CRPS has certain features which set it aside from other types of chronic pain² and which have implications for management. These include:

- a history of trauma or surgery in 95% of cases¹. There is no association with severity of trauma, which is typically minor³, but there is a high frequency of compensation claims.
- a striking, if temporary, response to sympathetic blockade. In some cases this may offer a useful route initial treatment

11.11 There are strong associations with:

- loss of employment⁴
- significant life events in the year preceding onset⁵⁻⁷
- depression and/or anxiety^{4, 8-10}
- psycho-neuroticism or personality disorders^{5, 11}.

11.12 Disproportionate disability from CRPS is reported and questions about whether symptoms are genuine have been raised^{12, 13}. However, the results of treatment in compensation cases with pain dysfunction are exceedingly poor¹⁴.

Management

11.13 Bonica in the 1950s was the first to appreciate that a combined physical and psychotherapeutic approach improved outcomes in pain management. Since then interdisciplinary programmes have become accepted good practice for management of CRPS as in other chronic pain states. There have now been a large number of controlled evaluations of cognitive behavioural treatment programmes for chronic pain in general which have been subjected to meta-analysis and systematic review¹⁵⁻¹⁷. These have demonstrated clear benefits over conventional management in terms of mood¹⁵, disability¹⁷, interference with activities¹⁵ and pain behaviour^{16, 17}. Even though reduction of pain intensity is not a primary goal for these programmes, some trials nevertheless report benefits^{15, 17}. In addition, some studies report cost-benefits in terms of decreased demand for health care¹⁸ and increased return to work¹⁵.

11.14 In CRPS, local hypersensitivity and allodynia in the affected extremity frequently form barriers to physical handling, weight-bearing exercise etc. Learned disuse leads to muscle wasting and contracture formation, which further impedes active use and increases sensitivity. Approaches to consider as initial management include orthotic intervention and sympathetic nerve blockade.

Orthoses

11.15 Pressure garments may be introduced gradually as a method of protecting the affected extremity from further painful skin contact and damage. Such garments will also alleviate swelling and there is anecdotal evidence of longer term benefits for pain. These may be used in conjunction with a weight-relieving orthosis such as a patellar-tendon bearing orthosis to allow those with lower limb involvement to regain some mobility despite on-going CRPS.

Sympathetic nerve blockade

11.16 Sympathetic nerve blockade may produce striking, albeit temporary, relief of pain in a sub-group of patients and has been advocated as a way into rehabilitation, producing a window of pain relief during which it is possible to break the vicious cycle by handling the affected limb and initiating

the resumption of physical activity¹⁹. A systematic review of the efficacy of this and other pharmacological interventions was undertaken by Kingery and colleagues in 1997²⁰. Clear placebo-controlled evidence was identified to support of the use of analgesics with steroids and capsaicin.

- 11.17 There was some support for the effectiveness of intravenous regional blockade using bretylium or ketanserin, while the more commonly used guanethidine, which has been more extensively investigated, was shown to be ineffective. No placebo-controlled data was found for sympathetic ganglion blockade, surgical sympathectomy or physical therapy. The reviewers missed the point that by definition the effects of blockade are temporary, so that long term effects will occur only if they are repeated or used in association with other interventions. Their conclusions must be treated with caution, since many of the trials were small and examined pharmacological interventions in isolation, rather than as part of a rehabilitation programme.
- 11.18 Based on the evidence outlined above, the mainstay of management is through an inter-disciplinary rehabilitation programme, but pharmacological interventions may offer a useful window of relief in which to initiate them. The inter-disciplinary programme should be provided by trained professionals who have had experience in and commitment to this difficult area of work. The disciplines generally needed to support the programme are listed in Table 11.1 and principal components of the programme²¹ in Table 11.2.

Table 11.1

Professionals to support an inter-disciplinary programme

Medical staff

Consultant in rehabilitation medicine, experienced in the management of RSD and chronic pain
Pain interventionist – usually an anaesthetist, to provide pharmacological procedures

Psychology staff

Trained in cognitive behavioural approaches to pain management

Physiotherapy staff

With experience in working with chronic pain patients

Occupational therapy staff

With experience in working with chronic pain patients and vocational training

Other staff who may be involved

Vocational counsellor
Recreational therapist

Table 11.2**Components of an interdisciplinary approach**

<p>Medical management</p> <ul style="list-style-type: none"> Investigation and confirmation of diagnosis Pharmacological intervention / blockade to provide a window of pain relief Reassurance that physical and occupational therapy are safe and appropriate Provide medical follow-up to prevent cure seeking elsewhere and iatrogenic damage Support any litigation / compensation claim to its resolution and conclusion
<p>Education</p> <ul style="list-style-type: none"> How stress, emotional stress, muscle tension and de-conditioning can increase pain experience Provide insight into how their own behaviours may serve to exacerbate their pain Help patient to understand and accept a self-management approach Teach relaxation techniques, breathing exercises etc to reverse sympathetic arousal
<p>Psychology</p> <ul style="list-style-type: none"> Identify any psychological factors contributing to excessive pain and disability behaviours Treat anxiety and depression Teaching coping strategies, positive thought patterns to help them regain control and inhibit negative thoughts, catastrophising etc Identify and challenge secondary gain resulting in excessive disability behaviour Support family in encouraging individual to relinquish their sick role and do more for themselves
<p>Physical therapy</p> <ul style="list-style-type: none"> Retrain normal body posture to avoid guarding, which may lead to bizarre postures and muscle tension Desensitization – handling the affected part following by passive stretching / isometric exercise Progression to active isotonic exercise and then strength training General body re-conditioning – cardiovascular fitness Encourage recreational physical exercise and functional goals
<p>Occupational therapy</p> <ul style="list-style-type: none"> Support graded return to independence in activities of daily living with clear functional goals Adaptation of environment to encourage maximal independence Extend to social and recreational activities in and outside the home Workplace assessment / vocational re-training

Fibromyalgia

- 11.19 This chronic **Musculoskeletal** syndrome, essentially a diagnosis of exclusion, is characterised by diffuse pain, particularly in and around the muscles, in the absence of inflammatory synovitis or myositis.
- 11.20 As well as muscular pain and aching, the history may include associated features such as sleep disturbance, general fatigue, headaches, irritable bowel syndrome, depression and anxiety. Examination of the **Musculoskeletal** system elicits tenderness upon palpation of discreet anatomical locations, described as ‘pressure points’, notably around the neck, sternum, buttocks and thighs, but is otherwise unremarkable.

- 11.21 Prevalence varies between 1% and 4% of the population, 75% of the afflicted being women²². Conditions with overlapping symptomatology (eg rheumatoid arthritis, SLE, polymyalgia rheumatica) must be excluded.
- 11.22 There is limited evidence to guide the management of fibromyalgia. Investigating tender points does not seem to be helpful (Frank et al in press). Instead, a so-called 'biopsychosocial' approach to management is advocated, where:
- 'bio' refers to the use of physiotherapy, particularly aerobic exercise²³ to overcome physical deconditioning
 - 'psycho' refers to cognitive behavioural therapy to address unhelpful illness beliefs and behaviour²⁴.
 - 'social' explores the social milieu which, when adverse (eg problems with relationships, financial difficulties, etc.), compounds the situation.
- 11.23 A pain management programme²⁵ is also needed. Analgesics should be used in preference to NSAIDs. Centrally acting drugs such as tricyclic antidepressants have proved particularly effective in small dosage²⁶.
- 11.24 Prognosis should be guarded. Although the most successful programmes claim 70% improvement at 14-year follow-up²⁷, shorter studies have suggested less improvement.

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12. Environmental access

Summary

- 12.1 Poor environmental access has many consequences. It can for example, increase vulnerability to injuries through falls, create dependence, delay discharge from hospital and affect potential to return to work.
- 12.2 As indicated in the Audit commission report “Better Equipped”, statutory providers of equipment such as wheelchairs are usually under-resourced, given low priority and often poorly managed. There are also large regional variations in provision.
- 12.3 The population most frequently at risk is elderly, has other illnesses and/or disabilities as well as **Musculoskeletal** (MSK) problems and has relatively low incomes. Good sources of information (eg many OT departments, DIAL UK, RADAR, other patient support groups and the Internet) about equipment to help with environmental access exist. A range of benefits is also available. However information about benefits, etc is complex and often difficult to follow and those who develop mobility problems over 65 years are specifically excluded from the mobility component of Disability Living Allowance.
- 12.4 Examples of good practice include Disabled Living Centres (where those with mobility problems can try out different equipment and be given independent expert advice before purchase or supply), Shopmobility schemes and Driving Assessment services. The choice in many areas, eg wheelchair provision, has increased. There is also a statutory obligation to consult service users when designing a service. Legislation is also acting as a spur to change with public transport and buildings gradually becoming more accessible to those with mobility problems.
- 12.5 However, there is much untapped potential to take advantage of technological advances to promote independence and self-respect amongst those with mobility problems.

Introduction

- 12.6 Musculoskeletal problems have a high prevalence worldwide. Amongst the elderly, in particular, these problems are often compounded by co-existing pathologies, which affect stamina, balance, etc (eg angina, stroke or lower limb amputation.) All these features may hinder movement both within and outside the home, limiting independence and lifestyle. In richer countries, technological improvements in wheelchair design, or computer operated environmental controls have helped environmental access for those with MSK-related mobility problems hugely over the last 10-20 years. Such changes have been spurred on by changed attitudes to people with disabilities and progressive legislation, which demands more accessible architecture, and transport systems. However, poorer countries may have insufficient resources to afford these technologies, and even in more prosperous communities, the attitudes of society and environmental barriers still pose problems for many disabled people¹. In Britain, the following scenarios are still all too common:
- Hospital discharge delayed by environmental barriers at home or slow provision of equipment eg wheelchairs
 - Return to work is delayed or prevented due to difficulties with access
 - Environmental difficulties result in undignified or humiliating situations, for example a wheelchair dependant individual being obliged to use the goods lift to move between floors
 - Failure to allow for mobility problems leads to an individual falling or sustaining other injuries.

- 12.7 Inter-agency barriers and fragmented funding have often worked against the efficient provision of help, but the Disability Discrimination Act and the work of the Disability Rights Commission have done much to support those trying to overcome these problems.

Sources of information and advice

For individuals with Musculoskeletal conditions

- 12.8 Good quality, easily accessible information to allow informed choices is fundamental for empowering individuals and is a key principle in the Living Options report produced by the Prince of Wales Advisory Group in 1985².
- 12.9 The Internet has some excellent disability web sites³. However the sources and the quality of information they provide need to be evaluated (see below). Disabled Living Centres⁴ can provide opportunities for people with disabilities to try out equipment options with free impartial advice available and there are additional exhibitions of specialist equipment including the annual Mobility Road Show. Occupational therapy departments combine assessment with advice and information on aids and solutions. For both equipment and the wider environmental access issues people may either seek information and advice from condition specific organisations, such as Arthritis Care⁵ or the National Ankylosing Spondylosis Society⁶, or contact national 'generic disabled persons organisations, such as RADAR⁷ or DIAL UK⁸ or the British Council of Disabled people⁹ or more locally based information and advice centres.

For professional practitioners or planners of services or facilities

- 12.10 The principle of consultation with, and the involvement of disabled people is now obligatory for Social Services Departments as part of the Disabled Persons (Consultation) Act 1986. The Health Service is also embracing the principle of the participation of disabled people to assist in the planning, provision and review of services.
- 12.11 Advice and representation can be obtained via one or more of the disabled persons organisations described above or from specifically convened local or national focus groups of disabled people.

Evaluation of equipment and services

- 12.12 There is a great need to evaluate the burgeoning amount of equipment and also the statutory and other services, which provide it. Well-conducted surveys have given valuable insights into users' experiences and their views of these services^{10, 11}. Reviews of equipment safety and ease of usage are undertaken by various statutory bodies including the Medicines and Healthcare Products Regulatory Agency (MHRA)¹² and Ricability¹³ who produce excellent written reports. However the MHRA is not set up to formally evaluate efficacy of all equipment marketed; instead it often has to respond to reports of adverse events after such events have been reported.

Organisation of services providing equipment for mobility and environmental access

- 12.13 The Audit Commission in its report 'Fully Equipped'¹⁴ looked at the functioning of several statutory equipment services relevant to this document – the orthotic service, the wheelchair and seating service and the community equipment services - and pointed out their shortcomings.

Under funding, lack of audit and research and managerial neglect were found to be widespread and these issues were considered a priority for change.

- 12.14 The principles of accessibility, equity of provision, the possibility of choice, quality and value for money are often stated, but seldom fully achieved. Whilst many people purchase equipment privately this is not a realistic option for large numbers of people who are on lower income levels. The importance of appropriate guidance and advice on suitability of equipment is essential to ensure the user gets what is needed. Unfortunately the criteria for the issue of equipment can vary considerably from area to area resulting in frustration and a sense of injustice¹⁴.

Financial help/concessions

- 12.15 People with disabilities tend to have relatively lower incomes, with less capital resource and this will particularly apply to those who have been disabled since childhood or early adulthood. A number of disability related benefits and concessions exist, but unfortunately people who develop a disability at or after their 65th birthday are not eligible to apply for higher rate mobility allowance (part of the Disabled Living Allowance), thereby excluding many who would otherwise benefit.
- 12.16 In order to help people with the complexities of their applications for benefit and with Benefits Appeal Tribunals, it is important to have the support and help of a competent Welfare Rights Adviser (officer). These are usually based in Social Services Departments or in local disabled person's organisations. The major sources of statutory funding are the Independent Living Fund, housing adaptation grants, educational support grants (for example to provide an assistant at a University), and support for those in employment through the Jobcentre Plus network. Occupational therapy departments, Social Services, relevant governmental departments, disabled persons' organisations (both local and national) and Citizens' Advice Bureaus should also be able to help identify alternative sources of funding eg charitable trusts, pension funds etc. Some benefits, such as higher rate mobility allowance, carry with them significant concessions. In Britain these include exemption from vehicle excise duty (car tax), concessionary parking¹⁵ and entitlement to a Disabled persons' parking badge. The latter has now been standardised across Europe as the 'blue badge'.

Provision of mobility aids and simple housing adaptations

- 12.17 Simple aids may be provided from a variety of sources, for example walking aids from physiotherapy departments, aids for daily living from Social Services Departments, local equipment stores and in some occupational therapy departments. Equipment can be privately purchased from local retail outlets, via mail order or sometimes direct from the manufacturer. When there is any question of housing adaptation, even if simple, eg fixing rails, it is sensible to seek the advice of an occupational therapist, who will know the regulations and local procedures. It is also best to seek the agreement of the landlord if one is involved! Unfortunately the provision of equipment and the assessment of need for equipment by the various statutory authorities can be a confusing process for disabled people and their advisors. In some parts of the UK, an assessment is no longer required for straightforward equipment such as bath aids. Where this has been adopted, equipment supply has speeded up. The recent integration of hospital and community equipment provision (joint budgets and loans) has also helped simplify processes.

Supplying more expensive equipment and major structural adaptations/modifications

- 12.18 In the majority of instances stairs are the greatest immediate obstacle to a person's mobility within the home, particularly in the absence of a downstairs toilet¹⁶. A range of options to improve access between floors exist. Re-housing in single level accommodation is often the simplest option.

However, this is not always feasible or desirable; a move may separate the disabled person from family, friends and informal carers. In such circumstances, a stair lift or through floor lift may be a satisfactory alternative. In extreme disability, for example with the most destructive forms of inflammatory arthritis or when such arthritis has been complicated by cervical myelopathy, hoisting systems, specialised beds and specialised washing facilities together with structural modifications may be necessary. These are likely to require major grants. The advice of an occupational therapist and an architect (often accessible through social services) on structural considerations, building regulations and general feasibility is essential. Such solutions need to be acceptable to the disabled individual and the owner of the property.

Wheelchairs

- 12.19 People with MSKD other than severe inflammatory arthritis are on the whole not as extensive users of wheelchairs as those with paralyzing neurological conditions. The former tend to confine use to outdoors on an intermittent basis. A small minority of people with severe arthritis will be dependent upon electrically powered wheelchairs for indoor and outdoor use when for example, severe lower limb arthritis is associated with severe upper limb involvement especially of the hands and shoulder. When people experience difficulty propelling a wheelchair, the early provision of an electrically powered chair is appropriate and modification to the controls may be necessary to suit arthritic hands. Bossingham and Russell (1980)¹⁷ showed that electrically powered wheelchairs are well used by people with advanced inflammatory arthritis provided there has been good assessment and appropriate prescription. An extensive range of wheelchairs is available for private purchase. A more limited range is available through local wheelchair services, although NHS voucher schemes are now available to provide some funding towards a wider choice.
- 12.20 Some outdoor electric chairs/scooters are capable of travelling up to 8 mph (class 3 vehicle), although only 4 mph is permitted on the pavement. Wheelchairs and scooters are now increasingly seen as a symbol of mobility rather than one of disability with many people seeing an electric scooter, whether three or four wheeled, as a socially acceptable method of transportation when mobility is severely limited. This development has been greatly facilitated by the recent spread of Shop Mobility schemes within shopping centres/areas.
- 12.21 Where a person wishes to purchase such a vehicle it can be helpful to refer to some specific publications such as 'How to Choose a Powered Vehicle'¹⁸ or 'Get Wheelchair Wise – A Guide to Public Transport'¹⁹. Independent assessment of the individual's requirements is highly recommended and can be undertaken either at DLCs or by member Centres of the Forum of Mobility Centres²⁰.

Independent private car mobility (drivers and passengers)

- 12.22 For much of the population a car is the preferred means of transport and car usage continues to rise²¹. For people with MSKD, the benefits of car usage need to be weighed against the potential difficulties getting into and out of a car and using its controls.
- 12.23 Driving safety is not usually an issue and the DVLA usually does not consider that 'arthritis' per se is a notifiable condition. However where a person's MSKD compromises vehicle control and therefore potential safety and/or when modified controls are required to drive, eg a left foot accelerator, the DVLA does need to be notified²². Patients with rheumatoid arthritis frequently choose not to drive during periods of exacerbation of their arthritis or following joint replacement and there is good reason to support this approach²³.
- 12.24 Those with established RA may have particular difficulties getting in and out of vehicles (hips and knees), using the ignition key, reaching up for and doing up seatbelts (shoulders and hands),

releasing parking brake inhibitor buttons (thumbs) or reversing and parking (many joints including the neck)²³⁻²⁵. An unstable rheumatoid neck may present a particular hazard for an affected driver or passenger if the vehicle they are travelling in is subjected to a rear end impact. It is difficult to be completely reassuring, but head restraints are mandatory in combination with a seat belt and firm supportive cervical collars may offer some protection²⁶.

- 12.25 Basic advice on aids for driving (including seats and restraints) and appropriate leaflets may be available from local occupational therapists and physiotherapists, but a good additional source of advice is one of the members of the Forum of Mobility Centres²⁰. The Disability and Inclusion Unit of the Department for Transport (DFT)²⁷, Resources Centres⁴, disabled persons' motoring organisations, car conversion specialists or Motability (if the individual is a customer) can be very helpful. *However it has to be emphasised that people do need to try vehicles and equipment for themselves before purchase.*
- 12.26 Often people with arthritis try to solve their problems themselves with varying degrees of success²³. Most people with major arthritis are likely to benefit from a vehicle with standard factory fitted power assisted steering, although sometimes this can be further lightened to make steering even easier. Additionally many will benefit from automatic transmission. In general the aids required to help with driving are relatively inexpensive and easily available. When people experience major difficulties operating car controls, or getting in and out, or with wheelchair or scooter stowage a specialist assessment is recommended.
- 12.27 The Motability Vehicle Leasing or hire purchasing schemes are widely used by people with arthritis, who are eligible if in receipt of higher rate Mobility Allowance for a minimum of three years. On the whole the leasing scheme is used more often as it provides the individual with inclusive insurance and car maintenance together with vehicle replacement after three years in return for the weekly contribution of their Mobility Allowance and an initial deposit²⁸.

Use of public transport, community transport and taxis

- 12.28 As stated above people with arthritis use public transport infrequently and there is a marked preference for saloon car taxis rather than the Black Cab wheelchair accessible taxis²³. Where available social car schemes and community transport, which provide a door-to-door delivery service but have to be booked in advance, can be useful options. Buses are often hazardous to people with arthritis, who may have difficulty holding on with arthritic upper limbs. Through the work of the DFT's Mobility and Inclusion Unit (who have responsibility for ensuring that public transport is accessible to disabled users - this is a requirement of the Disability Discrimination Act), there are now greater numbers of low floor buses with spaces for passengers in wheel chairs manned by drivers who have received training to improve their awareness of the needs of their disabled passengers. Similar work is ongoing to improve access and facilities on trains. Tripscope²⁹ is an excellent information resource about a wide range of travel issues either at home or abroad. Additionally the Ricability booklet 'wheels within wheels'³⁰ gives a great deal of very useful information on all aspects of using a wheel chair on public transport and on the phasing in of transport related regulations consequent upon the Disability Discrimination Act.

Access in public places

- 12.29 Wheelchair access to public buildings continues to improve, but may be extremely difficult in older establishments. Shop mobility schemes and parking concessions, in addition to drop kerbs, make it much easier for disabled people to use town centres, but sensory pavements can be very uncomfortable for people with arthritic feet. The RADAR key is an invaluable asset for any disabled person wishing to use disabled toilet facilities. These keys can be obtained (there is often a small fee) from local council or from RADAR⁷. It is important that local communities have their

own access group who can report on the local difficulties for disabled people and influence planners and statutory authorities.

Access for employment

- 12.30 At an early stage in a Musculoskeletal illness discussions between a person and his/her employer (and occupational health service if available) may help through job modification or rotation of tasks at work³¹. This approach is more likely to achieve job-retention than a prolonged period of sick leave, followed by a return to an unchanged job. Indeed, those who remain off work for more than six months (and hence receive Incapacity Benefit) are much less likely to return to work³¹.
- 12.31 Current government support for those with physical or emotional difficulties is summarized in 'Pathways to work'³³. If no occupational health service is available, as is usually the case in smaller companies, those who have difficulties in remaining in work or who are already unemployed should contact the local Jobcentre plus. Personal Advisers and Disability Employment Advisers are available there to provide personal advice and practical help and support. State assistance is often available in terms of help with getting to work, funding for modifications to equipment or other capital expenditure, and towards becoming self employed³³.
- 12.32 Arthritis Care can also give useful information³⁴, as may local charities such as local disabled peoples organisations³⁵.

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5. Arthritis Care/Young Arthritis Care, 18 Stephenson Way, London NW1 2HD. Free phone help line 0800 289170.
6. National Ankylosing Spondylitis Society, 3 Grosvenor Crescent, London SW1X 7ER. Tel. 0171 2359585.
7. Royal Association for Disability and Rehabilitation (RADAR), 12 City Forum, 250 City Road, London EC1V 8AC.
8. Dial UK, Park Lodge, St Catherine's Hospital, Tickhill Road, Doncaster DN4 8QN. Tel. 01302 310123.
9. British Council for Disabled People (BCODP), Litchchurch Plaza, Litchchurch Lane, Derby. Tel. 01332 295551.
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12. Medical Devices Agency – Disability Equipment Assessment Centres. Reports obtainable from – Orders Department, Room 1207, Hannibal House, Elephant and Castle, London SE1 6EQ. Email address des@medical-devices.gov.uk.

13. Research Institute for Consumers Affairs (RICA), 2 Marylebone Road, London SW1 4DF.
14. Fully Equipped. Audit Commission report obtainable from Bookpoint Limited, 39 Milton Park, Abingdon, Oxon OX14 4TD.
15. The Blue Badge Scheme, DTLR. Obtainable (free) from PO Box 236, Wetherby LS23 7NB.
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19. DFT\BHTA publication "Get wheelchair wise – A wheelchair users guide to public transport". BHTA tel (01732) 458486; web. <http://www.bhta.com>.
20. Forum of Mobility Centres c/o Benefits Agency, Post Point 6, Room GN35, Quarry House, Leeds LS2 7UA.
21. Oxlee P. Disabled people in cars – an overview in transport for disabled people. Proceedings of a conference organised by European Ministers of Transport 1989.
22. At a glance guide to current medical standards of fitness to drive, Drivers Medical Unit, DVLA, Longview Road, Morriston, Swansea SA99 1TU.
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27. Disability Policy Branch, Mobility and Inclusion Unit, DTLR, Zone 1/18, Great Minster House, 76 Marsham Street, London SW1 4DR.
28. Motability, Goodman House, Station Approach, Harlow, Essex CM20 2ET. Tel. 01279 635666.
29. Triscope, The Courtyard, Evelyn Road, London SW4 5JC.
30. Wheels within wheels – a guide to using a wheelchair on public transport – Ricability/ Department for Transport. www.ricability.org.uk; e-mail; mail@ricability.org.uk tel; 020 7427 2460
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13. APPENDICES

Appendix 1

Membership of the Working Party

Working Party Member and Affiliation	Address
Professor Howard Bird <i>British Society for Rheumatology, Arthritis Care & the Arthritis and Rheumatism Council</i>	Professor of Pharmacological Rheumatology, Clinical Pharmacology Unit, Chapel Allerton Hospital, Chapeltown Road, Leeds LS7 4SA
Mr Jiri Chand	Research Associate, MRC Health Services Research Collaboration, Department of Social Medicine, University of Bristol, Canynge Hall, Whiteladies Road, Bristol BS8 2PR
Professor Paul Dieppe	Director, MRC Health Services Research Collaboration, Department of Social Medicine, University of Bristol, Canynge Hall, Whiteladies Road, Bristol BS8 2PR
Dr Andrew Frank <i>British Society of Rehabilitation Medicine and the Pain Society</i>	Consultant in Rehabilitation and Rheumatology, Northwick Park Hospital, Watford Road, Harrow, Middlesex HA1 3UJ
Mrs Anthea Franks <i>National Osteoporosis Society</i>	C/o National Osteoporosis Society Camerton, Bath BA2 0PJ
Dr Jeffrey Graham <i>Department of Health Observer</i>	Principal Medical Officer, Department of Health, Wellington House, 133 Waterloo Road, London SE1 8UG
Dr Alison Hammond <i>College of Occupational Therapists</i>	Senior Research Therapist, Department of Rheumatology, Derbyshire Royal Infirmary, London Road, Derby DE1 2QY
Dr Lesley Hordon	Consultant Rheumatologist, Dewsbury General Hospital, Halifax Road, Dewsbury WF13 4HS
Mr Patrick Mulligan <i>British Orthopaedic Association</i>	C/o British Orthopaedic Association, 35-43 Lincolns Inn Fields, London WC2A 3PN

<p>Dr Christian Murray-Leslie <i>British Society of Rehabilitation Medicine</i></p>	<p>Consultant in Rehabilitation Medicine Derbyshire Royal Infirmary, London Road, Derby DE1 2QY</p>
<p>Dr Vera Neumann – Chair <i>British Society of Rehabilitation Medicine</i></p>	<p>Consultant/Senior Lecturer in Rehabilitation Medicine, Chapel Allerton Hospital, Chapeltown Road, Leeds LS7 4SA</p>
<p>Mrs Ceri Sedgeley <i>Chartered Society of Physiotherapy</i></p>	<p>Professional Adviser Chartered Society of Physiotherapy, Bedford Row, London WC1R 4ED</p>
<p>Professor Alan Tennant <i>Society for Research in Rehabilitation</i></p>	<p>University of Leeds, Rheumatology & Rehabilitation Research Unit, 36 Clarendon Road, Leeds LS2 9NZ</p>
<p>Reverend Graham Trice <i>Back Care</i></p>	<p>Back Care, 16 Elm Tree Road, Teddington, Middlesex TW11 8ST</p>
<p>Professor Lynne Turner-Stokes <i>British Society of Rehabilitation Medicine</i></p>	<p>Herbert Dunhill Chair of Rehabilitation Kings College London and Director, Regional Rehabilitation Unit Northwick Park Hospital, Watford Road Harrow, Middlesex HA1 3UJ</p>
<p>Dr Paul Watson <i>Pain Society</i></p>	<p>Senior Lecturer, Pain Management and Rehabilitation, University of Leicester, Department of Anaesthesia and Pain Management, Gwendolen Road, Leicester LE5 4PW</p>

Appendix 2

Useful sources of information

Organisation and address	Contact numbers/website
Arthritis Care 18 Stephenson Way London NW1 2HD	Tel: 020 7380 6500 Fax: 020 7380 6505 www.arthritiscare.org.uk
Arthritis Foundation (USA) P.O. Box 7669 Atlanta, GA 30357-0669 USA	www.arthritis.org
Arthritis and Musculoskeletal Alliance C/o British Society for Rheumatology 41 Eagle St LONDON WC1R 4LT	Tel: 020 7242 3313 Fax: 020 7242 3277
ARC (Arthritis Research Campaign) Copeman House St Mary's Court St Mary's Gate Chesterfield Derbyshire S41 7TD	Tel: 0870 850 5000 Fax: 01246 558007 www.arc.org.uk
BackCare 16 Elmtree Rd TEDDINGTON Middlesex TW11 8ST	Tel: 020 8977 5474 Fax: 020 8943 5318 www.backcare.org.uk
British Institute of Musculoskeletal Medicine 34 The Avenue Watford Herts WD17 4AH	Tel: 01923 220999 Fax: 01923 249037 www.bimm.org.uk
British Psychological Society St Andrew House 48 Princess Road East LEICESTER LE1 7DR	Tel: 0116 254 9568 Fax: 0116 247 0787 www.bps.org.uk
British Society for Rheumatology 41 Eagle Street LONDON WC1R 4TL	Tel: 020 7242 3313 Fax: 020 7242 3277 www.rheumatology.org.uk

British Society of Rehabilitation Medicine The Royal College of Physicians 11 St Andrews Place Regents Park LONDON NW1 4LE	Tel: 01992 638865 Fax: 01992 638905 www.bsrm.co.uk
The Chartered Society of Physiotherapists Dept of Professional Affairs 14 Bedford Row LONDON WC1R 4ED	Tel: 020 7242 1941 www.csp.org.uk
Employers Forum on Disability Nutmeg House 60 Gainsford Street London SE1 2NY	Tel: 020 7403 3020 Fax: 020 7403 0404 www.employers-forum.co.uk
Forum of Mobility Centres C/o Banstead Mobility Centre Damson Way Orchard Hill Queen Mary's Avenue Carshalton Surrey SM5 4NR	Tel: 020 8770 1151 e-mail: info@mobility-qe.com
Lupus UK St James House Eastern Road Romford, Essex RM1 3NH	Tel: 01708 731251 www.lupusuk.com
National Ankylosing Spondylitis Society N.A.S.S., PO Box 179, Mayfield, East Sussex, TN20 6ZL	Tel: 01435 873527 Fax: 01435 873027 E-mail: nass@nass.co.uk
National Rheumatoid Arthritis Society Briarwood House 11 College Avenue Maidenhead Berkshire SL6 6AR	Tel: 0128 670 606 www.rheumatoid.org.uk
Primary Care Rheumatology Society PO Box 42 Northallerton North Yorkshire DL7 8YG	Tel: 01609 774794 Fax: 01609 774726 www.pcrsociety.org.uk
Society for Back Pain Research C/O British Orthopaedic Association 35-43 Lincoln Inn fields LONDON WC2A 3PN	Tel: 020 7405 6507 Fax: 020 7831 2676

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