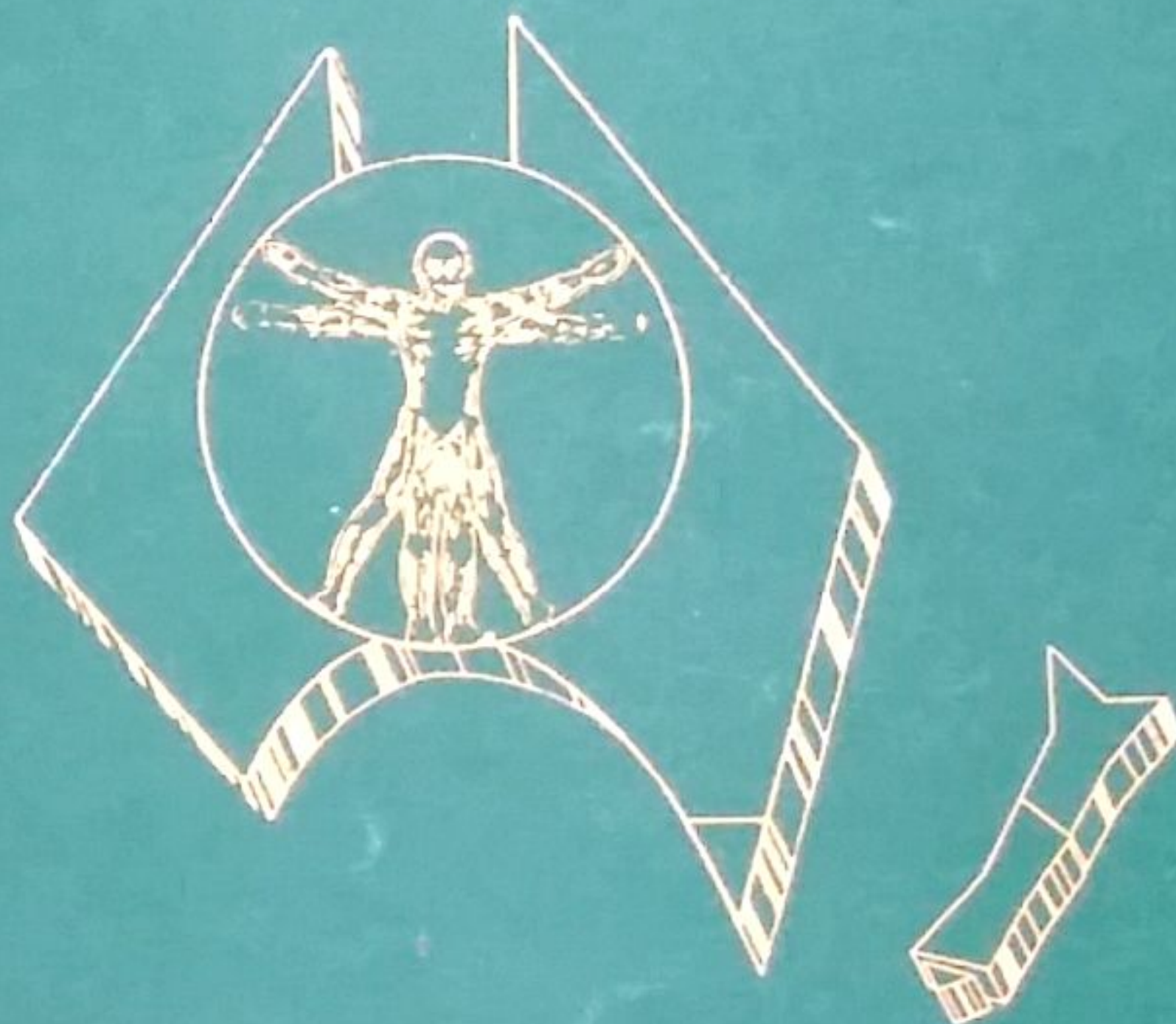


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 infections, tuberculosis
 meningitis, alleviation
 of joint pain arising
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 such as gonococcal or
 tuberculous arthritis.
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 myasthenia gravis,
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 active or latent peptic
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 ciency, chronic
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Kenacort-A 10



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Australasian Musculoskeletal Medicine

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The A.M.M. is produced by the Australian Association of Musculoskeletal Medicine for medical practitioners interested in the aetiology and management of musculoskeletal disorders. Opinions expressed are those of the authors and not necessarily those of the editor or the Association. Editorial comment may reflect the opinions of the editor alone. Contributions on any relevant topic are welcome for submission to the editor, Dr Ron Palmer, Suite 24 Royal Brisbane Place, 17 Bowen Bridge Road, Herston QLD 4006. Telephone (07)252 1128 or to any member of the A.A.M.M. Council.

Australian Association of Musculoskeletal Medicine

OFFICE BEARERS 1994

The following members were elected to office at the annual general meeting in Brisbane on 22nd October, 1994.

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| Dr. David Vivian | Brighton, VIC | (03) 596 7211 |



New Zealand Association of Musculoskeletal Medicine

OFFICE BEARERS 1994

The following members were elected to office at the annual general meeting in Christchurch on July 22nd 1994.

President:

Dr. Angus Johnston
126 Wade River Road, Whangaparaoa
Tel: +09 424 7912

President Elect & South Is Education Convenor:

Dr. Jim Borowczyk
79 Wilson's Road, St Martin's, Christchurch
Tel: +03 337 0991

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EDITORIAL



The cover of this edition heralds a new era of trans-Tasman co-operation. The title represents not a simple name change but rather a statement of the preceding year's dramatic events. The name change in itself proved to be an evolutionary process. At the A.G.M. of the A.A.M.M. it was initially debated, then carried, that the "Bulletin" would undergo a name change. In recognition of the continuing joint contribution between our respective associations, the words "Australia" & "New Zealand" were to be added to the cover as follows...

Australian & New Zealand Musculoskeletal Bulletin

This was somewhat a fistful, but the majority felt the word "Australasian" may play down the Kiwi component, or worse, upset our colleagues.

By invitation, the President of the N.A.Z.M.S.M. was present at the A.G.M. He was fully aware of the debate that transpired. The following day a lunch time meeting with five of the New Zealand executive pointed out that they would be perfectly happy with the word "Australasian". Simply, our sensitivity was misplaced. Further discussion ensued per "Bulletin" title and these thoughts were then conveyed to several members of the A.A.M.M. executive. Compromise has again held sway and we go to press with the new title...

Australasian Musculoskeletal Medicine

This successfully lays to rest the ongoing debate relating to "Bulletin" or "Journal".

In keeping with the new title format, it became necessary to alter the existing cover logo. You will recognise that we have reduced the size of the logo while adding a stylised outline of New Zealand.

Following the Norfolk Island and Rotorua meetings, the work has continued on the formation of the Faculty. Once again compromise was required on the argument between "faculty" and "college". As it ultimately eventuated, most of the expended energies were little more than a play on words. Now that we have legally incorporated the "Australasian Faculty of Musculoskeletal Medicine", a lot of the lead up debate seems unimportant. However, as with any democratic decision, the final outcome represents the majority view. This is as it should be. The founding of this faculty reflects the trust, confidence and goodwill of both associations toward each other. It is indeed a supreme achievement. It is not difficult to take one step further and describe the result as a milestone in trans-Tasman co-operation. The changes in the overall format of your journal are designed to reflect this joint venture.

The Brisbane Scientific Conference and Gold Coast workshop were resoundingly successful. How do you measure success? In this instance both programmes were heavily subscribed, the general consensus of delegates was that of satisfaction, and measured economically, this conference more than doubled any preceding conference in net takings. Success is never easy. No single person could undertake the enormity of staging such a large international event, at least while holding

down the responsibility of a busy medical practice. The take home message for all future conferences and workshops is therefore simple. Select a dedicated committee, choose a balanced programme, invite top speakers and continue to meet regularly to share the work load and support each other. A standard was set in Brisbane that will remain the yard stick by which all future conferences will be measured. We congratulate and thank the Brisbane committee on their outstanding achievement.



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A WORD FROM THE PRESIDENT OF THE A.A.M.M.

It was in July of 1993 that the last election of office bearers for A.A.M.M. occurred. The following is a report of what has happened in the last 17 months.

- A. Three Council meetings have been held. One of these was at the conclusion of the meeting in Rotorua and then two tele-conferences followed.
- B. In between Council meetings there have been four Executive hookups with minutes of these circulated to Council members.
- C. Numerous phone calls have ensued to enable the business to move smoothly and in particular, several conversations with the Bulletin editor.
- D. The first graduates of the Flinders course duly received their Diplomas in June, 1994.
- E. Three meetings have occurred with the three members of A.A.M.M. and three from N.Z.A.M.M. to re-write the instructional manuals currently used by the University of Otago. Each of these meetings has occurred over two to three days with intensive discussion and writing of materials. It was hoped that at the Annual General Meeting the first of these re-write manuals would be available. Although the text has been finalised, the photographs and diagrams have not been put together but it is hoped that in the near future, this will be accomplished.
- F. There have been two editions of the Bulletin under the editorship of Ron Palmer for which we are eternally grateful. The last edition came after a total removal of operations from Tamworth to Brisbane. There were many problems with this and hopefully these have all been overcome.
- G. It is a compliment to the initial Bulletin editor as well as the ongoing editor that we are now in our 11th year of its publication. This has been a continuous production for which Wade King is to be highly regarded and our best wishes for Ron Palmer to continue the exacting task.
- H. A newsletter which was discussed at the initial A.G.M. of the new council is now in operation. Two editions of the newsletter have been circulated with a view to keeping members informed of what is happening within the association and activities overseas.
- I. In April of this year we severed our ties with Laser Type Services of Tamworth. At the time of winding up, some 100 back copies of the Bulletin were distributed to all state members. These are to be used to encourage new membership.
- J. The accounting system was transferred from Tamworth to Max and Linda de Clifford who have had the laborious task of revamping and upgrading our mailing list. Unfortunately much documentation was lost in the transfer or discs were incompatible. Much work has had to go back to the beginning but the teething problems of this are now in hand. The important fact is that we keep informing members of their financial status so that the finances of the association can be kept in order. At the end of June 1994, there were 235 financial members of the association, an additional 40 people and associations received complimentary copies of the Bulletin. In addition, 200 copies were sent to New Zealand for the cost of production of the Bulletin over and above that required for our association.

- K. The licentiate list has been increased considerably following the resolution at the last A.G.M. to admit all fellows of the Australian College of Physical Medicine who also met the additional requirements of the licentiate. This list now has 33 members. The reason for compiling such a list is to present to government authorities a list of members we consider to be competent and to have recognition of skills in musculoskeletal medicine. The association seal is missing and the Honorary Secretary is investigating its whereabouts.
- L. A bold programme has been initiated by the Queensland organising committee for the annual conference. This comprehensive Continuing Medical Education programme has great potential and we wait expectantly for an assessment of the outcome of this initiative.
- M. A one day seminar on aspects of management of chronic musculoskeletal pain was conducted at the Flinders Medical Centre involving doctors, physiotherapists occupational therapists and members of the judiciary. A successful panel helped highlight the issues.

As President of the Association I have been active in waving the flag on behalf of the Association and the discipline. To this extent I have been involved in:

1. Two workshops in W.A., one in Perth and the other in Kalgoorlie. There is another follow up conference planned in some rural area, yet to be determined.
2. I have continued to conduct workshops, one day conferences and evening sessions in South Australia for those enrolled in the Certificate of Manual Medicine of the R.A.C.G.P. On the 24th September, six candidates sat and passed the practical exam run in Adelaide with Professor John Murtagh as the examiner. It is the intention to run regular workshops for the next intake of candidates for the Certificate of Manual Medicine. I have also made overtures to the Family Medicine Programmes in W.A. and N.T. to run similar programmes to stimulate people to pursue at least the college's certificate course, if not to advance people for the post graduate diploma courses.
3. I attended an international conference held in Vancouver, Canada, to discuss Chronic Fatigue Syndrome and Fibromyalgia. A report of this conference will appear in the next edition of the Bulletin.
4. I have conducted 5 two week intensive courses for the Flinders University Diploma of Musculoskeletal Medicine. In the process of these courses, together with other workshops, 20 or so new members have been enrolled.
5. Communication with F.I.M.M. has been initiated to determine why we should continue to be affiliated with this body from whom we receive very little help despite sending them \$500 annually. Two letters have been sent to F.I.M.M. questioning why we should not discontinue our affiliation.
6. I have communicated with the President and Secretary of the British Institute of Musculoskeletal Medicine to ensure that their training programme, ours and the Kiwis' are all focussed in a similar direction. In addition, I have suggested that there should be some official recognition by way of an invitation to executive members of each of the associations to attend corresponding annual and scientific meetings. The aim of this is to make sure there is plenty of cross cultural activity and that we should not be seen to be isolated in the overall body of knowledge of the discipline.
7. Overseas bodies are more actively pursuing specialty status than we are in Australia. It would seem reasonable that if there is some momentum for this to occur overseas

that we should not be left behind and should all be involved to ensure to work together for this purpose.

Finally, some statement needs to be made in respect to the formation of a Faculty of Musculoskeletal Medicine. I personally object to the term Faculty for the reasons outlined in the first newsletter to members. However, democracy rules and the consensus from both sides of the Tasman is that this should go ahead and appropriate Articles have been drawn up and circulated. The initial membership of the Australasian Faculty of Musculoskeletal Medicine is 22 and must now take the greater burden of the development of the discipline to a specialty. This means that the Associations whose only requirement for membership is to be a registered medical practitioner must continue with education for general practice. It is hoped that ensuring scientific meetings will run parallel in the years to come and that the Bulletin become the mouth piece for Australasia and thereby be the uniting link between the Faculty and the Associations on both sides of the Tasman. I would like to make some recommendations.

- A. That we extend an invitation to our British and New Zealand counterparts to have a complementary attendance at our annual scientific meeting each year and that this invitation to members of the executive be reciprocated.
- B. That we subsidise the attendance of two members of the executive to attend the B.I.M.M. and F.I.M.M. conference in April 1995. This would be to participate actively by the presentation of papers at both of these meetings and to be involved in any teaching that might run concurrently as well as sharing ideas in regard to teaching and the ongoing attempts for specialist recognition.
- C. That the election of office bearers occur every two years with no executive office being held for more than two consecutive terms.



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A WORD FROM THE PRESIDENT OF THE N.Z.A.M.S.M.



In this inaugural issue of "Australasian Musculoskeletal Medicine", I welcome the opportunity to write a few lines to mark this further step in trans-Tasman, or Australasian, co-operation in matters musculoskeletal.

At the recent Brisbane conference I detected a good feeling of empathy and I am only sorry that more of our members were not able to cross the Tasman to share the experience. The Brisbane conference and workshops presented a well rounded programme with Dr Jiri Dvorak presenting a "European" perspective. His conference presentations were as immaculately delivered and erudite as ever, but it was surprising to find that he is still using the same manipulative techniques that he demonstrated in New Zealand in 1989. This re-inforces a perception that the epicentre of musculoskeletal medicine is moving towards Lord Howe Island. Dr Mike Butler further confirmed that Australasia is academically up with the play with his two masterly presentations on Chronic Pain Management and Prevention of Chronicity. Professor Jim Taylor's paper on the Pathology of the Acutely Injured Cervical Spine could be considered as yet another World-class paper technically and conceptually, showing just what damage the spinal cord suffers in a fatal car accident or fall. Presumably similar lesions occurring in non-fatal car accidents would give an adequate explanation for the severity of symptoms of "whiplash".

The New Zealand Association's Conference in late July 1995 in Auckland is planned around the "Occupational Overuse Syndrome", the very basis of musculoskeletal medicine, encompassing as it does, "tennis elbow", rotator cuff lesions, "shin splints", not to mention "spinal dysfunctions". It is intended to have a workshop in which actual chronic cases are presented to a panel of therapists for examination and discussion of management with participation from the floor. I have been agreeably surprised how much I have learned from my colleagues in similar formats and I am sure that this is one way to get the most out of both the panel and the participants.

Angus Johnston



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From the A.A.M.M. Hon. Secretary's Desk

The advent of *Australasian Musculoskeletal Medicine* marks another stage in the development of the discipline. When the *A.A.M.M. Bulletin* was first produced in 1985 its main purpose was as a newsletter to the members of the Association. In its ten years of publication since then the *Bulletin* seems to have achieved far more than this. In recent years, under the current Editor's guidance, it has become a source of scientific information for doctors in Australia and New Zealand with interests in musculoskeletal medicine and no doubt for some in other parts of the world as well. It is now much more than a bulletin for A.A.M.M. members and under the new banner it can be expected to expand its scientific and educational horizons.

Another milestone was reached this year with the inauguration of The Australasian Faculty of Musculoskeletal Medicine. The Faculty was established for further development of the scientific, academic and educational aspects of the discipline. There are now three universities offering postgraduate courses in musculoskeletal medicine in Australasia and the burgeoning of educational activity raises a need for some co-ordination of their efforts. There are also increasing numbers of practitioners specialising in the field, including many with training in other disciplines such as rheumatology, neurology, rehabilitation, radiology, anaesthetics and pain management. Members of each group tend to approach the management of musculoskeletal health problems with different perspectives. At this stage of the discipline's development there is scope for all of the strategies that are applied but there is also a need for an umbrella organisation to foster co-operation between the various groups. The Faculty will provide a neutral forum for the sharing of ideas, the refinement of practical methods and the raising of standards of patient care.

Other organisations will continue to operate as they have before. The Faculty has no intention of usurping the functions of other groups. In fact, the opposite is the case. The activity of the Faculty will add to what is being done by others. In particular, the A.A.M.M. and the N.Z.A.M.S.M. can expect the Faculty to augment their educational activities by providing material and resources for them. The national associations will remain the principal foci for contact and exchange of ideas between the growing numbers of doctors in each country with interests in musculoskeletal medicine and especially those in primary care, where the centre of gravity of the discipline lies. The Faculty will work towards the enhancement of the scientific and academic standing of the discipline and the development of educational programmes that provide better understanding of musculoskeletal health problems and a higher quality of care for those who suffer from them.

NEWS

The recent Brisbane conference ultimately turned out to be very successful, but only after an enormous amount of planning, personal effort and dedicated team spirit. The take home message for any event of this magnitude is the welding of a closely knit team with a common goal to succeed.

Congratulations to Arnold Jones and Steve Jensen who have successfully completed their Flinders Diploma course. Well done guys. Sitting in the wings are several others who have now handed in their research papers for marking. Hopefully by the next edition of this journal there will be several others to congratulate.


The Queensland branch of the A.A.M.M. has purchased 8 portable examination couches that were in use at the Gold Coast workshop. These couches have now been donated to the parent Association and will be transported to all other annual conferences. Currently they are stored in Brisbane, but if any other State branch wishes to have a couch or two for general teaching purposes, please contact the editor. Essentially these are YOUR couches. However, it would be the responsibility of that State organisation to look after the couches and transport them to the site of annual conferences.

It was decided at the A.G.M. that the next conference would be held in the A.C.T. at Canberra. Any member input or offers of help in running this conference should be directed to committee members, David McGrath or Wade King. Guest speakers are always invited as keys around which a conference is structured, but there is ample opportunity for individual members to offer papers and partake in workshops. If you can contribute in any way, via educational aspects, or simply through sharing the work load in planning the conference, please contact either of the above members.

It is a healthy sign for musculoskeletal medicine to see more members taking the plunge into full time practice. From Melbourne, Steve Jensen reports that he has never been busier. In Brisbane, Peter Jackson has moved out of general practice and is almost over night flat out in his new occupation. With the number of doctors now undertaking Diploma courses it augurs well for the future of the discipline.

After the last Bulletin issue where letters to the editor were requested, it is pleasing to see some positive response. We welcome constructive criticism as well as letters on any matter. The success of this journal, as well as the Associations on either side of the Tasman, are only guaranteed through member participation. Please keep mail coming across the editor's desk.

There are a number of conferences being held in Europe and New Zealand in 1995-96. If Association members are intending to travel to these it is possible we may be able to negotiate special airline rates if a group booking is made. Advertisements are in this journal for some of these. If you are thinking about attending, contact the editor or Phil Watson. If sufficient numbers show interest then we will explore avenues for discount fares and accommodation.



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NEWS

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THE AUSTRALASIAN FACULTY OF MUSCULOSKELETAL MEDICINE

The Australasian Faculty of Musculoskeletal Medicine was formed in 1994 to co-ordinate development of the scientific, academic and educational aspects of the emerging discipline of musculoskeletal medicine. The aim of the Faculty is to draw together those involved in research and education in musculoskeletal medicine and those in specialist practice in the discipline to develop its scientific bases and their application in patient management. In the past a number of separate groups, including musculoskeletal physicians, rheumatologists, neurologists, rehabilitation physicians, interventional radiologists, anaesthetists and pain management specialists, have been attempting to achieve these ends but each from a relatively narrow perspective. The intention of the Faculty is to bring together all doctors in Australia and New Zealand with similar aspirations to enhance co-operation towards the common goal of improving the quality of care for patients with musculoskeletal health problems.

Membership of the Faculty is restricted to medical practitioners with university postgraduate qualifications in musculoskeletal medicine and those with Fellowship of a learned College and appropriate interests. The current membership includes the teaching staffs of all three university departments offering postgraduate courses in the discipline (The University of Otago, The Flinders University of South Australia and The University of Newcastle) and members of the Australian and New Zealand Associations of Musculoskeletal Medicine, the Royal Australasian College of Physicians, the Australasian Faculty of Rehabilitation Medicine, the Australasian Faculty of Occupational Medicine and the Royal Australasian College of Radiologists. Others with similar interests and qualifications are invited to join.

Further information about the Faculty may be obtained, in New Zealand, from the President:

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LETTERS TO THE EDITOR

Dear Editor

Yesterday I received the April '94 issue of the A.A.M.M. Bulletin. What a courageous issue. Admitting that we are a long way from being a precise scientific pursuit, that in musculoskeletal medicine too, therapeutic fashions come and go, and that MRI is of limited value in low back dysfunction diagnosis. Admitting that much of G.P. work involves 'defining the undefinable and coding the uncodable', that EMPIRICAL techniques of manipulation have been used since Hippocrates, that 'manual medicine manipulative techniques... have been validated in practice and are ideally suited to general practice'. To print a doctor's question: 'To what end must one go to quiet the superego of Science?'. Publishing that a doctor's statement that 'myofascial trigger points have long been known to have unusual autonomic and somatovisceral associations causing cough, nasolacrimal secretions, vertigo, ventricular ectopic, supraventricular tachycardia, deep chest pain.' Admitting that somatic dysfunctional disorders of the spine are often associated with altered autonomic function causing somatovisceral symptoms such as migraine, gall bladder, renal, gynaecological, bladder and other dysfunctions. Admitting that Osteopathic treatment gave relief after fruitless (and probably very expensive) lengthy investigations by orthodox doctors and disappointing results after physiotherapy manipulation and acupuncture. Printing Dr D.P. Anderson's delightful article ending with the two words: 'healing ART' (not healing science). Reprinting Dr E. Hackett's address tracing the importance of the 'healing touch' and admitting that 'modern scientific medicine has little of it' and finally exhorting 'manipulative doctors'... 'don't lose touch'. — and all this in one issue!

I retired from general practice in December '93. I never had any formal undergraduate or postgraduate training in musculoskeletal methods, I have no diploma or even certificate in musculoskeletal medicine. I was just lucky that after World War 2 I was introduced to physical medicine methods by a physiotherapist who treated me for my scoliosis. I can still hear her say, "they will teach you nothing about this in your medical course". How right she was. In the late 1950's an Osteopath fixed my severe lumbago and sciatica, for which the standard orthodox treatment then was disc surgery, in a few manipulation treatments.

So I began to study books by Dr Cyriax though I was too wary of using his violent and forceful cervical spine manipulations. While I was a 'foreign doctor resident' in 1965 I read Maitland's 'Vertebral Manipulation' first published in 1964 and his gentle and safe methods immediately appealed to me. At that time I had to hide the book from the other residents and specialists under whom I worked. When one specialist chanced to see the book I hastily had to assure him that G.D. Maitland was a lecturer at the University of Adelaide and that his preface mentioned the support of an orthopaedic surgeon for his book.

I even had the temerity to use cervical and thoracolumbar spine mobilisation a few times while I was a casualty resident without having some specialist looking over my shoulder every moment to see what I was doing. The patients were very pleased with the results and some became my private patients as soon as I started in general practice in the area in 1967.

At that time spinal manipulation/mobilisation was considered identical with chiropractic/osteopathic methods, abhorred by orthodox doctors. It was risky for a foreign doctor

still under scrutiny as to whether his medical training had been up to scratch to be seen using such tainted methods.

Imagine my surprise when in the early 1970s I heard that the Australian Association of Manipulative Medicine had been formed. I immediately joined and attended a meeting in Sydney. The A.A.M.M. then had some 45 members in the whole of Australia plus New Zealand. I remember that one of the founders, Frank May, barely recovered from a stroke, attended the conference. At the end of the conference I asked if there were any lectures or meetings where a G.P. interested in manipulation could learn more; there weren't any at that time.

Yes, the A.A.M.M. has come a long way in the past 23 years. The membership grew to hundreds, though still very low, about 5% of all general practitioners in a discipline which is 'ideally suited to general practice'.

Since up to 15% of family medicine consultations involve musculoskeletal disorders' should manipulative methods not been taught to all undergraduate medical students? By all means have a postgraduate diploma/certificate course in musculoskeletal medicine for the small percentage of doctors who want to practise manipulative medicine full time and to become specialists in the field. But to create the impression that the only way to learn manipulative skills for general practice is to attend a one year course and pass an examination and that submissions for the Bulletin must have such a high scientific standard that academics want to read them will only turn G.P.s away from musculoskeletal medicine. If this impression is created even ordinary G.P. members of the A.A.M.M. will hesitate to write to our publication. No wonder the Bulletin has had little mail to the Editor.

To any G.P. interested in manipulative methods, I would say: study 'Practical Orthopaedic Medicine' by Brian Corrigan and G.D. Maitland for diagnosis and general management of musculoskeletal problems and 'Vertebral Manipulation' by G.D. Maitland for gentle and safe spinal techniques. Try to attend A.A.M.M. workshops if available in your area and contact A.A.M.M. members if you have a problem or question. Once you have started to use manipulative techniques with gratifying results you can study 'Peripheral Manipulation' by G.D. Maitland.

If the A.A.M.M. is really interested in making musculoskeletal methods available in general practice where the greatest number of the general public will be reached, the Certificate of Manual Medicine course, started by Drs Murtagh and Kenna, should be resurrected. The next step would be to integrate teaching of manipulative methods into undergraduate medicine by lobbying universities and politicians. Has anyone ever estimated how much money the government and the public would save if manipulative methods were used first for the 15% of patients needing them instead of expensive x-rays, CT scans, MRIs, blood tests, ECGs etc. which are used first now, often with negative results? While waiting for formal integration of musculoskeletal medicine into undergraduate medical training A.A.M.M. members could perhaps give an occasional informal talk to medical students about manipulative methods. Perhaps if the A.A.M.M. is to meet the needs of those who suffer with musculoskeletal problems² it would seem that we should make learning manipulative methods available to general practitioners and medical students in general as soon as possible.

References

- 1) "What the professor never taught me" D.P. Anderson, Australian Association of Musculoskeletal Medicine Bulletin, Vol. 10, No. 1, April 1994, P.31.
- 2) From the Hon. Secretary's Desk, Australian Association of Musculoskeletal Medicine Bulletin, Vol. 10, No. 1, April 1994, p.8.

Dr. E.A.A.D. de Ruyter
Nerang, Q'land



Dear Editor,

As a member of the Australian Association of Musculoskeletal Medicine and a Fellow of the Australasian Faculty of Occupational Medicine, I am disappointed and somewhat offended by two sections in the A.A.M.M. News in the April Bulletin.

The article regarding the diversity of doctors enrolled in the course is nonsensical and reeks of xenophobia. From where do our members come if it is not from another field of medicine? Is our President not a General Practitioner? To suggest that General Practitioners, Occupational Physicians or Rehabilitation Physicians may be "misconceiving 'musculoskeletal' medicine as part of their own field of practice", shows a narrow and paranoid view that does the Association a disservice. Occupational Physicians may choose to pursue further studies in musculoskeletal medicine, toxicology, environmental medicine, epidemiology or numerous other specialised areas. There is nothing underhand in this, as suggested in the article. I note that our President studied obstetrics and gynaecology, presumably to enhance his general practice skills. I wonder if the R.A.C.O.G. was supportive or suspicious of him.

The paragraph directly relating to the Australasian Faculty of Occupational Medicine is both incorrect and illustrative of a lack of understanding of occupational medicine. Amongst others, the four hospital-based practitioners of occupational medicine in South Australia would, I am sure, be surprised to hear that there are no hospital appointments in occupational medicine in Australia. The specialty is industry-based rather than hospital-based but despite this occupational medicine has a strong hospital presence in Australia.

The derogatory comments on "requirements for membership of the Faculty" are also ill-conceived. The Faculty offers a formal training programme with exit examination for those wishing to become **Fellows** of the Faculty and does not deter anyone with the required qualifications from becoming a member and commencing the training programme. I refer the writer to the 'Competencies' document of the Faculty, perhaps more relevant in this discussion. Knowledge in any area is not the sole property of any one organisation. The A.A.M.M. will never advance to the level of a college until it becomes less cynical and paranoid and concentrates on improving its own professional standing. The learned colleges can assist and support the Association provided that they are not alienated by ill-informed, cynical criticism.

Let's show some maturity and **professionalism** — then we might be taken seriously by other health professionals.

Dr G. Graham, Adelaide

Dear Dr Graham,

Thank you for your letter, the contents of which are noted. Musculoskeletal medicine is indeed trying to become more professional as you suggest, hence the formation of the Australasian faculty. Many of our members, including the President to whom you refer, would not be easy with your inference as "General Practitioners". Some have been in musculoskeletal medicine for more than 30 years. Permit me to quote from the "Concise English Dictionary".

Specialist...One who devotes himself to a particular branch of a profession.

Specialty...A special characteristic or feature; a special pursuit, occupation etc.

Specialize...To differentiate, limit, or apply to a specific use.

This point aside, your comments on 'ownership' of musculoskeletal medicine are accepted. Musculoskeletal medicine is certainly an important part of occupational medicine, rehabilitation medicine, pain management and general practice, as well a full-time occupation for those who specialize in it. No one group can 'own' the discipline and all professional organisations do better to be inclusive rather than exclusive. The comments made in the April News were not intended to give offence and if sensitivities have been disturbed that is regretted. Perhaps you too are being a little oversensitive by having to resort to the use of adjectives such as "derogative".

Editor.

Dear Ron,

Thank you for continuing to send copies of the Bulletin to me. The contents are interesting and I often send photostats of this and that around to colleagues on this side of the world. We are particularly encouraged by your political pressuring of the medical establishment: we are equally embroiled in that here.

Mike Hutson has been trying to stir the international organisation (F.I.M.M.) into a bit of useful activity (and has discussed this with Norm Broadhurst and one of the N.Z. officers). Because of the European bias of that organisation, perhaps we would expect them to be more useful to us in ensuring that we are a recognized medical specialty: but nothing has happened yet, and I think it will be one of those slow campaigns (where you have to do most of the work yourself!).

It occurred to me that some of your members might want to read even more widely, and that they ought to know that this journal exists. Could I ask you to put a quarter-page advert in one of your next journals? With many thanks and best regards.

Richard M. Ellis FRCP, FRCS
Wiltshire, UK. Co-Editor,
Journal of Orthopaedic Medicine



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PRESIDENT'S ADDRESS

23rd Annual General Meeting Australian Association of Musculoskeletal Medicine

Musculoskeletal Medicine is slowly coming of age and at this time it is worthwhile looking at what has been achieved in the past decade in this country which sets the stage for what we hope to achieve in the next decade.

Ten years ago my introduction to the Australian Association of Musculoskeletal Medicine was via the suggestion of an anaesthetist, while in general practice had attended a helpful course at the Coppleson Institute in Sydney. I requested to join the A.A.M.M. and duly was informed by a rather tatty newsletter that an annual general meeting was to be held in Melbourne and this was to be accompanied by a workshop run by Robert Burns. The workshop was fabulous and the conference opened new horizons for me. Within the A.A.M.M. I found a great degree of enthusiasm, coupled with logical thinking which formed a sound foundation for the practice of musculoskeletal medicine as we know it today. This enthusiasm over the next few years was translated into the production of a Bulletin which has now completed its 10th year of continuous publication. Shortly after the Bulletin became an established entity a small group of aspiring musculoskeletal physicians developed a syllabus for the study of the discipline. This was followed by an assessment protocol for musculoskeletal dysfunction. At the same time we were moving slowly toward tertiary based courses but were beaten by the Kiwis who had their first candidates enrolled in the Otago Diploma programme in 1989 after a 15 year planning programme to get such a course established.

In 1991 Flinders took in the first candidates to the Graduate Diploma in Musculoskeletal Medicine. This November will be the 4th intake. Thirty three candidates have completed or are enrolled in this programme.

We are all aware of the fact that years ago Diplomas of Physical Medicine were available in the U.K. but these disappeared from the scene a decade or so ago for reasons which are difficult to comprehend, especially when one considers that the teaching of problems arising from the musculoskeletal system is universally poorly taught. This void is now widely recognised hence the motivation of a few to do something to correct the deficiency by instituting tertiary courses.

This ground swell of activity is not isolated to the Southern Hemisphere. The British Institute of Musculoskeletal Medicine was formed by a change of name of the previous British Association of Manual Medicine. Our British counterparts have commenced Post graduate courses and are anxiously looking forward to the time when the discipline will be recognised as a specialty in its own right. They have also instituted a Master of Musculoskeletal Medicine through University College, London.

The dearth of competency in musculoskeletal examination was highlighted by an article in the Australian and New Zealand Journal of Medicine by Dr M J Ahern. It was found that less than 15% of patients being clerked into a large public hospital received a musculoskeletal examination compared with greater than 97% of patients who had documentation of their cardiovascular, respiratory and gastrointestinal systems. Why is it, one asks, that with such documented neglect that more is not being done at the undergraduate level to include more teaching on what are the common presentations in medical practice of musculoskeletal dysfunction? It can be argued that diagnostic skills in musculoskeletal examination are equally as important in patient managements as are those skills relating to the cardiovascular and respiratory systems. It can be argued that

musculoskeletal skills will be of more use to the medical graduate than being exposed to numerous surgical procedures which have little relevance in day to day general practice.

Varying studies indicate that musculoskeletal problems are of the order of 15-20% in general practice yet very little of the teaching of the undergraduate programme would reflect this percentage. Little wonder therefore that inappropriate treatment, referrals or programmes are instituted. Little wonder also that many general practitioners are frustrated when told by the consultant that their patient has a functional overlay because the cause of their genuine impairment cannot be found by the said consultant.

Fundamental to the practice of musculoskeletal medicine is the reproduction of the patient's pain during the hands-on physical examination. This is coupled to a thorough knowledge of the anatomy and biomechanics which will result in a diagnostic formulation for ongoing patient management. This sequence is no different from other medical disciplines which have firmly established academic bases but it has not been seen often enough in current management of musculoskeletal dysfunction. The treating physician when in charge must monitor the progress of the patient and no treatment plan should be allowed to proceed endlessly, but should be reviewed every few weeks and altered as necessary. If adequate resolution is not forthcoming the treating physician should admit defeat rather than label the patient as functional as so often happens.

It is with confidence that I can advocate that clinicians skilled in the history and examination of the musculoskeletal system are capable of making a diagnosis and formulating a treatment programme which will be efficacious and cost effective for all concerned. Physicians have long been skilled in the broader field of medicine to assess when to invoke a surgical opinion or referral. Therefore referral to a musculoskeletal physician is more appropriate than to a surgeon for non-surgical pathology.

At the present time so much of a surgeon's training is devoted to mastering new technology and surgical skills there is little time for the study of causes of chronic musculoskeletal pain. Thus we all have anecdotal experiences of patients who have been no better following surgery because the wrong operation was performed for the wrong reason. Classic to this experience is that all "sciatica" must come from pathology affecting lumbar nerve roots when somatic referred pain patterns for Z joints, hips, sacroiliac joints and the iliolumbar ligaments have been mapped and documented but apparently not widely acknowledged.

Where is the lateral thinking which must be one of the clinician's "tools of trade"?

Many years ago the medical profession faced the task of educating the populace that every sniffle did not require an antibiotic for cure or prophylaxis. The long battle to convince people that viruses do not respond to antibiotics has been largely rewarded. Similarly it will be a difficult task to convince the public and to a lesser extent the medical profession, that NSAIDs, radiological investigations and surgical referrals are not necessarily the appropriate way to manage chronic musculoskeletal pain.

Although musculoskeletal problems which are obviously rheumatological or surgical, usually present no difficulty for the family physician, a considerable proportion of musculoskeletal complaints would be better served by referrals to a clinician skilled in musculoskeletal problems. If this did happen the general population would be much better served as would outpatient clinics, when musculoskeletal physicians are appointed to teaching hospitals. A musculoskeletal physician can quite competently identify and manage musculoskeletal dysfunction which is not surgical or rheumatological. This would release these specialists from soft tissue pathology allow them to be used by the deserving patient who requires their special skills. There is ample musculoskeletal pathology that is within the realm of the musculoskeletal physician without taking away the bread

and butter from our surgical and rheumatological colleagues. For those general practitioners who are looking for areas of challenge and who are happy to pursue avenues which will give them greater skills in the management of their patients, I can honestly point to musculoskeletal medicine as a rewarding area of hands on activity.

The practice of musculoskeletal medicine offers the clinician a mentally rewarding and emotionally satisfying field of practice. In addition, acute musculoskeletal injuries will be correctly managed which should reduce the number of patients who become chronic musculoskeletal pain sufferers. This early and appropriate intervention will do much to minimise a patient's misfortune by avoiding unnecessary referral patterns to surgeons or physiotherapists who are expected to treat the patient correctly when no worthwhile diagnosis has been made at the time of the referral.

The way forward is to join the international momentum which is being spontaneously generated by need. The Australian and New Zealand Associations of Musculoskeletal Medicine have recognised established programmes for continuing medical education. Ad hoc workshops are offered from time to time as well as structured courses via the College of General Practitioners together with more detailed post graduate diploma courses at various tertiary institutions. At present 46 members of A.A.M.M. have or are in the process of completing Diploma courses. This will provide a competent referral base as well as establishing musculoskeletal clinics in teaching hospitals to work in union with orthopaedic surgeons and rheumatologists which in turn will influence the teaching at undergraduate and post graduate levels.

Over the past decade the A.A.M.M. has developed a syllabus of instruction and a protocol of clinical assessment while becoming involved in the writing of manuals for instruction with our Kiwi colleagues. We have encouraged members to participate in post graduate education. In the next decade we must continue to work closely with medical colleagues of like mind to further develop the discipline based on the best scientific and medical expertise available and to encourage tertiary appointments as well as promoting a research base. We do have much to offer the patients suffering acute and chronic musculoskeletal pain in a way which is efficacious and cost effective as well as an expertise not found elsewhere.

In conclusion those practicing musculoskeletal medicine as the major part of their medical practice:

- ⇒ Do listen to what the patient has to say
- ⇒ Do take time over the history and examination
- ⇒ Do reproduce the patient's
- ⇒ Do make diagnosis when consultants have failed to do so
- ⇒ Do make patients better
- ⇒ Do save patients from surgery
- ⇒ Do save on costs of unnecessary investigations
- ⇒ Will say "I don't know" instead of branding the patient as functional.

This is good medical practice. If you feel your skills are inadequate in this area of medical practice there are means to improve but there is a cost. The return for effort is not always measured in dollars and cents.

There is much happening on the world scene in musculoskeletal medicine - now is the time to be involved to be in a position to reap the benefit.

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NOTES ON VANCOUVER CONFERENCE

Norman A. Broadhurst

Early in June I attended a conference in Vancouver on some aspects of musculoskeletal pain. The title of the conference was Fibromyalgia, Chronic Fatigue Syndrome and Repetitive Strain Injuries, the latter of which I thought had died a natural death as it was widely recognised as the Australian Disease. Interestingly enough it has arisen in the UK in the last couple of years and a paper was presented outlining the sequence of events, together with the numerous litigation applications, all of which are reflected in the Australian experience. It was advocated that although no specific pathology can be found in this condition as is also the case with FM and CFS, that the condition postulates activation of nociceptors in the muscle tendon unit. This subsequently may interfere with the dorsal horn neural transmission which in turn produces the regionalised pain, hyperalgesia, fatigue, sleeplessness, emotional distress and subsequent disability, all of which are part of the other two conditions with some variations.

Chronic Fatigue Syndrome

Fatigue is the major component of this syndrome which affects females more than males. Also known as myalgic encephalomyelitis, it mainly affects people who are high achievers with strong work ethics and a tendency to be perfectionists.

The symptoms to the patient are real but cannot be substantiated by any laboratory investigations. Tests of strength can often be achieved but with subsequent increase in pain and current fatigue. These patients also have poor concentration and frequently manifest some kind of psychosocial dysfunction. Some attention has been given to trying to determine whether this condition is viral or traumatic. The condition has been referred more euphemistically as the dysregulation of the normal stress response, leading to both physical and behavioural abnormalities. A proposal is that it is a malfunction of a hypothalamic pituitary adrenal axis and that attention to the various moderators of this system have revealed some interesting findings. These abnormalities of the HPA axis are significant statistically but attempts to correct them by medication have been disappointing with no change in the patients' symptoms.

Treatments for this condition have included acyclovir, injections of immunoglobulins, extended courses of essential fatty acids, magnesium, liver extracts etc., all of which have given no better than placebo responses. The consensus at the end of the conference was that this is a condition affecting predominantly females with no known precipitant and it would appear that when people have this, there is little likelihood of complete resolution. A longitudinal study of people with CFS indicated that in the year or two prior to the diagnosis being made, these patients on average had made 25 visits per year to health care providers.

Thus the summary for chronic fatigue syndrome is:

1. No known cause.
2. Diagnosis based on clinical findings.
3. No investigations helpful.
4. No form of rehabilitation or therapy has proven to be efficacious.
5. Minor help given with low dose amitriptyline and improvement in cardiovascular fitness.
6. Most improve in three to five years with a small number claiming a cure.
7. Big overlap with fibromyalgia.
8. Activity worsens the symptoms.

RSI

This is a term for cervicobrachial pain of uncertain pathogenesis, usually seen in an occupational context. It is characterised by widespread neck, shoulder girdle and arm pain, often of dysaesthetic quality including burning associated with paraesthesia, impaired perception of touch, allodynia, hyperalgesia and hyperpathia.

It is headline news in the UK and one statement was made that the big problem associated with RSI is that nobody famous has caught it yet and the essence as in the Australian experience was that multiple tests rule out that there is anything cheap or simple associated with it. The UK experience indicated that males who were self employed rarely caught this disease. It was more common in males than in females and the singular most presenting occupation was that of journalists. In terms of Workers Compensation, those who were male and over 50 were less likely to improve than any age group, especially when there was the threat of redundancy, thus the psychosocial dimensions are evident.

Fibromyalgia

This topic took up the bulk of the programme. Essential questions are - Does it really exist? Are the abnormalities real? This is a condition in which 90% of the sufferers are women peaking at the 30 to 50 age group. Since it is a clinical condition, the major problem for the patient is the difficulty of proving that they are sick, so if you have to prove you are sick, how are you ever going to get better? Statistics from over the world indicate quite a variability in its acceptance which does parallel the study of RSI. In Scandinavian countries something like 24% of sufferers of fibromyalgia are on disability pensions whereas this is only 6% in the U.S. There are no figures apparently for the Australian scene. Although there does not seem to be any triggering factors, most patients appear to reflect the precipitation of their symptoms following some form of stress. Whether this is glandular fever, the flu, motor vehicle accident or emotional strain, the symptoms seem to come on after such an event, although in some cases the patient cannot remember anything other than the slow onset of symptoms in which there is a measured degree of cognitive impairment in those patients who work in a professional capacity.

Various laboratory experiments have indicated that substance P is elevated in the FM sufferers. They have a decreased growth hormone and prolactin levels are raised. In addition serotonin deficiency in FM is noted along with low serum tryptophan levels. There are defects in the function and feedback regulation of HPA axis resulting in decreased cortisol and growth hormone production as well as decreased ATP levels in skeletal muscle. However these findings are not pathognomonic for fibromyalgia as they are also found in stress related conditions.

It is interesting to note that in one study it was found that in order to substantiate the existence of fibromyalgia in the patient, the legal costs were three times those of the medical costs to substantiate the claim for insurance purposes.

Bearing in mind the complex interaction of the psyche and the soma, it is suggested that patients suspected of having fibromyalgia syndrome should be asked about:

1. Cause of sleep disturbance.
2. Physiological effect of sleep disturbance.
3. Reaction of exercise testing.
4. Major sites of pain.
5. Referred pain distribution.
6. Functional disability.
7. Psychological dysfunction.
8. Developmental experiences.
9. Home environment.
10. Work environment.
11. Major stresses.
12. Effects of various treatments.

Unfortunately, the vicious cycle of the psychological disturbance which produces inactivity which produces pain, which produces disturbed sleep, which produces psychological disturbance is quite

evident. So far no treatment has shown to have any significant impact on the natural history of this sequence.

The nine pairs of sites for tenderness are

- 1 Occiput: bilateral, at the suboccipital muscle insertion.
- 2 Low cervical: bilateral, at the anterior aspects of the intertransverse spaces at C5-C7.
- 3 Trapezius: bilateral, at the mid point of the upper border.
- 4 Supraspinatus: bilateral, at origins, above the scapula spine near the medial border.
- 5 Second rib: bilateral at the second costochondral junctions, just lateral to the junctions on the upper surfaces.
- 6 Lateral epicondyle: bilateral, 2 cm distal to the epicondyles.
- 7 Gluteal: bilateral, in upper outer quadrants of buttocks.
- 8 Greater trochanter: bilateral, posterior to the trochanteric prominence.
- 9 Knee: bilateral, at the medial fat pad proximal to the joint line.

As a summary, the comparisons between CFS and FMS are shown in the following table. The major difference really amounts to fatigue being the predominant factor in CFS with a better prognosis than fibromyalgia whose major complaint is muscle pain and sleep disturbance.

Relative Occurrences of Selected Features in Chronic Fatigue Syndrome (CFS) vs. Fibromyalgia Syndrome (FMS)*

| Features | CFS | FMS |
|-----------------------------|-------|------|
| Musculoskeletal pain | ++ | +++ |
| Significant fatigue | +++ | ++ |
| Tender points | ++ | +++ |
| Sleep disturbance | +++ | +++ |
| Chronic headaches | ++ | ++ |
| Irritable bowel symptoms | ++ | ++ |
| Cognitive impairment | ++(+) | +(+) |
| History of viral illness | ++(+) | +(+) |
| Immune dysfunction | +++ | + |
| Neurohormonal dysfunction** | +++ | +++ |

*+ = uncommon, ++ = common, +++ = very common, +(+) = uncommon to common, ++(+) = common to very common.

** Postulated neurohormonal dysfunctions in both FMS and CFS need to be confirmed by further studies.



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OVERSEAS CONFERENCES

1. London - The British Institute of Musculoskeletal Medicine Annual General Meeting

Date: 21-21 April 1995

Our British counterpart runs on similar lines as our own with valued speakers but as yet we have no further information as to the programme. Further information may be obtained from:

Dr Peter Skew
Hon. Secretary
27 Green Land
Northwood,
MIDDLESEX HA6 SPX
UNITED KINGDOM

2. Austria - FIMM, 11th Congress of the FIMM

Date: 26 - 29 April 1995

At this stage a global programme has been suggested but no further topics have been clearly delineated. Further information may be obtained by writing to:

Professor Dr H Tilscher
C/- Austrope Interconvention Centre
PO Box 30a 1043
VIENNA, AUSTRIA

3. Christchurch - Spine in Action 1996

Date: 21-25 January 1996

Venue: Town Hall, Christchurch, New Zealand

This conference involves the International Society for the Study of Lumbar Spine together with the new Australasian Faculty of Musculoskeletal Medicine. Many authorities of musculoskeletal medicine throughout the world will be gathering and will include, Professor Anderson, Illinois, Professor Deyo, University of Washington in Seattle, Dr Jiri Dvorak from Switzerland, Professor Malcolm Jayson, University of Manchester, Professor Alf Nachemson, Sweden, Professor Jeorgen Kramer from St Joseph Hospital Bochum in Germany, Professor Panjabi, from Yale University Medical Centre, and Professor Norton Hadler, University of North Carolina. Further information can be obtained from:

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BIOMECHANICAL PATHOLOGY

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Abstract

Specific aging changes occur in the spinal column in the same manner that changes take place in all other tissues of the body. Muscle strength and bulk decline with advancing years and in turn lead to postural alterations. Biomechanics are considered and the mechanism of physiological creep is discussed. Degenerative changes occurring to the intervertebral discs are considered to be primary changes whilst the osteoarthritic degeneration in the zygapophysial joints are considered secondary. Hypertrophic bony changes and soft tissue scarring may stiffen or fuse unstable segments but at the risk of structural stenosis.

AGE CHANGES IN THE LUMBAR SPINE

Clinicians who seek to judge pathological change in the adult lumbar spine need to understand the major changes in structure and function which accompany the ageing process. In old age, lumbar vertebrae become shorter and wider, more concave at their endplates and with an increasing amount of osteophytosis at the vertebral rims. Simultaneously, the intervertebral discs (IVD) become more convex at their disc-vertebral interfaces. While there is a greater incidence of disc degeneration with increasing age (particularly at the lowest two lumbar levels), gross degeneration is by no means universal. Indeed, recent studies show that disc thinning in old age is unusual, since about three quarters of lumbar discs maintain or increase their central height in old age (1). The zygapophysial (Z) or facet joints show chondromalacia like splitting of articular cartilage on their central and anterior aspects as a response to load-bearing, while the later growth of marginal osteophytes contributes to facet enlargement. Capsular stretching and IVD disruption may lead to instability of the motion segment(1).

In addition to the bony and joint changes listed, ageing also effects the ligamentous and muscular systems of the spine. As with bone, collagenous tissue requires the stresses and strains of movement and tension if it is to

remain healthy and strong. With increasing age, the reduced exercise activity in most Western societies, is associated with a considerable loss of collagenous tissue. As a consequence, spinal ligaments and the thoraco-lumbar fascia lose some of their ability to resist and transmit stress. This predisposes the spine to damage during heavy activities such as lifting, and often prevents the individual from being able to lift and carry heavy loads.

Similarly, the strength and bulk of the back muscles declines in old age (2). The proportion of slow-twitch 11A muscle fibres increases at the expense of the fast-twitch 11B fibres. This change is considered to reflect an increase in muscle endurance, as opposed to strength, with increasing age. There is also a progressive replacement of muscle tissue by fat, so that total muscle bulk may remain much the same, but the proportion made up of muscular fibres declines in late middle and old age (2,3). A large part of this change, in sedentary Western societies, may be a consequence of disuse, rather than an inevitable consequence of ageing (6).

There is a decline in the muscle strength of abdominal and back muscles with increasing age, in both sexes. Ele's (1) study suggests, but does not prove, an age-related reduction in intra-abdominal pressure. The role of intra-abdominal pressure mechanisms and/or

the posterior ligamentous structures in assisting in the spreading of load during lifting, has been the subject of much critical debate in recent times (4,8). However, there is general agreement that in old age, as a general rule there is a decline in trunk muscle strength, intra-abdominal pressure and ligamentous compliance and strength. All of these changes would mean that the ability of the trunk muscles to lift and carry loads declines significantly in old age. The extent to which that decline is inevitable is questionable, since there is strong evidence that intensive physical rehabilitation programmes increases lifting and carrying performance in middle aged and older people (3).

These structural age changes are associated with changes in posture and function, including a flattening of the lumbar lordosis, increases disc stiffness with a decline in flexibility and altered biomechanical responses to loading. In this paper, the term "biomechanical pathology" has been used to describe the functional changes in postures, movements and response of the lumbar spine, which follows as a consequence of both morphological age changes and structural changes due to trauma.

POSTURE

The usual static posture for the lumbar spine is that of lordosis. While cervical lordosis begins to appear at birth and develops as a permanent curve at about 3 months of age, the permanent lumbar lordosis appears with extension of the legs and weight bearing in the erect posture, usually between 12 and 18 months of age. These curves continue to change until the completion of spinal growth, usually between the ages of 15 and 18 years (3,4,5).

Pelvic tilt in the sagittal plane and lumbar lordosis are inextricably linked together, since the pelvic girdle and sacrum are united by strong, relatively immobile sacro-iliac joints. Thus, when in erect posture the pelvis is tilted forward, it brings about an increase in lordosis, and when tilted backward, the lumbar spine flattens. This occurs as a result

of interaction between the long and short back muscles, abdominals (rectus abdominus and the oblique muscles), psoas major and iliacus, gluteus maximus and hamstrings (3). In the course of everyday activity, individuals constantly adjust their pelvic/lumbar spinal posture to allow for comfort, ergonomic advantage, automatic postural responses to changes in the environment and because of the requirements of different purposive movements. Muscle tightness affecting any of the muscle groups listed can change both resting posture and the total range of dynamic postures available.

The lumbosacral lordosis is a compound curve with the amount of curvature greatest at the L5-S1 level and least at the L1-2 level (3,4,5). In general, at all ages the shape of the intervertebral discs contribute a greater proportion to lordosis than do the shapes of the vertebrae. However, at the lumbosacral junction, the "wedge-shape" of the L5 vertebral body makes a significant contribution. The L5-S1 disc is also more wedge-shaped than higher discs (4).

SEXUAL DIMORPHISM AND AGE CHANGES

During the childbearing years, the L1-S1 angle of lumbar lordosis is greater in women than in men. This difference is not apparent in childhood and it disappears again in old age. The reasons for the postural difference are not clear, but they probably have a hormonal basis (4). Further analysis shows that a major difference in the lumbar posture of males and females occur at the lumbosacral angle, as the composite L1-L5 angles are similar in life in males and females. It is the increased sacral and pelvic tilt of females which is primarily responsible for the gender difference in the shape of the lordosis in adolescence and early adult life.

In old age, the lumbar lordosis flattens considerably in both sexes (4,5).

LUMBAR LORDOSIS AND BACK PAIN

Both a decline and an increase in lordosis have been implicated by clinicians as possible factors contributing to low back pain (4,9). In the main, these views are based on clinical judgements; since the only controlled studies of the possible relationship between habitual lumbar posture and low back pain are equivocal.

LUMBAR MOVEMENTS

Each adjacent pair of vertebrae is joined by an articular triad which only allows a few degrees of motion at each level. However, the whole lumbar column has considerable ranges of movement in the sagittal and coronal planes. There are also complex coupled movements which allow some horizontal plane movement (3). The thickness of each intervertebral disc, the compliance of its fibrocartilage and the shape and length of its adjacent vertebral end-plates are of primary importance in governing the extent of movement possible. The shape and orientation of the Z joint facets, with the ligaments and muscles of the posterior arch, guide the types of movements possible and provide restraints against excessive movement (3,4).

A large range of movement would occur in situations where disc height was relatively great and where vertebral end-plate dimensions relatively short (3). It is more usual for females than for males to possess this combination of dimensions in the lumbar spine and females usually demonstrate a greater range of motion during the child-bearing years. In old age (over 60 years), however, when male and female vertebrae and disc shapes become similar, and hormonal differences are reduced, the ranges of lumbar movements for men and women are almost identical.

A large number of studies have used a variety of methods to measure or estimate ranges of lumbar movements. These methods include direct measurement, radiographic studies, photographic techniques and

mathematical models. They have been utilised in studies of living and of post-mortem subjects (3). All studies demonstrate a significant reduction in the ranges of all lumbar movements with increasing age for both sexes. This decline is attributable principally to increasing disc stiffness, as demonstrated by the posterior release experiment of Twomey and Taylor (3) which shows a 40 per cent increase in disc stiffness in the elderly. The increased disc stiffness is associated with well known biochemical and histological changes which occur in the discs with increasing age. These changes include increases in the total of collagen fibres and in the ratio of Type I to Type II collagen, a decrease in water content, and a change in the proteoglycan ratios where the proportion of keratan sulphate to chondroitin sulphates increases (10). There is also an associated increase in the aggregation of proteoglycans and in the number of bonds between collagen fibrils (10). Collectively, these biochemical changes and the associated decrease in disc compliance, mean that the discs function less efficiently in movement and load bearing.

BIOMECHANICS

The orientation of the lumbar articular processes facilitates sagittal movement and allows for a considerable range of motion in this plane. From the erect standing posture, flexion usually comprises 70 per cent and extension 30 per cent of the total sagittal range. Flexion is restrained by compressive apposition of zygapophysial joint surfaces (1), increasing tension in posterior ligaments (including the posterior anulus), the TLF and muscles, while extension is blocked by the bony contact between the tips of the inferior articular processes and the laminae of the vertebra below (1,3,4). In standing, the back extensor musculature controls flexion by eccentric contraction. Kippers and Parker (11) show an "electrically silent" phase in the back muscles near or at the limit of lumbar flexion. While they conclude that the spine is supported passively by tension in postvertebral ligaments at this point, it is also supported in part by the elastic tension of the muscles and also substantially by the approximated zygapophysial facets (1). This

is because lumbar flexion involves both forward rotation and 1-3mm of ventral translation of each vertebra on the subsequent vertebra. The centre for this movement is usually located in the posterior anulus of the intervening disc (9).

CREEP IN THE LUMBAR SPINE

Creep is the progressive deformation of a structure under prolonged loading by forces which are not large enough to cause permanent damage to the components of the structure which is loaded (4). The lumbar spine is subject to both axial creep and creep in flexion as a routine part of many activities of daily living.

Axial creep produces the loss in stature which occurs through the day as a consequence of the sustained loads of body weight in erect posture; this is primarily due to fluid loss from the discs. Approximately 70% of this diurnal loss of stature is regained during the first half of the night's rest in the usual extended sleeping positions, although rest in flexion produces more rapid gains in stature than rest in other positions (3,4,12).

Creep in flexion occurs when the spine is loaded in full flexion for a sustained period. This procedure not only squeezes fluid out from the IVD's, the articular cartilage of the zygapophysial joints and the spinal ligaments, but it also distorts the discs and other soft tissues by redistributing the remaining fluid within them. The effect of creep in flexion is to produce progressive ventral movement further into flexion, beyond the end-point of its normal range. The amount of creep in the elderly is greater than in the young and both the creep and the recovery from creep take place over a longer period of time in older subjects (12). During this prolonged process the extrusion of fluid from the soft tissues deprives them of a part of their nutrition (13). In addition, if the force is maintained for a sufficiently long period, then the 'crimp' in the collagen fibrils of the posterior anulus and zygapophysial joint capsules is likely to be progressively reduced as the fibrils slowly elongate under the constant tension (3).

If high loads are applied for long periods (greater than one hour), a large amount of creep is achieved and recovery to the original starting posture (hysteresis) is extremely slow, particularly in the elderly. It takes many hours under rest conditions for the soft tissues to imbibe enough fluid to re-establish their usual shape (i.e., to reach equilibrium) after such sustained flexion loading (3). Many occupational groups (e.g., bricklayers, shearers, roofing carpenters and the like) regularly submit their spines to this category of insult. They may work with their spines fully flexed and under load for a considerable time, with little movement away from the fully flexed position once it has been attained, and little opportunity for recovery between episodes of work in the flexed position. It is also likely that prolonged sitting in the slumped position would produce similar effects in susceptible discs (12,13).

Creep in extension follows sustained loading at the limit of the range of lumbar extension, (13). There are few occupations or recreational pursuits which require loading in full extension for prolonged periods. Activities such as painting a ceiling with the arms extended above the head may involve lumbar creep in extension. However, this is very much less common than the human activities which produce creep in lumbar flexion.

INTERMITTENT, HIGH VELOCITY EXTENSION

While sustained lumbar extension is rare, there are a number of sports activities which involve repetitive, intermittent, high velocity movements into full extension. This group includes gymnasts, football players, high jumpers, basketball players and fast bowlers in cricket (3,13). During these sports, high impact, repetitive extensions movements drive the chisel-like inferior articular processes down onto the laminae (pars interarticularis) of the vertebra beneath. The forces are often very considerable and the load borne by the facets increases dramatically with the amount of extension of the region (3,13). Repetition of such activities over long periods of time results in

soft-tissue damage or inflammation and laminar sclerosis which may become obvious on radiographic examination. The same forces and repeated stresses may result in fracture of the isthmus of the pars interarticularis (spondylolysis), with the possibility of ventral slide of the upper vertebra (spondylolisthesis). In many sporting activities, the repetitive combination of alternate explosive extension followed rapidly by full flexion, places additional cyclic strains on the pars interarticularis because the anterior compressive loading applied to the superior articular process in flexion is also transmitted to the pars. This repetitive extension/flexion may cause fatigue fractures in the pars interarticularis in a manner analogous to metal fatigue, caused by successive movements in opposite directions (13).

INTRADISCAL PRESSURE

The nucleus of the intervertebral disc is contained under pressure within its protective fibrous and cartilaginous envelope. Intradiscal pressure is a useful index of the response of a disc to loading and of disc integrity. It has been shown to vary widely according to changes in posture, movement tasks performed and age. Axial loading produces lower pressure reading in children below the age of 16 years than in adults (3,4,13). Degenerate discs and some older discs do not respond to loading in a consistent way, as they may show pressure changes in different postures which are dissimilar from those shown by healthy discs (3).

MOTION SEGMENT PATHOLOGY

Schmorl & Junghanns (5) brought to prominence the concept of the motion segment and the interdependence of its constituent elements, particularly the articular triad formed by an intervertebral disc and two adjacent zygapophysial joints. Studies of the pathology of ageing and degeneration of the motion segment suggest that progressive loss of nuclear compliance and repeated minor strains of the motion

segment, initially cause stretching or circumferential tearing in the annulus fibrosus. Later, radial annular fissures appear, leading to internal disc disruption and sometimes to eventual disc resorption, with associated arthritic changes in the zygapophysial joints (3,5). Crock (14) states that internal disc disruption is much more frequent as a cause of back pain, than annular rupture with nuclear prolapse, and the study of Brinckman (15) supports the view that extensive internal disruption is not necessarily followed by nuclear extrusion. The disc degeneration is usually regarded as primary, with annular damage produced by flexion-torsion strains. The changes in the zygapophysial joints are regarded as secondary, but it is not certain that this is always the case (16).

THE "PROTECTIVE" FUNCTION OF THE ZYGAPOPHYSIAL JOINTS

The zygapophysial joints are designed to protect the annulus from the excessive torsion and flexion strains which most endanger it (1,3). They guide movements in appropriate planes, restrain movements at end-range and prevent movements which would overstretch the annular fibres (3). The chondromalacia commonly observed in the anterior coronally oriented parts of lumbar zygapophysial joints, the thickened subchondral bone plate and hypercalcification or sclerosis of the pars interarticularis in many adolescents and young adults, all attest to the stress transmitted through the facets in fulfilling this function (1,7). Farfan (9) maintained that torsion was the movement most likely to tear the spiral fibres of the annulus fibrosus, but Adams and Hutton (16) showed that in the loaded spine in neutral posture, the zygapophysial joints prevent the degree of torsion likely to tear the annulus. However, flexion stretches the posterior annulus and also reduces the congruity of the lumbar zygapophysial facets, permitting a wider range of axial rotation while in a flexed position. A torsional force applied to fresh unfixed lumbar spines produces axial rotation as a coupled movement, accompanied by flexion. Observations of CT scans of lumbar spines from patients with chronic low back pain suggest that torsional

strain, associated with rotational subluxation of a zygapophysial joint, is a common form of instability (18).

SYMPTOMS AND PATHOLOGY

It is often stated that there is a lack of correlation between pathology observed in the motion segment and back pain which has an earlier onset (17). Apart from discography, which is often difficult to interpret and MRI, which is only occasionally used, standard radiographic investigations only demonstrate gross bony changes or the end stages of internal disruption with disc thinning; they do not show the earlier soft tissue pathology which may be producing the pain.

Kirkaldy-Willis (18) and his colleagues provide a general scheme, which remains partly hypothetical, to correlate the natural history of motion segment degeneration with the symptoms commonly observed. The initial symptomatic phase, described as "dysfunction", is associated with a relatively minor strain of the joints of the motion segment, together with spasm of the segmental muscles and segmental hypomobility; pain may be associated with synovitis or capsulitis in the zygapophysial joints or with circumferential tears in the innervated lamellae of the annulus (4). Repeated damage to the motion segment eventually results in the second phase, of mechanical instability with internal disc disruption and possible "subluxation" or overriding of the zygapophysial facets (18). At this stage, a combination of facet hypertrophy and segmental instability with listhesis may cause nerve root entrapment by a dynamic stenosis in the nerve root canals (19).

Finally hypertrophic bony changes and soft tissue scarring may stiffen or fuse a previously unstable motion segment, with reduction of symptoms in the stiff motion segment but risk of structural stenosis.

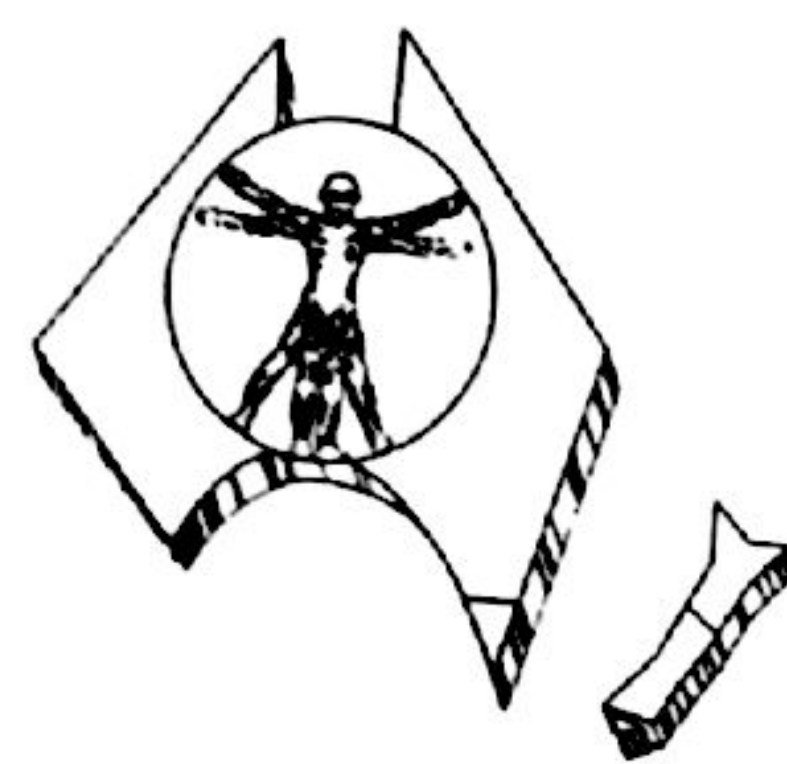
SPINAL STENOSIS

From middle life onwards, narrowing of the intervertebral canals and lateral recesses of the spinal canal has been attributed to hypertrophy and scarring of the ligamenta flava (5). Such "hypertrophy" may contribute to spinal stenosis. In some older individuals, there is evidence of the replacement of elastic tissue by the less resilient elastic fibrocartilage. Taylor et al (20) clearly show cases of retrolisthesis which involve tearing of the cartilaginous ligamentum flavum in such older persons. Intrusion of the ligament into the spinal canal in extension movements, may not be due to buckling of a less elastic ligamentum flavum, but may occur because the ligament is forced forwards by the articular processes during movement (3). This is accentuated by hypertrophic osteoarthritic changes in the Z joints with bony proliferation and osteophyte formation. True hypertrophy of the ligamenta flava probably does not occur, but rather the shortening of the column which accompanies osteoporosis may result in thickening of the ligamenta flava. Alternatively the ligament may be pushed anteriorly into the canals by: (i) thickened laminae, (ii) enlarged articular processes, (iii) subluxed facet joints in motion segment instability associated with internal disc disruption. Schmorl and Junghanns (5) emphasise that the significance of hypertrophy or bulging of the ligamentum flavum has been considerably overestimated.

A critical consideration of the literature suggests that the most important factors in lateral recess stenosis may be a combination of the ligamentum flavum thickening accompanying the "telescopic contraction" of the ageing vertebral mobile segments, together with hypertrophic osteoarthritic changes in the zygapophysial joints. Both the vertebral and intervertebral canals are narrowed by these combined bony and ligamentous changes.

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M.P.A.A. COMING EVENT 1995

Manipulative Physiotherapists to meet on the Gold Coast 1995

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Queensland will host the next major Australian conference on manipulative physiotherapy. Held each two years, the 1995 scientific meeting is expected to attract 500 delegates. The four-day event is open to all physiotherapists and other interested health professionals. Overseas interest is welcome. A trade exhibition will be held in association with the conference.



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OCTOBER 14 - 19, 1996
ZÜRICH, SWITZERLAND

A GLOSSARY OF MUSCULOSKELETAL TERMS

Jim Borowczyk and Wade King

Australasian Faculty of Musculoskeletal Medicine

This glossary is one of the first projects of the newly-formed A F M M. The main purpose of the Faculty is to act as an educational resource, providing information and course material to the Australian and New Zealand Associations of Musculoskeletal Medicine, and to any other interested professional organisation or individual practitioner.

The Faculty has reviewed the needs of the discipline at its present stage of development and decided that one such need was for a comprehensive glossary explaining the many special terms that relate to practice in musculoskeletal medicine or that may be found in the relevant literature. It is hoped that practitioners will find the glossary useful. Undoubtedly some will find omissions or inaccuracies in terms of current usage and the authors will welcome any comments or amendments that might be included in a future edition.

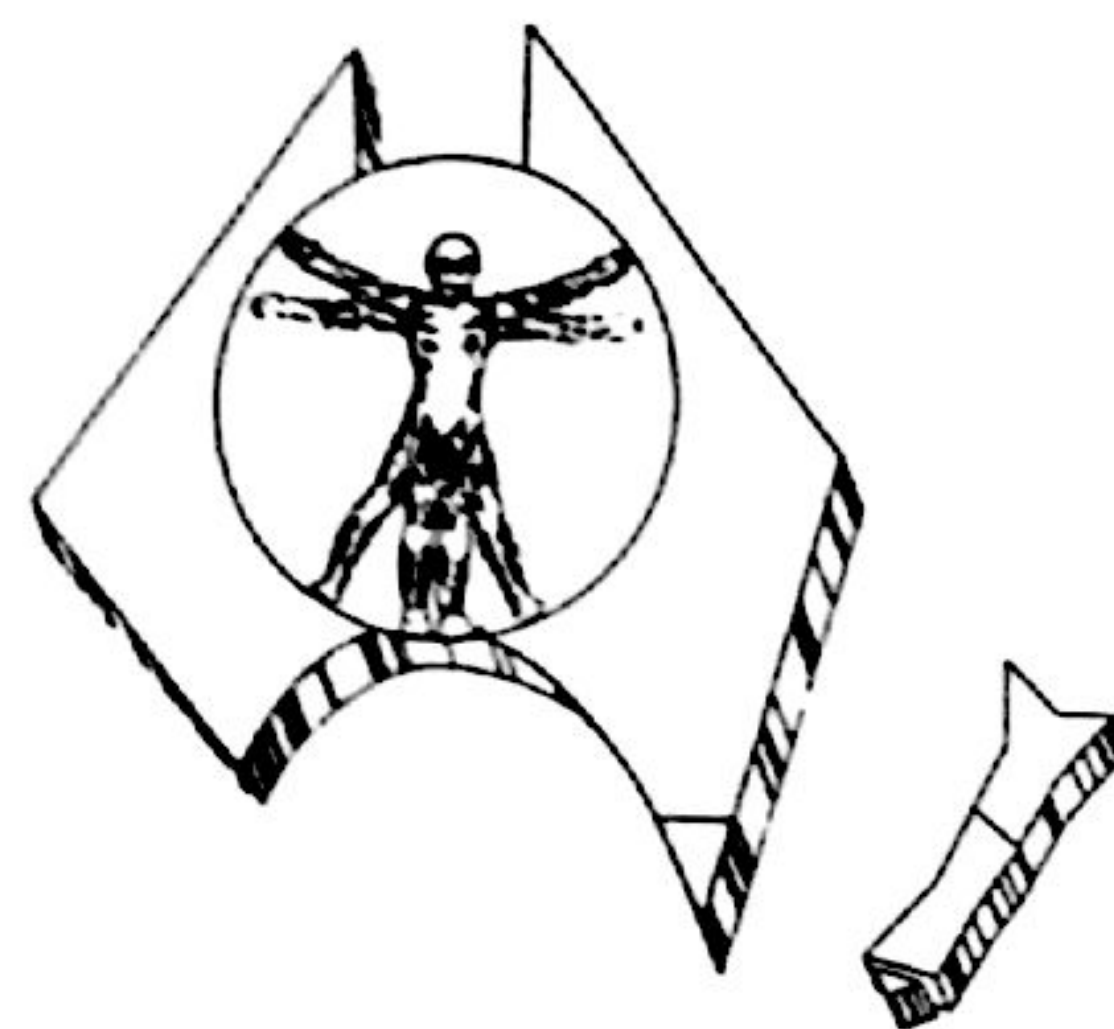
The aim of this glossary is to provide some explanation of terms, phrases, acronyms and eponyms encountered in the study of musculoskeletal medicine. It is not intended as a series of precise definitions but merely as a practical working guide.

Acronyms are printed here without full stops as some are spoken as words rather than as initials.

Eponyms are included to enable their interpretation, not to reinforce their use. Eponymous terms are generally to be discouraged as they are less readily understood than descriptive terms.

Some archaic and obsolete terms are included as they are still sometimes found in the literature. Scientific taxonomy is always in a dynamic state and inclusion here does not mean that a term is in current usage.

Users may find that some entries in the glossary contain terms that themselves require explanation. In such a case they should refer to a separate entry for the term in question. This advice is designed to obviate the need for frequent repetition of the instruction "q.v."



Aβ fibres

Large diameter afferent nerve fibres that transmit information concerning touch, vibration and proprioception.

Aδ fibres

Small diameter, slowly conducting, myelinated nerve fibres that respond to mechanical and thermal stimuli.

Abduction

Movement away from the midline.

Accessory movements

Movements that may be performed passively but not actively; such movements are accessory to those termed physiological.

Active exercise

Exercise involving active movement.

Active movement

Movement performed by the patient.

Acupressure

Application of pressure over an acupuncture point for the purpose of relieving pain; also known as Shiatsu; c.f. ischaemic compression.

Acupuncture

A method of treatment in which specific points on the body surface are stimulated with fine needles for the relief of pain and other purposes.

Acute locked back

A clinical condition in which the lumbar spine becomes suddenly locked, usually in a position of flexion, and painful.

Adduction

Movement towards the midline.

Adductor tendonitis

A disorder, presumed to be inflammatory but possibly an enthesopathy, of the attachments of the adductor muscles of the thigh; a cause of groin pain.

Adhesive capsulitis

An inflammatory condition of a joint capsule leading to contraction of the capsule and loss of mobility; most commonly affects the glenohumeral joint.

ADLs

Activities of daily living.

Adson's test

A clinical test in which the patient's radial pulse is felt while the patient turns his head to the ipsilateral side, breathes in deeply and has that arm abducted passively to 90°; loss of the pulse is said to be associated with a "thoracic outlet syndrome".

Agonists

Muscles so attached anatomically that when they contract they develop forces that reinforce each other.

Ala

A wing-like projection; e.g. the lateral part of the sacrum.

Albers-Schonberg disease

Osteopetrosis or marble bone disease.

Algogenic

Giving rise to pain.

Algometer

A device used for the assessment of pain.

Allodynia

Pain perceived from a stimulus that does not normally provoke pain.

Amyotrophic lateral sclerosis

A form of motor neuron disease.

Anamnesis

A European term for the medical case history.

Anatomical barrier

The limit of joint movement beyond which tissue damage occurs if further force is applied.

Anatomical position of the body

The reference position of the human body, standing erect and looking straight ahead, with arms at the sides, palms forward, feet approximated and parallel.

Ankle equinus

Deformity of the ankle in which plantar flexion is pronounced and dorsiflexion is limited.

Ankylosis

Pathological fusion of a joint.

ANOVA

Analysis of variance; a statistical method of comparing the mean values of sets of data to determine whether they are equivalent.

Antagonists

Muscles so attached anatomically that when they contract they develop forces that oppose the action of the agonists.

Antalgic gait

The gait adopted when there is pain aggravated by weight-bearing on one of the legs; as little time as possible is spent in the stance phase on the affected limb.

Antecedent data

Data from earlier sources such as studies published previously.

Anulus fibrosus

The ring-shaped outer part of an intervertebral disc, made up of collagen fibres arranged in circumferential lamellae.

Anular tear

A tear of the annulus fibrosus.

Apley's test

A clinical test for which the patient lies prone with one knee flexed to 90° and the examiner pushes downwards on the raised lower leg, then rotates it internally and externally to elicit pain or crepitus from a compressed meniscus.

Aponeurosis

A fibrous sheet, serving as a fascia enclosing a muscle or group of muscles, or as an expanded tendon at the point of attachment of a flat muscle.

Appendicular skeleton

The parts of the skeleton that support the limbs, as distinct from the axial skeleton.

Apprehension test

A clinical test for recurrent dislocation of joints; the examiner begins to move the joint passively, causing the patient to resist the movement and to look apprehensive if the test is positive; applied to patellae and shoulders in particular.

Arachidonic acid

An essential fatty acid involved in cell membrane structure; when released from damaged cells it may be metabolised by the action of cyclo-oxygenase to prostaglandin.

Arachnodactyly

Unusually long, 'spider-like' fingers such as those found in Marfan's syndrome.

Arnold-Chiari deformity

Elongation and downward protrusion of the cerebellum and brainstem into the cervical spinal canal, associated with spina bifida.

ART

Asymmetry, Range of motion, Tissue texture abnormalities.

Arthralgia

Joint pain.

Arthrocentesis

Aspiration of fluid from a joint space.

Arthrodesis

Surgical fusion of a joint.

Arthrogram

A radiological image of a joint space, usually after injection of contrast material.

Arthropathy

Joint pathology.

Articular cartilage

Hyaline cartilage.

Articular tropism

Asymmetric orientation of the facets of paired joints; a developmental anomaly of, for example, zygapophysial joints.

ASIS

Anterior superior iliac spine.

Ataxia

Incoordination of muscular action; one major type is due to disturbance of proprioceptive input, termed sensory ataxia, another to cerebellar dysfunction, termed cerebellar ataxia.

Auto-traction

Self-applied traction; a form of traction in which the patient provides the necessary force, such as by pulling against a fixed point.

Axial rotation

Rotation around an axis.

Axial skeleton

The part of the skeleton that supports the trunk of the body, including the skull, spine and pelvis, as distinct from the appendicular skeleton.

Axis of rotation

A line around which all parts of a rotating body move in circles; c.f. IAR.

Baastrup's disease

Clashing or "kissing" of the spinous processes of adjacent vertebrae, with periosteal irritation at their tips causing pain.

Bankart lesion

Detachment of the glenoid labrum and glenohumeral capsule from the anterior rim of the glenoid fossa; associated with recurrent anterior dislocation of the shoulder.

Barrier

An effect limiting joint movement or

muscular relaxation; types of barrier include anatomical, pathological, physiological and restrictive.

Biofeedback

A psychological method of neuromodulation used in pain management.

Biomechanics

The study of mechanical aspects of the body's functions, especially in relation to loading and movement.

Biomechanical axes

The three axes of reference in the biomechanical system for describing body movements; c.f. X axis, Y axis and Z axis.

Body mass index (BMI)

A measure of bodily habitus, calculated by dividing the body mass in kilograms by the square of the height in metres; the normal range is in the low 20s.

Bone remodeling

The process by which bony tissue changes size, shape or structure in response to mechanical stimuli.

Bouchard's nodes

Bony swellings around the proximal interphalangeal joints of the fingers due to osteoarthritis; c.f. Heberden's nodes.

Boutonniere deformity

A flexion deformity of the proximal interphalangeal joint of a finger; the PIP joint flexes through a "buttonhole" in the extensor hood due to loss of integrity of the central slip of the extensor tendon; the DIP joint is hyperextended.

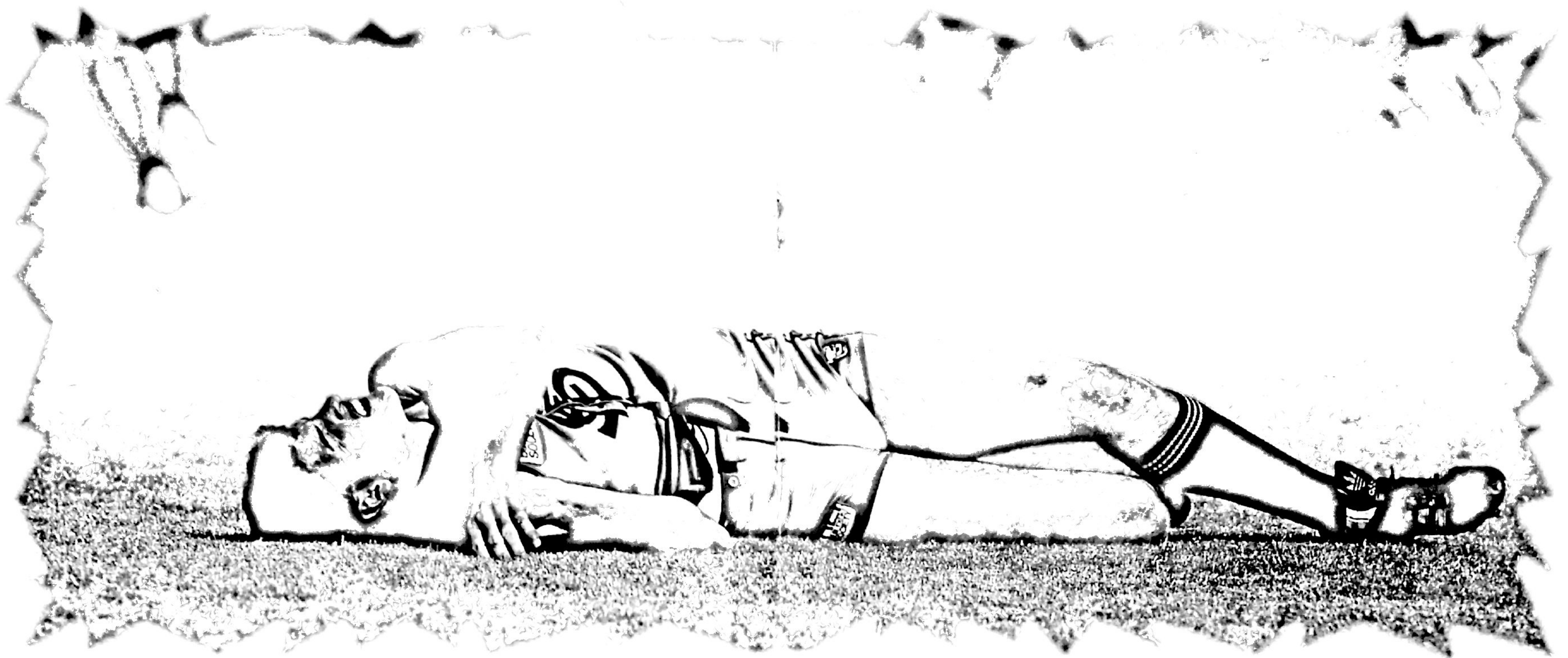
Brodie's abscess

The radiographic appearance of a circumscribed round or oval zone of radiolucency surrounded by a halo of sclerosis in the metaphysis of a bone affected by tuberculosis or other forms of osteomyelitis.

Brugger's relief position

A sitting posture in which the subject sits on the edge of the chair with legs apart,

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takes weight on the legs, relaxes the abdominal and gluteal muscles, and lets the arms hang loosely with the hands behind the hip joints; the pelvis tilts forwards, the abdomen protrudes, the lumbar lordosis is maximised and the thoracic kyphosis is minimised; relieves discomfort due to prolonged sitting with head down

Bruxism

Grinding of the teeth.

C fibres

Small diameter, slowly conducting, unmyelinated nerve fibres that respond to chemical, mechanical and thermal stimuli.

Cambium

The cellular inner layer of the periosteum adjacent to bone tissue.

Camptocormia

Exaggerated back stiffness associated with diffuse pain and bizarre clinical features; usually due to psychogenic overlay.

Capsular pattern

A pattern of joint movement limitation due to resistance of the joint capsule; found when the capsule is inflamed, as in arthritis; the typical pattern for each joint is determined by the capsular anatomy.

Categorical data

Data that can be separated into distinct categories; e.g. positive and negative results.

Cauda equina syndrome

A condition of radiculopathy involving the nerve roots that make up the cauda equina (i.e. the lumbar, sacral and coccygeal roots); clinical features include leg weakness, loss of reflexes, perineal paraesthesiae, urinary retention with overflow and loss of anal sphincter tone.

Caudad

Direction of movement away from the head.

Causalgia

A syndrome of sustained burning pain, allodynia and hyperpathia after a traumatic nerve lesion, often combined with vasomotor and sudomotor dysfunction and later trophic changes.

Central Pain

Pain generated within the central nervous system.

Centre of mass

The point in a body at which its mass is in equilibrium; the total mass may be considered concentrated at the COM for some calculations; often called the centre of gravity.

Centre of pressure

The point at which ground reaction forces are considered to act on the sole of the foot in gait analysis.

Centrode

The locus or path taken by the axis of rotation as a joint or spinal motion segment moves through its range; a plot of serial IARs.

Centroid

The geometric centre of a body.

Centrum

The main part of a vertebral body developed from axial mesenchyme.

Cephalad

Direction of movement towards the head.

Cervical headache

Head pain referred from the neck.

Cervicothoracic junction

The vertebral region C7 - T2/3.

Chondromalacia patellae

A condition of degradation and softening of the cartilage of the articular surfaces of the patella.

Chopart's joint

The articulation between the talus and

calcaneus proximally and the cuboid and navicular bones distally; separates the hindfoot from the midfoot.

Circumduction

A composite range of movement combining other ranges; occurs at ball and socket joints such as shoulder and hip.

Chiragra

Pain in the hand (archaic).

Chi-square test

A statistical test used to compare observed and expected frequencies of categorical data.

Chondroitin sulphate

A glycosaminoglycan with longer disaccharide chains than keratan sulphate.

Chondromalacia patellae

A condition of degeneration and softening of the articular cartilage of the patella.

Claw toe

A deformed toe in which the MTP joint is subluxed into extreme dorsiflexion and the PIP and DIP joints are plantarflexed; associated with metatarsalgia.

Click

The noise made or sensation felt when a joint is manipulated; said to be due to release of gases diffused from the blood into a joint space when the periarticular circulation is slowed by factors associated with joint restriction.

Close-pack position

The position of a joint in which there is maximal contact between the articular surfaces and the capsule and ligaments are tensed to the maximum; the most stable position of the joint.

Cobb's angle

A measure of scoliosis, being the angle subtended by lines drawn laterally from the vertebral endplates at the top and bottom of the scoliotic segment.

Coccydynia

Pain in the region of the coccyx; not necessarily due to a coccygeal problem; may be referred from the lumbar spine.

Compartment syndrome

A clinical condition of local pain, tenderness and swelling due to increased pressure in a closed fascial compartment, most commonly one of those of the lower leg; caused by bleeding or oedema following an injury or severe exercise.

Compliance

The opposite of stiffness; the quality that allows a body to deform in response to an applied force.

Compression

A loading mode in which the applied stress tends to squash the subject structure, causing it to shorten and widen.

Concentric muscle contraction

Contraction as the muscle shortens.

Confidence interval

A statistical term indicating the range in which a value can be expected to occur with a given level of confidence or probability; the 95% confidence level is most commonly used.

Contingency table

A grid table in which data is set out in categories to show the relationships between values at the top and the side of the table; e.g. a two by two contingency table could be used to display the positive and negative results of two tests.

Continuous data

Data with a continuous range of values; e.g. body heights.

Coronal plane

A frontal or vertical plane that divides the body into anterior and posterior portions.

Coupled movements

Movements occurring in two biomechanical directions at once; e.g.

cervical rotation is usually coupled with sidebending.

Coxa plana

Osteochondrosis of the femoral head; also called Perthe's disease.

Coxa valga

A condition in which the hip seems to protrude less than usual and the angle between the neck and the shaft of the femur is more than 125° .

Coxa vara

A condition in which the hip seems to protrude more than usual and the angle between the neck and the shaft of the femur is less than 125° .

Coxalgia

Pain in the hip.

Coxarthrosis

Degenerative condition of the hip joint.

Creep

Progressive deformation of a body due to a low level of loading sustained over a long period.

Crepitus

A grating sensation.

Crimp

The buckled or wavy shape assumed by collagen fibres when not under load.

Criterion standard

A reliable and valid standard against which comparable things can be tested; often called a "gold standard".

CT scan

Computerised tomographic scan.

Cubitus recurvatus

A deformity of the elbow involving hyperextension; associated with constitutional hypermobility.

Cubitus valgus

A deformity of the elbow in which the

carrying angle is increased.

Cubitus varus

A deformity of the elbow in which the carrying angle is decreased.

Degenerative joint change

Osteoarthritis; change that occurs in a joint due to the normal process of ageing and repeated joint loading over time.

Degrees of freedom

Directions of movement of which a joint is capable.

De Kleijn's test

A clinical test for vertebrobasilar insufficiency; with the patient supine the head is moved slowly and gently towards a quadrant position of neck rotation and extension, while the patient talks to report any subjective change; slurring of speech, symptoms of dizziness, nausea etc. or nystagmus observed by the examiner constitute a positive test and the movement must not be continued; a positive test on rotation to one side suggests arterial insufficiency on the other.

Dermatome

An area of skin supplied by a particular spinal nerve and to which radicular pain related to that nerve is referred in a characteristic pattern.

Dextroconvex

Convex to the right.

Diarthrodial joint

A freely moveable articulation.

Diffuse idiopathic skeletal hyperostosis

A disease of hyperostosis and osteophyte formation leading to ankylosis of vertebral bodies with preservation of disc height and sparing of the zygapophysial and sacroiliac joints; seen radiologically as the "candle wax" appearance of flowing ossification along the right anterolateral aspect of at least four contiguous vertebral bodies, most commonly T7-11; also called Forestier's disease.

DIP joint

Distal interphalangeal joint.

Disability

A functional limitation; any restriction or lack of ability to perform an activity in the manner or within the range considered normal for a human being; a consequence of impairment in terms of functional performance; influenced by psychological factors and assessed by non-medical means; a behavioural problem.

Disc degeneration

The changes that occur in an intervertebral disc due to the normal process of ageing; with a gradual loss of water-binding capacity the disc becomes drier and more solid but disc height is maintained or even increased.

Disc degradation

Chemical degradation of the nucleus pulposus of a disc, with progressive loss of water-binding capacity and dehydration; caused by an auto-immune response initiated by an endplate fracture; may lead to isolated disc resorption or internal disc disruption with loss of disc height.

Disc prolapse

Protrusion of part of an intervertebral disc beyond its normal confines.

Disc herniation

Extrusion of material from the nucleus pulposus of a disc through an abnormal opening in the annulus fibrosus.

Discography

A radiological procedure in which an intervertebral disc is injected with contrast material to produce an image of internal disc structure.

Discometry

Measurement of the pressure inside an intervertebral disc, by means of a special needle; an experimental technique that demonstrates the effects on a disc of various postures and movements.

DISH

Diffuse idiopathic skeletal hyperostosis.

DISI pattern

The dorsal intercalated segment instability pattern of the wrist in which the lunate is dissociated from the scaphoid and tilted dorsally.

Distraction

Drawing apart; separation of parts, as when a structure is stretched longitudinally by a tension stress.

DMARDs

Disease modifying antirheumatic drugs; gold salts, methotrexate etc. used to treat arthritides.

Dorsal horn laminae

The layers of cells in the dorsal horn where afferent neurones synapse.

Dorsiflexion

Movement of the foot or the toes upwards.

Duchenne gait

A gait adopted in the presence of gluteal weakness in which the centre of gravity of the body is shifted over to the side of weakness.

Duchenne's muscular dystrophy

Progressive pseudohypertrophic muscular dystrophy; an X-linked recessive chromosomal disorder, affecting young boys who have progressive weakness and bulky muscles due to fat and connective tissue replacement of muscle tissue.

Dynamic posture

The sequence of positions assumed by the body in activity.

Dysaesthesia

An unpleasant or abnormal sensation, whether spontaneous or evoked.

Dysequilibrium

Disturbance of balance.

Eccentric muscle contraction

Contraction as the muscle lengthens.

Ecological validity

A type of external validity related to the situation in which results or outcomes occur; the extent to which results obtained in one setting can be generalised to other circumstances.

EDS

Ehlers-Danlos syndrome.

Effleurage

Gentle massage of the stroking type; c.f. petrissage.

Ehlers-Danlos syndrome

An inherited disorder of collagen synthesis characterised by unusual skin laxity, joint hypermobility and vascular fragility.

EMG

Electromyography; the technical process of recording the electrical activity of a muscle between electrodes that may be either needles inserted into it or flat electrodes taped over it.

Endfeel

The sensation appreciated by the examiner as a joint is brought to the limit of its movement (see hard, soft endfeel).

Endplate

The cartilaginous structure at the junction between the upper or lower surface of an intervertebral disc and the adjacent vertebral body; variously considered as part of the disc or the vertebra; structure continuous with the inner layers of the annulus fibrosus.

Endplate fracture

Fracture of the endplate that allows the material of the nucleus pulposus to come into contact with the blood and nerve supply of the vertebral bone.

Enthesis

Junctional tissue between tendon and bone; occurs at points of muscle attachment.

Enthesopathy

Pathology of entheses; usually involves a tear and repair process; e.g. lateral epicondylar enthesopathy, one form of "tennis elbow".

Eosinophilic granuloma

A lipid storage disease of the histiocytosis X type in which the patient has one or more lytic bone lesions that may cause pathological fracture but usually heal spontaneously; more common in children; when it affects a vertebral body it may cause a flattish wedge-shaped deformity called vertebra plana.

Epiphyseal traction injuries

Minor avulsion injuries of the entheses at which muscles insert into bony ossification centres; usually occur in adolescence as overuse syndromes; the more common sites and their eponymous designations include the tibial tuberosity (Osgood-Schlatter's disease), the lower pole of the patella (Sinding-Larsen's disease) and the posterior calcaneus (Sever's disease).

Eversion

Turning outwards; eversion of the foot is outward (lateral) turning of the entire foot on the talus and of the forefoot in relation to the hindfoot.

Exercise

Autogenous bodily movement.

External rotation

Rotation of a body part away from the midline; also called lateral rotation.

External validity

The extent to which the results of a study or outcomes that are obtained under certain conditions can be generalised; includes population validity and ecological validity.

Extrinsic muscles

Muscles connected outside a structure such as a hand or foot; extrinsic hand muscles originate proximally to the hand proper but attach to structures within the hand.

Fabella

A sesamoid bone that sometimes occurs in the lateral head of the gastrocnemius muscle at the back of the knee; may articulate with the lateral femoral condyle.

FABER test

A test of thigh adduction, hip joint function, and sacroiliac joint restriction. Flex, ABduct, and Externally Rotate the hip.

Facilitation

Active and deliberate muscle contraction.

Far out syndrome

A clinical condition of low back pain due to the L5 ventral ramus becoming trapped between the L5 transverse process and the ala of the sacrum.

Fast-twitch glycolytic fibre

A type of skeletal muscle fibre with a fast contraction rate, fast fatigue rate, large diameter, white colour, low myoglobin content, few mitochondria, low capillary association, ATP production by anaerobic glycolysis and high myosin ATPase activity; also called FG or type IIB muscle fibre.

Fast-twitch oxidative glycolytic fibre

A type of skeletal muscle fibre with a fast contraction rate, intermediate fatigue rate, intermediate diameter, red colour, high myoglobin content, many mitochondria, high capillary association, ATP production by oxidative phosphorylation and high myosin ATPase activity; also called FOG or type IIA muscle fibre.

FG fibre

Fast-twitch glycolytic muscle fibre.

Fibrodysplasia ossificans progressiva

A rare muscle disease in which connective tissue components of muscular structures become ossified at widespread sites, mainly in the trunk; formerly called myositis ossificans.

Fibromyalgia

A clinical entity consisting of chronic pain and tenderness at 11 of 18 specific sites, associated with tiredness, poor sleep, lack of refreshment from rest and depression; no pathological correlations have been demonstrated.

Fibromyositis

A variant of fibrositis.

Fibrositis

A vague term for muscular dysfunction; introduced in 1904 to designate the muscular changes associated with "lumbago"; sometimes used now as a synonym for fibromyalgia; the term fibrositis is tainted by controversy, obsolete and probably best avoided.

First ray (of foot)

Structures associated with the first metatarsal bone of the foot and the phalanges of the big toe.

Flat foot

A clinical condition of the foot in which the medial arch is unusually low and the medial border of the sole is close to or in contact with the ground; often associated with midfoot pronation and hindfoot valgus; also called pes planus.

Floating ribs

The 11th and 12th ribs, which have no attachment at their anterior ends.

Foot flat

The term used in the traditional terminology of gait analysis to describe that point in the stance phase at which the foot comes into full contact with the ground.

FOG fibre

Fast-twitch oxidative glycolytic muscle fibre.

Forefoot

The part of the foot anterior to the tarsometatarsal joint complex, i.e. in front of the midfoot.

Forestier's disease

Diffuse idiopathic skeletal hyperostosis.

FOS protein

A protein deposited in the anterior horn of the spinal cord due to increased synaptic activity associated with nociceptive transmission in chronic pain states.

Freiberg's disease

Osteochondrosis of the head of the second, or rarely the third, metatarsal head; most common in adolescent or young adult females.

Frozen shoulder

A clinical entity characterised by marked restriction of shoulder movement; may be due to adhesive capsulitis.

Functional radiology

The use of radiological procedures to assess function; e.g. plain radiographic views in weight-bearing or with other stresses applied, comparative views at extremes of joint range, IAR studies.

GAGs

Glycosaminoglycans.

Gait cycle

The entire period of ambulation between the heel strike (or initial contact) of one foot to the next heel strike of the same foot.

Gapping

The separation of two joint surfaces. If forceful enough cavitation may occur within the joint, so producing a click.

Gaymans effect

An effect described by some manual therapists who claim that breathing out enhances muscle relaxation and facilitates mobilisation in even segments of the spine (such as C0-C1, C6-C7) and breathing in enhances relaxation and facilitates mobilisation in odd segments (e.g. C3-C4, C5-C6).

Glycosaminoglycan

A biochemical structure composed of a

long polymeric chain of repeating disaccharide units; types include chondroitin sulphate and keratan sulphate; GAGs are basic components of proteoglycan.

Gonalgia

Pain in the knee (archaic).

Gonarthrosis

Degenerative condition of the knee joint (obsolete).

Goniometer

An instrument in the form of a protractor between two arms, one fixed and the other moving so as to measure the angular range of movement of a joint.

Goniometry

The measurement of ranges of movement using a goniometer.

Gower's sign

The clinical observation of a patient climbing up his legs by pushing with his hands to achieve erect posture; suggests spinal instability or muscular dystrophy etc.

Ground reaction force

A gravitational force produced by the weight of an object acting on the surface on which the object lies; for a human body, the GRF equals the body weight.

Guyon's canal

An anatomic passage in the wrist, between the pisiform bone and the hook of the hamate; the ulnar nerve passes through it into the hand.

Hallux rigidus

Stiffness of the big toe.

Hallux valgus

Valgus deformity of the big toe; lateral angulation of that toe from the metatarsophalangeal joint.

Hammer toe

A toe deformity with flexion of the PIP

joint and extension of the DIP and MTP joints.

Handicap

A social disadvantage due to impairment and disability; influenced by social factors and circumstances; e.g. a loss of income resulting from the disability of not being able to perform work tasks; a social problem.

Hand-Schuller-Christian disease

A disseminated form of histiocytosis X.

Hard endfeel

The sensation when motion is limited by either intra-articular arthrotic changes, or sudden muscular spasm. The limit of motion at the barrier imparts an abrupt, "hard" feeling to the examining hands.

Hautant's test

A clinical test in which the patient sits with eyes closed and arms outstretched in front, and the examiner notes deviation of one or both hands from the neutral position with differing degrees of cervical rotation and head position; said to be useful for diagnosing imbalance due to cervical dysfunction.

Heel off

The term used in the traditional terminology of gait analysis to describe the instant at which the heel leaves the ground; c.f. terminal stance.

Heel strike

The term used in the traditional terminology of gait analysis to describe the instant at which the heel comes into contact with the ground; c.f. initial contact.

Hemilamina

An anatomic term sometimes applied to either the left or right lamina of a vertebra, according to a usage that applies the singular term "lamina" to mean the whole of the structure more commonly referred to as the laminae.

High intensity zone (HIZ)

An MRI sign consisting of a bright spot at the back of an intervertebral disc and signifying the circumferential extension of a radial fissure in the annulus fibrosus.

Hill-Sachs lesion

A compression fracture of the posterolateral aspect of the humeral head associated with recurrent anterior dislocation of the glenohumeral joint.

Hindfoot

The functional segment of the foot comprising the ankle and heel and including the talus and calcaneus; c.f. midfoot and forefoot.

Hip drop test

A clinical test described for the assessment of sacroiliac joint mobility; the patient stands and drops one knee forward while the examiner monitors the spinous process of L5 and the PSIS; the relative distances between L5 and the two PSISs is said to increase if the SIJs are mobile.

Histiocytosis X

A group of lipid storage diseases associated with osteolytic lesions that resemble bone tumours; e.g. eosinophilic granuloma.

Huneke's phenomenon

An proposition of some manual therapists that describes distant pain referral as being due in some circumstances to hyperalgesic scar tissue.

Hyaline cartilage

The type of cartilage that lines the articular facets of synovial joints; a highly specialised tissue composed of a matrix of collagen fibres and proteoglycans, with scattered chondrocytes but no blood vessels, lymphatics or nerves.

Hyaluronic acid

A glycosaminoglycan component of proteoglycan; the principal macromolecule in synovial fluid.

Hydraulic amplifier effect

The mechanism described as an explanation for the role of the thoracolumbar fascia in enhancing the antifixion capacity of the back muscles.

Hyper/hypoaesthesia

Increased/decreased sensitivity to somatic stimulation.

Hyper/hypoalgesia

Increased/decreased response to a stimulus which is usually painful.

Hyperlordosis

Increase in the usual lordotic curvature of the lumbar spine.

Hyper/hypomobility

Increased/decreased movement, especially of a joint.

Hyperostosis

Increased bone formation; hypertrophy of bone tissue.

Hypertonus

Increased muscle tone.

Hysteresis

The difference between the rate of deformation of a body under prolonged loading and the rate of loss of deformation, reflecting the energy lost by the body due to the loading stress.

IAR

Instantaneous axis of rotation; the axis of rotation at a particular instant in time.

IAR studies

Comparison of a series of IARs determined from functional radiographs to assess the quality of movement between the structures involved.

ICM

Instant centre of motion; the centre of motion at a particular instant in time; the terms ICM and IAR are loosely used as if interchangeable.

IDD

Internal disc disruption.

Iliotibial band friction syndrome

A clinical condition of lateral knee pain and dysfunction due to friction between the iliotibial band and the lateral femoral condyle.

Impairment

A loss or abnormality of anatomic structure or physiological or psychological function; may cause disability and handicap; an alteration of health status assessable by medical means; a medical problem.

Incidence

An epidemiological measure of the rate of occurrence of new cases of a condition within a specified period of time.

Inclinometer

An instrument with a balanced pointer on a central pivot, used for measuring angular inclination and ranges of joint motion.

Inclinometry

Measurement of ranges of movement using an inclinometer.

Infraction

A fracture into a bony surface, often of a relatively minor compression type but significant functionally when it occurs for example in the articular surface of a zygapophysial joint.

Initial contact

The term used in the RLA terminology of gait analysis to describe the moment when the first part of the foot makes contact with the ground; c.f. heel strike.

Initial range of movement

The distance moved by a joint from a slack position up until the resistance in the joint capsule and associated ligaments just balances the force trying to move the joint.

Innominate bone

The composite bone that forms the

anterolateral part of the pelvis, comprising the ilium, ischium and pubis.

Innominate shear (upslip)

Upward displacement of an innominate bone in relation to the sacrum.

Instability

Lack of stability, especially of a joint.

Instantaneous axis of rotation

See IAR.

Internal disc disruption

A pathological condition of the inner parts of an intervertebral disc, involving degradation of the nuclear matrix and progressive erosion of the anulus fibrosus, typically along radial fissures; results from end-plate fracture.

Internal rotation

Rotation of a body part towards the midline; also called medial rotation.

Inter-observer reliability

The reliability of observations made by different observers at the same time or under similar conditions.

Interventional radiology

Radiological practices involving interventions such as nerve blocks or disc injections, designed to provoke or relieve symptoms for diagnostic and therapeutic purposes.

Intervertebral amphiarthrosis

The articulation between adjacent vertebral bodies, including the intervertebral disc; also called inter-body joint.

Intra-articular

Inside a joint, within a joint cavity.

Intra-observer reliability

The reliability of observations made by the same observer at different times.

Intrinsic muscle (e.g. of foot)

A muscle whose attachments lie within a particular structure (e.g. a foot); c.f.

extrinsic muscle.

Inversion

Turning inwards; inversion of the foot involves inward (medial) turning of the entire foot on the talus and of the forefoot in relation to the hindfoot.

Ischaemic compression

Application of strong, usually painful, pressure on a trigger point for the purpose of relieving pain and rendering the trigger point inactive; c.f. acupressure.

Isoinertial muscle contraction

Contraction of a muscle against constant resistance; results in dynamic work when the muscle moment exceeds the resistance, as in lifting an object of a certain mass.

Isokinetic muscle contraction

Contraction of muscle resulting in movement of a joint at constant velocity; dynamic work is done and maximal muscle moment is produced.

Isolated disc resorption

A pathological condition resulting when disc degradation is restricted to the nucleus; progressive loss of water-binding capacity and dehydration lead to loss of disc height, buckling of the anulus and compromise of all joints of the segment; characterised on radiological images by disc narrowing, often with local osteophyte formation.

Isometric muscle contraction

Increased muscle activity producing increased tension while the length remains constant; results in static work, as in the maintenance of posture.

Isotonic muscle contraction

Contraction of a muscle with tension constant; nonphysiologic.

Joints of Luschka

The neurocentral or uncovertebral joints in the cervical spine.

Joint laxity

A condition of (relative) instability or "hypermobility" of a joint.

Joint play

The sum of all angular and translatory movements possible in a joint.

Joint reaction force

The force acting at the contact surface of a joint under load.

Joint restriction

A condition of limited movement or "hypomobility" of a joint.

Jump sign

A clinical sign consisting of an involuntary flinch by the patient, usually associated with a withdrawal reaction, in response to stimulation of a trigger point.

Keratan sulphate

A glycosaminoglycan with shorter disaccharide chains than chondroitin sulphate; forms one of the basic components of proteoglycan.

Kienbock's disease

Ischaemic necrosis and atrophy of the lunate bone of the wrist.

Kinematics

The qualitative branch of biomechanics concerned with the nature of movements without reference to the forces involved.

Kinesiology

The study of motion in the human body.

Kinetics

The quantitative branch of biomechanics concerned with the forces involved in posture and movement.

Kissing spines

Clashing of the spinous processes in extension, sometimes resulting in periosteal irritation at the tips, which can become painful; the clinical syndrome may then be called Bastrup's disease.

Kohler's disease

Osteochondrosis of the navicular bone of the foot.

Lamellae

Leaves or sheets; used to describe the layers of collagen fibres which make up the anulus fibrosus.

Laminectomy

A surgical operation involving excision of a vertebral lamina, usually to decompress a nerve root affected by disc prolapse.

Lasegue's sign

Pain and muscle spasm in the posterior thigh when the ankle is passively dorsiflexed from the "straight leg raising" position; said to indicate lumbar or sciatic nerve root irritation but this conclusion is not universally accepted.

Lateral (external) rotation

Rotation of a body part so that the anterior surface moves outward and away from the median plane of the body.

Layer palpation

Careful palpation with the object of distinguishing the various fascial planes and the state of the layers of tissue between them.

Ledderhose's disease

Fibromatous swelling of the plantar fascia, analogous to Dupuytren's contracture of the hand.

Legg-Calve-Perthe's disease

Osteochondrosis of the femoral head; also Perthe's disease.

Letterer-Siwe disease

A rare and usually fatal form of histiocytosis X.

Ligament of Bourger

The only 'true' ligament of the intertransverse group between adjacent vertebral transverse processes, the others being essentially raphes.

Lisfranc's joint

The tarsometatarsal articulations considered as a complex; separates the midfoot from the forefoot.

Locomotor system

The bodily mechanisms concerned with locomotion, including the musculoskeletal system and associated parts of the nervous system.

Long sitting test

A clinical test for pelvic rotation involving comparison of the relative lengths of the lower limbs in the supine and long sitting positions; the long sitting position is sitting upright with the knees extended and the hips flexed to 90°.

Lordosis

An antero-posterior curvature of the spine, concave posteriorly.

Loose-pack position

The joint position at which the capsule is most relaxed and joint play is maximal; usually the best position for testing accessory movements, for mobilising treatment and for immobilisation in a splint; often the position in which a joint is rested and so also called the resting position.

Lumbago

An obsolete term for pain in the lumbar region; sometimes used as if designating a specific condition but it carries no such connotation and is better avoided in the clinical context.

Lumbarisation

Developmental anomaly of a sacral segment, usually the first, that results in it having the morphological characteristics of a lumbar vertebra.

McKenzie method

A therapeutic exercise method using repeated exercises, usually but not invariably into spinal extension, to treat disc prolapse.

McMurray's test

A clinical test for meniscus tear in the knee; the patient lies supine with hip and knee flexed, and the examiner then passively extends the knee, while rotating it externally to test the medial meniscus and internally to test the lateral meniscus; a painful click signifies a positive test.

Mallet finger

A finger deformity involving flexion of the DIP joint, which cannot be extended actively; due to rupture or avulsion of the extensor tendon at its insertion into the base of the distal phalanx.

Mallet toe

A toe deformity involving flexion of the DIP joint.

Manipulation

Literally, any therapeutic procedure in which the hands are used to treat the patient; this is the definition accepted in New Zealand and in the US; in Australia and in many parts of Europe, the term is used to describe therapy involving a high velocity, low amplitude thrust; c.f. mobilisation with impulse.

Marble bone disease

An inherited condition of bone dysplasia causing increased bone density and brittleness; also called osteopetrosis and Albers-Schonberg disease.

March fracture

A stress fracture of a metatarsal bone, most commonly the second, after unaccustomed activity.

Marfan's syndrome

An inherited disorder of collagen and elastin synthesis that affects connective tissue elements of the skeleton, the cardiovascular system and the eyes; characterised by tall stature, long limbs (especially the arms), long fingers (arachnodactyly or 'spider fingers'), generalised joint laxity, scoliosis, spondylolisthesis, high arched palate, hernias, aortic aneurysm, heart valve

abnormalities, retinal detachment and lens dislocation.

MBB

Medial branch block.

MCP joint

Metacarpophalangeal joint.

Mechanoreceptors

Specialised nerve endings situated in or adjacent to a joint capsule, first described by Wyke; their function is to relay proprioceptive information and they also have a role in nociception; four types are described, styled types I to IV.

Medial branch block

A radiological diagnostic procedure in which the nerves that supply a specific zygapophysial joint, the medial branches of the adjacent dorsal rami, are blocked with local anaesthetic solution to determine the role of that joint in pain generation.

Melorrheostosis

A rare pathological condition of patchy sclerosis of bones, which have the radiographic appearance of flowing candle wax; usually confined to one limb, where it causes pain and stiffness; a radiological curiosity.

Meniscoid

A fibro-adipose structure projecting from the capsule into the cavity at the margin of a zygapophysial joint.

Meniscus

A fibrocartilaginous structure occurring in a joint such as the knee.

Meniscus entrapment

A proposed explanation for the mechanism of acute locked back, based on the theory that a meniscoid becomes trapped between the facets of a zygapophysial joint in certain circumstances.

Meniscus extrapment

A proposed explanation for the mechanism of acute locked back, based on the theory that a meniscoid becomes trapped outside

the cavity of a zygapophysial joint in certain circumstances and squeezed between the capsule and one of the joint margins.

Meralgia paraesthetica

A nerve entrapment syndrome involving the lateral cutaneous nerve of the thigh (L2,3); the nerve is usually compressed where it passes through the inguinal ligament just medial to the ASIS; symptoms are paraesthesiae and pain in the antero-lateral thigh.

Metatarsalgia

Pain in the region of the metatarsal bones and especially their distal ends, the metatarsal heads which form the MTP joints.

Midfoot

The functional segment of the foot comprising the bones of the tarsus and their attachments, between the talus and calcaneus posteriorly and the tarsometatarsal joints anteriorly; c.f. hindfoot and forefoot.

Mills's manipulation

A manipulative technique for treatment of lateral epicondylar enthesopathy.

Milwaukee brace

An orthotic device for the correction of scoliosis; consists of a pelvic corset connected by steel bars to a cervical ring that supports the chin and occiput.

Milwaukee shoulder

A condition of rapidly destructive arthropathy associated with chronic hydroxyapatite crystal deposition, resulting in suddenly increasing pain, swelling and dysfunction of the shoulder, usually that of an elderly patient.

Minnesota Multiphasic Personality Inventory

A psychological instrument for the assessment of the effects of pain on personality and behaviour.

MMPI

Minnesota Multiphasic Personality Inventory.

Mobilisation

Literally, the process of increasing the movement of a joint, using any therapeutic technique; used more narrowly in Australia and some parts of Europe to mean manipulation without thrust (impulse) but elsewhere includes soft tissue techniques and other forms of manual therapy.

Mobilisation with impulse (thrust)

A therapeutic technique for increasing the range of movement of a joint using a high velocity, low amplitude thrust, that may produce a click; also called manipulation.

Mobilisation/traction levels

Level I - minimal force just sufficient to produce zero pressure between the two joint surfaces.

Level II - force beyond level I that does not introduce stretch to the elastic structures.

Level III - force that stretches the elastic tissues to the physiological barrier.

Level IV - force causing irreversible overstretch, rupture or compression of a component of the musculoskeletal system and results in structural damage.

Modulation

Literally, regulation or adjustment to a certain proportion; used of pain; c.f. neuromodulation.

Moment

A bending effect induced by a force applied to a body fixed at a point; the product of the magnitude of the force and the perpendicular distance between the fixed point and the line of action of the force; measured in newton-metres.

Moment arm

The perpendicular distance between a fixed point or centre of motion of a body and the line of action of an applied force; also called lever arm.

Morton's foot

A configuration of the foot with congenital shortening of the first metatarsal, abduction of the first tarsometatarsal joint and a long second metatarsal; predisposes to excessive weight-bearing by the second metatarsal, with associated callus formation in the underlying skin and occasionally stress fracture.

Morton's metatarsalgia

Pain in the forefoot due to an entrapment syndrome or neuroma involving one of the plantar digital nerves, most commonly that between the third and fourth metatarsal heads.

Motion gain

The increase in angular movement of a joint following mobilising therapy and muscle stretching (relaxation).

Motion segment

A segment of the spine comprising two adjacent vertebrae and the articulations between them, including the inter-body joint with the intervertebral disc and the two zygapophysial joints at that spinal level.

Motor neuron disease

An idiopathic degenerative disease of motor neurons, affecting both cortical and anterior horn neurons, causing both upper and lower motor neuron features clinically, with progressive weakness and paralysis; one form is amyotrophic lateral sclerosis.

Motor point

The anatomic site at which a motor nerve enters a muscle.

Motor unit

The functional unit of skeletal muscle, composed of a single motor neuron and the group of muscle fibres innervated by it; the smallest part of a muscle that can be made to contract independently.

MRI

Magnetic resonance imaging.

MTP joints

Metatarsophalangeal joints.

Muscle energy techniques

Forms of mobilising treatment and therapeutic exercise based on regulation of the energy produced by the patient's muscles; muscle energy techniques include "hold/relax", postfacilitation relaxation, postisometric relaxation etc.; they are particularly useful for relaxing tight muscles.

Muscular rheumatism

An obsolete term of imprecise meaning used to describe various forms of muscular dysfunction, c.f. non-articular rheumatism.

Musculoskeletal medicine

The branch of medical science concerned with the functions and disorders of the musculoskeletal system, including the muscles, ligaments, joints and bones of the axial and appendicular skeletons and those parts of the nervous system associated with them.

Myalgia

Pain arising from muscle tissue.

Myelography

A radiological procedure that generates an image of the spinal cord and its relations after the injection of a contrast medium into the subarachnoid space.

Myofascial pain syndrome

An alternative and now obsolescent term for a trigger point syndrome of muscle.

Myofasciitis

A variant of fibrositis.

Myofibrositis

A variant of fibrositis.

Myogelosis

A term used by some European authors to denote circumscribed firmness and tenderness to palpation in a muscle or muscles.

Myositis

Inflammation of muscle.

Myositis ossificans

An obsolete term for fibrodysplasia ossificans progressiva.

Myotactic unit

A group of agonist and antagonist muscles that function together as a unit because they share common spinal reflex responses.

Myotendinosis

An obsolete term signifying pathological change in a muscle and its tendon; c.f. myogelosis, palpable band, tight band, trigger point.

Myotome

A group of muscles and other deep tissues in which somatic referred pain from a particular spinal motion segment is experienced.

Myotomal pain

An obsolete term for somatic referred pain.

Negative predictive value

A statistical index used to estimate the likelihood of one variable having a negative correlation with another.

Neuralgia

Pain in the distribution of a nerve or nerves.

Neurocentral synchondrosis

The cervical articulation or pseudo-articulation also called the uncovertebral joint.

Neuromodulation

The modification of neural transmission by endogenous or exogenous influences; the mechanism is used in pain management to modify the transmission of nociceptive information, e.g. by means of TENS or biofeedback.

Neuromuscular therapy

A generic term for types of therapeutic technique that rely on interplay between

forces applied by the therapist and the patient's own muscular contractions and relaxations.

Neuropathy

A disturbance of function or pathological change in a nerve.

Neuroscience

The branch of science concerned with the nervous system and its functions.

Neutral zero method

A clinical method of measuring and recording ranges of joint movement, in degrees of angle from a starting point at a specified resting position called the neutral zero position.

NMT

Neuromuscular therapy; a generic term for a range of treatment modalities involving active contraction of the patient's muscles (vide infra).

NMT 1

A therapeutic technique in which the patient uses his own agonistic muscle contraction to increase movement beyond the pathological barrier; this technique is often prescribed as a home exercise.

NMT 2

A therapeutic technique in which the patient first contracts the muscles of a restricted joint so as to move it away from a pathological barrier, then in the following period of post-facilitation relaxation, the operator mobilises in the direction of motion restriction.

NMT 3

A therapeutic technique in which the patient first contracts the muscles of a restricted joint so as to move it towards a pathological barrier, against resistance provided by the therapist, then, in the period immediately following contraction, the operator mobilises into the direction of restriction; this technique is useful when contraction of the antagonist musculature produces pain.

Nociception

The process by which sensory information about tissue damage is conveyed through the nervous system to the cerebral cortex.

Nociceptor

A sensory receptor which responds to a noxious stimulus; note that nociceptors are not specialised but are simply C fibre endings.

Non-articular rheumatism

An obsolete term introduced in 1938 as a generic description to include various ill-defined conditions thought to affect non-articular components of the musculoskeletal system.

NSAIDs

Non-steroidal anti-inflammatory drugs.

Nuchal line

The line of attachment of the superficial cervical muscles to the occiput.

Nuchal raphe

The aponeurotic structure that separates the muscles in the midline at the back of the neck; formerly known erroneously as the ligamentum nuchae.

Nucleus pulposus

The inner part of an intervertebral disc, composed of a semi-fluid mass of mucoid material.

Nutation

A nodding movement, as found at the C0-C1 articulation; often used incorrectly to describe the movement of the sacrum between the ilia.

Ochronosis

A rare genetic disorder of amino-acid metabolism, in which homogentisic acid is deposited in the spine, causing pain and stiffness; usually diagnosed in elderly males.

Ollier's disease

A familial condition of multiple enchondromata.

Orthosis

A splint or other device for supporting or straightening a body part.

Ortolani's test

A clinical test for congenital dislocation of the hip; the baby's thighs are held with the examiner's thumbs medially and fingertips over the greater trochanters, then the hips are gently flexed and abducted, restricted abduction or a click signify a positive test.

Osgood-Schlatter's disease

An epiphyseal traction injury of the tibial tuberosity.

Osteitis

Inflammation of bone.

Osteitis condensans ilii

A condition in which sclerosis occurs in the ilium adjacent to the sacroiliac joint of a parous woman, supposedly due to increased stress on a lax SIJ in pregnancy.

Osteitis deformans

An idiopathic bone disease in which bony architecture is deranged progressively by increases of both osteoclastic and osteoblastic activity; resultant bony thickening, weakening and deformation cause tibial and femoral bowing, cranial bossing and other deformities; patients may have low grade pain but the condition is often asymptomatic and discovered when radiographs are taken for other purposes; also called Paget's disease.

Osteitis fibrosa cystica

A condition of endosteal cavitation and marrow replacement with connective tissue due to severe hyperparathyroidism.

Osteoarthritis

Degenerative joint change.

Osteochondritis

A term variously applied to osteochondrosis and epiphyseal traction injuries; sometimes classified as crushing, splitting and pulling osteochondroses.

Osteochondritis dessicans

A condition of osteochondral injury in which a fragment of cartilage and subchondral bone becomes separated from the underlying bone, tends to affect convex joint surfaces, such as the lateral aspect of the medial femoral condyle and the lateral aspect of the talar dome.

Osteochondromatosis

Benign tumour formation of synovial origin, the most common tumour of bone; multiple osteochondromata occur, especially around the knee.

Osteochondrosis

A condition of aseptic necrosis of bone involving centres of ossification, with gradual resorption and simultaneous new bone deposition, the more common sites and their eponymous designations include the femoral head (Legg-Calve-Perthe's disease), the navicular (Kohler's disease), the second or third metatarsal (Freiberg's), the capitellum of the humerus (Panner's) and the vertebral end-plate (Scheuermann's).

Osteogenesis imperfecta

A hereditary disorder of collagen synthesis, resulting in brittle bones that are prone to fracture and lax ligaments; about two-thirds of those affected have blue sclerae and about half have crumbling teeth (dentinogenesis imperfecta).

Osteomalacia

Defective mineralisation of bone.

Osteonecrosis

Death of bone tissue; usually due to impaired blood supply or injury.

Osteopathia striata

An asymptomatic condition of bone characterised by lines of increased density parallel to the shafts of long bones and radiating like a fan in the pelvis; a radiological curiosity.

Osteopenia

Literally, lack of bone; a generic term that

includes osteomalacia and osteoporosis.

Osteopetrosis

Markedly increased bone density, usually as the result of dysplasia; c.f. marble bone disease.

Osteophytes

Horizontal projections of new bone from periosteal surfaces, usually near but not at joint margins; occur in degenerative conditions; c.f. syndesmophytes.

Osteopoikilosis

A rare inherited condition in which small areas of sclerosis are disseminated through bones; creates the radiological curiosity of spotted bones.

Osteoporosis

Abnormal diminution of bone mass.

Outcome measure

An instrument used to assess the outcome of patient management.

Oxford pain chart

An instrument for the measurement of pain, especially after an intervention, incorporating categorical scales for pain intensity and pain relief, with notation of side-effects and a global assessment of the treatment.

Pain

An unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage.

Pain maps

Depictions of regions to which pain is referred; e.g. the patterns of cervical somatic pain referral described by Dwyer et al.

Pain reference zone

The typical reproducible bodily area of pain perception resulting from an active trigger point, or stimulation of a latent trigger point. The area in which pain is

perceived is not anatomically connected to the trigger point, and may be at some distance from it.

Painful arc

A part of an angular range of movement in which pain occurs; e.g. there may be a painful arc in the abduction range in impingement syndromes of the shoulder.

Paget's disease of bone

Osteitis deformans.

Palpable band

An alternative term for a tight band in a muscle; c.f. myotendinosis.

Panner's disease

Osteochondrosis of the capitellum of the humerus.

Paravertebral block

A therapeutic procedure involving blockade of a spinal nerve root by injection of local anaesthetic solution close to the root as it leaves the intervertebral foramen.

Passive exercise

Exercise involving passive movement.

Passive movement

Movement of a bodily part other than by active contraction of the attached muscles; used in clinical examination to assess the quality of the movement, whether or not it evokes pain, the position of any barrier and the endfeel.

Pathogenesis

The process of development of a disease or condition.

Pathological barrier

The limit of movement in a dysfunctional joint; motion restriction at a range less than that of the physiological barrier; also called restrictive barrier.

Patrick's test

The FABER test.

Pellegrini-Stieda lesion

A condition of ossification of the upper end of the medial collateral ligament of the knee; due to organisation and calcification of a haematoma.

Perthe's disease

Osteochondrosis of the femoral head.

Pes anserinus ("swan's foot")

The tendon expansion and attachment of sartorius, gracilis and semitendinosus on the medial border of the tuberosity of the tibia.

Pes cavus

A foot deformity characterised by an unusually high arch and often associated with clawing of the toes; may be familial and idiopathic or due to neurological conditions such as peroneal muscular atrophy (Charcot-Marie-Tooth disease).

Pes planus

Flat foot.

Pes valgus

Another term for pes planus or flat foot.

Pes varus

A foot deformity associated with tightness of the tibialis anterior and posterior muscles.

Petrissage

A massage technique of the kneading type.

Physical medicine

The branch of medical therapeutics concerned with the use of physical modalities of treatment; sometimes used incorrectly as if a synonym of musculoskeletal medicine but such usage is presumptuous; physical modalities may be used in the treatment of disorders of any body system, e.g. for bronchial asthma and for stroke rehabilitation.

Physical modalities

Forms of treatment which rely on physical effects; e.g. applications of heat or cold, therapeutic exercise, manual therapy,

traction, hydrotherapy and various forms of electrotherapy.

Physiological barrier

The limit of normal joint movement that can be obtained by the patient's own muscular contraction. This is normally slightly less than the anatomical barrier.

Physiological movements

Movements that can be performed by active contraction of the patient's muscles or passive overpressure in the same directions.

Phocomelia

Congenital absence or markedly reduced development of arms or legs but with hands or feet present.

PIP joints

Proximal interphalangeal joints.

PIR

Postisometric relaxation.

Plantar flexion

Turning the foot or toes downward.

Population validity

A type of external validity related to the population under consideration; the extent to which results obtained in a study can be generalised to the population from which the study sample was drawn.

Positive predictive value

A statistical index used to estimate the likelihood of one variable having a positive correlation with another.

Posterior elements

The parts of a vertebra posterior to the pedicles.

Postfacilitation relaxation

The relaxation that occurs after facilitation of a muscle.

Postisometric relaxation

The relaxation that occurs after isometric contraction of a muscle.

Postural imbalance

Lack of balance in posture; a state of posture in which paired muscles on opposite sides of the body, or agonists and antagonists, are exerting unequal forces.

Prehension

The act of grasping or taking hold of an object.

Present neutral position

The position of a joint or vertebral segment in which joint play is greatest, joint volume is at its greatest and pain, if perceived, is at its least intense; also called loose pack position.

Prevalence

An epidemiological measure of the proportion of a specific population in which a particular condition occurs at a specific point in time; also used to mean the proportion of a population with a particular condition (even if the subjects were necessarily tested over a period of time, it is presumed that they all had the condition at the same time).

Pronation

Turning of any part of the body so that it faces downwards; describes the midfoot in the common condition in which its medial border is close to the ground and the forefoot is abducted and everted.

Prostaglandins

A group of chemical substances, originally isolated from seminal plasma but found in many tissues; produced by the action of cyclo-oxygenase on arachidonic acid, a metabolite of phospholipids released by cell membrane damage; have a role in nociception by facilitating the action of algogenic substances; also have many other properties.

Proteoglycan

A biochemical structure comprising a protein core to which glycosaminoglycan chains are attached in an arrangement that resembles a bottlebrush; strongly hydrophilic; a major component of

cartilage matrix, nucleus pulposus and the microstructure of connective tissues.

Provocative testing

A clinical or radiological assessment procedure involving application of a localised mechanical stress or some other intervention to produce a change in symptoms.

Pseudoradicular syndrome

A term used by some European authors to mean pain that radiates into a limb but is not of radicular origin; most probably means somatic referred pain.

PSIS

Posterior superior iliac spine.

Psoriatic arthropathy

Chronic inflammatory joint disease associated with psoriasis.

Pulled elbow

A clinical condition of elbow pain and dysfunction of sudden onset after a traction injury, usually affecting a child less than eight years old, and due to distal subluxation of the radial head; usually responds to manipulation into a position of supination.

Pushed elbow

A compression injury of the elbow.

Q angle

The tibiofemoral angle, measured as the angle between lines from the tibial tubercle to the midpoint of the patella and from the midpoint of the patella to the ASIS; used to assess valgus and varus deformities of the knee and patellar tracking; the normal range of the Q angle is 5°-15°.

Radial tunnel syndrome

A clinical syndrome of lateral elbow pain and paraesthesiae due to entrapment of the radial nerve as it passes through the lateral intermuscular septum in the distal part of the upper arm.

Radicular pain

Pain due to nerve root irritation; typically 'lancinating' pain, sharp in quality and experienced in a long, narrow distribution of the dermatomal type.

Radiofrequency denervation

Therapeutic procedure using radiofrequency energy for thermocoagulation of nerves, such as the medial branches of dorsal rami involved in nociceptive transmission from zygapophysial joints; also called radiofrequency neurotomy.

Range of motion

The angular or linear range of movement of which a joint or other structure is capable.

Ray (of hand or foot)

Structures related to a metacarpal or metatarsal bone and the associated phalanges.

Referred pain

Pain felt in a region innervated by nerves other than those that supply the source of pain.

Reflex sympathetic dystrophy

A clinical condition characterised by circulatory changes and atrophy of the skin and subcutaneous tissues, mediated by a reflex alteration in the activity of the sympathetic nerves supplying the vessels of the affected parts and usually found in association with causalgia.

Reflex therapy

Treatment modalities that rely on stimulation of sensory receptors to evoke a reflex response.

Reliability

The extent to which a measure or instrument is reproducible; defined as the ratio of variance in true scores to the variance in observed scores when that measure or instrument is used; involves the consistency or dependability of observations.

Resistance to movement

The combination of tissue stiffness and other forces that oppose movement of a body structure.

Respiratory synkinesis

The enhancement of muscle contraction and relaxation by timing them with phases of inspiration and expiration.

Restrictive barrier

An impediment to further movement within the physiological range of motion of a joint; the presence of restriction in this range of an otherwise normal joint means that it is dysfunctional; c.f. pathological, anatomic and physiological barriers.

RFD

Radiofrequency denervation.

Ring apophysis

The narrow rim of dense bone around the perimeter of the upper and lower surface of each vertebral body, at the site of the secondary ossification centre.

Ritchie Russell points

Tender points described as occurring in skin; possibly the tender points of fibromyalgia or some type of trigger points.

RLA terminology

The method of describing the gait cycle devised at the gait laboratory of the Rancho Los Amigos medical centre, California.

ROM

Range of motion.

Romberg's test

A clinical test for the sensory type of ataxia; the patient stands with heels together and then closes his eyes; marked swaying and a tendency to fall signify a positive test and suggest a deficiency of peripheral proprioceptive input or a posterior column lesion.

Rotation

Circular movement in which all parts of a body move in parallel arcs around a fixed central point.

RSD

Reflex sympathetic dystrophy.

Sacralisation

Developmental anomaly of a lumbar vertebra, usually the lowest, that results in it having morphological characteristics of a sacral segment.

Sagittal plane

The vertical antero-posterior plane that divides the body into left and right.

Salter-Harris classification

A systematic classification of growth plate injuries of bone; useful for assessing the prognosis with respect to future growth.

Scheuermann's disease

Osteochondrosis of the vertebral end-plate.

Schmorl's node

A zone of radiolucency with adjacent increased bone density in the region of the central part of a vertebral end-plate, associated with Scheuermann's osteochondrosis or end-plate fracture.

Schober's test

A clinical assessment of lumbar spinal flexion; originally described as measurement of the distance between the spinous processes of S1 and C7 in the erect and fully flexed positions; in the modified Schober test more commonly used, two skin marks are made, one 5cm below and the other 10cm above a line joining the PSISs, and as the patient flexes the distance between them should increase by at least 6cm.

Sciatica

Pain arising in the lower back and radiating via the sciatic nerve to the lower limb, usually in a dermatomal pattern; the term suggests but is not diagnostic of radicular pain.

Scoliosis

Any lateral curvature of the spine.

Screw home mechanism

The spiral movement by which the tibia rotates externally on the medial femoral condyle as the knee comes into full extension, enhancing stability of the joint in the extended position.

Segmental dysfunction

Abnormal function of a spinal motion segment, possibly causing pain and disability, and due to a disorder of one or more components of the segment, including the intervertebral disc, the zygapophysial joints and associated structures.

Segmental instability

Excessive movement between the two vertebrae in a spinal motion segment.

Segmental restriction

Complete or partial loss of the physiological movement between the two adjacent vertebrae of a spinal motion segment.

Sensitivity

A measure of the utility of a test in detecting a condition when that condition is known by other means to be present; hampered by false positive results.

Set

The difference between the initial length or shape and the final length or shape when a body is deformed by an applied force.

Sever's disease

An epiphyseal traction injury of the posterior calcaneus.

SFTR method

A systematic method of measuring and recording ranges of joint movement in the clinical setting; ranges are assessed in the Sagittal, Frontal and Transverse planes, and the Rotational sense, and recorded in degrees of angle from a specified starting point; a modification of the Neutral Zero method.

Shear

The tendency of one part of a structure to slide across another; a shear stress is a force applied across the long axis of a body; c.f. tension, compression, torsion.

Shin splint

A clinical condition of shin pain and tenderness associated with weight-bearing activity; due to soft tissue injury, a compartment syndrome or a stress fracture.

SIJ

Sacroiliac joint.

SIJ provocation test

A clinical test for SIJ dysfunction in which the patient lies on the contralateral side with the lower hip extended and the upper hip flexed, then the examiner holds the ASIS and the ischial tuberosity, and rotates the SIJ around its axis to reproduce pain if the test is positive.

Sinding-Larsen's disease

An epiphyseal traction injury of the lower pole of the patella.

Sinistroconvex

Convex to the left.

Sinuvertebral nerve block

A radiological diagnostic and therapeutic procedure in which local anaesthetic solution is injected with the aid of an image intensifier onto the sinuvertebral nerve that supplies the dural sheath of a spinal nerve root and the back of an intervertebral disc.

Sitting forward flexion test

A clinical test for SIJ restriction; a variation of the standing forward flexion test, performed with the patient sitting to eliminate the effects of leg length inequality and lower limb muscle imbalance; if the sitting test is positive it is more likely that the SIJ is restricted on that side.

Skin drag test

A clinical test for the skin moisture said to be associated with spinal segmental dysfunction; the examiner's fingers are

drawn lightly down the vertebral column on each side of the spinous processes to seek the local increase in skin dampness attributed to altered sympathetic activity; c.f. skin rolling test.

Skin rolling test

A clinical test for the skin texture changes said to be associated with spinal segmental dysfunction; a wedge of skin is taken between the thumbs and index fingers, and gently rolled, usually in a cephalad direction, to elicit a 'doughy' feeling if the test is positive; the patient may also experience an unpleasant sensation or pain, and the examination may leave a red patch on the skin over the dysfunctional segment; c.f. skin drag test.

Slow-twitch oxidative fibre

A type of skeletal muscle fibre with a slow contraction rate, slow fatigue rate, small diameter, red colour, high myoglobin content, many mitochondria, high capillary association, ATP production by oxidative phosphorylation and low myosin ATPase activity; also called SO or type I muscle fibre.

Slump test

A clinical test for radicular or dural irritation; the patient sits with legs dangling and hands behind back, then slumps the trunk, flexes the neck and has each leg extended passively and each foot dorsiflexed by the examiner; pain reproduction on neck flexion alone or combined with leg extension suggests dural irritation, whereas pain on leg extension without neck flexion suggests a leg muscle origin.

Snapping hip

The phenomenon of a snapping sound or catching sensation in the lateral aspect of the hip on active movement; due to the fascia lata sliding over the greater trochanter and then snapping tight; a clinical curiosity requiring symptomatic treatment only.

SO fibre

Slow-twitch oxidative muscle fibre.

Soft endfeel

The sensation felt by the examiner at the end of the range of passive movement of a joint restricted by tight muscles or an effusion; c.f. hard endfeel.

Soft tissues

Tissues other than bone; includes ligaments, fasciae, muscles, tendons, entheses, joint capsules, menisci, synovia, bursae, articular cartilages, nerves, vessels etc.

Soft tissue injury

An injury involving the soft tissues; e.g., in relation to the spine such an injury may involve the paraspinal muscles, spinal ligaments, zygapophysial joint capsules, articular cartilages, intervertebral discs and/or other structures; the term is sometimes used pejoratively to imply minor injury (only) but such usage is unscientific.

Soft tissue techniques

Manual therapeutic techniques involving gentle stretching of the soft tissues, as compared to joint mobilisation and manipulation.

Somatic dysfunction

Impaired or altered function of related components of the somatic system: bony, arthrodial and myofascial structures, and related neural, vascular and lymphatic elements.

Somatic pain

Pain generated from one of the somatic structures of the spine, such as a zygapophysial joint or the internal parts of a disc, as opposed to pain from a neural structure or an internal viscus; somatic pain is typically deep, dull and diffuse in quality; c.f. radicular pain.

Somatic referred pain

Pain generated from one of the somatic structures of the spine and referred to a region of a limb or the trunk in a diffuse

pattern; the most common type of referred limb pain; typically deep and dull in quality as opposed to the lancinating pain of radicular irritation.

Somatovisceral effect

An alteration of visceral function attributed to a somatic cause; not to be confused with pain referral phenomena such as, for example, abdominal pain referred from a lower thoracic spinal segment.

Spasm

An alternative term for tetanic muscle contraction.

Specificity

A measure of the utility of a test in discriminating between a particular condition and others that may resemble it; hampered by false negative results.

Spinal claudication

A clinical syndrome due to spinal stenosis and comprising back and leg pain, paraesthesiae and weakness that are aggravated by spinal extension and walking, and relieved by spinal flexion and rest.

Spinal motion segment

The functional unit of the spine, composed of two adjacent vertebrae and the joints between them.

Spinal segmental dysfunction

Abnormal function of a spinal motion segment due to a disorder of one or more components of the segment, including the intervertebral disc, the zygapophysial joints and associated structures; may cause local and/or referred pain and various types of disability.

Spinal stenosis

Narrowing of the spinal canal; may be severe enough to compress the spinal cord or nerve roots and their attendant blood vessels, causing back and leg pain, and sometimes the syndrome of spinal claudication.

Spondylogenic reflex syndrome

A clinical condition attributed to a causative relationship between spinal segmental dysfunction and local non-inflammatory soft tissue changes.

Spondylolisthesis

Forward displacement of a vertebra with respect to the one below; the more common types include lytic or isthmic (due to spondylolysis), degenerative and dysplastic; less common are post-traumatic, post-operative and pathological.

Spondylolysis

Development of pars interarticularis defect(s), acquired as a stress fracture at a site that may be susceptible to injury because of some predisposition.

Spondylosis

Osteoarthritis or degenerative change of the spine.

Sprain

A soft tissue injury involving damage to the internal architecture but not loss of integrity of the structure concerned; includes a wide range of conditions, from a minor and temporary ligament stretch to a severe and permanent distortion of a joint capsule.

Spray and stretch

A physical treatment procedure in which the skin over a muscle is sprayed with a volatile substance to produce a vapocoolant effect, then the muscle is stretched passively; used to treat trigger point syndromes.

Springing test

A clinical method for eliciting pain from, or testing the resistance or 'springiness' of a joint; the examining hand or fingers are positioned over one or both partner(s) of the joint or spinal segment, which is then gently 'sprung' and note made of the quality of movement, the endfeel, and whether or not pain is elicited.

Stance phase

The portion of the gait cycle during which the whole foot is in contact with the ground.

Standing forward flexion test

A clinical test for sacroiliac joint restriction in which the PSISs are observed as the patient bends forward in the standing position; with normal joints the PSISs should move symmetrically but with unilateral SIJ restriction or lower limb muscle imbalance one may be seen to overtake the other.

Static posture

The position assumed by the body at rest.

Stereoradiography

A radiological procedure employing a special technique to obtain stereoscopic radiographs which produce a three-dimensional effect.

Stiffness

The resistance of a structure to deformation; proportionate to the slope of the stress-strain curve of that structure; measured as the force required to produce a unit of deformation.

Still's disease

A form of juvenile arthritis.

Stork test

A clinical test of SIJ motion restriction with the patient standing on one leg.

Strain

The force that develops in a body in response to an applied stress.

Stress

A force or load applied to a body.

Stress fracture

A bone fracture associated with repeated, relatively minor stresses rather than a single major insult.

Stress-strain curve

A graphic depiction of the relationship

between stresses and corresponding strains, usually with stress on the vertical or X axis and strain on the horizontal or Y axis.

Substance P

A neuropeptide composed of eleven amino acids, released from both ends of nociceptive afferent nerve fibres, to act as a synaptic transmitter at the dorsal horn and as a vasodilator to promote inflammation and healing at the peripheral end.

Supination

The turning of a part of the body so that it faces upwards.

Swan neck deformity

A finger deformity involving proximal interphalangeal joint hyperextension and distal interphalangeal joint flexion; due to imbalance of extensor versus flexor action at the PIP; the opposite of boutonniere deformity.

Swing phase

The period of the gait cycle during which the foot is not in contact with the ground.

Syndesmophytes

Vertical projections from the discovertebral margins of the spine, due to ossification of anuli fibrosi; occur in ankylosing spondylosis and other spondylarthropathies; c.f. osteophytes.

Taut band

An alternative term for a tight band in a muscle.

Tender point

A clinical phenomenon of localised tenderness at a site in the soft tissues, often at anatomically consistent locations associated with fibromyalgia.

Tennis elbow

A clinical entity of lateral elbow pain and dysfunction; a loose term encompassing various disorders of the lateral forearm muscles and their attachments; includes lateral epicondylar enthesopathy, trigger point syndromes of wrist extensors etc.

Tension

Longitudinal tightness or stretching; a force that tends to produce tension is called a tension stress and its effect a tension strain.

Tension headache

Occipitofrontal headache said to be associated with tension of the occipitofrontalis muscle and its aponeurosis.

TeP

Abbreviation for tender point.

Tetany

A state of maximum contraction of all motor units of a muscle or group of muscles; also called tetanic contraction or spasm.

Therapeutic exercise

A physical modality of treatment employing specific forms of exercise for a therapeutic purpose.

Thomas's test

A clinical test for fixed flexion of the hip; the patient lies supine and the examiner flexes the contralateral hip passively; as the lumbar lordosis straightens the pelvis tends to flex and the affected thigh will rise if the test is positive.

Thoracic outlet syndrome

A clinical syndrome of pain and paraesthesia in a shoulder and arm, said to be due to compression of the subclavian artery and brachial plexus at the thoracic outlet, in a narrow costoclavicular space, by a cervical rib or by the scalenus anterior muscle; controversial; to be distinguished from referred cervical pain etc.

Thoracolumbar fascia

The fascia that envelops the lumbar muscles and separates them into three compartments; comprises three layers called anterior, middle and posterior; has a role in enhancing the power of the muscles it envelops; also called dorsolumbar fascia.

Tietze's syndrome

A rare clinical entity involving painful, tender swelling of one of the upper costal cartilages, especially the second, idiopathic, benign and self-limiting.

Tight band

A palpable bundle of tense muscle fibres in the long axis of an irritable muscle involved in a trigger point syndrome.

Tinel's sign

A physical sign of carpal tunnel syndrome, elicited by tapping over the median nerve at the front of the wrist to reproduce the typical hand pain and paraesthesia if the test is positive.

Torque

A stress that induces torsion; also called a moment.

Torsion

Twisting of a body.

Traction

Pulling or stretching a structure; application of a tension stress.

Transduction

The process by which the noxious stimulus of tissue damage is detected and nociception initiated; chemical and mechanical mechanisms of transduction are described.

Translation

Rectilinear movement in which all parts of a body move the same distance in the same direction.

Transmission

The conduction of information through the nervous system.

Travell points

An alternative term for muscular trigger points.

Trendelenberg test

A clinical test of gluteal muscle function; the patient stands first on both legs and

then on one while the examiner watches from behind to see if the pelvis rises on the non-weight-bearing side, as normal, or drops due to weakness of the gluteus medius, signifying a positive test.

Trendelenberg gait

The typical pelvic-dipping gait resulting from weakness of the gluteal musculature on one side, hip dysfunction or pain

Trigger point

A focus of hyperirritability in a muscle that may cause pain spontaneously, both locally and in a characteristic pattern of referral, is always tender and stimulation of which by pressure reproduces pain in the typical pattern of referral, pathognomonic feature of a trigger point syndrome.

Trigger point syndrome

A clinical entity related to a specific muscle and combining symptoms of pain locally and in a characteristic pattern of referral with signs of a palpable tight band in the muscle, tenderness at a trigger point and, on trigger point stimulation, a local twitch response, a jump sign and reproduction of pain in the typical pattern.

Trousseau points

Tender points described as lying over zygapophysial joints; possibly the tender points of fibromyalgia; c.f. trigger points.

TrP

Abbreviation for trigger point.

Twitch response

The palpable but subtle local twitch of a muscle evoked by stimulation of a trigger point; c.f. jump sign.

Uncovertebral joint

The bony articulation or pseudo-articulation described as occurring between the uncinat process of the posterolateral edge of a cervical vertebral body and the rim of the vertebral body above; also known as neurocentral joint, uncinat joint or joint of Luschka.

Underberger's test

A clinical test of vertebral artery provocation.

Valgus

Orthopaedic term describing a structure in which the part distal to it is bent or turned outward.

Validity

The extent to which an instrument measures what it is supposed to measure; the range of interpretations that may be placed on test results; note that it is not the measure that is valid or invalid but the use to which it is put.

Valleix points

Tender points originally described as lying on nerves but possibly the same as those described in fibromyalgia or an early description of trigger points.

Varus

Term describing a structure in which the part distal to it is bent or turned inward.

VAS

Visual analogue scale.

Vertebra plana

A flattish wedge-shaped deformity of a vertebral body caused by eosinophilic granuloma.

Vertebral artery provocation tests

Clinical tests for vertebro-basilar insufficiency; the examiner gently and slowly extends and rotates the patient's head, while checking for the occurrence of dizziness or nystagmus, which signify compromise of the artery on the opposite side to the direction of rotation; may be performed with the patient standing (Underberger's test) or sitting (attributed to Hautant) but probably best with the patient supine (De Kleijn's test, q.v.).

VISI pattern

The volar intercalated segment instability pattern of the wrist, in which the lunate is turned towards the volar or palmar surface

and the capitate is tilted dorsally.

Visual analogue scale

An instrument for the measurement of pain or other symptoms, consisting of a line of known length with one end representing the absence of the symptom and the other the most extreme experience of it; the subject marks a point along the line to indicate the amount of symptom present.

Volar surface

The palmar or anterior surface of the forearm, wrist or hand.

Watson's test

A clinical test for instability of the radial side of the carpus and in particular scapho-lunate dissociation; the examiner applies pressure to the dorsal aspect of the distal radius and the palmar aspect of the distal pole of the scaphoid with passive radial deviation; a click is felt when the test is positive.

Weaver's bottom

Ischiogluteal bursitis, formerly an occupational hazard for weavers who sat for long periods on hard surfaces.

Wolff's law

A concept of bone structure which says that the architecture and mass of bones are adjusted to accommodate the prevailing forces imposed by function or deformity; explanation for the observation that the direction and thickness of trabeculae in cancellous bone are related to lines of stress.

X axis

A biomechanical axis passing sideways through the body from right to left.

Y axis

A biomechanical axis passing vertically through the body from foot to head.

Z axis

A biomechanical axis passing through the body from back to front.

Z joint

Zygapophysial joint.

Zones of irritation

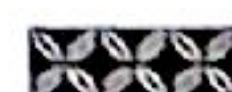
Areas of tenderness said to appear coincidentally with joint restriction and described as due to unusual sensitivity of a periosteal surface close to the dysfunctional joint; the pressure sensitivity is said to disappear upon provocation testing and the ZI to be eliminated on restoration of normal joint function; the concept has no anatomic or histological correlation.

Zygapophysial joint

The synovial joint on either side between the posterior elements of adjacent vertebrae; also loosely termed facet joint.

Zygapophysial joint block

An injection of local anaesthetic solution into the synovial cavity of a zygapophysial joint, for the purpose of blocking pain generated within that joint.



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CASE STUDIES

T.R. Female aged 22

History

The patient worked as a service officer in a allied health profession. She indicated that her pain had come on eighteen months ago as a result of repetitive flexion together with twisting, in order to load and unload boxes. The pain which she experienced initially was in the upper thoracic area between the shoulder blades with some later involvement of the right shoulder. The pain initially was dull in description and with no treatment because she thought the pain would go away.

After three months she saw the local doctor who ordered X-rays of the neck and shoulders. These were reported as being normal and although the doctor did not know what the cause was, she was referred to a physiotherapist who also did not know what to do and gave her one treatment. The patient did not return but continued to work. She saw the LMO again who this time referred her to an orthopaedic surgeon and another physiotherapist. This occurred fifteen months after the original injury and the patient maintained that during this period of time, her back always hurt when she went to work, although there was no time off. The discomfort was present on weekends and on holidays.

The orthopaedic surgeon gave her three weeks off work and she was sent to a third physiotherapist, still with no diagnosis being made and told to return to work on restricted duties, bearing in mind that she had been working normal duties for the ensuing sixteen months post injury. Her restricted duties of five hours a day with no heavy lifting did not resolve the problem and she was referred again to the orthopaedic surgeon who ordered a bone scan which was also reported as normal. Three courses of NSAIDS were not helpful in ameliorating her pain.

Her major discomfort which she has continued to experience is that of pain

between the upper part of the shoulder blades on continued neck flexion. Lifting the hands above the head also increased this type of pain in such activities as hanging out the washing.

Examination

At the time of examination the patient stood bent markedly forwards with shoulders hunched. She had large breasts, (which may in the future cause problems) and therefore she was made aware of the option of breast reduction. Her shoulders moved in all modalities without discomfort and the cervical spine had a full range of movement, also without pain. In respect to the lumbar regions, side bending to the right and to the left reproduced some right sided lumbosacral discomfort, she could extend only to 10 degrees with reproduction of the same pain but could flex to the ground with ease.

Palpation revealed tenderness mainly over the interspinous spaces from T2 to T5 as well as some tenderness in the bulk of the right trapezial muscle just above the supraspinatus muscle. Movements of the hips and pelvic structures were all within normal limits.

Assessment & Management

The assessment of this patient is that she had interspinous pain in the thoracic area with secondary tenderness in the right trapezial muscle. There was also some hypomobility in the lumbosacral motion segment.

In the first instance the motion segment was mobilised and the stiff unit manipulated. Then followed a short time of stretching and the patient was re-tested with abolition of her lumbosacral discomfort. She had a complete range of movement without pain and she stood in a neutral anatomical position without discomfort.

In respect to the mid scapular pain at presentation, the areas of tenderness were infiltrated with a mixture of local anaesthetic and celestone. Immediately following the

local anaesthetic the pain was abolished for the first time in eighteen months. Over the ensuing few weeks the patient returned slowly to a graded full time work function and she presented one month later saying that she had had no reproduction of her pain which was isolated to the T2-T5 interspinous spaces.

Lessons to be learnt

1. Pain must be reproduced
2. Pain often occurs in unusual places, i.e. interspinous spaces
3. It is easy to block the pain and reassess

CASE STUDY

J.F. Female aged 41

History

Initial presentation was that of left groin and hip pain of twelve months duration. The pain was said to have come on slowly over a short period of time for no particular reason. The pain then became quite intense and she was seen by the local doctor who referred her to a gynaecologist because he thought that endometriosis might be the cause of this patient's pain. She was seen at a large public hospital where laparoscopy revealed no endometriosis and it was suggested then that she be referred to an orthopaedic surgeon.

Examination at that time revealed a lady who walked with a fairly normal gait and had a full range of spinal movement without pain. Her straight leg raising on the left was full although sluggish and he thought that there was some pain over the anterior aspect of the left thigh. There was no neurological loss (and his comment was that the pain did not sound orthopaedic). She was reviewed again by the gynaecologist with the suggestion that she see a general surgeon at which time her pain had increased quite significantly to the extent that she walked with a limp, could not stand easily on the left leg because of the discomfort. She had trouble sitting for any period of time and could not lie on her left side in bed. Most activities of daily living

were hampered because of the pain that she was experiencing in the left groin and hip region. Radiological investigations included normal X-rays, CT scan and bone scan.

Examination

At the time of consultation the patient was in considerable pain and walked with quite a marked limp. As she stood the left knee was bent and the bulk of her weight was taken on the right leg. The posture otherwise was normal. Any attempt to determine pain in side bending, extension and flexion exacerbated her pain quite considerably. When asked to fully weight bear on the left leg there was initial pain taken up in stretching the leg to be able to weight bear but once the leg was stretched, weight bearing was not painful. It would therefore infer that the area of the pain is not in a weight bearing structure.

In the supine position the patient had limited left straight leg raise with some reproduction of her groin and hip pain on dorsi flexion. However she had pain in the right groin where the iliopsoas muscle moves down to attach into the lesser trochanter. Resisted movement of the slightly flexed left hip increased the left groin pain. There was also quite exquisite pain over the area of the left greater trochanter to palpation.

Assessment & Management

It was decided that because of her ongoing pain, further testing of structures would not be beneficial until such time as the pain could be adequately blocked. An attempt to eliminate the pain began with injection of 5 mls of local anaesthetic and one vial of celestone to the left greater trochanter bursa.

After five minutes the patient had a straight leg raise which was pain free, all movements of the hip could then be executed as well as testing for the sacroiliac joint. All these movements produced a dull feeling but not her pain as previously. When asked to walk she did so without pain and movements of the lumbar spine were within normal limits except that of extension which reproduced some pain in the left groin.

The diagnosis therefore is that of trochanteric bursitis with possible involvement of the iliopsoas bursa. She was given appropriate stretching exercises and reviewed two weeks later. At the presentation on the second consultation she was quite delighted that the pain that she had experienced so painfully over the last 4-6 weeks had resolved. I could not give her a reason why the pain began in the first instance.

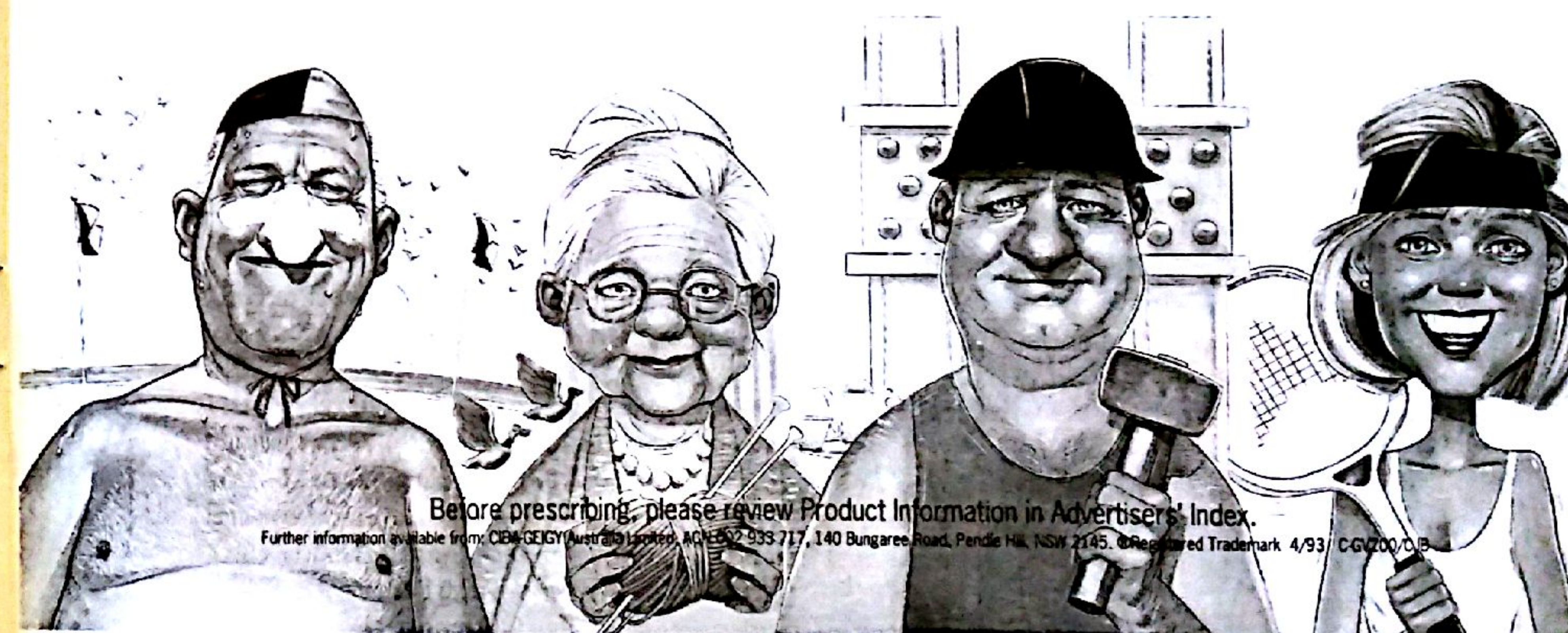
She has continued with post isometric stretching exercises for the iliopsoas muscle on the left and is now relatively pain free in all activities.

Lessons to be learnt

1. Always reproduce the patient's pain and block it if possible.
2. Straight leg raise, even with dorsi flexion can reproduce significant pain whenever the structures which are moved are stretched or strained over the inflamed part.
3. Don't get tunnel vision and think all the pain on certain tests is classic of that pain. There are variations.



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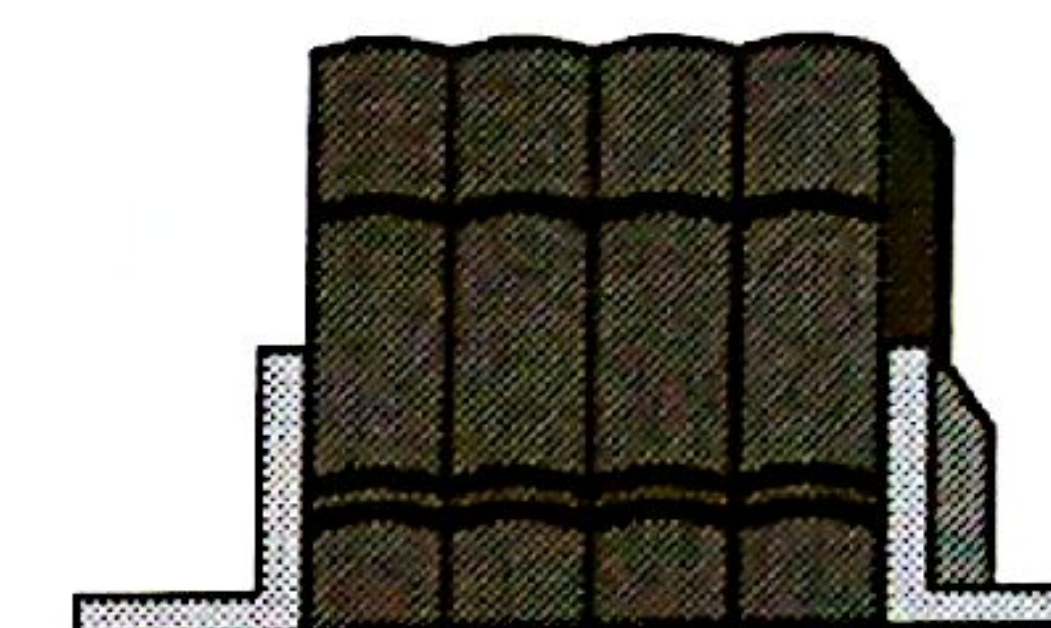
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1. Reiss W. et al, Percutaneous absorption of diclofenac. *Drug Res* 1986, 36 (11) 7: 1092-6. 2. Chlud K, Percutaneous therapy with non-steroidal anti-inflammatory drug (NSAID) with particular reference to pharmacokinetic factors. *Fortschritte der Medizin* (D) 1991, 109 (2) 59-64. Further information available from: CIBA-GEIGY Australia Limited, ACN 002 933 717, 140 Bungaree Road, Pendle Hill, NSW 2145. Phone (02) 688 0444. ®Registered Trademark (S4 All States) 8/94 C-GV387/CJBA

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BOOK REVIEW



Orthopaedic Physical Assessment 2nd Edition, Prof. David Magee Published by: W.B. Saunders Company

Every now and again, and not so often as one would like, there is a book released that stands head and shoulders above the norm. This is such a publication. I have now reviewed many publications relating to musculoskeletal medicine and with the exception of Melzack and Walls "Pain", there is not another that has the relevance to the undergraduate musculoskeletal trainee as this book offers. At Flinders, Corrigan is the standard text but suffers quite severely as it was a first edition, never revised, and is now over 10 years out of date. Many of the statements are showing the cobwebs of time and it did lack from a descriptive review of essential musculoskeletal tests. As an end result it became necessary to have a back-up manual by which to learn the correct way of carrying out these tests. We tended, as a group, to use McRae. This book was essentially pure tests, black and white drawing showing the various stages of each test in sequence. Magee combines all of the features of both books and uses extensive photographs and x-ray plates to illustrate the points being made. Many photographs have overlaid drawing of bone and joint positions to depict accurately where structures lie. Further, there are numerous line drawing to supplement the above. Radiology is not confined to plain x-rays, but included CT scans, Isotope scans and MRI. The normal as well as the abnormal are well represented.

Each chapter follows a common plan. One follows sequentially a well worn path. Entries are listed under the following headings...

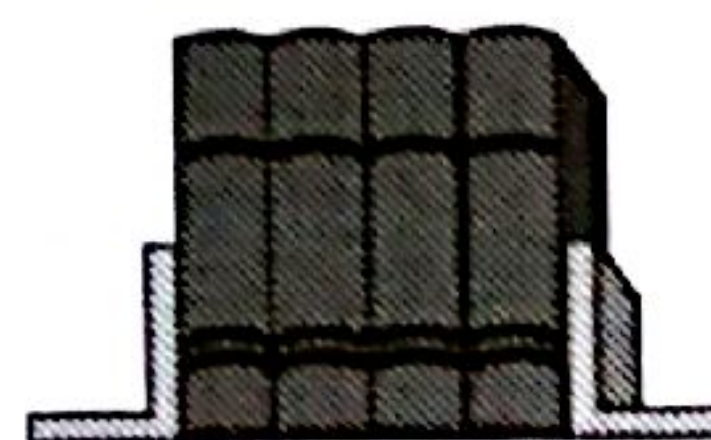
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| Applied Anatomy | Active Movements | Reflexes and Cutaneous Distribution |
| Active Movements | Passive Movements | Joint play Movements |
| Patient History | Resisted Isometric Movements | Radiographic Examination |
| Observation | Functional Assessment | |
| Examination | Special Tests | |

David Magee is the professional head of the Department of Physical Therapy in the Faculty of Rehabilitation Medicine at the University of Alberta, Edmonton, Alberta, Canada. The first edition of the book was written in 1987, the second being released in 1992-3. Two totally new chapters were added to the later edition, these being, "Head & Face", and "Emergency Sports Assessment". The book covers all the usually described subjects such as spinal segments, shoulder, knee, etc., but goes further to include gait assessment and posture. My own two particular fields of interest, the knee and the foot are covered extremely well. Case studies included at the end of most chapters provide the reader with assessment exercises.

The text begins with a chapter on basic concepts and principles and this sets the pattern by which the reader can effectively start his own musculoskeletal interview and examination. Perfection is virtually an unobtainable goal in any walk of life, and undoubtedly there will be critics of this text. Each and every one of us may have special quirks that are missing from the text, but I find it hard to be critical of any major oversights. For my money, David Magee takes ten out of ten. An excellent text that I think replaces the texts currently in use at Flinders University Diploma course. The book is 655 pages and unfortunately arrived on my desk with no covering letter. I am therefore unable to state the RRP. It is essential reading and a great basis for preparing any musculoskeletal lecture.

Editor.

BOOK REVIEW



A. Sports Injuries: Basic Principles of Prevention & Care

B. Clinical Practice of Sports Injury, Prevention & Care

Edited by P.A.F.H. Renstrom

This review covers two volumes of a 5 volume series set. These 2 volumes are part of the Encyclopaedia of Sports Medicine. The set has been produced by the International Olympic Medical Commission in collaboration with the International Federation of Sports Medicine. They are released by Blackwell Scientific Publications. Volume 4 was published in 1993 and volume 5 in 1994. These two volumes compliment each other.

The books are true encyclopaedias, are quite long, and go into great detail on all matters discussed. Volume 4 extends to 482 pages while volume 5 is a massive 727 pages. This is the first time in a book review that I have not fully read the total text, but in this instance have read at random, paying detailed attention to subjects that are of particular concern to myself, for example, "Overuse Knee Injuries". Other subjects of lesser personal importance have been skimmed sufficiently well to know the overall contents and the depth of knowledge contained.

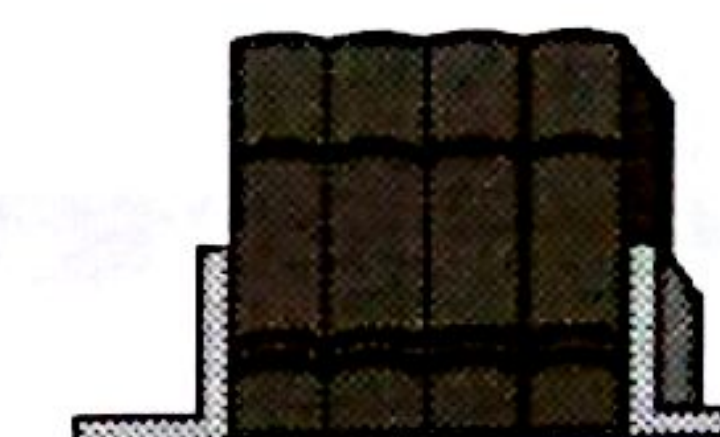
As the dust jacket states, sports injuries are very common and their incidence is rising. Prevention will play an increasingly important role in sports medicine. In "Sports Injuries" basic anatomical, pathological, physiological and functional aspects are outlined, together with details of biomechanics. Time is devoted to overuse and impact forces on the body. Common intrinsic risk factors that include malignment, muscle weakness and imbalance are discussed. Specific preventative measures are also covered. This is complete, discussing equipment, athletic gear, strapping etc., to training techniques, nutrition and psychological factors.

"Clinical Practice" takes the preceding volume a step further, building on the information contained in volume 4. The first part of the book details traumatic and overuse injuries, then deals with prevention and care. Each part of the body is examined in turn, discussing the particular injuries associated with the area. The second part of the book details sports specific injuries, prevention and care and examines the prevention and care of injuries associated with most of the Olympic sports.

There are many sports medicine books available that focus on treatment and rehabilitation, but few go into prevention or recurrence of injuries. These volumes do. In the preface the editor states, "Most injuries can be prevented. Dramatic acute injuries are... often difficult to prevent, but much can be done to improve the situation." He goes on to point out, "The rules in many sports could be changed so that they maximise protection to the athletes."

It is emphasised that many injuries are sports specific, eg., tennis elbow or rider's sprain, and that many of those injuries are quite preventable. It is a pity to see the word "strain" describing the injury in the text. As most musculoskeletal physicians will realise, "strain" applies to the force being exerted and "sprain" is the resulting injury. These blemishes are few and far between and do not undermine the quality of the work covered. By understanding the injury mechanism and the risk for injury, prevention can be effective.

BOOK REVIEW



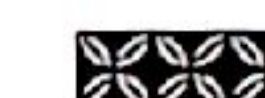
These 2 volumes are well illustrated with photographs, drawings and charts. They are very specialised reference works. They cannot be recommended as purchase "musts" for many of our readers, yet for some of us working in sports medicine type practices or associated with professional sports teams, they are certainly recommended acquisitions. The books are quite massive in size, but comprehensive in detail. Each chapter is written by a different authority so there becomes a continuing change in style throughout the volumes. They are not boring.

I have not had the privilege to view the first 3 volumes, but hope Blackwells will forward these for review. If they are forthcoming they will appear in future editions. These volumes are comprehensive works, not for everyone, but essential reference books for those having a "sports medicine" aspect to their musculoskeletal practice.

Volume 4 R.R.P. \$126

Volume 5 R.R.P. \$155

Editor



Orthopaedic Basic Science

Edited by : Sheldon R. Simon

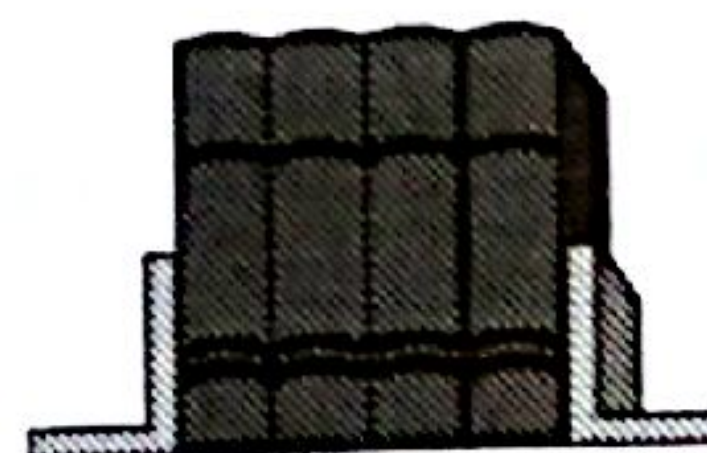
Published by: The American Academy of Orthopaedic Surgeons, 1994

In recent years there has been a vast increase in scientific knowledge of the anatomy, molecular biology, physiology, biomechanics and pathology of the musculoskeletal system. The aggregation of current information in these areas forms the body of knowledge on which musculoskeletal medicine is based. That base is common to the discipline of orthopaedic surgery and the American Academy of Orthopaedic Surgeons has gathered the salient facts in this new book.

The work brings together for the first time a large amount of material that previously has only been available from narrowly focussed scientific journals or specialist publications. In each area it summarises reliable information considered to be established theory or fact and minimises or leaves out hypotheses and data considered conjectural or too new to be fully verified. The result is an authoritative reference and a valuable guide to the current state of knowledge on each topic.

Five chapters deal with the form and function of articular cartilage, the anatomy, biology and biomechanics of tendon, ligament and meniscus, the anatomy, physiology and mechanics of skeletal muscle, the form and function of bone and the anatomy, physiology and pathology of peripheral nerve. There are separate chapters on bone development and the growth plate, on bone injury, regeneration and repair, and on the molecular and cellular biology of inflammation and neoplasia. A special chapter is devoted to the principles of biomechanics and another to the kinesiology of the various regions of the musculoskeletal system and the co-ordination of functions in posture and movement. There is also a chapter on biomaterials in current use and one on conditions of other bodily systems that might complicate management of musculoskeletal problems. Finally, there is a chapter on experimental design and statistical analysis, designed to improve understanding of the critical reasoning method by which scientific knowledge is acquired.

BOOK REVIEW



The setting out of the work reflects its primary intention as a source of information for those involved in education. Facts are presented clearly and in sufficient detail for understanding in reasonable depth. Additional clarification is provided by numerous tables, graphs and illustrations, including photomicrographs, radiographs and diagrams. The main text is not annotated but each chapter is supported by a selected bibliography containing several pages of reference to the relevant scientific literature.

The standing of this book may be gauged by the fact that it has been chosen as the recommended text in basic sciences for the postgraduate diploma course in musculoskeletal medicine at the University of Newcastle. No doubt it will also find its way into the reading lists for other courses involving scientific study of musculoskeletal function and dysfunction.

That basic science underpins all disciplines of medical practice is axiomatic. No branch of medical endeavour can claim to have legitimacy without a firm scientific basis. Understanding of the nature of things is fundamental to the interpretation of observations and the rational development of ideas. *Orthopaedic Basic Science* provides a guide for those who seek that sort of understanding of the musculoskeletal system.

Wade King

704pp — R.R.P. hardcover \$230, softcover \$220
Distributed in Australasia by Harper Educational publishers



Acupuncture, Trigger Points and Musculoskeletal Pain

By: P.E. Baldry - Second Edition

Published by: Churchill Livingstone, 1993

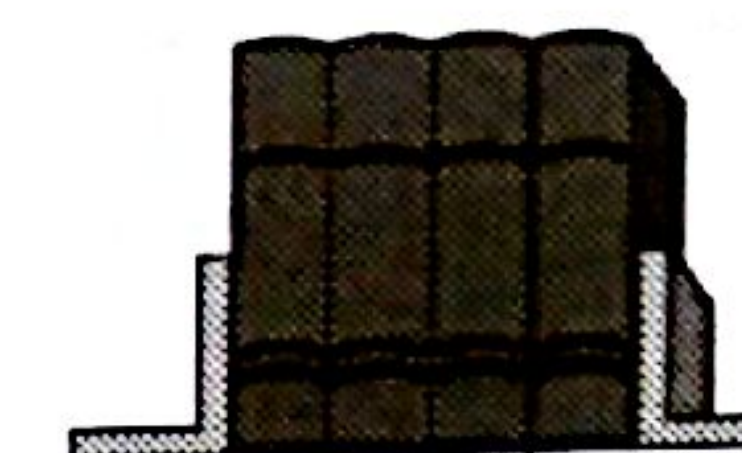
Most General Practitioners who are treating musculoskeletal pain have entered this field by either of two pathways — acupuncture or manual medicine. With the knowledge of acupuncture points and skills of palpation, myofascial trigger points assume increasing relevance to treating myofascial pain syndromes.

This book brings acupuncture and trigger point therapy together in a well-organised, concise and explicit manner. The book is divided into three parts. The first part deals with a historical review of acupuncture. These paragraphs in themselves make this book interesting reading.

Part two contains an excellent up-to-date section on the neurophysiology of pain. Any doctor who has not got access to other material could not find a better summary of current concepts and review of pain theory.

The third part is entirely practical in nature and each chapter deals with a particular Regional Pain Syndrome — eg. pain in the neck, pain in the lower limb, etc. Throughout this section, the author has interspersed clinical case presentations, which, as the author states in his preface, "are there to provide illustrations from everyday clinical practice, that serve to highlight certain important principles underlying the diagnosis and management of the various painful musculoskeletal disorders."

BOOK REVIEW



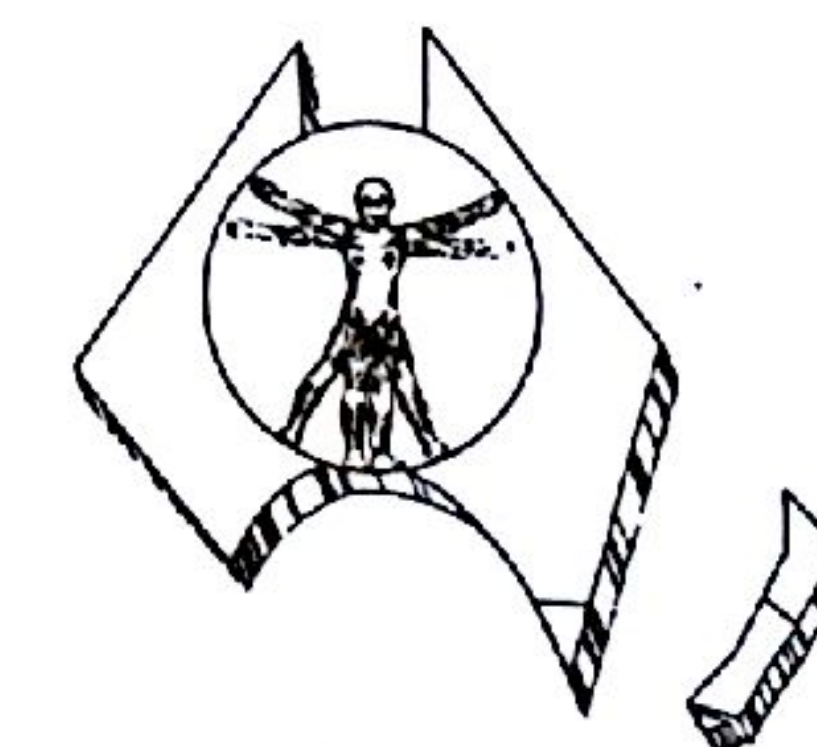
This section of the book is a delight to browse through and read the specific sections of interest. The author is obviously thoroughly familiar with presentations of musculoskeletal pain and writes from that perspective.

Throughout the book, the author has attempted to provide a balanced view of nociceptive stimulation therapy. He has gone to some length to describe the various trials on the efficacy of acupuncture in a chapter entitled "Scientific Evaluation of Acupuncture". He has also attempted to draw upon the scientific evidence for the various proposed treatments and to provide some rationality into the management. An example of this is his treatment of lateral epicondylitis (tennis elbow), in which steroid injection, acupuncture, etc., are all discussed.

Those familiar with Travell and Simons' books will obviously compare the two. This book is more condensed and the text easier to read on each specific muscle or region. However, the line diagrams, although adequate, do not seem to stick in the reader's mind in the same way as the colour diagrams of referred pain patterns, from Travell and Simons's volumes.

In summary, this book should find a place on every musculoskeletal physician's desk. For the more serious student undergoing postgraduate education in musculoskeletal medicine, this book is a valuable mine of information — easily read and interesting.

Philip Watson



EARLY NOTICE

- The next A.A.M.M. Annual Scientific Conference will be held at Canberra.
- A proposed 'Work Shop' is intended to be held at Thredbo Alpine Village.
- The tentative dates are 12th to 18th August, 1995.
- Further details will appear in the March 1995 edition of this journal.



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ANAPROX 550

A NON-STEROIDAL ANTI-INFLAMMATORY
AGENT DEVELOPED BY SYNTEX RESEARCH.

DESCRIPTION The chemical name is the sodium salt of (+)-6-methoxy- α -methyl-2-naphthaleneacetic acid. It is a propionic acid derivative related to the arylacetic acid class of drugs. It is unrelated to salicylates and the corticosteroid hormones. Naproxen sodium is an odourless, white to off-white crystalline substance. It is soluble in water. It is available as a capsule-shaped, blue film-coated tablet containing 550mg of naproxen sodium engraved with the words "SYNTEX" on one side and "ANAPROX 550" on the other side and as an oval, bi-convex blue film-coated tablet containing 275mg of naproxen sodium engraved with the words "SYNTEX" on one side and "ANAPROX 275" on the other side. **PHARMACOLOGY** ANAPROX dissociates into naproxen anion and sodium in vivo at physiological pH. ANAPROX has been shown to have anti-inflammatory properties when tested in classical animal test systems. In addition, it has analgesic and antipyretic actions. It exhibits its anti-inflammatory effect even in adrenalectomised animals, indicating that its action is not mediated through the pituitary axis. The exact mechanism of its anti-inflammatory action is not known. In man, ANAPROX is completely absorbed from the gastro-intestinal tract after oral administration. Peak plasma levels following each dose are attained within two hours with equilibrium normally achieved after four-five doses. It has a mean biological half-life of approximately 14 hours. At therapeutic levels ANAPROX is approximately 99.9% albumin bound. It has a relatively small volume of distribution (0.09 - 0.03 litres per kg) which corresponds to about 10% of the body weight in humans. Extensive plasma protein binding apparently acts to restrict the drug largely to the plasma compartment. Human metabolism of the naproxen anion determined by analysis of the urinary radioactivity following a 100mg IV dose was found to be relatively simple. The parent structure was altered only by removal of the 6-methoxy group to form 6-demethyl-naproxen and by conjugation of the acid function. 70% of the ingested dose was eliminated either as unchanged naproxen, 10% or as conjugated naproxen, 80% (40% naproxen glucuronide and 20% unknown conjugate). Some 28% of the dose underwent 6-demethylation. As a consequence 5% of the dose appeared in the urine as demethylated naproxen, and 22% as conjugates of demethylated naproxen. The acute toxicity of 6-demethyl-naproxen given by different routes to rats and mice was found to be considerably lower than that of naproxen. In subacute studies, the toxicity of the metabolite in all cases was found to be significantly lower than that of naproxen. Only very preliminary pharmacological assay of this metabolite has been carried out and it would appear to be very much less active than the parent compound. The plasma level curves of naproxen sodium would be expected to increase proportionally with doses up to 550mg b.i.d. Larger doses would result in a much less than proportional increase due to accelerated renal clearance of disproportionately increased amounts of non-protein bound drug. However, whether this effect increases or decreases the toxicity of ANAPROX has not been established. **INDICATIONS** ANAPROX is indicated as an analgesic in acute migraine attacks, for the treatment of rheumatoid arthritis, osteoarthritis, ankylosing spondylitis and for the relief of acute and/or chronic pain states in which there is an inflammatory component. **CONTRAINDICATIONS** Patients who are hypersensitive to naproxen or naproxen sodium or in whom acetylsalicylic acid or other non-steroidal anti-inflammatory agents induce allergic manifestations eg asthma, rhinitis and urticaria. Patients with either a history of, or active, peptic or gastrointestinal ulceration or chronic dyspepsia. Active gastrointestinal bleeding. Children under 5 years of age. **PRECAUTIONS** ANAPROX should not be used concomitantly with NAPROSYN (naproxen) or NAPROGESIC/SYNFLEX (naproxen sodium) since they all circulate in the plasma as the naproxen ion. In patients with active peptic ulcer or active inflammatory disease of the gastrointestinal tract and active rheumatoid arthritis, an attempt might be made to treat the arthritis with a non-ulcerogenic drug, such as gold. As with other non-steroidal anti-inflammatory drugs, ANAPROX should not be given to patients with active peptic ulcer. Patients prone to gastrointestinal tract irritation or with a history of peptic ulcer or diverticulosis should be closely supervised. Serious gastrointestinal adverse reactions can occur at any time in patients taking non-steroidal anti-inflammatory drugs. The cumulative incidence of serious gastrointestinal adverse reactions, including gross bleeding and perforation, increases approximately linearly with duration of use of naproxen (or other non-steroidal anti-inflammatory drugs) therapy. As with other risk of adverse reactions with use of higher doses of these drugs. Patients with initial haemoglobin values of 10 grams or less who are to receive long-term therapy should have haemoglobin values determined frequently. Patients on some anti-coagulants should be watched for an increase in prothrombin time and patients on other drugs such as hydantoins, sulphonamides, sulphonylureas or methotrexate should be observed for increased effect or toxicity. A 550mg tablet of ANAPROX contains approximately 50mg of sodium. This should be considered in patients whose overall intake of sodium must be markedly restricted. Peripheral oedema has been observed in some patients although sodium retention has not been reported. For this reason, the drug should be used with caution in patients with fluid retention, hypertension or heart failure. Anti-inflammatory, anti-pyretic and analgesic effects of naproxen sodium may mask the usual signs or symptoms of infection. Naproxen sodium therapy should be discontinued for at least 72 hours before testing adrenal function. As with other non-steroidal anti-inflammatory drugs borderline elevations of

one or more liver tests may occur in up to 15% of patients. These abnormalities may progress, may remain essentially unchanged, or may be transient with continued therapy. The SGPT (ALT) test is probably the most sensitive indicator of liver dysfunction. Meaningful (three times the upper limit of normal) elevations of SGPT or SGOT (AST) occurred in controlled clinical trials in less than 1% of patients. A patient with symptoms and/or signs suggesting liver dysfunction, or in whom an abnormal liver test has occurred, should be evaluated for evidence of the development of more severe hepatic reaction while on therapy with this drug. Severe hepatic reactions, including jaundice and cases of fatal hepatitis, have been reported with this drug as with other non-steroidal anti-inflammatory drugs. Although such reactions are rare, if abnormal liver tests persist or worsen, if clinical signs and symptoms consistent with liver disease develop, or if systemic manifestations occur (e.g. eosinophilia, rash, etc.), this drug should be discontinued. Adverse ophthalmological effects have been observed with non-steroidal anti-inflammatory agents, accordingly, patients who develop visual disturbances during treatment with ANAPROX should have an ophthalmological examination. [See ADR under "SPECIAL SENSES"]. **Use in Patients With Impaired Renal Function** In chronic studies in laboratory animals naproxen sodium has caused nephritis. Glomerular nephritis, interstitial nephritis and nephrotic syndrome have been reported rarely in humans. Naproxen sodium should therefore be used with great caution in patients with significantly impaired renal function and the monitoring of serum creatinine and/or creatinine clearance is advised in these patients. ANAPROX should not be given to patients with creatinine clearance less than 20ml/minute because accumulation of naproxen metabolites has been seen in such patients. Certain patients, specifically those where renal blood flow is compromised, such as extracellular volume depletion, cirrhosis of the liver, sodium restriction, congestive heart failure, and pre-existing renal disease should have renal function assessed before and during naproxen sodium therapy. Some elderly patients in whom impaired renal function may be expected, as well as, patients using diuretics could fall within this category. A reduction in daily dosage should be considered to avoid the possibility of excessive accumulation of naproxen metabolites in these patients. **Use in the Elderly** Studies to date have not identified any subset of patients not at risk of developing peptic ulcer and bleeding. However, elderly and debilitated patients are more prone to gastrointestinal ulceration than others. Most of the fatal gastrointestinal events associated with non-steroidal anti-inflammatory drugs have occurred in this patient population. One study indicates that although total plasma concentration of naproxen is unchanged, the unbound plasma fraction of naproxen is increased in the elderly. The lowest effective dose is recommended in elderly patients. **Use in Patients with Impaired Liver Function** Chronic alcoholic liver disease and probably also other forms of cirrhosis reduce the total plasma concentration of naproxen but the plasma concentration of unbound naproxen is increased. The implication of this finding for naproxen sodium dosing is unknown. In patients with impaired hepatic function, the lowest effective dose is recommended. **Use in Pregnancy** PREGNANCY CATEGORISATION C Non-steroidal anti-inflammatory drugs inhibit prostaglandin synthesis and, when given during the latter part of pregnancy, may cause closure of the foetal ductus arteriosus, prolong labour and delay birth. Continuous treatment with non-steroidal anti-inflammatory drugs during the last month of pregnancy should only be given on sound indications. During the last few days before expected birth, agents with an inhibitory effect on prostaglandin synthesis should be avoided. ANAPROX should, therefore, only be administered during pregnancy if the benefit justifies the potential risk. **Use in Lactating Mothers** The drug has been found in the milk of lactating mothers at a concentration approximately 1% of that found in plasma. As the effect of the drug in the newborn is not known, the use of ANAPROX in lactating mothers is not recommended. **Use in Children** Naproxen sodium administration to children under 5 years of age is contraindicated since safety in this age group has not been established. NAPROSYN (naproxen) Suspension 25mg/mL is an appropriate formulation for use in children 5 years and over. (Please refer to the NAPROSYN Product Information). **Significant Interactions with Drugs and Laboratory Tests** (i) Naproxen sodium may interact with other albumin bound drugs, for example, warfarin or bishydroxycoumarin may be displaced and induce excessively prolonged prothrombin times. Similarly, patients receiving hydantoins, sulphonamides, sulphonylureas or methotrexate should be observed for increased effect or toxicity. (ii) It decreases platelet aggregation and prolongs bleeding time. This effect should be kept in mind when bleeding times are determined. Patients who have coagulation disorders or are receiving drug therapy that interferes with haemostasis should be carefully observed if naproxen sodium is administered. Patients on full anticoagulation therapy (e.g. heparin or dicoumarol derivatives) may be at increased risk of bleeding if given naproxen sodium concurrently. Thus, the benefits should be weighed against these risks. (iii) Probencid significantly prolongs the half-life of the drug (from 14 to 37 hours). This is associated with a decrease in conjugated metabolites and an increase in 6-O-demethyl naproxen. (iv) The natriuretic effect of furosemide has been reported to be inhibited by some drugs in this class. (v) Inhibition of renal lithium clearance leading to increases in plasma lithium concentrations has been reported. (vi) Urinary 17-ketogenic steroids may be spuriously increased due to a reaction between naproxen sodium (and/or its metabolites) and m-dinitrobenzene (used in this assay). 17-hydroxycorticosteroid measurements (Porter/Silber test) do not appear to be altered. (vii) It may interfere with some urinary assays for 5-hydroxy-indoleacetic acid. (viii) Naproxen sodium and other non-steroidal anti-inflammatory drugs can reduce the antihypertensive effect of propranolol and other beta blockers. (ix) In vitro studies have shown that naproxen may inter-

fere with the metabolism of zidovudine, resulting in higher zidovudine plasma levels. Therefore, consideration should be given to reducing zidovudine doses to avoid the potential of increased side effects associated with increased zidovudine plasma levels. (x) As with other non-steroidal anti-inflammatory drugs, naproxen may increase the risk of renal impairment associated with the use of ACE (angiotensin I converting enzyme) inhibitors. **Special Precautions** If steroid dosage is reduced or eliminated during ANAPROX therapy, the steroid dosage should be reduced slowly and the patients must be observed closely for any evidence of adverse effects, including adrenal insufficiency and exacerbation of symptoms of rheumatoid arthritis. **ADVERSE REACTIONS** Adverse reactions reported in controlled clinical trials in 960 patients treated for rheumatoid arthritis or osteoarthritis are listed below. In general, these reactions were reported two to 10 times more frequently than they were in studies in the 962 patients treated for mild to moderate pain. **Incidence greater than 1%** Gastrointestinal: The most frequent complaints reported related to the gastrointestinal tract. They were constipation, heartburn, abdominal pain, nausea, dyspepsia, diarrhoea, stomatitis. **Central Nervous System:** Headache, dizziness, drowsiness, lightheadedness, vertigo. **Dermatologic:** Itching (pruritus), skin eruptions, ecchymoses, sweating, purpura. **Special Senses:** Tinnitus, hearing disturbances, visual disturbances. **Cardiovascular:** Oedema, dyspnoea, palpitations. **General:** Thirst. *Incidence of reported reactions between 3% and 9%: Those reactions occurring in less than 3% of the patients are unmarked. **Incidence less than 1%** PROBABLE CAUSAL RELATIONSHIP: The following adverse reactions were reported less frequently than 1% during controlled clinical trials and through voluntary reports since marketing. The probability of a causal relationship exists between the drug and these adverse reactions. **Gastrointestinal:** Abnormal liver function tests, gastrointestinal bleeding, haematemesis, jaundice, melena, peptic ulceration with bleeding and/or perforation, non-peptic gastrointestinal ulceration, vomiting, ulcerative stomatitis, colitis, fatal hepatitis. **Renal:** Glomerular nephritis, haematuria, interstitial nephritis, nephrotic syndrome, renal disease, renal papillary necrosis, renal failure. **Haematologic:** Eosinophilia, granulocytopenia, leukopenia, thrombocytopenia. **Central Nervous System:** Depression, dream abnormalities, inability to concentrate, insomnia, malaise, myalgia, muscle weakness, aseptic meningitis. **Dermatologic:** Porphyria cutanea tarda, alopecia, skin rashes, epidermal necrolysis, erythema multiforme, Stevens-Johnson syndrome, photosensitivity reactions including rare cases in which skin is resembling porphyria cutanea tarda or epidermolysis bullosa. **Special Senses:** Hearing impairment. **Cardiovascular:** Vasculitis, congestive heart failure. **General:** Anaphylactoid reactions, menstrual disorders, pyrexia (chills and fever), eosinophilic pneumonitis. **CAUSAL RELATIONSHIP UNKNOWN:** Other reactions have been reported in circumstances in which a causal relationship could not be established. However, in these rarely reported events, the possibility cannot be excluded. Therefore these observations are being listed to serve as alerting information to the physicians. **Haematologic:** Agranulocytosis, aplastic anaemia, haemolytic anaemia. **Central Nervous System:** Cognitive dysfunction, convulsions. **Dermatologic:** Urticaria. **Mouth and Throat:** A few severe cases of sore throat have been observed. **General:** Angioneurotic oedema, hyperglycaemia, hypoglycaemia, hyperkalaemia. **DOSAGE AND ADMINISTRATION** **Acute Migraine Headache:** The dose is 525mg at the first symptom of an impending headache. An additional 275mg to 550mg dose can be given throughout the day, if necessary, but not before an hour after the initial dose. The total daily dose should not exceed 1375mg. **Acute Pain States with An Inflammatory Component:** For the relief of acute pain states in which there is an inflammatory component, the dose is 550mg initially followed by 275mg every six to eight hours as required. The total daily dose should not exceed 1375mg. **Rheumatoid Arthritis, Osteoarthritis, Ankylosing Spondylitis and Chronic Pain States with an Inflammatory Component:** The dosage range of naproxen sodium is 550mg to 1,100mg daily in two divided doses. The starting dose should not be less than 550mg daily and may be varied stepwise within this range 550mg to 1,100mg daily maintaining twice daily administration for long-term maintenance, depending on the needs of the patient. **OVERDOSAGE** Significant overdosage of the drug may be characterised by drowsiness, epigastric pain, indigestion, nausea or vomiting. A few patients have experienced seizures, but it is not clear if these were related to naproxen or not. It is not known what dose of naproxen sodium would be life threatening. Should a patient ingest a large number of ANAPROX tablets accidentally or purposefully, the stomach may be emptied and usual supportive measures employed. Animal studies indicate that the prompt administration of activated charcoal would tend to reduce markedly the absorption of the drug. Haemodialysis does not decrease the plasma concentration of naproxen because of the high degree of its protein binding. **PRESENTATION** ANAPROX is supplied as a 550mg capsule-shaped, blue film-coated tablet engraved with the words "SYNTEX" on one side and "ANAPROX 550" on the other side and as a 275mg oval, bi-convex, blue film-coated tablet engraved with the words "SYNTEX" on one side and "ANAPROX 275" on the other side. "ANAPROX 550" is available in packs of 5, 10 and 50 tablets. "ANAPROX 275" is available in packs of 5, 20 and 50 tablets. **PHARMACEUTICAL PRECAUTIONS** ANAPROX 550mg and 275mg Tablets: Protect from light, store below 30°C, shelf-life four years. **PBS Restricted:** 50 tablets + 3 repeats. **Unrestricted:** 10 tablets. **SYNTEX AUSTRALIA LIMITED** 275 ALFRED STREET, NORTH, NORTH SYDNEY NSW 2060. **TGA Approval Date:** 5 March, 1993. **Safety Related Changes:** 21 June, 1993. © Registered Trademark. **S&H SYNAN 1709**

