

American Back Society Meets in San Francisco, Part II

SO MUSCLES DO CAUSE BACK PAIN, AFTER ALL

Robert Cooperstein, MA, DC

Editor's note: the first part of this article appeared in the January 26, 1998 issue of *Dynamic Chiropractic*.

Dr. Scott Haldeman of UC Irvine presented evidence in favor of what one would have supposed a fairly innocuous thought: that back muscles can be a source of pain. Although the different professions that treat muscles to relieve back pain may find some rationale (if not some solace) in Dr. Haldeman's wisecrack, "Back pain is caused by whatever we happen to treat." He contends, "There is very little evidence that muscles of the back are a source of pain, and attempts to measure muscle strains and spasms have, as a rule, been unsuccessful."

A novel device called a magnetic stimulator allows recording an averaged cortical potential on magnetic stimulation of peripheral muscle. Palpable muscle spasm attenuates the reading from the muscle. Since voluntary isometric contraction reduces the responses, it appears that the muscle spindle is the origin. Likewise, since muscle paralysis under anesthesia does not eliminate the potentials, afferents are implicated.

When 20 subjects with low back pain and palpable spasm were tested, muscle stimulation produced better, stronger maps (cortical evoked responses) than skin stimulation. Upon being treated with spinal manipulation and tracked before and after with magnetic stimulation, there was relatively close correlation among palpable muscle spasm, visual analogue scales of pain, Roland-Morris activity scores, and the cortically evoked potentials on magnetic stimulation of paraspinal muscles. Although this does not prove that muscles were the source of the pain in these patients, these data suggest that muscles do play a role in the genesis of back pain, even though it remains difficult to determine whether the spasm is primary or secondary.

Denervation Atrophy of Rectus Capitis in Whiplash

Dr. Philip Greenman, from Michigan State Osteopathic College, last spoke on the role of the rectus capitis posterior minor as a cause of craniocervical syndrome at the ABS meeting in Montreal in 1994. He reported then that among his whiplash patients that did not improve under treatment a proton density weighted MRI examination only poorly demonstrated the rectus capitis posterior muscles, minor and major. The muscles had atrophied to a fat density.

In a follow-up study designed to explain why these muscles are partially replaced with fat in patients symptomatic after whiplash, Dr. Greenman looked for EMG changes. Sure enough, there were denervation potentials. The rectus capitis posterior minor cannot be dissected away from the posterior occipital atlanto membrane, and is interdigitated with the dura. Given this lack of a cleavage plane,

and that the muscle is innervated by the posterior primary division of C1, it may become denervated by the trauma. Dr. Greenman has not as yet found any treatment, not even exercise, to be useful for denervation trauma of this muscle.

Early Return to Work of the Postoperative Patient

Dr. Eugene Carragee, of the Orthopaedic Spine Center at Stanford, posed the following question: Since modern discectomies do not appear to destabilize the spine, why should there be 3-4 months of disability (as the data show) following this surgical procedure? Microdiscectomy or limited discectomy may not have a better long-term result than nonsurgical treatments, but it could shorten the period of disability and loss of work.

In one study, 50 patients were allowed to return to normal activity after discectomies with care only for the wound itself, with a return to work at an average of 1.5 weeks. There were few if any reherniations. In a follow-up study involving 129 consecutive patients, the patients were given no -- that's right, no -- postoperative restrictions, whether they were returning to heavy labor or light duty work; nor did they receive any physical therapy.

After being followed for a minimum of one year, it was found that 97.2% had returned to work with a mean work loss of only 1.4 weeks, and resumed full duties at 3.1 weeks. It did take about twice as long for the heavy work group to resume full duties. There were nine reherniations, and five patients requiring reoperation, figures about the same as those that are seen in postoperative situations with more prolonged time off work. Dr. Carragee concluded that lifting postoperative restrictions following at least certain types of cervical discectomies appears safe and dramatically reduces the period of work loss, down to three weeks in 90% of cases. The significantly shorter period of work loss in the non-worker's compensation group compared with the compensated group is an unpleasant observation that speaks for itself.

Scheuermann's Kyphosis

Dr. Stephen Esses of Baylor College of Medicine evaluated the long term functional capacity, radiographic outcome, and results of three treatment approaches for 63 patients with Scheuermann's kyphosis. The three treatment methods emphasized exercise and observation, Milwaukee bracing, and fusion with Harrington instrumentation. After following the patients for 10-28 years, with a mean of 14 years, no significant differences in outcome could be found, neither radiographically (curve progression) nor in terms of survey findings (ADL, pain levels, general health, work status, etc.). Surgery had a bigger impact on curve improvement in the short term, but not in the long term. Irrespective of different treatment regimens, patients with Scheuermann's kyphosis have an excellent functional outcome. Treatment may not be beneficial, and the guidelines for bracing and surgery should be reevaluated.

NSAIDs

There were two talks emphasizing the complications of nonsteroidal anti-inflammatory drugs (NSAIDs), often used by patients with painful musculoskeletal conditions. The main point of Dr. Lee Simons, of the Harvard University School of Medicine, was the importance of cyclo-oxygenase (cox) selectivity in the choice of the most appropriate NSAID therapy. That is, although all of the NSAIDs are cox inhibitors, thus preventing prostaglandin production, they have differential impacts on cox-1 (which enables protection of the gastrointestinal tract) and cox-2 (which enables prostaglandin

synthesis). It may be possible to reap the benefits of prostaglandin suppression, minus the GI complications, by selecting the optimal NSAID for a given condition.

Dr. Simons added that although NSAIDs are the most frequently prescribed drugs for osteoarthritis, guidelines suggest that analgesics should be the primary treatment, since the inflammatory component is not the main problem in osteoarthritis. In discussing the complications and costs of NSAID therapy for rheumatoid arthritis alone, he reported that these patients receive 10/1000 hospitalizations due to gastrointestinal toxicity, costing \$200 million a year. There are 2,600 deaths among these rheumatoid patients alone, and about 20,000 (!) deaths per year among all patients taking NSAIDs for various soft tissue (usually arthritic) disorders. The typical gastric ulcer that may result is not due to the impaired cox-1 alone, but also because these drugs are weak organic acids. Cox-2 potent drugs that essentially leave cox-1 alone at clinical doses are under development.

(Later on, during a question and answer session, Dr. Simons said "neuroceuticals" have no science and provide no benefit. He added that no reproducible data in humans show that ingesting cartilage precursors such as chondroitin sulfate and glucosamine, will help cartilage heal in arthritic patients.)

Dr. James Scheiman, of the University of Michigan Medical Center, covered much of the same ground as Dr. Simons, adding primarily a description of the renal complications of NSAID therapy, and some more details on the chemistry involved. Cox-1 is produced constitutively, whereas cox-2 is an inducible enzyme, the quantity of which is up-regulated when there is an inflammatory condition. The primary cox-2 selective (cox-1 sparing) drugs under development are Etodolac and Nabumetone. Even more important than choosing the right NSAID would be outright avoidance by using analgesics where anti-inflammatory action is unnecessary. Strategies to minimize adverse effects include treating for *heliobacter pylori* infection when present, and suppressing acid production with H2 inhibitors and similar drugs.

Dr. Scheiman also provided some figures. There is dyspepsia in 15-25% of NSAID patients, but dyspepsia does not predict ulcers or increased risk of bleeding. I repeat: those patients who report dyspepsia are not the ones at risk for gastroduodenal ulcers (usually stomach) that occur in up to 20% of patients. (So much for establishing the safety of these drugs by asking the patient if he is feeling "heartburn.") Furthermore, enteric coating does not help much with ulcers and bleeding, even though it may decrease dyspepsia.

Renal prostaglandins serve with other mediators to enable normal kidney function. NSAIDs may, by interfering with the production of prostaglandins in the distal portion of the renal tubule, interfere with salt and water elimination, and thus cause swelling. Electrolyte imbalances, such as hyperkalemia, may also result. It is thought that the frequency of minor renal problems with NSAID therapy is about five percent, and that major problems are quite rare. Those patients who have pre-existing heart or liver disease, or systemic hypertension, are most at risk for renal complications.

Upright and Dynamic Imaging of the Spine with MRI

According to Dr. Alexander Norbash of Stanford University Medical Center, there are eight open magnet MRI systems in existence. Despite the technical obstacles involved in using them (lower image resolution, limitation on types of pulse sequences), these novel units do permit advanced dynamic, weight-bearing imaging of the spine. Dr. Norbash has been able to evaluate intervertebral disk volume and shape changes as a function of changes in the amount of weight bearing by having subjects don a 20kg liquid collar while sitting. He has also assessed disk conformational changes in flexion and

extension. There is decreased disk height and increased cross sectional area with increased weight-bearing, especially at L4-5, although no demonstrable change in disk volume.

The advent of open MRI also permits advanced, dynamic imaging of a moving subject, using a method called "MR-tracking": a flexible coil with a self-contained proton source is affixed to the skin overlying a musculoskeletal landmark. Nevertheless, it has been quite a challenge to keep the moving spine in the same field for the slices, and to increase the speed of developing the sequence without worsening the resolution. Using kinematic MRI, Dr. Norbash has been able to track the patella, shoulder, and spine during weight-bearing flexion and extension maneuvers. He has discovered, as a case in point, a relatively abrupt flexion moment at the L5-S1 level occurring relatively late in total flexion. Kinematic MRI of the spine may help define physiologic abnormalities in anatomically "normal" spines.

It should be noted that these advanced, dynamic images have the same relationship to conventional MRI as cineradiography has to plain x-ray, and thus mark a great leap forward in our ability to assess functional anatomy. In addition to dynamic imaging, open MRI permits minimally invasive procedures, such as a biopsy, to be done in the chamber.

Reliability and Validity in Spinal Medicine -- Nothing Works; it's All a Ritual

So says Dr. Nikolai Bogduk of Royalty Newcastle Hospital (New South Wales, Australia). Thanks to bad time management, I managed to miss this talk, even though I had highlighted it in the program schedule as a must-hear. Luckily, there is a detailed abstract published in the program notes. Even better, my good friend and ABS associate Anthony J. Lisi, DC, provided me with a synopsis of the talk, which reads so well that I can publish it without comment.

"Bogduk's talk on Saturday morning began with an overview of reliability, validity, sensitivity, specificity, and predictive value. He spoke in a scolding tone, as if he were impatient with the fact that such a review was necessary. A look at the faces of the audience in my area seemed to show that most attendees, across all disciplines, did need this review. Stating that he was 'only the messenger,' he then presented his summary of about 15 articles (none his) over the past 15-20 years, which studied various aspects of physical examination of the spine. In most cases, he compared MDs with PTs for the various tests ... There were few tests (that were acceptable). The ones I remember are: palpation for tenderness (PTs somewhat better than MDs), and McKenzie evaluation in pain centralizers." Thanks, Dr. Lisi.

From his abstract in the program notes, I might add that Dr. Bogduk based his remarks on the finding that reliability studies for diagnostic tests generally show low kappa scores, where scores below 0.4 are unacceptable. As for validity, he finds that likelihood ratios (post-test odds divided by pre-test odds) do not often attain levels substantially higher than 1.0, the number that would be obtained when the test is no better than simply guessing. "Many of the practices in spinal medicine have not been evaluated for reliability or validity ... Physical examination is a traditional ritual that physicians practice using techniques of assumed reliability and validity. The available data on the science of clinical examination for spinal pain indicates that diagnosis is based essentially on guesswork. The patient is lucky if they obtain a correct diagnosis."

Spinal Imaging

I attended several afternoon workshops during this ABS symposium, and briefly report on two of them. The always interesting Dr. Jacob Parker of UCSF spoke on spinal imaging. He said that the discovery

that a large proportion of asymptomatic people are walking around with disk bulges that can be readily visualized with on MR or CT scans has done much to discredit the clinical significance of such bulges. Dr. Parker put the matter in a broader perspective by telling "the rest of the story": other data indicate that these asymptomatics are at greater risk for developing back pain and sciatica than asymptomatics without disk bulges. (See Willberger, Pang J. Neurosurg. 59: 137-141, 1983.)

In other words, longitudinal studies suggest that asymptomatic disk bulges are far from benign. The finding that many asymptomatics carry around disk bulges is no more puzzling than the fact that 20% of the population is HLA-B27 without having ankylosing spondylitis. Individuals with positive lab values or MRI findings are often more likely to become symptomatic than those who test negative, while those who are already positive for symptoms are more likely to have the lab or imaging findings.

Conservative Management of the Geriatric Spine

Dr. Kevin A. McCarthy, dean of Palmer College of Chiropractic West, described how "the geriatric patient presents the clinician with unique health care challenges." In the last 100 years, the total population has increased five fold, while the geriatric population has increased 15 fold. The greatest increase is in the group over 85 years old. By the year 2020, people over 65 will constitute more than 20% of the population.

These demographics no doubt explain why health providers are marketing to the "well elderly." The issue is: what can be done to prevent these elderly from going into an expensive decline, and winding up in nursing homes? They have multiple pathologies, atypical presentations, and it is difficult to set standards of care for them. "Geriatric" care actually begins during the 40s and 50s, because it is very difficult to get people older than that to change their lifestyles, such as by taking up exercise.

Conservative care of the elderly requires an assessment strategy, the centerpiece of which is developing a baseline, some type of ADL scale. The goal of spinal wellness involves: maximization of joint function; the prevention of acute and subacute episodes of physiologic loss; involving the patient in healthy behaviors (such as exercise for flexibility); low resistance training; and endurance training for aerobic capacity.

Dr. McCarthy discussed several "spinal health inhibitors." These include adaptation to pain and trauma; a lack of understanding of exercise (perceived exertion may significantly exceed actual exertion); and specific activity inhibitors such as falls, medications, depressive illness, and stressful life situations. In the end, geriatrics don't really get better -- a situation that is bound to be rather "tough and unfun for a healer" -- but they can get the highest possible quality of life for as long as possible.

Robert Cooperstein, DC
Palmer College of Chiropractic West
San Jose, California
drrcoop-aol.com

MARCH 1998