February 2009
COX® RESEARCH PEARLS
Compiled for you by
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My colleagues:

February is a short month but the number of papers is great. I have never read a stronger month of clinically relevant literature for our daily practice. Over 45 hours at the computer have gone into this month's *Pearls*. Please enjoy and find great pleasure in your patient's happy relief.

\- Jim Cox

A MOST CLINICALLY IMPORTANT PAPER FOR YOUR CLINICAL PRACTICE

ELASTIC LUMBAR BELT WEARING IN SUBACUTE LOW BACK PAIN IMPROVES SIGNIFICANTLY THE FUNCTIONAL STATUS, THE PAIN LEVEL, AND THE PHARMACOLOGIC CONSUMPTION.

Calmels, Paul; Queneau, Patrice; Hamonet, Claude; Le Pen, Claude; Maurel, Frederique; Lerouvreur, Claire; Thoumie, Philippe. Effectiveness of a Lumbar Belt in Subacute Low Back Pain: An Open, Multicentric, and Randomized Clinical Study. Spine 2009; 34(3):215-220, February 1, 2009

This randomized, multicentric, and controlled study with 197 subacute patients with low back pain (2 groups, 1 treated with a lumbar belt and 1 control group) shows that lumbar belt wearing is consequent to improve significantly the functional status, the pain level, and the pharmacologic consumption. This study may underline the interest of lumbar support as a complementary and nonpharmacologic treatment beside the classic medication use in low back pain treatment.

A multicentric, randomized, and controlled study to evaluate the effects of an elastic lumbar belt on functional capacity, pain intensity in low back pain treatment, and the benefice on medical cost was done on 2 groups: a patient group treated with a lumbar belt (BWG) and a control group (CG). The main criteria of clinical evaluation were the physical restoration assessed with the EIFEL scale, the pain assessed by a visual analogic scale, the main economical criteria was the overall cost of associated medical treatments.

Results. One hundred ninety-seven patients have participated. The results show a higher decrease in EIFEL score in BWG than CG between days 0 and 90. Respectively significant reduction in visual analogic scale was also noticed. Pharmacologic consumption decreased at D90 (the proportion of patients who did not take any medication in BWG is 60.8% vs. 40% in CG).

Conclusion. Lumbar belt wearing is consequent in subacute low back pain to improve significantly the functional status, the pain level, and the pharmacologic consumption. This study may be useful to underline the interest of lumbar support as a complementary and nonpharmacologic treatment beside the classic medication use in low back pain treatment.

Editor Note: I have designed a belt with memory foam like that in a Tempurpedic mattress that is in the pocket of the belt. As it warms with patient body heat, it molds to the patient's body contour under the elastic restraint belt and renders exceptional support. This paper supports its clinical use. The Cox® Lumbosacral Belt is manufactured and distributed by *Dee Cee Laboratories* and can be obtained from them at 1-800-251-8182. -- JMC

LEAD PAPER FOR THIS MONTH:
PHYSICAL THERAPISTS FIND THAT THORACIC SPINE THRUST ADJUSTMENTS ARE VERY RELIEVING OF NECK PAIN
-- GREAT NEW DISCOVERY IN MEDICINE CALLING FOR FUTHER MANIPULATION RESEARCH -- WOW!!!!!!!!!!!!!!!!!! -- *Jim Cox*

EVIDENCE HAS BEGUN TO EMERGE IN SUPPORT OF THORACIC THRUST MANIPULATION AS AN INTERVENTION IN THE MANAGEMENT OF MECHANICAL NECK PAIN.

Gonzalez-Iglesias, J; Fernandez-de-las-Penas, C; Cleland, JA; Gutierrez-Vega, MDR: Thoracic Spine Manipulation for the Management of Patients With Neck Pain: A Randomized Clinical Trial. JOURNAL OF ORTHOPAEDIC & SPORTS PHYSICAL THERAPY 2009; 39 (1):20-27 (out of Spain)

To investigate if patients with mechanical neck pain receiving thoracic spine thrust manipulation would experience superior outcomes compared to a group not receiving thrust manipulation, 45 patients were assigned to 2 groups: a control group, which received electro/thermal therapy for 5 treatment sessions, and the experimental group, which received the same electro/thermal therapy program in addition to a thoracic spine thrust manipulation once a week for 3 consecutive weeks. The effects of treatment on pain relief was VAS and disability (100-point disability scale), and cervical range of motion. Patients receiving thoracic manipulation experienced greater improvements in pain at the fifth (final) treatment session and at the 2-week and 4-week follow-up periods (P<.001), with pain improvement scores in the manipulation group of 16.8 mm and 26.5 mm greater than those in the comparison group at the 2- and 4-week follow-up periods, respectively. The experimental group also experienced significantly greater improvements in disability with a between-group difference of 8.8 points (95% confidence interval [CI]: 75, 10.1; P<.001) at the fifth visit and 8.0 points (95% CI: 5.8, 10.2; P<001) at the 2-week follow-up.

Thoracic spine thrust manipulation results in superior clinical benefits that persist beyond the 1-month follow-up period for patients with acute neck pain. Future studies should continue to investigate the effects of thoracic spine thrust manipulation, as compared to other physical therapy interventions, in a population with mechanical neck pain.

NOW, DON'T MISS THE ARTICLES UNDER TREATMENT CONCERNING

1. *WET CUPPING FOR LOW BACK PAIN,*
2. *COMPARISON OF BONE SETTERS TO PHYSICAL THERAPY FOR RELIEVING LOW BACK PAIN, AND*
3. *THE MOST INTRIGUING PAPER ON INJECTING SALINE INTO THE CONTAINED DISC UNTIL IT RUPTURES AND THIS IS TO RELIEVE RADICULOPATHY.*

WOW! -- JMC

BIOMECHANICS

REPETITIVE FLEXION AND EXTENSION CERVICAL SPINE MOTION UNDER LOADING OF 1500 N RESULTS IN DISC HERNIATION THAT CAUSES PAIN. REPETITIVE ROTATION TWISTING MOTIONS DID NOT

Drake, JDM; Callaghan, JP. Intervertebral neural foramina deformation due to twotypes of repetitive combined loading. CLINICAL BIOMECHANICS 24 (1). JAN 2009. p.1-6

Nerve root compression due to intervertebral foraminal decrease caused by posture, sustained loading and disc height loss, herniation, or altered mechanics may result in tissue compression and noxious stimuli known to elicit pain from neural tissues in the spine. It has been established that non-neutral postures combined with repeated loading can cause disc herniations, however information regarding the effect of repetitive axial twist loading is limited. The objectives of this study were twofold; to measure the occlusion of the foramina due to two types of repetitive loading and to investigate whether repetitive combined axial twist loading can contribute to disc injury.

Sixteen porcine cervical spine segments (C5/6) were subjected to 1500 N of compression combined with either repetitive flexion-extension motions of 16.4 degrees of static flexion with repetitive axial twist motions. The foramina pressure was measured bilaterally using plastic tubing and a custom pressure monitoring system. Specimens were loaded until 10,000 cycles were reached or disc herniation occurred.

Significantly larger pressure (pre-post difference) developed in the intervertebral foramina of specimens that were repetitively flexed-extended ($P = 0.028$) compared to those that were repetitively twisted. All of the flexed-extended specimens herniated, whereas in the twisted specimens five (62.5%) had incomplete herniations, one (12.5%) sustained a facet fracture, and two (25%) had no damage. There was no difference between the loading groups for vertical height loss ($P = 0.994$).

Interpretation: Repetitive loading of flexion-extension motions are a viable pain generating pathway in absence of distinguishing height loss. This information may be useful to consider for the diagnosis and treatment of nerve root compression.

H SHAPED SACRAL FRACTURES

Nathan Linstrom, Joseph Heiserman, Keith Kortman. Anatomical and biomechanical analyses of the unique and consistent locations of sacral insufficiency fractures. Spine 2009;34(4): 309–315

Sacral insufficiency fractures occur at consistent locations where sacral stress dominates. The predominant vertical components of sacral insufficiency fractures most frequently occur bilaterally through the alar regions of the sacrum, which are the thickest and most robust appearing portions of the sacrum instead of subjacent to the central sacrum, which bears the downward force of the spine. In a study of 108 sacral fracture patients, a walking model strongly correlated with identical locations for most sacral and pelvic insufficiency fractures. Locations of sacral insufficiency fractures are nearly congruous with stress depicted by walking biomechanical models. Osteoporotic sacral insufficiency fractures may present with characteristic "H" type patterns with both vertical and horizontal components of fractures across the sacrum; bilateral or unilateral vertical fractures through the sacral alar regions medial to the sacroiliac joints and lateral to the neuroforamena; isolated horizontal components; or variations of these patterns. In contrast, post-traumatic nonosteoporotic sacral fractures occur at many different locations throughout the sacrum including the neuroforamena and central canal and are more commonly unilateral when there is a vertical component.

ACTIVE LOWER LIMB MOVEMENTS MAY CONTRIBUTE TO LOW BACK PAIN

Scholtes, SA; Gornbatto, SP; Van Dillen, LR. Differences in lumbopelvic motion between people with and people without low back pain during two lower limb movement tests. CLINICAL BIOMECHANICS 24 (1). JAN 2009. p.7-12

Active limb movements with lumbopelvic motion and increased symptoms in people with low back pain was tested in 41 people without low back pain who did not play rotation-related sports and 50 people with low back pain who played rotation-related sports were examined. During knee flexion and hip lateral rotation, people with low back pain demonstrated a greater maximal lumbopelvic rotation angle and earlier lumbopelvic rotation, compared to people without low back pain. This suggests that people with low back pain who play rotation-related sports may move their lumbopelvic region to a greater extent and earlier during lower limb movements than people without low back pain. Because people perform many of their daily activities in early to midranges of joint motion the lumbopelvic region may move more frequently across the day in people with low back pain. The increased frequency may contribute to increased lumbar region tissue stress and potentially low back pain symptoms. Lower limb movements, therefore, may be important factors related to the development or persistence of low back pain.

OSTEOPOROSIS OF THE LUMBAR SPINE SHOWS DISC EXPANSION BUT NOT WITH SPINAL MOBILITY ALTERATION

Yang, Zhengyi; Griffith, James F.; Leung, Ping Chung; Lee, Raymond. Effect of Osteoporosis on Morphology and Mobility of the Lumbar Spine. Spine 2009;34(3):E115-E121

Disc morphology and spinal mobility in subjects with varying degrees of osteoporosis of the lumbar spine were studied in 90 elderly subjects with varying bone mineral densities (22 normal, 28 osteopenia, 40 osteoporosis). Although the thoracic spine had been shown to have decreased anterior vertebral body height in subjects with osteoporosis, this study revealed that the anterior height was increased in the lumbar region. Osteoporosis was associated with expansion of the middle of the disc with corresponding collapse of vertebral bodies, but osteoporosis was found not to be related to either disc preservation or degeneration. No significant change in spinal mobility was observed in patients with osteoporosis. Osteoporosis does not only affect the bone but also the nonosseous tissues. It was found to be associated with expansion of the intervertebral disc, which was likely to be secondary to changes in the vertebral endplate.

CERVICAL SPINE ROTATION PATTERNS ON SHOULDER ABDUCTION

Takasaki, Hiroshi; Hall, Toby; Kaneko, Shouta; Iizawa, Takeshi; Ikemoto, Yoshikazu. Cervical Segmental Motion Induced by Shoulder Abduction Assessed by Magnetic Resonance Imaging. Spine 2009; 34(3):E122-E126

A comparative measurement study of in vivo cervical rotation, induced by shoulder abduction, measured using magnetic resonance imaging was done on 22 subjects without history of significant cervical spine disorders. Cervical rotation was assessed with the shoulder in 0, 30, 60, 90, and 120[degrees] abduction. No statistically significant differences were found in cervical segmental rotation between each shoulder position under passive conditions. When the right shoulder was abducted, with isometric contraction, at each shoulder position up to 90[degrees] abduction, each cervical vertebra tended to rotate to the left and the largest vertebral movement was seen at C6, being 5.20[degrees] (SD = 3.66) at 0[degrees] abduction. The pattern of movement changed at 120[degrees] abduction, with C1 and C2 rotating to the right. Shoulder abduction up to 90[degrees] induced left rotation throughout the cervical spine only in the presence of muscle contraction, with the largest movement occurring at C6. A contrasting pattern of upper and lower cervical rotation occurred when the arm was positioned in 120[degrees] abduction.

OSTEOPHYTE FORMATION VARIES IN UPPER AND LOWER LUMBAR SPINE – THEY GROW TOWARD THE ADJACENT DISC IN THE UPPER LUMBAR SPINE AND AWAY IN THE LOWER LUMBAR SPINE

Kasai, Y; Kawakita, E; Sakakibara, T; Akeda, K; Uchida, A. Direction of the formation of anterior lumbar vertebral osteophytes. BMC MUSCULOSKELETAL DISORDERS 2009; 10:NIL_1-NIL_6

The formation of lumbar vertebral body osteophytes was studied 14,250 pairs of anterior lumbar vertebral osteophytes across the adjacent intervertebral discs in 2,850 patients who were all over 60 years old. Anterior lumbar vertebral osteophytes were distributed into six groups based on the direction of extension of each pair of osteophytes across the intervertebral disc space. In L1-L2 and L2-L3, the number of patients classified into groups B (the pair of osteophytes extended in the direction of the adjacent disc) and C (almost complete bone bridge formation by a pair of osteophytes across the intervertebral disc space) was larger than that classified into group D (the pair of osteophytes extended in a direction away from the adjacent disc). In L3-L4, L4-L5 and L5-S1, the number of patients in group D was greater than that of patients belonging to groups B and C.

The pairs of osteophytes frequently formed in the direction of the adjacent disc in the upper lumbar vertebrae (L1-L2 and L2-L3) and in the direction away from the adjacent disc in middle or lower lumbar vertebrae (L3-L4, L4-L5, and L5-S1).

GREATER TRUNK STIFFNESS IS NOTED IN RECURRENT LOW BACK PAIN PATIENTS

Hodges, P; van den Hoorn, W; Dawson, A; Cholewicki, J. Changes in the mechanical properties of the trunk in low back pain may be associated with recurrence. JOURNAL OF BIOMECHANICS 2009; 42 (1): 61-66

Exercise is one of the few effective treatments for LBP and is often based on the premise of reduced spinal stiffness, trunk muscle adaptation may increase stiffness. To assess trunk stiffness and damping, 14 people with recurring LBP and 17 pain-free individuals were tested via equal weights (12-15% body weight) attached to the front and back of the trunk via pulleys such that the trunk could move freely and no muscle activity was required to hold the weights. Trunk stiffness was greater in recurrent LBP patients (forward perturbation only), but damping was lower (both directions) than healthy controls. Contrary to clinical belief, trunk stiffness was increased, not reduced, in recurrent LBP, most likely due to augmented trunk muscle activity and changes in reflex control of trunk muscles. Although increased stiffness may aid in the protection of spinal structures, this may have long-term consequences for spinal health and LBP recurrence due to compromised trunk dynamics (decreased damping).

THORACIC SPINE ERECTOR SPINAE MUSCLES FATIGUE MORE THAN THE LUMBAR COUNTERPART IN LOW BACK PAIN PATIENTS

Sung, PS; Lammers, AR; Danial, P. Different parts of erector spinae muscle fatigability in subjects with and without low back pain. SPINE JOURNAL 2009; 9 (2):115-120

Considering the thoracic and lumbar components of the erector spinae muscles in regard to their individual roles in fatigue with low back pain was investigated. Forty subjects with LBP and 40 subjects without LBP were compared based on surface EMG and endurance of the erector spinae muscles. Significant EMG differences in the thoracic and lumbar parts of the erector spinae muscles between subjects with and without LBP were noted. The thoracic part had a significantly

lower median EMG frequency than the lumbar part in subjects with LBP. It is suggested that subjects with LBP demonstrated higher fatigability of the erector spinae muscles at the thoracic part than at the lumbar part. The increased fatigability of the thoracic part needs to be emphasized in rehabilitation strategies for subjects with LBP.

HIGH PHYSICAL ACTIVITY PROTECTS CHILDREN FROM FUTURE BACK PAIN OVER LESS ACTIVE CHILDREN

Wedderkopp, N; Kjaer, P; Hestbaek, L; Korsholm, L; Leboeuf-Yde, C. High-level physical activity in childhood seems to protect against low back pain in early adolescence. SPINE JOURNAL 9 (2). FEB 2009. p.134-141

Physical activity in childhood was evaluated to determine its impact on back pain reporting in early adolescence (3 years later) in a random sample of Danish children from the city of Odense sampled at age 9 years and followed-up at age 12 years.

Physical activity was assessed with the MTI-accelerometer. The accelerometer provides a minute-by-minute measure of the physical activity performed. High physical activity (HPA) levels seem to protect against future low back pain and appear to actually "treat" and reduce the odds of future mid back pain. The least active children had an odds ratio of 3.3 to the most active children of getting low back pain and 2.7 of getting mid back pain 3 years later. When stratified oil back pain at baseline, this effect on mid back pain was especially noticeable in children who had had mid back pain already at baseline, with an odds ratio of 7.2.

FACET TROPISM NOR DISK DEGENERATION ARE INVOLVED IN DISTINGUISHING THE DEVELOPMENT OF FAR LATERAL LUMBAR DISK HERNIATION FROM THAT OF POSTEROLATERAL LUMBAR DISK HERNIATION

Lee, DY; Lee, SH. Effects of Facet Tropism and Disk Degeneration on Far Lateral Lumbar Disk Herniation: Comparison With Posterolateral Lumbar Disk Herniation. NEUROLOGIA MEDICO-CHIRURGICA 2009; 49 (2):57-61

Differences in facet tropism and disk degeneration were investigated as key factors distinguishing the development of far lateral lumbar disk herniation from that of posterolateral lumbar disk herniation in 46 patients with far lateral lumbar disk herniation individually matched with 46 patients with posterolateral lumbar disk herniation. Preoperative standing body height, body weight, and body mass index were compared. Facet tropism was measured using computed tomography and disk degeneration was evaluated using magnetic resonance imaging. Mean body mass index showed a significant difference between patients with the far lateral and posterolateral lumbar disk herniation (24.9 +/- 2.7 vs. 23.7 +/- 2.3 kg/m(2), p = 0.04). However, no significant differences were found in standing body height and body weight, facet tropism, or disk degeneration between two groups. Neither facet tropism nor disk degeneration are involved in distinguishing the development of far lateral lumbar disk herniation from that of posterolateral lumbar disk herniation.

CAUSES

HAMSTRING SHORTNESS OVERLOADS THE SPINE DURING LIFTING

Carregaro, RL; Coury, HJCG. Does reduced hamstring flexibility affect trunk and pelvic movement strategies during manual handling? INTERNATIONAL JOURNAL OF INDUSTRIAL ERGONOMICS 2009; 39 (1):115-120

The influence of reduced hamstring flexibility on trunk and pelvic movement strategies adopted by healthy males during manual handling tasks was studied in 17 subjects who performed a sagittally symmetrical handling task involving a 15 kg box, and hamstring flexibility was measured by means of the Straight Leg Raise Test. Subjects with reduced flexibility presented higher trunk movement amplitudes and a restriction on pelvis movements during handling tasks. Movement coordination was also influenced by the reduced flexibility. Reduced hamstring flexibility is related to increased trunk angles, which can overload the spine during manual materials handling.

CYCLISTS HAVE LOWER BONE MINERAL DENSITY THAN NON CYCLISTS

Smathers, AM; Bemben, MG; Bemben, DA. Bone Density Comparisons in Male Competitive Road Cyclists and Untrained Controls. MEDICINE AND SCIENCE IN SPORTS AND EXERCISE 41 (2). FEB 2009. p.290-296

Low bone mineral density (BMD) has been documented in endurance-trained runners; however, the bone status of cyclists is unclear. Comparison of body, lumbar spine and femur BMD was done to 32 male competitive road cyclists to 30 matched controls. BMD was measured using dual energy x-ray absorptiometry (DXA; GE Lunar Prodigy, v. 6.70.021). Calcium intake was estimated from a food frequency questionnaire. Resting serum total and free testosterone levels were measured by RIA.

Results: There were no significant differences ($P > 0.050$) between the cyclists (CYC) and the controls (CON) for age, height, body mass, or testosterone levels. CYC had significantly ($P < 0.050$) lower percent body fat and higher bone-free lean body mass than the CON. Calcium intake for CYC was significantly higher than for the CON group. Anterior-posterior spine (L2-L4) and lateral spine (LS) BMD (g.cm(-2)) were significantly lower for CYC than for CON. 9% of CYC and 3% of CON were classified as osteoporotic, whereas 25%, and 10% of CYC and CON, respectively, were osteopenic. Conclusions: Male cyclists had lower spine BMD than controls, which was not associated with group differences in testosterone. Future studies are needed to elucidate the underlying mechanisms for low bone mass in cyclists.

YOUNG WOMEN WITH IDIOPATHIC OSTEOPOROSIS HAVE AN INCREASED BONE RESORPTION WITHOUT CHANGES IN BONE FORMATION WHEN ASSESSED BY BIOCHEMICAL MARKERS

Peris, P; Ruiz-Esquide, V; Monegal, A; Alvarez, L; de Osaba, MJM; Martinez-Ferrer, A; Reyes, R; Guanabens, N. Idiopathic osteoporosis in premenopausal women. Clinical characteristics and bone remodelling abnormalities. CLINICAL AND EXPERIMENTAL RHEUMATOLOGY 26 (6). NOV-DEC 2008. p.986-991

Osteoporosis is infrequent in young premenopausal women and is often associated with secondary disorders. A study to analyse the clinical characteristics and bone remodelling abnormalities in premenopausal women with idiopathic osteoporosis was done on 28 premenopausal women with idiopathic osteoporosis (aged 38.3 +/- 7.6, years. The patients had one or more fragility fractures and/or decreased bone mass (z-score <-2 in the lumbar spine or femur). In all patients, secondary causes of osteoporosis were excluded and previous skeletal fractures, family history and risk factors for osteoporosis were recorded. In addition, bone mineral density at the lumbar spine and hip, spinal x-rays, and laboratory tests including PTH, 25-hydroxyvitamin D, 1,25 (OH)(2) vitamin D and urinary calcium excretion were measured. Bone markers such as serum bone alkaline phosphatase (bone AP) and PINP and urinary hydroxyroline (HYP), NTx and CTx were measured and results were compared with those observed in a control group of 28 healthy premenopausal women.

Results: 46% of the patients had previous fragility fractures, 53% had family history of osteoporosis, 36% had associated hypercalciuria and 30% had a BMI <20 Kg/m(2). Patients with idiopathic osteoporosis had increased bone resorption markers (NTx and HYP) but normal bone formation markers when compared with health), controls. No significant differences in the clinical and biochemical parameters were observed between patients with or without hypercalciuria.

Conclusion: Young women with idiopathic osteoporosis have an increased bone resorption without changes in bone formation when assessed by biochemical markers.

LIPOMATOSIS OF THE SCIATIC NERVE AS CAUSE OF RADICULOPATHY

Fandridis, EM; Kiriako, AS; Spyridonos, SG; Delibasis, GE; Bourlos, DN; Gerostathopoulos, NE. LIPOMATOSIS OF THE SCIATIC NERVE: REPORT OF A CASE AND REVIEW OF THE LITERATURE. MICROSURGERY 29 (1). 2009. p.66-71

Lipomatosis of the sciatic nerve is also known as lipofibromatous hamartoma. A male, 26-year-old, presented with gait impairment, leg pain, and foot drop compatible with sciatic nerve's compression. The preoperative magnetic resonance imaging (MRI) revealed diffuse thickening of the proximal third of the sciatic nerve with adipose tissue interspersed among the nerve fascicles. Internal neurolysis was performed with microsurgical techniques under high magnification. The patient was followed up for a period of 34 months. He significantly recovered, and there was no clinical recurrence of the tumor.

CHRONIC COMPRESSION OF THE DORSAL ROOT GANGLION CAUSES EXPRESSION OF HOMERLA, A PROTEIN THAT CAUSES THERMAL HYPERALGESIA BY NEURAL INJURY

Ma, ZL; Zhu, W; Zhang, W; Gu, XP. Effect of the Synaptic Scaffolding Protein Homer1a on Chronic Compression of Dorsal Root Ganglion. ANNALS OF CLINICAL AND LABORATORY SCIENCE 2009; 39 (1):71-75

The synaptic scaffolding protein Homer1a has received increasing attention because it appears to play a critical role in synaptic plasticity. Chronic compression of the dorsal root ganglion (CCD causes Homer1a mRNA in the ipsilateral dorsal horn of CCD rats to increase at 4 hr, remain elevated at 8 hr, and then return to baseline values by 24 hr after CCD treatment. No such change occurred in sham operated or control rats. Significant thermal hyperalgesia appeared at 24 hr post-operation in the CCD rats, but not in the Sham-operated or Control groups. These data show that CCD induces a transient and rapid increase in Homer1a expression in the spinal dorsal horn. These data also suggest that the transient and rapid increase in Homer1a expression may play an important role in the thermal hyperalgesia elicited by neural injury.

ATHEROSCLEROSIS AND BONE LOSS MAY BE RELATED

Hyder, JA; Allison, MA; Wong, N; Papa, A; Lang, TF; Sirlin, C; Gapstur, SM; Ouyang, P; Carr, JJ; Criqui, MH. Association of Coronary Artery and Aortic Calcium With Lumbar Bone Density. AMERICAN JOURNAL OF EPIDEMIOLOGY 2009;169 (2):186-194

Atherosclerosis and osteoporosis share many risk factors, but their independent association is unclear. The associations between volumetric trabecular bone mineral density (vBMD) of the lumbar spine and coronary artery calcium (CAC) and abdominal aortic calcium (AAC) were studied via quantitative computed tomography to assess vBMD and the presence and extent of CAC and AAC among 946 women (mean age = 65.5 years) and 963 men (mean age = 64.1 years) in a substudy of the Multi-Ethnic Study of Atherosclerosis. Prevalences of CAC were 47% and 68% in women and men, respectively, and AAC prevalences were 70% and 73%. Sequential, sex-specific regression models included adjustment for age, ethnicity, body mass index, hypertension, dyslipidemia, diabetes mellitus, smoking, alcohol consumption, physical activity, interleukin-6, C-reactive protein, homocysteine, and sex hormones. After full adjustment, lower vBMD was associated with greater CAC score among women ($P < 0.002$) and greater AAC score among women ($P = 0.004$) and men ($P < 0.001$). After adjustment, vBMD quartile was inversely associated with CAC prevalence (P-trend = 0.05) in women and AAC prevalence (P-trend < 0.01) in men. Partially and fully adjusted models showed similar results. Though modest, these significant, independent associations suggest that atherosclerosis and bone loss may be related.

LUMBAR ARTERY STENOSIS IS ASSOCIATED WITH LOW BACK PAIN INTENSITY

Korkiakoski, A; Niinimaki, J; Karppinen, J; Korpelainen, R; Haapea, M; Natri, A; Tervonen, O. Association of Lumbar Arterial Stenosis with Low Back Symptoms: A Cross-Sectional Study Using Two-Dimensional Time-of-Flight Magnetic Resonance Angiography. ACTA RADIOLOGICA 2009; 50 (1):48-54

Recent studies indicate that diminished blood flow may cause low back symptoms and intervertebral disc degeneration. This relationship was studied by two-dimensional time-of-flight magnetic resonance angiography for the relationship of arterial stenosis and lumbar pain symptoms in an occupational cohort of 228 middle-aged Finnish males. In each subject, the first (L1) to fourth (L4) segmental lumbar arteries were evaluated for lumbar artery stenosis using a dichotomic scale. The sensitivity of 2D TOF-MRA in detecting stenosis was 0.58, the accuracy 0.89, and the specificity 0.94. In 97 (43%) subjects all arteries were normal, whereas 130 (57%) had at least one stenosed artery. The left L4 artery was most often affected. The degree of arterial stenosis was associated with intensity of low back and sciatic pain, and sciatica pain duration during the past 3 months. Conclusion: Arterial stenosis was associated with subjective pain symptoms, indicating a role of decreased nutrition in spinal disorders.

NERVE ROOT INJURY CAUSES CYTOKINE AND TUMOR NECROSIS FACTOR PRODUCTION THAT CAUSES RADICULOPATHY

Rothman, SM; Huang, Z; Lee, KE; Weisshaar, CL; Winkelsteln, BA. Cytokine mRNA Expression in Painful Radiculopathy. JOURNAL OF PAIN 10 (1). JAN 2009. p.90-99

Inflammatory cytokines contribute to lumbar radiculopathy. The 0 root in the rat underwent compression (10gf), chromic gut suture exposure (chr), or their combination (10gf+chr). Ipsilateral C7 spinal cord and dorsal root ganglia (DRG) were harvested at 1 hour after injury for real-time PCR analysis of IL-1 beta, IL-6, and TNF-alpha. Cytokine mRNA increased after all 3 injuries. TNF-alpha mRNA in the DRG was significantly increased over sham after 10gf+chr ($P = .026$). Spinal IL-1 beta was significantly increased over sham after 10gf and 10gf+chr ($P < .024$); IL-6 was significantly increased after 10gf+chr ($P < .024$). In separate studies, the soluble TNF-alpha receptor was administered at injury and again at 6 hours in all injury paradigms. Allodynia was assessed and tissue samples were harvested for cytokine PCR. Allodynia significantly decreased with receptor administration for 10gf and 10gf+chr ($P < .005$). Treatment also significantly decreased IL-1 beta and TNF-alpha mRNA in the DRG for 10gf+chr ($P < .028$) at day 1. Results indicate an acute, robust cytokine response in cervical nerve root injury with varying patterns, dependent on injury type, and that early increases in TNF-alpha mRNA in the DRG may drive pain-related signaling for transient cervical injuries.

Perspective: Inflammatory cytokine mRNA in the DRG and spinal cord are defined after painful cervical nerve root injury. Studies describe a role for TNF-alpha in mediating behavioral sensitivity and inflammatory cytokines in transient painful radiculopathy. Results outline an early response of inflammatory cytokine upregulation in cervical pain.

POSTURAL FAULTS SEEN IN MOUTH BREATHING OVER NASAL BREATHING CHILDREN

Neiva, PD; Kirkwood, RN; Godinho, R. Orientation and position of head posture, scapula and thoracic spine in mouth-breathing children. INTERNATIONAL JOURNAL OF PEDIATRIC OTORHINOLARYNGOLOGY 2009; 73 (2):227-236

Mouth-breathing is a common clinical condition among school-age children and some studies have correlated this condition with quality of life and postural alterations. To investigate the orientation and position of the scapula, thoracic spine and head posture among mouth-breathing (MB) children and nasal-breathing (NB) children,28 MB children and 21 NB children were compared for internal rotation, upward rotation, anterior tilt, scapular elevation and abduction bilaterally as well as thoracic kyphosis, forward head position and shoulder protrusion. The MB children showed increased scapular superior position in relation to the NB group. Ninety-five percent of the NB children and 58% among the MB children had been breastfed, this difference was statistically significant. MB children increased scapular superior position in comparison to NB children due probably to the position of forward head, leading to an alteration in the positioning of the mandible. The absence of significantly difference in posture pattern between groups in the present study could attributed to height-weight development in this age, as the posture of children changes in order to adapt to new body proportions, regardless of health status. The results observed in this study demonstrate the importance of using reliable measurements in the postural assessment of MB and NB children helping physical therapists to focus their strategies during rehabilitation in more specific conditions.

GLIOBLASTOMA MULTIFORME MASQUERADES AS AN L1-L2 DISC HERNIATION

Choi, WC; Lee, JH; Lee, SH. Spinal cord glioblastoma multiforme of conus medullaris masquerading as high lumbar disk herniation. SURGICAL NEUROLOGY 71 (2). FEB 2009. p.234-237

A case of primary intramedullary glioblastoma occurring at conus medullaris is presented, which was initially undetected and misdiagnosed as L1 through L2 disk herniation. Surgery was performed to remove the L1-L2 disc herniation and the patient's symptoms persisted. With progressive paresis, The conus medullaris tumor was diagnosed with follow-up MRI with enhancement and a second surgery revealed a biopsy confirmed glioblastoma multiforme.

COPPER DEFICIENCY PRODUCES SENSORY ATAXIA MYELOPATHY

Zara, G; Grassivaro, F; Brocadello, F; Manara, R; Pesenti, FF. Case of sensory ataxic ganglionopathy-myelopathy in copper deficiency JOURNAL OF THE NEUROLOGICAL SCIENCES 277 (1-2). FEB 15 2009. p.184-186

Spinal cord involvement associated with severe copper deficiency has been reported in the last 8 years. Copper deficiency may produce an ataxic myelopathy. Clinical and neuroimaging findings are similar to the subacute combined degeneration seen in patients with vitamin B12 deficiency. Macrocytic, normocytic and microcytic anemia, leukopenia and, in severe cases, pancytopenia are well known hematologic manifestations. A patient with copper deficiency, dorsal root ganglions and cervical dorsal columns involvement is presented. Clinical status and neuroimaging improved after copper replacement therapy. Sensory neurons of dorsal root ganglia may be the most sensitive nervous pathway. In this case the early copper treatment allowed to improve neurologic lesions and to prevent further involvements.

PRE-PREGNANCY PHYSICAL ACTIVITY DOES NOT INFLUENCE RISK OF PAIN 1/2 YEAR AFTER DELIVERY

Mogren, IM. Physical activity and persistent low back pain and pelvic pain post partum. BMC PUBLIC HEALTH 8. DEC 22 2008. p.NIL_1-NIL_5

The potential influence of pre-pregnancy regular leisure-time physical activity (PA) on the risk of persistent LBPP half a year after pregnancy and to explore the starting time and prevalence of PA among women experiencing LBPP during pregnancy, in relation to remission or persistent LBPP half a year after pregnancy was studied in 639 women who reported LBPP during pregnancy. These women were sent a questionnaire at approximately six months after delivery. The respondents were divided into three groups: 'no pain', 'recurrent pain', and 'continuous pain. 44.5% of subjects reported current PA at six months post partum. The mean starting time of PA was 2.6 months post partum and the mean number of current, weekly events of PA was 3.4; there were no differences between the groups. 82.2% reported previous PA at some period in life. Women with BMI >= 30 reported current PA to a lesser extent. The number of years of pre-pregnancy PA did not influence the risk of persistent LBPP. Almost half of women who had experienced LBPP during pregnancy reported PA at six months post partum. The number of years of pre-pregnancy PA did not influence the risk of persistent LBPP. Obesity was a risk factor for not practicing PA.

PERIPHERAL NERVE DAMAGE RESULTS IN REINNERVATION WITH INCREASED SENSITIVITY, EXPLAINING HOW NERVE DAMAGE LEADS TO CHJRONIC PAIN

Jankowski, MP; Lawson, JJ; McIlwrath, SL; Rau, KK; Anderson, CE; Albers, KM; Koerber, HR. Sensitization of Cutaneous Nociceptors after Nerve Transection and Regeneration: Possible Role of Target-Derived Neurotrophic Factor Signaling. JOURNAL OF NEUROSCIENCE 2009; 29 (6):1636-1647

Damage to peripheral nerves is known to contribute to chronic pain states, including mechanical and thermal hyperalgesia and allodynia. It is unknown whether the establishment of these states is attributable to peripheral changes, central modifications, or both.

To answer this, several different approaches to assess the changes in myelinated (A) and unmyelinated (C) cutaneous nociceptors after transection and regeneration of the saphenous nerve were taken. Response characteristics and neurochemical phenotype function of neurons was tested. Myelinated nociceptors had significantly lower mechanical and thermal thresholds after regeneration, whereas C-polymodal nociceptors (CPMs) had lower heat thresholds. There was a significantincrease in the percentage of mechanically insensitive C-fibers that responded to heat (CHs) after regeneration. Immunocytochemical analysis of identified afferents revealed that most CPMs were isolectin B4 (IB4) positive and transient receptor potential vanilloid 1 (TRPV1) negative, whereas CHs were always TRPV1 positive and IB4 negative in naive animals (Lawson et al., 2008). However, after regeneration, some identified CPMs and CHs stained positively for both markers, which was apparently attributable to an increase in the total number of IB4-positive neurons. Real-time PCR analysis of L2/L3 DRGs and hairy hindpaw skin at various times after

saphenous nerve axotomy suggested multiple changes in neurotrophic factor signaling that correlated with either denervation or reinnervation of the cutaneous target. These changes may underlie the functional alterations observed after nerve regeneration and may explain how nerve damage leads to chronic pain conditions.

THE FOLLOWING PAPER IS ADDED BECAUSE DIFFERENTIATION OF DIABETIC AND RADICULAR NEUROPATHIES IS OF GREAT IMPORT AND THIS PAPER GIVES CLINICAL INSIGHT AS TO THEIR DIFFERENTIAL. ALSO OF INTEREST IS THAT THE PAPER COMES FROM BAGHDAD, IRAQ WHERE SOUND MEDICAL CARE CONTINUES WHILE CONFLICT CONTINUES.

Sheki, AA; Hamdan, FB. The role of different neurophysiological tests in the differential diagnosis of diabetic axonal neuropathy and lumbosacral radiculopathy. NEUROSCIENCES 14 (1). JAN 2009. p.25-30

Differential diagnosis of diabetic axonal neuropathy (DAN) and lumbosacral radiculopathy (LSR) patients were studied for the neurophysiological tests used at the Al-Kadhimiya Teaching Hospital, Baghdad, Iraq, from July 2006 to February 2007. Twenty-seven healthy subjects, 44 type 2 diabetics, and 36 LSR patients were studied. The HbA1c level, plain x-ray, and MRI of the lumbosacral region and different electrophysiological tests were assessed.

The sural sensory nerve action potential (SNAP) amplitude values were reduced in 56.3%, and the sural/radial amplitude ratio (SRAR) values were reduced in 71.8% in the diabetic patients, but not in the LSR group. The peroneal compound muscle action potential (CMAP) amplitude was low in 70.45% DAN patients versus 35.5% LSR patients. Peroneal F-minimum (Fmin) values were prolonged in 56.8% DAN versus 32.25% LSR patients. The F-persistence (Fp) values were low in 72.7% of DAN, versus 45.2% of LSR patients. However, the F-chronodispersion (Fc) was abnormal in 71% of LSR versus 11.4% of DAN patients.

Conclusion: The SRAR was found to be more significant than the sural SNAP amplitude alone in the differential diagnosis of the 2 groups. Abnormal peroneal Fc and Fp seems to be valuable tests in the detection of LSR and DAN patients.

CERVICAL

INFORMED CONSENT FOR CERVICAL SPINE MANUAL MANIPULATION BECAUSE OF ARTERY DISSECTION POSSIBILITIES

Paciaroni, M; Bogousslavsky, J. Cerebrovascular Complications of Neck Manipulation. EUROPEAN NEUROLOGY 61 (2). 2009. p.112-118

The safety of spinal manipulation is an issue that demands regular and rigorous assessment, as manipulation of the upper spine has been associated with serious adverse events such as cerebrovascular accidents due to cervical artery dissection. A correlation between stroke and cervical manipulation has been reported with increasing frequency, and each new report seems

to reignite debate between neurologists and manual therapists. Specific risk factors for cerebrovascular complications related to spinal manipulation have not been identified yet; for this reason, any patient may be at risk, particularly those below 45 years of age. Patients undergoing spinal manipulative therapy need to consent to the possible risk of stroke or vascular injury from the procedure

EDITOR JMC COMMENT: I know of no vertebral or carotid artery dissection reported from flexion distraction and decompression adjusting. Not saying there may not be, but I know of none.

POST WHIPLASH LONG LASTING WORK DISABILITY IS PRIMARILY DUE TO COGNITIVE LOSS AND AGE, NOT HEAVY LIFTING OR EDUCATIONAL LEVEL

Buitenhuis, J; de Jong, Peter J.; Jaspers, Jan P.C.; Groothoff, Johan W. Work Disability After Whiplash: A Prospective Cohort Study. Spine. 34(3):262-267, February 1, 2009.

The consequences of neck pain after motor vehicle accidents in terms of disability for work and the relationship this has with symptom and work-related factors was studied.
A relationship has been suggested between poor recovery from or persistent work disability after whiplash and female gender, older age, marital status, heavy manual work, self-employment, prior psychological problems, subjective complaints of poor concentration, pain catastrophizing, and kinesiophobia.

To test these findings, individuals with neck complaints after involvement in traffic accidents, who initiated compensation claim procedures with a Dutch insurance company (n = 879), were sent questionnaires (Q1) concerning the accident, the injuries that they had sustained, their complaints at that time, and questions regarding work and disability. The course of complaints and work disability was monitored at 6 (Q2) and 12 months (Q3) after the accident. A total of 58.8% of the population with neck complaints studied was work-disabled after the accident. Age and impaired concentration complaints after 1 month were found to be related to work disability at 1 year, independent of physical complaints and work characteristics. Age and concentration complaints were important independent predictors of long-lasting work disability, whereas no evidence emerged to indicate that the degree of manual labor (blue or white collar work) or educational level was involved in persistent work disability in post-whiplash syndrome. The current results suggest that work disability could benefit most from interventions related to recovery from cognitive complaints and less from physically related interventions.

5 OF 11 PROLAPSED CERVICAL SPINE DISCS REDUCED UNDER ROTATION AND EXTENSION MOVEMENT

Scannell, Joan P.; McGill, Stuart M. Disc Prolapse: Evidence of Reversal With Repeated Extension. Spine. 34(4):344-350, February 15, 2009.

Eighteeen porcine cervical spines were repeatedly flexed and lateral flexed under 1472 N of axial compression until disc prolapse took place and then repeated extension and rotation under axial compression of the C3/4 segments was applied. All 18 specimens contained healthy discs before

testing, but after testing 2 of the 18 specimens had endplate fractures, whereas 11 of the 18 specimens had prolapsed. Prolapsed nucleus was reduced in 5 of the 11 prolapsed specimens after the reversal testing, whereas the remaining 6 did not change. The prolapsed discs that centralized had significantly less disc height loss. This study showed that with repeated flexion, in porcine cervical spines, disc prolapse was initiated and that the displaced portion of nucleus can be directed back towards the center of the disc in response to particular active and passive movements/positions.

TRAMPOLINE USE BY CHILDREN IS URGED TO BE BANNED

Leonard, H; Joffe, AR. Children presenting to a Canadian hospital with trampoline-related cervical spine injuries. PAEDIATRICS & CHILD HEALTH 14 (2). FEB 2009. p.84-88

Trampoline-related accidents resulting in death or injury of 7 cases of cervical spine injury showed 4 patients had lasting neurological deficits at discharge from hospital, and another patient died at the scene due to refractory cardiac arrest. Injuries were sustained both on (n=5) and off (n=2) the trampoline from mechanisms that included attempted somersaults on the trampoline and falls from the trampoline. All the trampolines were privately owned home trampolines. An ambulance was called for five patients, intravenous fluids were administered to two patients with hypotension and spinal shock, and cardiopulmonary resuscitation was performed on one patient. All six patients surviving the initial injury were admitted to hospital for a mean +/- SD of 9.5 +/- 9.0 days. These six patients underwent imaging including x-rays, computed tomography and magnetic resonance imaging, and three patients required surgery for spinal stabilization.

CONCLUSION: Cervical spine injuries from trampolines lead to severe neurological sequelae, death, hospitalization and significant resource use. The authors agree with the Canadian Paediatric Society's statement that trampolines should not be used for recreational purposes at home, and they support a ban on all paediatric use of trampolines.

DISC

BONE MARROW DERIVED STEM CELLS SURVIVE AND DIFFERENTIATE WITIN THE NUCLEUS PULPOSUS OF DEGENERATED RAT DISCS

Wei, AQ; Tao, H; Chung, SA; Brisby, H; Ma, DD; Diwan, AD. The Fate of Transplanted Xenogeneic Bone Marrow-Derived Stem Cells in Rat Intervertebral Discs. JOURNAL OF ORTHOPAEDIC RESEARCH 27 (3). MAR 2009. p.374-379

The potential of using stem cells to treat disc degeneration xenogeneic bone-marrow derived stem cells placed in a rat disc degeneration model to determine which cell types, if any,survived and differentiated into disc-like cells. Human bone-marrow derived CD34(+) (hematopoietic progenitor cells) and CD34(-) (nonhematopoietic progenitor cells, including mesenchymal stem

cells) cells were isolated and injected into rat coccygeal discs. The rats were sacrificed at day 1, 10, 21, and 42. Treated discs showed CD34(-) cells were detected until day 42 in the nucleus pulposus of the injected discs. After 3 weeks these cells had differentiated into cells expressing chondrocytic phenotype (Collagen II and Sox-9). In contrast, the fluorescent labeled CD34(+) cells could not be detected after day 21. No fluorescence-positive cells were detected in the noninjected control discs. Further, no inflammatory cells infiltrated the nucleus pulposus, even though these animals had not received immunosuppressive treatment. This study showed that transplanted human BM CD34(-) cells survived and differentiated within the relative immune privileged nucleus pulposus of intervertebral disc degeneration.

DISC DEGENERATION LINKED TO GENETIC VARIANTS

Videman, T; Saarela, J; Kaprio, J; Nakki, A; Levalahti, E; Gill, K; Peltonen, L; Battie, MC. Associations of 25 Structural, Degradative, and Inflammatory Candidate Genes With Lumbar Disc Desiccation, Bulging, and Height Narrowing. ARTHRITIS AND RHEUMATISM 60 (2). FEB 2009. p.470-481

The allelic diversity of structural, inflammatory, and matrix-modifying gene candidates and their association with disc degeneration was studied in 588 men ages 35-70 years. Associations of single-nucleotide polymorphisms in AGC1 and in 12 collagen, 8 interleukin, and 4 matrix metalloproteinase genes with quantitative magnetic resonance imaging measurements of disc desiccation and disc bulging and height narrowing scores, after controlling for age and suspected risk factors were studied. Twelve of the 99 variants in 25 selected candidate genes provided evidence of association with disc signal intensity in the upper and/or lower lumbar regions. Allelic variants of AGC1, and COL11A2 genes provided the most significant evidence of association with disc signal intensity. The same variants of AGC1 and COL9A1 as well as variants in the COL11A1 gene were also associated with disc bulging, as was AGC1 with disc height narrowing. In addition, 4 allelic variants in the immunologic candidate genes (rs2071375 in ILIA [P = 0.027]; rs1420100 in IL18RAP [P = 0.005]) were associated with disc signal intensity.

Conclusion. Genetic variants account for interindividual differences in disc matrix synthesis and degradation. mechanisms of degeneration are found and support the view that disc degeneration is a polygenetic condition.

AGGRECANASES MAY CAUSE DISC DEGENERATION

Pockert, AJ; Richardson, SM; Le Maitre, CL; Lyon, M; Deakin, JA; Buttle, DJ; Freemont, AJ; Hoyland, JA. Modified Expression of the ADAMTS Enzymes and Tissue Inhibitor of Metalloproteinases 3 During Human Intervertebral Disc Degeneration. ARTHRITIS AND RHEUMATISM 2009; 60 (2):482-491

Investigation of the expression of the recognized aggrecanases and their inhibitor, tissue inhibitor of metalloproteinases 3 (TIMP-3), in human intervertebral disc tissue was done on 24 nondegenerated and 30 degenerated disc samples. They were analyzed for absolute messenger RNA (mRNA) copy number of ADAMTS 1., 4, 5, 8, 9, and 15 and TIMP-3 by real-time reverse

transcription-polymerase chain reaction. Thirty-six formalin-fixed embedded intervertebral disc samples of varying grades of degeneration were used for immunohistochemical analyses. In addition, samples from 8 subjects were analyzed for the presence of matrix metalloproteinase (MMP)- and aggrecanase-generated aggrecan products. The aggrecanases ADAMTS 1, 4, 5, 9, and 15 may contribute to the changes occurring in the ECM during intervertebral disc degeneration. Targeting these enzymes may be a possible future therapeutic strategy for the prevention of intervertebral disc degeneration and its associated morbidity.

INTERVERTEBRAL DISC MODEL DEVELOPED TO STUDY DISC METABOLISM AND FACTORS LEADING TO DISC DEGENERATION

Magnier, C; Boiron, O; Wendling-Mansuy, S; Chabrand, P; Deplano, V. Nutrient distribution and metabolism in the intervertebral disc in the unloaded state: A parametric study. JOURNAL OF BIOMECHANICS 2009; 42 (2):100-108

A 2-D finite element model for the intervertebral disc in which quadriphasic theory is coupled to the transport of solutes involved in cellular nutrition was developed for investigating the main factors contributing to disc degeneration. Degeneration is generally considered to result from chronic disc cell nutrition insufficiency, which prevents the cells from renewing the extracellular matrix and thus leads to the loss of proteoglycans. Hence, the osmotic power of the disc is decreased, causing osmomechanical impairments. Cellular metabolism depends strongly on the oxygen, lactate and glucose concentrations and on pH in the disc. To study the diffusion of these solutes in a mechanically or osmotically loaded disc, the osmomechanical and diffusive effects have to be coupled. The intervertebral disc is modeled here using a plane strain formulation at the equilibrium state under physiological conditions after a long rest period (called unloaded state). The correlations between solute distribution and various properties of healthy and degenerated discs are investigated. The numerical simulation shows that solute distribution in the disc depends very little on the elastic modulus or the proteoglycan concentration but greatly on the porosity, diffusion coefficient and endplate diffusion area. This coupled model therefore opens new perspectives for investigating intervertebral disc degeneration mechanisms.

DISCOGENIC LOW BACK PAIN CAUSING PAIN IS BEST TREATED NON SURGICALLY

Madigan, L; Vaccaro, AR; Spector, LR; Milam, RA. Management of Symptomatic Lumbar Degenerative Disk Disease. JOURNAL OF THE AMERICAN ACADEMY OF ORTHOPAEDIC SURGEONS 2009; 17 (2):102-111

Symptomatic lumbar degenerative disk disease, or discogenic back pain, is difficult to treat. Patients often report transverse low back pain that radiates into the sacroiliac joints. Radicular or claudicatory symptoms are generally absent unless there is concomitant nerve compression. Physical examination findings are often unremarkable. Radiographic examination may reveal disk space narrowing, end-plate sclerosis, or vacuum phenomenon in the disk; magnetic resonance imaging is useful for revealing hydration of the disk, annular bulging, or lumbar spine end-plate (Modic) changes in the adjacent vertebral bodies. The use of diskography as a confirmatory study remains controversial. Recent prospective, randomized trials and meta-

analyses of the literature have helped expand what is known about degenerative disk disease. In most patients with low back pain, symptoms resolve without surgical intervention; physical therapy and nonsteroidal anti-inflammatory drugs are the cornerstones of nonsurgical treatment. Intradiskal electrothermal treatment has not been shown to be effective, and arthrodesis remains controversial for the treatment of discogenic back pain. Nucleus replacement and motion-sparing technology are too new to have demonstrated long-term data regarding their efficacy.

NO ASSOCIATION OF MODIC TYPE I CHANGE AND INFECTION

Wedderkopp, N; Thomsen, K; Manniche, C; Kolmos, HJ; Secher Jensen, T; Yde, CL: No Evidence for Presence of Bacteria in Modic Type I Changes. ACTA RADIOLOGICA 2009; 50 (1):65-70

Recent studies suggest an association between sciatica and Propionibacterium acnes. Modic type I changes in the vertebrae are closely associated with sciatica and lower back pain, and recent studies have questioned the ability of conventional magnetic resonance imaging (MRI) to differentiate between degenerative Modic type I changes and vertebral abnormalities caused by infection. To test this idea, 24 consecutive patients with Modic type I changes in lumbar vertebrae had a biopsy taken from the affected vertebra by a strict aseptic procedure. None of the biopsies yielded growth of anaerobic bacteria. In one patient, both biopsies yielded growth of Staphylococcus epidermidis, and in another patient coagulase-negative staphylococci were isolated from one biopsy. Both patients received oral antibiotics without convincing effect on symptoms. Conclusion: No evidence of bacteria in vertebrae with Modic type I changes.

BONE MARROW CELLS CO CULTURED WITH NUCLEUS PULPOSUS CELLS INCREASED NUCLEUS CELLS GREATER THAN CO CULTURING WITH MESENCHYMAL STEM CELLS

Umeda, M; Kushida, T; Sasai, K; Asada, T; Oe, K; Sakai, D; Mochida, J; Ikehara, S; Iida, H. Activation of Rat Nucleus Pulposus Cells by Coculture with Whole Bone Marrow Cells Collected by the Perfusion Method. JOURNAL OF ORTHOPAEDIC RESEARCH 2009; 27 (2):222-228

Cell proliferation and matrix synthesis were compared for rat nucleus pulposus cells cocultured with mesenchymal stem cells (MSCs) or fresh whole bone marrow cells (BMCs), harvested by the perfusion or aspiration methods. Nucleus pulposus cells were isolated from tail intervertebral discs of F344/slc rats, and BMCs were obtained from femora. Proteoglycan synthesis, DNA synthesis, and aggrecan mRNA expression were measured. The level of transforming growth factor-beta in supernatants from the culture system was also measured. Cell number, aggrecan mRNA expression, and uptake of [S-35]-sulfate and [H-3]-thymidine by nucleus pulposus cells cocultured with fresh whole BMCs all increased significantly compared with nucleus pulposus cells cocultured with MSCs. TGF-beta secreted by nucleus pulposus cells cocultured with fresh whole BMCs also significantly increased when compared with cocultures with MSCs. The perfusion method was superior to the aspiration method for preventing contamination of BMCs with peripheral red blood cells and lymphocytes, which may cause an autoimmune response in the disc. In conclusion, researchers suggest that fresh whole BMCs harvested by the perfusion method are more effective for increasing the proliferative and matrix synthesis capacity of nucleus pulposus cells.

LUMBAR DISC REMOVAL RECURRENT DISC PAIN AND HERNIATION STUDY: GREATER REPORTED INCIDENCE OF LONG-TERM RECURRENT BACK AND LEG PAIN AFTER AGGRESSIVE DISCECTOMY BUT A GREATER REPORTED INCIDENCE OF RECURRENT DISC HERNIATION AFTER LIMITED DISCECTOMY

McGirt, MJ; Ambrossi, GLG; Datoo, G; Sciubba, DM; Witham, TF; Wolinsky, JP; Gokaslan, ZL; Bydon. A RECURRENT DISC HERNIATION AND LONG-TERM BACK PAIN AFTER PRIMARY LUMBAR DISCECTOMY: REVIEW OF OUTCOMES REPORTED FOR LIMITED VERSUS AGGRESSIVE DISC REMOVAL. NEUROSURGERY 2009; 64 (2):338-344

To determine whether aggressive disc removal with curettage (AD) or limited removal of disc fragment (LID) alone with little disc invasion provides a better outcome for the treatment of lumbar disc herniation with radiculopathy, the literature was reviewed from published studies between 1980 and 2007 to determine long-term back pain or recurrent disc herniation. Fifty-four studies (60 discectomy cohorts) met the inclusion criteria, reporting the outcomes of 13 359 patients after lumbar discectomy (limited removal (LID), 6135 patients; aggressive disc removal (AD), 7224 patients). The reported incidence of short-term recurrent back or leg pain was similar after surgery (mean, LD 14.5%) ; AD (mean, 14.1%). However, more than 2 years after surgery, the reported incidence of recurrent back or leg pain was 2.5-fold less after LID compared with AD. The reported incidence of recurrent disc herniation after LD (mean, 7%;range, 2-18%) was greater than that reported after AD (mean, 3.5%; range, 0-9.5%). Review of the literature demonstrates a greater reported incidence of long-term recurrent back and leg pain after AD but a greater reported incidence of recurrent disc herniation after LD. Prospective, randomized trials are needed to firmly assess this possible difference.

INCIDENCE

IN NORTH CAROLINA THE INCIDENCE OF CHRONIC LOW BACK PAIN HAS RISEN FROM 3.9% TO 10.2% OF THE POPULATION FROM 1992 TO 2006

Freburger, JK; Holmes, GM; Agans, RP; Jackman, AM; Darter, JD; Wallace, AS; Castel, LD; Kalsbeek, WD; Carey, TS. The Rising Prevalence of Chronic Low Back Pain. ARCHIVES OF INTERNAL MEDICINE 2009; 169 (3):251-258

The prevalence of chronic LBP and the demographic, health-related, and health care-seeking characteristics of individuals with the condition was studied by a cross-sectional, telephone survey of a representative sample of North Carolina households in 1992 and repeated in 2006. A total of 4437 households were contacted in 1992 and 5357 households in 2006 to identify noninstitutionalized adults 21 years or older with chronic (> 3 months), impairing LBP or neck pain that limits daily activities. These individuals were interviewed in more detail about their

health and health care seeking.

Results: The prevalence of chronic, impairing LBP rose significantly over the 14-year interval, from 3.9% in 1992 to 10.2% in 2006. Increases were seen for all adult age strata, in men and women, and in white and black races. Symptom severity and general health were similar for both years. The proportion of individuals who sought care from a health care provider in the past year increased from 73.1% to 84.0% while the mean number of visits to all health care providers were similar (19.5 [1992] vs 19.4 [2006]).

Conclusions: The prevalence of chronic, impairing LBP has risen significantly in North Carolina, with continuing high levels of disability and health care use. A substantial portion of the rise in LBP care costs over the past 2 decades may be related to this rising prevalence.

LOW BACK PAIN IN MILITARY ENLISTEES REQUIRING HOSPITALIZATION IS 27%

Mattila, VM; Sillanpaa, P; Visuri, T; Pihlajamaki, H. Incidence and trends of low back pain hospitalization during military service - An analysis of 387,070 Finnish young males. BMC MUSCULOSKELETAL DISORDERS 10. JAN 19 2009. p.NIL_1-NIL_6

All male conscripts performing their compulsory military service during 1990-2002 were studied for hospitalizations. Altogether 7,240 LBP hospitalisations were identified among 5,061 (1.3%) male conscripts during the study period. The event-based incidence of LBP hospitalisation was 27.0 . In most cases, the diagnosis was unspecified LBP (n = 5,141, 71%) followed by lumbar disc disorders (n = 2,069, 29%). Hospitalisation incidence due to unspecified LBP was 19.1 per 1,000 person-years and 7.8 per 1,000 person-years due to lumbar disc disorders. The incidence of unspecified LBP remained unaltered, while hospitalisation due to lumbar disc disorders declined from 1993 onwards. Although conscripts accepted into military training pass physician-performed examinations as healthy, young adults, LBP hospitalisation causes significant morbidity during military service.

SICK LEAVE FOR NECK AND SHOULDER PAIN IS LOWER THAN PREVIOUS STUDIES SHOW

Alipour, Akbar; Ghaffari, Mostafa; Shariati, Batoul; Jensen, Irene; Vingard, Eva: Four-Year Incidence of Sick Leave Because of Neck and Shoulder Pain and Its Association With Work and Lifestyle. Spine 2009; 34(4):413-418

To find the incidence of sick leave because of neck and shoulder pain (NSP) in industrial workers, and its association with work and lifestyle risk factors, 18,031 Iranian employees were invited to participate in a baseline study. They were followed for 4 years. During a 4-year follow-up the incidence of sick leave was 0.8% (98 sick leave cases in 12,184 employees). For nonparticipants this incidence was 4.2% (130 cases in 3127 employees). Potential physical risk factors were repetitive work and sitting positions at work; for psychosocial factors unattractive work was the only significant remaining factor. The incidence of neck and shoulder pain based on sick leave is definitely very low compared with previous studies in high-income countries. This incidence varies between participants and nonparticipants. Risk factors for sick leave differ from risk

factors for self-reported pain. A young population, job security, the insurance system, different health behaviors, and healthy worker bias, are all factors that may affect the results, and sick-leave as an outcome must be interpreted with more caution in middle- and low-income countries.

HOSPITAL WORKERS SHOW NURSES HAVE INCIDENCE OF LOW BACK PAIN AT 77% AND 54% DIAGNOSED WITH A HERNIATED LUMBAR DISC

Karahan, A; Kav, S; Abbasoglu, A; Dogan, N. Low back pain: prevalence and associated risk factors among hospital staff. JOURNAL OF ADVANCED NURSING 2009; 65 (3):516-524

The prevalence and risk factors for lower back pain amongst a variety of hospital workers including nurses, physicians, physical therapists, technicians, secretaries and hospital aides was studied via a 44 item questionnaire. Most respondents (65.8%) had experienced low back pain, with 61.3% reporting an occurrence within the last 12 months. The highest prevalence was reported by nurses (77.1%) and the lowest amongst secretaries (54.1%) and hospital aides (53.5%). In the majority of cases (78.3%), low back pain began after respondents started working in the hospital, 33.3% of respondents seeking medical care for 'moderate' low back pain while 53.8% (n = 143) had been diagnosed with a herniated lumbar disc. Age, female gender, smoking, occupation, perceived work stress and heavy lifting were statistically significant risk-factors Preventive measures should be taken to reduce the risk of lower back pain, such as arranging proper rest periods, educational programmes to teach the proper use of body mechanics and smoking cessation programmes.

SCOLIOSIS

SPONDYLOLISTHESIS

HIGH SIGNAL, EARLY ONSET PARS INTERARTICULARIS DEFECTS HEAL WITH BRACING

Sairyo, K; Sakai, T; Yasui, N. Conservative treatment of lumbar spondylolysis in childhood and adolescence THE RADIOLOGICAL SIGNS WHICH PREDICT HEALING. JOURNAL OF BONE AND JOINT SURGERY-BRITISH VOLUME 2009; 91B(2):206-209

Evaluation of healing of a pars defect when wearing a trunk brace was done to evaluate how the stage of the defect on CT and the presence or absence of high signal change in the adjacent pedicle on T2-weighted MRI were related to bony healing. Twenty three children conservatively for at least three months were asked to refrain from sporting activity and to wear a Damen soft thoracolumbosacral type brace. There were 41 pars defects in 23 patients. These were classified as an early, progressive or terminal stage on CT. The early-stage lesions had a hairline crack in the pars interarticularis, which became a gap in the progressive stage. A terminal-stage defect was

equivalent to a pseudarthrosis. On the T2-weighted MR scan the presence or absence of high signal change in the adjacent pedicle was assessed and on this basis the defects were divided into high signal change-positive or -negative. Healing of the defect was assessed by CT.

In all, 13 (87%) of the 15 early defects healed. Of 19 progressive defects, only six (32%) healed. None of the seven terminal defects healed. Of the 26 high signal change-positive defects 20 (77%) healed after conservative treatment whereas none of the high signal change-negative defects did so. It is concluded that an early-stage defect on CT and high signal change in the adjacent pedicle on a T2-weighted MR scan are useful predictors of bony healing of a pars defect in children after conservative treatment.

STENOSIS

TREATMENT

PERIPHERAL NERVE STIMULATION RELIEVES CHRONIC LOW BACK PAIN AND FAILED BACK PAIN

Verrills, P; Mitchell, B; Vivian, D; Sinclair, C. Peripheral Nerve Stimulation: A Treatment for Chronic Low Back Pain and Failed Back Surgery Syndrome? NEUROMODULATION 2009; 12 (1):68-75

Peripheral nerve stimulation as a treatment option for patients with chronic low back pain was studied by implanted percutaneous electrodes within the major area of pain. There was a significant decrease in pain levels: an average reduction of 3.77 visual analog scale points. Eleven patients (85%) reported successful outcomes and an average pain reduction of 4.18 points but two reported a poor response. Pain relief was highly correlated with reduced analgesia and patient satisfaction. No complications were reported. This study demonstrates a treatment option that is safe, nonpharmacologic, reversible, and effective for patients with chronic low back pain that have exhausted other treatment options.

VERTEBROPLASTY FOR COMPRESSION FRACTURES REDUCES THE VAS SCORE FROM 8 TO 1.5

Masala, S; Mastrangeli, R; Petrella, MC; Massari, F; Ursone, A; Simonetti, G: Percutaneous vertebroplasty in 1,253 levels: results and long-term effectiveness in a single centre. EUROPEAN RADIOLOGY 2009; 19 (1):165-171

In a, 624 patients with 1,253 compression fractures were treated by percutaneous vertebroplasty (PVT). Imaging studies, clinical visits and short- and long-term follow-up were assessed by visual analogue scale (VAS) testing of pain. Statistical analysis was performed to evaluate pain response after PVT (paired two-tailed t-test) and to assess any differences in pain due to different lesions

(ANOVA test). Researchers found a statistically significant improvement in the patients' quality of life, particularly in pain (P <0.001). The average VAS value pre-PVT was 8.0 +/- 2.5, which significantly dropped to 1.5 +/- 0.4 by 12 months. There were no significant differences in pain response between the groups of patients with different underlying disease. There was a low complication rate in our study. PVT should be considered the treatment of choice in vertebral fractures with refractory pain. With strict evaluation of the clinical indications and subspecialised operators, long-term effectiveness is probable.

STIMBELT IS ELECTRIC STIMULATION WORN TO RELIEVE LOW BACK PAIN

Popovic, DB; Bijelic, G; Miler, V; Dosen, S; Popovic, MB; Schwirtlich, L. Lumbar Stimulation Belt for Therapy of Low-Back Pain. ARTIFICIAL ORGANS 2009; 33 (1):54-60

STIMBELT, an electrical stimulation system that comprises a lumbar belt with up to eight pairs of embedded electrodes and an eight-channel electronic stimulator is developed for the treatment of low-back pain (LBP). The direct goals of the treatment were to relieve pain, reduce muscle spasms, increase strength and range of motion, and educate individuals with LBP in reducing the chances of its reoccurrence. The results indicate significant benefits for individuals who use the STIMBELT in addition to the conventional therapy as opposed to only the conventional therapy.

INJECTING WATER IN THE LOW BACK RELIEVES WOMEN'S BACK PAIN WHEN IN LABOR

Kushtagi, P; Bhanu, BT. Effectiveness of subcutaneous injection of sterile water to the lower back for pain relief in labor. ACTA OBSTETRICIA ET GYNECOLOGICA SCANDINAVICA 88 (2). 2009. p.231-233

The analgesic efficacy of subcutaneous injection of sterile water compared to isotonic saline was investigated in a randomized, controlled study on a total of 100 women in the active phase of labor and who complained of low back pain. Pain perception was rated on a numerical rating scale before and at 10 and 45 minutes after the injection. The initial pain score was the same in both groups and pain relief was expressed by both groups irrespective of the solution injected, but the sterile water group had significantly higher relief scores compared to those receiving saline. This was not influenced by maternal age, parity, education, body mass index, cervical dilatation at intervention or fetal size, suggesting that subcutaneous injection of sterile water to the lower back provides relief from back pain during labor.

JOINT MOBILIZATION INCREASES WATER DIFFUSION INTO THE LUMBAR DISC

Beattie, PF; Donley, JW; Arnot, CF; Miller, R. The Change in the Diffusion of Water in Normal and Degenerative Lumbar Intervertebral Discs Following Joint Mobilization Compared to Prone Lying. JOURNAL OF ORTHOPAEDIC & SPORTS PHYSICAL THERAPY 2009; 39 (1):4-11

The immediate change in the diffusion of water in the nuclear region of normal and degenerative lumbar intervertebral discs (IVDs) following a single session of lumbar joint mobilization, and to compare these findings to the immediate change in the diffusion of water following a 10-minute

session of prone lying was studied. The purpose of this study is that there is conflicting evidence regarding the effectiveness and efficacy of lumbar joint mobilization. Increased knowledge of the physiologic effects of lumbar joint mobilization can lead to refinement of its clinical application.

A total of 24 people (15 males and 9 females), ranging in age from 22 to 58 years, participated in this study. All subjects had a history of activity-limiting low back pain. Diffusion-weighted magnetic resonance images (DW-MRIs) were obtained immediately before and after a 10-minute session of lumbar joint mobilization. At least 1 month later, a second session was performed in which DW-MRIs were obtained immediately before and after a 10-minute session of prone lying.

RESULTS: Following lumbar joint mobilization, a significant increase in the mean values for diffusion of water was observed within degenerative IVDs at L5-S1 (22.2% increase. Degenerative IVDs at L1-2 to L4-5 and normal IVDs at L1-2 to L5-S1 did not demonstrate a change in diffusion following joint mobilization. Prone lying was not associated with a change in diffusion for normal or degenerative IVDs.

CONCLUSIONS: The stimulus provided by lumbar joint mobilization may influence the diffusion of water in degenerative IVDs at L5-S1; however, these are preliminary findings and the relationship of these findings to pain and function needs further investigation.

H REFLEX NOT BENEFITED WITH EXTENSION EXERCISES

AlAbdulwahab, SS; Al-Jabr, JE. The effect of repeated back extension exercise on H- reflex in patients with lumbosacral radiculopathy. JOURNAL OF BACK AND MUSCULOSKELETAL REHABILITATION 21 (4). 2008. p.227-231

A repeated back extension exercises (RBEE) from prone position have been widely prescribed for patients with lumbosacral radiculopathy (LSR) and are reported to alter the intensity and distribution of radicular symptoms. To evaluate the effect of RBEE from prone position on soleus H-reflex of patients with LSR, 30 patients with confirmed chronic unilateral LSR were studied. All patients performed 30 repetitions of RBEE from prone position. The soleus H-reflex was measured before and after the RBEE. The H-reflex was elicited by electrical stimulation of the tibial nerve on the poplitial fossa of both legs. The non-involved leg of the patient was used as a control. Subjective pain intensity and sit-to-stand performance were also measured before and after RBEE using numerical pain rating scale and a stopwatch respectively.

Results: The H-reflex in the involved leg, pain intensity and the sit-to-stand test did not significantly improve after the RBEE.

Conclusion: Single session of 30 repetitions of RBEE is not enough to improve the neurophysiology of the compromised nerve root, pain intensity and sit-to-stand performance of patients with chronic LSR.

FIBROMYALGIA AS A DIAGNOSIS IS DEBATED BUT CHIROPRACTIC STUDENTS FEE CONFIDENT TO TREAT IT

Busse, JW; Kulkarni, AV; Badwall, P; Guyatt, GH. Attitudes towards fibromyalgia: A survey of Canadian chiropractic, naturopathic, physical therapy and occupational therapy students. BMC COMPLEMENTARY AND ALTERNATIVE MEDICINE 2009; 8:NIL_1-NIL_10

The frequent use of chiropractic, naturopathic, and physical and occupational therapy by patients with fibromyalgia has been emphasized repeatedly, but little is known about the attitudes of these therapists towards this challenging condition. A cross-sectional survey to 385 senior Canadian chiropractic, naturopathic, physical and occupational therapy students in their final year of studies inquired about attitudes towards the diagnosis and management of fibromyalgia. While they disagreed about the etiology (primarily psychological 28%, physiological 23%, psychological and physiological 15%, unsure 34%), the majority (58%) reported that fibromyalgia was difficult to manage. Respondents were also conflicted in whether treatment should prioritize symptom relief (65%) or functional gains (85%), with the majority (58%) wanting to do both. The majority of respondents (57%) agreed that there was effective treatment for fibromyalgia and that they possessed the required clinical skills to manage patients (55%).

Chiropractic students were most skeptical in regards to fibromyalgia as a useful diagnostic entity, and most likely to endorse a psychological etiology. In our regression model, only training in naturopathic medicine and the belief that effective therapies existed were associated with greater confidence in managing patients with fibromyalgia.

ELASTIC LUMBAR BELT WEARING IN SUBACUTE LOW BACK PAIN IMPROVES SIGNIFICANTLY THE FUNCTIONAL STATUS, THE PAIN LEVEL, AND THE PHARMACOLOGIC CONSUMPTION.

Calmels, Paul; Queneau, Patrice; Hamonet, Claude; Le Pen, Claude; Maurel, Frederique; Lerouvreur, Claire; Thoumie, Philippe. Effectiveness of a Lumbar Belt in Subacute Low Back Pain: An Open, Multicentric, and Randomized Clinical Study. Spine 2009; 34(3):215-220

This randomized, multicentric, and controlled study with 197 subacute patients with low back pain (2 groups, 1 treated with a lumbar belt and 1 control group) shows that lumbar belt wearing is consequent to improve significantly the functional status, the pain level, and the pharmacologic consumption. This study may underline the interest of lumbar support as a complementary and nonpharmacologic treatment beside the classic medication use in low back pain treatment.

A multicentric, randomized, and controlled study to evaluate the effects of an elastic lumbar belt on functional capacity, pain intensity in low back pain treatment, and the benefice on medical cost was done on 2 groups: a patient group treated with a lumbar belt (BWG) and a control group (CG). The main criteria of clinical evaluation were the physical restoration assessed with the EIFEL scale, the pain assessed by a visual analogic scale, the main economical criteria was the overall cost of associated medical treatments.

Results. One hundred ninety-seven patients have participated. The results show a higher decrease in EIFEL score in BWG than CG between days 0 and 90. Respectively significant reduction in visual analogic scale was also noticed. Pharmacologic consumption decreased at D90 (the proportion of patients who did not take any medication in BWG is 60.8% vs. 40% in CG).

Conclusion. Lumbar belt wearing is consequent in subacute low back pain to improve significantly the functional status, the pain level, and the pharmacologic consumption. This study may be useful to underline the interest of lumbar support as a complementary and nonpharmacologic treatment beside the classic medication use in low back pain treatment.

EXERCISE FOR RECURRENT LOW BACK PAIN IS MORE BENEFICIAL THAN DAILY WALKING IN DISABILITY IMPROVEMENT AND HEALTH PARAMETERS

Rasmussen-Barr, Eva; Äng, Bjorn; Arvidsson, Inga; Nilsson-Wikmar, Lena. Graded Exercise for Recurrent Low-Back Pain: A Randomized, Controlled Trial With 6-, 12-, and 36-Month Follow-ups. Spine 2009; 34(3):221-228

Exercise for recurrent low back pain was studied via a randomized controlled trial with treatment for 8 weeks and follow-up post-treatment at 6-, 12-, and 36- months.

Seventy-one patients recruited consecutively (36 men, 35 women) with recurrent nonspecific LBP seeking care at an outpatient physiotherapy clinic were randomized into 2 treatment groups; graded exercise intervention or daily walks. The primary outcome was perceived disability and pain at 12-month follow-up. Secondary outcomes included physical health, fear-avoidance, and self-efficacy beliefs. Of the participants, 83% provided data at the 12-month follow-up and 79% at 36 months. At 12 months, between-group comparison showed a reduction in perceived disability in favor of the exercise group, whereas such an effect for pain emerged only immediately postintervention. Ratings of physical health and self-efficacy beliefs also improved in the exercise group over the long term, though no changes were observed for fear-avoidance beliefs.

It was concluded that a graded exercise intervention, emphasizing stabilizing exercises, for patients with recurrent LBP still at work seems more effective in improving disability and health parameters than daily walks do. However, no such positive results emerged for improvement regarding pain over a longer term, or for fear-avoidance beliefs.

CHINESE HERB RESTRAINS OSTEOCLAST ACTIVITY FOR BENEFIT OF OSTEOPOROSIS CARE

Zhang, H; Xing, WW; Li, YS; Zhu, Z; Wu, JZ; Zhang, QY; Zhang, W; Qin, LP. Effects of a traditional Chinese herbal preparation on osteoblasts and osteoclasts. MATURITAS 2008; 61 (4):334-339

Bone formation and resorption is a balanced and continuous process. When osteoclastic bone resorption exceeds osteoblastic bone formation, bone density decreases, which can lead to osteoporosis. Er-Zhi-Wan (EZW), a famous traditional Chinese formulation, has been developed as

a restorative formula for hundreds of years, which contains two herbs viz. Herba Ecliptae and Fructus Ligustri Lucidi. EZW is widely used to prevent and treat various kidney diseases for its actions of nourishing the kidney yin and strengthening tendon and bone. The rats were orally administered EZW (0.45. 1.8 and 7.2 gkg(-1)) for total seven doses and twice a day, and then the different concentrations of EZW-containing serum were prepared. The serum from rats treated with EZW for 4 days did not facilitate proliferation of primary cultural osteoblasts and UMR 106 cells, but evidently inhibited both proliferation of RAW264.7 cells and differentiation of osteoclasts from RAW264.7 cells induced by receptor activator of nuclear factor kappa B ligand (RANK-L) and macrophage-colony stimulating factor (M-CSF).

Conclusion: Antiosteoporotic activity of EZW is carried out mainly via restraint of osteoclastic bone resorption, which is in accordance with the traditional Chinese medicine theory on nourishing the kidney yin. Therefore EZW has favorable potency to develop a new anti-osteoporotic agent in clinic.

ORTHOPAEDIC MANUAL THERAPY AND MCKENZIE METHODS SEEMED TO BE ONLY MARGINALLY MORE EFFECTIVE THAN WAS ONE SESSION OF ASSESSMENT AND ADVICE-ONLY FOR TREATING LOW BACK PAIN IN WORKING ADULTS

Paatelma, M; Kilpikoski, S; Simonen, R; Heinonen, A; Alen, M; Videman, T: ORTHOPAEDIC MANUAL THERAPY, MCKENZIE METHOD OR ADVICE ONLY FOR LOW BACK PAIN IN WORKING ADULTS: A RANDOMIZED CONTROLLED TRIAL WITH ONE YEAR FOLLOW-UP. JOURNAL OF REHABILITATION MEDICINE 2008; 40 (10):858-863

The comparative outcomes of trteating acute to chronic first or recurrent low back pain with orthopaedic manual therapy, McKenzie method, or advice only to be active were studied on 134 subjects. At the 3-month follow-up point, significant improvements had occurred in all groups in leg and low back pain and in the disability index, but with no significant differences between the groups. At the 6-month follow-up, leg pain, back pain, and disability index improved more in the McKenzie method group than in the advice-only group. At the 1-year follow-up, the McKenzie method group had a better disability index than did the advice-only group. In the orthopaedic manual therapy group at the 6-month and 1-year follow-up visits, improvements in the pain and disability index were somewhat better than in the advice-only group. No differences emerged between the orthopaedic manual therapy and McKenzie method groups in pain- and disability-score changes at any follow-up. The orthopaedic manual therapy and McKenzie methods seemed to be only marginally more effective than was one session of assessment and advice-only for treating low back pain in working adults.

WET CUPPING EFFECTIVE TO RELIEVE LOW BACK PAIN

Farhadi, K; Schwebel, DC; Saeb, M; Choubsaz, M; Mohammadi, R; Ahmadi, A. The effectiveness of wet-cupping for nonspecific low back pain in Iran: A randomized controlled trial. COMPLEMENTARY THERAPIES IN MEDICINE 2009; 17 (1):9-15

Wet-cupping therapy, one of the oldest known medical techniques, was tested on 98 patients aged 17-68 years with nonspecific low back pain; 48 were randomly assigned to experimental group and 50 to the control group. A series of three staged wet-cupping treatments, placed at 3 days intervals (i.e.,0, 3, and 6 days) were given and patients in the control group received usual care from their general practitioner.

Results: Wet-cupping care was associated with clinically significant improvement at 3-month follow-up while the experimental group who received wet-cupping care had significantly lower levels of pain intensity and pain-retated disability and medication use than the control group.

Conclusions: Traditional wet-cupping care delivered in a primary care setting was safe and acceptable to patients with nonspecific tow back pain. Wet-cupping care was significantly more effective in reducing bodily pain than usual care at 3-month follow-up.

JMC EDITOR QUESTION: ARE WE BONE SETTERS?

TRADITIONAL BONE SETTING GIVES SAME RELIEF OF CHRONIC LOW BACK PAIN AS PHYSICAL THERAPY BUT THE PATIENTS SHOWED GREATER SUBJECTIVE BENEFIT FROM THE BONE SETTERS

Zaproudina, N; Hietikko, T; Hanninen, OOP; Airaksinen, O. Effectiveness of traditional bone setting in treating chronic low back pain: A randomised pilot trial. COMPLEMENTARY THERAPIES IN MEDICINE 2009; 17 (1):23-28

The effectiveness of traditional bone setting (TBS) compared with conventional physical and exercise therapy (PhT) in treating chronic low back pain (cLBP) was test with a randomised chnical trial. Working-aged cLBP patients (n = 131, age range 29-51 years) were randomised into two treatment groups: TBS and PhT. Follow-up assessments took place 1, 6 and 12 months after treatment.

TBS is a popular traditional manual mobilisation therapy for musculoskeletal. disorders in Finland. Conventional PhT was used as the reference treatment. LBP intensity (Visual Analog Scale 0-100, VAS), the Oswestry Disability Index (ODI), the global assessment score (scale -1 to +10), a health-related quality of life (HRQoL) assessment and spine mobility measurements were used as measures.

Results: 118 patients (95.9%, 59 men and 59 women) completed the treatment program. Both treatments reduced the VAS and ODI levels after 1 month. Changes in VAS did not differ between the two treatment groups (mean -0.2, CI -11.3 to 10.9). The improvement in ODI (mean 2.4, CI -1.2 to 6.0, p = 0.069, repeated measurements ANOVA) and quality of life scores (mean -0.03, CI -0.06 to 0, p = 0.056) tended to be greater after TBS. Additionally, global assessment scores were better for TBS-treated patients (Mann-Whitney test, p = 0.001). There were no differences between the spine mobility test results of the two groups. Changes in both VAS (mean -2.4, CI -15.5 to 10.6) and ODI (mean 1.0, CI -3.0 to 5.1) measures did not, however, differ between the groups at the 1-year follow-up stage.

Conclusions: Most cLBP patients found the treatments to be beneficial. Although the tong-term dynamics of pain and disability did not differ between the groups, the subjective benefits appeared to be more significant after TBS. (C) 2008 Elsevier Ltd. All rights reserved.

INJECTING SALINE INTO CONTAINED DISC HERNIATIONS UNTIL THEY EXTRUDE AND SEQUESTER IS OFFERED AS A TREATMENT FOR RADICULOPATHY CAUSED BY DISC HERNIATION THAT IS CONTAINED

Kanai, A. Treatment of Lumbar Disk Herniation by Percutaneous Intradiscal High-Pressure Injection of Saline. PAIN MEDICINE 2009; 10 (1):76-84

Available percutaneous procedures for lumbar disk herniation are not sufficiently effective for large herniations. Percutaneous intradiscal high-pressure injection of saline (IDHP) is designed to tear the thinned posterior longitudinal ligament (PLL), leading to significant reduction in mechanical compression of nerves by the herniation. To study this, 25 patients with lumbar disk herniation-associated underwent fluoroscopy in the lateral position, a Tuohy needle was advanced into the herniated disk. Following intradiscal anesthesia, a control glass syringe with Luer lock was attached to the needle for high-pressure intradiscal injection of saline. Pain was scored with a visual analog scale (VAS), and physical activity was assessed using the Japanese Orthopaedic Association (JOA) score.

Tearing of the PLL was confirmed by a sudden loss of resistance to injection and leakage of contrast medium out of the disk into the epidural space. No adverse events were noted during and after IDHP apart from mild lumbago that disappeared within a week. IDHP resulted in tearing of extruded and sequestered herniated disks and PLL in 20 (80%) patients, and significant improvement of VAS and JOA scores throughout the 6-month observation period. The mean procedural time was 18 min. MRI confirmed the disappearance of herniated material after tearing. IDHP was unsuccessful in five patients.

IDHP leads to prompt relief of pain, with good outcome in patients with lumbar disk large herniation resistant to medical treatment.

SUBJECTS WITH NON SPECIFIC LOW BACK PAIN FEEL THE NEGATIVE ATTITUDE TOWARD THEM BECAUSE NO SPECIFIC PATHOLOGY IS IDENTIFIED AS THE ETIOLOGY OF THEIR PAIN

Slade, SC; Molloy, E; Keating, JL. Stigma Experienced by People with Nonspecific Chronic Low Back Pain: A Qualitative Study. PAIN MEDICINE 10 (1). JAN-FEB 2009. p.143-154

To determine participant experience of exercise programs for nonspecific chronic low back pain (NSCLBP) subjects, 18 people aged over 18 years were studied for stigmatization with the following subthemes emerge: stigma perpetrated by health care providers; stigma facilitated by the "sickness versus wellness" model; stigma applied by friends, family, the community, the workplace, and the low back pain subgroup; stigma-associated diagnostic uncertainty and the need for pathology driven validation.

The ramifications of stigma and discrimination are enduring, potentially disabling and appear to interfere with care-seeking, rehabilitation participation, and potentially, rehabilitation outcomes. Public and health professional education, low back pain-specific support groups and dissemination of success stories may help to alleviate stigma.

CLINICIANS SHOULD NOT LUMBAR IMAGE FOR ACUTE OR SUBACUTE LOW BACK PAIN PATIENTS WITHOUT SERIOUS INDICATIONS

Chou, R; Fu, RW; Carrino, JA; Deyo, RA. Imaging strategies for low-back pain: systematic review and meta-analysis. LANCET 2009; 373 (9662):463-472

Some clinicians do lumbar imaging routinely or in the absence of historical or clinical features suggestive of serious low-back problems. The effects of routine, immediate lumbar imaging versus usual clinical care without immediate imaging on clinical outcomes in patients with low-back pain and no indication of serious underlying conditions was studied. A randomised controlled trial that compared immediate lumbar imaging (radiography, MRI, or CT) versus usual clinical care without immediate imaging for low-back pain was done. These trials reported pain or function (primary outcomes), quality of life, mental health, overall patient-reported improvement (based on various scales), and patient satisfaction in care received. Six trials (n=1804) met inclusion criteria. No significant differences between immediate lumbar imaging and usual care without 3 months immediate imaging for primary outcomes at either short-term for function long-term (6-12 months, for pain and function. Results are most applicable to acute or subacute low-back pain assessed in primary-care settings.

Interpretation: Lumbar imaging for low-back pain without indications of serious underlying conditions does not improve clinical outcomes. Therefore, clinicians should refrain from routine, immediate lumbar imaging in patients with acute or subacute low-back pain and without features suggesting a serious underlying condition.

ELECTRICAL STIMULATION OF THE SPINE AIDS POSTURAL CONTROL BUT NOT PROPRIOCEPTION

Reeves, N Peter; Cholewicki, Jacek; Lee, Angela S.; Mysliwiec, Lawrence W: The Effects of Stochastic Resonance Stimulation on Spine Proprioception and Postural Control in Chronic Low Back Pain Patients . Spine 2009; 34(4):316-321

Eighteen chronic low back patients received stochastic resonance (SR) stimulation of the paraspinal muscles to determine if proprioception and trunk postural control were improved. Decreased spine proprioception and larger postural sway have been found in low back pain patients, although several studies have also shown no differences in spine proprioception. No significant differences in spine proprioception were observed between SR stimulation levels for any of the 3 orthopaedic planes. SR stimulation significantly improved postural control, but only in the lateral plane. No differences in postural control were observed between stimulation levels 25%, 50%, and 90% in the lateral plane. There was no correlation between spine proprioception and postural control. Results suggest that SR stimulation to the paraspinal muscles can improve

postural control; however, this improvement cannot be attributed to improved spine proprioception based on the current study. People with compromised neuromuscular control or those exposed to unstable environments may benefit from SR stimulation.

The instability of the spine requires sensory control as provided by mechanoreceptors in spinal ligaments, facet joints, discs, and paraspinal muscles. Injury to spinal soft tissues results in altered proprioception and reflex delays. Stochastic resonance is a form of white noise which reduces needed stimulus for sensory input. SR may improve spinal central nervous system ability to control spine performance. Muscle spindles are stimulated which could improve spinal control It was shown that SR did improve postural control, but not proprioception.

Electrical stimulation threshold (EST) and vibration perception threshold (VPT) used for SR stimulation were delivered with specially designed electrodes that were capable of applying both electrical stimulation and mechanical vibration to the spine. The EST was determined by applying electrical stimulation via an isolator unit to a single pair of electrodes.

ACUTE BACK PAIN PATIENTS WITH LOW PAIN INTENSITY, SHORTER DURATION, AND FEW PREVIOUS EPISODES RECOVER FASTER

Hancock, MJ; Maher, CG; Latimer, J; Herbert, RD; McAuley, JH. Can rate of recovery be predicted in patients with acute low back pain? Development of a clinical prediction rule. EUROPEAN JOURNAL OF PAIN 2009; 13 (1):51-55

A simple prediction rule to help clinicians identify patients with acute low back pain likely to recover at different rates and to compare a clinician's prognosis judgment to the prediction rule was studied on 239 patients with acute low back pain who participated in a randomised controlled trial. The primary outcome was days to recovery from pain. Patients with lower than average initial pain intensity, shorter duration of symptoms and fewer previous episodes recovered more quickly than patients without these characteristics. Therapists were able to predict patients likely to recover at different rates, however, they did not perform as well as the clinical prediction rule. The rule requires validation in a different sample of patients.

ACTIVE PHYSICAL TREATMENT AND GRADED ACTIVITY ARE MORE COST EFFECTIVE THAN CT SCANNING FOR TREATING CHRONIC LOW BACK PAIN

Smeets, RJ; Severens, JL; Beelen, S; Vlaeyen, JW; Knottnerus, JA. More is not always better: Cost-effectiveness analysis of combined, single behavioral and single physical rehabilitation programs for chronic low back pain. EUROPEAN JOURNAL OF PAIN 2009; 13 (1):71-81

To examine whether a combination of a physical training and operant-behavioral graded activity with problem solving training is cost-effective compared to either alone one year post-treatment, a randomized controlled trial of 172 patients with chronic disabling non-specific low back pain referred for rehabilitation treatment, were randomized to 10 weeks of aerobic training and muscle strengthening of back extensors (active physical treatment; APT), 10 weeks of gradual assumption of patient relevant activities based on operant-behavioral principles and problem

solving training (graded activity Plus problem solving training; GAP), or APT combined with GAP (combination treatment; CT). Based on the incremental cost effectiveness ratios (ICERs) and cost-effectiveness acceptability curves CT is not cost-effective at all. However, GAP is cost-effective regarding the reduction of disability and gain in QALY, and to a lesser degree APT is more cost-effective than CT in reducing disability.

TWO VIEWS – FOR AND AGAINST- EPIDURAL STEROID INJECTIONS FOR LOW BACK AND RADICULAR PAIN

(1) Sethee, J; Rathmell, J. Epidural steroid injections are useful for the treatment of low back pain and radicular symptoms: Pro. CURRENT PAIN AND HEADACHE REPORTS 13 (1). FEB 2009. p.31-34

Studies in acute radicular pain due to herniated nucleus pulposus have failed to show that epidural steroid injection reduces long-term pain or obviates the need for surgery. Similarly, there is scant evidence that epidural steroids have any beneficial effect in those with acute low back pain without leg pain or in those with chronic low back or leg pain. However, most studies have demonstrated more rapid resolution of leg pain in those who received epidural steroid injections versus those who did not. The role of epidural steroid injections in the management of acute radicular pain due to herniated nucleus pulposus is simply to provide earlier pain relief.

(2) Argoff, CE; Sims-O'Neill, C. Epidural steroid injections are useful for the treatment of low back pain and radicular symptoms: Con. CURRENT PAIN AND HEADACHE REPORTS 13 (1). FEB 2009. p.35-38

Lumbar epidural steroid injections are commonly performed in the United States for treating radicular low back pain. However, the best available data suggest that the benefit afforded by these injections is quite limited; in fact, new data suggest that in geographic areas where many such injections are performed, more and not fewer spine surgeries are actually completed annually. Researchers suggest that further high-quality studies are required and their results respected through their implementation in daily practice to better ensure that only appropriate patients are advised to undergo this procedure.

SPINAL STIFFNESS IS REDUCED IN MANY FORMS OF CARE (SPINAL MANIPULATION AND/OR EXERCISE) BUT IS NOT RELATED TO OUTCOME OF PAIN RELIEF OF CHRONIC LOW BACK PAIN

Ferreira, ML; Ferreira, PH; Latimer, J; Herbert, RD; Maher, C; Refshauge, K. Relationship between spinal stiffness and outcome in patients with chronic low back pain. MANUAL THERAPY 2009; 14 (1):61-67

To determine whether spinal stiffness changes after treatment; the relationship between pre-treatment spinal stiffness and change in stiffness with treatment; the relationship between spinal stiffness, pain, disability and global perceived effect of treatment; and whether spinal stiffness predicts outcome of treatment or response to treatment in chronic low back pain patients was studied on 191 subjects with chronic low back pain who were randomly allocated to groups that received either spinal manipulative therapy, motor control exercise, or a general exercise

program. Spinal stiffness was assessed before and after intervention. All three groups showed a significant decrease in stiffness following treatment ($p<0.001$). No difference between groups was observed. There was a significant negative correlation between pre-treatment stiffness and change in stiffness. There was a significant but weak correlation between change in stiffness and change in global perceived effect of treatment, and a significant but weak correlation between change in stiffness and change in function for subjects in the spinal manipulative therapy group. No significant association was observed between initial stiffness score and any of the final Outcome measures following treatment. Initial stiffness did not predict response to any treatment. In conclusion, spinal stiffness decreases over the course of an episode of treatment, more so in those with the stiffest spines, but the decrease is not dependent on treatment and is not generally related to outcome.

24 HOUR SCHEDULE INSTRUMENT FOR QUANTIFYIJNG SPINAL MECHANICAL LOADING IS PROMISING AS A PREVENTION OF LOW BACK PAIN

Bakker, EWP; Verhagen, AP; van Trijffel, E; Lucas, C; Koning, HJCMF; Koes, BW: Individual advice in addition to standard guideline care in patients with acute non-specific low back pain: A survey on feasibility among physiotherapists and patients. MANUAL THERAPY 14 (1):68-74

To decrease the cost of treating low back pain (LBP), prevention might be beneficial. Modification of spinal mechanical load obtained with the 24 Hour Schedule-24HS-(an instrument for quantifying spinal mechanical load) in addition to standard care of guideline-recommendations might be effective. Two surveys in primary care setting in 97 patients with acute (<6 weeks) non-specific LBP (who received a 24HS assessment and 24HS-advice at baseline), and 18 physiotherapists (all involved in 24HS baseline assessments). Patients and physiotherapists were first contacted by telephone after 6 months by a research assistant and requested to complete a questionnaire developed to assess feasibility. During this interview patients again completed a follow-up 24HS assessment. Eighty-eight patients and 17 physiotherapists participated in the follow-up. The median score of patients' questionnaire was 7 (interquartile range 5.9-8.3) and of physiotherapists' questionnaire 8 (interquartile range 7-8.5). Both questionnaires exceeded the criteria for feasibility, which researchers had previously set at seven or higher (out of 10). Subsequently, 24HS-advice was considered feasible for use in primary care healthcare providers and patients with LBP. In patients, the absence of LBP during the follow-up Period and in physiotherapists 'lack of time' were identified as factors that could potentially threaten the feasibility in 24HS-advice.

PRIMARY CARE CLINICIANS ASSESS DIFFERENTLY FOR ACUTE LOW BACK PAIN PATIENTS – NONE ASSESS PSYCHOSOCIAL FUNCTION GREATLY

Kent, PM; Keating, JL; Taylor, NF. Primary care clinicians use variable methods to assess acute nonspecific low back pain and usually focus on impairments. MANUAL THERAPY 2009; 14 (1):88-100

The assessment of acute (<12 weeks duration) nonspecific low back pain (NSLBP) by 651 primary care clinicians from six professional disciplines (Physiotherapy. Manipulative Physiotherapy,

Chiropractic, Osteopathy, General Medicine, and Musculoskeletal Medicine) indicate that the methods used by different professional disciplines to assess NSLBP vary considerably as 44 out of 48 assessment techniques showed significantly different utilisation rates across professions. Furthermore, assessment across domains of health in this condition was variable. as clinicians commonly assess physical impairments and pain and less commonly assess activity limitation and psychosocial function (100% of clinicians very frequently or often assess physical impairment. 99% assess pain, 21% assess activity limitation, and 7% assess psychosocial function). Adoption of greater standardisation of assessment by clinicians may require demonstration of the capacity of this standardisation to improve patient outcomes.

CHONDROCYTES ARE THE BEST CELL (OVER BONE MARROW AND ANULUS FIBROSUS CELLS) TO REGENERATE DISC CONTENT

Kuh, SU; Zhu, YR; Li, J; Tsai, KJ; Fei, QM; Hutton, WC; Yoon, TS. A comparison of three cell types as potential candidates for intervertebral disc therapy: Annulus fibrosus cells, chondrocytes, and bone marrow derived cells. JOINT BONE SPINE 76 (1). JAN 2009. p.70-74

Candidate cell types for disc cell transplantation therapy include anulus fibrosus (AF) cells, chondrocytes, and bone marrow derived cells (BMDCs). The disc matrix production in these three types of cells, before and after stimulation with rhBMP-2 was studied to determine the best candidate for the disc cell therapy. AF cells, chondrocytes, and BMDCs (iliac crest and femur) were isolated and grown in monolayer. They were treated for 3 days with rhBMP-2. After 3 days, proteoglycan (sGAG) content in the media was quantified. Results: (1) Without rhBMP-2 the chondrocytes produced more proteoglycan (sGAG) as compared to the other two cell types (AF cells and BMDCs).

After stimulation with rhBMP-2 the chondrocytes produce even more proteoglycan than the other two cell types. (2) As compared to the other two cell types, in terms of mRNA expression, the chondrocytes expressed more aggrecan, type I collagen, and type 11 collagen before stimulation with rhBMP-2. After rhBMP-2 stimulation, the chondrocytes expressed even more aggrecan, type I collagen, and type 11 collagen in proportion to the concentration of rhBMP-2. For the BMDCs there were no changes in type I and 11 collagen. (3) rhBMP-2 stimulation produced increases in the protein levels of aggrecan, type I and 11 collagen in all three types of cells.

Conclusions: Results suggest that chondrocytes are the best candidate for the disc cell therapy.

CAUDAL EPIDURAL STEROID INJECTIONS SHOW LEVEL I EVIDENCE FOR RELIEF OF CHRONIC PAIN SECONDARY TO DISC HERNIATION OR RADICULITIS AND DISCOGENIC PAIN WITHOUT DISC HERNIATION OR RADICULITIS. FURTHER, THE INDICATED EVIDENCE IS LEVEL IL-1 OR IL-2 FOR CAUDAL EPIDURAL INJECTIONS IN MANAGING CHRONIC PAIN OF POST LUMBAR LAMINECTOMY SYNDROME AND SPINAL STENOSIS.

Conn, A; Buenaventura, RM; Datta, S; Abdi, S; Diwan, S. Systematic Review of Caudal Epidural Injections in the Management of Chronic Low Back Pain. PAIN PHYSICIAN 2009; 12 (1):109-135

Caudal epidural injection of local anesthetics with and without steroids is used in various conditions - disc herniation and radiculitis, post-lumbar laminectomy syndrome, spinal stenosis, and chronic low back pain of disc origin without disc herniation or radiculitis. To evaluate their effect a review of the literature was performed according to the Cochrane Musculoskeletal Review Group Criteria as utilized for interventional techniques for randomized trials and the Agency for Healthcare Research and Quality (AHRQ) criteria for observational studies. The level of evidence was classified as Level I, II, or III based on the quality of evidence developed by the U.S. Preventive Services Task Force (USPSTF) through searches of PubMed and EMBASE from 1966 to November 2008, and manual searches of bibliographies of known primary and review articles.

The primary outcome measure was pain relief (short-term relief = up to 6 months and long-term > 6 months). Secondary outcome measures of improvement in functional status, psychological status, return to work, and reduction in opioid intake were utilized.

This systematic review shows Level I evidence for relief of chronic pain secondary to disc herniation or radiculitis and discogenic pain without disc herniation or radiculitis. Further, the indicated evidence is Level II-1 or II-2 for caudal epidural injections in managing chronic pain of post lumbar laminectomy syndrome and spinal stenosis.

CERVICAL INTERLAMINAR EPIDURAL INJECTION SHOWED SIGNIFICANT EFFECT IN RELIEVING CHRONIC INTRACTABLE PAIN OF CERVICAL ORIGIN AND ALSO PROVIDING LONG-TERM RELIEF WITH AN INDICATED EVIDENCE LEVEL OF LEVEL II-1.

Benyamin, R; Singh, V; Parr, AT; Conn, A; Diwan, S; Abdi, S. Systematic Review of the Effectiveness of Cervical Epidurals in the Management of Chronic Neck Pain. PAIN PHYSICIAN 2009; 12 (1):137-157

Chronic neck pain is a common problem in the adult population with a typical 12-month prevalence of 30% to 50%, and 14% of the patients reporting grade II to IV neck pain with high pain intensity and disability that has a substantial impact on health care and society. Cervical interlaminar epidural injections in managing various types of chronic neck and upper extremity pain emanating as a result of cervical spine pathology was studied via the Cochrane Musculoskeletal Review Group criteria as utilized for interventional techniques for randomized trials and the criteria developed by the Agency for Healthcare Research and Quality (AHRQ) criteria for observational studies, The primary outcome measure was pain relief (short-term relief = up to 6 months and long-term > 6 months). Secondary outcome measures were improvement in functional status, psychological status, return to work, and reduction in opioid intake.

Results: Cervical interlaminar epidural injection showed significant effect in relieving chronic intractable pain of cervical origin and also providing long-term relief with an indicated evidence level of Level II-1.

BLIND INTERLAMINAR EPIDURALS IN MANAGING ALL TYPES OF PAIN EXCEPT FOR SHORT-TERM RELIEF OF PAIN SECONDARY TO DISC HERNIATION AND RADICULITIS IS LIMITED

Parr, AT; Diwan, S; Abdi, S. Lumbar Interlaminar Epidural Injections in Managing Chronic Low Back and Lower Extremity Pain: A Systematic Review. PAIN PHYSICIAN 2009; 12 (1):163-188

Low back pain with or without lower extremity pain is treated with interlaminar, caudal, transforaminal epidural steroid injections for various conditions, namely - intervertebral disc herniation, spinal stenosis, and discogenic pain without disc herniation or radiculitis. Cochrane Musculoskeletal Review Group Criteria as utilized for interventional techniques for randomized trials and the Agency for Healthcare Research and Quality (AHRQ) criteria for observational studies determines the level of evidence as classified as Level I, II, or III based on the quality of evidence developed by the U.S.

Preventive Services Task Force (USPSTF) for therapeutic interventions. Data sources included PubMed and EMBASE from 1966 to November 2008, and manual searches of bibliographies of known primary and review articles. The primary outcome measure was pain relief (short-term relief = up to 6 months and long-term > 6 months). Secondary outcome measures were improvement in functional status, psychological status, return to work, and reduction in opioid intake.

Results: The evidence based on this systematic review is limited for blind interlaminar epidurals in managing all types of pain except for short-term relief of pain secondary to disc herniation and radiculitis. This evidence does not represent contemporary interventional pain management practices and also the evidence may not be extrapolated to fluoroscopically directed lumbar interlaminar epidural injections.

FACET JOINT SEDATION OF CERVICAL AND LUMBAR FACET JOINT PAIN WAS LEVEL II-1

Smith, HS; Chopra, P; Patel, VB; Frey, ME; Rastogi, R. Systematic Review of the Role of Sedation in Diagnostic Spinal Interventional Techniques. PAIN PHYSICIAN 2009; 12 (1): 195-206

Assessment of studies was carried out by utilizing Agency for Healthcare Research and Quality (AHRQ) methodologic quality criteria of the literature on the subject of facet joint pain and the lack of literature on the subjects of discogenic pain and sacroiliac joint pain are major limitations. Three studies were identified which met inclusion and methodologic assessment quality criteria. Based on the 3 randomized double-blind trials with stringent criteria utilizing 80% pain relief and the ability to perform prior painful movements without any significant pain following the diagnostic injection in evaluation of facet joint pain, the indicated evidence is Level II-1.

IDET OFFERS FUNCTIONALLY SIGNIFICANT RELIEF IN APPROXIMATELY ONE-HALF OF APPROPRIATELY CHOSEN CHRONIC DISCOGENIC LOW BACK PAIN PATIENTS

Helm, S II; Hayek, SM; Benyamin, R; Manchikanti, L. Systematic Review of the Effectiveness of Thermal Annular Procedures in Treating Discogenic Low Back Pain. PAIN PHYSICIAN 2009; 12 (1):207-232

Thermal annular procedures (TAPs) have been developed as intradiscal electro-thermal therapy (IDET), radiofrequency annuloplasty, and intradiscal biacuplasty (IDB). However, these treatments continue to be controversial, coupled with a paucity of evidence. A comprehensive evaluation of the literature relating to TAPs according to Cochrane Review criteria for randomized controlled trials (RCTs) and according to the Agency for Healthcare Research and Quality (AHRQ) criteria for observational studies was done. Systematic review of IDET identified 2 RCTs and 16 observational studies with an indicated evidence of Level II-2. Systematic review of radiofrequency annuloplasty identified no RCTs but 2 observational studies with an uncertain evidence of Level II-3. Systematic review of IDB identified one pilot study. The level of evidence is lacking with Level III. IDET offers functionally significant relief in approximately one-half of appropriately chosen chronic discogenic low back pain patients. There is minimal evidence supporting the use of radiofrequency annuloplasty and IDB.

TRANSFORAMINAL LUMBAR EPIDURAL STEROID INJECTIONS IS LEVEL II-1 FOR SHORT-TERM RELIEF AND LEVEL II-2 FOR LONG-TERM IMPROVEMENT IN THE MANAGEMENT OF LUMBAR NERVE ROOT AND LOW BACK PAIN.

Buenaventura, RM; Datta, S; Abdi, S; Smith, HS. Systematic Review of Therapeutic Lumbar Transforaminal Epidural Steroid Injections. PAIN PHYSICIAN 2009; 12 (1):233-251

Lumbar transforaminal epidural injections in managing chronic low back and lower extremity pain was reviewed via the Cochrane Musculoskeletal Review Group criteria as utilized for interventional techniques for randomized trials and the criteria developed by the Agency for Healthcare Research and Quality (AHRQ) criteria for observational studies. The indicated evidence is Level II-1 for short-term relief and Level II-2 for long-term relief in managing chronic low back and lower extremity pain.