

European Action Towards Better Musculoskeletal Health

A Guide to the Prevention and Treatment of Musculoskeletal
Conditions for the Healthcare Practitioner and Policy Maker

A unified voice can make a difference



A Global Voice.
A World of Influence.



A Bone and Joint Decade Report 2005

ISBN Number for the report is ISBN 91-975284-3-9.

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The **European Action Towards Better Musculoskeletal Health** is an initiative of the Bone and Joint Decade which has been undertaken in collaboration with European League Against Rheumatism (EULAR), European Federation of National Associations of Orthopaedics and Traumatology (EFORT) & International Osteoporosis Foundation (IOF) and with experts from across Europe in the areas of rheumatology, orthopaedics, trauma, public health, health promotion and policy implementation. In addition the views of people with musculoskeletal conditions have been taken into account. The recommendations are based on a review of the evidence from existing guidelines and systematic reviews, along with expert opinion. The project has been supported by a grant from the European Community. This document is a summary of the report, and the full document with supportive evidence for the recommendations is available at:

http://europa.eu.int/comm/health/ph_projects/2000/promotion/fp_promotion_2000_frep_15_en.pdf

and

http://www.boneandjointdecade.org/news/articles/european_action_better_musc_health.pdf.



eular European League Against Rheumatism





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European Action Towards Better Musculoskeletal Health

Musculoskeletal conditions include osteoarthritis, rheumatoid arthritis, osteoporosis, low back pain, and musculoskeletal injuries such as limb fractures, sprains, and strains following accidents, sports and occupational activities. They are a major cause of morbidity in all countries across Europe and have a substantial influence on health and quality of life inflicting an enormous cost on health and social care systems¹. In Europe, an estimated 25% of adults are affected by longstanding musculoskeletal problems that limit everyday activities². With an increase in the number of older people throughout the world, along with changes in lifestyle, this burden will inevitably increase. Therefore, preventative strategies are urgently needed to reduce this burgeoning problem.

What is the burden of disease?

- Almost one-quarter of Europeans suffer some form of rheumatism or arthritis². These are the commonest chronic illnesses in Europe.
- 50% of the adult population report musculoskeletal pain for at least 1 week in the last month³.
- Musculoskeletal conditions are the 8th leading cause of disease burden across Europe and osteoarthritis and rheumatoid arthritis account for 3.5% of disability adjusted life years (DALYs) lost⁴.
- *Joint diseases* account for half of all chronic conditions in persons aged 65 and over.
- *Back pain* is the second leading cause of sick leave.
- *Fractures* related to *osteoporosis* have almost doubled in number in the last decade; it is estimated that 40% of all women over 50 years in age will suffer from an osteoporotic fracture.
- The *severe injuries* caused by traffic accidents produce a tremendous demand for preventive and restorative help.
- The impact on the individual and on society is predicted to increase dramatically with the ageing of the population and lifestyle changes, such as obesity and lack of physical activity.

The **European Action Towards Better Musculoskeletal Health** has developed evidence-based strategies to prevent musculoskeletal problems and to ensure that those people with musculoskeletal conditions enjoy a life with fair quality as independently as possible. These strategies have the potential to reduce the future burden of musculoskeletal conditions in Europe. They should be used as a guide for developing services and providing care to effectively prevent and treat musculoskeletal conditions

What is the impact on the individual?

- Musculoskeletal conditions are characterised by pain and loss of physical function that limits the person's activities and restricts their participation in society. Their impact is pervasive. Mobility and dexterity are commonly restricted with an enormous impact on a person's quality of life.
- Musculoskeletal conditions cause more functional limitations in the adult population in most welfare states than any other group of disorders⁵. They are a major cause of years lived with disability in all continents and economies. Health surveys indicate that musculoskeletal conditions cause 40% of all chronic conditions, 54% of all long-term disability, and 24% of all restricted activity days.
- In surveys carried out in Europe, the prevalence of physical disabilities due to a musculoskeletal condition has repeatedly been estimated to be 4-5% of the adult population⁶. The prevalence is higher in women, and increases strongly with age. Musculoskeletal conditions are the main cause of disability in older age groups.
- Work disability is a major consequence of these conditions for the individual. A musculoskeletal problem or condition often leads to permanent or temporary loss of work ability.



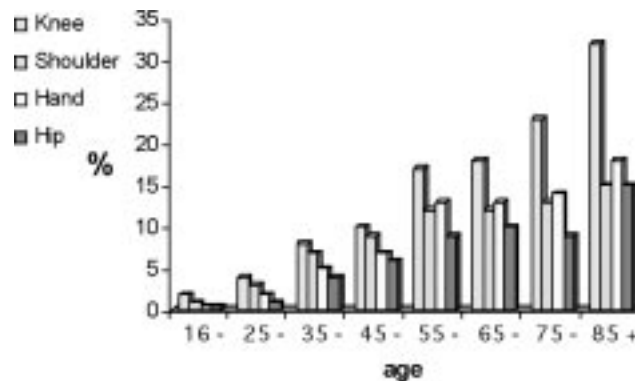
What are the costs of musculoskeletal conditions on society?

Musculoskeletal conditions have a major impact on society due to their frequency, chronicity and resultant disability. In Europe, musculoskeletal conditions have been shown to incur some of the highest costs of illness due to work disability and utilisation of health and social care resources. For example, in Sweden the cost of illness for musculoskeletal conditions represent almost a quarter of the total cost of illness, 90% of which is the indirect costs of sick leave and early retirement⁷. In the Netherlands these conditions ranked second after mental retardation as a healthcare cost⁸, accounting for 6% of total medical costs. Furthermore, it has been shown that one in five of all adults in Europe are under long-term treatment for rheumatism or arthritis and that 15-20% of primary care consultations relate to musculoskeletal problems⁹.

Musculoskeletal conditions are a major cause of work disability¹⁰. For short term sickness absence they rank second to respiratory disorders, but they are the most common cause of long term absence. They are a common cause of disability pensions. Musculoskeletal conditions were the most expensive disease category regarding work absenteeism and disablement in the Netherlands.

Prevalence of Joint Problems in General Population (UK)

The prevalence of musculoskeletal conditions reported in a postal survey demonstrates an age-related increase in both men and women¹¹



What is going to happen?

The impact on the individual and society is predicted to increase dramatically. Many of these conditions are more prevalent or have a greater impact in older age and by the year 2025 a quarter of Europe's population is predicted to be over 65 years, with the greatest increase in those over 80 years. The number of those affected by these conditions will increase markedly, in particular those affected by osteoporosis and osteoarthritis. Changes in lifestyle factors such as obesity, smoking and lack of physical activity will also greatly increase the burden of musculoskeletal conditions¹².

What are the important musculoskeletal conditions?

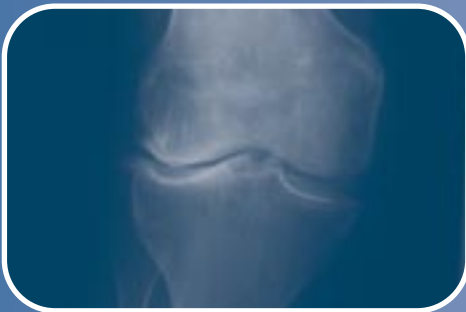
Osteoarthritis

- Osteoarthritis (OA) is the most common joint disorder and accounts for more disability among the elderly than any other disease.
- In people age 55 – 74 years osteoarthritis of the hand affects 70%, foot 40%, knee 10% and of the hip affects 3%¹³.
- Prevalence increases with age and 40% of people over 70 suffer from osteoarthritis of the knee
- Clinically it is characterised by joint pain, crepitus, and stiffness after immobility and limitation of movement.
- Osteoarthritis is a slowly progressive musculoskeletal disorder that can occur in any joint, but is most common in selected joints of the hand, the spine, and the lower limb weight-bearing joints - the hip, knee and feet.
- The condition is characterised by changes to the structure of the entire joint. There are focal areas of fibrillation, fissures, ulceration and full thickness loss of articular cartilage within synovial joints, associated with hypertrophy of bone (osteophytes and subchondral bone sclerosis) and thickening of the capsule. In this sense it is the reaction of synovial joints to injury. This pathological change, when severe, results in radiological changes of loss of joint space, subchondral sclerosis, bony cysts and osteophytes. The consequence is pain and loss of function.

- In surveys of adults with musculoskeletal problems, most of whom have osteoarthritis, over 60% report some form of activity limitation and almost 40% of those with osteoarthritis report that they need assistance from friends and relatives with daily tasks, 27% need changes to their living arrangements, 23% state they need special transport arrangements and 26% report that osteoarthritis had influenced their paid employment¹⁴.

Osteoarthritis - considerations for the future

- The burden due to osteoarthritis will significantly increase
- The population across Europe is aging which will increase the prevalence of OA and impact on individuals will increase it progresses with ageing.
- Obesity is increasing and is associated with the development and progression of osteoarthritis.
- There is a growing knowledge in the cell biology and biochemistry of the cartilage that could give new treatment possibilities in the future.
- Biochemical markers and new imaging techniques might in the future identify people at risk or in earlier stages of the disease and allow for an early intervention.
- More knowledge is however needed and the potential reduction on the burden of osteoarthritis on individuals and society is still to be shown.



Rheumatoid arthritis

- Rheumatoid arthritis is the most common inflammatory disease of the joints affecting about 0.5% of adults, women more often than men with a peak age of onset of 35-45 years¹.
- Rheumatoid arthritis usually presents with pain, stiffness and symmetrical swelling of the small joints of the hands and feet but may also any other synovial joint. Symptoms of fatigue, weight loss and malaise can occur as well. There can be systemic involvement such as vasculitis. Mortality is increased.
- It is characterised by inflammation of the synovium causing swelling, and the production of excess synovial fluid. The inflamed synovium spreads across the joint surface and leads to erosion of bone.
- It is usually progressive affecting further joints and the destructive disease process causes irreversible bony erosions and the joints become structurally deformed, with long-term pain and disability.
- Rheumatoid arthritis from its early stages can have a significant impact on patients' ability to carry out their activities of daily living and leisure. Disability increases linearly with duration.
- Rheumatoid arthritis has an early and significant impact on the person's ability to work and socio-economic status with work capacity restricted in a third within a year and within 3 years almost half 40 may be registered work disabled¹⁵. The health costs are doubled in people with rheumatoid arthritis, with the indirect costs being slightly greater than the direct costs, although the increasing use of effective but expensive biologic therapies may change this.



Rheumatoid arthritis - considerations for the future

- The incidence of rheumatoid arthritis fell between the 1960's and 1980's and this is now reflected in a fall in the prevalence in women aged 16-74 years in data from the UK
- There have been major advances in the treatment of RA in the last 20 years, in particular over the last 5 years with the introduction of biological therapies and the long-term outcome of the disease has improved and continues to do so. The socioeconomic impact should also reduce.



Back pain

- Low back pain is a major health and socioeconomic problem across Europe. The majority of back pain is due to non-specific causes, that is there is no known underlying pathology. It is usually defined as pain localised below the 12th rib and above the inferior gluteal folds, with or without leg pain.
- It is estimated that 12-30% of adults have low back pain at any time and the lifetime prevalence in European countries varies between 60% and 85%¹⁶.
- Most episodes of low back pain settle after a couple of weeks but many have a recurrent course with further acute episodes affecting 20-44% of patients within one year in the working population and lifetime recurrences of up to 85%.
- Non-specific back pain is usually classified as acute (less than 6 weeks) or subacute (up to 3 months) if they occur suddenly after a prolonged period without pain (6 months) and with a retrospective duration of less than 3 months. Non-specific back pain is classified as chronic if it occurs episodically within a 6-month period or with duration of more than 3 months.
- There are several specific causes of back pain which can be defined by the cause and need to be looked for such as degenerative conditions (e.g. herniated disc disease, spinal stenosis and degeneration of facet joints); inflammatory conditions (e.g. ankylosing spondylitis); infective causes (e.g. osteomyelitis); neoplastic causes (e.g. metastases, primary benign or malignant tumours); metabolic bone disease (e.g. vertebral fracture related to osteoporosis); referred pain (e.g. from duodenal ulcer); psychogenic pain (originating in the mind rather than the body); trauma (e.g. fractures) and congenital (e.g. severe scoliosis, spina bifida).



- Most individuals return to work within 1 week and 90% will return within 2 months, but less than 50% will return to work after 6 months off work and there is little chance of returning to work after 2 years absence¹⁷.
- Chronicity of back pain is associated with psychosocial factors, workplace factors including job dissatisfaction and unavailability of light duties, and obesity.
- The greatest cost to society is due to the few who have symptoms for over 3 months.

Back pain - considerations for the future

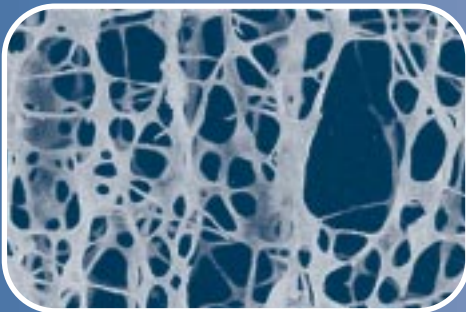
- The prevalence and incidence of low back pain appears to be moderately increasing, with a greater increase in the functional consequences, especially work disability.
- Systems of social support may affect the chronicity of the problem in some cases. The increases may also be influenced by the aging of the population along with the increasing prevalence of obesity and a sedentary lifestyle.
- Low back pain will therefore continue to be a major problem for individuals and society.
- Prevention is important and there is a theoretical potential for reduction of the problem but there is a need for studies on the effect of different interventions for primary (reducing occurrence) and secondary (reducing chronicity) prevention.

Osteoporosis

- Osteoporosis is defined as a systemic skeletal disease characterised by low bone mass and microarchitectural deterioration of bone tissue, with a consequent increase in bone fragility and susceptibility to fracture.
- The clinical manifestation of osteoporosis is fracture following low energy trauma, usually a fall.
- 21.2% of women and 6.3% of men in Sweden aged 50-84 years are osteoporotic¹⁸
- The lifetime risk of any fracture after the age of 50 years is 20% for a man and over 50% for a woman¹⁹
- Osteoporotic fractures typically affect the spine, wrist, hip, pelvis and upper arm.
- Osteoporosis and associated fractures are an important cause of mortality and morbidity.
- Vertebral fractures cause acute and chronic pain and disability. Impact on quality of life increases with number of vertebral fractures.
- Hip fractures cause up to a 20% reduction in expected survival and up to a third become totally dependent, many needing institutional care.

Osteoporosis - considerations for the future

- As populations across Europe age and become more sedentary, the number of people affected by osteoporosis and sustaining fractures will increase significantly.
- In Europe, there were an estimated 3.79 million osteoporotic fractures, of which 0.89 million were hip fractures. The total direct costs were estimated at Euro 31.7 billion which are expected to increase to Euro 76.7 billion in 2050 due to demographic changes.



Musculoskeletal trauma and injuries

There is a wide spectrum of trauma and injuries that affect the musculoskeletal system in terms of the cause, the structural damage and the outcome. In this summary document, musculoskeletal trauma and injuries are considered in the context of (a) major limb trauma, (b) occupational and (c) sports injuries.

Major limb trauma

- Major limb trauma are acute injuries to the limbs, and include fractures, dislocations, crushing injuries, open wounds, amputations and neurovascular injuries. These injuries may resulting from both intentional injuries or accidents.
- Accidents are common and injuries to the limbs may occur in 70% of them.
- The commonest cause lower limb injuries is sport accidents, whereas upper limb injuries are more often due to accidents at home.

Musculoskeletal trauma and injury - considerations for the future

- Severe trauma is a major cause of death in patients older than 65 years and many trauma centers are seeing an increase in elderly patients. These polytraumatized patients often present with significant co-morbid conditions and limited physiologic reserves. Elderly patients tend to have longer lengths of hospital stay, increased complications and poorer survival and outcomes after severe trauma compared to younger patients.
- Poor functional recoveries from severe trauma in elderly patients is much more common than in younger patients. It has been observed, that only 8% of traumatized, geriatric patients returned to their previous level of functional independence.
- Fractures are one of the most important sources of disability among the elderly trauma population and are increasing even more rapidly than the elderly population themselves. In a population-based cohort study most recent fractures were observed in the upper (30%) and the lower extremity (38%). These fractures resulted in persistent and measurable impairment of the activities of daily living or general quality of life in elderly patients. Furthermore, fractures were associated with an increased mortality.
- The impaired functional outcome among geriatric patients after fractures reflects the reduction in functional reserve with loss of muscle strength and bone density as well as reduced coordination and protective reflexes.
- Emphasis must be placed on trauma prevention (e.g. falls in the elderly) to lessen its massive socio-economic costs. Improvements in rehabilitation after trauma may lead to reduced disability and trauma.

Occupational injuries

- Occupational injuries include trauma resulting from an acute or instantaneous event (e.g., slips or falls) and musculoskeletal problems which result from small, but additive tissue damage sustained through performance of repetitive tasks.
- Musculoskeletal problems related to occupation are predominately known as cumulative trauma disorders. They are also called repetitive strain injuries [RSI], overuse syndromes, or cervical-brachial disorders.
- Repetitive strain injuries is considered to be not a diagnosis but a catch-all term for symptoms and signs, which are located in the neck, upper back, shoulder, arm, elbow, hand, wrist and fingers. The symptoms may include pain, stiffness, tingling, clumsiness, loss of co-ordination, loss of strength, skin discoloration, and temperature differences.
- Cumulative trauma disorders, which are disorders of the soft tissues and the surrounding structures, are considered to be work-related when the work environment and the performance of work contribute significantly to their development. They are therefore clearly distinguishable from classic occupational diseases such as asbestosis or silicosis, which do have a direct cause-effect relationship between a single hazard and a specific disease. musculoskeletal problems.
- Key risk factors, which have been identified for the development of occupational injuries are repetition, high force, awkward joint posture, direct pressure, vibration, and prolonged constrained posture.

Considerations for the future

- Protecting people from work-related cumulative trauma disorders poses two major challenges: firstly, specific risk factors and environments need to be identified, and secondly, appropriate modifications of work organisation, tasks, work stations, and tools need to be instituted.
- Important components of any treatment plan are a) determining the predictiveness of personal and occupational factors for the onset of cumulative trauma disorders in occupations requiring repetitive work and b) controlling and reducing those work-place risk factors encountered by the affected worker.
- Given both the social and economic impact of occupational cumulative trauma disorders and the fact that they are largely preventable, government agencies as well as all sectors of society need to be alerted in order to make the workplace a safer environment and to lessen the socio-economic costs of occupational trauma.

Sports injuries

- Sports injuries include strains, sprains, dislocations, fractures, and lacerations. These injuries cause pain, loss of function and affect quality of life. They may result in loss of training or competition or absence from work.
- The majority of sports injuries are similar to injuries that normally occur in non-athletes but they have occurred during sporting activities. Many are common to a variety of sports.
- Injuries occurring in sports and physical activities are usually mild and many are never reported. More severe injuries may either be acute, chronic or overuse injuries. They may be caused by intrinsic or extrinsic factors, either alone or in combination.
- Injuries cost society billions of euros in both direct and indirect costs.

Considerations for the future

- It is important to understand the mechanism of injury in order to prevent further injuries.
- Statistics on the incidence of sports injuries are inadequate and difficult to compare. Many of the studies on the incidence of sports injuries in a sport or group of athletes use different definitions of incidence.
- Economic costs of injuries depend on the severity of the injury, the duration and type of treatment, working and playing time lost and the permanent damage to the individual.
- Increase in exercise in unfit, poorly trained individuals will result in an increase in injuries related to sport.

What can be done to prevent musculoskeletal conditions and reduce their impact?

Recommendations by European Action Towards Better Musculoskeletal Health

Strategies have been developed which bring together the evidence-based interventions that have been identified for the different musculoskeletal conditions.

The strategies are based on a review of the evidence from existing guidelines and systematic reviews, along with the opinion of experts from across Europe in the areas of rheumatology, orthopaedics, trauma, public health, health promotion and policy implementation. In addition the views of people with musculoskeletal conditions have been taken into account.

The strategies are aimed at

- the whole population to prevent these conditions where possible
- those individuals at highest risk of developing these conditions
- those who already have these conditions to reduce the impact that they have upon them.



The strategies look for commonality of recommendations that will maintain or improve musculoskeletal health whatever the underlying condition. In addition they combine what can be achieved from evidence-based interventions with what those with musculoskeletal conditions, their carers and representatives; and health care providers want to be achieved.

The evidence for these recommendations is available in the full report at http://europa.eu.int/comm/health/ph_projects/2000/promotion/fp_promotion_2000_frep_15_en.pdf and http://www.boneandjointdecade.org/news/articles/european_action_better_musc_health.pdf.

Strategies for the whole population

Everyone is at risk of developing musculoskeletal conditions, but to reduce the enormous impact on the quality of life of individuals and socio-economic impact on society related to musculoskeletal conditions, people at all ages should be encouraged to follow a bone and joint healthy lifestyle and to avoid the specific risks related to musculoskeletal health. This means:

- Physical activity to maintain physical fitness
- Maintaining an ideal weight
- A balanced diet that meets the recommended daily allowance for calcium and vitamin D
- The avoidance of smoking
- The balanced use of alcohol and avoidance of alcohol abuse
- The promotion of accident prevention programmes for the avoidance of musculoskeletal injuries
- Health promotion at the workplace and related to sports activities for the avoidance of abnormal and overuse of the musculoskeletal system
- Greater public and individual awareness of the problems that relate to the musculoskeletal system. Good quality information on what can be done to prevent or effectively manage the conditions and the need for early assessment

These measures will improve the musculoskeletal health of the population. Their modification will also have many other health benefits, as they are risk factors for other conditions, mainly chronic, such as cardiovascular disease.

Recommendations for a Bone and Joint Healthy Lifestyle:

Physical activity

People at all ages should achieve and maintain the optimum level of physical activity and fitness within their own personal limitations.

A target for physical activity for an average sedentary adult is engaging in at least 30 minutes of physical activity of moderate intensity, such as a brisk walk, every day or on most days of the week but may need to be individualised for those who have limited mobility. Specific exercises have a role for improving activities related to the daily requirements of the individual.

Ideal body weight

People at all ages should maintain their weight so that they are within the recommended healthy body mass index (between 19 kg/m² and 25 kg/m²). (the risks of disease in all populations can increase progressively from lower BMI levels)

A balanced diet

A balanced diet is recommended at all ages that meets the recommended daily allowance for calcium (at least 800mg per day) and fish oils. This is most important during the phases of growth and development and also in the elderly. In individuals at risk of vitamin D deficiency due to insufficient exposure to ultraviolet irradiation, adequate vitamin D intake (400 IU up to 800 IU daily in the frail elderly) is recommended.

Smoking

The avoidance of smoking is recommended

Alcohol

The avoidance of excess alcohol consumption is recommended.

Accident prevention

Actions are recommended to prevention accidents, in particular related to:

- sports activities
- occupation
- participation in traffic
- fall prevention in the elderly

These may include accident prevention campaigns or be through regulations and laws.

Abnormal use and overuse of the musculoskeletal system

Abnormal use or overuse of the musculoskeletal system needs to be recognised and prevented. This includes reducing workplace exposure and correct training for occupational activities (e.g. repetitive tasks, lifting) and sports activities. In addition, structural or functional abnormalities of the musculoskeletal system (e.g. hip dysplasia in the newborn, scoliosis and foot deformities in the adolescent or malalignment of leg axis) need to be recognized early and addressed as appropriate.

Raising public and individual awareness

Raise public and individual awareness of the problems that relate to the musculoskeletal system, what can be done to prevent or manage the conditions and the need for early assessment.

Strategies for those at risk

Those at greatest risk must be identified and encouraged to take measures to reduce their risk. This should be on a background of being encouraged to follow a healthy lifestyle and to avoid the specific risks related to musculoskeletal diseases.

This requires a case finding approach for the different musculoskeletal conditions to identify those individuals most at risk who will benefit most from evidence-based interventions

Condition	Case finding strategy	Intervention recommended
Osteoarthritis	Those deemed most at risk, who include people aged 50+ years, obesity, abnormal biomechanics (e.g. identify newborns at risk of hip dysplasia), a history of joint injury, intense sporting activities or certain occupations.	For the population deemed to be at risk, there should be programmes to promote the importance of avoiding obesity, a gain in physical fitness and access to both preventative surgical interventions and rehabilitation.
Rheumatoid arthritis	Those with early inflammatory arthritis should be identified and assessed as soon as possible, as many will progress to develop rheumatoid arthritis.	People with three or more persistently inflamed joints should be assessed expertly as soon as possible, at least within 6 weeks of onset of symptoms. If diagnosed as rheumatoid arthritis, early treatment is recommended.
Back pain	All adults should be considered at risk. Back pain is very common and it is not yet possible to identify those in the community at greater risk of developing back pain with sufficient sensitivity or specificity to make any recommendations. "Yellow flags" for persistence or recurrence need to be looked for.	There should be a strategy to encourage the population to change behaviour and beliefs about back pain and on the importance of undertaking moderate exercises several times per week.
Osteoporosis	Assessment of fracture probability should be performed using risk factor profiling (e.g. older people (>65 years); men and women with strong risk factors such as untreated hypogonadism, previous low trauma fracture, glucocorticoid therapy, BMI <19 kg/m ² , maternal history of hip fracture, excess alcohol and smoking) and, where indicated, bone density assessment.	For the at risk population education and lifestyle advice should be provided, together with the correction of calcium and vitamin D deficiency and risk factor modification where possible. Case-finding strategies should be implemented to identify individuals with a high fracture probability. Interventions should be initiated for those with a high fracture probability as outlined in the next 2 sections.

Condition	Case finding strategy	Intervention recommended
Major musculoskeletal injuries	The whole population should be considered at risk, particularly those participating in traffic, high-risk occupation or leisure activities	Identification of risk factors. Create safe communities by <ul style="list-style-type: none"> • removing external risks • modifying the environment • using correct equipment • using protective equipment • education and training programs • obeying rules and regulations • maintaining physical fitness • avoiding drugs and alcohol • establishing fast and well-trained rescue chain
Occupational musculoskeletal injuries	The whole working population should be considered at risk, particularly those exposed to repetition, high force, awkward joint posture, direct pressure, vibration, prolonged constrained posture or psychological factors such as psychological demand, stress, etc.	Identification of occupational risk factors. Adaptation of work place and organisation. Participation in accident awareness and prevention campaigns. Multi-disciplinary approach to educate participants on: <ul style="list-style-type: none"> • the importance of physical and psychological fitness • the skills and techniques required by the particular work • the nutritional requirements of the events • correct clothing and protective equipment • obeying the rules
Sports injuries	The whole population that participates in physical activity or sport is at risk, particularly the physically unfit person if they try to do too much, too quickly. Participants in contact sports, where the wrong body type for the sport, the level of expertise and experience differ and the rules of the sport are not observed. In the rehabilitation phase the risk for a new injury is increased.	Identification of risk factors. Multi-disciplinary approach to educate participants on: <ul style="list-style-type: none"> • the importance of physical fitness including basic aerobic fitness • the skills and techniques required by the particular sport • the nutritional requirements of the events • correct clothing and protective equipment • obeying the rules

Strategies for those with early features of musculoskeletal conditions

Those with earliest features of a musculoskeletal condition should receive an early and appropriate assessment of the cause of their problem. Once their needs have been identified they should receive early and appropriate management and, in addition, education in the importance of self-management.

This requires methods to ensure that those who have the earliest features of the different musculoskeletal conditions are assessed by someone with the appropriate competency and that the person should have timely access to care that is appropriate to their needs.

This should be on a background of enabling people to recognise the early features of musculoskeletal conditions and to know what to do, either managing the problem themselves or knowing when to seek appropriate professional help. In addition people should be enabled to access the skills necessary to manage and take responsibility for their own condition in the long term and to be able to lead full and independent lives.

The following approaches are recommended from evidence and expert opinion for early assessment and management to achieve the best outcomes:

Condition	How to assess and manage those with the <u>earliest</u> features of a musculoskeletal condition
Osteoarthritis	<p>The strategies outlined for those at risk should be undertaken including education programs to encourage self management. This should include information on the condition, lifestyle and its treatment.</p> <p>There should be pain management including the use of topical analgesics, simple analgesics and NSAIDs.</p> <p>Normal biomechanics should be restored, including osteotomy, ligament and meniscal surgery where indicated.</p> <p>Environmental adaptations in the home and workplace and the use of aids, braces or devices should be considered.</p> <p>The use of glucosamine sulphate, chondroitin sulphate or hyaluronic acid and of I/A therapies (including corticosteroids, hyaluronic acid and tidal irrigation) should be considered.</p>

Condition **How to assess and manage those with the earliest features of a musculoskeletal condition**

Rheumatoid arthritis

For those with the early stages of rheumatoid arthritis it is important that a correct diagnosis is made by expert assessment within 6 weeks of onset of symptoms.

Disease modifying anti-rheumatic drug (DMARD) treatment should be started in addition to symptomatic therapy and rehabilitative interventions as soon the diagnosis of rheumatoid arthritis is established. The choice of treatment should take into account the presence of prognostic indicators supporting the use of more aggressive therapy. Treatment should be closely monitored to ensure ideal disease control.

There should be education programmes to encourage self management. These should include information on the condition, lifestyle and its treatment

Treatment should consider all aspects of the effect of the condition on the person.

People with rheumatoid arthritis should be enabled to participate as fully as possible through rehabilitation and modification of the work, home and leisure environment.

Back pain

There should be a strategy to encourage the population to change behaviour and beliefs about back pain and on the importance of maintaining physical activity and employment by those with acute or subacute back pain.

On a background of public awareness, health care professionals should learn to follow the appropriate guidelines which recommend staying active; avoiding bed rest; using paracetamol, NSAIDs or manual therapy and addressing “red” and “yellow” flags.

Osteoporosis

For the population with osteoporosis (BMD T score ≤ -2.5) there should be educational and lifestyle advice programmes.

For those identified as having a high risk of fracture there should be appropriate pharmacological interventions.

For older people at high risk of falling there should be in addition a falls prevention programme.

Major musculoskeletal injuries

There should be immediate accurate diagnosis and appropriate treatment on the scene.

In addition there should be stabilisation of basic life functions; systemic pain management; consideration of immobilisation, if unstable; early transportation to centre with appropriate experience and equipment.

Consider operative or non-operative stabilisation of fractures; immediate operative treatment if further deterioration is expected; adequate fluid and nutrition management; pulmonary, cardiovascular and neurological complications.

Prevent complications (infection, thrombosis, embolism, heterotopic ossifications).

Start early mobilisation and rehabilitation.

Occupational musculoskeletal injuries

There should be early accurate diagnosis and treatment.

In addition there should be pain management including systemic and topical analgesics; partial work restriction.

Consider short-term immobilisation and the use of aids, braces or devices.

Maintain physical fitness during rehabilitation.

Understand the mechanism of injury and prevent future injuries by considering adaptation work place, transferring the patient to another job or distinct job modification.

Return to work early.

Sports injuries

There should be early accurate diagnosis and treatment.

RICE - rest, ice, compression and elevation.

Pain management including systemic and topical analgesics.

Consider immobilisation, if unstable – early mobilisation, if stable; the use of aids, braces or devices; immediate operative treatment if further deterioration is expected; operative reconstruction of tendons, capsule and ligaments; operative or non-operative stabilisation of fractures.

Maintain physical fitness during rehabilitation.

Return to sport when pain free and able to carry out all skills required by the sport.

Understand the mechanism of injury and prevent future injuries.

Consider adaptation of special technique in sport.

Strategies for those with established musculoskeletal conditions

Those with a musculoskeletal condition, that is those who have pain, impairment of function, and limitation of activities and restriction of participation, should have fair opportunity of access to appropriate care which will reduce pain and the consequences of musculoskeletal conditions, with improvement in functioning, activities and participation.

Most outcomes are best achieved with good pain management, disease management and disease rehabilitation. These outcomes should be achieved in the most cost effective way possible for the appropriate environment.

This should be on a background of enabling people to recognise the early features of musculoskeletal conditions and to know what to do, either managing the problem themselves or knowing when to seek appropriate professional help. In addition people should be enabled to access the skills necessary to manage and take responsibility for their own condition in the long term and to be able to lead full and independent lives.

The following approaches are recommended from evidence and expert opinion for assessment and management to achieve the best outcomes:

Condition	Recommended management of those with <u>established</u> musculoskeletal conditions
Osteoarthritis	<p>The strategies outlined for those at risk should be undertaken including education programs to encourage self management. These should include information on the condition, lifestyle and its treatment.</p> <p>There should be pain management including the use of topical analgesics, simple analgesics and anti-inflammatory analgesics (NSAIDs).</p> <p>The use of glucosamine sulphate, chondroitin sulphate or hyaluronic acid and of I/A therapies (including corticosteroids, hyaluronic acid and tidal irrigation) should be considered.</p> <p>Normal biomechanics should be restored, including osteotomy, ligament and meniscal surgery where indicated. Joint replacement surgery should be considered for end-stage joint damage that is causing unacceptable pain or limitation of function. Surgery should be timely.</p> <p>There should be rehabilitation programmes to improve function, activities and participation. The use of aids, braces or devices should be considered. Environmental adaptations in the home and workplace should be considered.</p>

Rheumatoid arthritis

DMARD treatment should be continued in addition to symptomatic therapy and rehabilitative interventions.

Treatment should be expertly monitored to ensure ideal disease control. The choice of treatment should take into account the presence of prognostic indicators supporting the use of more aggressive therapy.

Surgery should be considered for end-stage joint damage that is causing unacceptable pain or limitation of function. Those with late stage rheumatoid arthritis may have greater surgical needs and a co-ordinated approach is required. Surgery should be timely.

Treatment should consider all aspects of the effect of the condition on the person.

There should be rehabilitation programmes and modification of the work, home and leisure environment to enable people with rheumatoid arthritis to participate as fully as possible.

Back pain

Effective treatments for subacute and chronic non-specific back pain are exercise therapy, behavioural therapy including pain management or a combination of these.

Multi-disciplinary programs should be delivered for non-specific back pain if there is no improvement with exercise or behavioural therapy. It is as yet unclear what the optimal content of these programs is.

Rehabilitation should be undertaken with consideration and involvement of the workplace.

Back pain of known cause (specific back pain) needs specific management.

Osteoporosis

For those with established osteoporosis there are a number of key strategies that depend on the severity and stage of the disease. The appropriate strategy will consist of one or a combination of the following:

- education and lifestyle advice (as above)
- analgesia when indicated
- physiotherapy when indicated
- pharmacological intervention with bone active drugs
- falls prevention programme in older people at high risk of falling
- calcium and vitamin D supplementation in frail older people
- orthopaedic management of fracture when indicated
- multi-disciplinary rehabilitation
- nutritional support
- hip protectors for frail older people in residential care or nursing homes

Major musculoskeletal injuries

Pain management including systemic and topical analgesics.

Consider definitive operative treatment, including stabilisation, reconstruction of biomechanics, arthroplasty, reattachment of limbs, amputation, and plastic surgery.

Consider definitive non-operative treatment, including use of aids, braces or devices or prosthetic devices.

Start early mobilisation and rehabilitation.

Consider reintegration into the workplace and society.

Occupational musculoskeletal injuries

Pain management including systemic and topical analgesics.

Partial work restriction.

Consider the use of aids, braces or devices.

Maintain physical fitness during the rehabilitation.

Understand the mechanism of injury and prevent future injuries by considering modification of task and work organisation, transferring the patient to another job or distinct job modification.

Return to work early.

Sports injuries

Pain management including systemic and topical analgesics.

Consider in depth diagnosis, incl. MRI, diagnostic arthroscopy etc.

Consider operative reconstruction of tendons, capsule and ligaments.

Consider operative or non-operative stabilisation of fractures.

Active rehabilitation with joint specific exercises.

Maintain physical fitness during the rehabilitation process.

Return to sport when pain free and able to carry out all skills required by the sport.

Multi-disciplinary approach for the care of athletes should involve coach, physiotherapist, physician, physiologist, psychologist, nutritionist, podiatrist and biomechanics.

Evaluate the mechanism of injury and training errors to prevent future injuries.

Based on understanding the rules, the physiological stresses and the injury mechanism consider adaptation of training and technique.

What actions must be done to prevent and effectively treat musculoskeletal problems and conditions?

Actions are necessary for the implementation of these strategies - for the whole population, for those at risk and for those with a musculoskeletal condition. These actions should be a priority.

Key actions recommended are:

- develop a comprehensive health strategy to address the determinants of musculoskeletal health. This may be at a local, national or European level. This should consider health promotion, prevention, treatment and rehabilitation of musculoskeletal conditions based on the recommendations of this report
 - put musculoskeletal conditions on the political agenda at all levels, recognising the importance of musculoskeletal health and making appropriate priorities with resources
 - give priority to research needs of musculoskeletal conditions at the European and national level to gain a better understanding of the causes of musculoskeletal conditions and their effects on people, more effective prevention and treatment and to recognise the need to evaluate the cost-effectiveness of strategies for their prevention
 - link programmes to prevent musculoskeletal problems and conditions with existing priorities and activities, such as around determinants of health, where there are opportunities for mutual benefit
 - collect data, for example as part of health interview surveys, to monitor determinants for, occurrence and impact of musculoskeletal conditions in all European states in a standardised manner. This will enable the quantification and monitoring of the scale of the problem and the effect of the implementation of any health strategies
- + Actions to implement strategies to benefit **all**:
- raise awareness of the public and of health professionals about the scale and impact of musculoskeletal conditions and of the options for prevention and treatment
 - empower people at all ages to be responsible for their own musculoskeletal health. They should understand their personal risks and know of a *bone and joint healthy lifestyle* that they can follow to reduce these risks. This should be through public health programmes, health promotion campaigns and healthy workplace programmes

- ensure that employment and disability legislation are appropriate for the maintenance of musculoskeletal health.
 - create safe communities that reduce the risk of accidents and facilitate a *bone and joint healthy lifestyle*
 - create workplaces that provide appropriate ergonomics, reduce risk of accidents and optimise psychological stress.
- + Actions to implement strategies to benefit **those at risk**:
- implement case finding approaches for the different musculoskeletal conditions aimed at identifying those individuals who are most at risk of future problems related to musculoskeletal diseases and who will benefit from evidence-based interventions
 - reduce risk factors for musculoskeletal conditions in the community
- + Actions to implement strategies to benefit those **with a musculoskeletal condition** are:
- Those with any of the different musculoskeletal conditions, at any stage from the earliest features, should be assessed and managed by someone with the appropriate competency and have timely access to care that is appropriate to their needs (equity)
 - Timely access for those with the earliest features of a musculoskeletal condition is most important to minimise the associated morbidity.
 - People should be enabled to access the skills necessary to take responsibility for their own musculoskeletal condition in the long term, make informed choices and to be able to lead full and independent lives through
 - Access to high quality information so that people can develop and maintain an informed dialogue with health and social care professionals
 - Self management programmes / expert patient groups
 - People should be enabled to participate in home, work and leisure activities through environmental adaptation, provision of services and sickness benefit regulations.
 - People should be enabled to stay at work or in education by health care, social support, education and training, and employment policies, which are linked where appropriate.
 - There should be an integrated approach to those with musculoskeletal conditions between health and social care professionals.
 - There should be appropriate education and competency of health professionals to manage musculoskeletal conditions in an evidence-based way at all levels of health care provision

What is needed to implement these strategies?

These strategies will only improve musculoskeletal health if they are actively implemented. This requires action by **all stakeholders** –from the public at risk, patients, health care and social care professionals, employers, up to national and the European political levels. Each stakeholder should consider what actions they need to take to implement these strategies and help improve musculoskeletal health across Europe – what each of us should be doing.

The Public

- ⇒ Raise children to actively participate in physical activities, have body awareness and maintain this throughout life through education, public awareness and health promotion.
- ⇒ Take responsibility to maintain your own musculoskeletal health.
- ⇒ Be aware of the need for and possibilities for prevention of musculoskeletal problems and be able to make informed choices through education.
- ⇒ Take steps to identify your individual risk and need for intervention by accessing information and other methods of risk assessment.
- ⇒ Reduce the stigma associated with musculoskeletal conditions and encourage others in the community to take early action to reduce their risk.



The Patient / Carer

- ⇒ Recognise the patient / carer potential educational role to the community by engaging with other stakeholders and relating experience.
- ⇒ Understand the concept of being a person at risk, take a responsibility to maintain your own musculoskeletal health and ensure that you have access to reliable and up-to-date information to minimise your risk of developing a musculoskeletal condition.
- ⇒ Reduce the stigma associated with musculoskeletal conditions and create a positive attitude to facilitate early presentation to the healthcare system through education and raising awareness.
- ⇒ Enable people to recognise the early features of a musculoskeletal conditions and to know what to do, either managing the problem themselves or knowing when to seek expert help.
- ⇒ Enable people to access the skills necessary to manage and take responsibility for their condition in the long term and to be able to lead full and independent lives.
- ⇒ Ensure access to high quality information so that people can develop and maintain an informed dialogue with health and social care professionals.
- ⇒ Ensure access to early assessment and management, including access to self-management courses where available.
- ⇒ Be aware of your rights and access to education, training and employment.



The Health or Social Care Professional

- ⇒ Ensure all health and social professionals are aware of the need for and possibilities for prevention, and to promote them.
- ⇒ Have an advocacy role, communicating the burden of disease to public, politicians and peers, and promoting strategies for their prevention and treatment.
- ⇒ Develop a more integrated approach between health and social care professionals and identify mutual benefits across sectors.
- ⇒ Ensure appropriate competency of health and social care professionals so that they are able to (a) recognise and advise those at risk and are (b) able to manage those with a musculoskeletal problem appropriate to their needs including recognising when they require timely and / or more expert management (triage).
- ⇒ Prioritise resources into appropriate services to improve musculoskeletal health (financial, physical and human).
- ⇒ Implement guidelines for management of musculoskeletal conditions at all stages appropriate to local population that include identification of those who need most rapid assessment and management.
- ⇒ Provide integrated, co-ordinated, seamless, multi-professional, multi-disciplinary care.
- ⇒ Establish quality assurance systems to ensure the best outcomes for those with musculoskeletal conditions.



The Employer

- ⇒ Create a good workplace that provides appropriate ergonomics, reduces the risk of accidents and minimises psychological stress.
- ⇒ Provide access to appropriate lifestyle advice and offer workplace programmes to discourage smoking and provide healthy food.
- ⇒ Offer opportunities to keep people in employment or to facilitate early return to employment through work adjustment or flexibility in working hours.
- ⇒ Timely provision of vocational and professional rehabilitation.

The National Political Level

- ⇒ Develop and implement national and regional plans / policies that
 - recognise the importance of musculoskeletal health and give appropriate priority to the improvement of musculoskeletal health that is commensurate with the burden of these conditions.
 - encourage & facilitate the implementation of this strategy, recognising political opportunities and providing necessary resources.
 - explicitly refer to musculoskeletal conditions alongside existing priorities and activities for other disease areas where there is mutual benefit such as within public health policies and initiatives for common determinants of health.
 - give priority to the need for research and for programmes to be developed that will lead to a better understanding of the causes of musculoskeletal conditions and their effects on people, and secondly the need to evaluate the cost effectiveness of strategies for their prevention.
- ⇒ Initiate data collection, for example as part of health interview surveys, to monitor determinants for, occurrence and impact of musculoskeletal conditions in a standardised manner to other European States.
- ⇒ Provide public health programmes that implement the recommended strategies, including actions to reduce known risk factors.
- ⇒ Health and safety legislation appropriate to maintaining musculoskeletal health.
- ⇒ Support cross-sectoral working - bring together policies of mutual benefit eg bringing together health, social, education, employment, transportation and housing policies
- ⇒ Initiate development and implementation of guidelines for case-finding appropriate to local population and provision of resources and incentives for the implementation of these guidelines.

- ⇒ Implement guidelines for early management of musculoskeletal conditions appropriate to the local population and provision of resources and incentives for the implementation of these guidelines.
- ⇒ Ensure health systems provide timely access to care with equity of access for the various musculoskeletal conditions where early actions will alter outcomes.
- ⇒ Develop quality assurance mechanisms for guidelines.
- ⇒ Ensure competency of providers of care, including establishing standards for education and training of health and social care professionals.
- ⇒ Develop and implement policies to keep people at work despite their musculoskeletal condition, such as flexible working arrangements, flexible benefits and appropriate social support.

The European Political Level

- ⇒ Develop and implement European plans and policies that
 - recognise the importance of musculoskeletal health
 - encourage & facilitate the implementation of this strategy
 - explicitly refer to musculoskeletal conditions alongside existing priorities and activities for other disease areas where there is mutual benefit such as within public health policies and initiatives for common determinants of health.
 - give priority to the need for research and for programmes to be developed that will lead to a better understanding of the causes of musculoskeletal conditions and their effects on people, and secondly the need to evaluate the cost effectiveness of strategies for their prevention.
- ⇒ Recognise political salience of reducing the burden of musculoskeletal conditions
- ⇒ Initiate data collection, for example as part of health interview surveys, to monitor determinants for, occurrence and impact of musculoskeletal conditions in all European States in a standardised manner.
- ⇒ Support cross-sectoral working and bring together policies of mutual benefit for musculoskeletal health eg bringing together health, social, education, transportation and housing policies.
- ⇒ Develop policies to keep people at work despite their musculoskeletal condition.
- ⇒ Encourage national implementation of guidelines for case-finding appropriate to local population.

How to make it happen

To be successful, you must be one of the champions for change.

You need to plan the implementation of these strategies if they are to achieve their goals of improving musculoskeletal health, whether for your country, region or your local health district - the principles are similar.

First identify the needs and priorities for your population– which conditions are the greatest burden? Where is management most deficient? Choose from the various strategies those which are most relevant and feasible and identify what level you need to achieve changes – the political, employer, health and social care professional, the patient and their carer and at the public level. Then develop and carry through an implementation plan following key principles the most important of which is to identify those stakeholders who will also champion change.

Principles of implementation

- Dissemination of this report's recommendations should be planned, targeted and evaluated
- Dissemination needs to be supplemented by active implementation strategies
- Identify local, regional, national and /or international champions for change
- Establish a task group to develop an implementation plan to change policies and / or clinical practice
- Set clear and specific objectives that relate to your particular needs and priorities
- Provide a rationale for action
- Identify decision makers and their stage of readiness to change
- Adopt a multifaceted approach to achieving change
- Identify opportunities for integration with existing programmes
- Think big but start small with strategies that are likely to have positive results
- Evaluate for cost and clinical effectiveness

How to evaluate the effectiveness of strategies for the prevention and treatment of musculoskeletal conditions

Evaluation of the impact of these strategies can be by considering their dissemination, their application or the actual improvement in musculoskeletal health. Indicators for monitoring musculoskeletal health have been recommended by the European Commission "Indicators for Monitoring Musculoskeletal Problems and Conditions" project available at URL: http://europa.eu.int/comm/health/ph_projects/2000/monitoring/fp_monitoring_2000_frep_01_en.pdf.

The application of these across the community in surveys and registers will enable the effect of any strategies to be measured. Although many of the recommendations could show benefit in less than 5 years, such a result on musculoskeletal health may take longer to demonstrate. Measures of implementation are a more realistic outcome and surveys need to be undertaken to identify initiatives across Europe that are implementing these strategies and to enable each to learn from another about the barriers and facilitators to their successful application.

The first step

The first action is to identify and bring together the key stakeholders who want to work together to improve musculoskeletal health – those representing people with musculoskeletal problems, the clinicians and policy makers. They first need to identify needs, the priorities and the barriers and they can then focus on how to overcome these and implement the relevant strategies. In this planned way the impact of musculoskeletal conditions in all parts of Europe can be reduced.

References

- 1 The Burden of Musculoskeletal Diseases at the Start of the New Millenium. WHO Technical Report Series No 919. 2003; World Health Organization, Geneva, Switzerland.
- 2 European Opinion Research Group EEIG. Health, Food and Alcohol and Safety. Special Eurobarometer 186. 2003; European Commission.
- 3 Urwin M, Symmons D, Allison T, Brammah T, Busby H, Roxby M et al. Estimating the burden of musculoskeletal disorders in the community: the comparative prevalence of symptoms at different anatomical sites, and the relation to social deprivation. *Ann Rheum Dis* 1998; 57(11):649-655.
- 4 The World Health Report. 2002. Geneva, Switzerland, World Health Organization.
- 5 Woolf AD, Pfleger B. Burden of major musculoskeletal conditions. *Bull World Health Organ* 2003; 81(9):646-656.
- 6 Reynolds DL, Chambers LW, Badley EM, Bennett KJ, Goldsmith CH, Jamieson E et al. Physical disability among Canadians reporting musculoskeletal diseases. *J Rheumatol* 1992; 19(7):1020-1030.
- 7 Jacobson L, Lindgren B. Vad kostar sjukdomarna? (What are the costs of illness?). 1996. Stockholm, Socialstyrelsen (National Board of Health and Welfare).
- 8 Meerding WJ, Bonneux L, Polder JJ, Koopmanschap MA, van der Maas PJ. Demographic and epidemiological determinants of healthcare costs in Netherlands: cost of illness study. *BMJ* 1998; 317(7151):111-115.
- 9 Rasker JJ. Rheumatology in general practice. *Br J Rheumatol* 1995; 34(6):494-497.
- 10 Woolf AD. Economic Burden of Rheumatic Diseases. In: Edward D Harris et al, eds, *Kelley's Textbook of Rheumatology Volume 1, 7th ed, Ch 28*. ISBN 141002049; Saunders, October 2004.
- 11 Badley EM, Tennant A. Changing profile of joint disorders with age: findings from a postal survey of the population of Calderdale, West Yorkshire, United Kingdom. *Ann Rheum Dis* 1992; 51(3):366-371.
- 12 Woolf AD, Åkesson K. Understanding the burden of musculoskeletal conditions. The burden is huge and not reflected in national health priorities. *BMJ* 2001; 322(7294):1079-1080.
- 13 Pettersson IF, Jacobsson LT. Osteoarthritis of the peripheral joints. *Best Pract Res Clin Rheumatol* 2002; 16(5):741-760.
- 14 Brooks PM. A template for diagnosis and management of musculoskeletal diseases. *Med J Aust* 1996; 165(6):331.
- 15 Jantti J, Aho K, Kaarela K, Kautiainen H. Work disability in an inception cohort of patients with seropositive rheumatoid arthritis: a 20 year study. *Rheumatology (Oxford)* 1999; 38(11):1138-1141.
- 16 Andersson GB. Low back pain. *J Rehabil Res Dev* 1997; 34(4):ix.
- 17 Waddell G. The clinical course of low back pain. *The back pain revolution*. Edinburgh: Churchill Livingstone, 1998:103-117.
- 18 Kanis JA, Johnell O, Oden A, Jonsson B, De Laet C, Dawson A. Risk of hip fracture according to the World Health Organization criteria for osteopenia and osteoporosis. *Bone* 2000; 27(5):585-90.
- 19 Van Staa TP, Dennison EM, Leufkens HG, Cooper C. Epidemiology of fractures in England and Wales. *Bone* 2001; 29(6):517-522.

Acknowledgements

This report was prepared by European Bone and Joint Health Strategies Group, co-ordinated by Professor Anthony Woolf, Dr Kristina Åkesson, Dr Juliet Compston, Professor Karl-Göran Thorngren and Professor Piet van Riel.

The project has been supported by the Bone and Joint Decade Foundation (BJD), The European League Against Rheumatism, (EULAR), The European Federation of National Associations of Orthopaedics and Traumatology (EFORT), The International Osteoporosis Foundation (IOF) and by experts from across Europe who have contributed their time and expertise. It has been supported by a grant from the European Community (Grant Agreement number: SI2.304598 (2000CVG3-430)). The recommendations reflect the views of the participants. The European Commission is not liable for any use that may be made of the recommendations contained in this report.

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