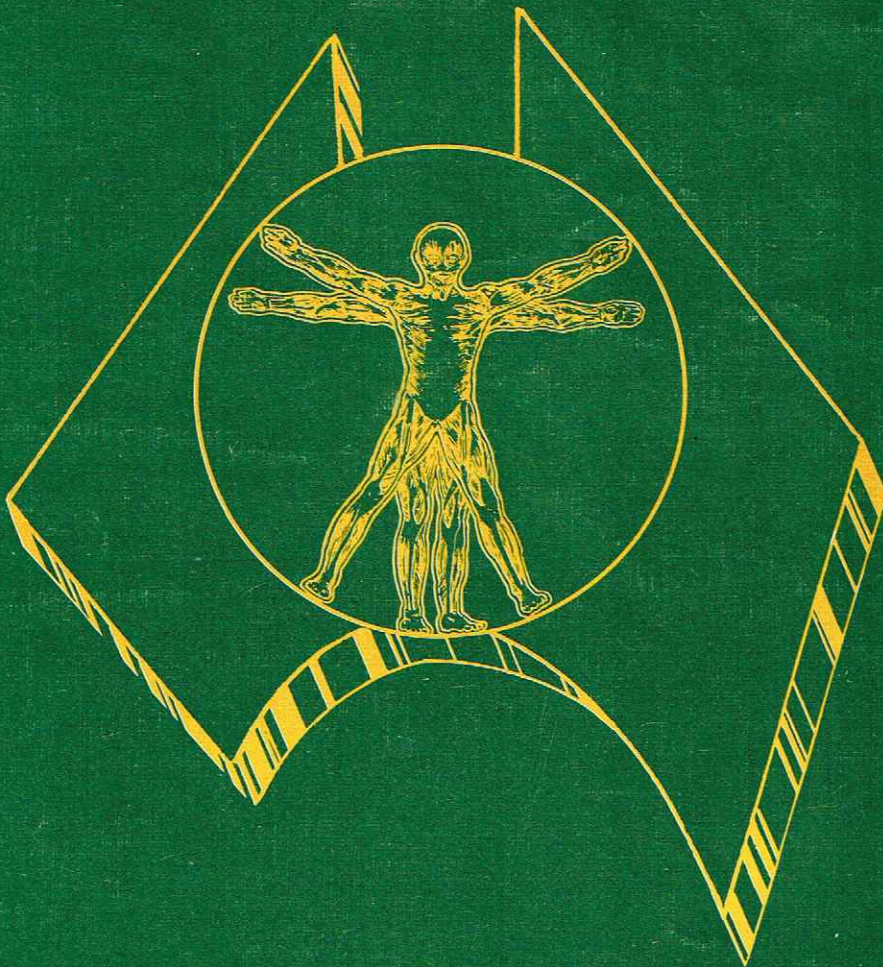


**Australian
Association of
Musculoskeletal
Medicine**

Bulletin

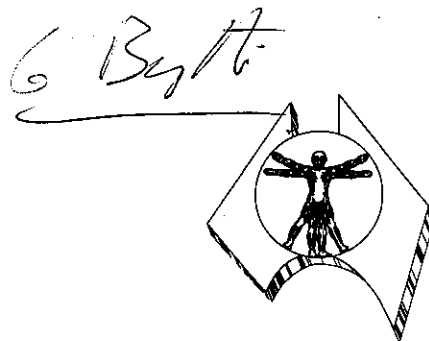


Neck and Shoulder Pain
Therapeutic Exercise

Vol. 3 No.1 June 1987

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Australian Association of Musculoskeletal Medicine



Bulletin

Vol.3 No.1

June, 1987

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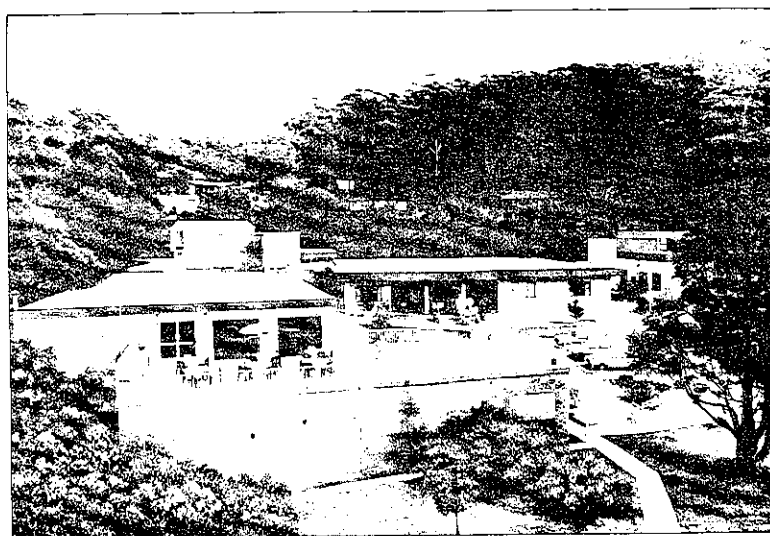
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AUSTRALIAN ASSOCIATION OF MUSCULOSKELETAL MEDICINE **OFFICE-BEARERS 1987**

The following members were elected to office at the annual general meeting in Sydney on 14th November 1986.

PRESIDENT:

Dr. Nikolai Bogduk BSc (Med) (Hons), MB, BS (Hons), PhD,
Dip Anat, Hon MMTAA.

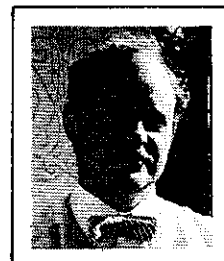
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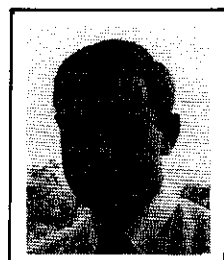
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telephone (067) 66 6166



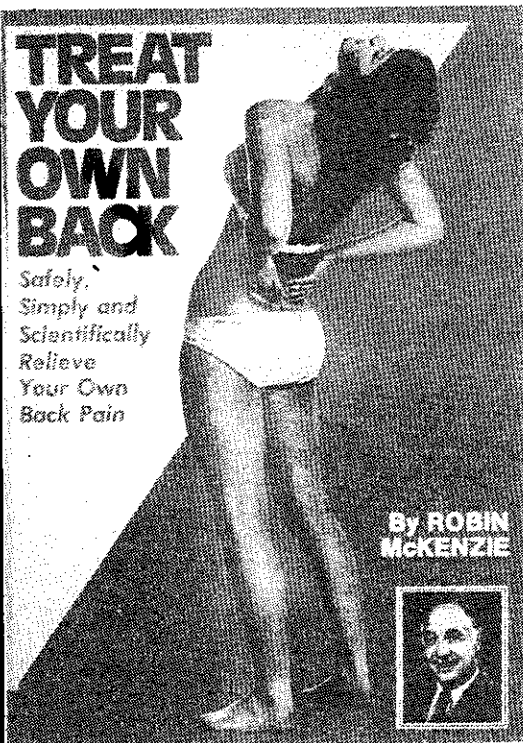
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Dr. John Varejka	Grenfell, NSW	(063) 43 1211
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Editorial

Welcome to Volume 3 of the Bulletin. The little green magazine that some said could only last two or three issues is now in its third year of publication. There has been a break of several months but the Bulletin is now back in regular production and hopefully bigger and better than ever.

Members could be forgiven for wondering what has gone on in the Association since the last annual conference. Some possibly thought that not very much had: after all, the A.A.M.M. was once likened to a submarine that only surfaced once a year and was not heard from in between. Others may have remembered all the activity foreshadowed at the 1986 A.G.M. and wondered whether any of it would really come to anything, and whether there really was any justification for the subscription increase determined at that meeting.

In fact, a great deal has been going on in the Association, especially at committee level, in the last six months. Not the least of this has been a total re-organisation of the way the Bulletin is prepared and although this has involved a temporary lapse in publication, it is hoped that it will be compensated for by a more informative, more scientific and more regular Bulletin in the future.

Even more importantly, the committee has been taking positive steps towards the consolidation of musculoskeletal medicine as a distinct branch of medical science, or as some would prefer to term it, a legitimate medical (sub-) specialty.

This is an issue that has vexed the Association for years, as most members are aware. The problem has not been the scientific legitimacy of the discipline. That has always been apparent, although perhaps not quite so clearly years ago as it has been more recently: those of us in the Association always knew there was a scientific basis in anatomy, biomechanics, physiology and pathology for what we did. The problem was to achieve recognition amongst our medical peers, those colleagues in other branches of medicine whose perceptions of musculoskeletal medicine were by definition based on a lesser degree of interest and understanding. Some of their attitudes tended to place musculoskeletal medicine somewhere in the realm of rheumatology, or orthopaedic surgery, or perhaps rehabilitation. The distinctions between these fields and ours had to be drawn in ways which clarified the differences without introducing unnecessary elements of duality or competition.

Just how we are going about this will be apparent from several items in this issue. Some of these are in the nature of allusions and members will have to do some reading between the lines. This is necessary at this stage as the precise details of some of our strategies are best not made public until they come to fruition. However, all will be revealed in due course, and in the relatively short term at that. In the meantime, members can be assured that their interests are being advanced in ways that would probably not have been possible even one or two years ago. We already have a firm footing on ground that would previously have been denied to a body like ours.

Whilst it remains essentially an interest group, the Association now has even more to offer members who wish to pursue their interest beyond the level of reading relevant scientific articles, participating in occasional workshops and attending annual conferences. For those who wish to go further there will be a clearly defined course of study and practical training with specific objective goals leading to recognised qualifications of expertise.

The twenty-three pioneers who formed the A.A.M.M. in 1971 could hardly have envisaged the degree of involvement in education and research that their fledgling group would have only seventeen years later. It is to them, and to the many others who have made significant contributions to the Association over the years, that we owe the gratitude for the current position of strength and activity to which the A.A.M.M. has evolved.

The present stage of the Association is more a beginning than an ending of achievement. Those who are members now are fortunate in being "in on the ground floor" of something set to rise to greater heights than ever previously thought possible.

Exciting, isn't it?

President's Comments

With a new committee, and a legacy of directives from the retiring committee, the Association is about to embark on a new era. The themes for the immediate future are profile, knowledge and respectability. The catalyst for these is the syllabus, and the vehicle is the Bulletin.

The retiring committee undertook the ground work for establishing a syllabus of knowledge in musculoskeletal medicine. Not only did this initiate the material creation of the syllabus but it revitalised the way in which the committee works. Each member of the committee was charged with producing a set of general and specific objectives to describe expected standards of knowledge in a particular area of musculoskeletal medicine. When collated, the various members' contributions amount to a comprehensive syllabus. The new committee is charged with continuing this work. Each member will work on a particular aspect of the evolving syllabus. In this way, the work of the committee is dispersed and shared, and any achievements will be collective. A corollary of this pattern of endeavour is that the committee must continue to meet regularly to collate their work. This will cost the Association funds, but we believe that the investment is worthwhile.

The syllabus is designed solely to describe a body of knowledge and skills that should be the desired achievements of anyone seeking a responsible reputation or recognition in musculoskeletal medicine. The concept is only an abstract one. We are simply seeking to define a body of knowledge. The syllabus, at this stage, will only describe an implicit standard against which anyone may choose to measure themselves. The committee does not imply that it, or anyone else, has mastered this standard, nor does it presume that the syllabus will define the ultimate or only standard that should apply. Rather, it is creating the first of what may become several competing syllabi in the field of musculoskeletal medicine. It is not the intention of the committee to set itself up as creators and guardians of the "standard", but it is the intention to at least, and at last, put something on paper that people concerned about this field might start debating.

The committee does believe that it is time some definition of achievement and competence is established, but it does not consider that the Association should become some sort of self-appointed body of censors or examiners. This is why the concept of the syllabus is simply abstract. The members of the committee are drawing on their own experience in musculoskeletal medicine and their expectations of what constitutes required knowledge and appropriate skills in the good practice of musculoskeletal medicine. Others may disagree with minor features, or perhaps major features of the syllabus that emerges, but the committee believes that because it will be acting responsibly the expectations implied in the syllabus will all be justified. In short, it is expected that the syllabus will become the material symbol of what the Association stands for in terms of providing good musculoskeletal medicine for the public.

As the syllabus develops, portions will be published in the Bulletin so that members can respond, offering criticism or amendments, or (hopefully) endorsing the efforts of the committee, and this process introduces another innovation of the working of the committee. It has been resolved that instead of the Bulletin being the responsibility of one member, the editor, the entire committee will work towards preparing each issue. Again, each member is being charged with compiling a specific contribution, and each issue will be the collated results of this work.

Each meeting of the committee will therefore be a hive of activity spanning an entire weekend. Members will meet to collate developments in the syllabus, and to enter their contributions to the Bulletin. The Bulletin typesetter will attend these meetings with her sophisticated word-processing equipment so that the results of all work can be recorded immediately. This will greatly streamline the processes of revising drafts and preparing copy for publication.

Increased costs will be incurred in funding committee meetings of this sort, for travel and for other expenses. This use of funds should be justified by the meetings being intense and efficient, and actually doing a great deal of work in the Association's interests, including the production of both the syllabus and the Bulletin. On the other hand, as experience is gained of this new approach, the committee will be exploring avenues of economy, such as having preliminary meetings in each state to brief representatives, and having only a small number of representatives actually attending the working meetings, bringing with them the contributions of others.

The other intention for the Bulletin is to work systematically through various topics of musculoskeletal medicine, providing review articles or reprints of key articles on selected topics. The object is to publicise to members achievements and the state of knowledge in various fields of musculoskeletal medicine. Taking this notion to a possible maturity, the Bulletin could in time become like a quarterly "add on" encyclopaedia of musculoskeletal medicine, whose contents becomes much of the source material for the syllabus once it is established. Thus, if the syllabus states that something should be known, somewhere at some time in the Bulletin there would appear an article or a guide to references to that issue.

In this way the Association will establish its profile and respectability. The syllabus and Bulletin will become the material evidence of what the Association is about. The quality of the syllabus will define the Association's ideals, and the content of the Bulletin will reflect its progress towards these ideals. The age of anecdotal "evidence" and self-proclaimed expertise has come to an end; with it go the things that inevitably generate bickering and personal rivalry. There is a legitimate body of scientific knowledge in musculoskeletal medicine, there is much unknown, and there are many exciting theories.

Respectively, these need to be mastered, discovered and tested. The committee will work towards defining the expected body of knowledge and how theories and the unknown may be explored, and moreover, it will seek to help anyone wishing to learn and explore. It is through this process that we will raise the image of the Association amongst our colleagues, and extend better medicine more widely to our patients.

A.A.M.M. ROLL OF HONOUR

The following members have held executive office in the Association since its formation in 1971:

PRESIDENTS:

Dr. Frank May	1971-73
Dr. Brian Corrigan	1974-76
Dr. Brian Burnell	1977-78
Dr. Gordon Byth	1979
Dr. John Bosler	1980-84
Dr. Conrad Winer	1985-86
Dr. Nik Bogduk	1987

HON. SECRETARIES:

Dr. Gordon Byth	1971-72
Dr. Murray Ingpen	1973
Dr. Conrad Winer	1974-84
Dr. David Vivian	1985-

TREASURERS:

Dr. John Livingston	1971-74
Dr. A. (Kitch) Kitchener-Smith	1975-76
Dr. M. (Toby) Arnold	1977-78
Dr. Alex Ganora	1979-86
Dr. Wade King	1987

A full list of present office-bearers is on Page 3.

From The Hon. Secretary's Desk



It seems that the CT scan is frequently misused in the assessment of patients presenting with pain that may be derived from the spine. I see many patients who have had a lumbar or cervical CT scan ordered virtually the moment they presented to a doctor for assessment of pain.

The CT scan may provide relevant information, but probably only in a small number of these cases. The CT scan seems to show lumbar disc prolapses reasonably well (particularly if contrast is used). It has only limited value in cervical disc injuries (without contrast).

It is apparent that lumbar disc prolapse is a fairly rare cause of back or leg pain, so the relevance of the CT scan as an initial investigation is limited.

The overuse of CT scans is perpetuated by the anachronistic view that lumbar disc prolapse is a common cause of back pain. If such was the case, routine CT would be more reasonable and surgery would be something of a panacea.

The truth is that a CT scan often provides little useful information, and certainly no indication as to what management is appropriate.

In general, a CT scan of the lumbar spine should only be ordered if it will influence management. Thus, if a patient is responding slowly or not at all to conservative (non-operative) management, a CT scan should be ordered if and only if a specific scenario would lead to surgery. Thus a comment to the patient such as "You have a large disc prolapse causing your leg pain. I know this because you have grossly restricted straight leg raising on that side, muscle deficit and reflex loss. This CT scan will be done to show the level of the prolapse (and this may later be confirmed by myelogram) so that the surgeon can remove the disc", is reasonable.

The opposite use of the CT scan is to be derided. It is hopeless to say to a patient "I don't know what is going on, I'll order a CT scan". The ramifications of a positive scan may be disastrous. Operation may ensue on the basis of the scan findings. But was the patient's pain caused by the abnormality on the scan? Both you and your patient will know in the months and years which follow.

I consider lumbar CT scans should be ordered in the following cases:

1. Pre-operatively for disc injury and/or stenosis to establish the level of pathology.
2. If cancer is suspected, eg. weight loss, increasing neurological signs, etc.

The following three hypothetical cases give some idea of when a CT scan is appropriate.

Patient 1.

2 week history of low back pain, followed by the advent of acute severe posterior leg pain to the foot, accompanied by cessation of low back pain.

Signs - SLR 30° on that side, moderate weakness of peroneals, and absent ankle jerk.

Provisional diagnosis - Postero-lateral disc protrusion.

Investigations - CT scan not required at first.

Reassess - (A) if after usual conservative management (rest, analgesics, epidural, etc), signs improve, there is little need for CT. Maybe plain X-rays to ascertain degree of disc degeneration (but how much useful information will it provide?).

(B) Pain unchanged, signs as before or worse. Surgery only option. Do CT scan/myelogram to establish the level of disc prolapse.

Patient 2.

2 year history of back ache. Sedentary worker. Intermittent bilateral buttock ache. Gets mild relief from mobilisation and exercise programme. Condition static.

Signs - Stiff into flexion. Restricted posterior intervertebral movements L5/S1. Tender over facet joints at this level.

Provisional Diagnosis - Facet joint dysfunction secondary to:

- ? disc degeneration
- ? faulty biomechanics
- ? facet joint osteoarthritis

Investigations - Plain X-ray - Why? - may help with prognosis and treatment, eg. may show sacralisation that may be injected, may show facet joint arthritis, etc.

CT scan - will it show anything of relevance that you will act upon? If not - don't scan.

In this patient, if you are happy that expert mobilisation/traction has occurred, treatment options include:

- ergonomic redesign
- back support
- facet joint steroids
- exercise modification, etc.

If the patient does not improve, a decision in consultation with the patient about surgery or other invasive treatments should be made. Once a firm decision has been made to consider surgery, then a CT scan or other investigation (eg. discography) could be performed.

Patient 3.

6 week history of right buttock pain. No low back pain. Aggravated by sitting, standing and bending. Eased by walking. Health good.

Signs - Normal hip. SLR 75° on ipsilateral side, 90° on other. Very tender buttock. Resisted hip movements - mildly painful. Tender stiff L5/S1 on the side of buttock pain.

Provisional Diagnosis - Pain referred from L5/S1 intervertebral joint complex.

Investigations - No investigation required at first as the treatment is to be gentle.

This is the type of case that is often over X-rayed, and it demonstrates poor diagnostic skills. A pelvis and hip X-ray is often taken, but is unnecessary at first because of the normal range of hip movements.

A CT scan is sometimes ordered. If it is normal the patient is told there is nothing wrong with his or her back. If it is abnormal, showing for example, a disc bulge, management is directed at the disc.

Progress

- (A) If patient recovers with non-invasive management, such as
- no treatment
 - rest
 - mobilisation
 - avoidance of aggravating activities, etc

no investigation is required.

- (B) Patient not recovering, do plain film. Facet, paravertebral or trigger point injection may be done prior to this.

The role of CT scanning beyond these narrow limits is ill-defined. Possible additional uses of CT screening includes:

- detection of congenital and/or acquired canal stenosis that may be relevant to occupational medicine.
- identification of alleged abnormal characteristics of the facet joint in pain states.
- post-discography CT
- functional end range movement CT - in relationship to upper cervical instability.

CT scans are overused as a diagnostic tool in the assessment and management of pain syndromes derived from the spine. Inability of the practitioner to carry out a detailed physical examination of the musculoskeletal system is often the cause of this overuse. The dogma of back pain equals disc prolapse is outdated.



NEWS

"heard on the bush telegraph"

Perhaps the most important news for some time is that the syllabus has been drafted and is ready to form the basis of a major new undertaking which will add significantly to the effectiveness of the Association's activities. A weighty document of some 33 pages, it sets out for the first time a comprehensive outline of the body of scientific knowledge and specialised clinical skills which together comprise the substance of musculoskeletal medicine.

The next step, which is now under way, is to collate the pertinent facts and substantive theories relevant to each of the topics which the syllabus outlines. This will be, by its very nature, a process which continues indefinitely, as knowledge cannot be finite. However, in a practical sense there will be stages reached at which the information collected on a particular topic can be said to be a summary of the current knowledge and views on that subject. When these are reached they will be published in the Bulletin or made available to members in other ways. This should lead to a progressive broadening of the scientific base of musculoskeletal medicine in Australia.

Moves are also afoot to broaden the academic base of the discipline. It would not be politic to set out the precise nature of these moves at this time, but members may be assured that the objectives are to further the cause of musculoskeletal medicine for the mutual benefit of concerned doctors, health authorities, current patients and the general community. Naturally, further details will be published as appropriate stages are reached and goals are achieved.

□ □ □

The committee seems to have been busier this year than at any previous time in the history of the Association. Hardly a day, and certainly never a week, goes by without members being in contact with one another on some aspect of the Association's business. As well, committee members have agreed to meet physically on a regular quarterly basis.

The first of the new-style meetings was held in April, somewhat along the lines of the A.I.M.M. Fischingen monastery meetings. Committee members were cloistered for two days in a bush homestead out of sight of all other habitation. The two days (and nights) of intensive work produced the substance of the syllabus, the first steps towards its implementation, the framework for this issue of the Bulletin and a new resolve to heighten the profile of the Association in the scientific medical community. Hopefully this surge of activity will be washing around the feet of the general membership in the not-too-distant future.

□ □ □

Members who wish to contribute to any of the Association's current projects, or indeed to suggest new ventures, are invited (and encouraged) to send their ideas to the A.A.M.M. Project Co-ordinator, **Vern Vivian**, at 21 Old Geelong Road, Point Lonsdale, Victoria, 3225.

□ □ □

The often-discussed plans for a mid-year meeting of the Association are coming to fruition this year with a meeting to be held at Mount Buller, Victoria, in July. The obvious enthusiasm expressed for this meeting suggests that there may be considerable scope for more frequent gatherings of Association members. So much is happening within musculoskeletal medicine at the moment that there would be no problem filling agendas for several meetings each year. The days of the submarine are long gone: it has been replaced by an aircraft carrier!

Negotiations have again been conducted with our New Zealand colleagues on the subject of joint meetings and the committees of both associations are delighted to announce that the next annual conference will again be a combined meeting of the A.A.M.M. and the N.Z.A.M.M., in Brisbane in October, 1987. Members of both national bodies can look forward to re-forging the many friendships that have developed at similar meetings over the years.

There was some discussion of a possible extension to Desaru in Malaysia and a meeting there to include other groups from South-East Asia, the Pacific area generally and possibly North America. This idea has been deferred to allow all concerned to concentrate on making the Brisbane meeting a success. However, the concept of a wider regional meeting has not been abandoned and will be considered again in the near future.

In accepting the invitation to Brisbane the Kiwis have issued one of their own, for another combined conference next year. In fact, they are so confident that they have already booked the venue at Wairakei, a major tourist centre in the heart of the N.Z. North Island, for the first week of November, 1988. They have also approached Professor David Simons of California (co-author with Professor Janet Travell of the standard work on myofascial trigger points) and hope to have him speaking on that and similar topics at the 1988 meeting.

□ □ □

The President has again been honoured by the international scientific community. Hard on the heels of the Waghemacker Prize awarded to him by F.I.M.M. in 1986 comes the award this year of the Volvo Prize of the International Society for the Study of the Lumbar Spine. This latest accolade was for a paper entitled "The Morphology of the Lumbar Erector Spinae", presented at the recent I.S.S.L.S. meeting in Rome.

□ □ □

Whilst on the subject of the President, members may be interested to know that he will soon be leaving the University of Queensland to take up a position in the Department of Anatomy at the University of Newcastle in N.S.W.

□ □ □

Research grants are available from the Association for any form of research, clinical or otherwise, relevant to the scientific basis of musculoskeletal medicine. Applicants for grants do not have to be members of the Association. Anyone wishing to apply for funds should set out fully the aims of the study to be undertaken, the methods to be employed, and some indication of how the funds requested are to be used in the project: these details should be submitted to the Hon. Sec. for consideration by the Committee.

□ □ □

Len Youngs, previously reported as having travelled back to the U.S.A., sends word from Sacramento that he is looking forward to seeing other members again on his return to Australia in time for the next annual conference in Brisbane in October. It seems that even for a natural-born American, California is not a patch on the Australian east coast, but then we could all have told him that, couldn't we?

□ □ □

*Another member presently wearing our colours overseas is **Clive Kenna**, who is spending six months of this year in Europe. He planned to spend most of this time in France, working with Robert Maigne, but also intended to visit other European centres "to see what was going on". His dispatches indicate that all has gone well so far and he should have a great deal to share with us when he gets back towards the end of the year.*

□ □ □

At the last A.G.M. in Sydney the decision was taken to increase the annual subscription to \$45. Whilst this is a relatively large increase, members are reminded that it is the first increase for several years and was not decided upon without good reasons. The Association is moving into a new phase of its life, with the emphasis changing from being purely an interest group (albeit one with important educational and research roles) to becoming a group more actively involved with the further education of all members and the development of a more structured discipline of

musculoskeletal medicine. These ideas may sound ambitious but they are achievable. Unfortunately their achievement will require funds. Benefits will, of course, flow back to members in the medium and longer terms.

Any member who feels that the new subscription will create personal hardship is invited to communicate with the Treasurer.

□ □ □

Some members will be saddened by the recent demise of our sister (some would say mother) association, the Australian Association of Physical and Rehabilitation Medicine. Many will remember the days of joint annual conferences (the last in 1977), when both associations were relatively small and had many members in common. Of course, the passing of the A.A.P.&R.M. is a natural consequence of the success of its daughter body, the Australian College of Rehabilitation Medicine, and as such is really an occasion for satisfaction for ambitions achieved. Nonetheless, it is hard to cast the mind back to those earlier days "when the world was wide" without at least a twinge of nostalgia.

□ □ □



MAIL BAG Letters to the editor

"I had written him a letter....."



No other issue generates letters like membership classification. In fact, lately no other issue has generated letters at all. It seems that the way we classify ourselves is always likely to be a cause of controversy. One wonders what will happen when the syllabus project comes to fruition, with all that it implies for the future.

The latest offering on the [R] system comes from one of our most esteemed members, and the editor is most grateful for it. It not only raises questions about the method of implementation of the [R] classification but goes on to deeper issues which touch on the foundations of all classifications and the very fabric of society itself.

Dear Sir,

I would like to update your classification of me. I wish to be known as an [R]. Also, may I suggest that [R] be put in front of the name rather than behind it lest [R] be considered a recognised qualification.

I have also noted some discrimination in your otherwise excellent journal. Have you noticed how the names beginning with A & B are arranged before other letters in the membership lists. I feel that affirmative action is required and that all lists should be printed in reverse alphabetical order.

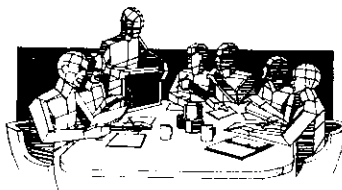
Yours faithfully,
(Dr.) Brian Zeman
Ryde, NSW, 2112

These suggestions seem generally commendable, although the editor confesses to a little uncertainty about the possible ambiguity of the first sentence (modern neologisms are often a trifle risky, or is it risqué?)

Presumably the next step will be to designate those who have assimilated all the syllabus material as an [S]. Those who qualify in both ways may wish to be known as [R.S.]. The editor wonders whether members may wish to comment on that.

Keep those cards and letters coming in, folks!

-Ed.



MEETINGS, CONFERENCES AND COURSES

LOCAL AAMM MEETINGS

Regular meetings, practical sessions and courses are conducted in numerous centres around Australia by state branches, local groups and individual members of the Association. These activities are mainly for the benefit of members living in a particular area and they will generally be advised by letter or by local notices of dates, times and venues. Anyone who is not receiving information about local activities, or who would like more details about what is going on, should contact one of the local organisers listed below.

- In **Adelaide**, Dr. Norm Broadhurst, telephone (08) 295 1890.
- In **Ballarat**, Dr. Jim Rose on (053) 35 7366.
- In **Brisbane**, Dr. Carl Rotkirch on (07) 344 1022.
- In **Canberra**, Dr. Goff Nelson on (062) 95 6773.
- In **Hobart**, Dr. Ron Heddle on (002) 34 5990.
- In **Melbourne and Geelong**, Dr. Bruce Kinloch on (03) 420 5313 and Dr. David Vivian on (03) 596 7211.
- In **Perth**, Dr. Harry Moore on (09) 322 5864.
- In **Sydney**, Dr. Conrad Winer on (02) 27 8926.
- In **Tamworth**, Dr. Wade King on (067) 66 6166.
- In **Toowoomba**, Dr. Jeff Phillips on (076) 38 4800.
- In **Townsville**, Dr. Roger Watson on (077) 71 3084.
- In **Wollongong**, Dr. Alex Ganora on (042) 67 2811.

Those who live in other areas and who would like to organise or participate in local meetings should contact one of their state representatives, who can arrange publicity and other assistance from the resources of the Association.

WINTER MEETING

The inaugural A.A.M.M. Winter Meeting will be held at the Southern Cross Lodge, **Mount Buller**, Victoria, from 26th to 31st July, 1987. The new A.A.M.M. syllabus of musculoskeletal medicine will be presented to members for the first time at this meeting and there will be sessions on its scope, content, methods of implementation and implications for the future. No doubt there will also be some discussion of deceleration injuries of various musculoskeletal structures.

Further details of this meeting can be obtained from Dr. Murray Deerbon, 91 Canterbury Road, Heathmont, Victoria, 3135, telephone (03) 729 4011.

ANNUAL CONFERENCE

The seventeenth annual conference of the Australian Association of Musculoskeletal Medicine will be held as a combined meeting of the A.A.M.M., the New Zealand Association of Musculoskeletal Medicine and the Australian Spinal Research Society. Sessions will be held at the Ithaca Room, City Hall, **Brisbane**, from Friday 23rd to Sunday 25th October, 1987. The main theme of the conference will be "The Biology of the Lumbar Disc" and ten speakers of national and international repute will address topics including disc structure and development, biochemistry, biomechanics, movements, structural changes with ageing, biochemical changes of heredity and ageing, mechanical changes with ageing, pathology and disc pain, radiological investigations, conservative treatment and surgical treatment. There will also be time for free papers and one session will be devoted to the presentation to members of the new A.A.M.M. syllabus of musculoskeletal medicine.

The Annual General Meeting of the Association will be held at the conference venue on Friday 23rd October, 1987, at 4.30pm.

The conference will be preceded by a practical workshop on the clinical assessment of the patient with spinal pain. This will be held at the C.W.A. Rooms, Gregory Terrace, **Brisbane**, on Thursday 22nd October. For logistic reasons the workshop will be limited to approximately thirty participants and those interested are advised to apply early.

Programmes and registration forms will be sent to all members in due course. In the meantime, any enquiries about either the conference or the practical workshop should be addressed to Dr. Carl Rotkirch, Suite 26, McCullough Specialist Centre, 259 McCullough Street, Sunnybank, Qld., 4109.

OTHER AUSTRALIAN MEETINGS

Numerous meetings on topics of relevance to musculoskeletal medicine are held throughout Australia by groups allied to the A.A.M.M. Members are specifically invited to attend many of these and they are advertised in the Bulletin on a reciprocal basis. Some of those coming up include the following.

A one-day seminar entitled "Whiplash, Backlash and Chronic Pain" will be conducted by the Pain Management Team at Bethesda Hospital, **Melbourne**, on 14th August, 1987, beginning at 9am. All interested medical practitioners and other health professionals are invited to attend. Cost for the day will be \$75, which includes lunch. Further details may be obtained from Dr. Bruce Kinloch, Bethesda Hospital, 30 Erin Street, Richmond, Victoria, 3121, telephone (03) 420 5313.

The Arthritis Foundation of Australia and the Cumberland College of Health Sciences are jointly sponsoring a seminar on "Arthritis and Sport" on Saturday, 26th September, 1987 at the Cumberland College, **Sydney**. Professor John Bland of the U.S.A. will be the keynote speaker and topics to be discussed include relationships between sport and arthritis, screening of individuals at risk, prescribing sport for people with arthritis and the reversibility of osteoarthritis. For registration details contact Elizabeth Rich on (02) 969 1400.

The Manipulative Therapists Association of Australia is conducting its Fifth Biennial National Conference at the Regent Hotel, **Melbourne**, from 25th to 28th November, 1987. Further information about this important conference can be obtained from A.J. Grace, P.O. Box 58, Warrnambool, Victoria, 3280, telephone (055) 62 6777.

The Ergonomics Society of Australia is hosting the Tenth Congress of the International Ergonomics Association at the Sheraton-Wentworth Hotel, **Sydney**, from 1st to 5th August, 1988. Enquiries should be addressed to the IEA'88 Secretariat, P.O. Box 380, Spit Junction, NSW, 2088, telephone (02) 969 1400.

MEETINGS OVERSEAS

The Second International Back Pain Congress will be staged in **Hong Kong** and **Peking** from 14th to 20th June, 1987. This follows the successful first congress held in Vienna in November, 1985. Another very interesting programme is planned, with eminent guest speakers from several countries. The address for further information is Congress Team International (U.K.) Ltd., 30 Deane Way, Ruislip, Middlesex, HA48SX, England.

The International Association for the Study of Pain is holding its fifth World Congress in **Hamburg**, West Germany, from 2nd to 7th August, 1987. These meetings are held every three years and attract researchers and clinicians from the twenty national associations affiliated with the world body, including the Australian Pain Society. Information about the Congress and about the Society's activities in Australia can be obtained from its secretary, Dr. Terry Little, Pain Clinic, Southern Memorial Hospital, Kooyong Road, Caulfield, Victoria, 3162.

The Tenth Congress of the International Federation of Physical Medicine and Rehabilitation will be held at the Sheraton Centre Hotel, **Toronto**, Ontario, Canada, from 10th to 14th April, 1988. The theme of the conference is "Rehabilitation: quality assured". Plenary sessions, special interest seminars, poster sessions, scientific institution visits, workshops and an outstanding social programme are planned. Details can be obtained from The Secretary, Xth Congress, International Federation of Physical Medicine and Rehabilitation, 545 Jarvis Street, Toronto, Ontario, Canada, M4Y 2H8.

The next tri-ennial congress of F.I.M.M. (the International Federation of Manual Medicine, with which the A.A.M.M. is affiliated) will take place in **London** from 18th to 22nd September, 1989. Any enquiries at this stage should be addressed to Dr. John Paterson, Honorary Secretary of B.A.M.M., the host association, at 14 Wimpole Street, London, W1M 7AB, England.



A cheerio call to someone selected at random from the membership barrel

Winter-time turns our thoughts to the sunny north and this quarter's coo-ee goes up to Cairns in tropical Queensland, where **Howard Stevens** spends his days in balmy year-round warmth. Like all in active musculoskeletal practice, Howard has a busy professional life. Lately he has been even busier than most because of his commitment to postgraduate studies, which have recently gained him the Diploma in Public Health Administration from the University of Sydney. Never one to rest on his laurels, he is now seeking fresh academic fields to conquer and he is likely to go on being busy for the foreseeable future.

Life in the far north has its compensations, though, and for Howard these include sailing the sparkling waters off Cairns in his nineteen-foot yacht "Investigator". Another is the little house on the river-front block that Howard and his wife Kerri have recently bought at Kuranda in the Cairns hinterland. They plan to live there among the rainforest trees and tropical wildflowers in a spot as close to Heaven as any in this beautiful country. To say that those of us who live in colder climes might be a little envious would be something of an understatement.

NEUROLOGY OF THE NECK-SHOULDER COMPLEX

Nikolai Bogduk

Department of Anatomy, University of Queensland
and
Pain Clinic, Princess Alexandra Hospital, Brisbane

ABSTRACT

The musculoskeletal anatomy of the neck and shoulder girdle is outlined, with particular reference to the innervation of the various structures. Patterns of localised and referred pain are related to the neural connections described. Movement restriction is also addressed, with discussion of possible mechanisms and their physiological bases.

INTRODUCTION

Structurally, the neck consists of the seven cervical vertebrae covered by the prevertebral and posterior neck muscles, and flanked by the scalenes. The shoulder region consists of the clavicle, scapula and upper humerus, forming the acromioclavicular and glenohumeral joints, and covered by some 17 major muscles. The scapula is suspended from the neck, directly by the levator scapulae, and indirectly, through the ligamentum nuchae, by the trapezius and portions of the rhomboid muscles.

Neurologically, all these structures, in the neck and shoulder, are innervated by the cervical spinal nerves, which reflects their common embryological origin from cervical somites. The cervical dorsal rami innervate the cervical zygapophyseal joints and the posterior neck muscles [3]. The cervical ventral rami innervate the prevertebral muscles [14, 18] and the scalenes [13]. Although the motor innervation of trapezius is from the spinal accessory nerve, its sensory innervation is from the C2,3,4 ventral rami [22].

The cervical intervertebral discs are innervated posteriorly by the cervical sinuvertebral nerves [8], laterally by branches of the vertebral nerve [8] and anteriorly by branches of the prevertebral nerves and sympathetic trunks [1, 8].

The glenohumeral joint is usually supplied anteriorly by the axillary nerve (C5,6) and posteriorly by the suprascapular nerve (C5,6) [12]. Additionally, branches may arise from the posterior cord of the brachial plexus or from the long thoracic nerve [12]. The acromioclavicular joint receives a branch from the suprascapular nerve [12]. The innervation of the several shoulder muscles is

depicted in Table 1.

From this account it is evident that every cervical nerve is involved in the innervation of the neck, and in the shoulder region every segment from C2 to C8 is represented to, at least, some extent. The joints of the shoulder region are innervated by C5,6, and these segments are represented in virtually every one of the shoulder muscles. The exception are the muscles suspending the scapula from the neck. These are innervated by C2 to C5 with a predominance of C3,4.

SHOULDER PAIN

Local pain in the shoulder would obviously be mediated by the C5,6 spinal cord segments, and neurologically, there is little distinction between C5,6 joint pain and pain from periarticular muscles innervated by C5,6. It is for this reason that, on the basis of symptoms alone, glenohumeral or acromioclavicular arthritis may be indistinguishable from bony lesions in the humerus or soft tissue lesions in the rotator cuff and deltoid. The various local causes of shoulder pain, therefore, need to be distinguished by clinical examination and radiographic or other investigations.

The physiological basis of referred pain is convergence [4]. Afferent fibres from topographically separate regions of the body converge on common neurons in the central nervous system. Activation of the common neuron by one set of afferents permits the pain to be perceived as arising in the area innervated by the other set of afferents.

The simplest pattern of convergence is at the segmental level where afferents from different structures and regions innervated by the same spinal nerve converge on common neurons in the dorsal horn. Although this convergence has not been explicitly

demonstrated anatomically, it is evident from clinical experiments (q.v.). A more complicated convergence occurs at higher levels in the nervous system. Thalamic neurons receive afferents from several spinal cord segments and such connections enable pain from one segment to be perceived as arising from adjacent and distant segments [4]. With respect to the shoulder, both segmental and complex patterns of referred pain occur.

TABLE 1

THE SEGMENTAL INNERVATION OF THE SHOULDER MUSCLES

MUSCLE	NERVE SUPPLY	SEGMENTS
trapezius	accessory cervical plexus	XI
levator scapulae	cervical plexus	C2,3,4
rhomboids	dorsal scapular	C3,4,5
supraspinatus	suprascapular	C4,5
infraspinatus	suprascapular	C5,6
teres minor	axillary	C5,6
deltoid	axillary	C5,6
subscapularis	posterior cord	C5,6
teres major	posterior cord	C6,7
serratus anterior	long thoracic	C5,6,7
pectoralis major	medial and lateral	C5,6,7,8,T
pectoralis minor	pectoral	C6,7,8
latissimus dorsi	posterior cord	C6,7,8
coracobrachialis	musculocutaneous	C5,6,7
biceps brachii	musculocutaneous	C5,6,7
triceps brachii	radial	C6,7,8

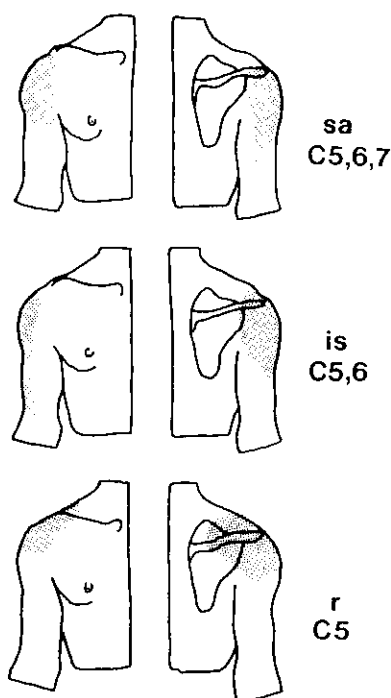


FIGURE 1. The distribution of referred pain following the injection of hypertonic saline into serratus anterior (sa), infraspinatus (is) and rhomboids (r).

Based on Kellgren [15].

Given that C5,6 are the dominant segments of the shoulder region, one could expect shoulder pain to occur as a result of noxious stimulation of any structure innervated by C5,6. Indeed, this proves to be so, and has been demonstrated both experimentally and clinically.

Kellgren [15] showed that in normal volunteers, pain-producing injections of hypertonic saline into infraspinatus, rhomboids or serratus anterior produce referred pain to the shoulder, located generally over the deltoid muscle (Figure 1). All of these muscles are innervated by the C5 and/or C6 spinal nerves.

Structures in the vertebral column innervated by C5 and C6 also produce referred pain to the shoulder. Stimulation of the C5 and C6 interspinous ligaments evokes pain over the back of the scapula [11,16] (Figure 2). Patterns of referred pain from the cervical zygapophyseal joints have not been published, but since these joints are innervated by the same branches of the dorsal rami that innervate the interspinous ligaments, a similar pattern of referral could be expected. Indeed, our own experience [7] with cervical medial branch blocks confirms this, as does the experience of others with dorsal ramus blocks and dorsal ramus neurotomy [19,20].

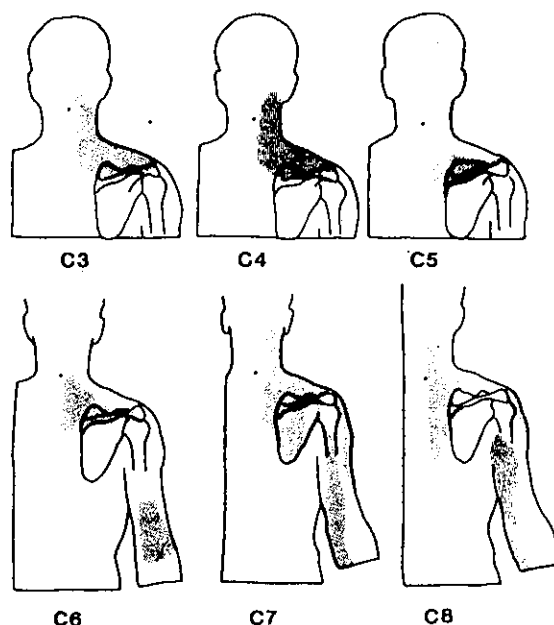


FIGURE 2. The distribution of referred pain following the stimulation of interspinous structures with hypertonic saline. The point of stimulation is marked by a dot and the segmental level stimulated is indicated below each figure.

Based on Feinstein et al. [11]

Experimental stimulation of the cervical intervertebral discs does not produce as dramatic or obvious a referral to the shoulder. Cloward [10] showed that midline anterior stimulation of the C3-4 to C6-7 intervertebral discs produces posterior midline pain. Anterolateral stimulation of the same discs produces more laterally located pain, but over the vertebral border of the scapula rather than the point of the shoulder (Figure 3).

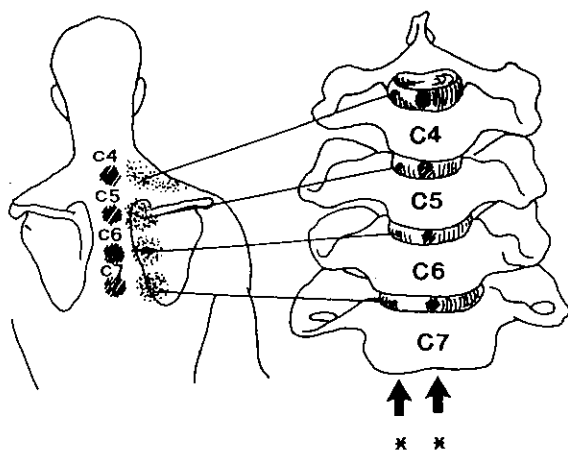


FIGURE 3. The distribution of referred pain following the stimulation of the cervical intervertebral discs in the midline anteriorly, and anterolaterally.

Midline stimulation produces midline referred pain. Anterolateral stimulation produces a more lateral distribution, along the vertebral border of the scapula.

Based on Cloward [10].

Clinical studies of trigger points [21] complement these experimental observations (Figure 4). Trigger points in C5,6 muscles, like infraspinatus, supraspinatus, deltoid, subscapularis, and the scalenes, cause referred pain similar to that described by Kellgren [15], and anaesthetisation of these trigger points relieves the referred pain [21].

Collectively, these several observations are consistent with the concept of segmental convergence. Referred shoulder pain can be produced from various musculoskeletal structures innervated by C5,6; be they scapular, paravertebral or vertebral in location.

The next most predominant segments that innervate the shoulder are C3,4. These segments innervate the muscles that approach the shoulder from above. In terms of the segmental convergence mechanism of referred pain, one could expect shoulder pain to result from noxious stimulation of other C3,4 structures. Upper shoulder pain, essentially

across the superior border of the scapula (Figure 2), can be elicited experimentally by stimulating the C3 and C4 interspinous ligaments [9,11], and clinically, a similar area of referral occurs with trigger points in trapezius and levator scapulae [21] (Figure 5).

Confoundingly, Campbell and Parsons [9] were able to produce referred pain to the shoulder by stimulating posterior midline structures at the C2, C1 and even suboccipital levels! These observations defy explanation simply on the basis of segmental convergence, for C1 is not represented in the shoulder region. Such displaced patterns of referral, however, probably have their basis in the diffuse convergence pattern of certain thalamic nuclei [4].

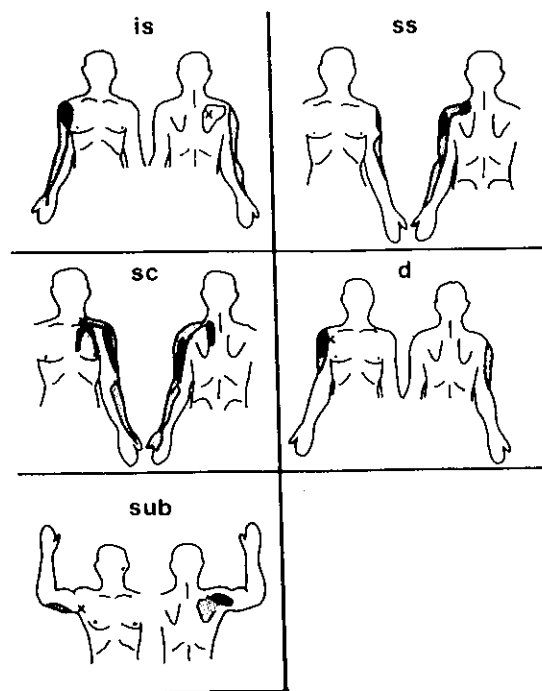


FIGURE 4. The distribution of referred pain associated with trigger points (x) in the infraspinatus (is), supraspinatus (ss), scalenes (sc), deltoid (d) and subscapularis (sub).

The major areas of referred pain are shown in black, while the distribution of pain of lesser intensity is depicted by stippling.

Based on Travell and Rinzler [21].

CLINICAL IMPLICATIONS

Disregarding the mechanisms involved, the various experimental and clinical observations outlined above can be restated in a clinical approach to shoulder pain.

Shoulder pain can be local or referred. Local pain-producing disorders usually can be identified by clinical examination and

appropriate investigations. Referred pain can stem from anywhere in a large catchment area, but the neurology of the shoulder region serves as a guide.

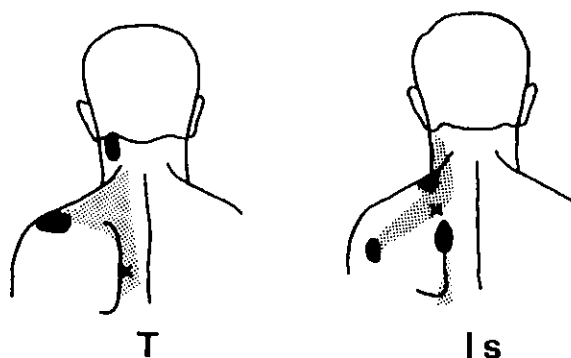


FIGURE 5. The distribution of referred pain associated with trigger points (x) in the trapezius (T) and levator scapulae (Is).

Based on Travell and Rinzler [21].

Scapular, paravertebral and vertebral structures innervated by C5,6 are the foremost likely sources of referred shoulder pain. Next in line are structures innervated by C3,4, particularly when the pain is referred to the top of the shoulder rather than to its point. Finally, given the observations of Campbell and Parsons [9], it is not impossible for disorders high in the neck to be a source of shoulder pain. The comprehensive assessment of referred shoulder pain, therefore, requires exhaustive examination of this entire catchment area. When a suspected primary source is identified, its responsibility for the generation of referred pain, ideally, should be proven by provoking the referred pain by provoking the suspected source, and relieving the referred pain by anaesthetising or treating the suspected source.

At this stage it is relevant to raise a warning against total preoccupation with somatic sources of referred pain. Visceral pain can also be referred to the shoulder either because of the convergence between visceral and shoulder afferents, or as a result of irritation of the diaphragm (C3,4,5) by visceral disease. So, added to the differential diagnosis of shoulder pain are disorders like angina pectoris, pleurisy, cholecystitis, subphrenic abscess and sub-diaphragmatic blood.

MOVEMENT RESTRICTION

Cervical pain is not infrequently associated with restricted movement of the shoulder, which resembles frozen shoulder or painful arc syndrome, but there have been no

formal studies of this phenomenon and its mechanism is unknown. It can, therefore, only be discussed in a theoretical sense.

Irrelevant to the consideration of this aspect of neck shoulder syndromes are obvious local, mechanical causes of shoulder restriction, such as osteoarthritis or adhesive capsulitis secondary to inflammatory joint disease.

Of intermediate significance are disorders like supraspinatus tendinitis, subacromial bursitis, and tubercular contusions or fractures. In these conditions the pathology is located in the shoulder region but the restriction is not mechanical. Instead, attempted movement aggravates the lesion and evokes pain. It is this pain that restricts movement, either by inhibiting the agonist for the movement or by recruiting the antagonist.

There is no dispute about this neuromuscular mechanism of movement restriction. Indeed, in textbook descriptions of painful arc syndromes the mechanism of movement restriction is not even stated. It is taken for granted as a natural, obvious response to local pain. However, the example of neuromuscular restriction of movement exemplified by painful arc syndromes serves as a basis for the interpretation of shoulder restriction when local causes of pain are absent.

Given that movement can be restricted by local painful conditions, it is entertainable that similar effects might occur in cases of referred pain syndromes affecting the shoulder, in particular those arising from the neck.

It has been shown in experiments on animals and in man that lumbar spinal pain can be accompanied by increased activity, if not spasm, in the gluteal and hamstring muscles [2,5,6,17]. In man, pain arising from the lumbar zygapophyseal joints can limit straight leg raising by producing hamstring spasm [17].

Similar experiments in the cervical region have not revealed exactly comparable findings but nonetheless show that spasm in diverse muscles may be elicited by stimulating cervical zygapophyseal joints [23].

Given these introductory considerations, movement restriction in the shoulder may be interpreted in several ways. First it may be that, as a result of cervical pain, the motor neuron pools of certain shoulder muscles are facilitated. As a result, their normal stretch reflexes would be facilitated, so that upon attempted movement any muscle stretched

would react with an inappropriate contraction to oppose the motion. In a more extreme situation, the cervical pain might produce tonic spasm of shoulder muscles and thereby limit movement.

Although consistent with physiological principles, this proposed mechanism is only hypothetical. What are required are EMG studies of affected patients to determine the behaviour of their shoulder muscles during shoulder movements.

Another interpretation is that upon movement of the shoulder, strain is added to the neck. Any displacement of the humerus displaces the centre of gravity of the upper limb and increases the torque on the scapula. This torque is resisted by the suspensory muscles of the scapula, among them - levator scapulae. In bearing a greater load, the levator scapulae increases the downward strain on its rostral attachments. Since these are to the C1,2,3 and 4 transverse processes, it is evident that moving the humerus increases the vertical and lateral load on the entire neck from C1 down. Any pain-producing lesion in the neck would therefore be subject to aggravation. This aggravation could be followed by several responses. Either the offending movement, because it produces pain, is inhibited voluntarily or reflexly; or as a non-specific response to pain, muscles in the neck and shoulder react by some form of spasm (like

the hamstrings in response to lumbar zygapophyseal joint pain). Spasm of appropriate shoulder muscles could then restrict shoulder movement just as they do in response to aggravation of local painful conditions of the shoulder.

Like the previous, this explanation is only hypothetical, but it could easily be tested. In the first instance it would not apply to movements, like rotation of the humerus, in which there is no increased torque on the scapula; nor should there be any restriction to careful passive examination of the shoulder. Finally, relief of the cervical lesion, for example by injections of local anaesthetic, should permit free motion of the shoulder.

These two hypothetical explanations essentially invoke a neuromuscular mechanism, in which otherwise normal shoulder muscles are inhibited or activated by the tonic presence, or aggravation of, a painful cervical lesion. A still more speculative issue is whether or not chronic cervical pain might cause abnormal activity in shoulder muscles to the extent that local pathology, like contracture, ultimately develops. Under such circumstances, attempted movement would be restricted either mechanically by the contracture or reflexly by evoking pain when the contracted muscle is stretched. But yet again, there is no data available that either supports or refutes this hypothesis.

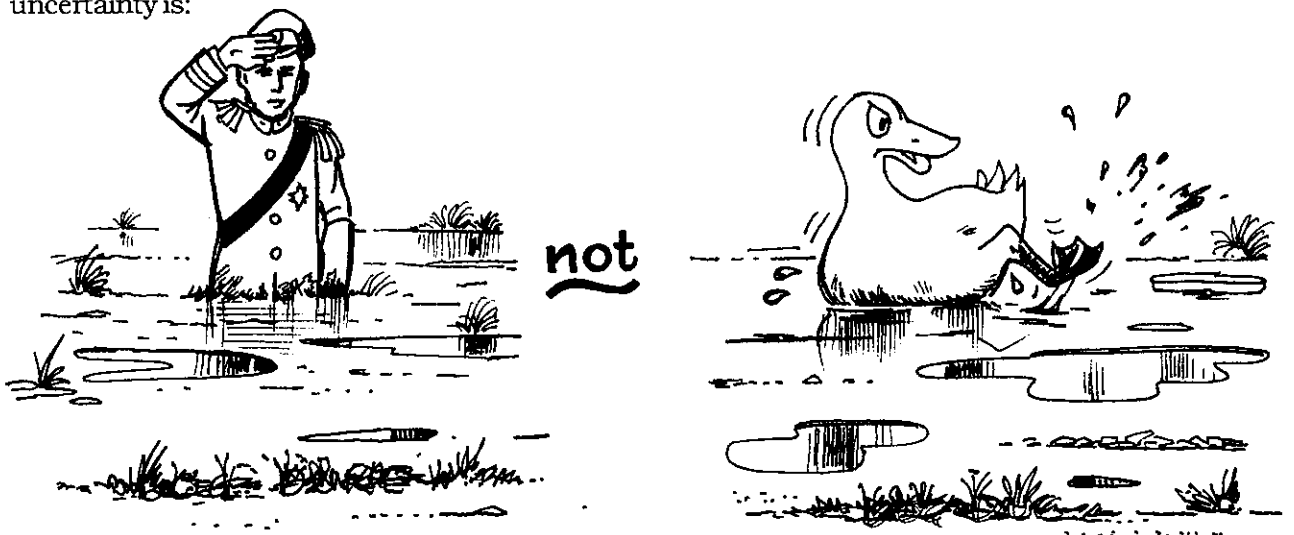
REFERENCES

1. BALJET, B., DRUKKER, J. The innervation of the vertebral column and its ligaments. *Verh. Anat. Ges.* 73, 1173-1174, 1979.
2. BOGDUK, N. Lumbar dorsal ramus syndrome. *Med. J. Aust.* 2: 537-541, 1980.
3. BOGDUK, N. The clinical anatomy of the cervical dorsal rami. *Spine*, 7: 319-330, 1982.
4. BOGDUK, N. Referred pain from the cervical and thoracic vertebral column. *Proceedings of an International Symposium on Manipulative Therapy, Manipulative Therapists' Association of Australia, Perth, 1983 (in press).*
5. BOGDUK, N & MUNRO, R.R. Posterior ramus-anterior ramus reflexes. *Proceedings of the Australian Physiological and Pharmacological Society*, 4: 183-184, 1973 (Abstract).
6. BOGDUK, N. & MUNRO, R.R. Dorsal ramus ventral ramus reflexes in the cat and man. *J. Anat.* 118: 394, 1974 (Abstract).
7. BOGDUK, N. & MARSLAND, A. The cervical zygapophyseal joints as a source of neck pain. *Spine* (submitted).
8. BOGDUK, N., WINDSOR, M., & INGLIS, A. The innervation of the cervical intervertebral discs. *Spine* (in press).
9. CAMPBELL, D.G. & PARSONS, C.M. Referred head pain and its concomitants. *J. Nerv. Ment. Dis.* 99: 544-551, 1944.
10. CLOWARD, R.B. Cervical diskography. A contribution to the aetiology and mechanism of neck, shoulder and arm pain. *Ann. Surg.* 150: 1052-1064, 1959.
11. FEINSTEIN, B., LANGTON, J.N.K., JAMESON, R.M. & SCHILLER, F. Experiments on pain referred from deep somatic tissues. *J. Bone & Joint Surg.* 36A: 981-997, 1954.
12. GARDNER, E. The innervation of the shoulder joint. *Anat. Rec.* 102: 1-18, 1948.
13. HOLLINSHEAD, W.H. *Anatomy for Surgeons: Volume 1, The head and neck.* Harper and Row, New York, 1954.
14. HOVELACQUE, A. *Anatomie des Nerfs Craniens et Rachidiens et du Systeme Grande Sympathique*, Doin, Paris, 1927.
15. KELLGREN, J.H. Observations on referred pain arising from muscle. *Clin. Sci.* 3: 175-190, 1938.

16. KELLGREN, J.H. On the distribution of pain arising from deep somatic structures with charts of segmental pain areas. *Clin. Sci.* 4: 35-46, 1939.
17. MOONEY, V. & ROBERTSON, J. The facet syndrome. *Clin. Orthop.* 115: 149-156, 1976.
18. POIRIER, P. & CHARPY, A. *Traite d'Anatomie Humaine*, Tome 3, 2e edition, Masson, Paris, 1905.
19. SLUJTER, M.E. & KOETSVELD-BAART, C.C. Interruption of pain pathways in the treatment of the cervical syndrome. *Anaesthesia* 35: 302-307, 1980.
20. SLUJTER, M.E. & MEHTA, M. Treatment of chronic back and neck pain by percutaneous thermal lesions, in: *Persistent Pain, Modern Methods of Treatment*, Volume 3, Lipton, S. & Miles, J. (eds) Academic Press, London, 1981, pp.141-179.
21. TRAVELL, J. & RINZLER, S. The myofascial genesis of pain. *Postgrad. Med.* 11: 425-434, 1952.
22. WARWICK, R. & WILLIAMS, P.L. *Gray's Anatomy*, 35th Edition, Longmans, London, 1973.
23. WYKE, B. Neurology of the cervical spinal joints, *Physiotherapy* 65: 72-76, 1979.



Some members may be in doubt about the pronunciation of the new President's name. Their perplexity will be compounded by the mispronunciations often heard when he is introduced as a speaker at conferences, etc. The official proclamation for those suffering these torments of uncertainty is:



The name is Cossack and means "Prince (or Duke) of God". So, beware: any member mispronouncing it in the future will be put to the sword, or raped and pillaged, or evangelised, or perhaps all three. You have been warned.

Whilst on the subject of pronunciation, it may be worth drawing members' attention to the correct way of saying "musculoskeletal": both e's are short, as in "skeleton". It does seem a pity that, having exorcised the hyphen that was wont to creep in, we can now all spell the word but are sometimes unsure of the way it should be said.

AN UPDATE ON NECK PAIN

Nikolai Bogduk

Department of Anatomy, University of Queensland
and
Pain Clinic, Princess Alexandra Hospital, Brisbane

ABSTRACT

Contemporary views on the anatomy, pathology and mechanisms of neck pain are presented. The assessment of patients with neck pain and/or cervical referred pain, including brachialgia, is discussed.

Treatment modalities are reviewed, with an appraisal of their efficacy. Some details are given of percutaneous radiofrequency denervation, a somewhat controversial method of treatment for chronic zygapophyseal joint pain.

INTRODUCTION

In 1984, the anatomy, pathology and mechanisms of neck pain were reviewed in a paper published in the Australian Family Physician [6]. Since that time there have been major developments in the field of neck pain. New anatomical data and clinical reports have appeared which vindicate many of the concepts outlined in 1984, and which warrant an updated review.

It has been customary to classify cervical pain syndromes in terms of pathology or simply on the basis of clinical features. However, this has led to a potentially confusing picture, for clinical classifications are frequently based on preconceived notions of the cause of pain which are not necessarily consistent with known pathological or physiological data. In this regard, it is safer to develop a classification based on a combination of objective anatomical and pathological data from which clinical manifestations can be derived on the basis of known physiological mechanisms.

ANATOMY

Any structure in the neck which is innervated by the cervical spinal nerves can be a source of neck pain, and the distribution of these nerves constitutes a primary basis for classifying cervical pain syndromes. The cervical spinal nerves have three principal branches: the prevertebral branches of the ventral rami, the dorsal rami and the sinuvertebral nerves.

The prevertebral nerves innervate the prevertebral muscles and the anterior

longitudinal ligament. In association with branches from the cervical sympathetic trunks, they also innervate the anterior aspect of the cervical intervertebral discs. This nerve supply to the front of the cervical discs has not been established in human adult cadavers for the nerves appear to be too small to be detected by dissection [15]. However, studies of human foetal material have clearly demonstrated nerve fibres running in the anterior longitudinal ligament and the outer anterior laminae of the cervical intervertebral discs [2], and histological studies of adult discs removed at operation have revealed nerve endings in the outer third of the annulus fibrosus [15,50]. Posterolaterally, the cervical intervertebral discs receive a further innervation from the grey rami communicantes that form the vertebral nerve: the sympathetic nerves accompanying the vertebral artery [13].

The cervical dorsal rami supply the posterior neck muscles and the cervical zygapophyseal joints [5]. From C3-4 to C6-7 each joint is supplied by the medial branches of the dorsal rami that run above and below the joint. The C2-3 joint is supplied by the third occipital nerve which is the medial branch of the C3 dorsal ramus.

The atlanto-occipital and lateral atlanto-axial joints are not zygapophyseal joints for they lie anterior to the emerging spinal nerves. Reflecting this difference, these joints are supplied respectively by the C1 and C2 ventral rami [34].

The cervical sinuvertebral nerves are branches that enter the cervical intervertebral foramina to supply structures within the vertebral canal. Each is formed by a branch

from the ipsi-segmental ventral ramus and a branch from the grey rami communicantes that form the vertebral nerve [15]. Within the vertebral canal each sinuvertebral nerve has a predominantly upward course. It supplies branches to the back of the intervertebral disc at its level of entry into the vertebral canal, to the disc above, and to the posterior longitudinal ligament between these two levels [15,50]. Additionally, the sinuvertebral nerves supply the anterior aspect of the cervical dura mater.

The C1 to C3 sinuvertebral nerves have a prolonged upward course, passing through the foramen magnum into the posterior cranial fossa where they innervate the dura mater in the region of the clivus [32]. En route, these nerves innervate the median atlanto-axial joint and its ligaments.

On anatomical grounds, the potential sources of neck pain are the synovial joints and ligaments of the neck; the dura mater; the prevertebral and postvertebral muscles; and the cervical intervertebral discs. That the cervical discs can intrinsically be a source of pain has been a contentious issue, reservations being based on the failure of studies to demonstrate hitherto that these structures had a nerve supply. However, it is now evident that these discs are well endowed with a nerve supply anteriorly, posterolaterally and posteriorly, and must therefore be regarded as potential sources of pain.

PATHOLOGY

Neck muscles are subject to strain, rupture and the development of trigger points. Strain or rupture of prevertebral muscles is most likely in acceleration (extension) injuries of the neck [7]. Trigger points are well described sources of pain [43] but their pathology remains poorly understood. An important consideration is whether trigger points represent primary pathological states or whether they are secondary to an underlying disorder such as joint disease. It seems feasible that in some cases, trigger points may arise as a result of overuse or postural abnormalities affecting muscle activity, but in other cases they occur reflexly in response to a primary joint disorder.

Cervical synovial joints are subject to rheumatoid arthritis, degenerative joint disease and traumatic strain or fracture. Fractures of the zygapophyseal joints are not uncommon, and are being reported increasingly in the literature [1,3,27,51]. Experimental and clinical studies have shown that zygapophyseal fractures are a common lesion in "whiplash" injuries of the neck, but

are frequently overlooked [7]. Between 50% and 87% of such fractures are not evident on plain films of the neck [3,51], and require special techniques such as pillar views [1], tomography [3,51] or CT scanning [27] for their demonstration.

Congenital anomalies of the cervical spine, as such, do not cause pain, but may be associated with pain when excessive strain is imposed by the anomaly on adjacent ligaments and joints.

The fact that cervical intervertebral discs can be a source of pain is evident in the fact that stimulation of these discs, electrically or by injections of contrast medium or saline, evokes pain [19,20,31,40,44] and that injections of local anaesthetic into a painful disc can relieve a patient's neck pain [42]. The cause of primary disc pain, however, is obscure, for no pathological studies have yet been conducted on cervical discs known to be painful, nor has magnetic resonance imaging yet been used to demonstrate possible causes of cervical disc pain *in vivo*. However, prominent amongst the pathological states detected in experimental studies of whiplash are tears of the annulus fibrosus and end-plate avulsions [7]. By comparison, classical disc herniations have rarely been demonstrated in studies of whiplash injuries [7].

Because the spinal dura mater receives a nerve supply it must be capable of being a source of pain. Studies have shown that low back pain can be produced experimentally by chemical irritation of the dural sleeves of lumbar nerve roots without compressing the nerve roots [23], and a similar effect in the cervical region should be possible. Pathologically, nerve roots sleeves could be irritated mechanically by osteophytes or chemically by exudates from the adjacent intervertebral disc or zygapophyseal joint.

CERVICAL REFERRED PAIN

Referred pain is pain perceived as arising in a region topographically displaced from the site of the primary cause of pain. It is a result of convergence on dorsal horn and thalamic neurons of impulses from topographically separate regions. Spinal referred pain occurs when vertebral afferents activate cells which also receive afferents from regions of the body other than the vertebral column. As a result, the brain interprets the pain as arising not only from the spine but also the other region.

Cervical pain can be referred to the head, the shoulder and upper limb, and to the chest wall where it can mimic angina. Any structure in the neck that can produce neck pain can also produce referred pain, and the most

notable sources of cervical referred pain are the cervical synovial joints and the cervical intervertebral discs. As a rule, disorders of these structures at upper cervical levels (C1-3) can be associated with referred pain in the head, while at lower levels (C4-7) the referred pain is perceived in the shoulder, the scapular region, or the anterior chest wall. Experimental studies have shown that electrical stimulation of lower cervical discs causes pain over the scapula [19,20], and clinical studies have shown that pain in the shoulder arising from the C5-6 zygapophyseal joints and pain in the head arising from the C2-3 joints can be relieved by anaesthetising these joints [11,12]. Detailed reviews on the mechanisms of cervical headache [8], shoulder pain [4], and cervical angina [18] are available elsewhere.

BRACHIALGIA

It has been traditional teaching to ascribe arm and shoulder pain to nerve root compression, but this simple concept is no longer tenable. Physiological [28,29] and clinical [38] studies deny the capacity of simple nerve root compression to cause pain. Compression alone produces only paraesthesiae or objective loss of neural function such as weakness or numbness. In the absence of such objective neurological signs nerve root compression cannot be deemed the source of arm pain.

Constant, deep, dull, aching pain is characteristic of somatic referred pain. When felt in the arm it implies a somatic lesion in the neck. When felt in association with objective neurological signs, it is most likely that the cervical lesion is the cause of both the pain and the nerve root compression, but by separate and different mechanisms. For example, degenerative discs and degenerative zygapophyseal joints may be intrinsic sources of pain and both may produce osteophytes that could compress a spinal nerve. The compression causes objective neurological signs, but the pain and referred pain stems from the disc or the joint itself.

This dualistic mechanism of symptom-production has important ramifications in treatment, for therapy must be directed at both the cause of neurological signs and the cause of pain. Therapy directed only at decompressing a nerve may ignore the cause of pain and may fail to relieve it.

Although simple nerve root compression does not cause pain, dorsal root ganglia are exquisitely sensitive to mechanical stimulation, particularly if previously damaged by mechanical or ischaemic insults [28,29]. Therefore, compression of dorsal root

ganglia may be a cause of pain, but in such cases it is a shooting or lancinating pain characteristic of neurogenic pain in contrast to the constant ache of somatic referred pain.

DIAGNOSIS

The diagnosis of neck pain is based on clinical assessment and specialised ancillary investigations. Clinical assessment should begin with the taking of a detailed history, with particular attention to the mechanical aspects of incidents precipitating pain. Physical examination should include careful inspection, palpation of specific anatomical structures, testing of movements of individual spinal segments and special tests such as the upper limb tension test. However, many techniques in common usage are of little diagnostic value. The examination of neck movements as a whole yields no information about specific diagnoses, for any cause of neck pain at any segmental level has the capacity to restrict the range of movement of the neck. Similarly, plain radiographs and CT scans do not reveal sources of pain. They show only morphological changes that may or may not be relevant to the cause of pain. The radiological signs of spondylosis, for example, occur equally frequently in patients with and without neck pain [24,25].

Radiological investigations are appropriate principally to confirm or exclude fractures, dislocations, congenital anomalies and inflammatory conditions. They can also be used to identify lesions putatively responsible for objective neurological signs which are evident on clinical examination. Electromyography can be used to confirm neurological signs, and CT scans or myelography can be used to detect disc protrusions, osteophytes or canal stenosis that may be the cause of nerve compression. However, such investigations are not indicated when pain alone is the complaint, for no correlations have been established between the presence of pain and the appearance of any abnormality that might be reported.

The most accurate and direct means of establishing the specific source of neck pain is by provocation and anaesthetisation.

Primary pain arising from an intervertebral disc can be diagnosed by provocation discography [26,31,44]. This technique involves the insertion of needles into all of the cervical intervertebral discs which are then systematically and randomly stimulated by injection of normal saline or contrast medium. When so injected a normal disc may be painful, but a symptomatic disc will reproduce the patient's particular pain. Consistent reproduction of the patient's pain

upon repeated stimulation of the same disc identifies that disc as the source of pain. Discs which produce pain do not necessarily correspond to any or the greatest spondylotic changes on plain radiography.

Provocation discography can be supplemented by analgesic discography [42]. At the time of provocation discography, a small volume of local anaesthetic can be injected into the disc. If this relieves the patient's pain, that disc is confirmed as the source of pain, for no other structure is anaesthetised by such injections.

Analgesic discography, however, is not always possible. Its results depend on adequate infiltration of the nerves in the disc. Because these nerves lie in the outer third of the anulus fibrosus, adequate analgesia is possible only if fissures are present in the disc to allow the local anaesthetic to track from the nucleus, where it is injected, to the outer anulus. If such fissures are not present, provocation discography will still be positive for distention of the disc still strains the outer anulus and stimulates the nerves, but analgesic discography will be negative for the local anaesthetic cannot track to the innervated symptomatic portion of the disc. Analgesic discography is therefore limited by a possibly high false negative rate, but this does not detract from its value as a diagnostic procedure when a positive result is obtained.

Pain arising from structures innervated by the cervical dorsal rami can be diagnosed by a combination of provocative electrical stimulation and local anaesthetic blocks. Using radiologically determined target points, needles or electrodes may be introduced onto any one of the cervical dorsal rami (except C1) or their medial branches, and used to stimulate or anaesthetise the nerve [5,45,46-48]. That a given nerve (or nerves) is responsible for a patient's pain will be revealed if stimulation of the nerve reproduces the pain and if selective anaesthetisation of the nerve relieves it. The exact source of pain can then be determined from a knowledge of the distribution of the particular nerve. It is most likely to be one or both of the zygapophyseal joints innervated by the nerve. This is confirmed if anaesthetisation of both the nerves to a particular joint totally abolishes the patient's pain.

An alternative approach is the use of intra-articular zygapophyseal joint blocks [12,21,22,49]. These are performed by introducing a needle into the target joint. An arthrogram may be performed to verify accurate placement of the needle, and local anaesthetic may be injected to anaesthetise the joint. Complete relief of pain indicates that

this joint is the source of pain.

Nerve blocks and zygapophyseal joint blocks do not reveal the pathology of the cause of pain, but a positive block pin-points the source of pain and invites detailed investigations such as pillar views, tomography or CT scans to search for occult fractures or similar injuries. However, lesions such as capsular strains constitute a possible cause of symptoms that may not be evident on radiological investigation, and their presence may be revealed only implicitly by a positive response to diagnostic blocks.

Pain due to irritation of nerve root sleeves can be difficult to diagnose, for the root sleeve cannot be anaesthetised without also anaesthetising the enclosed root and all the structures it supplies. Therefore, in the first instance, nerve root sleeve blocks are not specific. However, in the presence of pain unresponsive to zygapophyseal blocks and provocation and analgesic discography, but responsive to blocks of nerve root sleeve, root sleeve irritation becomes the most likely cause of pain.

Manipulative therapists have long contended that symptomatic vertebral joints can be diagnosed by manual examination, but these claims have remained untested until recently. In the context of cervical zygapophyseal joint pain, it has been shown that manual examination by a trained manipulative therapist can be as accurate as radiologically controlled diagnostic joint blocks in the diagnosis of pain from these joints [30]. Thus it is possible to obviate the need for invasive diagnostic blocks to detect cervical zygapophyseal disorders if the skills of a reliable manipulative therapist are available. However, the accuracy of manual examination for other sources of neck pain has still to be proven.

TREATMENT

There is no established optimal treatment of neck pain. Except in the case of rheumatoid arthritis, the value of drug therapy is unproven. Supportive collars, physiotherapy, manipulative therapy, exercises, trigger point injections, acupuncture and transcutaneous electrical nerve stimulation all have their committed advocates, but there is a lack of published clinical trials that reveal the optimal indications and true efficacy of these treatments.

One trial of physiotherapy for neck pain found it little better than placebo drug therapy [17]. One study of acupuncture showed it produced an earlier symptomatic recovery from neck pain than physiotherapy [36], while

another showed acupuncture to be no more efficacious than placebo transcutaneous nerve stimulation [41].

Surgical procedures are exempt from double-blind controlled trials so it is easier to proclaim, although not prove, their efficacy. In this context, anterior cervical fusion appears effective for primary disc pain, but only if the diagnosis is made by provocation discography. In such cases fusion is attended by an 80% absolute success rate, compared with only 40% if disc stimulation is not performed [31].

The mechanism by which anterior cervical fusion relieves neck pain is not clear. Fusion is undertaken seemingly in the belief that abnormal movement, or "instability" is the cause of pain, and the disc is excised to permit the fusion. However, what has never been overtly recognised is that disc excision, in a sense inadvertently, removes the source of pain. Thus, the "active" component of anterior cervical fusion may not be the actual fusion and resultant immobilisation but the excision of the disc. In another sense, anterior cervical fusion involves severing the nerves to the painful disc, and this may be the cardinal step in pain relief. In this regard, a more conservative form of therapy has been investigated in which the painful disc is not removed but disc pain is relieved simply by coagulating the nerves to the disc percutaneously using radiofrequency electrodes. Initial results with this procedure appear promising [48] but further studies are continuing.

Decompression of nerve roots is logical therapy, but only for the relief of nerve compression (not necessarily pain). There is no indication for decompression when nerve root compression is not evident and is not the cause of pain. However, in some cases decompressive procedures may inadvertently treat the cause of pain, and this has led to the illusion that these procedures are worthwhile for neck pain, albeit in an unpredictable manner and therefore with a variable success rate.

For example, facetectomy may be undertaken to remove zygapophyseal osteophytes compressing a nerve root, but if that zygapophyseal joint had also been the primary cause of pain, neck pain would be relieved if the nerve supply to the joint were inadvertently interrupted during the procedure. On the other hand, if the disc was the source of pain, facetectomy would decompress the nerve root and relieve any objective neurological signs or root pain, but would not relieve the disc pain. Conversely, disc excision to decompress a nerve root would

inadvertently relieve disc pain, but would have no effect on zygapophyseal pain.

Persistent pain following nerve root decompression invites a renewed search for the source of pain which might not have been affected by the surgery. Preferably, however, the sources of pain should be established clearly before any surgery is undertaken.

Two forms of therapy are currently available for zygapophyseal joint pain. These are intra-articular steroids and denervation of the painful joint.

Intra-articular steroids have been used on a presumptive basis for the treatment of spinal pain because similar injections into joints of the appendicular skeleton appear to relieve pain in those joints. The literature on intra-articular steroids for lumbar pain is quite substantial and indicates a worthwhile benefit [33,35,37,39]. The literature on neck pain is more scant but nevertheless indicates a similar worthwhile benefit. Relief of neck pain for two weeks to six months [49], or three days to thirteen months [21] has been reported in some patients following a single injection of steroid into painful cervical zygapophyseal joints. However, not all patients respond, and the response is often short-lived.

It is unclear, at this stage, whether the lack of response is due to technical factors such as inadequate dispersal of the steroid within the joint or whether some conditions are not "steroid responsive". With respect to the latter, it is not known whether the steroids act by an anti-inflammatory effect, or by another effect such as sclerosing the nerve endings in the zygapophyseal joint capsule. The foremost requirement in this field is a double-blind trial of intra-articular steroids, and one such trial, for low back pain, is currently being undertaken in Canada.

Percutaneous radiofrequency denervation (PRFD) of zygapophyseal joints is a contentious issue in neurosurgery, and the procedure has been marred by misrepresentation and unrecognised technical problems. The procedure involves introducing electrodes onto the nerves that supply the painful zygapophyseal joint and coagulating them with radiofrequency current in order to block transmission of pain impulses from the symptomatic joint.

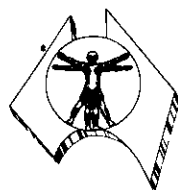
By convention, surgical therapy is supposed to produce a lasting cure, and this expectation has been applied to PRFD. However, this is inappropriate. PRFD is designed only to coagulate the nerves that transmit pain, not to treat the cause of pain. Furthermore, nerves are able to recover from coagulation, usually

in about twelve months [9]. If the cause of pain remains and the nerves regenerate, pain will recur. Thus, PRFD can have only a limited effect, and recurrence of pain is a natural, expected outcome in due course. It is not designed to effect a permanent cure, and should not be regarded as, or measured against, "surgical" cures. Rather, it is a form of long-term neural blockade. As such it offers the prospect of limited but profound relief of pain in patients who respond to diagnostic cervical medial branch blocks. If pain recurs, the procedure is repeatable. Its application, therefore, should be as a form of recurrent analgesia, not as a "once only" surgical therapy.

REFERENCES

1. ABEL, M.S. The radiology of chronic neck pain: sequelae of occult traumatic lesions. *CRC Crit Rev Diagn Imag* 20:27-78, 1983.
2. BALJET, B., DRUKKER, J. The innervation of the vertebral column and its ligaments. *Verh Anat Ges* 73:1173-1174, 1979.
3. BINET, E.F., MORO, J.J., MARANGOLA, J.P., HODGE, C.J. Cervical spine tomography in trauma. *Spine* 2:163-173, 1977.
4. BOGDUK, N. Anatomical and neurophysiological features of the neck-shoulder symptom complex. In: *Proceedings of a Symposium on Neck-Shoulder Syndromes. Manipulative Therapists' Association of Australia, Sydney, 1981*, pp.45-57.
5. BOGDUK, N. The clinical anatomy of the cervical dorsal rami. *Spine* 7:319-330, 1982.
6. BOGDUK, N. Neck pain. *Aust Fam Phys* 13:26-29, 1984.
7. BOGDUK, N. The anatomy and pathophysiology of whiplash. *Clin Biomech* 1:92-101, 1986.
8. BOGDUK, N. Cervical causes of headache and dizziness. In: *Modern Manual Therapy of the Vertebral Column*, Grieve G (ed). Churchill Livingstone, Edinburgh, 1986, pp.289-302.
9. BOGDUK, N. Back pain: zygapophyseal joint blocks and epidural steroids. In: *Neural Blockade in Clinical Anaesthesia and Pain Management* Cousins, M.J., Bridenbaugh O (eds). Lippincott, Philadelphia (in press).
10. BOGDUK, N. The innervation of intervertebral discs. In: *The Biology of the Intervertebral Disc* Ghosh P (ed). CRC Press (in press).
11. BOGDUK, N., MARSLAND, A. On the concept of third occipital headache. *J Neurol Neurosurg Psychiatr* 49:775-780, 1986.
12. BOGDUK, N., MARSLAND, A. The cervical zygapophyseal joints as a cause of neck pain. *Spine* (submitted).
13. BOGDUK, N., LAMBERT, G., DUCKWORTH, J.W. The anatomy and physiology of the vertebral nerve in relation to cervical migraine. *Cephalalgia* 1:11-24, 1981.
14. BOGDUK, N., MACINTOSH, J.E., MARSLAND, A. A technical limitation to the efficacy of radiofrequency neurotomy for spinal pain. *Neurosurgery* (in press).
15. BOGDUK, N., WINDSOR, M., INGLIS, A. The innervation of the cervical intervertebral discs. *Spine* (in press), 1986.
16. BOOTH, R.E., ROTHMAN, R.H. Cervical angina. *Spine* 1:28-32, 1976.
17. BRITISH ASSOCIATION OF PHYSICAL MEDICINE. Pain in the neck and arm: a multicentre trial of the effects of physiotherapy. *BMJ* 1:253-258, 1966.
18. BRODSKY, A.E. Cervical angina. A correlative study with emphasis on the use of coronary arteriography. *Spine* 10:699-709, 1985.
19. CLOWARD, R.B. Cervical diskography. A contribution to the etiology and mechanism of neck, shoulder and arm pain. *Ann Surg* 150:1052-1064, 1959.
20. CLOWARD, R.B. The clinical significance of the sinu-vertebral nerve of the cervical spine in relation to the cervical disk syndrome. *J Neurol Neurosurg Psychiatr* 23:321-326, 1960.
21. DORY, M.A. Arthrography of the cervical facet joints. *Radiology* 148:379-382, 1983.
22. DUSSAULT, R.G., NICOLET, V.M. Cervical facet joint arthrography. *J Can Ass Radiol* 36:79-80, 1985.
23. EL MAHDI, M.A., LATIF, F.Y., JANKO, M. The spinal nerve root "innervation" and a new concept of the clinicopathological inter-relations in back pain and sciatica. *Neurochirurgia* 24:137-141, 1981.
24. FRIEDENBERG, Z.B., BRODER, H.A., EDEIKEN, J.E. et al. Degenerative disk disease of the

- cervical spine. *JAMA* 174:375-380, 1960.
25. FRIEDENBERG, Z.B., MILLER, W.T. Degenerative disc disease of the cervical spine. *J Bone Joint Surg* 45A:1171-1178, 1963.
 26. HODGKINSON, A. Neck pain localisation by cervical disc stimulation and treatment by anterior interbody fusion. *J Bone Joint Surg* 52B:789, 1970.
 27. HOUKIN, K., MIYASAKA, K., ABE, S., FUJIYA, M., IWASAKI, Y., ABE, H. Fracture of the cervical articular processes - clinical, plain radiographic and CT evaluations. *Neuro-Orthopaedics* 2:81-86, 1986.
 28. HOWE, J.F. A neurophysiological basis for the radicular pain of nerve root compression. In: *Advances in Pain Research and Therapy* Bonica, J.J., Liebeskind, J.C., Albe-Fessard, D.G. (eds), Volume 3. Raven Press, New York, 1979, pp.647-657.
 29. HOWE, J.F., LOESER, J.D., CALVIN, W.H. Mechanosensitivity of dorsal root ganglia and chronically injured axons: a physiological basis for the radicular pain of nerve root compression. *Pain* 3:25-41, 1977.
 30. JULL, G., BOGDUK, N., MARSLAND, A. The accuracy of manual diagnosis for cervical zygapophyseal joint pain syndromes. *Med J Aust* (submitted)
 31. KIKUCHI, S., MACNAB, I., MOREAU, P. Localisation of the level of symptomatic cervical disc degeneration. *J Bone Joint Surg* 63B:272-277, 1981.
 32. KIMMEL, D.L. Innervation of the spinal dura mater and dura mater of the posterior cranial fossa. *Neurology* 10:800-809, 1960.
 33. LAU, L.S.W., LITTLEJOHN, G.O., MILLER, M. Clinical evaluation of intra-articular injections for lumbar facet joint pain. *Med J Aust* 143:563-565, 1985.
 34. LAZORTHES, G., GAUBERT, J. L'innervation des articulations inter-apophysaire vertebrales. *Comptes Rendues de l'Association des Anatomistes*, 43, Reunion, 1956, pp.488-494.
 35. LIPPIT, A.B. The facet joint and its role in spine pain. *Spine* 9:746-750, 1984.
 36. LOY, T.T. Treatment of cervical spondylosis. Electroacupuncture versus physiotherapy. *Med J Aust* 2:32-34, 1983.
 37. LYNCH, M.C., TAYLOR, J.F. Facet injection for low back pain. *J Bone Joint Surg* 68B: 138-141, 1986.
 38. MACNAB, I. The mechanism of spondylogenic pain. In: *Cervical Pain*, Hirsch, C., Zotterman, Y (eds). Pergamon, Oxford, 1972, pp.89-95.
 39. MOONEY, V., ROBERTSON, J. The facet syndrome. *Clin Orthop* 115:149-156, 1976.
 40. PAWL, R.P. Headache, cervical spondylosis, and anterior cervical fusion. *Surg Ann* 9:391-408, 1977.
 41. PETRIE, J.P., HAZELMAN, B.L. A controlled study of acupuncture in neck pain. *Br J Rheumatol* 25:271-275, 1986.
 42. ROTH, D.A. Cervical analgesic discography. A new test for the definitive diagnosis of the painful-disk syndrome. *JAMA* 235:1713-1714, 1976.
 43. SIMONS, D.G. Myofascial trigger points: a need for understanding. *Arch Phys Med Rehabil* 62:97-99, 1982.
 44. SIMMONS, E.H., SEGIL, C.M. An evaluation of discography in the localization of symptomatic levels in discogenic disease of the spine. *Clin Orthop* 108:57-69, 1975.
 45. SLUIJTER, M.E. Percutaneous thermal lesions in the treatment of back and neck pain. *Radionics Procedure Technique Series*. Radionics Inc., Burlington, 1981.
 46. SLUIJTER, M.E., KOETSVELD-BAART, C.C. Interruption of pain pathways in the treatment of the cervical syndrome. *Anaesthesia* 35:302-307, 1980.
 47. SLUIJTER, M.E., MEHTA, M. Treatment of chronic back and neck pain by percutaneous thermal lesions. In: *Persistent Pain. Modern Methods of Treatment*, Lipton, S., Miles, J (eds), Volume 3, London, Academic Press, 1981, ch 8, pp 141-179.
 48. SLUIJTER, M.E., VERCRUYSE, P.R.M. Radiofrequency lesions in the treatment of headache. *Cephalalgia* 5 (Supp 3):94-95, 1985.
 49. WEDEL, D.J., WILSON, P.R. Cervical facet arthrography. *Regional Anaesthesia* 10:7-11, 1985.
 50. WINDSOR, M., INGLIS, A., BOGDUK, N. The innervation of the cervical intervertebral discs. *J Anat* 142:218, 1985.
 51. WOODRING, J.H., GOLDSTEIN, S.J. Fractures of the articular processes of the cervical spine. *Am J Roentgenol* 139:341-344, 1982.



THERAPEUTIC EXERCISE WITH MANUAL THERAPY

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ABSTRACT

The role of therapeutic exercise as an adjunct to manual therapy is explained. An outline is given of the historical development of the medical use of exercise. The rationale for using exercise as a modality of treatment is discussed, with emphasis on the need for prescription of specific exercises for particular indications.

Various types of exercise and exercise programmes are described, with practical information about their uses.

INTRODUCTION

The purpose of therapeutic exercise is to help the body return to normal or optimal function after traumatic injury, biomechanical dysfunction, pathological impairment or psychological disorder.

It is a tool for rehabilitation. Its rather restrictive, remedial role of bridging the gap between illness and wellness has been extended to include a positive, preventive role bridging the gap between health education and health practice.

Whilst it is kept in mind that the exercises themselves may not be directly responsible for the resolution of symptoms, it has been shown they assist in some way with the self-restorative processes and self-motivating factors that contribute towards the return to normal function after injury [1,2], and it is recognised that exercises help patients achieve independence and responsibility for their own health and well-being [3,4].

GENERAL CONCEPTS

From a therapeutic point of view, musculoskeletal disorders often present with a combination of factors affecting articular structures and adjacent soft tissues. The prescription for exercise has to be directed towards the mechanical, chemical and psychological aspect of the condition and to the behaviour and nature of the complaints.

From a preventive viewpoint, alignment, balance, co-ordination and general fitness are considered. The selection of exercise is directed to problems of poor body image, lack of postural control, imbalance of muscle

groups and a reduction of fitness.

In brief, manual therapy exercises aim to alter the relationship between tissues and tissue fluids, prevent adaptive shortening, increase limited range of movement, improve function, provide movement education and reduce the predisposition for injury.

Keynotes are MOTION, MOVEMENT, ACTION, and FITNESS

The role of the manual therapist is to promote an understanding of the patient's problems, to facilitate in the learning of how to deal with them, and to dispel any misconceptions or fears the patient may have about their condition.

Therapists are aware of patients being more satisfied if they receive an adequate explanation of their problem, knowing that reassuring information makes the situation more comprehensible and acceptable in many situations [5]; this frequently serves as a prelude to an exercise programme.

HISTORICAL BACKGROUND

The concept of therapeutic exercise is not new [6]. The Chinese, Egyptians, Greeks, Turks, and Romans were all familiar with the benefits of active movements. The ancients observed the weakness and wasting that accompanied bed rest. They encouraged exercise and preservation of body strength and beauty.

The Latin derivation of the word exercise is to unlock or free the part to move. Among the Greeks, the general term for exercise was *ascesis* and an ascete was a person who

exercised both mind and body as distinct from an athlete who exercised only to win a prize.

As a matter of interest, at that time most exercises were done in a state of complete undress, hence the derivation of the name gymnast, as the greek word for nude is *gymnos*.

During the Christian era, the gymnastic and dancing spectacles of these earlier times were abandoned and it was not until 1569 that Mercurialis laid down the following general principles for the application of medical gymnastics or therapeutic exercise:

1. they should be prescribed and directed on an individual basis.
2. they should be specific.
3. due attention must be given not to exacerbate the condition.
4. they should be given to persons leading a sedentary life.

He advised mountain climbing for weak legs, discus throwing for weak wrists, dancing, riding, and walking.

By the mid 18th Century, Nicholas Andry wrote that of all methods of alleviating and curing infirmities, there is nothing to equal exercise related to the musculoskeletal system.

He emphasised that rest had its advantages as it repairs dissipated spirits and refreshes fatigued bodies but that the abuse of rest is more serious than the abuse of exercise or as an old adage has it, "if you rest, you rust".

Books began to be published on medical gymnastics. The importance of anatomical knowledge and of training the cardiovascular system was stressed.

In 1857, N. Dalley wrote what is reputed to be the longest book on kinesiology, "The Science of Movement". Today kinesiology is a core subject in the curriculum of both physiotherapy and physical education students as all exercise routines, therapeutic or otherwise, are based on an understanding of mechanical principles and their application to body movements and activities.

From Sweden, Ling introduced system to exercise. This deals with starting positions, detailed instructions for the specific movement, the number of exercises in the set, and progression [7].

Sherrington advanced concepts further directing exercises towards sensory and proprioceptive input and voluntary control. His principle that all movement is the shadow of position has become a basic rule for both manual therapy techniques and exercise.

RATIONALE

As there is no substantial scientific evidence to support the validation of therapeutic exercise in manual therapy, the rationale has to come from the positive laboratory evidence from animals showing the effects of immobilisation on muscle, nerve, and connective tissue.

Contractures develop in muscles and capsular ligaments. There is proliferation and adhesion formation of intra-capsular connective tissue, fibrillation of cartilage, and degradation of collagen [8,9].

The bone-ligament-bone unit deteriorates, contributing to the decrease in the maximum failure load and to the energy absorbed before failure. This leads to an increase in the extensibility of ligaments, mechanical overstrain and instability [10].

There are also disturbances of circulation and neuromuscular function.

The importance of therapeutic exercise after injury is that early movement is essential for the prevention of contracture and adhesion formation, drainage of tissues, and prevention of ischaemia.

Early, gentle motion after injury increases the diffusion rate for cartilage 3-4 times above static level [11], and the extensibility of healing tissues to maximum length is encouraged, thus helping to avoid delayed or poor repair [12].

For people leading increasingly sedentary or inactive lives, with weight gain, and for the ever increasing battle against gravity with age, goal directed exercise promotes better movement control and neuromuscular efficiency [13], thus encouraging fitness and reducing the predisposition to injury.

Spinal Problems

For spinal problems the lack of scientific evidence is a dilemma facing many practitioners as it is the same for almost all non-evasive treatment programmes [14].

Conjecture about the causes of back pain is rampant. The pathological processes are poorly understood and assertions are made that do not always relate to establish facts.

Cyriax claimed that well over 90% of low back problems could be attributed to lumbar disc lesions [15].

Evans postulated that postural back-ache is extremely common, producing a nagging, low

grade ache, often persistent for many years [16].

Adams equated postural back pain with chronic, low lumbar ligamentous strain [17].

Williams and others have associated back pain with weak abdominals and reduced stabilisation of the pelvic girdle [18,19].

Kirkcaldy-Willis and Hill have suggested that the sacro-iliac joint is a commonly overlooked cause of low back pain [20].

Nachemson has shown that the intradiscal pressure at the L3-4 disc is less with a lordosis in sitting than with a flat back [21] and yet the flat back position is recommended by the posture committee of the American Academy of Orthopaedic Surgeons [22].

Certainly, disc lesions are almost unknown and back pain is much less prevalent where the native population assumes a flat back posture [23] but there are too many other differences in their way of life to claim that as the main reason.

According to Sarno [24], certain factors are about equal in persons with a predisposition to back pain. These are discal, degenerative or postural, and tension myositis.

Variables precipitating an upset in any of these factors can be due to trauma, misuse or disease influenced by environmental, occupational or recreational conditions.

The clinical result is varying degrees and distribution of pain, stiffness, tightness and tension, postural and movement difficulties, tiredness, fatigue, and reduced functional capacity.

PRESCRIPTION FOR EXERCISES

The choice of exercise has to be directed towards the mechanical or chemical bias of the condition and the management related to the functional and behavioural characteristics of the patient. The main points of treatment derive from the therapist's initial evaluation.

Always start with a trial position, and give time to assess pain behaviour and to plan action.

The following exercises are examples of those used in manual therapy programmes for acute and chronic pain, and for prophylaxis.

FOR SEVERE DYSFUNCTION WITH ACUTE PAIN

Keynote is MOTION. Cornerstones are

positioning, persuasive correction, centralisation of pain, and reduction of pressure.

For a patient with lumbo-sacral pain, with unilateral referral due to a posterior or posterolateral disc derangement and presenting with a deviation or list of the lumbar spine secondary to the derangement. The exercise is persuasive corrective movement of the upper trunk or pelvis.

The aim to produce a lateral glide to assist in the correction of posture, reduction of the derangement, and centralisation of pain.

The manoeuvre may need to be assisted by the therapist at first, and take some time to master.

The patient is encouraged to breathe quietly, to relax, and to report on any change in the distribution of pain.

In most instances pain centralises. When this happens, gentle sustained extension in standing should follow. As the pelvis sags forward, the spine passively extends. Muscle work by the patient is minimal. Pain should continue to decrease and remain centralised.

The corrective regime is practised in front of a mirror if possible. An explanation for the treatment is given along with advice to repeat the movement six times per hour in order to maintain the correction, and prevent recurrence of derangement.

Emphasis is placed on postural correction and the maintenance of a lordosis, especially in sitting.

Common faults are that the patient side bends rather than side glides and does not maintain the corrected position during extension.

For severe pain but no deviation, the patient may start positioned in prone lying for five minutes. Progression is made to supporting weight on pronated forearms, then on to hands with arms outstretched.

If pain eases, repeated passive extension in lying (10 x 3) progresses to extension in standing repeated at regular intervals throughout the day, and especially after any sustained time in flexion with a reduced lumbar lordosis.

Further reference to these procedures can be found in the text, "The Lumbar Spine - Mechanical Diagnosis and Therapy" by R.A. McKenzie [25].

It is hypothesised that there is forward migration of nuclear material, a reduction of the derangement, release of pressure on the posterior annular fibres, and relaxation of the posterior ligaments and soft tissues.

There is also a change in the lumbar zygapophyseal joint intracapsular pressure [26] with passive movement and positioning, and contraction of the abdominal muscles with passive extension.

From a neurological viewpoint, there is enhancement of proprioceptor activity and a complex, centrifugal pattern of motor response associated with sensory, reflex responses to the active movement [27,28].

Extension exercises will not be suitable for those patients with spinal stenosis or neural arch involvement.

For severe pain of long duration, made worse by extension, or for a patient who is quite distressed, presenting with signs of swelling or bruising of the lumbar area, the semi-Fowler position of lying with knees and hips flexed to 90° and well-supported on a stool can be recommended. This position gaps the zygapophyseal joints, reduces intra-discal pressure to a minimum, and gently stretches post-vertebral structures.

A combined movement position of side-lying, rotation, with either flexion or extension at the site of the lesion may also give relief.

If pain eases, a set of six progressive exercises, emphasising the importance of the abdominal musculature and posture can be started. These were first recommended by Williams in 1937, who applied the principles of vector analysis to the rhomboids and the spinal flexors and extensors which control the lumbo-sacral spine. There is no emphasis on mobilisation [29].

Until recently, these exercises have been used almost exclusively in the United States and Canada for patients with low back pain.

Williams Exercises

1. Posterior pelvic tilt

Patient lying on back with knees flexed, feet on floor.

To exercise: flatten back on to floor, hold for 5 seconds, relax, and repeat 10 times.

Patient is advised not to arch back when relaxed.

2. Abdominal bracing

Start as for 1. Fold arms across chest.

To exercise: tighten stomach muscles, lift head up so chin touches chest. Hold for 5 seconds, relax, repeat 10 times working up to 25.

Patient is advised not to do regular sit-ups.

3. Progressive abdominal bracing

Start as for 1. Bring one knee up towards chest, clasp hands round knee and pull knee down to chest.

To exercise: raise head and shoulders off the floor, Repeat as before.

4. Progression so that both knees are brought to chest

In both 3 and 4 it is important that knees are brought up as far as possible before being pulled on to chest, otherwise spine will extend and ilio-psoas contract instead.

Patient is advised not to do double straight leg raise.

5. Psoas stretch in supine lying

For right psoas pull left knee on to chest.

To exercise: stretch right leg flat on to bed.

Patient is advised not to pull knee towards the axilla as this stretches the sacro-iliac joint which, if painful, may inhibit the psoas stretch.

6. Postural correction in standing

Start with back against wall and heels six inches from the wall.

To exercise: flatten back against wall and then walk away holding the position for up to 10 seconds. Gradually increase the holding time.

This exercise will be familiar to those dancers who practise the Alexander method of posture training and control.

It could be recommended for those with a hyperlordosis but in New Zealand we prefer to encourage the natural lordotic curve with sitting and standing.

These exercises are simple, but by paying attention to detail they initiate the skills required for good postural alignment and abdominal control.

Working in conjunction with the dorso-lumbar fascia and mid-line ligaments and muscles, the abdominal musculature controls intra-abdominal pressure which according to Farfan [30] is effective in the prevention of shear at an intervertebral joint and in reducing the amount of stress produced by muscular action.

Post Isometric Relaxation Exercises

When it is considered that pain or movement limitation is produced primarily by muscles, post-isometric relaxation techniques may be useful. There are six steps to follow [31].

1. The joint is placed in a 3-dimensional position at the end of the available range for the specific segment involved.
2. Light resistance is applied by the therapist.
3. The patient attempts to return to neutral.
4. Contraction is held for up to 7 seconds.
5. The patient relaxes.
6. When relaxation is complete, the operator moves into the restricted range.

The steps are repeated 3 to 5 times.

eg.1 **For restricted rotation to left at the mid-cervical level, C3-4-5:**

Patient supine lying, neck is flexed up to C3, rotate and side-bend gently to left to point of restriction, hold in that position as patient contracts right trapezius and levator scapulae. When patient relaxes, move into the restricted range.

eg.2 **For restricted flexion and right side-bending at the mid-thoracic level T5-6-7:**

Patient sits on stool, sags and flexes forward. Operator curls right arm and forearm around patient's head and places fingers over left scapula. One finger of the other hand palpates the left T5-6 interspace.

Side-bend to right, then apply rotation, until tension is felt on left at T5-6. Resistance to left side-bending, rotation and extension is given for up to 7 seconds. When patient relaxes, move into the restricted range.

These exercises are known also as direct action or muscle energy techniques. The pain appears to be due to the inability of the muscle to relax to full resting length and to a degree of ischaemia that may be involved.

This type of technique follows the natural pattern for movement which has a rotational element. It produces inhibition of muscle [32], increases relaxation, and blood flow. It is also thought that it may produce an analgesic

effect on muscle and at the tender points of insertion at the periosteum.

This procedure should be painless, the force never excessive (no more than twelve pounds of pressure). Moderate not maximal contractions are performed, counterforce being equal to the muscle force. Four seconds can be given for the muscle to relax before the movement range is increased.

FOR CHRONIC DYSFUNCTION

The keynote is MOVEMENT. The cornerstones are postural correction, slow repetitive movement to end of range, reduction of pain, and stretch of tissues.

For those with restricted movement and pain at end of range where capsular tightness is detected, auto-assisted and free exercises can be prescribed, as recommended by Kaltenborn from Norway.

Fixation and starting positions are similar to the assessment and treatment techniques used in manual therapy [33] and careful instructions and explanations are given.

Cervical Exercise

For headaches and reduced movement at the upper cervical level, the position of the head upon the neck is important. Retraction of the cervical spine is combined with flexion of the occiput on atlas, a manoeuvre not easily accomplished by some with long term problems. Specific auto-assisted mobilisation may first be necessary to achieve the long term goal [34].

1. **For reduced flexion**

Patient sits, clasps one hand around atlas and upper cervical spine to fixate. The other hand (the moving hand) is placed with fingers at base of occiput with forearm resting on skull.

To move: this hand presses head forward and pushes chin on to chest.

2. **For reduced extension**

Start as 1. The moving hand is on the forehead with fingers resting on scalp.

To move: the head is pressed backwards over the fixating hand.

3. **For reduced side-bending**

Start as for 1. The moving hand is placed across base of occiput with fingers towards ear, forearm rests on side of skull.

To move: the head is pressed and tilted to



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the side.

4. For reduced rotation

Start as for 1. Moving hand as for 3.
To move: the head is pressed slightly forward first, then pressed round in direction for movement.

Common faults are that movement can be of too large an amplitude and that pressure can be not firm enough for location emphasis.

Isometric or resisted exercise for hypermobility can be given with these positions as well as combining extension or flexion with side-bending and rotation.

Thoracic Exercise

Mobilisation for restricted thoracic movement can be influenced by arm and leg positions.

5. For reduced flexion in the upper or lower thoracic area

Kneel with legs together for upper, and apart for lower. Rest on hands with arms outstretched for upper, and on pronated forearms for lower.

To move: arch up and round trunk. Segmental flexion will be emphasised.

Lumbar Exercise

Restricted movement in the lumbar spine can be influenced by leg movements.

6. For side-bending restriction in the upper and lower lumbar area

Lie on back with legs apart for upper, and together for lower.

To move: alternate hip hitch. Segmental side-bending will be emphasised.

COMMENTS

For good effect, exercises to stretch tight articular structures should be performed slowly, taken to end of range and held for up to 7 seconds. Repeat 5 to 10 times at least 5 times per day.

Tissue fluids respond to the alternate compression and release of pressure provided by movement. Joint surfaces are lubricated more efficiently, and nutrition is improved. There is activation of proprioceptors and connective tissue can be vigorously stretched [35].

For some patients these exercises are a start

towards a better body image and postural control and booklets for further guidance can be a useful adjunct to learning.

Sensitivity

For other patients with long standing back pain, hyperactivity of the autonomic nervous system may be a critical feature [36]. Manifestations of this are extreme sensitivity to touch and pressure.

There is a change in the texture of the skin and superficial connective tissue morphea or poikiloderma may be observable.

The state of the muscle can range from a mild elastic type of tension, to a string or rope-like quality, or to a boggy, sponge-like consistency.

One can speculate that these are reflections of what is going on at joint level or that they are primarily caused by autonomic dysfunction. But whatever the cause, in such cases there seems to be a very fine tuning between the exercise regime and exacerbation of symptoms and these patients have to be carefully monitored and progressed with caution, keeping in mind that for motivation the directions must continually be adjusted to the physical state of the subject and to their understanding of body care.

FOR PREVENTION OF INJURY

The keynote is FITNESS. The cornerstones are postural control, muscle strength, flexibility, and endurance.

In manual therapy, once pain and stiffness are relieved the aim is to provide a measure for the prevention of recurrence. Professor Janda has already dealt with the effects of muscle imbalance and the role its correction has in injury prevention.

Mr O. Evjenth and Mr H. Gunnari from Norway have designed sequence exercises to meet the demand for reconditioning, to counteract the abuse of rest and loss of condition [37].

There are five sets of exercise in each sequence. All five exercises should be able to be performed at the same level, and easily repeated 20 times before progressing to the next sequence. This ensures that overall fitness is achieved rather than over-emphasis in one area, thus creating an imbalance between muscle groups.

Sequence I

This corresponds to most functional

movements for daily living. Each exercise has three levels of resistance from the start to full range. Common errors have to be corrected. They should be combined with breathing. If it hurts, stop: strain but no pain.

In normal circumstances, a person should exercise at 50% or more of their aerobic capacity. A patient should work at 30% or less if in recovery from a recent illness. The pulse is the best guide: no more than 30 beats above the resting pulse.

Sequence Exercises

1. **Squat:** to exercise leg and hip muscles.
Breathe in going down, out coming up.

Resistance levels:

- A. down until thighs are almost horizontal
- B. thighs horizontal
- C. deeper squat, thighs under horizontal

Common errors: upper body bends too far forward and movement is jerky, so the knees are overloaded.

As a special note at this point, in Sweden, crouching has now become a favourite way to relax the abdominals and exercise the diaphragm.

2. **Dips:** to exercise the chest and arm muscles.
Stand between two chairs, back to back.
Grip backs of chairs, support body through arms.
Bend knees and resist downward sinking with arms until knees touch floor.
Raise back from floor with some assistance from legs.

Resistance levels:

- A. legs aid considerably
- B. legs aid less
- C. legs provide almost no support

Common errors: legs used too much, no load on arms.

3. **Hyperextension** exercises back and hip muscles.
Lie prone on floor, over a firm cushion, legs are best fixed.
Body is raised evenly with buttocks consciously working at end of movement.
Pause, then lower.

Resistance levels:

- A. arms along side
- B. arms bent, hands behind neck
- C. arms straight, outstretched above head.

Common errors: upper body jerks instead of rising steadily.

4. **Pull-up:** exercises arm and shoulder girdle muscles

Lie on back under table.
Grasp edge of table firmly.
Raise body using arms.
Sink body down slowly.

Resistance levels:

- A. legs bent at knees
- B. legs straight
- C. wide grip opposite edges of table, if possible.

Common error: arms not stretched out fully between repetitions.

5. **Curl-ups:** exercise abdominal muscles
Lie on back, over a pillow or cushion, plantar flex feet.
Pull upper body upward, keeping small of back, hips, and toes on floor.

Resistance levels: depend on arm position

- A. arms along side
- B. arms bent, clasped at back of neck
- C. arms straight, outstretched above head.

Common errors: movement too fast, head and neck craned forward throughout the exercise.

Sequences II and III

These use many of the same muscles but in a different pattern. They are more difficult and require a higher level of performance.

Further advancement and skill with this type of exercise can be achieved at the gymnasium with weights or sequence apparatus or in a form that not only trains the body but also delights the mind, whatever is the sport or recreation of choice.

CONCLUSION

On looking back, therapeutic exercise has been with us in different forms for centuries. Important aspects have been threaded through different culture and civilizations.

At the present time, Cyriax, Williams, Yanda, Kaltenborn, McKenzie, and Evjenth have had important influences.

In looking forward, scientific investigation may offer better guidelines for the criteria for exercises but as a matter of interest, it may also pay us a look at a group of people for whom the scourge of back pain is not a problem, and ponder the reasons why [38].

These are the Sherpa people of Nepal. They lead a strenuous life far removed from Western industrialised society.

They sleep on hard surfaces without mattress or pillow and they learn to carry awkward, heavy weights from an early age.

Young babies are carried on their mothers' backs, at first in baskets then with their legs straddled round their mothers' waist. Seldom are their feet on the ground before 18 months.

Cross-legged sitting is infrequently seen, most often they squat rather than sit.

Transport is always on foot, they walk rather than run. No wheels, no machines, only the occasional assistance of a yak to ease the burden.

In our society, only the well-trained weight lifter can compare as far as the low incidence of back pain is concerned [39,40]: a person for whom squatting, exercise with weights and co-ordinated movement is a daily routine and for whom the keynotes are fitness, balance, and planned, controlled action.

SUMMARY

1. Specific exercises are recommended to be prescribed on an individual basis.

REFERENCES

1. DE VRIES, HA, SIMARD, CP et al. 1982. Fusimotor System Involvement in the Tranquiliser Effect of Exercise. *Am J Phys Med* 61,3:111.
2. POLLACK, ML, WILMORE, JH et al. 1984. Exercise in Health and Disease. Evaluation and Prescription for Prevention and Rehabilitation. Philadelphia WB Saunders.
3. BURKITT, A. 1986. Health, Health Education and Physiotherapy.
4. WILSON, C. 1978. Exercise for Arthritis. In: Basmajian, JV Therapeutic Exercise. 3rd Edition. Baltimore, Williams & Wilkins.
5. DEYO, R, DIEHL, A. 1986. Patient Satisfaction with Medical Care for Low Back Pain. *Spine* 11, 1:28.
6. LICHT, S. 1978. History. In: Basmajian, JV (ed) Therapeutic Exercise 3rd Edition. Baltimore, Williams & Wilkins.
7. PROSSER, EM. 1950. Manual of Massage and Movements. London, Faber & Faber.
8. McDONOUGH, A. 1981. Effects of Immobilisation and Exercise on Articular Cartilage. *J Orth & Sp Phys Th* 3:1.
9. WIKTORSSON, M, MOLLER, B. et al. 1983. Effects of Warming-up Massage and Stretching on Range of Motion and Muscle Strength in the Lower Extremity. *Am J Sp Med* 11:249.
10. NOYES, F., TORVIK, P. et al. 1974. An Analysis of Immobilisation Exercise and Re-Conditioning Effects on Ligaments. *J Bone & Jt Surg* 56:7.
11. DONATELLI, R, OWENS, H. et al. 1981. Effects of Immobilisation on the Extensibility of Periarticular Connective Tissue. *J Orth & Sp Phys Th* 3,2:67.
12. EVANS, P. 1980. The Healing Process at Cellular Level. A review. *Physio* 66:256.
13. SHIMAMURA, M, LIVINGSTON, RB. 1963. Longitudinal Conduction Systems Serving Spinal and Brain Stem Co-ordination. *J Neuro Phys* 26:258.
14. SARNO, JE. 1976. Chronic Back Pain and Psychic Conflict. *J Sc & Rehab Med* 8:143.
15. CYRIAX, J. 1974. Textbook of Orthopaedic Medicine. Vol. 1, 6th Edition. London. Balliere & Tindall.
16. EVANS, D. 1980. Extended Hell Shoes. *Rheum & Rehab* 19:103.
17. ADAMS, CB, LOGUES, V. 1971. Studies in Cervical Spondylotic Myelopathy. *Brain* 94:557.
18. BLACKBURN, SE, PORTNEY, LG. 1981.

Electromyographic Activity of Back Muscles During Williams Flexion Exercise. *Phys Th* 61:878.

19. SUZUKI, N, ENDO, S. 1983. A quantitative Study of Trunk Muscle Strength and Fatiguability in the Low Back Pain Syndrome. *Spine* 8:69.
20. KIRKCALDY-WILLIS, WH, HILL, RS. 1979. A More Precise Diagnosis for Low Back. *Spine* 4:102.
21. NACHEMSON, A. 1975. Towards a Better Understanding of Low Back Pain. A Review of the Mechanics of the Lumbar Disc. *Rheum & Rehab* 14:129.
22. ZYLBERGOLD, R, PEPER, M. 1981. Lumbar Disc Disease - Comparative Analysis of Physical Therapy Treatments. *Arch Phys Med Rehab* 62:176.
23. CAILLET, R. 1971. The Low Back Pain Syndrome. 2nd Edition. Philadelphia. FA Davis & Co.
24. SARNO, JE. 1978. Therapeutic Exercise for Back Pain. In: Basmajian, JV (ed) *Therapeutic Exercise* 3rd Edition. Baltimore, Williams & Wilkins.
25. MCKENZIE, RA. 1981. The Lumbar Spine: Mechanical Diagnosis and Therapy. Waikanae, Spinal Publications.
26. ELVEY, R, THOMPSON, E. et al. 1985. The Clinical Significance of Measured Lumbar Zygapophyseal Intracapsular Pressure Variation. In: *Proceedings 4th Biennial Conference MTAA Brisbane*.
27. MULDER, T, HULGSTYN, W. 1984. Sensory Feedback Therapy and Theoretical Knowledge of Motor Control and Learning. *Am J Phys Med* 63:226.
28. KEELE, SW, SUMMERS, JJ. 1976. In: Stelmach, GE (ed) *Motor Control Issues and Trends*. New York, Academic Press.

29. FARFAN, H, GRACOVETSKY, S, et al. 1985. The Abdominal Mechanism. *Spine* 10:317.

30. WILLIAMS, PC. 1937. Lesions of the Lumbo-Sacral Spine Chronic Traumatic (Postural). Destruction of the Lumbo-Sacral Intervertebral Disc. *J Bone & Jt Surg* 29:690.
31. GRIEVE, G. 1981. Mobilisation of the Spine. 4th Edition. Edinburgh, Churchill Livingstone. Chapter 13.
32. EVANS, E, EGGERS, G. et al. 1960. Experimental Immobilisation and Remobilisation of Rat Knee Joints. *J Bone & Jt Surg* 42A:737.
33. KALTENBORN, F. 1970. Mobilisation of the Spinal Column. (Trans) McKenzie, RA. Wellington, NZ University Press.
34. BUSWELL, JS. 1978. A Manual of Home Exercises for the Spinal Column. Auckland. Pelorus Press.
35. GRODZUNSKY, H, LIPSHITZ, H. et al. 1978. Electro-Mechanical Properties of Articular Cartilage During Compression and Stress Relaxation. *Nature*: 275:448.
36. GUNN, C, MILBRANDT, W. 1978. Early and Subtle Signs in Low Back Pain. *Spine* 3:267.
37. GUNNARI, G, EVJENTH, I, BRADY, M. 1984. Sequence Exercises. A Sensible Approach to All-round Fitness. Oslo, Dreyers Forlag.
38. BUSWELL, KS, KROEF, E. 1985. Khunde Hospital The Himalayan Trust, Nepal. Personal Communication.
39. CASS, LS, CONLEE, R. 1981. Effects of Fast and Slow Isokinetic Weight Training on Strength and Endurance. *J Med & Sc in Sports Phys Th* 3,2:66.
40. KULUND, DN, DEWEY, JB. 1978. Olympic Weight-lifting Injuries. *Phys & Sp Med* 6:111.



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Interactions with Other Drugs: Concurrent treatment with acetylsalicylic acid lowers the plasma concentration of **VOLTAREN** by about one-third, but the clinical significance of this effect has not been determined. The concomitant administration of **VOLTAREN** with preparations containing lithium or digoxin, may raise the plasma concentrations of these drugs, however, no clinical signs of overdosage in such cases have yet been encountered.

The addition of glucocorticoids to non-steroidal anti-inflammatory agents, though sometimes necessary for therapeutic reasons, may aggravate gastrointestinal side effects. The concurrent oral treatment with two or more non-steroidal antirheumatic drugs may promote the occurrence of side effects.

ADVERSE REACTIONS: **VOLTAREN** is generally well tolerated. At the start of treatment, however, some patients may complain of gastro-intestinal symptoms (e.g. anorexia, nausea, epigastric pain or diarrhoea). These effects are usually mild and transient, and need not interfere with continuation of medication. Peptic ulcer, or gastro-intestinal haemorrhage, has been reported during therapy with **VOLTAREN**. Usually these episodes occurred in patients with a history of such disorders, or who were receiving concomitant therapy with other drugs. Occasionally, skin reactions such as drug rash and eczema, peripheral oedema or slightly raised serum transaminase levels have been observed. There have been isolated reports of anaphylactoid reactions. Central nervous system reactions in the form of headache and dizziness, tiredness, insomnia, or irritability may be experienced by some patients, but these are usually mild and transient. The occurrence of myoclonic encephalopathy has been described in two patients.

Blood dyscrasias (aplastic anaemia, agranulocytosis, leucopenia) have been encountered very rarely in association with the use of **VOLTAREN**. A few cases of haemolytic anaemia, thrombocytopenia, reduction in haemoglobin levels and positive Coombs' test have also been reported. Some further unwanted effects which have rarely been observed are jaundice, hepatitis, renal failure and nephrotic syndrome. Isolated cases of erythema multiforme have been reported.

DOSEAGE AND ADMINISTRATION: Initial dosage is 75 to 150 mg daily, depending on the severity of the condition, given in 2 or 3 divided doses. For long-term therapy, 75 or 100 mg daily, in divided doses, is usually sufficient.

The tablets, being enteric-coated, should be swallowed whole.

PRESENTATION AND PACKS:

VOLTAREN 25: Enteric-coated tablet containing diclofenac sodium 25 mg; round, biconvex, yellow, marked "Geigy" on one side and "B2" on the other. Containers of 50.

VOLTAREN 50: Enteric-coated tablet containing diclofenac sodium 50 mg; round, biconvex, pale brown, marked "Geigy" on one side and "G1" on the other. Containers of 50.

NEW REHABILITATION SWIMMING EXERCISES (BACKSWIM) FOR PATIENTS WITH MUSCULOSKELETAL INJURIES

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Alex Ganora
Laurel Mitchell

Illawarra Rehabilitation Centre, Thirroul, NSW.

ABSTRACT

An effective exercise technique has been developed at the Illawarra Rehabilitation Centre, which involves a systematic and phased programme of specific swimming and exercise instruction for back pain sufferers, acute and chronic. The programme is designed to achieve long-term gains in spinal function, activity levels and fitness. It can be applied from the acute phase of back injury through to maintenance swimming for fitness training. No previous swimming ability or water competence is required and aerobic levels of fitness can be achieved.

The programme is described, including the method of instruction and the phases of training. Initial results of the programme are presented in a population of 100 back injured persons.

INTRODUCTION

The hydrotherapy pool at the Illawarra Rehabilitation Centre has been operational now for the past three years. During this time the exercise methods used for the patient with musculoskeletal injuries have been constantly reviewed, evaluated and upgraded in an effort to develop a suitable and effective exercise programme for the injured patient.

Initially emphasis focused on the basic hydrotherapy exercise techniques, which relied heavily on the general benefits derived from a wet heat medium, that of improving circulation, relieving pain and promoting rest and relaxation. While the overall benefits of exercises in heated water cannot be disputed, it became evident that a large percentage of patients with musculoskeletal injury, who were referred for swimming fitness:

- * failed to adequately master swimming (especially freestyle);
- * took a long period to develop a non-harmful technique; or
- * required an extended period of one to one instruction.

Swimming is of course an ideal exercise for the healthy individual, however it poses several potential problems for the patient with back or neck injuries. These include:

- * Painful water posture.
- * Injurious and/or painful arm rotation

movements.

- * Hyperflexion of the neck.
- * Neck rotation (freestyle).
- * Jerky unco-ordinated movements.
- * Loss of confidence in the therapeutic environment.

The swim style required had to produce a fluent, continuous free-flowing movement which would serve to protect the injured patient from movements which may aggravate the injury or cause discomfort.

The swim strokes which proved unsatisfactory were those of the freestyle, breaststroke, butterfly and side sculling. All four swim styles present problems for the injured patient.

The backstroke position was found to have several real advantages over its counterparts, in that it:

- * allowed the face to be free of the water;
- * avoided complicated breathing mechanics;
- * allowed for the use of flotation devices;
- * provided a relaxing supine position;
- * relieved painful weight bearing; and
- * reduced anxiety.

The backstroke style however, was not fully adopted. The specialised needs of those with musculoskeletal injuries required several modifications of the style to allow patients to graduate safely and slowly to their individual levels of fitness.

It was found that a graduated sequential programme was necessary which would enable individuals to progress through the various stages of fitness, until they had achieved a capacity level which was as close to their physiological limits as health and safety factors would allow.

Several phases were devised in order to:

- * incorporate specific exercises.
- * provide safety parameters for the injured patient.
- * closely monitor individual progress.
- * achieve specific objectives.

The phases of the Rehabilitation Swim Exercise Programme (Backswim) are as follows:

Phase 1

a)

1. Familiarise patient with overall plan for Phase 1.
2. Patient to be placed in the supine position.
3. Apply neck, hip and ankle floats.
4. Staff remain with the patient.

b)

5. Instigate passive double arm back sculling movement.
6. Remove ankle floats.
7. Encourage gentle paddling of the feet.
8. Establish a regular breathing pattern.

Phase 1 is suitable for patients who:

- * are non-swimmers.
- * are mildly hydrophobic.
- * have back or neck injuries.
- * are highly anxious.
- * are deconditioned.
- * are upgrading following a period of bed rest.

The objectives of Phase 1 are:

- * to obtain complete relaxation and water confidence in the patient.
- * to promote co-ordination and body awareness.
- * to begin a continuous gentle form of exercise.

Phase 2

1. Discontinue arm action.
2. Attach flippers.
3. Simple clear instructions.
4. Correct recovery and starting techniques taught.
5. Neck support remains.
6. Gentle cycling movement of legs.
7. Horizontal body position maintained.

Phase 2 is suitable for patients who:

- * have had previous water experience.
- * are moderately deconditioned.
- * are not anxious.
- * exhibit low pain behaviour.

The objectives of Phase 2 being:

- * to establish partial weight bearing.
- * to increase patient's balance and movement.
- * to build confidence.
- * to prevent patient from injury.

Phase 3

1. Maintain no arm movement.
2. Neck float remains on, as do the flippers.
3. Reduce cycling movement of legs.
4. Encourage a horizontal upper body position.
5. Introduce kickboard - arms to wrap around same.

Phase 3 is suitable for patients who upgrade from Phase 2.

The objectives of Phase 3 are:

- * to produce a flowing movement through water.
- * to further upgrade strength in legs and hips.
- * to attend to problem areas which may cause injury.

Phase 4

a)

1. Re-introduce passive arm strokes (double arm strokes).
2. Maintain and develop the free flowing movement.
3. Retain neck float initially.
4. Continue leg exercise movement and flippers.

b)

5. Begin alternate half stroke movement of arms.
6. Allow gentle body rotation only.
7. Neck float removed.
8. Continue to promote a smooth uninterrupted movement through the water.

Phase 4 is suitable for patients who require upgrading from Phase 3.

The objectives of Phase 4 are:

- * to upgrade patient's fitness levels.
- * to strengthen shoulder girdle and associated muscles.
- * to develop and maintain smooth uninterrupted motion.
- * to improve co-ordination and body awareness.
- * to improve mobility and flexibility.
- * to improve self esteem.

Advantages of Backswim

- * Insignificant failure rate.
- * Enables patients to achieve goals easily.
- * It is often the only form of upgrading a patient can tolerate.

- * Backswim is simple and fast.
- * Reduces tension and promotes relaxation.
- * Increases self esteem.

THE STUDY

The study aimed to examine 100 patients' response to a swim exercise programme (Backswim) specifically designed for people with musculoskeletal injury.

A purposive sample of 100 hospitalised patients with lower back pain and/or cervical pain were chosen, the sample being reflective of 1/3 the total population of subjects who had completed the swim exercise programme. Data was collected over a five month period. Each subject's medical record was examined retrospectively and contact per phone was made for final data analysis.

PATIENTS' AGES

Subjects ages range from 17 years to 71 years. No real distinctive age group predominated, although the age concentration was between 20 years to 50 years as evident in Figure 1.

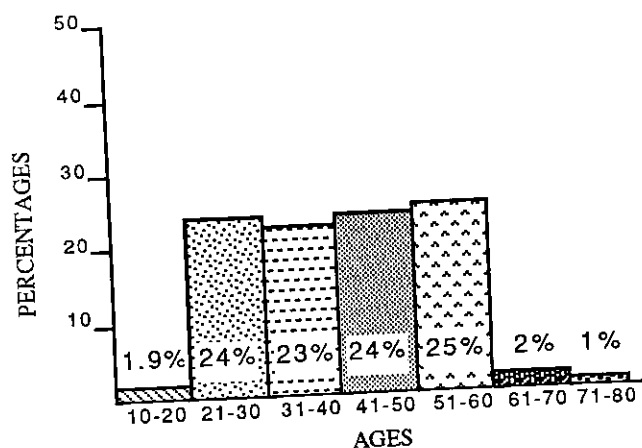


Figure 1. Patients' Ages

CLASSIFICATION

Figure 2 clearly reflects a higher percentage of subjects with chronic injuries as compared to those with acute or exacerbated injuries. The swimming exercise technique used adapts to suit all patient classifications.

PHYSICAL STATE ON COMMENCEMENT OF PROGRAMME

The subject's physical state on commencement of the programme is based on:

1. Length of immobility
2. Poor muscle tone
3. Initial response to exercise

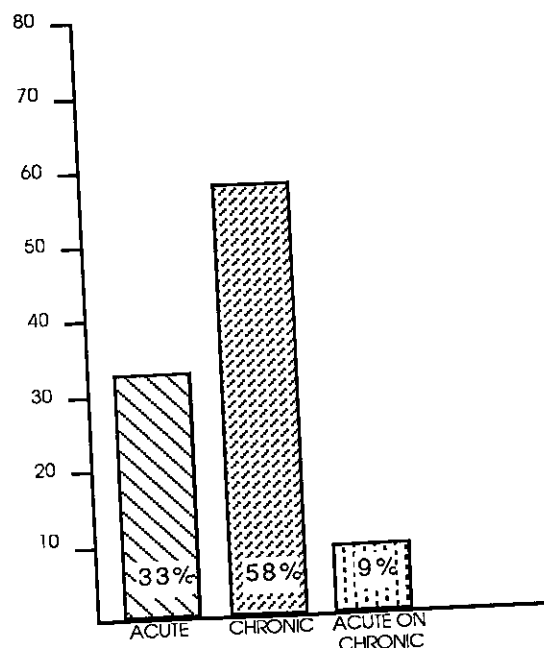


Figure 2. Classification

- ACUTE = 0 - 3 months
- CHRONIC = 3 months
- ACUTE ON CHRONIC = Patients suffering an exacerbation of old injury

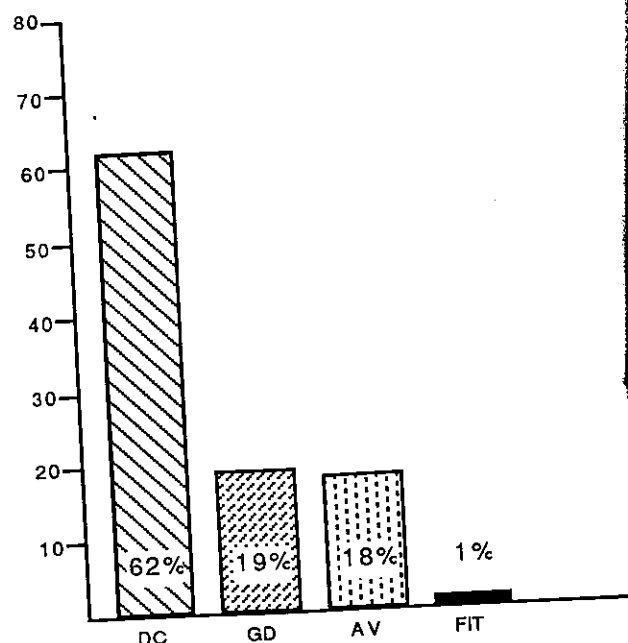


Figure 3. Physical State on Commencement of Programme

- DC Deconditioned
- GD Grossly Deconditioned
- AV Average
- FIT Fit

THERAPY TIMES

Therapy times are largely dependent on programme restrictions. The ideal time period is two half-hourly sessions per day.

As indicated in the graph, a high percentage of subjects were allocated only one half-hourly session per day.

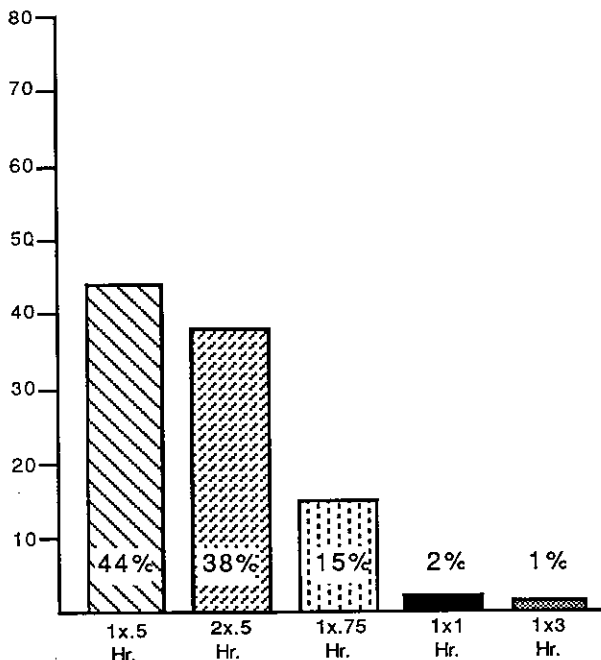
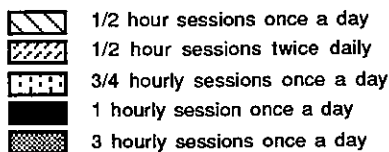


Figure 4. Therapy Times



PROGRESS THROUGH PHASES

Of the 100 subjects who began the exercise

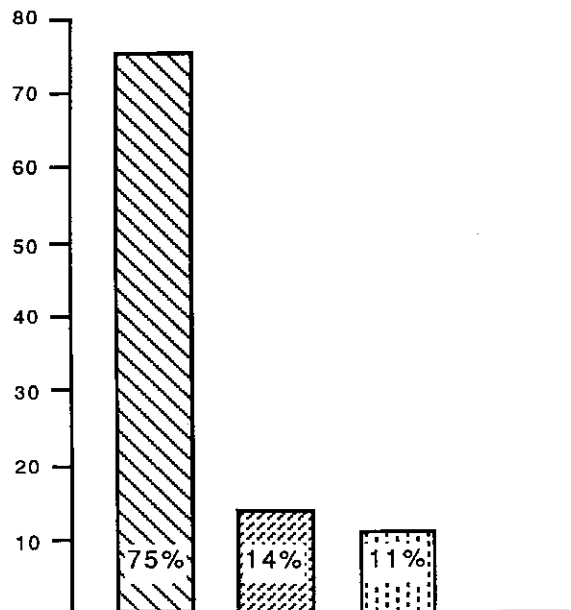
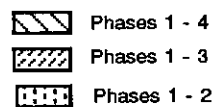


Figure 5. Progress Through Phases



programme, 75% successfully completed the four phases. 14% completed phases 1-3 where nil rotation was required or subjects had limited arm mobility. 11% completed phases 1-2 where relaxation on low back exercises only were required.

CONCLUSION

This study has demonstrated that a population of disabled persons with back and/or cervical injuries can be successfully mobilised in a well controlled therapeutic environment. It also indicates that injured persons can be involved in a fitness programme which can be upgraded to aerobic levels.



AAMM membership currently stands at 370 and is growing all the time. Membership lists are available to members on request: simply contact the Treasurer. An updated list will be published in the next issue of the Bulletin.

New members are always welcome. If you know of a colleague who may be interested in joining the Association, send his name and address to the Treasurer, who will send him a membership form, together with the latest issue of the Bulletin and other information about the Association.

INQUIRY INTO MEDICAL EDUCATION AND THE MEDICAL WORKFORCE

On 20th January, 1987, the Federal Minister for Health Dr Neal Blewett announced an inquiry into medical education and the medical workforce.

The inquiry will be chaired by Professor Ralph Doherty, Pro Vice-Chancellor of Queensland University. Other members of the Committee of Inquiry are:

- * Professor Robert Smith, Vice Chancellor, University of WA;
- * Dr Bernie Amos, Westmead Hospital;
- * Professor Richard Larkins, University of Melbourne;
- * Mrs Delys Sergeant, Social Biology Resources Centre, Melbourne
- * Dr Neville Hicks, University of Adelaide; and
- * Dr Sue Morey, Royal Prince Alfred Hospital, Sydney.

In announcing the establishment of the committee, Dr Blewett said that it would give members of the medical profession, educationalists, health administrators, other health care professionals, and the community an opportunity to contribute to the shaping of the medical practitioner workforce of the future.

The proposed terms of reference of the Inquiry are:

"To inquire into and make recommendations upon major aspects of preparation for medical practice, including:

1. The effectiveness of the curricula and the structure of current Australian medical undergraduate education and the internship year, in producing medical graduates with appropriate skills and competencies to meet national health care needs;
2. The effectiveness of current post-graduate Australian training for general medical practice and medical specialties (including continuing education programs and specialist accreditation);
3. The provision of an appropriate supply of each broad category of medical practitioner, with particular regard to supply issues such as projected wastage rates and the entry into Australia of overseas trained medical practitioners, and demand issues of meeting national health care needs, and including specific recommendations for appropriate overall intakes into medical undergraduate education;
4. The selection of students to undertake the study of medicine including ways in which entry to medical education may be made available to the widest socio-economic range of students;
5. The health, social and economic impact of the major recommendations of the inquiry.

And to provide advice to the Ministers on the implementation of such recommendations as the Government decides upon".

The following is the Association's submission to the Committee of Inquiry.

SUMMARY

A major health need is the satisfactory management of chronic musculoskeletal complaints, notably back pain, neck pain and related complaints.

At present, medical training is inadequate for the proper management of these problems.

Such training that is afforded is grossly incommensurate with the epidemiological and financial size of this community need.

The Australian Association of Musculoskeletal Medicine recommends that **postgraduate courses in musculoskeletal medicine be established** and that **academic centres be established to foster developments in this field, and to provide leadership and standards in research, developments, clinical practice and education.**

PREAMBLE

The Australian Association of Musculoskeletal Medicine (AAMM) would like to draw to the attention of the Committee the problems concerning musculoskeletal medicine. In this regard, our submission addresses the first and second terms of reference.

The AAMM represents a membership of about 350, principally general practitioners, who express an interest in musculoskeletal medicine. In broad terms, musculoskeletal medicine encompasses all disorders of muscles and joints, but in practice the principal foci are non-surgical orthopaedic complaints, troublesome and poorly understood complaints such as "frozen shoulder", "tennis elbow", etc, and most particularly back pain, neck pain and related referred pain problems.

SUBMISSIONS

1. It is the impression of the AAMM that **musculoskeletal complaints are very common.**

There are no figures available for Australia, but it seems reasonable that the prevalence of musculoskeletal complaints should be similar to that in the USA for which figures are available. The Nuprin Pain Report (1) revealed that on 101 or more days during 1985, 5% of the population suffered headache, 9% backache, 5% muscle pain, and 10% suffered joint pains. These proportions do not include those patients who suffered these complaints less frequently. Sporadic or incidental complaints were tabulated separately. The figure of 101 days represents one third of the entire year, and so the proportions quoted above are representative of the prevalence of chronic musculoskeletal complaints. Transposing these figures to Australia suggests that up to 25% of the population suffers chronic musculoskeletal complaints, and some 10% from back pain alone.

Other American figures are quoted in Appendix I.

2. It is the impression of the AAMM that **chronic musculoskeletal complaints are poorly managed.**

General practitioners are usually the first to see patients with musculoskeletal complaints, and are usually the practitioners that eventually become responsible for their long-term management. General practitioners are well-trained in the assessment and management of disorders of other body systems, such as heart disease, hypertension, neurological, respiratory and gastro-intestinal disorders, but their training does not equip them in a comparable manner to assess and manage musculoskeletal complaints. The most common recourses adopted are the prescription of analgesics (for symptomatic relief only), referral to physiotherapy and referral to specialists.

Analgesics are notoriously ineffective for chronic musculoskeletal complaints, particularly spinal pain, and at best offer only marginal symptomatic relief.

Physiotherapy, as generally practiced and as generally available, is similarly ineffective for chronic complaints.

Specialists offer only limited help. If a disorder can be treated surgically, orthopaedic and neurosurgeons can offer help, but the majority of patients do not present with indications for surgery. For example, fewer than 30%, and perhaps as few as 5% of patients with back pain have complaints due to herniated discs that could be treated surgically (2,3). The remainder do not have indications for surgery and are usually referred back to the general practitioner, or are referred for another course of physiotherapy before again returning to the care of the general practitioner. Rheumatologists offer a significant expertise in the management of inflammatory joint disease, but not for so-called "mechanical" disorders,

It is common for patients to enter what can be called the "back pain circus". The patient consults a general practitioner, who prescribes rest and analgesics, but the patient does not improve. The general practitioner prescribes physiotherapy, but several weeks of treatment do not afford relief. Radiographs are taken. They are reported normal. The patient is referred to a specialist. The patient waits days, weeks or months for an appointment. The specialist finds nothing remarkable clinically. More radiographs are taken. They are normal. Perhaps expensive tests such as CT scans and MRIs are taken. These too are essentially normal. The specialist prescribes physiotherapy. Again this is uneventful. The patient may return to the general practitioner, or a surgeon may, against better judgement, attempt surgery. The surgery fails to relieve pain. More physiotherapy: uneventful. The patient returns to the general practitioner. The cycle is then repeated using different general practitioners, physiotherapists and specialists.

Similar cycles could be described for poorly understood conditions like "frozen shoulder".

During this process, the patient develops secondary psychological and sociological problems, such as anger and resentment at not having found a "cure", and unemployment.

3. It is the impression of the AAMM that **back pain alone, as one major musculoskeletal complaint, is very costly.**

Back pain is costly not only in terms of direct patient suffering, but also in terms of the medical resources it drains, loss of productivity through unemployment, and in compensation payments. Again, figures are not available for Australia, but British figures are available.

It was estimated that in Britain, in 1980, back pain cost 220 million pounds per year in lost output, 40 million pounds per year in sickness benefits, and 60 million pounds per year for national health services (4). On a pro population basis, the corresponding figures for Australia would be \$80 million, \$16 million and \$24 million, and these do not incorporate the cost of workers compensation lump sum settlements. The latter has been addressed in the business press (5-7).

Australian figures are available for the cost of "whiplash" injuries to the neck. Over a five year period, in Victoria alone, whiplash cost \$28 million in health services and compensation payments (8).

Whatever the exact figures may be for Australia, it is an inescapable conclusion that massive costs must be involved in untreated spinal complaints.

4. It is the belief of the AAMM that **the foremost issue underlying this problem is lack of knowledge.**

In current undergraduate curricula, emphasis is laid on inflammatory and auto-immune joint diseases, but these are not the common problems seen in general practice. Moreover, they constitute a minority of presentations even to rheumatologists practices. Degenerative joint disease and low back pain are the predominant presentations (9). Curricula in orthopaedics are already limited, and must deal with important issues such as fracture and trauma management, leaving little time for chronic non-surgical complaints. It seems that no more than one lecture is ever delivered to undergraduates on the topic of back pain, and then the emphasis is on surgically treatable disorders such as classical disc herniation.

The emphasis of undergraduate curricula is not commensurate with prevalence of the complaints with which general practitioners are expected to deal.

Specialist training is pre-occupied with more traditional aspects of the specialty. Rheumatology is dominated by education in rheumatoid arthritis and auto-immune diseases. Orthopaedics and Neurosurgery are dominated by a wide variety of surgical responsibilities. Chronic, non-surgical complaints are not addressed in the depth that is possible.

All these limitations occur despite the availability of a large body of knowledge about

musculoskeletal complaints, and one that is ever increasing. However, the practical reality seems to be that in general, general practitioners and specialists do not acquire this new knowledge. The services they offer are based on what they were taught in undergraduate school or for their Fellowship. Some specialists do take a particular interest and upgrade their knowledge, but these are few and far between. Their numbers are not adequate for the population demand.

In response to the demand, other resources have developed in the form of Pain Clinics, but these are limited in several ways. They are few in number, and are usually staffed on a part-time basis by specialists in other fields donating their time. They are not funded as formal units in the hospital, and often struggle to maintain their existence. Such expertise that is available is usually polarised, with the contemporary emphasis being laid on psychological assessment and palliative management, there being a lack of specific expertise in musculoskeletal medicine.

Faced with having to deal with intractable musculoskeletal pain, practitioners frequently resort to dismissing these complaints as "functional", "psychogenic" or "litigation neurosis". Rather than legitimate medical practice, this behaviour expresses the frustration of medical practitioners that results from their lack of knowledge and training about these complaints, and represents recourse to anti-patient prejudice to hide ignorance and avoid guilt and responsibility. "Litigation neurosis" is a diagnosis based simply on emotional responses by medical practitioners. It has no scientific foundation, and in fact has been denied by formal studies (10). Patients with compensation claims do not differ from non-compensation patients in personality tests and in the descriptions of their pain (11), and substantial proportions of patients continue to suffer chronic pain despite settlement of litigation (10,12). Unemployability, rather than personal psychological problems, has been shown to be the major predictor of outcome in patients with compensable back pain (13). "Psychogenic pain" and "functional overlay" are undefined diagnoses propagated by practitioners unqualified to make such diagnoses, when they fail to, or cannot, formulate an organic diagnosis.

SUMMARY OF CURRENT STATUS

The management of musculoskeletal complaints, notably back pain, constitutes a major health need in Australia, measurable not only in terms of personal suffering but also in terms of economic costs. Large numbers of patients currently demand treatment, but through lack of knowledge, lack of facilities, or prejudice this is not available to them. The training afforded medical practitioners is not commensurate with the size of this community problem.

RECOMMENDATIONS

1. Postgraduate courses should be made available in musculoskeletal medicine.

The AAMM recognises that, in principle, undergraduate curricula cannot always cater for every contemporary health need. Curricula are constrained by time, but are challenged by expansion of knowledge. Not every health need can be taught in an undergraduate curriculum. Some medical schools elect to train graduates with a general, but superficial, knowledge of health care needs, but ones that hopefully are sufficiently astute that they may elect to develop particular knowledge further, either personally or in the form of specialty training.

The AAMM further recognises that there are traditional requirements in established specialties. Neurosurgeons must train in the management of cerebral tumours and vascular disease; orthopaedic surgeons must train in the management of trauma and operative treatment of bone and joint diseases. These training programmes are already intense, and there may not be space for additional training in chronic musculoskeletal complaints.

Notwithstanding these reservations, there remains a community demand for better services for musculoskeletal complaints, which implies a better training of at least some practitioners. It is unacceptable to decide that "back pain is a trivial issue that can't fit into an already crowded undergraduate curriculum, and in any case it is handled well enough by the specialists". The prevailing size of musculoskeletal problems in our community attests to the fact that this laissez-faire approach has failed, to the cost of the patients, and indirectly to the cost of every tax payer, insurance payer, employer and consumer.

Already some of our members practice exclusively in musculoskeletal medicine, which reflects the demand for such services. However, most of these members have acquired their knowledge informally on an ad hoc basis, having been motivated by interest and community concern. They, and the AAMM recognise that their training is inadequate when compared to the available body of knowledge in this field.

Consequently, the AAMM appeals that optional postgraduate training courses be established, or at least facilitated, for medical practitioners wishing to upgrade or update their knowledge and skills in musculoskeletal medicine.

The AAMM does not imply the development of a new specialty, but envisages that such courses would be analogous to courses like the DRCOG, DA, DOG etc, offered by some Colleges and Universities. The object is to provide general practitioners who have a need or interest in this field with the training that they did not receive at the undergraduate level, and which is not available through established specialty training. Such courses could be administered through a University or through organisations like the Coppleston Institute at the University of Sydney.

The syllabus of such a course should encompass the anatomy, physiology and pathology of musculoskeletal disorders; the assessment and investigation of musculoskeletal complaints and an awareness of the reliability of clinical and investigative techniques; the range of therapeutic techniques that are available, their theoretical basis, their known or putative efficacy, their indications and their side-effects; and the development of a capacity to evaluate new developments in the field in the light of established and new knowledge.

To this end, the AAMM is concluding the formulation of a comprehensive syllabus that would meet these objectives.

2. **Academic centres of excellence should be established in the field of musculoskeletal medicine.**

Because the field of musculoskeletal medicine has been neglected, it has not developed a supra-structure that other fields of medicine have. In other fields, excellence and knowledge is manifest by academic departments that guide clinical training and conduct research in the field. There is no equivalent for musculoskeletal medicine.

While, to some, it might appear that musculoskeletal medicine falls in the province of orthopaedic surgery or rheumatology, established departments in these specialties have not pursued those complaints about which the AAMM is concerned. Legitimately and admirably they have pursued more mainstream aspects of their field, but in so doing have left no-one to guide the development of less fashionable aspects.

Without academic leadership, and scientific scrutiny, musculoskeletal medicine has been plagued by confusion and controversy, which in turn has jeopardised its respectability, rendering it easy to dismiss in the planning of academic institutions.

Without leadership, standards vary. The field is open to self-appointed experts who propagate innovations and recommendations on the basis of hearsay and exhortation, without these innovations having been tested. For lack of alternatives, medical practitioners, in desperation, may adopt any new idea that is claimed to work. As private practitioners they are unable to conduct clinical trials and to discriminate worthwhile from useless or fanciful treatments. These practitioners and their patients are dependent on recommendations from "authorities". Such recommendations do not come from existing departments. On matters of musculoskeletal medicine, such ex cathedra statements that are made are usually based on opinion, prejudice or even snobbery, rather than the formal results of investigations or audits. Departments, capable of and interested in resolving controversies in musculoskeletal medicine are required.

The field of musculoskeletal medicine, however, is not totally consumed with putative charlatanism. There have been many developments of legitimately evaluated therapies, but this knowledge is not passed on to practitioners and ultimately to patients. A major example is the use of transcutaneous nerve stimulation for pain control. Controlled trials have shown this to be a worthwhile form of analgesia in intractable musculoskeletal pain,

but awareness of this therapy amongst general practitioners is minimal.

The role of an academic department would be to pass on legitimate knowledge and to conduct research designed to formulate innovations and to evaluate putatively worthwhile diagnostic and therapeutic techniques. In this regard, it would be the mainstay of the postgraduate program described in Recommendation 1.

It could be suggested that postgraduate clinical training in musculoskeletal medicine should be the province of one of the established Colleges, such as the RACP or the ACRM. However, this would depend on the motivation and co-operation of these Colleges, but even then, Colleges are not equipped or designed to undertake formal research. This is the province of the Universities. Postgraduate programs require an input from Universities, but whereas established specialties receive this input through Fellows who are also academics, this facility does not exist for musculoskeletal medicine. Any worthwhile development in musculoskeletal medicine, be it within an established College or independent of a College, would require the expertise of an academic facility in this field.

EVALUATION

The implementation of the Recommendations of the AAMM could be evaluated by a series of audits.

Of intrinsic interest alone would be a series of formal studies to determine the actual epidemiology of musculoskeletal complaints in Australia at present. This could be achieved by telephone surveys such as those conducted for the Nuprin Pain Report in the US (1); and for back pain and whiplash, figures could be obtained through Workers Compensation Boards and the records of Insurance Companies.

Unfortunately, attempts to explore this issue, to date, at the University of Queensland in the form of student projects, have been met with scepticism, on the grounds that it is too difficult for a student, and by clerical obstruction within the relevant authorities. Consequently, a more august inquiry is required.

A further form of study would be audits of individual practitioners, representing "average" general practitioners, practitioners with an interest in musculoskeletal medicine, public hospital outpatients, and hopefully specialist practitioners, to determine, on an "open" basis, exactly how well these practitioners fare with musculoskeletal complaints at present.

All these studies would provide a baseline measurement against which evaluations could be made. Subsequent audits would reveal how success rates and patient satisfaction compared following the introduction of better training and improved management techniques. Insurance statistics, in particular, could be measured with respect to how many patients are successfully rehabilitated and whether the number of large claims and settlements is reduced.

Implicit in these suggestions is the reiteration of the need for an academic department motivated to undertake such audits, reinforcing the importance of Recommendation 2 above.

REFERENCES

1. STERNBACH, R.A. Survey of pain in the United States: the Nuprin Pain Report. *Clin J Pain* 2:49-53, 1986.
2. HORAL, J. The clinical appearance of low back disorders in the city of Gothenburg Sweden. *Acta Orthop Scand Supp* 118, 1969.
3. FRIBERG, S. Lumbar disc degeneration in the problem of lumbago sciatica. *Bull Hosp Joint Dis* 12:1-20, 1954.
4. WOOD, P.H.N., BADLEY, E.M. Epidemiology of Back Pain. In: Jayson, M.I.V. (ed) *The Lumbar Spine and Back Pain*, 2nd Ed. Pitman, Kent, 1980, pp.29-55.
5. Cover Story. The crippling cost of compo. *Business Review Weekly*. July 23-29, 1983, pp.10-18.
6. Cover Story. That aching back. *Time*, July 14, 1980, 116:32-42.
7. Cover Story. Australia's biggest health problem. *The Bulletin*, October 13, 1981, 101:72-75.

8. BALLA, J. Socioeconomic effects of "whiplash". Paper presented at the 8th Annual Scientific Meeting of the Australian Pain Society, University of Melbourne, 5th-7th February, 1986.
9. FLEMMING, A. What the medical practitioner and the public expect of the rheumatologist. Paper presented at the 2nd Scientific Meeting of the Australian College of Rehabilitation Medicine, Sydney, 22nd-29th May, 1982.
10. MENDELSON, G. Not "cured by a verdict". Effect of legal settlement on compensation claimants. *Med J Aust* 2:132-134, 1982.
11. MELZACK, R., KATZ, J., JEANS, M.E. The role of compensation in chronic pain: analysis using a new method of scoring the McGill pain questionnaire. *Pain* 23:101-112, 1985.
12. BOGDUK, N. The anatomy and pathophysiology of whiplash. *Clin Biomech* 1:92-101, 1986.
13. DWORKIN, R.H., HANDLIN, D.S., RICHLIN, D.M., BRAND, L., VANNUCCI, C. Unravelling the effects of compensation, litigation, and employment on treatment response in chronic pain. *Pain* 23:49-59, 1985.

APPENDIX I

ADDITIONAL FIGURES ON THE INCIDENCE OF LOW BACK PAIN

From: Loeser, J.D. Low back pain. In: Pain edited by J.J. Bonica. Raven Press, New York, 1980, pp.363-377.

"The number of published papers addressing issues such as incidence, prevalence, and costs of low back pain is very limited, and much anecdotal information is bandied about by physicians, insurance companies, and governmental agencies. One exception is the article by Nagi and associates which describes self-assessments by a geographically stratified sample of 1,135 persons between 18 and 64 years old, residing in Columbus, Ohio. Approximately 18% of the respondents reported persistent low back pain Significant functional impairment of job performance was reported by 44% of the sample with low back pain; only 15% of the sample without back pain had performance impairments."

"Pheasant reviewed the hospitalization data for the state of California in 1974 His data suggests that 721,000 hospital discharges due to low back pain occurred in the United States The hospital bills for the total group of low back pain patients in the United States in 1974 approximated one billion dollars."

"In 1977 in the State of Washington, 10,533 compensable injuries related to the back occurred, representing 25% of the total injuries This group of patients consumed 63.5 million dollars of compensation, or 36% of the total state compensation payments."

"Ward et al found that low back pain had an incidence of 22.8 per 1,000 in men and 15.3 per 1,000 in women in a sample based on the case records of general practitioners in northern England."

References

- NAGI, S.Z., RILEY, L.E., NEWBY, L.G. A social epidemiology of back pain in a general population. *J Chron Dis* 26:769-779, 1973.
- PHEASANT, H.C. Backache - its nature, incidence and cost. *West J Med* 126:330-332, 1977.
- WARD, T., KNOWELDEN, J., SHARRARD, W.J.W. Low back pain. *J R Coll Gen Pract* 15:128-136, 1968.



NEW ZEALAND CONFERENCE REPORT

A small but dedicated band of AAMM members paid their fees and fares and journeyed to Christchurch in September 1986 for the "Spine in Action" conference, a combined meeting of the New Zealand Association of Musculoskeletal Medicine, New Zealand Pain Society and New Zealand Association of Sports Medicine.

Congratulations go to the Kiwis for superb organising and programming. It was gratifying to see that 350 registrants from several countries were attracted to what proved to be a very worthwhile conference.

Several issues that arose in the plenary sessions were interesting in that they seemed common to all the countries represented. For example:

- * Musculoskeletal problems in general practice account for about 20-25% of consultations yet scant teaching is given at the undergraduate level in most English speaking universities.
- * Very few general practitioners seem to be able to provide appropriate management for common musculoskeletal disorders.
- * If doctors were better trained in the early management of musculoskeletal problems, there should be a decrease in the numbers suffering from chronic pain and disability.
- * There are no permanent positions in our public hospital systems to provide training in musculoskeletal medicine to resident medical officers in their early post-graduate years.
- * Perhaps it would be better to close down institutional pain clinics and replace them with musculoskeletal medicine departments so that the patients are seen earlier in their illnesses.
- * Millions of dollars are spent every year by insurance companies in vain attempts to get people better while at the same time insufficient funds are available for the research programmes that may unravel the causes of all the suffering.
- * Knowledge about the aetiologies of musculoskeletal problems is growing, but only slowly because of the paucity of research.
- * Politicians and health administrators need to be lobbied about the deficiencies in knowledge and the needs for education and research.

Perhaps national associations like the AAMM need to promote musculoskeletal medicine more aggressively, to increase awareness of the nature of the problems and the need for scientific solutions.

Two of the interesting papers presented at the conference are summarised below.

SPINAL DISORDERS - Biomechanics, Pathology and Diagnosis. Jayson - U.K.

The structure and function of the spinal column are interdependent. It is important to appreciate that the axis of the rotation of the thoracic region is in the middle of the vertebral body while at the lumbar level the axis is in the middle of the pars interarticularis.

All body tissues have a range of stretch after which permanent derangement occurs. The intact disc can withstand immense pressures and a large increase in the intranuclear pressure alone cannot account for the cause of the prolapsed disc. Herniation of the annulus fibrosus or the nucleus pulposus are the result of micro-fractures of the vertebral end plates and/or the trabeculae of the vertebral bodies. This disruption interferes with the nutrient exchange of the disc which in turn alters the glycoaminoglycans of the nucleus pulposus. The disc is now unable to withstand the compression forces which then leads to stresses on the annulus fibrosus, with subsequent prolapse or herniation. For anatomical reasons the herniation is usually postero-laterally but can occasionally be posteriorly.

Structural causes of low back pain include spondylosis and osteoarthritis, prolapsed disc, spinal stenosis, fractures and chronic inflammatory disorders.

The sources of the symptoms include the outer annulus fibrosus, the posterior longitudinal ligament, trabecular micro fractures, compressional fractures, annular rim lesions, interosseous hypertension and the periosteum.

Special investigations may help in the diagnosis of these conditions, in particular, nerve and joint blocks, discography, high resolution CAT scan with contrast and nuclear magnetic resonance imaging can produce useful information.

In the case of non-specific back pain there are certain patterns in which there is no demonstrable pathology. Chronic is a good example of these.

Prognosis is dependent on many factors; of these increasing frequency and duration of attacks, persistence of signs and prolonged incapacity are unfavourable indications.

THE SPINE - What Happens and Why. Bogduk - Australia

The spine in the foetus consists of mesenchyme, cartilage and bone. The latter develops ossification centres as the vertebral bodies produce bone for the spinal and transverse processes which are not present at birth.

There is plenty of cartilage present in early childhood and the cartilagenous growth plate will become part of the annular ring. The plane of the apophyseal joint is in the A/P plane in early childhood and by adulthood goes to a more vertical position. The change in position is possibly due to the erector spinae muscle activity.

Once the adult disc has formed it serves as a cushion for movement. Biochemically it changes with age.

The cardinal change in the disc is in the glycoaminoglycans. As age advances the nucleus pulposus takes less of the load and the annulus fibrosus more. The zygapophyseal joints become affected by degeneration as a result. However, the lumbar discs do not narrow solely because of age.

When considering problems of acute back pain think of the structures and tissues involved.

- * muscles - Stress on insertions cause pain - eg. iliocostalis, lumbar aponeurosis at the posterior superior iliac spine.
- * ligaments - There is no definitive evidence of ilio-lumbar, ligamentum flavum, supraspinatus and interspinous to be a source of pain. The anterior and posterior ligaments can be affected by disc bulge.
- * joints - In extension, clashing of the spinal processes can cause mid-line pain and tenderness, eg. sky diving. In rotation, the inferior processes of the zygapophyseal joints hit the lamina below and pulls the contra-lateral capsule, both being causes for pain. In compression, fractures of the end plates of the vertebral bodies occur. This exposes the nucleus pulposus to the blood supply of the cancellous bone. Resorption causes disc narrowing and attendant problems. A biochemical change in the nucleus pulposus has to occur before extrusion of the material against the nerve root. Distortion of the annulus fibrosus will also be a source of pain. Repeated torsion injuries due to severe and repeated rotation action result from the forces which shift the axis of rotation posteriorly giving rise to avulsion fractures and annular tears. Therefore repeated strains give rise to increasing trauma with subsequent disc avulsion.

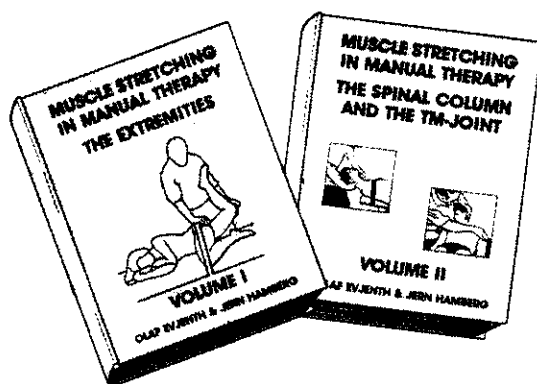
OTHER SNIPPETS FROM THE CONFERENCE:

- * Much chronic back pain has its origin in minimal brain dysfunction which is likely to occur in childhood. *Janda - Czechoslovakia.*
- * Reflex sympathetic dystrophy affects one arm yet after a few months bony changes of osteoporosis are the same in both arms. *Butler - New Zealand.*
- * Top gymnasts train 5 hours a day/6 days a week and a high percentage sustain repeated spinal injuries. Prior asymptomatic Scheuermann's disease does not seem to predispose athletes to spinal problems. A 20° rotation of the thoracic spine in a patient with scoliosis will not cause

sporting problems. *Heere - Holland.*

- * Many people with whiplash injuries had C1, C2 problems of hypomobility which may be the source of the pain in the chronic whiplash sufferers. *Dvorak - Switzerland.*
- * The number of young people who had had Scheuermann's disease and subsequently got low back pain was surprisingly high if they had tight hamstrings. This implies that the added stretch on the lumbar structures caused problems. *Fisk - New Zealand.*
- * In cases of suspected disc prolapse, traction of 1/3 - 1/2 body weight for 20-30 minutes, 5 times a week for 3-4 weeks can be helpful. Sacroiliac pain is best treated with manipulation and exercises. *Ellis - United Kingdom.*

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SEEN IN SYDNEY



The social pages of the Sunday papers have nothing on the Bulletin.



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of the Sixteenth Annual Conference in Sydney.



Naturally, the names have been suppressed to protect the innocent.



Many members, especially those in general practice, have difficulties keeping up with the literature in musculoskeletal medicine. This is understandable, not only in deference to the precious little time a busy doctor might have for reading in the first instance, but also because so much of the literature is dispersed in journals that many members might not come across in the normal course of events.

Accordingly, the AAMM committee has undertaken to publicise regularly some articles which carry a worthwhile message and to annotate not a precis of these articles but what is perceived to be their value, not only in the scientific sense but sometimes ideologically and politically in terms of reforming and developing the practice of musculoskeletal medicine.

Members are invited to submit notes on articles they may come across in the course of their reading for publication in this section of the Bulletin. Contributing in this way will help all members to increase their awareness of developments in the field.

Kikuci S, MacNab I, Moreau P. Localisation of the level of symptomatic cervical disc degeneration. J Bone Joint Surg, 63B: 272-277, 1981.

The name of MacNab will be familiar to many, if not most, and this together with the standard of the journal in which the article is published, should establish the repute of this article. Basically, it describes how in patients with discogenic neck pain the symptomatic level can be established using provocative disc stimulation and root blocks. Ideologically, this paper challenges traditional practices in which the level to be operated upon is chosen seemingly at random or on the basis of the most marked spondylotic changes. Neither of these criteria is scientific and neither has anything to do with pain. Indeed, the authors compare their current experience using discography as an indicator with their previous experience of using arbitrary indicators. The provoking question for would-be readers is: are your patients being operated on in random fashion with random results, or is the exact source of their pain being established before irreversible major surgery is undertaken?

Bogduk N. The anatomy and pathophysiology of whiplash. Clin Biomech 1: 92-101, 1986

This paper describes the biomechanics of whiplash and outlines the possible lesions that result. All the available literature on this topic is reviewed. The prompting questions for would-be readers are: do you understand what might be wrong in your patients; have all their lesions been excluded; when the report says NAD, were all the right tests undertaken; do enigmatic features like blurred vision have an organic basis or are they "non-organic" signs; are you interested in the references that deny the existence of "litigation neurosis"?

Introducing Clinical Biomechanics

This is a new journal initiated by a group of British osteopaths but who have recruited an editorial board of basic scientists with established international reputations. Its purpose is to address research topics germane to the field of musculoskeletal science and back pain in particular the basic science aspects of spinal disorders.

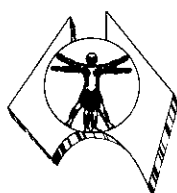
Notable titles published to date include:

- "The shape of the spine in young males with and without back complaints"
- "A critical review of the evidence for a pain-spasm-pain cycle in spinal disorders"
- "Vibration and people"
- "The precise measurement of knee kinematics as an aid in clinical assessment"
- "Back pain: the risk factors and its prediction in work people"
- "Biomechanics of the spinal canal"
- "Lumbosacral zygapophyseal joint tropism and its effect on hyaline cartilage"
- "Diurnal variations in spinal loading and the effects on stature: a preliminary study of nursing activities"
- "Evaluation of spinal loads and chair designs in seated work tasks"

The journal is published as four issues per year. Subscription rates are £47.00. Subscriptions should be directed to Clinical Biomechanics, John Wright Journals, 7 Great Western Way, Bristol BS1 6He, UK; and made payable to Physics Trust Publications.

Crawford, E.L.P., Baird, P.R.E., Clark, A.L. From St Stephens Hospital, London. Cauda equina and lumbar nerve root compression in patients with AIDS. The Journal of Bone and Joint Surgery.

This paper presents five case reports of patients known to be HIV positive who presented with symptoms suggestive of lumbar disc lesions. Signs of cauda equina compression and lumbar nerve root compression were subsequently elicited. Myelography in all cases, and CT enhanced myelography in one case, failed to show evidence of significant disc protrusion or any other compression pathology. Case 4. 37 year old man presented with five month history of a numbness, sometimes associated with pain in the outside of his right foot. He also complained of low back pain and some reduced sensation in the buttocks. Examination revealed absent light-touch and pinprick sensation over the lateral side of his right foot, no loss of power but the right ankle jerk was absent. The authors point out that AIDS must be considered in the differential diagnosis of patients presenting with features of spinal cord compression. With the rapid increase in HIV positive people in Australia an awareness of these cases is of increasing significance.



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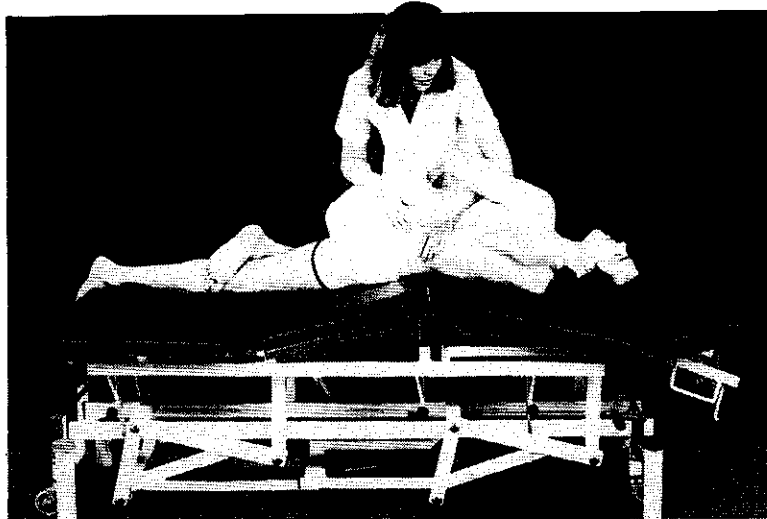
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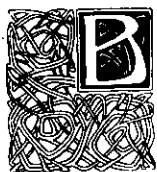
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SUTTON 307



BOOK REVIEW

Understanding Orthopaedics

by

Professor Jerzy M. Sikorski
Professor of Orthopaedic Surgery,
University of Queensland.

Butterworths, Sydney, 1986.

This book is described as "a sound basic text" of orthopaedic medicine and surgery, suitable for medical undergraduates, orthopaedic residents, physiotherapists and occupational therapists.

In attempting such a work, Professor Sikorski has covered the gamut of basic clinical orthopaedic medicine and surgery in about 200 pages, using a format which integrates traditional orthopaedic principles of diagnosis and management with important concepts such as the significance of normal and abnormal human posture and functional activity. This emphasis on human function is a refreshing change for an introductory orthopaedic text.

The first part of the book discusses the basic principles of assessment and management of emergencies which threaten life and limb. The text then examines important issues such as pain, deformity and developmental abnormality of the musculoskeletal system.

The middle portion of the book examines the causes and sequelae of mechanical failure of the various components of the musculoskeletal system.

The last section of the book examines both normal and abnormal function of the musculoskeletal system, with the focus on the biomechanics of musculoskeletal disorder rather than on specific orthopaedic diseases. This approach is both interesting and informative, especially for an undergraduate reader, and provides a sound basis for the understanding of many common disorders of posture and mobility which are not normally addressed even in large texts.

Frequent use is made of algorithms to outline the protocols for diagnosis and treatment of many conditions. The algorithms are both clear and concise and would, I expect, be very acceptable at the medical undergraduate level.

The major problem that an author faces in attempting to compile a broad-based introductory text is that of avoiding superficial coverage of important areas of knowledge. Professor Sikorski, for the most part, has overcome this difficulty. With only a few exceptions, the topics and concepts of his text are well defined and well explained. There is an occasional lack of emphasis with regard to the prevalence of some conditions, and there are some lapses into conceptual terminology which would not be familiar to medical undergraduates. In some chapters, paragraph headings are almost as long as the paragraph they introduce; this perhaps indicates the need for heavier revision of the text in its next edition.

There are many illustrations, most of which are clear and complementary to the text. Unfortunately, many of the x-rays which have been included have been reduced to the size of a postage stamp, and have all but lost their usefulness in the graphic sense. The next edition would perhaps be improved by including fewer x-rays, enlarging their size and clarity, and incorporating arrows that would more clearly identify the sites of radiological pathology.

Each chapter concludes with a chapter summary, which is brief and concise. At times, the brevity tends to compromise accuracy of statement, but in general these summaries allow ready review of important themes.

It was disappointing to find that no references for further reading were included at any point in the text, and this would seem an unfortunate omission in this type of book.

Nonetheless, "Understanding Orthopaedics" is regarded as a commendable first text for medical undergraduates and paramedical staff, especially in view of its orientation towards human function and the very common disorders of posture and mobility.

For seasoned AAMM members, the text may be interesting more than informative, but it is a book that most members would be interested to read.

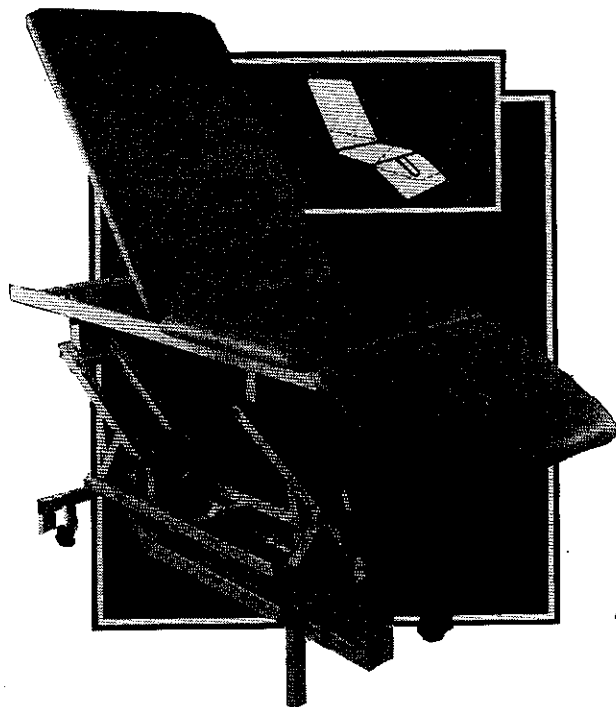
A final comment, reflecting a personal bias, relates to the text's approach to the diagnosis and management of pain. At a time in which we are witnessing the development and refinement of concepts of pain and especially the assessment and management of chronic pain, it is very distressing to read statements such as "The only safe and effective way to treat pain is to remove the cause of pain." While such statements may be seen to indicate an abundant orthopaedic enthusiasm to tackle the problem of pain at the level of nociception, I consider that the time has come for a more mature and balanced approach to the problem of pain even in basic texts, and especially in those texts which serve to educate at an undergraduate and early post-graduate level. While an entire chapter is devoted to the topic of pain in the musculoskeletal system, no mention is made of psychological factors in assessing and managing either acute or chronic pain, and the reader is allowed the clear impression that pain is a pathophysiological phenomenon which can be adequately managed along traditional lines of orthopaedic diagnosis and treatment. The failure of traditional orthopaedic management to deal with many patients suffering chronic musculoskeletal pain is only too well known to members of the Association. I can only hope that future revisions of this text will strive for a more balanced approach in this area.

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SUTTON 369

THE PRESIDENT'S REPORT FOR THE YEAR 1985/86

***Presented at the Eighth Triennial Congress of FIMM,
held in Madrid in 1986.***

I wish to welcome you, the delegates of the various national societies to this meeting of the FIMM here in Madrid. I also wish to thank you all for your support and friendship that you have given me for my work during the past three years. Special thanks go to the Spanish Federation for Manual Medicine, in particular to the President Dr. R. Pastrana and his team for the excellent preparation of this meeting, for the organisation of the congress and for the generous hospitality of the Spaniards.

Since our last meeting at Baden-Baden, I have been contacted by the British Federation (participating in the BAM session in London) as well as by the French one. With reference to my participation in the Clinical Days (Journées cliniques) at the Dieu Hôtel in Paris, organised by the Maigne School, I have drawn up a detailed report to appear in *Manuelle Medizin*. I believe that through a still closer co-operation beyond all boundaries Manual Medicine may be developed and promoted further.

The French school, as per the Dieu Hôtel tradition, is based on clinical observation. Clinical and theoretical research, as in many countries, must harmoniously mould into the objective.

Following the last meeting of Kloster Lichtenthal, Baden-Baden, the second seminar week of the FIMM, organised by the German Federation for Manual Medicine took place. The main subject was the atlanto-occipital transition region. As during the first seminar week at Fischingen (Switzerland), there developed interesting possibilities for discussion among the various experts from the many countries represented.

Once again, the results deriving from these discussions will be published in book-form in the Springer edition. Concerning the magazine *Manual Medicine* there is not much new to tell, except that the contents will have to be slightly more practice-oriented in the future. The English edition, still in its beginnings, does not yet indicate as to whether it shall survive.

The *Révue de Médecine Orthopédique* magazine issued by the Maigne School is excellently prepared - all numbers that have appeared up to now hold extremely original and interesting articles.

The co-operation with Manual Medicine has begun, and should develop still further in the future.

The documentation centre for literature, directed by Dr. V. Dvorak, supported by the FIMM and organised by the Swiss Federation for Manual Medicine, is working out well. The articles pertaining to our interest are regularly mentioned in *Manual Medicine*. Of course this centre is open to all FIMM members.

Before ending this report, I wish to thank very much Dr. Baumgartner, Secretary, and his team for their co-operation, and also Dr. Schmid, Bern, treasurer of the FIMM, for their work.

I wish to thank all of you once again for your loyal co-operation, and I wish also that you will give the same, friendly assistance to my successor. I wish you all an interesting congress and a pleasant trip back home.

**Erich Schwarz,
President FIMM, 1983-1986**

THE NEW PRESIDENT'S REPORT

An open letter to all members of FIMM throughout the world, including members of the AAMM.

Dear Colleagues,

The FIMM Congress in Madrid was an opportunity for the members of numerous countries to meet again, to exchange their knowledge and findings as well as to reinforce their friendship relations.

I would like to express our sincere thanks to Dr. Roberto Pastrana, President of the Congress in Madrid, for the immense effort which he has made organising the 8th Congress in his country as well as for his warm-hearted welcoming us.

Our thanks equally extend to my predecessor leaving as President, Dr. Erich Schwarz who presided over FIMM's destiny with great wisdom and charm.

The Manual Medicine is making progress in view of knowledge of the scientific basis as well as diagnostic technique and therapeutic practising.

Many items of information given at the Congress were of a very high scientific level.

The FIMM has the great chance that several schools with different conceptions are gathering within its frame. This is a good situation. If unity of the federation means strength, and we must endeavour to reinforce this unity, the uniformity of concepts, interpretation and practice in the field of manual medicine would be impoverishing and disastrous.

Our strength is unity in diversity. Having different schools in the same country seems to be normal and enriching.

If reality is unique, the interpretation of facts may be different and the aspects of approach may vary. It is also for this reason why the meeting at international congresses are so useful and necessary. We have to put questions constantly, to put into question ourselves confronting our opinions with the others. If discussions are enriching, disputes cause mischief and are useless.

Dear Colleagues, in the three years until the 9th FIMM Congress in London, let us reflect on the basis of Manual Medicine, refine our diagnostic and therapeutic technique to our and everybody's satisfaction, but above all to offer help and relief to our patients, since this is our medical task.

With best wishes,

Dr. Agnel-Edgar Depoorter
President FIMM, 1986-89.

The next tri-ennial congress of F.I.M.M. (the International Federation of Manual Medicine, with which the A.A.M.M. is affiliated) will take place in **London** from 18th to 22nd September, 1989. Any enquiries at this stage should be addressed to Dr. John Paterson, Honorary Secretary of B.A.M.M., the host association, at 14 Wimpole Street, London, W1M 7AB, England.

MINUTES OF THE MEETING OF THE GENERAL ASSEMBLY OF THE INTERNATIONAL FEDERATION OF MANUAL MEDICINE *held on Tuesday, June 24th, 1986 in Madrid.*

The following were present:

Australia:	Dr. Winer Dr. Vivian	Italy:	Dr. Radaelli Dr. Leuci
Austria:	Dr. Tilscher		Dr. Brugnioni
Belgium:	Dr. De Nayer Dr. Depoorter Dr. Vansteenland	New Zealand:	Dr. Choy
Bulgary:	Dr. Gatcheva Dr. Todoroff	North America:	Dr. Greenman Dr. Levin Dr. Mennel
CSSR:	Dr. Janda	Poland:	Dr. Arkuszewski
Denmark:	Dr. Fossgreen Dr. Knuchen	Spain:	Dr. Pastrana Dr. Garcia Dr. Jimenes
Finland:	Dr. Rekola	Sweden:	Dr. Silverstolpe Dr. Hemborg
France:	Dr. Maigne Dr. Gourjon Dr. Juvin	Switzerland:	Dr. Schwarz Dr. Schmid Dr. Huguenin
FRG:	Dr. Neumann Dr. Wolff		Dr. Baumgartner
Holland:	Dr. Muller	Uruguay:	Dr. Taich

The President Dr. Schwarz expressed his thanks to Dr. Pastrana for the organisation of the General Assembly. He welcomed the delegates from 18 different countries.

He proposed to change the items and to add point 9a: Application of the Portuguese Association of Manual Medicine, and 9b: Application of the Bulgarian Association of Manual Medicine.

This proposition was unanimously accepted by the General Assembly.

1. The following delegates were nominated as plenipotentiaries of their national association:

Australia:	Dr. Winer	Italy:	Dr. Radaelli
Austria:	Dr. Tilscher	New Zealand:	Dr. Choy
Belgium:	Dr. Vansteensland	North America:	Dr. Levin
CSSR:	Dr. Janda	Poland:	Dr. Arkuzewski
Denmark:	Dr. Fossgreen	Spain:	Dr. Pastrana
Finland:	Dr. Rekola	Sweden:	Dr. Hemborg
France:	Dr. Maigne	Switzerland:	Dr. Huguenin
FRG:	Dr. Neumann	UK:	Dr. Burn
Holland:	Dr. Muller	Uruguay:	Dr. Tajch

2. Apologies for absence: received from the associations of Norway and Luxembourg.
3. Minutes of the last meeting: The minutes of the General Assembly held in 1985 were read in French, and they were approved as being correct.
4. Matters arising from the minutes: no discussion.
5. The President's Report: The President Dr. Schwarz presented his written report (enclosed with these minutes) which was unanimously accepted.
6. The Secretary-General's Report: The Secretary-General Dr. Baumgartner presented his written report which was unanimously accepted! His report is enclosed with the minutes. A short discussion about the future of the English journal Manual Medicine came to the conclusion that all English speaking members should subscribe to it, and there was the remark that a subscription of 2000 copies would be necessary at least within two years, otherwise the journal

could no longer be issued by the publishers.

7. **The Treasurer's Report:** The Treasurer Dr. Schmid presented his written report which is enclosed with the minutes. He informed the delegates about the surplus of income over expenditures of Swiss francs 4'651.-. The assets are now Swiss francs 61'109.-. The two auditors Dr. Johannson and Dr. Paterson suggested accepting the treasurer's report, and by vote this was unanimously done.
8. **The Scientific Advisory Committee:** The President Dr. Schwarz thanked Dr. Janda for his work as President of this Committee. Dr. Janda reported on the meeting of the Scientific Advisory Committee held in Madrid in the morning. He pointed to the necessity of subscribing to the English edition of Manual Medicine.
9. **Election of Officers:**
Nomination for the Presidency:
Dr. Maigne proposed Dr. Depoorter as President, seconded by Dr. Huguenin. Dr. Depoorter was elected by a unanimous resolution and he was acclaimed accordingly. He expressed his thanks for the trust placed in him.

Nomination for the Vice-Presidency:
Dr. Pastrana was proposed by Italy, seconded by Belgium. Dr. Burn was proposed by Germany, seconded by Austria. Dr. Tilscher was proposed by Denmark, seconded by Holland. When put to the vote, Dr. Burn received 16 votes, Dr. Pastrana 14 and Dr. Tilscher 6.
Dr. Burn and Dr. Neumann were accordingly elected.

Secretary General:
Dr. Baumgartner was proposed by Switzerland and seconded by Germany. There were no other nominations. Dr. Baumgartner was re-elected by unanimous acclamation.

Treasurer:
Dr. Schmid was proposed; there were no other nominations. He was re-elected by unanimous acclamation.

Assistant Secretary-General:
Dr. De Nayer was proposed and unanimously elected.

Assistant Treasurer:
Dr. Colombo was proposed and unanimously re-elected by acclaim.

Auditors:
Dr. Johannson and Dr. Paterson were proposed and unanimously re-elected.
- 9a. **Application for membership of the Portuguese Association of Manual Medicine:** Dr. Baumgartner informed the meeting of the application which he had received from the national association of Portugal. Up to that moment, he had not got the necessary constitution in French from the Portuguese association. Therefore, the application had to be postponed for consideration.
- 9b. **Application for membership of the Bulgarian Association for Manual Medicine:** Dr. Baumgartner informed the meeting of the application. The Bulgarian Association fulfilled all necessary conditions. The constitution in French was according to the constitution of FIMM. A list of seven members of the society was submitted. The application from the Bulgarian Association was unanimously approved.
10. **Congress in Madrid:** The President thanked again Dr. Pastrana and his collaborators for preparing this congress.
Dr. Pastrana welcomed all delegates. He informed the meeting that the organisation of the congress was quite difficult because of the general election in Spain on that weekend. The President expressed also his thanks to the Spanish society for their invitation.
11. **Congress 1989:** Dr. Burn informed the meeting about the topic and date of the next congress in London: "Update on back pain" from September 18 to 22, 1989.
Dr. Depoorter suggested Brussels for the congress in 1992. Dr. Greenman informed the meeting that the North American association would rather not organise the congress in the near future.
Dr. Tilscher suggested that also Vienna could become a place of congress in the future.

12. Waghemaker Prize: Dr. Janda informed the meeting that Dr. Bogduk from Australia was awarded the Waghemaker Prize.
13. Next meeting of the Scientific Advisory Committee: It was resolved to hold the next meeting in London probably on June 20, 1987.
14. Further subjects:
Dr. Fossgreen informed the meeting of a charity association to support research in back pain.

Dr. Tilscher gave information about a meeting of the International Society for the Study of Pain in Vienna from November 7 to 9, 1986, with the topic of headache.

Dr. Janda informed about a meeting regarding Neuro-Orthopaedics and Rehabilitation taking place in Prag under the auspices of FIMM from November 19 to 21, 1986.

Dr. Neumann suggested that Dr. Schwarz should be elected to Honorary Membership of the International Federation of Manual Medicine. This was unanimously adopted.

There were no other items, and the meeting concluded with the expression of thanks to the President by Dr. Neumann.

Madrid, June 24, 1986

H. Baumgartner
Secretary-General

REPORT OF THE SECRETARY-GENERAL

Four items have mainly been dealt with by the Secretary-General in the course of eight months since the last Assembly of Delegates:

The list of FIMM members has been finalised in time for submission to the General Assembly, and it can be distributed to the delegates today.

Although the updated lists had been requested from the national associations by three written demands, only half of the associations handed them in. The addresses have been stored, and they can be completed any time. Each association is kindly requested to continue sending a new list of members to the secretary every year, so that a complete list can be published again in view of the next international congress.

The Secretary-General has kept on furthering close contacts with groups of medical doctors from the German Democratic Republic as well as Bulgaria, and he hopes that it will be possible for these national societies of manual medicine to become also members of the international association soon.

Only in the middle of May has the Portuguese society applied for FIMM membership.

Subject to compliance with statutory requirements, the Assembly of Delegates will discuss the respective adoption.

Sponsored by the FIMM, the Journal of Manual Medicine is published by Springer. Unfortunately only a few contributions have been obtained for publication. Therefore, the journal has appeared quite irregularly as yet.

Thanks to Dr. Jiri Dvorak's great effort, the following numbers will be published regularly.

The irregular issue of the journal has been in line with the various associations' irregular providing the secretary with information to be published.

The FIMM News can only be published if adequate contributions are made available to the secretary.

The FIMM documentation centre covers 729 original articles, 92 of which were accepted last year. The journal in German language "Manuelle Medizin" was supplied with 58 abstracts for publication. Publication of such abstracts in the English journal has also been attempted. Currently the abstracts are being prepared by the Swiss association; a participation of any further co-workers would be very much appreciated.

Upon request, every FIMM member will receive adequate literature with regard to the topic in the field of manual medicine from Dr. V. Dvorak, CH-7402 Bonaduz (Switzerland).

In both journals recent articles accepted will summarily be published half-yearly in the future.

Madrid, June 24, 1986

H. Baumgartner
Secretary-General

PROTOCOL FOR THE SCIENTIFIC ADVISORY COMMITTEE MEETING

Present:

Chairman:	Dr. Janda, CSSR
President:	Dr. Schwarz, Switzerland
Vice-President:	Dr. Neumann, FRG
Vice-President:	Dr. Greenman, North America
Secretary General:	Dr. Baumgartner, Switzerland
Committee Members:	Dr. Winer, Australia
	Dr. Hemborg, Sweden
	Dr. Silverstolpe, Sweden
	Dr. Fossgreen, Denmark
	Dr. Riis-Knudsen, Denmark
	Dr. de Nayer, Belgium
	Dr. Mennel, North America
	Dr. Burn, UK
	Dr. Paterson, UK
	Dr. Tilscher, Austria
	Dr. Taich, Uruguay
	Dr. Maigne, France
	Dr. Gourjon, France
	Dr. Wolff, FRG
	Dr. Gatcheva, Bulgaria
	Dr. Buchmann, GDR
	Dr. Muller, NL
Observer:	Dr. Graf-Baumann, Springer-Verlag, FRG

Dr. Janda proposed to discuss the problems regarding the English edition of the FIMM journal Manual Medicine.

Vice-President Neumann was pleased with the new journal in French: Revue de médecine orthopédique.

He recalled that years ago the Scandinavian associations had urgently requested an English journal.

At that time 16,000 subscriptions had been mentioned. For the first supply there were 609 subscribers and in 1986 only 221. Springer agreed to publish the journal for another two years; however, a sale of 2000 copies at least would be necessary.

Neumann asked all national associations present from English speaking countries to subscribe immediately to the journal and to motivate the members as well as scientists from their country to submit papers for publication. As soon as there is a sufficient supply of publication material, the journal will be issued regularly. The date of issue of the next four numbers could be assured to a certain extent.

Dr. Fossgreen suggested to change the name to "International Journal for Manual Medicine" for a

better sound. The policy should also be changed to a less scientific path.

Dr. Janda: "Changing the name points to a weak editorial association. There are several other journals in competition with Manual Medicine. There are many doctors practising but not studying M.M. It is rather our fault if the journal has not more readers. The editorial board has to invite other authors".

Dr. Greenman was not successful in collecting papers despite his circulating requests among faculties, colleagues and universities. Two years would not be enough for the promotion of papers and sales.

Dr. Wolff: "There is no national association backing the journal equal to the French or German associations".

"The Scientific Advisory Committee has to supervise the publication of the journal. This committee must support the journal. All English speaking members should subscribe to the journal; that's the secret of the wanted result".

Dr. Fossgreen: "The Danish association decided not to combine the annual fee with the subscription, because many doctors are in a group practice and would get several copies".

Dr. Janda suggested to publish journals with special topics and to put several members of the committee present in charge of guaranteeing the journal. The Zurich convention should also be discussed again, because several points were missing such as neuro-muscular techniques.

A lengthy discussion regarding the designation of the title took into consideration: Orthopaedic Medicine; Neuro-Orthopaedy, Musculo-Skeletal Medicine.

"Manual Medicine" as title and "International Journal for Musculoskeletal Medicine" as sub-title were accepted.

Dr. Muller proposed to change the name of "International Association" to "Fédération internationale de médecine musculo-squelettique". His proposal was seconded by Dr. Burn.

Dr. Baumgartner was of the opinion that this subject should be put on the agenda for discussion at the next meeting in 1987.

Concluding Dr. Janda reported that two studies had been submitted for the Waghemaker Prize and that they were evaluated by himself, Maigne and Fossgreen. In the relation of 2 to 1, Bogduk's study was taken into consideration for the Waghemaker Prize.

Next meeting: probably on June 22nd, 1987 in London.

Madrid, June 24th, 1986

H. Baumgartner
Secretary-General:

A report compiled by Brown, Copeland & Co. in New Zealand for the National Road Board said that the estimated cost of road accidents in 1983 was \$530 million.

This was made up of:

\$286 million	property damage
\$186 million	lost output
\$76 million	payment for pain, grief & suffering and ancillary medical care
\$26 million	hospital costs
\$4 million	ancillary services (police, roadway clearance, etc.)
\$1 million	before hospital costs (ambulance, accident, doctor, etc.)

In 1980-82 each fatal accident cost about \$160,000, serious injury accident \$20,000, minor injury accidents \$4000, and non-injury \$1000.

Australian doctors wishing to keep in touch with world-wide developments in the field of musculoskeletal medicine are urged to **SUBSCRIBE NOW** to

Official Journal of

FIMM

Fédération Internationale
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International Federation
for Manual Medicine



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Nederlandse Vereniging van Artsen voor Manuele Geneeskunde
The New Zealand Association of Musculo-Skeletal Medicine
Norwegian Society for Manual Medicine
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Schweizerische Aerztegesellschaft für Manuelle Medizin
Svensk Förening för Ortopedisk Medicin

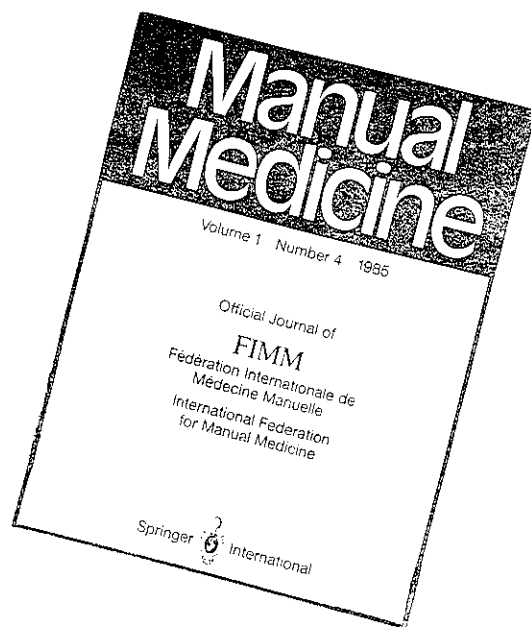
Manual Medicine, founded in cooperation with the well-established German journal *Manuelle Medizin*, fulfills the long-standing need for an exchange of information among practitioners of manual medicine all over the world. Reflecting the growing importance of this field, **Manual Medicine** publishes articles exclusively in English under the auspices of **Fédération Internationale de Médecine Manuelle - FIMM**, which currently includes national societies in Europe, North America, Australia, and New Zealand.

Manual Medicine presents new developments of interest to the international reader, featuring:

1. review articles,
2. original contributions,
3. specially translated articles from the German journal **Manuelle Medizin**,
4. commentaries on current work in the field,
5. book reviews,
6. FIMM news (from the member societies).

Subscriptions: annual rate DM 116.00 plus carriage charges, making a total of DM 134.95 for Surface Airmail Lifted delivery. Airmail delivery rates on request. Orders should be sent to the publishers, Springer-Verlag, Heidelberger Platz 3, D-1000 Berlin 33, Federal Republic of Germany.

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BULLETIN PICTURE QUIZ

The Association's family album again provides the pictures for this quarter's quiz.

Note the body language demonstrated in these photographs, which were taken at a recent Association function, then select the picture which best fits each of the captions printed between them. Remember that all captions may relate to only one of the pictures.

A.



1. The glazed expressions were probably induced more by alcohol than by mutual endearment.
2. Postural mirroring is being used to generate a feeling of security, but may be masking less benign motives.
3. The crossed legs signify defensiveness but integrity is still certain to be breached.
4. The figure on the left is likely to become an innocent victim of the schemes of the figure on the right.
5. The right hand positions suggest erotic interest and intimacy is very likely to ensue.

B.

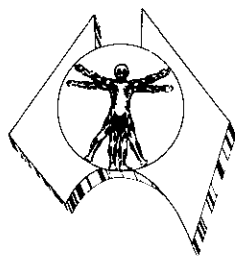


Members should send their replies to the editor by 15th August, 1987. The neatest correct entry will win free tickets for two to the Association's annual dinner, to be held during the annual conference in Brisbane from 23rd to 25th October, 1987. The winner's name will be published in the next issue of the Bulletin.

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There is space on this list for many other companies with interests in the field of musculoskeletal medicine. The Bulletin welcomes advertisements for any products or services considered worthy of members' attention. Advertising managers are invited to contact the editor.



See you at ...

**THE 17th ANNUAL SCIENTIFIC MEETING
OF THE
AUSTRALIAN ASSOCIATION OF MUSCULOSKELETAL MEDICINE**

to be held as a combined conference with

**THE NEW ZEALAND ASSOCIATION OF MUSCULOSKELETAL MEDICINE
and
THE AUSTRALIAN SPINAL RESEARCH SOCIETY**

at the City Hall, Brisbane

**on
23rd to 25th October, 1987**

Theme: The Biology of the Lumbar Disc

