

### **The innervation of lumbar intervertebral discs: an update**

McCarthy PW. *European Journal of Chiropractic* 1993; 41:21-29.

The innervation of the lumbar intervertebral disc (IVD) is limited to the outermost elements. Using antibody technology, it has been possible to determine the presence of afferent and efferent nerve fibres within the outer annulus fibrosus. There are two types of terminal structure associated with afferent nerves in the IVD: the complex, probably proprioceptive; and the free nerve ending, probably nociceptive. The form of nociception is probably not mechanical or thermal, but chemical instead, the stimulus originating in the environment of the inner IVD. It is suggested that the role for the free nerve endings is related to vascular changes and introduction of the immune system into the outer annulus fibrosus. Healthy motion of the intervertebral joint is seen as a method of maintaining the nutritive supply to the outer elements; preventing disruption of diffusion through the IVD, which would otherwise lead to local waste product build up and its obvious consequences.

### **A randomized clinical trial of manual therapy and physiotherapy for persistent back and neck complaints: subgroup analysis and relationship between outcome measures**

Koes BW, Bouter LM, van Mameren H, Essers AHM, Verstegen GJMG, Hofhuizen DM, Houben JP, Knipschild PG. *J Manipulative Physiol Ther* 1993; 16:211-219.

**Objective:** To study the efficacy of manual therapy and physiotherapy in subgroups of patients with persistent back and neck complaints. The second objective was to determine the correlation between three important outcome measures used in this trial.

**Designs:** Randomized clinical trial (subgroup analysis).

**Setting:** Primary health care in the Netherlands.

**Patients:** Two hundred fifty-six patients with nonspecific back and neck complaints of at least 6 weeks duration who had not received physiotherapy or manual therapy in the past 2 years.

**Interventions:** At the discretion of the manual therapists, physiotherapists and general practitioners. Physiotherapy, consisted of exercises, massage and physical therapy (heat, electrotherapy, ultrasound, shortwave diathermy). Manual therapy consisted of manipulation and mobilization of the spine. Treatment by the general practitioner consisted of drugs (e.g., analgesics), advice about posture, home exercises and (bed)rest. Placebo treatment consisted of detuned shortwave diathermy (10 minutes) and detuned ultrasound (10 minutes).

**Main Outcome Measures:** Changes in severity of the main complaint and limitation of physical functioning measured on 10-point scales by a blinded research assistant and global perceived effect measured on a 6-point scale by the patients.

**Results:** Improvement in the main complaint was larger with manual therapy (4.3) than with physiotherapy (2.5) for patients with chronic conditions (duration complaint of 1 year or longer). Also, improvement in the main complaint was larger with manual therapy (5.5) than with physiotherapy (4.0) for patients younger than 40 years (both were

measured after 12-months follow-up). Labeling of patients by the treating manual therapists as "suitable" or "not suitable" for treatment with manual therapy did not predict differences in outcomes. Generally, there was a moderate to strong correlation between the three outcome measurements, although a considerable number of patients gave a relatively low score for perceived benefit, while the research assistant gave a high improvement score for the main complaint and physical functioning.

**Conclusions:** The subgroup analysis suggests better results of manual therapy compared to physiotherapy in chronic patients (duration of present complaints of 1 year or longer) and in patients younger than 40 years old). Differences for other subgroups were less clear. The explorative findings of these subgroups analyses have to be investigated in future research.

### **A description of WorkCare claims where chiropractors wrote the initiating certificate: Victoria 1990-1991**

De Coster LD, Ebrall PS. *Chiropr J Aust* 1993; 23:33-37.

This study was a retrospective description of all initiating WorkCare certificates written by Victorian chiropractors during the first twelve-month period of the reinstatement of their entitlement to do so. A total of 1,471 claims were identified where injury management was only by a chiropractor. The sample was described in both demographic and case-mix terms. The initiation of claims loosely followed the historical pattern, as did the distribution of age groupings. There was a slight gender bias towards female claimants. Chiropractors were shown to manage a broad range of afflictions, the most prevalent being sprains and the most common body location the back. The broad range of afflictions currently managed is a strong indicator of the community's expectations of what a chiropractor is expected to deliver as a primary contact health practitioner. Most claimants with chiropractic management did not require compensation days paid for by the Accident Compensation Commission. Of those who did, the majority required less than 90 days. The average cost per claim was \$954.53. The value of this study lies in its historical documentary quality and in the identification of new, quantitative data for use by economists, planners and social scientists in determining ways to improve the cost-effective management of the injured worker. It also presents new information to direct both the education and assessment of undergraduate chiropractic students, and continuing education programs for graduates.

### **Cervicogenic headache: responses to nitroglycerin, oxygen, ergotamine and morphine**

Bovim G, Sjaastad O. *Headache* 1993; 33:249-252.

The response in cervicogenic headache to four different agents have been studied. Nitroglycerin was given sublingually to 27 patients. Eighteen patients got more than 20% increase of their headache. Of those with any headache increases at all, 12 got bilateral and 12 unilateral pain. The typical late cluster headache response to nitroglycerin was not seen in cervicogenic headache. The provocative effect



of nitroglycerin seemed less marked in cervicogenic than in cluster headache. Oxygen inhalation, a frequently used treatment for cluster headache, was given to 14 patients with cervicogenic headache. In general, the effect seemed uncertain and probably clearly inferior to the effect in cluster headache. Ergotamine treatment (given to 13 patients) also seemed to be of little avail in cervicogenic headache. Morphine injections given to 11 cervicogenic headache patients resulted in "marked" improvement in 4, but complete pain freedom was only seen in 2 cases. In our opinion, the present results and further evidence to the view that different etiologic and pathogenetic factors underlie cervicogenic headache and cluster headache.

### Effect of extensor muscle activation on the response to lumbar posteroanterior forces

Lee M, Esler M-A, Mildren J, Herbert R.  
Clin Biomech 1993; 8:115-119.

The purpose of this study was to examine the responses of normal subjects to the application of cyclical lumbar posteroanterior forces which simulated a manipulative therapy technique known as mobilization. The specific aim was to determine whether increases in spinal extensor muscle activity could modify the stiffness of lumbar posteroanterior movements. The lumbar posteroanterior stiffness was measured in eleven asymptomatic subjects in the prone position, both in the relaxed condition and during maximal voluntary isometric muscle contractions. The electromyographic activity of lumbar extensor muscles was measured in the relaxed and maximal contraction conditions during the application of mobilization. The posteroanterior stiffness was found to be significantly greater during maximum activation of the extensor muscles. The results indicate that muscle activity can significantly alter lumbar posteroanterior stiffness.

### Glucocorticoid-induced osteoporosis in the lumbar spine, forearm, and mandible of nephrotic patients: a double-blind study on the high-dose, long-term effects of prednisone versus deflazacort

Olgaard K, Storm T, Wørnø NV, Daugaard H, Egkjær M, Lewin E, Brandt L. Br J Rheumatol 1993; 32(suppl):15-23.

The long-term effects of high-dose steroid treatment with either prednisone (PDN) or deflazacort (DFZ) were examined on various parts of the skeleton in 29 patients with nephrotic syndrome. All had normal skeleton at the start of the steroid treatment. At the beginning, PDN was given as 80 mg/day and tapered down to 20 mg/day for 1 year and DFZ was given in an equipotent dosage. Twenty-three patients completed 6 months of treatment, and 18 patients completed 12 months of treatment. Beside laboratory parameters to ensure the effect of treatment on the nephrotic syndrome, all had measurements of the bone mineral content (BMC) at 0, 6 and 12 months of treatment. BMC was measured by single photon absorptiometry of both forearms and by dual photon absorptiometry of the mandible, forearms, and lumbar spine. The effect of DFZ was compared to that of PDN due to a potential 'calcium

sparing' effect of DFZ. The therapeutic effects on the nephrotic syndrome were not different between the two drugs. Urinary 24-h protein decreased from 9.9 to 1.1 g in the DFZ-treated patients and from 8.0 to 1.4 g in the PDN-treated patients. Plasma albumin concentration normalized in both groups. Both groups of steroid-treated patients had a significant reduction of the BMC levels in all part of the skeleton. However, the bone decay rates/month were significantly different between different bone regions and between different drug regimes. In the forearm, the bone decay rate was 5.3%/year in the PDN group and 2.0%/year in the DFZ group ( $P < 0.001$ ). In the mandible, decay rate was 7.0%/year in both groups, and in the lumbar spine it was 12.5%/year in the PDN group and 6.8%/year in the DFZ group ( $P < 0.01$ ). Thus, the bone loss in the PDN-treated group was significantly higher than that of the DFZ-treated patients, despite a similar therapeutic effect on the nephrotic syndrome. Therefore, the detrimental effect of long-term steroid treatment on the skeleton may not be abolished, but can be reduced significantly by using deflazacort instead of prednisone.

### Dietary adequacy: a pilot study of Australian vegetarians

Jamison JR, Minster C, Parker N. Chiropr J Aust 1993; 23:9-14.

Twenty vegetarian volunteers participated in a study to assess the nutritional adequacy of their usual diet. Dietary intake was determined by analysing a three-day weighted intake using the Diet 1 NUTTAB data base, and nutrient adequacy was evaluated according to the Australian recommended daily allowance. A number of nutrient deficiencies were detected. Zinc deficiency emerged as a particular problem in the female participants of this study. A strategy which provides vegetarians with an accurate assessment of their dietary intake and facilitates acquisition of a better knowledge of food composition is discussed.

### Compartment syndrome and shin splints of the lower leg

Gerow G, Matthews B, Jahn W, Gerow R.  
J Manipulative Physiol Ther 1993; 16:245-252.

**Objectives:** The objective of this article is to review and categorize the current knowledge on compartment syndromes (CS) and shin splints (SS), with specific importance relegated to the diagnosis, differential diagnosis and management of these conditions.

**Data Sources:** The bibliographic data sources reviewed are limited to the English language and human content and are from medical and scientific journals, as well as chiropractic and medical texts. A mini-Medline version of *Index Medicus* was utilized. Terms for indexing included compartment syndromes, shin splints and stress fractures. The bibliographies of the journals selected were then evaluated and, where appropriate, the specific journal or text references regarding diagnosis and management were then reviewed. This information was then included in this article, where useful, to further clarify or reference statements made.

**Conclusion:** Differential diagnosis of the acute CS from chronic CS



and SS requires clinical methods and imaging procedures. The pathogenesis of the acute CS of the lower leg is associated with external pressure or internal hemorrhage. If the tissue pressure were to rise above 30–40 mm Hg for 4–12 h, irreversible muscular damage would result. Emergency surgical intervention is the only appropriate form of treatment in acute CS. In chronic CS, where elevated pressure exist on a transient basis, influenced by activity, conservative management procedures are felt to be effective. However, if these methods are not helpful, surgical intervention may be necessary. The etiology of pain associated with SS is not associated with compartmental pressure elevations, but rather, results from periostitis occurring along the tibia caused by muscular and tendinous strain associated with inflammation. Conservative management is most appropriate for this disorder, with surgical intervention being an uncommon treatment approach.

Although clinical findings are useful in the diagnosis of these disorders, fluid pressure findings may be necessary to fully differentiate acute CS from other disorders. Up until recently, common methods of obtaining pressure measurements of compartments included the use of a needle manometer. More recently, however, a hand-held miniature fluid pressure monitor has been developed that produces reproducible measurements of interstitial fluid, making testing potentially practical for the clinician.

### Headache as a presentation of angina: reproduction of symptoms during angioplasty

Bowen J, Oppenheim G. Headache 1993; 33:238–239.

We report a case of angina presenting as headache in a 59-year-old man. Headaches were relieved by nitroglycerin and were reproduced by occlusion of the first obtuse marginal artery during angioplasty. Headaches resolved after successful angioplasty. The temporal relationship between coronary artery occlusion and the headache suggests that headache angina is due to referred pain rather than a generalized vasospastic disorder.

### Reactivity of leg alignment to articular pressure testing: evaluation of a diagnostic test using a randomized crossover clinical trial approach

Haas M, Peterson D, Panzer D, Rothman EH, Solomon S, Krein R, Johansen R. J Manipulative Physiol Ther 1993; 16:220–227.

**Objective:** A study was undertaken to assess the reliability of detecting leg alignment changes (reactivity) and to determine if the observed leg alignment reactivity can be attributed to a rotary articular pressure challenge.

**Design:** Prospective double-blind crossover trial of a diagnostic test.

**Setting:** Laboratory: Center for Technique Research.

**Participants:** Forty-two chiropractic college students, faculty and staff.

**Interventions:** A standardized force of 2 or 3 kg was applied with a 1 cm<sup>2</sup> rubber-tipped pressure algometer on the lateral aspect of the T3–T7

spinous processes and the posterior aspect of the lateral masses of C1.

**Main Outcome Measures:** Leg alignment reactivity: an increase in leg alignment discrepancy (yes or no) following a diagnostic intervention.

**Results:** The reliability for detecting leg alignment reactivity was poor: on average, Kappa = 0.05 in the thoracics and 0.06 at C1. On average, the attributable risk of leg alignment reactivity (pressure test risk – sham test risk) was less than 4%. In many cases, the sham rate was greater than the pressure test rate.

**Conclusions:** For the population investigated, leg alignment reactivity to rotary pressure testing can, in the majority of cases, be attributable to background noise. This procedure was not found to be viable for identifying vertebrae for adjustment. Further research with different subject populations, regions of investigation, leg alignment measurement techniques and vertebral challenge techniques are indicated.

### Glucocorticoid effects on statural growth

Avolio LV. Br J Rheumatol 1993; 32(suppl 2):27–30.

Glucocorticoid use in children is not only associated with the side effects which are seen in adults, but also with severe adverse effects on statural growth. As little as 2.5–5.0 mg prednisolone/day can cause a retardation in statural growth. A direct relationship exists between the dose of glucocorticoid used and statural growth. The use of knemometry, a sensitive technique for measuring the growth of long bones in children has increased the accuracy of growth rate measurements. Many factors, such as disease process, sex, daily vs alternate day therapy, ethnic variations or whether the patient has been immobilized must be considered when evaluating the effects on stature of a particular glucocorticoid. Although alternate day therapy may benefit some patients (particularly those with juvenile chronic arthritis), not all patients respond beneficially to this type of regimen. New generations of glucocorticoids which may not be as detrimental to the growing child should now be considered.

### Vitamin E consumption and the risk of coronary heart disease in men

Rimm EB, Stampfer MJ, Ascherio A, Giovannucci E, Colditz GA, Willett WC. N Engl J Med 1993; 328:1450–1456.

**Background:** The oxidative modification of low-density lipoproteins increases their incorporation into the arterial intima, an essential step in atherogenesis. Although dietary antioxidants, such as vitamin C, carotene, and vitamin E, have been hypothesized to prevent coronary heart disease, prospective epidemiologic data are sparse.

**Methods:** In 1986, 39,910 U.S. male health professionals 40 to 75 years of age who were free of diagnosed coronary heart disease, diabetes, and hypercholesterolemia completed detailed dietary questionnaires that assessed their usual intake of vitamin C, carotene, and vitamin E in addition to other nutrients. During four years of follow-up, we documented 667 cases of coronary disease.

**Results:** After controlling for age and several coronary risk factors,



we observed a lower risk of coronary disease among men with higher intakes of vitamin E ( $P$  for trend = 0.003). For men consuming more than 60 IU per day of vitamin E, the multivariate relative risk was 0.64 (95 percent confidence interval, 0.49 to 0.83) as compared with those consuming less than 7.5 IU per day. As compared with men who did not take vitamin E supplements, men who took at least 100 IU per day for at least two years had a multivariate relative risk of coronary disease of 0.63 (95 percent confidence interval, 0.47 to 0.84). Carotene intake was not associated with a lower risk of coronary disease among those who had never smoked, but it was inversely associated with the risk among current smokers (relative risk, 0.30; 95 percent confidence interval, 0.11 to 0.82) and former smokers (relative risk, 0.60; 95 percent confidence interval, 0.38 to 0.94). In contrast, a high intake of vitamin C was not associated with a lower risk of coronary disease.

**Conclusions.** These data do not prove a causal relation, but they provide evidence of an association between a high intake of vitamin E and a lower risk of coronary heart disease in men. Public policy recommendations with regard to the use of vitamin E supplements should await the results of additional studies.

### Vitamin E consumption and the risk of coronary heart disease in women

Stampfer MJ, Hennekens CH, Manson JA, Colditz GA, Rosner B, Willett WC. *N Engl J Med* 1993; 328:1444-1449.

**Background.** Interest in the antioxidant vitamin E as a possible protective nutrient against coronary disease has intensified with the recognition that oxidized low-density lipoprotein may be involved in atherogenesis.

**Methods.** In 1980, 87,245 female nurses 34 to 59 years of age who were free of diagnosed cardiovascular disease and cancer completed dietary questionnaires that assessed their consumption of a wide range of nutrients, including vitamin E. During follow-up of up to eight years (679,485 person-years) that was 97 percent complete, we documented 552 cases of major coronary disease (437 nonfatal myocardial infarctions and 115 deaths due to coronary disease).

**Results.** As compared with women in the lowest fifth of the cohort with respect to vitamin E intake, those in the top fifth had a relative risk of major coronary disease of 0.66 (95 percent confidence interval, 0.50 to 0.87) after adjustment for age and smoking. Further adjustment for a variety of other coronary risk factors and nutrients, including other antioxidants, had little effect on the results. Most of the variability in intake and reduction in risk was attributable to vitamin E consumed as supplements. Women who took vitamin E supplements for short periods had little apparent benefit, but those who took them for more than two years had a relative risk of major coronary disease of 0.59 (95 percent confidence interval, 0.38 to 0.91) after adjustment for age, smoking status, risk factors for coronary disease, and use of other antioxidant nutrients (including multivitamins).

**Conclusions.** Although these prospective data do not prove a cause-and-effect relation, they suggest that among middle-aged women the use of vitamin E supplements is associated with a reduced risk of coronary heart disease. Randomized trials of vitamin E in the primary

and secondary prevention of coronary disease are being conducted; public policy recommendations about the widespread use of vitamin E should await the results of these trials.

### Review of Harrington rod treatment of spinal trauma

Riebel GD, Yoo JU, Fredrickson BE, Yuan HA. *Spine* 1993; 18(4):479-491.

Harrington rod treatment for spinal trauma has become the gold standard against which other treatment modalities are judged. A review of the results of Harrington rod treatment is essential to establish a baseline level of efficiency in terms of rehabilitation time, correction of deformity, canal decompression, motion segment loss, and device-related complications. With economic concerns becoming more important in medical treatment, the value of new techniques must be clearly superior to established methods. Harrington rod-augmented spine fusion is reliable and cost-effective in the thoracic and thoracolumbar spine. The risks of rod failure and late complications related to lost motion segments in the lumbar spine make pedicle screw systems a better option in this region.

### Antinuclear antibodies: what they mean, when to order and how to interpret tests

Cohen PL. *J Musculoskel Med* 1993; 10(4):37-46.

Antinuclear antibodies (ANAs) are useful diagnostic markers of autoimmune connective tissue disease, including systemic lupus erythematosus, Sjögren's syndrome, myositis, and scleroderma. They are also found in some patients with rheumatoid arthritis and are occasionally present in asymptomatic persons. Individual ANA specificities correlate with certain disease manifestations. However, most positive ANA test results should be considered an indication of disease only when the patient also exhibits clinical signs and symptoms. Recognition of diseases by their associated ANAs is often useful for diagnosis and prognosis. In addition, ANAs are likely to provide clues to the pathogenesis of these diseases of unknown cause.

### Congenital anomaly of the second cervical vertebra predisposing to progressive cervical myelopathy: a case report

Chozick BS, Knuckey NW, Epstein MH. *Spine* 1993; 18(3):339-342.

The authors describe a previously unreported constellation of developmental anomalies of the C2 vertebra, which predisposed to the development of cervical myelopathy in a young patient. The embryology of the vertebral column is reviewed briefly, and the origin of each anomaly of the C2 vertebra is traced to one of the two early stages in development as follows: 1) the formation of the mesenchymal vertebra or 2) its induction to cartilage. This case emphasizes the importance of congenital stenosis in the development of cervical myelopathy in young patients. The outcome is favorable when it is treated aggressively.