EDITORIAL COMMENT

Musculoskeletal dysfunction is the inevitable fate of all of mankind. In most individuals it will be due to decline through age, but a significant number will encounter impairment through disease or trauma. Great advances have been made in the management of such problems, but millions of people throughout the world suffer unnecessary pain and disability. The aim of the Bone and Joint Decade is to highlight this, to increase the awareness of society to the suffering and cost due to musculoskeletal disease and to influence government at national and international level in order to increase the organisation and resources devoted to its treatment. Such a task can only be accomplished by world-wide, multidisciplinary efforts. The concept which initiated the Bone and Joint Decade is the co-ordination of this by publicity, pressure and participation.

The thrust of the Decade was begun by a steering group which was set up after an inaugural meeting in Lund, Sweden, in April 1998. Its objectives are to provide information and support to national and international organisations devoted to musculoskeletal disorders, to promote co-operation within these bodies, to initiate activities in developing countries and to identify the current burden of the problem and its future impact. The Decade aims to promote partnership with patient, professional and scientific organisations, research bodies, scientific journals, health-care providers, governments and non-governmental organisations in all countries and regions. The vital need for adequate funding for orthopaedic research must be made clear and continual attention will be drawn to this throughout the Decade. Particular emphasis has been placed on four aspects, namely trauma, joint diseases, spinal disorders and osteoporosis.

This Journal strongly supports the concepts of the Bone and Joint Decade and has invited four distinguished contributors to provide a short Editorial on each of the major headings.

Frank Horan - Editor.

SEVERE TRAUMA TO THE EXTREMITIES

Lorenz Böhler defined trauma as the specialty which took care of all injuries from their onset to full rehabilitation. Severe trauma to the extremities is often associated with polytrauma. When it was formed 40 years ago, the aim of the Swiss AO group was the restoration of function and bone healing in the limbs in an attempt to avoid the lifelong disability which often followed the treatment of this type of injury. The introduction of advanced techniques of bone fixation, the realisation of the necessity of accurate reduction of intra-articular fractures and the aggressive management of accompanying injuries to the soft tissue, including vascular and nerve lesions, have revolutionised the management of these injuries and made proper restoration of function a practical possibility.

It is clear that the amount of severe trauma will increase in spite of efforts at its prevention by governments, insurance companies and employers. The best results in the management of these injuries can be obtained in designated trauma centres with fully specialised teams caring for the patient from the time of the accident to discharge after rehabilitation. To be efficient and cost-effective these centres must serve populations of about two million, otherwise the volume of work produced will not be enough to give sufficient employment to the numbers of superspecialists involved. The rapid transfer of the injured from the scene of the accident to the trauma centre is vital and methods of transport will develop further. Such management requires a team effort and there can be no weak links. There must, however, be a specialist who co-ordinates the actions of the team once the initial measures to preserve life have been taken. This must be the orthopaedic traumatologist, properly trained and recognised.

The evolution of treatment will continue. We are witnessing steady improvements in techniques of fixation. Endoscopically-assisted surgery will continue to enhance the management of injuries related to the joints. The plate will become less invasive, bridging the bone in a more biological way, and it may improve to a level at which it supersedes the use of the nail, since it may allow a more precise anatomical reconstruction. External fixation will remain as a cheap and important method of primary stabilisation and will be of particular value in developing countries.
Comparison of methods of treatment and of the performance of individual centres is probably best carried out by assessments based on injury score systems. The necessity to examine cost-effectiveness very carefully will make the use of such comparisons mandatory in order to allow governments to decide whether they have a proper economic return for their investment.

Basic research into bioactive and biodegradable implants will succeed in producing usable materials within a few years. The use of bone substitutes and methods of stimulation of the growth of bone by biochemical and physical methods will continue to improve. Growth factors will help to restore damage to the skin, soft tissue, ligaments and even nerves. These treatments may not necessarily influence the overall primary result but will lower the incidence of complications and shorten the healing period.

To achieve this our training programmes must be planned to allow superspecialisation in orthopaedic trauma. The economics of the aggressive management of severe injury to the extremities will become apparent and justify the cost of research and of the maintenance of specialist centres. Reconstruction and not destruction must be our motivation.

Rene Marti

JOINT DISEASES

Disease of the joints affects millions of patients and is the main reason for disability in the elderly. Since the number of people over the age of 50 years will double during the next 20 years, the management of such disease will be crucial. Improvements in joint replacements, the prevention of articular degeneration, the control of pain and tissue engineering are likely to be the main topics of importance in the next decade.

The striking results obtained by total hip replacement will improve further, particularly in the younger patient. To ensure this, research must continue to enhance the fixation of the implant to bone, to lessen the foreign-body reaction to wear debris and to increase the understanding of the mechanical and biological factors involved in the relationship between bone and foreign material. The methods of assessing the quality of the results of procedures will improve in accuracy and enable materials, methods and, possibly, surgeons to be selected better. Radiostereometric analysis is currently the best available tool for the assessment of implants, but sophisticated image-analysis programmes will need to be developed in order to assess early failure and to allow quicker appraisal of new designs or materials. The corollary to this is that cost-containment programmes will then emerge which will force surgeons to select the appropriate prosthesis for particular patients with guidance as to the material to be used and the design employed.

Tissue engineering of cartilage and bone, using different supporting materials in conjunction with adhesive proteins, growth factors and autologous stem cells, will gradually improve. This will then cease to be a laboratory exercise and become a clinical technique, although the research programmes necessary for this development are considerable. Genetic therapy may possibly help in the prevention of some diseases such as congenital dislocation of the hip, sickle-cell anaemia, rheumatoid arthritis and some types of osteoarthritis.

During the next decade we must improve our methods of assessing the efficiency of joint replacement based on quality-of-life rating. National and perhaps international registers must be expanded so that we may have full information. There will be improvements in the implants with better wear characteristics of the materials and enhanced fixation.

Progression will not be possible without a sound programme of academic research which must be supported nationally by governments and linked closely to that carried out in industry. This must address the prevention of joint deterioration and the reconstruction of injured bone as well as improvement in implants. Potential enhancement of clinical management must then be assessed by tightly organised clinical trials in order to compare new techniques before they are allowed universal use.

Laurent Sedel

SPINAL DISORDERS AND LOW BACK PAIN

During the Decade of the Bone and Joint we must increase our knowledge of the basic pathophysiology of low back pain and sciatica, seeking molecular markers for nerve injuries, inflammation and nerve pain. Fundamentally, degeneration of the disc is no different from degenerative disease in any joint in that it is a natural and constitutional process. Genetic control is overwhelmingly important, with the environment having little or no part to play. We should look at the molecular immunological aspects of the degeneration. It is important to capitalise on modern molecular biology and titrate the use of ‘magic bullets’, immunohistochemistry, radio-immunoassay, radiolabelled imaging and PET scanning for nociceptor activity versus molecular mediation of pain/inflammation and growth/angiogenesis. Substance P, kinins, cytokines and growth factors need to be measured in relation to disc degeneration, sciatica, epidural fibrosis and the ‘failed back’, just as they have provided the molecular basis of the response of tissues and organs to trauma. The basis for the management of disorders of the spine should be a robust structure, underscored by relevant basic science, but it currently resembles a ‘house of cards’ built on shaky foundations.

MRI must be better related to the clinical features and the recent development of MRI scanning in the erect position may well reveal biomechanical defects and spinal pathology which are unrecognisable when the patient is supine. Appendicular loading of the joints in health and disease can also be investigated. Biomechanics needs to be taken into the next millennium, harnessing Wolff’s Law in
favour of structure and form *versus* function. Strains and stresses must go hand in hand with biochemical, neurological, anatomical and perhaps electrical partners. Bio-integration and biodegradability are key words.

Prevention is put forward as an important issue, yet, as regards lower back pain, we have hardly scratched the surface of the relevant epidemiology and natural history. ‘Evidence-based surgery’ is there to be practised, but the alternative seems irresistible. We introduce, for example, percutaneous and laser techniques for no good scientific reason and then try to justify them until condemnatory evidence eventually emerges. We talk nobly about randomised controlled trials and then, in the management of scoliosis, fail to apply the Cochrane criteria. Systems of instrumentation have multiplied at bacterial rates but all we are seeing is a triumph of technology over commonsense.

It is difficult to see how the spine can be successfully untwisted and to spend half a day in the operating theatre is clearly not the way forward. We must consider degradable implants which alter stress-strain distributions in a structure such as the lordotic apex of every structural scoliosis to stimulate development of kyphosis and yet leave no long-term residue. Or is that ideal just too difficult to grasp? Shortening of the ribs and overdosing children with melatonin appear to be the contemporary aims!

As regards the spine, we are still in the preGalilean period. Meetings of spinal surgeons resemble religious rallies rather than scientific conferences. The next millennium may well provide all the answers, but we have to go backwards before we can progress. André’s tree needs a radical prune of its unscientific and very costly branches thus allowing for some welcome new growth. If we set about this, the Decade of the Bone and Joint will be off to a good start and the quest for the spinal Holy Grail may well be successful.

*Robert A. Dickson*

**OSTEOPOROSIS**

Osteoporosis describes the depletion of bone mass which, with architectural modification, leads to reduction of bone strength and increased risk of fracture. At a personal level the pain and disability are devastating enough but considered on a national or world scale the cost of care is enormous. Predicted changes in demography will lead to a threefold increase in fractures associated with osteoporosis by the year 2050. Postmenopausal women are at greatest risk of fracture with a 15% lifetime risk of hip fracture at the age of 50 years, compared with 6% for men. For postmenopausal, white women the risk of fracture of a vertebral body is three times that of the hip. To add to the misery, wrist and other fractures have a greater incidence in old age. All fractures tend to increase dependence and the need for formal care in the community or in institutions.

Clearly, there is a very strong case for the use of countermeasures in order to reduce the development of the condition. These may be started early in life by the indoctrination of children to accept changes in lifestyle. An increase in intake of dietary calcium and a general improvement in nutrition together with a moderate increase in exercise will lead to an optimisation of bone mass at skeletal maturity. Initiation of treatment at pivotal points of life such as surgical menopause, the use of steroids for other conditions and first fracture may further reduce bone loss or possibly restore the skeleton. Population screening and investigation of groups at risk should be considered, although this increased cost will be a considerable burden the health-care budget, already over stretched by providing the resources for the emergency care for the patients with fractures. The cost of DEXA, or alternative diagnostic measures, may need to be driven down so that the need for screening can be met. A careful cost-benefit analysis will almost certainly demonstrate the efficacy of early diagnosis followed by active treatment.

Treatment can be shown to prevent further bone loss, sometimes restore bone density and occasionally reduce the incidence of fractures. Existing treatments include oestrogens or other anti-resorptive agents such as bisphosphonates, calcitonin and calcium with vitamin D. The complications associated with these drugs may be reduced when newer compounds are released for general use. Selective oestrogen-receptor modulators (SERMs) have the beneficial effects of oestrogen with hopefully fewer dangerous complications such as breast cancer. The prospect of eliminating bleeding in postmenopausal elderly women should lead to increased compliance. Fluoride produces an increase in measured bone mass but does not reliably reduce the fracture rate. New bisphosphonates hold the promise of reduced gastrointestinal problems which complicate treatment for many patients. Anabolic agents may have a place in future treatment regimes. Currently, oestrogens and oestrogen agonists are used in late middle age with bisphosphonates and calcium with vitamin D later in life, but development of more patient-friendly drugs may lead to more effective schemes of treatment.

The present size of this problem with the misery and disability caused will demand a rapid increase in research efforts in the next decade. The Bone and Joint Decade will draw the attention of doctors and politicians to this special need.

*Neil Rushton*