

Septic arthritis in a lumbar facet joint: a rare cause of an epidural abscess

Heenan SD, Britton J.
Neuroradiology 1995; 37:462-464.

A 10-year-old boy presented with a 7-day history of back pain and pyrexia. MRI showed an epidural abscess arising from septic arthritis in a lumbar facet joint. Whilst septic arthritis in a large joint is relatively common in children, epidural abscess is rare. This case illustrates how infection in a synovial joint may extend into the extradural space and might be the route of infection in more cases than has previously been recognised.

Pain and deformity in women's feet

Frey C.
J Musculoskel Med 1995; 12(9):27-32.

Although foot size tends to increase after age 20, evidence indicates that most women have not had their feet measured in more than 5 years. As a result, women wear shoes that are smaller than their feet, contributing to significant foot pain and deformity. As foot length increases, forefoot width also appears to increase but heel width does not change significantly. To avoid painful and deforming constriction of the forefoot, women with longer feet may therefore need a shoe with a combination last, which has disproportionate forefoot and hindfoot widths. Encourage your patients to shop for shoes at the end of the day, when feet are largest, and to select styles that allow ample room for toes and forefoot.

Irritable bowel syndrome and spinal manipulation: a case report

Wagner T, Owen J, Malone E, Mann K.
Chiropractic Technique 1995; 7(4):139-140.

This is a case study of a 25-year-old woman with chronic irritable bowel syndrome. The patient was treated by a chiropractor using spinal manipulation. The patient's symptoms were quickly alleviated during the course of treatment. A number of mechanisms for this phenomenon are suggested.

Fatigue fracture of the sacral bone associated with septic arthritis of the symphysis pubis

Albertsen AMB, Egund N, Jurik AG.
Skeletal Radiol 1995; 24:605-607.

Fractures of the pubic rami are almost invariably associated with fractures of the posterior arch of the pelvic ring. Two women, aged 50 and 67 years, with septic arthritis of the symphysis pubis attended by severe low back pain, were followed with CT and MR

imaging of the pelvis, as well as bone scintigraphy in one patient. In the first patient sacral fractures with severe displacement were revealed, prompting stabilizing symphysiodesis. In the second patient an undisplaced fatigue fracture was confirmed in the right half of the sacrum. In patients with pelvic laxity following arthritis of the symphysis and post-traumatic osteolysis associated with low back pain, displaced or occult fractures of the bones adjacent to the sacroiliac joints should be considered.

Thoracocostal subluxation syndrome: an often overlooked cause of chest and arm pain

Johnson HH.
Chiropractic Technique 1995; 7(4):134-138.

Subluxation of the rib at the thoracocostal junction as a cause of back, chest, and arm pain is often overlooked. Many patients with this condition have had many costly tests and treatments with little or no improvement. Spinal manipulative therapy can provide effective treatment for this condition. This paper presents the anatomy of the thoracocostal junction, the signs and symptoms of this condition, the differential diagnosis of this syndrome, the manipulative treatment, and home instruction for the patient.

Spinal extradural angiolipoma

Bouramas D, Korres DS, Roussos L, Mantzilas T,
Anagnostopoulos D.
Journal of Spinal Disorders 1995; 8(4):324-327.

We present a case of an extradural thoracic spinal angiolipoma in a 27-year-old woman. The epidural tumor was evaluated with computerized tomographic scans and magnetic resonance imaging scans. The tumor was removed, and the clinical symptoms improved remarkably.

Nucleus pulposus pulmonary embolism: a case report

Schreck RI, Manion WL, Kambin P, Sohn M.
Spine 1995; 20(22):2463-2466.

Study Design: This postmortem case report describes nucleus pulposus pulmonary embolism occurring in a human.

Objectives: Clinical, pathologic, and pathogenetic features of the case are discussed. Reference is made to warnings in the literature stressing the importance of avoiding, during radiologic procedures, any possibility of intrathecal ingress of iodinated, ionic, hyperosmolar contrast material.

Summary of Background Data: Various tissues have been implicated as pulmonary emboli in humans. Nucleus pulposus has been reported to embolize to spinal cord vessels in animals and humans and to embolize to the lungs in two animal species.

This is the first report of nucleus pulposus pulmonary embolism in a human.

Methods: A patient with refractory low back pain was admitted for lumbar discography using diatrizoate meglumine, 52%, and diatrizoate sodium, 8%. Afterward, an ultimately fatal systemic reaction began, among the symptoms of which were spasmodic extensions of the lower back and legs. Postmortem examination was performed.

Results: Nucleus pulposus pulmonary emboli were seen microscopically on random lung sections. The lumbar vertebral column grossly featured acute herniations of disc material into vertebral marrow spaces; nucleus pulposus was identified microscopically in these areas.

Conclusions: We speculate that the spasmodic back extensions imposed compressive forces on vertebrae, causing nucleus pulposus to be extruded into vertebral marrow sinusoids (thus creating emboli) and possibly causing these emboli to flow anteriorly into the anterior external vertebral plexus, which resulted in pulmonary emboli exclusively with no spinal cord emboli.

Magnetic resonance angiographic diagnosis of ectatic vertebral artery

Epstein NE, Silvergleid R.

Journal of Spinal Disorders 1995; 8(4):308-310.

In the cervical spine, routine and contrast magnetic resonance (MR)- and computed tomography (CT)-based studies may fail to differentiate between an ectatic vertebral artery and a solid foraminal mass. A complete cervical and lumbar Myelo-CT scan in a 67-year-old female with lumbar stenosis revealed an incidental, left-sided C3-C4 foraminal mass. A vascular lesion was suspected when the MR study revealed the lesion to be a signal void. MR angiography confirmed an ectatic C3-C4 vertebral artery loop. The possibility of a vertebral artery anomaly should be considered in patients with asymptomatic lateral and foraminal cervical lesions on CT studies. In these patients, routine MR and MR angiography are necessary to demonstrate the status of the vertebral artery in the foramen.

GAIT (gravity-assisted intermittent traction): a motion-assisted form of distractive manipulation

Davis PT.

Chiropractic Technique 1995; 7(4):125-129.

Traction in some form is (and has been) a commonly used modality of treatment for various approaches to health care, including chiropractic. In recent times, it has been used by several practitioners, including McManis, Cox, Leander, and now Hill (the focus of this article). The Hill technique uses the Hill Intertrac Table, which allows for common short-lever, high-

velocity manipulation, also uses a unique approach to linear axial distraction with a mechanically assisted table developed by Thomas Hill, D.C. Positions attainable through the technique on the Intertrac table include flexion/extension and lateral flexion in combination with a new position achieved by elevation of the lower section, allowing for a gravity assist. Using the table and Hill's approach to manipulation greatly reduces the amount of force needed to perform the adjustment, and the movement of the table ensures a long-axis release in the sacrum/sacroiliac joint.

In vivo axial rotations and neutral zones of the thoracolumbar spine

Kumar S, Panjabi MM.

Journal of Spinal Disorders 1995; 8(4):253-263.

Fourteen normal male subjects with mean age 23 (range 20-32) years and mean body weight of 69.6 kg underwent right and left axial rotation in a special machine - axial rotation tester (AROT). The AROT was designed and fabricated such as to allow uninhibited coupled axial rotation and lateral flexion while preventing flexion and extension. The range of rotation (ROR) and neutral zone (NZ) were recorded during active rotation (.A), active rotation with blindfold (.B), and passive rotation with blindfold (.P). Finally, bilateral axial rotation was tested with 6, 12, 18, 24, 30, and 36 Nm rotary torque (.T). There was no significant difference between ROR.A and ROR.B, both being ~140°. However, there was a significant difference between NZ.A and NZ.B ($p < 0.01$). ROR.P was ~30° greater than ROR.A. The trunk structures showed a nonlinear viscoelastic behavior with progressive rotary torque application. The neutral zone in axial rotation did not show significant difference between different loads. It is reported that the rotary neutral zone varies between subjects, and it is suggested to be contributory to spinal laxity.

Functional impairments of the vertebral column in babies and children - osteopathy and manual therapy

Zak K.

Manuelle Medizin 1995; 33:147-149.

In view of the high incidence of reversible functional impairments of the vertebral column, some of which have long-term implications for the overall postural and locomotor system, osteopathy and manual medicine are essential for the paediatric age group, and are often of incomparable value in the acute situation. In the case of conditions that tend to become chronic (poor posture, hypermobility, muscular insufficiency) the techniques used in osteopathy and manual medicine should also be regarded as an absolute necessity - partly because they do not damage the spine -, especially in view of the high incidence (20% of all children with "silent" blocks). Among 152 babies and children (age range 6 weeks to 15 years 6 months) examined from

March 1991 to November 1993 it was striking that not a few for whom no remarkable findings had been recorded at the usual screening checks had massive pathologic findings. All babies with obvious hip abnormalities seen on ultrasound examination or on clinical examination were also found to have osteopathic lesions of the spine, internal organs or jaw.

Persistent cervical dysfunction following whiplash injury

Weh L, Bigdeli-Azari B, Dallmer J, Sablotny J. *Manuelle Medizin* 1995; 33:139-143.

The discrepancy between symptoms reported and objective findings following whiplash injury has led to different theories. Conventional radiograms are not very helpful. Therefore we measured the cervical function about 2 years after trauma in 105 health insurance patients injured in accidents and 61 healthy persons were examined. Radiograms of the cervical spine with patients were taken in the lateral view in the standard position and with maximal forward and backward inclination. The positions of the head and the vertebrae were analyzed by a computer program. The values measured for the segmental angles in the three positions was subjected to statistical analysis. Diminished lordosis of the upper segments was found in the posttraumatic group; in addition, the total cervical mobility was reduced, and there was a pronounced hypomobility in the upper segments ($P < 0.001$), especially in extension. The mobility difference between posttraumatic and healthy subjects decreased in the craniocaudal direction. Owing to the hyperextension and backwards rotation of the head in whiplash injury, the upper ventral ligaments, especially, are injured. Our results suggest a limitation of movement caused by shrinkage of traumatized anterior vertebral ligaments. The reduced segmental mobility represents the probability of former injury even after 2 years. Pathologic position and function can explain persistent cervical and cranial symptoms. A correlation was proven between symptoms and objective dysfunction after whiplash injury.

Motion characteristics of the lumbar spine in the normal population

McGregor AH, McCarthy ID, Hughes SP. *Spine* 1995; 20(22):2421-2428.

Study Design: The present study investigated the dynamic motion characteristics of the lumbar spine in the normal population using a potentiometric analysis system.

Objectives: To assess the ability of a triaxial potentiometric analysis system to measure dynamic motion in the lumbar spine, and to use this system to form a database of dynamic motion characteristics from which normal parameters of motion and the factors affecting this motion could be defined.

Summary of Background Data: Spinal motion has been studied

using a variety of different methods, the majority of which have been limited either in terms of reliability, accuracy, or invasiveness and many have been only of a static nature. There has been no previous study into the normal dynamic motion characteristics of the lumbar spine.

Methods: The accuracy of the system was determined by a series of tests against a calibrated engineering mill, and the reliability of the system was assessed on 10 subjects with repeated measurements over a 3-day period. Values of range of motion and angular velocity were obtained from 203 normal subjects during flexion and extension, lateral flexion, and rotation.

Results: The results of the calibration testing revealed excellent accuracy, and it was shown that the system was repeatable. Initial analysis of the results indicated that sex differences did exist with men having 58.4° of flexion and women having 53.4°. Age appeared to have an influence on motion, and a gradual reduction was seen with each decade ($P < 0.001$), with the 20-29-year age range having 59.5° mean flexion, the 30-39-year group having 58.1°, the 40-49-year group having 53.7°, the 50-60-year group having 57.5°, and the 60-70-year group having 45.9°. Multiple regression techniques revealed that only a few factors are important with respect to motion and that these varied according to the characteristic being defined.

Conclusions: Range of motion tended to be affected by age and sex, whereas velocity was only affected by distance moved, with occupation and body mass index having little or no influence on the motion. The factors identified could only account for a small proportion of the variation seen, suggesting that it is difficult to predict the motion characteristics with any degree of sensitivity.

Characteristics of patients successfully treated for cervicogenic headache by surgical decompression of the second cervical root

Pikus HJ, Phillips JM. *Headache* 1995; 35:621-629.

We have recently reported 90% success in a series of patients undergoing microsurgical decompression of the second cervical (C2) nerve root and ganglion for cervicogenic headache. Review and analysis of our database was carried out in order to cull factors characterizing patients amenable to this surgical treatment. Thirty-five sequential C2 decompressions performed on 31 patients who were pain-free or significantly improved in follow-up were evaluated retrospectively. Preoperative factors and intraoperative findings were analyzed for prognostic significance. The diagnosis of cervicogenic headache was made using established criteria and success of CT-guided C2 anesthetic blockade in alleviating the headache. Numerous historical factors noted preoperatively including age, sex, history of trauma, autonomic symptoms, visual changes, and many others were not able to be well correlated with outcome in univariate analysis. Likewise, no strong correlation could be made for findings on

physical examination. Thus, no specific prognostic factors could be established, other than the accepted diagnostic criteria and successful anesthetic blockade of the C2 root and ganglion. These factors should identify the subset of patients with cervicogenic headache predominantly due to C2 root or ganglion effect and thus may favor a surgical treatment.

Reliability of manual end-play palpation of the thoracic spine

Haas M, Raphael R, Panzer D, Peterson D.
Chiropractic Technique 1995; 7(4):120-124.

This paper reports the reliability of manual end-play assessment of the thoracic spine (restriction present/absent). The data were collected as part of a randomized controlled trial to evaluate, in part, the construct validity of motion palpation. A blind, repeated-measures design was used in the laboratory setting to evaluate interexaminer reliability; blind, repeated measures of untreated control subjects were used in the approximation of intraexaminer reliability. The subjects were 73 first-year chiropractic college students, symptomatic and asymptomatic.

Nine percent of the tests were positive for end-play restriction. The restriction rate was unaffected by examiner, symptomatology, or repetition of palpatory examination. Interexaminer reliability was poor overall ($K = 0.14$). There were no important differences in reliability for symptomatic and asymptomatic subjects or for upper and lower thoracic regions. Intraexaminer reliability approximations revealed moderate self-consistency: $K = 0.55$ and 0.43 for examiners 1 and 2 respectively. These results were consistent with the findings of previous studies in other regions of the spine.

Oculocephalic sympathetic dysfunction in posttraumatic headaches

Khurana RK.
Headache 1995; 35:614-620.

Oculocephalic sympathetic functions were assessed in five patients with posttraumatic headaches using the thermoregulatory sweat test and biochemical pupillary responses. Four patients demonstrated bilateral sympathetic dysfunction following whiplash injury, and one patient demonstrated unilateral sympathetic dysfunction following forehead injury. Biochemical pupillary responses were diagnostic in the early posttraumatic period, while the thermoregulatory sweat test was abnormal up to 56 months following injury. This study documents serious injury to the cervical sympathetic nerves in patients with posttraumatic headaches following whiplash injury, and shows the reliability of the thermoregulatory sweat test in identifying patients with long-term oculocephalic sympathetic dysfunction. It also shows dissociated postganglionic cranial sympathetic dysfunction. Our experience and a review of the pertinent literature shows no

convincing clinical or experimental evidence to establish oculocephalic sympathetic dysfunction as a direct cause of head pain, but it may exert an effect on cephalic pain through the trigeminovascular system.

Aneurysmal subarachnoid hemorrhage associated with weight training: three case reports

Haykowsky MJ, Findlay JM, Ignaszewski AP.
Clin J Sport Med 1966; 6(1):52-55.

Weight training is a popular component of physical fitness in North America. This form of training remains relatively safe with few cases of life-threatening injuries. However, a series of studies have demonstrated that repetitive upper- and lower extremity weight training incorporating a Valsalva maneuver can increase arterial pressure to values as high as 480/350 mm Hg. This marked increase in arterial pressure is transmitted to the cerebral vasculature and increases cerebral arterial transmural pressure and may have the potential to initiate the rupture of a previously innocuous intracranial aneurysm. We report three cases of subarachnoid hemorrhage (SAH) associated with arm (bicep) curls and leg press weight training and discuss the possible link between this form of exercise and aneurysmal SAH.

Chiropractic and competition law

Bolton SP.
Chiropr J Aust 1995; 25:140-145.

The legislative period in Australian chiropractic history (1961-1985) saw enactment of regulatory chiropractic legislation in all six Australian states, the Australian Capital Territory and the Northern Territory. Ten years after completion of this Australia-wide process, attention now focuses on potential conflict between state regulation of the chiropractic profession and federal competition law.

Prior knowledge: a consideration in curriculum development

Jamison JR.
Chiropr J Aust 1995; 25:134-139.

Aim: Nutrition is an area in which community interest and information, or misinformation, abounds. Undergraduate students enter the formal component of their nutrition education with such prior exposure. This study aims to explore the nutritional beliefs of a group of young Australians in order that such prior knowledge can be taken into consideration when implementing their undergraduate teaching in this subject area.

Design: A survey of 96 second-year chiropractic and osteopathy students was undertaken prior to their commencing their

formal course in nutrition. The beliefs of this convenience sample were assessed, using a closed-question questionnaire.

Results: By and large this student group demonstrated a factually correct appreciation of nutritional information. Little, if any, dogmatic adherence to nutritional myths was noted. A questioning attitude was detected.

Conclusions: It is suggested that a program emphasizing critical appraisal of nutritional information will optimally serve the learning needs of this student group. In view of the nutritional beliefs of this group and the proposed approach to teaching this subject, it is suggested that health authorities need to have little concern that these future health professionals will contribute to the persistence of nutrition misinformation in the community.

**William C. Schulze, MD, DC (1870–1936):
from mail-order mechano-therapists to
scholarship and professionalism
among drugless physicians, part 2**

Keating Jr JC, Rehm WS.
Chiropr J Aust 1995; 25:122–128.

The career of William C. Schulze, MD, DC has had a profound, albeit largely forgotten, effect upon the chiropractic profession. As the second president of the National College of Chiropractic, he led his school from its early correspondence programs toward higher standards of scholarship. His broad-scope orientation earned harsh criticism among some straight chiropractors, but commanded respect from a substantial segment of the profession. In this second of two parts, we consider Schulze's activist role among college and professional leaders. The traditions he fathered set the stage for the chiropractic profession's educational reforms in the 1930s and beyond, and despite his death in 1936, the intellectual traditions nurtured the subsequent work of chiropractic scholars such as Joseph Janse and Roy W. Hildebrandt.

**Integration of chiropractic into managed care in a
multidisciplinary setting**

White AH.
J Manipulative Physiol Ther 1995; 18(9):626–627.

The first round of managed care flourished from 1990–1995. As the "economic screws" tightened, all subspecialties of health care lost their unbridled freedom to the primary-care physician. Patients can no longer visit their subspecialists (including chiropractors) of choice. As the public becomes disenchanted with such limited managed care and as new reforms of managed care emerge, the chiropractor and other subspecialists are regaining their rightful position.

Centers of excellence can clearly diagnose and treat a patient more quickly, economically and accurately than the bureaucratic, "kicked back" primary care gatekeeper. Enlightened managed

care business developers are using chiropractors as primary care health providers and are using centers of excellence that include chiropractors as a major cog in the wheel.

The new managed care system directs patients to the least expensive professional who can get the job done most efficiently and accurately. With minimal redirection, the chiropractor is the ideal professional to diagnose and treat the early phases of spinal problems and can easily triage patients to the most appropriate chronic health care providers.

**The effects of research, managed care and
professional relations on the chiropractic profession**

Kats DJ.
J Manipulative Physiol Ther 1995; 18(9):628–630.

The health care professions are in a period of rapid change, and chiropractic, because it is a relatively young profession, is experiencing change at an even more rapid pace. The changes in the chiropractic profession will be dictated in large measure by the effects of future research, managed care and the professional relationship established between the chiropractic profession and other health care professions. In this article, these effects are discussed by reviewing the past history of chiropractic, the present status and future implications.

**The assessment of intramuscular discrimination
using signal detection theory:
its potential contribution to chiropractic**

Murphy BA, Dawson NJ.
J Manipulative Physiol Ther 1995; 18(9):572–576.

Introduction: Most studies on sensory changes after manual therapies have focused on pain sensitivity. This ignores the wider range of sensory alternations that may be important in assessing patient functioning and neglects the issue of bias, which is inherent in most methods of pain assessment employing threshold methodology. Signal detection theory (SDT) addresses the issue of bias and provides a measurement of intramuscular discrimination—the ability to discriminate between two stimuli—which can be assessed over the full range of sensation. This paper will discuss the strengths and limitations of SDT and report on the effects of trigger point therapy and manipulation on intramuscular discrimination to illustrate the potential contribution of this methodology to chiropractic.

Methods: Intramuscular needle electrodes were used to provide a pair of electrical stimuli to the forearm extensor muscles. Subjects were asked to assess the differences between stimuli before and after treatment. The treatments consisted of manual trigger point therapy applied to the forearm extensors, cervical spine manipulation and a control treatment.

Results: After the trigger point therapy, there was a significant improvement in the ability of the subjects to discriminate be-

tween intramuscular signals to treated muscle. Some individual subjects showed alterations in ability to discriminate after cervical spine manipulation but the effect was not significant in the group as a whole.

Conclusions: The methodology of signal detection theory provides a promising, bias-free method of assessing changes in intramuscular sensation after various treatments. In these experiments, trigger point therapy was found to enhance intramuscular discrimination, suggesting that a peripheral reflex may be involved.

Bent spine syndrome

Serratrice G, Pouget J, Pellissier JF.

J Neurol Neurosurg Psychiatry 1996; 60:51-54.

Eight elderly patients developed progressive paravertebral muscle weakness with bent spine on standing but normal supine posture. Computed tomography showed pronounced hypodensity of the paraspinal muscles. Serum creatine kinase was moderately increased, paraspinal EMG non-specific, and biopsy myopathic. The syndrome was familial in two patients and may be caused by a late onset paraspinal muscle dystrophy. In the absence of specific pathological changes, such cases could be classified as having "bent spine syndrome".

Determinants of lumbar disc degeneration: a study relating lifetime exposures and magnetic resonance imaging findings in identical twins

Battié MC, Videman T, Gibbons LE, Fisher LD, Manninen H.

Spine 1995; 20(24):2601-2612.

Study Design: Retrospective cohort.

Objectives: To investigate the effects of lifetime exposure to commonly suspected risk factors on disc degeneration using magnetic resonance imaging, and to estimate the effects of these suspected risk factors relative to age and familial aggregation, reflecting genetic and shared environmental influences.

Summary of Background Data: Structural and biochemical changes associated with disc degeneration are suspected as the underlying conditions of many back-related symptoms. Little is known about the determinants of disc degeneration.

Methods: Based on lifetime discordance in suspected environmental risk factors for disc degeneration, 115 male identical twin pairs were selected. An in-depth interview was conducted of occupational and leisure time physical loading, driving, and smoking. Disc degeneration was evaluated using observational and digital magnetic resonance imaging assessment methods.

Results: Heavier lifetime occupational and leisure physical loading was associated with greater disc degeneration in the upper lumbar levels ($P = 0.055-0.001$), whereas sedentary work was associated with lesser degeneration ($P = 0.006$).

These univariate associations did not reach statistical significance in the lower lumbar region. In multivariate analyses of the upper lumbar levels, the mean job code explained 7% of the variability in observational disc degeneration scores; the addition of age explained 16%, and familial aggregation improved the model such that 77% of the variability was explained. In the lower lumbar levels, leisure time physical loading entered the multivariate model, explaining 2% of the variability. Adding age explained 9%, and familial aggregation raised the variability in disc degeneration scores explained to 43%.

Conclusions: The present study findings suggest that disc degeneration may be explained primarily by genetic influences and by unidentified factors, which may include complex, unpredictable interactions. The particular environmental factors studied, which have been among those most widely suspected or accelerating disc degeneration, had very modest effects.

Spectrum of pathophysiological disorders in cervicogenic headache and its therapeutic indications

Martelletti P, LaTour D, Giacobuzzo M.

JNMS: Journal of the Neuromusculoskeletal System 1995; 3(4):182-187.

Cervicogenic headache is a relatively common form of headache arising from neck structures. The pathophysiology probably results from various local pain-producing factors such as intervertebral dysfunction with a secondary neurogenically activated headache crisis. This report represents a series of patients suffering from cervicogenic headache and the results achieved by means of spinal manipulative treatment. The clinical improvement obtained in these patients supports a biomechanical hypothesis for this type of headache.

Fibrocartilaginous embolism of the spinal cord: a clinical and pathogenetic reconsideration

Tosi L, Rigoli G, Beltramello A.

J Neurol Neurosurg Psychiatry 1996; 60:55-60.

A 16-year-old girl did a handstand for fun, returned to her feet, experienced a sudden pain in her back, and became progressively paraplegic within 30 hours. MRI showed lumbar cord swelling, multiple Schmorl's nodes, a collapsed T11-T12 disc space, and intraspongious disc prolapse into the T12 vertebral body. These findings, related to the initial manoeuvre, suggested that an acute vertical disc herniation could have occurred as the first step in a process leading to spinal cord infarction due to fibrocartilaginous emboli from the nucleus pulposus of the intervertebral disc. The medical literature so far reports 32 cases of fibrocartilaginous embolism (FCE) of the spinal cord, all at necropsy, with the exception of one histologically demonstrated in a living patient. A clinical diagnosis of FCE would be desirable for many impor-

tant reasons, but was never made. This causes severe limitations in the knowledge of the disease and precludes any therapeutic possibility. On the basis of the clinical features and findings in the present case, compared with data from the reported cases, a first attempt is made to identify the clinical context within which new information obtainable through MRI examination can lead to a reliable clinical diagnosis of FCE. The vexed question of the pathogenesis has been reviewed. An increased intraosseous pressure within the vertebral body, due to acute vertical disc herniation, seems to offer a consistent pathogenetic explanation and some therapeutic prospects.

Eosinophilic granuloma of the thoracic and lumbar spine

Cox JM, Hazen LJ, Kreissman S.
JNMS: Journal of the Neuromusculoskeletal System 1995;
3(4):197-202.

Chiropractic physicians see patients with spinal pain of pathologic origin. Worsening of back pain after manipulation in a 16-year-old girl alerted the treating chiropractic physician to further diagnostic workup to include magnetic resonance imaging of the spine. Eosinophilic granuloma was diagnosed and the proper referral for care was made. The case stresses the importance of recognizing contraindicatory signs to spinal manipulation and the need for proper interdisciplinary care of such patients. Proper diagnostic and treatment protocols for eosinophilic granuloma are presented.

Mechanoreceptors in intervertebral discs: morphology, distribution, and neuropeptides

Roberts S, Eisenstein SM, Menage J, Evans EH, Ashton IK.
Spine 1995; 20(24):2645-2651.

Study Design: The present study investigated the occurrence and morphology of mechanoreceptors in human and bovine intervertebral discs and longitudinal ligaments.

Objective: To determine the type and frequency of mechanoreceptors present in intervertebral discs and anterior longitudinal ligaments in two patient groups, those with low back pain and those with scoliosis. Bovine coccygeal discs were examined.

Summary of Background Data: Nerves have been described in intervertebral tissues, but there is little information on the endings of these nerves and their receptors, stimulation of which can cause a nerve impulse.

Methods: The presence of mechanoreceptors were investigated by immunolocalization of nerves and neuropeptides. By examining sequential sections, the frequency of receptors was assessed.

Results: Immunoreactivity to neural antigens showed mechanoreceptors in the annulus fibrosus and longitudinal ligaments of bovine and human specimens. Their morphology resembled

Pacinian corpuscles, Ruffini endings, and, most frequently, Golgi tendon organs. They were found in 50% of discs investigated from patients with low back pain and in 15% of those with scoliosis.

Conclusions: Mechanoreceptors were found in the outer 2-3 lamellae of the human intervertebral disc and anterior longitudinal ligament. Physiologic studies in other tissues indicate that these provide the individual with sensation of posture and movement, and in the case of Golgi tendon organs, of nociception. In addition to providing proprioception, mechanoreceptors are thought to have roles in maintaining muscle tone and reflexes. Their presence in the intervertebral disc and longitudinal ligament can have physiologic and clinical implications.

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