



PROFESSIONAL NOTES

Muscle Relaxants for LBP

Ever since the US AHCPR clinical practice guideline titled *Acute Low Back Problems in Adults* in 1994, there has been caution about the appropriateness of the use of muscle relaxants for patients with acute low-back pain. There is limited research evidence supporting their effectiveness, and there are more side effects and complications than with other treatments recommended by the AHCPR – NSAIDs and spinal manipulation.

New results from the North Carolina Back Pain Project, in which comprehensive data was obtained on 1,633 back pain patients attending a representative sample of family physicians, chiropractors, orthopedic surgeons and nurse practitioners, underscore these concerns. Bernstein, Carey et al. from the University of North Carolina at Chapel Hill report:

- Almost 2 of 3 (63%) medical patients received muscle relaxant medication.
- However they had no improvements in recovery – pain or disability – over other

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CHIROPRACTIC MANAGEMENT FOR LUMBAR DISC HERNIATION

Spinal Adjustment/Manipulation Proven Safe and Effective

INTRODUCTION

EVIDENCE-BASED CARE is bringing major changes to the management of patients with pain associated with disc herniation. There is now broad agreement in medical practice that surgery should not generally be considered for these patients until there has been a trial of conservative non-surgical care.^{1,2,3} Reasons include:

- a) The majority of patients recover adequately, and at least as well as after surgery, under conservative care.⁴
- b) Current surgical techniques, even though less invasive than in the past, have significant problems in terms of effectiveness, safety and cost. Most have no scientific evidence of effectiveness.⁵

Safety has now been looked at more closely in a multicenter trial from Sweden which reports a complication rate of 24%, with almost half of these complications being serious. Approximately 8% of patients required re-operation.⁶ This emphasizes the importance of a trial of conservative care, which is beneficial to most patients and has very low complication rates.

With respect to cost, Gibson, Grant and Waddell, in a recent Cochrane Systematic Review of surgery for lumbar disc prolapse, estimate that the 1-2% of low-back patients who undergo surgery for lumbar disc herniation account for fully one-third of the massive healthcare costs associated with managing low-back pain.

- c) In many cases the disc herniation, although present and plainly visible on imaging, is not the source of the pain. Approximately 40% of adults aged 40 years or more have lumbar disc herniation but no pain whatsoever.⁷ Many patients recover from disabling back and leg pain without any change in the size and location of their disc herniations.^{4,8}

2. So one or more trials of conservative care approaches are important. But, on the basis of current evidence, what are the best choices of conservative care? Who should a patient consult? To whom should medical doctors in primary care refer their patients for appropriate care?

One option, with at least as much research evidence of safety, effectiveness and patient satisfaction as any other, is skilled manipulation. This, as in chiropractic practice, should be supported by other physical therapies, a graduated exercise plan and self-care advice as appropriate.

An important recent addition to the evidence comes from a large multicenter, interdisciplinary study from Haas, Goldberg et al. reference 9 in the US in which “usual medical care” (prescription drugs, exercise plan, self-care advice and physical therapy) and “usual chiropractic care” (spinal manipulation, physical therapies, exercise plan and self-care education) were compared for a population of patients with back pain and referred leg pain below the knee.

In this study, discussed in more detail in paragraph 10, the patients receiving chiropractic care did significantly better in terms of reduced pain and disability throughout the follow-up period of two weeks to three years.

This issue of the Report looks at the current research evidence relevant to chiropractic management - including the likely sources of pain when a patient has lumbar disc herniation; the safety and effectiveness of chiropractic management; the likely mechanisms of action of chiropractic adjustment or manipulation; and the reasons why spinal manipulation should be given by a skilled professional with formal training and fulltime practice in this specialized field.

Because some physicians are unfamiliar with the recent scientific literature and

may still have concerns about the safety of manual care in the presence of disc herniation, that issue, which is the subject of a recent comprehensive review by Oliphant in Canada,¹⁰ is dealt with in some detail.

B. MECHANISMS OF HERNIATION

3. There are two basic mechanisms of disc herniation, illustrated in Figure 1, which are:

(a) Sudden prolapse. This occurs as a result of a sudden load or force on the disc while the spine is in flexion. This is the type of disc herniation seen in many industrial lifting injuries.

(b) Gradual Prolapse. Repetitive or prolonged loads fatigue the outer annulus of the disc. The annulus creeps over time at its weak points, the posterior boundaries, and finally herniates.

Disc herniation may be contained (where there is a protrusion but the outer annulus remains intact) or uncontained (where the contents of the nucleus completely penetrate the annulus and prolapse into the vertebral canal).

C. SOURCES OF PAIN

1. **Three-Joint Complex** There are three points of contact between adjacent vertebrae in the spine – the intervertebral disc and, at the back of the vertebrae on each side, the two facet or zygapophyseal joints. These comprise the ‘three-joint complex’, to use the term coined by the North American orthopedic surgeon Kirkaldy-Willis.

Any loss of height and normal mechanical movement at the disc, as occurs with herniation, inevitably alters function at the facets. These are richly innervated with pain-sensitive nerve fibers, much more so than the disc. Where there is disc degeneration there will likely be facet degeneration. Pain may arise from any or all of the three elements in the three-joint complex.

2. **Disc Pain.** Experts agree that pain directly from the disc herniation is primarily from nerve root sleeve edema and other inflammatory responses around the disc material – not the pressure of nuclear material on the nerve root.^{4,8} Cassidy, Thiel and Kirkaldy-Willis, reviewing the evidence for this, note:

a) Animal studies have confirmed the inflammatory effect of the nucleus and the presence of immunoglobulin G in the disc.

b) Many disc herniation patients with sciatica who go to surgery have swelling and inflammation around the nerve root regardless of the size or extent of the disc herniation.

c) In their clinics, where side-posture manipulation has been used in the management of patients with herniation and back pain, they have noticed “little to no correlation between the size of the herniation and the patient’s syndrome or response to manipulative therapy.”

They conclude that pain from disc herniation is due to inflammation. Other neurological signs where present, such as loss of sensation, motor power and reflex, are the result of nerve compression.

1. **Joint Pain.** Much of the pain associated with disc herniation may in fact come from related dysfunction or subluxation at the facet joints. With respect to this:

a) Many studies, including that by neuroradiologists Bozzao, Gallucci et al.⁸ discussed below under natural history, confirm the experience of Cassidy et al. just referred to – that there is no correlation between treatment, clinical result and the size and position of the herniation. This suggests that pain may often be from related mechanical dysfunction at another site, as for example at the richly innervated facet joints. So does the fact that many people have disc herniation with no pain or disability.

b) Mooney and Robertson,¹¹ reporting on 100 consecutive cases of sciatica treated with facet blocks, have demonstrated that the lumbar facet joints can give rise to symptoms indistinguishable from those ascribed to disc herniation.

c) Many chiropractic and medical researchers consider that the effectiveness of skilled manipulation, discussed below, can primarily be explained as the alleviation of pain from overlying facet joint dysfunctional or subluxation.^{12,13,14}

An interesting eyewitness account comes from Chrisman et al.¹⁵ who performed side-posture lumbar manipulations during disc operations to observe the effects directly. They report “neither the nerve root nor the disc protrusion moved perceptibly, but the laminae moved apart by as much as 5mm markedly stretching the lower fibers of the ligamentum flavum and the superior lateral joint (facet) capsule.”

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In other words, strong movement at the facets, none at the disc.

D. NATURAL HISTORY

8. For most patients there is spontaneous reduction in the size of disc herniation (RDH) over a period of months. The exact causes of this RDH or shrinkage of disc material are unknown but probable causes are:

a) Resorption – related to the lack of nutrients supplied by the disc.

b) Desiccation – due to the lack of hydrophillic proteoglycans.

c) Phagocytosis – stimulated by the inflammatory response to the acute phase of disc herniation.⁴

A sizeable sub-group of individuals achieve a reasonable recovery over 1 to 3 months without any treatment. However there is little correlation between RDH and improvement, and treatment is recommended for all. This should initially be non-surgical unless there is major or progressive neurological deficit.

In a thorough study relative to natural

history Bozzao, Gallucci et al. performed repeat magnetic resonance imaging (MRI) on 69 patients with confirmed lumbar disc herniation treated by conservative methods (bed rest, education, manipulation and physical therapy) at their clinics at the University of Rome, Italy. 43 of these patients had experienced leg pain for 1 to 3 months before the first MRI, 26 had experienced lumbar pain for longer than 3 months. Repeat MRIs were an average of 11 months (range 6 to 15 months) after the initial MRI. It was found:

a) On re-examination, 4 of the 69 had new herniations at different spinal levels.

b) Of the remaining 65, all treated conservatively:

- 31 (48%) had RDH higher than 70%,
- 10 (15%) had RDH between 30% and 70%,
- 19 (29%) had no appreciable change in the size of the herniation, and
- 5 (8%) had an increase in the size of the disc herniation.

In summary, 63% (41) had a natural reduction of size of disc herniation of 30% or more.

c) Most interestingly, however, no correlations at all were found between the natural history of the herniation (i.e. whether or not it had reduced or increased in size at repeat MRI, and by how much) and each of:

- age,
 - location of the herniation,
 - time between the MRI studies
- and, most interestingly of all,
- continuing symptoms or clinical results.

The one positive correlation found was between the initial size of the herniation and the degree of reduction – the largest herniations had the largest spontaneous reduction in size over time.

The authors conclude that “lumbar disc herniation is primarily

a non-surgical disease” that should be treated by conservative methods.

E. EFFECTIVENESS OF MANIPULATION

9. Since the early 1990s there has been sufficient research evidence to support the conclusion, made by Cassidy et al. in 1993, that “the effectiveness of side-posture manipulation for lumbar disc herniation has been established.”⁴ At that time they reviewed the studies published, which included:

a) A controlled trial by Nwuga¹⁶ showing that lumbar, side-posture, rotation manipulation was superior to conventional conservative medical care (physical therapy, comprising heat, exercise and postural education). At six weeks follow-up manipulated patients showed significantly greater improvement of spinal mobility and straight leg-raising than patients in the physiotherapy group.

The trial population comprised 51 consecutive patients with disc protrusion confirmed by myelography and electrodiagnosis. All were experiencing back pain and pain and/or numbness to the leg arising from reflex changes apparently associated with root compression.

i) The study group of 25 received rotational lumbar manipulation and back education 3 times weekly for 4 weeks. The comparison group of 26 received conventional physical therapy department care (diathermy (heat), exercises, and back education) at the same frequency over the same period of time.

ii) Pre and post (at 6 weeks) treatment measurements were made for various ranges of lumbar spinal motion (flexion and extension, total side flexion, total lumbar rotation) and straight-leg raising.

iii) Prior to treatment there was no significant difference between the two patient groups on any of these parameters. Following treatment those receiving manipulation showed a statistically significant improvement on all measures compared with those receiving conventional medical therapy. It was concluded that manipulation was the superior treatment.

b) Several prospective studies,¹⁷⁻²⁰ showing that 50-80% of patients with lumbar disc herniation are relieved by side-posture manipulation. The largest, by Kuo and Loh,¹⁹ involved a series of 517 patients over an eight year study period. All had a diagnosis of lumbar disc protrusion and were referred for manipulative therapy. 77% had a favourable response, defined as relief of pain at least to the extent that the patient could perform daily activities of living.

c) Cassidy et al. also reported on a series of 15 patients at their outpatient clinic. For these:

i) All received side-posture manipulation for lumbar disc herniation with a view to reducing pain through improved mobility of the spine.

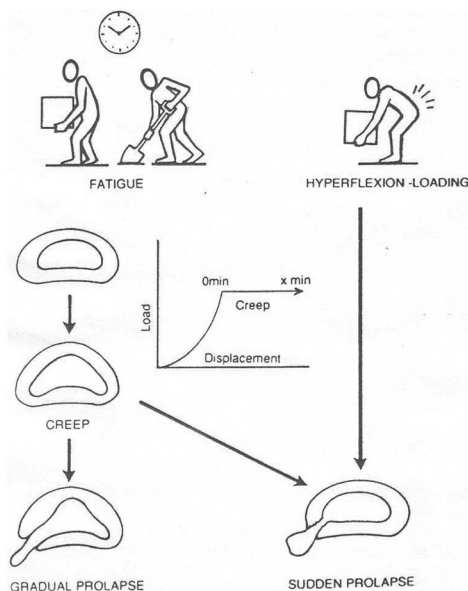
ii) 14 of the 15 obtained significant clinical improvement and relief of pain after a 2-3 week course of manipulation.

iii) CT scans before and three months after treatment showed that in most cases, notwithstanding clinical improvement, the appearance of the disc herniation remained unchanged.

10. Subsequently there have been cases and case series supporting the effectiveness of chiropractic manipulation from Slosberg,²¹ Stern, Coté et al.,²² Crawford and Hannon,²³ and BenEliyahu.²⁴ And now there is the major US study from Mitchell Haas, DC from the Western States Chiropractic Col-

Figure 1

MECHANISMS OF HERNIATION



Muscle Relaxants for LBP

continued from page 1

patients, including those receiving NSAIDs and chiropractic management. Further than this those receiving muscle relaxants “had somewhat slower recovery from the episode of back pain” than others, and this finding remained true after controlling for baseline functional status, age, workers’ compensation status, and use of NSAIDs.

(Bernstein E, Carey TS, Garrett JM(2004) *The Use of Muscle Relaxant Medications in Acute Low Back Pain*, Spine 19(12):1346-1351)

NSAIDs - REAL RISKS AND HARM UNKNOWN

A major new study published in the *British Medical Journal* explains that the real risk rates and harm from the use of non-steroidal anti-inflammatory drugs (NSAIDs) are not known. This is because participants in NSAIDs drug trials “were mainly patients known to have benefited from NSAIDs and in whom the risk of adverse events was small.” For example “those with toxicity to NSAIDs or at risk of gastrointestinal or renal problems were specifically excluded,” and those over age 75 are excluded from most trials.

Although the quality of trials was generally good “some aspects of the reporting of these trials was poor.” In particular “serious gastrointestinal events such as bleeding were poorly reported” and “other serious adverse events (including renal toxicity) were not mentioned in any trial.”

In this study, under the auspices of the Medical Research Council and led by Professor Paul Dieppe from the Department of Social Medicine, University of Bristol, there was a comparison of patients in the trials and patients who actually use NSAIDs in the community. The study focused on osteoarthritis (OA), because NSAIDs are used primarily for arthritis and OA is the most common form. The study’s overall conclusions are that the risks of NSAIDs use are under-represented in the controlled trials which, apart from excluding many types of patients at risk and focusing on those known to be benefiting from NSAIDs, are small (average size 67 patients) and brief (mostly focusing on use for a period of six weeks or less, whereas NSAIDs are commonly used over a much longer period in the community). More community studies now need to be done.

Terrett has reported that there are 32,000 hospitalizations and 3,200 deaths per year in the US because of GI bleeding and other complications for patients receiving NSAIDs for OA. (*Current Concepts in Vertebrobasilar Complications following Spinal Manipulation*, Terrett AGJ, 2nd edition 2001, NCMIC, West Des Moines, IA, 118-119.) These figures may now be conservative. Prolonged use of NSAIDs should be avoided if possible.

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research. It already has a portfolio of over 100 journals, one of which is BMC Musculoskeletal Disorders.

To illustrate how speedy this publishing is compared with traditional journal publishing, a new study of motion palpation submitted by Humphreys, Delahaye and Peterson of the Canadian Memorial Chiropractic College on April 21, 2004 was accepted and published after peer review on June 15, 2004. This study, titled *An Investigation into the Validity of Cervical Spine Motion Palpation Using Subjects with Congenital Block Vertebrae as a ‘Gold Standard’* may be found online at www.biomedcentral.com/1471-2474/5/19

NEW BOOKS

1. *The Back Pain Revolution*, Gordon Waddell, Churchill Livingstone, Edinburgh, 2nd edition, 2004

The first edition of *The Back Pain Revolution*, published in 1998, proclaiming that “back pain was a 20th century medical disaster” and prescribing remedies for the situation rapidly became a classic. Professor Gordon Waddell, a Scottish orthopaedic surgeon was already recognized and respected as an international authority in this field.

The second edition, just published, is even more informed and comprehensive. It reemphasizes the need to move from a biomedical to a biopsychosocial approach for most patients. It updates the research and the various national clinical guidelines worldwide – and provides specific proposals for future health-care for back pain. Quite simply, it should be read by all practitioners managing patients with back pain.

Waddell combines expertise with an unusual freedom from professional bias. His honesty means that no one professional group gets everything it might want – but most chiropractors will be surprised and pleased with the manner in which their profession and its potential contribution are reviewed. Points of note are:

a) In a chapter titled *Back Pain Through History*, DD Palmer is described as “a magnetic healer who knew the early medical literature well and the methods of the bonesetters” and someone who “founded chiropractic on the twin pillars of science and vitalism, with strong emphasis on the mind-body relationship.”

There is a balanced and excellent description of modern chiropractic practice which “restores musculoskeletal integrity and neurophysiologic function” but also “stresses a proper diet, lifestyle and a health environment” and is “a patient-centered hands-on approach that depends on good communication between doctor and patient.”

It is acknowledged that the chiropractic profession has “developed professional education, the equal of orthodox medicine, with virtually no external funding.” There is “still a major problem of communication and misunderstanding” between many in the professions of chiropractic and medicine, but this book promotes cooperation in the interests of patients.

b) Waddell’s detailed recommendations for best future health-care for back pain are of particular value and interest. Key points in a comprehensive final chapter on this matter include:

- There should be a shift of resources from medical specialist care to primary care.
- Primary care should manage the great majority of patients, those who have “ordinary backache.” This should be in two ways. First, by primary care providers (e.g. family physicians, chiropractors, osteopaths, physical therapists). Second, for the 10% of patients who do not recover sufficiently to return to normal activities within a few weeks, by a “dedicated multi-disciplinary back pain rehabilitation service” also located in primary care.

This should be led by “a specialist with expertise in back pain rehabilitation” traditionally a medical specialist but in the future specialists who “might better come from family medicine, osteopathic medicine, chiropractic medicine, behavioral medicine or physical therapy.”

- The role of other medical specialist services, in secondary or tertiary settings, should be to investigate and treat the relatively small number of patients “with serious spinal pathology, nerve root problems that do not settle, and those who require consideration of surgery.”

c) Dealing with relief from acute pain and disability, Waddell explains that “in view of the evidence that is now available we should organize services to make manipulation available as an option for all patients who need additional symptomatic relief . . . chiropractors, osteopaths, and an increasing number of physical therapists have professional training and expertise in manipulation . . . We also need to audit levels of education, skills and the delivery of manual therapy.” With respect to treatments other than manipulation “there is a wide range of other symptomatic options, but there is little scientific evidence that they are effective.”

2. *Essentials of Skeletal Radiology*, Terry Yochum and Lindsay Rowe, Lippincott Williams and Wilkins, Philadelphia, 3rd edition, 2005.

Few chiropractors will not have heard of Yochum and Rowe’s definitive text on skeletal radiology. The third edition features 500 new illustrations and more than 1000 new references.

Forewords by chiropractic radiologists Reed Phillips, DC DACBR PhD and Joseph Howe, DC DACBR, medical radiologist Donald Resnick, MD, Professor of Radiology, University of California at San Diego and osteopathic radiologist Bruce Farkas, DO JD, lavish praise on a text that is scholarly, impeccably organized and “extremely user friendly.” What sets this book apart from others of high quality in the field of skeletal radiology, says Resnick, is “the completeness of the coverage of the various disease processes that affect the musculoskeletal system.” All imaging methods, from conventional radiography to MRI, for all skeletal disorders and developmental abnormalities, are illustrated for the clinician – “it is all here in the pages of this work.”

3. *Ultimate Back Fitness and Performance*, Stuart McGill, Wabuno Publishers, Waterloo, Canada, 2004.

What are the best exercise programs for the back? What program should you be selecting for prevention of injury, sports performance enhancement and rehabilitation after injury for

your patients? Here, from Stuart McGill, PhD, Professor of Spine Biomechanics at the University of Waterloo, Canada, a world renowned researcher and authority in this field, is his much-anticipated book answering those questions and summarizing the research. It is highly impressive.

- McGill starts by explaining why the many books, videos, manual and pamphlets with a standard set of exercises will not help many people. First, each person has individual needs, and second, many commonly accepted ‘wisdoms’ about back training are wrong. He reviews these ‘wisdoms’ – which relate to stretching (for various individuals and performance tasks it is not helpful), strength training (not as valuable as endurance), motor patterns (key to back fitness, but inhibited by various exercises given after back injuries), misdirected exercises aimed at one muscle group alone, etc.

- Having challenged much conventional thinking he then presents the anatomical and scientific foundation for back exercise and fitness, and then a complete description of building a five stage program for rehabilitation and/or performance enhancement. These five stages are recognizing and re-patterning disturbed motor programs, enhancing stability and then endurance, and finally moving to strength then power and agility training. Many examples illustrate each step and there is a focus on how to identify critical components for each individual’s needs – having regard to general biomechanics and the demands of individual activities/sports.

Further information on content and purchase of this text, self-published by McGill to reduce costs, can be found at www.backfitpro.com or by email to Kathryn@backfitpro.com.

4. *Golden Rules for Vibrant Health*, Joseph Sweere, Basic Health Publications Inc., North Bergen, NJ, 2004.

Many chiropractors, particularly in North America, will be interested to read and make their patients aware of this self-help guide to health and life from Dr. Joseph Sweere of Northwestern Health Sciences University in Bloomington, Minnesota – in a simple, practical and wise manner it crystallizes his 40 years experience as a chiropractic clinician, author and educator.

The book, now available in major US bookstores, has enthusiastic endorsement from chiropractic and medical experts prominent in the field of holistic health (e.g. Dan Redwood, DC, Cheryl Hawk, DC PhD and Norman Shealy, MD PhD, founding President, American Holistic Medical Association). There are chapters on food, water, exercise, rest and breathing, choosing health care providers, preventing many specific problems from heart disease and headaches to respiratory disorders and depression, stress management, relationships and attitudes and belief systems.

It is “the most comprehensive holistic guidebook I have seen”, says Dr. Cheryl Hawk, but “is also very practical in giving readers specific actions to follow in all areas discussed.” For example a nutrition chapter dealing with the right ratio of alkalinity and acidity for your body explains the health benefits of a predominantly alkaline state, lists specific foods and balances, makes recommendations and then indicates how to monitor the situation through simple and inexpensive saliva tests.

lege, Portland, Oregon and Bruce Goldberg, MD from the Department of Family Medicine, Oregon Health and Science University, Portland²⁵ and colleagues in which:

a) A group of 2,870 patients with acute and chronic low-back pain of mechanical origin was studied. The patients received treatment in 51 chiropractic clinics (60 treating chiropractors) and 14 community medical clinics (111 treating medical doctors).

A practice-based, prospective observational research model was chosen rather than a randomized controlled trial for two reasons – first because it was more appropriate for the research questions being asked, which related to a wide range of data on practice, and was more appropriate for long-term follow-up of patients, and second because this type of research better reflects usual practice in the healthcare system (has better ‘external validity’).

b) Patients received ‘usual medical care’ (medication, physical therapies, exercise plan and self-care education) or ‘usual chiropractic care’ (spinal manipulation, physical therapies, exercise plan and self-care education).

c) The subset of patients with back pain and leg pain radiating below the knee had results of major clinical significance. After adjustment of the results to allow for any differences between the chiropractic and medical treatment groups at the commencement of the study:

i) On the 100 point Visual Analogue Scale for pain, at two weeks there was a 21.7 greater reduction in pain score for those patients receiving chiropractic care. That approximate level of advantage was maintained over 12 months (with measurements at 1, 3 6 and 12 months).

ii) On the Revised Oswestry Disability Questionnaire measuring patient-assessed ability to perform daily activities, there was a 9% superiority in reduced disability for chiropractic patients at two weeks, and this was maintained throughout three years follow-up. This is in circumstances where a 5% improvement is clinically significant. (Chiropractic patients improved much more than 9% of course – this was only the greater extent of their improvement over the patient group receiving conservative medical care).

11. Further controlled trials are needed. These should, for example, compare different approaches to conservative care, different protocols of spinal adjustment within chiropractic practice (e.g. side posture and flexion/distraction), manipulation by professionals with differing education and skill levels, and chiropractic manipulation combined with different adjunctive measures.

However the effectiveness of chiropractic management generally, and side-posture manipulation specifically, currently have as much or more research support as any other form of conservative care for patients with disc herniation. Many patients in the above studies who recovered following chiropractic manipulation, had failed to get relief from other methods of conservative care.

12. **How does manipulation work?** This remains unclear but likely mechanisms include:

a) Increased joint motion induced by manipulation allows the inflammation from disc material to subside more easily, and/or:

b) Manipulation may provide input to functional reflexes, modifying pain; and/or

c) Manipulation reduces related and overlying pain from the facet joints.

13. **Level of skill.** Cassidy, Thiel and Kirkaldy-Willis, foremost authorities in this field who have introduced chiropractic manipulation and management in the setting of a major orthopedic hospital out-patient clinic in Canada, emphasize the need for appropriate professional training and skill and warn that “subtle variations of manipulative techniques can be important in the treatment of disc herniation.”²⁴ In particular:

a) Patients with nerve root entrapment from herniation respond best to manipulations that maintain lumbar lordosis. Pre-positioning should allow for manipulation with minimal force or thrust. Conversely, manipulation that flexes and/or compresses the lumbar spine should be avoided. Ischial contact pelvic manipulations, which do both, can aggravate disc herniations.

b) Mobilizing the segment back and forth through passive range of motion is “an important and necessary” preliminary to manipulation. If mobilization increases distal leg pain or the patient cannot tolerate it, it is wrong to proceed to manipulation at that time.

In severe cases the first few manual treatments should involve mobilization without manipulation. In cases where manipulation increases leg pain and neurological deficit it should obviously be discontinued. In the rare cases where saddle anesthesia or bowel or bladder dysfunction develop, the patient should be referred for surgical assessment.

F. SAFETY OF MANIPULATION

14. Despite the above evidence, the conservative treatment of disc herniation by medical doctors still does not generally include referral for manipulation. One reason for this may be presumed lack of safety, and fear that joint manipulation may cause further injury to an already weakened disc. Yet:

a) All published medical experts in manipulation such as Bourdillon and Day in Canada,¹³ Lewit in the Czech Republic,¹⁴ and Maigne in France,²⁵ agree with the chiropractic and osteopathic professions that skilled manipulation is safe and appropriate for the great majority of patients with disc herniation and should be considered a first option for conservative care.

b) In a comprehensive literature review in 1992, assessing all the studies internationally in English, French and German and reporting adverse effects of lumbar spinal manipulation up to 1991, Terrett and Kleynhans,²⁶ found a total of 65 cases in which disc-related complications were alleged. Nearly half (44%) were medical manipulation under anesthesia.

In an extremely thorough systematic review published this year, updating Terrett and Kleynhans’ work to 2002 and assuming that all reported cases were in fact caused by manipulation, Oliphant provides a best estimate of the risk of spinal manipulation causing a clinically worsened disc herniation of “less than one in 3.7 million treatments.”¹⁰

c) The above figures relate to case reports, where causation is asserted but often unproven. Oliphant also pools all the subjects of trials and prospective and retrospective studies who received lumbar spinal manipulation for back and/or leg pain, and where adverse effects were discussed. Notably:

i) There was not one serious complication in over 2,100 patients and 13,100 treatments.

ii) This includes four studies that focus specifically on spinal

manipulation for disc herniation. These represent 117 patients and over 2,000 treatments.

15. A detailed understanding of the relevant anatomy and biomechanics supports the above statistics, and the claim that, even in the presence of a weakened disc, manipulation is safe. A generation ago some researchers, such as Farfan,²⁷ suggested that rotational stress (torsion) for manipulation might cause disc failure. However, Cassidy et al.⁴ have analyzed their work, and subsequent evidence, and disagree for these reasons:

a) Farfan's work shows that normal discs withstand an average of 23° of rotation before failure, degenerated discs 14°. However the posterior facet joints in the lumbar spine only allow about 2-3° of rotation. Failure of the disc from rotational force (torsion) could only arise following fracture of the facets.

b) When researchers such as Farfan, working experimentally rather than with patients, have shown disc failure from torsion, the failure is in the form of peripheral tears in the annulus rather than prolapse or herniation, as shown in Figure 2.

c) The structure of the lumbar disc is in fact very well-suited to resist rotational forces. The collagen fibers in the annulus cross in successive layers tilted at 60-70° from the spinal axis. They are so arranged that "during the coupled motions of lateral bending and rotation, half of the annular fibers are placed under a tensile stress" while the others are not. The disc provides "more resistance to torsion than to other directions of force." (Flexion actually results in more displacement and higher internal pressures in the disc than torsion.)

Cassidy et al. conclude that in general "it is hard to comprehend how the small amount of rotation introduced during side-posture manipulation could damage or irritate a healthy or herniated disc."

G. CONCLUSION

16. If the conservative management of disc herniation is to be consistent with best scientific evidence available, or in other

words evidence-based, a first line option for patients should be skilled manual care supported by adjunctive methods, as in chiropractic care. In the acute stage mobilization techniques are used, in the sub-acute state a range of mobilization and manipulation techniques.

Arguably the most experienced and respected medical voice on this matter is that of Professor Karel Lewit, the Prague neurologist and manual medicine specialist. In his words, where the term 'blockage' is the equivalent of the chiropractic terms 'subluxation' or 'dysfunction'.

"In disc prolapse concomitant blockage may cause the patient's condition to deteriorate considerably, so that after treatment of the blockage the clinical condition may be greatly improved. To what extent this can happen cannot be easily foretold, but it is always worth trying provided we use the right technique."

The better studies of chiropractic management, including those by Cassidy, Thiel and Kirkaldy-Willis in Canada, and Haas, Goldberg et al. in the US, are well-designed, by respected senior researchers, interdisciplinary, and demonstrate both safety and effectiveness. Cassidy, Thiel and Kirkaldy-Willis put it succinctly:

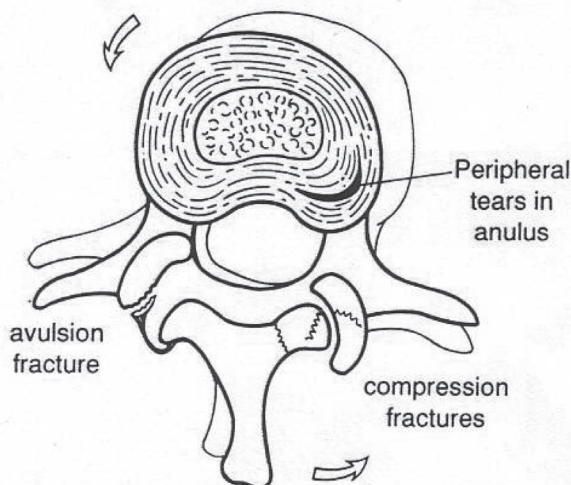
"The efficacy of side-posture manipulation for lumbar disc herniation has been established".⁴ **TCR**

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Figure 2

Mechanisms of Injury from Torsion (Rotation)



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