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TRENDS IN HEALTH CARE EXPENDITURES FOR SPINE PROBLEMS

Treatment for back and neck problems accounted for approximately 86 billion dollars in health care expenditures in the United States in 2005. This study reviewed trends in per user expenditures for spine related services, and compared those trends with changes in health status among patients receiving care.

The authors examined data from 1997 to 2006 using the medical expenditure panel survey maintained by the Agency for Healthcare Research and Quality. Patients with medical expenditures for common back problems were selected using ICD-9 codes. Those subjects' data were reviewed for expenditures related to inpatient, outpatient, pharmacy and emergency visits.

Treatment costs for back and neck problems had increased in 2006 by 65% since 1997 (adjusted dollars). Also noted was an increase in the number of people who sought treatment, from 14.8 million in 1997 to 21.9 million in 2006. For inpatient hospitalizations, the adjusted, per user expenditure increased from \$13,040 in 1997 to \$17,909 in 2006. Although the proportion of spine patients who reported outpatient visits remained stable, the number of visits per user increased by 0.8% per year, with the mean, per user expenditure increasing 1.9% per year. These changes resulted in a 6.7% average annual increase in national outpatient expenditures, from \$10.4 billion in 1997 to \$18.4 billion in 2006. The average, annual expenditure for prescription medications increased, with total national pharmacy expenditures increasing by an average of 14.4% per year from 1997 to 2006. This change included a 660% increase in expenditures for opioid medications, from \$246 million in 1997 to \$1.9 billion in 2006.

Interestingly, the proportion of patients reporting any limitation in physical function increased steadily during that time, from 20.6% in 1997 to 28.3% in 2006.

Conclusion: This study found that national expenditures for spine problems in the United States increased by 82% from 1997 to 2006. However, ratings on all measures of self-reported mental and physical health and activity limitations among those with spine problems worsened. Pharmacy costs accounted for the greatest increase in both per user and total national expenditures.

Martin, B., et al. Trends in Health Care Expenditures, Utilization, and Healthcare Status among U.S. Adults with Spine Problems, 1997 to 2006. *Spine*. 2009, September 1; 34(19): 2077-2084.

LYMPHEDEMA AND WEIGHTLIFTING AFTER BREAST CANCER

Many women with lymphedema are advised to limit weight-bearing with the affected arm, in order to avoid increasing their symptoms. However, this restriction precludes any benefits of controlled exercise. This study examined the effects of controlled weightlifting on a group of breast cancer survivors with lymphedema.

This randomized, controlled trial included 141 female breast cancer survivors with stable lymphedema. The women were divided into a treatment group, performing weightlifting, and a control group. Participants in the weightlifting group received training in specific exercises during small group sessions with fitness instructors at a local YMCA. The number of sets and repetitions and the amount of resistance used were gradually increased in a strictly prescribed fashion, with no upper limit of weight imposed. Exercise

sessions occurred for 90 minutes twice a week for one year. Lymphedema exacerbations and limb function were measured at baseline and at 12-month follow-up.

After one year, women in the weightlifting group had significantly increased strength as measured by bench press and leg press exercises as compared to controls ($p < 0.001$). No significant difference was seen between the two groups in the number of women who experienced increased limb swelling. The number and severity of lymphedema related symptoms decreased more in the treatment group than in the control group over the course of the study. No serious side effects were related to the intervention.

Conclusion: This study did not find an increase in lymphedema among patients with a history of mastectomy who engaged in a weightlifting program.

Schmitz, K., Weightlifting in Women with Breast Cancer Related Lymphedema. *New Eng J Med*. 2009, August 13; 361(7): 664-673.

SHOCKWAVE THERAPY FOR GREATER TROCHANTERIC PAIN SYNDROME

Recently, investigators have begun to use the term greater trochanteric pain syndrome to describe the clinical condition of greater trochanteric and peritrochanteric hip pain and tenderness. Shockwave therapy has been used successfully for the management of various musculoskeletal disorders. This study sought to determine whether low energy shockwave therapy is effective in the treatment of chronic greater trochanteric pain syndrome.

From June of 2007 through March of 2008, all patients with an established diagnosis of chronic greater trochanteric pain syndrome

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who were treated with shockwave therapy were considered for study inclusion. A similar group of patients who were treated during the same time interval with additional forms of traditional, nonoperative methods, but did not receive shockwave therapy, were enrolled as a control group.

All patients were offered traditional, nonoperative therapy, shockwave therapy and surgery. A total of 33 patients in each group were compared. The shockwave group received 2,000 shocks, for a total energy flux density of 360 mJ/mm². The outcome measures included pain visual analog scores, Harris hip scores and the Roles Maudsley score. All measures were collected at baseline, and at one, three and 12 months post-treatment.

At one, three and 12 months after treatment, mean visual analog scores favored the shockwave therapy group ($p < 0.01$, $p < 0.01$ and $p < 0.01$, respectively). In addition, scores on the Harris hip scale also favored the shockwave group. Out of the 33 patients in each group, 10 in the shockwave group and zero in the control group reported excellent results.

Conclusion: This study of patients with greater trochanteric pain syndrome demonstrates that shockwave therapy may be an effective treatment for the symptomatic treatment of these patients.

Furia, J., et al. Low Energy Extracorporeal Shock Wave Therapy as a Treatment for Greater Trochanteric Pain Syndrome **Am J Sp Med.** 2009; 37(9): 1806-1813.

BODYWEIGHT SUPPORT FOR GAIT TRAINING AFTER STROKE

Gait training with body weight support on a treadmill is becoming a popular treatment for patients with acute impairments secondary to stroke. This randomized, controlled trial assessed the effect of gait training with bodyweight support versus that of conventional gait training for patients with gait deficits due to stroke.

This single-blind, randomized, controlled trial included 97 patients selected within 30 days of ischemic or hemorrhagic stroke. The subjects were randomly assigned to either treadmill training with bodyweight

support or conventional gait training. An experimental group received 20 minutes of gait training with bodyweight support on a motorized treadmill, in addition to 40 minutes of conventional training, five times per week for a total of 20 sessions. A control group received 60 minutes of conventional gait training on the same schedule. The primary outcome measures were the Trunk Control Test, the modified Rankin scale, the Barthel Index, Functional Ambulation Categories and others administered before treatment, after 10 and 20 sessions, and then two weeks after treatment completion.

Both groups demonstrated improvement in gait, with no significant difference found between the two. The results also revealed no significant difference between the groups in primary outcomes at two weeks after completion of treatment.

Conclusion: This study of treadmill gait training with body weight support demonstrates that this treatment is safe and effective. However, the study did not find this training superior to conventional gait training.

Franceschini, M., et al. Walking after Stroke: What Does Treadmill Training with Bodyweight Support Add to Over Ground Gait Training in Patients Early after Stroke? **Stroke.** 2009, September; 40: 3079-3085.

ROPINIROLE FOR GAIT IMPAIRMENT IN CHRONIC STROKE

Several studies have suggested that central nervous system stimulants targeting catecholamine delivery systems may have a role in facilitating motor recovery after stroke. This study sought to determine whether the dopamine agonist, ropinirole, in combination with physical therapy, could foster greater improvement in gait than therapy alone in patients with chronic stroke.

Study participants were 33 patients with either ischemic or hemorrhagic stroke one to twelve months prior to the study's onset. All had moderate motor impairment, defined as a Fugal Meyer arm/leg motor score within the range of 23 to 83. For all nine weeks of this study, each subject received either ropinirole or a placebo once daily.

Ropinirole was titrated up to at least three mg per day. During weeks six to nine, the subjects participated in a 90-minute therapy session twice per week, in addition to ropinirole or a placebo. The primary outcome measure, gait velocity, was measured weekly for the duration of the study and at 12 weeks' follow-up.

In the ropinirole plus physical therapy group, the peak daily dose averaged 2.4 ± 1.2 mg, with only four patients reaching a 4 mg/day dose at week nine. Across all subjects, significant gains in gait velocity were seen from baseline to week 12, 42%, higher than at baseline ($p < 0.0001$). The ropinirole plus therapy group did not demonstrate significantly greater recovery of motor function than did the placebo group.

Conclusion: This study of patients with chronic stroke study did not find that adding ropinirole improves gait velocity beyond the effect of physical therapy alone.

Cramer, S., et al. Randomized, Placebo Controlled, Double-Blind Study of Ropinirole in Chronic Stroke. **Stroke**. 2009, September; 40(9): 3034-3038.

CLINICAL UTILITY OF INPATIENT ELECTRODIAGNOSTIC STUDIES

Inpatient electrodiagnostic studies are often requested as part of the diagnostic evaluation of patients hospitalized with symptoms suggestive of a neuromuscular disorder. However, the clinical utility of electrodiagnostic studies for the evaluation of inpatients with neuromuscular symptoms has not previously been well studied. This study assessed the contribution of inpatient electromyograms (IP-EMGs) to the diagnosis and management of such patients.

Medical records of patients at a tertiary medical center who underwent EMGs from January 2005 to December 2007 were retrospectively reviewed. Studies were classified into one of five categories. Those classifications were studies that confirmed the clinical diagnosis, those that identified new and relevant diagnoses, those that found an initial diagnosis, and studies that were determined to be inconclusive or normal. Additional diagnostic testing and treatments

based on the EMG findings were also reviewed.

A total of 103 EMGs were performed on 98 patients. The subjects' mean age was 61.5 years. EMG confirmed the preliminary clinical diagnosis in 53.3% of the patients, while a new, clinically relevant diagnosis was made in 12.6% of the cases. A third of the studies had incidental diagnoses, and 16.5% of the EMGs resulted in inconclusive results. Only three percent of the EMGs were found to be normal. New diagnosis and/or treatment changes based on the results occurred in 27.2% of the patients.

Conclusions: This study found EMGs helpful in confirming clinical diagnoses, as well as in identifying new, clinically relevant diagnoses, among patients at a tertiary medical center. EMG results impacted diagnostic evaluation and treatment in a substantial portion of patients.

Perry, D., et al. Clinical Utility of Electrodiagnostic Studies in the Inpatient Setting. **Musc Nerve**. 2009, August; 40:195-199.

INFARCT VOLUME AND POST-STROKE IMMUNE CELL FUNCTION

Acute ischemic stroke is associated with a variety of serious medical complications which independently predict a worse outcome. These include a stroke induced depression of systemic immunity which renders patients susceptible to infections. This study sought to find independent, early predictors for the development of post-stroke infection.

Fifty patients with acute ischemic stroke and symptom onset of less than 12 hours were enrolled. Control individuals were patients scheduled to undergo elective cataract surgery without a history of stroke, myocardial infarction or peripheral artery disease. A clinical diagnosis of ischemic stroke was confirmed by CT or MR imaging. Leukocyte/lymphocyte subsets were determined by white blood cell count and fluorescence.

Compared to those of controls, neutrophil counts in the stroke group were elevated at baseline and post-stroke day one. Infarct volume was the main factor associated with lymphocytopenia on days one and

day four. Blood natural killer cell counts were reduced after stroke. Monocyte counts increased after ischemia, paralleled by a profound deactivation, predominantly after extensive infarct. Reduced T-helper cell counts, monocytes human leukocyte antigen-DR expression and monocytic *in vitro* production of tumor necrosis factor alpha were associated with infections. Only stroke volume prevailed as an independent predictor of respiratory infections.

Conclusion: This study found that stroke size, as measured by infarct volume on 24- to 36-hour follow-up CT/MRI, was significantly associated with a reduced lymphocyte count, and deteriorated monocyte function, suggesting an inverse relationship between stroke volume and immune function.

Hug, A., et al. Infarct Volume Is a Major Determiner of Post-Stroke Immune Cell Function and Susceptibility to Infection. **Stroke**. 2009, October; 40(10): 3226-3232.

KETAMINE AND COMPLEX REGIONAL PAIN SYNDROME

Complex regional pain syndrome (CRPS) is a chronic pain syndrome typically affecting an upper extremity after local trauma. Although the recovery rate for CRPS is unknown, a substantial number of patients develop chronic disease, with severe pain, disability and loss of quality of life. Recent studies have implicated the N-methyl-D-aspartic acid receptor (NMDAR) as significant in the etiology and perseverance of chronic pain. This study sought to determine whether the NMDAR antagonist, ketamine, can improve pain in patients with CRPS-1.

Sixty patients with CRPS-1 participated in this double-blind, randomized, placebo controlled, parallel group trial. The patients were given a five-day IV infusion of low-dose ketamine or placebo, using an individualized, stepwise tailoring of dosage based on effect (pain relief) and side effects (nausea/vomiting/psychomimetic effects). The primary outcome of the study was a 10-point pain scale, administered during the treatment week and for 11 weeks of follow-up.

The patients' median disease duration was 7.4 years. At the end of infusion, the ketamine dose was 22.2

mg/h/70 kg. Ketamine modulated the course of pain during the 12-week study period more favorably than did placebo ($p < 0.001$). Significant differences in pain reduction between ketamine and placebo were maintained until week 11. At week 12, the difference between the groups lost significance ($p=0.07$). The treatment did not result in functional improvement. Patients receiving ketamine often experienced mild to moderate psychomimetic side effects during the drug's infusion (76% versus 18%, $p < 0.001$).

Conclusion: This study of patients with chronic CRPS-I found that a multiple day ketamine infusion can significantly reduce pain, although without functional improvement.

Sigtermans, M., et al. Ketamine Produces Effective and Long-Term Pain Relief in Patients with Complex Regional Pain Syndrome Type I. *Pain*. 2009, October; 145(3): 304-311.

SUSTAINED MECHANICAL LOAD AND DIFFUSION OF VERTEBRAL DISC

Lumbar intervertebral discs are the largest avascular structures in the human body. Alteration in nutrition is thought to be the final, common pathway for disc degeneration. The acute effects of mechanical loading on the transport of solutes in the disc remain a subject of controversy. This study investigated the acute effects of load on the transport of small solutes into the human intervertebral discs.

This study comprised two phases. In phase I, plain, pre- and post-contrast magnetic resonance imaging (MRI) scans of the lumbosacral spine were performed for eight, healthy volunteers. Post-contrast images were acquired for up to 7.5 hours after contrast administration. In phase II, conducted one month later, the same subjects were subjected to axial loads of 50% of their total body weight for a period of 4.5 hours. Scans were obtained pre-load, and then post-load, for up to 7.5 hours. All five lumbar intervertebral discs were studied in all eight volunteers using MRI, for a total of 80 discs (40 for each phase of the study). Each disc was studied at six different time points in each phase, for a total of 240 scans or 1,200 disc images.

The data revealed significantly lower signal intensity ratios, indicating a reduction in transport ratios for the loaded discs. Signal intensity ratios continued to rise for three hours into the recovery phase, suggesting retardation of transport of small solutes into the center of the disc for up to three hours after unloading.

Conclusion: This study supports the theory that sustained mechanical loading impairs diffusion of nutrients entering the disc, possibly accelerating disc degeneration.

Arun, R., et al. What Influence does Sustained Mechanical Load Have on Diffusion in the Human Intervertebral Disc? An In Vivo Study Using Serial Post Contrast Magnetic Imaging. *Spine*. 2009, October; 14(21): 2324-2337.

HIP AND TRUNK MUSCLE FUNCTION AND PATELLOFEMORAL PAIN

Patellofemoral pain (PFP) is a common cause of lower extremity pain, particularly among runners. The exact etiology of PFP is unknown, but it is thought that neuromotor control, strength and range of motion of the hip muscles are all clinically important. This study sought to better understand the role of hip muscles in PFP.

This cross-sectional study included 10 participants diagnosed with PFP and 27 asymptomatic controls. The patients, all 40 years of age or younger, were evaluated while performing a stair stepping task. Electromyographic activity of the vastus medialis oblique (VMO), the vastus lateralis (VL) and the anterior gluteus medius were recorded using surface electrodes. A hand-held dynamometer was used to assess the isometric force of hip external rotation, abduction and trunk side flexion strength.

When individuals with PFP completed the same stair-stepping task, control of both the gluteal and vasti muscles was altered. Both the anterior and posterior portions of the gluteus medius were more delayed in the PFP group than in the control group ($p = 0.01$ and $p = 0.012$, respectively). In addition, there was a delay in the onset of VMO in the PFP group, leading to an alteration in the EMG onset timing difference (VL-VMO) between the groups ($p =$

0.001). Trunk side flexion strength was significantly less (29%) in individuals with PFP ($p = 0.03$). However, no significant differences were found between the groups in hip internal and external range of motion or hip abduction and external rotator strength.

Conclusion: This study demonstrates that trunk side flexion strength and neuromotor control of the gluteus medius are affected in individuals with PFP.

Cowen, S., et al. Altered Hip and Trunk Muscle Function in Individuals with Patellofemoral Pain. *Br J Sp Med*. 2009, August; 43(8): 584-588.

PARATHYROID HORMONE FOR OSTEOPENIA

Vertebral fractures are an important clinical indicator of the progression of osteopenia and osteoporosis. Parathyroid hormone (PTH) is known to play an important role in the regulation of calcium hemostasis. Prior studies have indicated that a single, daily, subcutaneous injection of PTH can significantly reduce the risk of osteoporotic fractures due to the stimulation of osteoblast activity and bone formation. This animal study evaluated the anabolic potency of PTH on bone stability and bone microstructure.

A biomechanical device was constructed for the testing of the fourth lumbar vertebrae, with a measurement range of 2N- 500 N. To produce significant osteoporosis, 33 female rats were ovariectomized. Ten weeks later they were randomly divided into three groups of 11 rats each. A control group received no supplement, while a second group received food supplemented with estradiol benzoate. A third group received phytoestrogen free food and a daily subcutaneous injection of 1, 24 PTH. The animals were treated with those diets for another five weeks, and then sacrificed for bone evaluation.

The PTH group had significantly higher, absolute yield stress, elastic limit, and stiffness values than the other groups. Micro-radiographic evaluation demonstrated that cortical volume, cortical width, and trabecular bone area were higher in the PTH and food supplement groups than in the control group. Both supplement

groups demonstrated visibly greater improvement in trabecular connectivity than the control group. The PTH group demonstrated the most active bone remodeling and restoration.

Conclusion: This animal study found that, after short-term application, parathyroid hormone supplementation can improve bone quality and quantity among rats with advanced osteoporosis.

Schmisch, S., et al. Short-Term Effects of Parathyroid Hormone on Rat Lumbar Vertebrae. *Spine*. 2009, September 1; 34(19): 2014-2021.

MEDITERRANEAN DIET AND COGNITION

The typical Mediterranean diet consists of vegetarian foods, olive oil, fish and wine, with small amounts of dairy, poultry and beef. This diet has been found to be correlated with decreased cardiovascular and mortality risk, as well as longer survival. This study examined the Mediterranean diet and its potential protective effects against cognitive decline and incident dementia in an elderly French sample.

A group of 9,294, non-demented community dwellers, 65 years of age or older, was selected in 1999 to 2000 from the electoral rolls of three French cities. Three follow-up examinations were performed at two years (wave 1, 2001 to 2002), four years (wave 2, 2003 to 2004), and seven years (wave 3, 2006-2007). Results were based on findings for 1,410 subjects who participated in waves one, two and three in Bordeaux. Diet adherence was measured using 24-hour recall and a food frequency questionnaire. Cognitive performance was measured using four neuropsychological tests, the Mini Mental State Examination (MMSE), the Isaacs Set Test (IST), the Benton Visual Retention Test (BVRT), and Free and Cued Selective Reminding Tests (FCSRT).

The mean, baseline neuropsychological results did not differ across diet categories. After covariate adjustment, higher diet adherence was found to be associated with fewer MMSE errors ($p < 0.006$). The mean, annual decline in MMSE and FCSRT scores significantly decreased with increased adherence to the diet.

Conclusion: This study suggests that adherence to a Mediterranean diet correlates with slower cognitive decline, as measured by the Mini Mental State Examination, as well as by Free and Cued Selective Reminding Tests. However, greater diet adherence was not associated with incident dementia.

Feart, et al. Adherence to a Mediterranean Diet, Cognitive Decline, and Risk of Dementia. *JAMA*. 2009, August 12; 302(6): 638 - 648.

MEDITERRANEAN DIET AND PHYSICAL ACTIVITY AND AD

Previous research has shown that physical activity can slow down or prevent functional decline associated with aging. However, the relationship is less clear regarding Alzheimer disease (AD) or dementia. This study sought to further explore the association of the combined effects of diet and physical activity on the risk of AD.

This prospective, cohort study included 1,880 elderly individuals without dementia, all living in New York City. An initial history was recorded and a comprehensive physical and neurological examination completed. A diagnosis of probable or possible AD or dementia was made at a diagnostic conference of neurologists and neuropsychologists. Patients were followed for their adherence to the Mediterranean diet and a weekly sum of their physical activity. The primary outcome measure was time to incident AD.

Of the 1,880 individuals studied, a total of 282 incident cases of AD occurred during a mean of 5.4 years' follow-up. When considered simultaneously, both Mediterranean-type diet adherence ($p = .008$ for trend) and physical activity ($p = .03$ for trend) were associated with lower AD risk. In models considering only physical activity, more physical activity was associated with a lower risk for developing AD with physical activity associated with a 29% to 50% lower risk of developing AD.

Those who were neither adhering to the healthy diet nor participating in physical activity had a higher risk of AD than did those who were both adhering to the diet and participating in physical activity ($p = 0.03$). The

absolute risk of AD declined from 21% in the group with no physical activity and low diet adherence to nine percent in the group with much physical activity plus high diet adherence.

Conclusion: This study demonstrates that both a higher Mediterranean type diet adherence and higher physical activity are independently associated with a reduced risk of Alzheimer's disease.

Nikolaos, S., et al. Physical Activity, Diet, and Risk of Alzheimer's Disease. *JAMA*. 2009, August 12; 302(6): 627-637.

INTRAVASCULAR INJECTION WITH AND WITHOUT DIGITAL SUBTRACTION ANGIOGRAPHY

The primary indication for cervical epidural steroid injections (CESIs) is radicular pain secondary to cervical disc pathology or spinal stenosis. The symptomatic relief of radicular pain is attributed to suppression of inflammation, due to mechanical or chemical nerve root irritation. This study sought to determine whether digital subtraction angiography (DSA), combined with real-time fluoroscopic imaging, improves the detection rate of intra-vascular injection during cervical transforaminal epidural steroid injections (CTFESIs).

A total of 134 patients were studied, all of whom had presented with cervical radicular pain, and all of whom had undergone a CTFESI, performed by a single physician between 2004 and 2007. Anterior, posterior and oblique radiographs were taken to document the final needle position before injection of contrast. For patients in the non-DSA group, contrast was injected under real-time fluoroscopy. When intravenous injection was detected, the needle was repositioned. If intra-arterial injection was identified, the procedure was aborted. A test dose of lidocaine was administered, with assessment of sensory and motor function thereafter. A one milliliter dose of dexamethasone was then injected. The procedure was the same for the DSA group, except that DSA was used when contrast was being administered.

Intravascular injection was detected in 18% of the CTFESIs performed without DSA. After adding

the DSA technology, the detection of vascular injection was found to have increased to 32.8% (p=0.041). The increased detection of intravascular injection with DSA technology was similar when considering all injections, first injections, and second or subsequent injections.

Conclusion: This study of patients undergoing cervical transforaminal epidural steroid injections suggests that digital subtraction angiography, along with real-time fluoroscopy, can improve detection of intravascular injection, and, thus, reduce the risk of complications associated with inadvertent intravascular injection.

McLean, J., et al. The Rate of Detection of Intravascular Injections and Cervical Transforaminal Epidural Steroid Injections with and without Digital Subtraction Angiography. **PM&R**. 2009; 1(7): 636-642.

ELECTROPHYSIOLOGICAL ABNORMALITIES AFTER MULTIPLE CONCUSSIONS

According to the American Academy of Neurology, a concussion occurs when an impact causes some alteration in mental status, but may or may not be accompanied by loss of consciousness. In recent years, it has been shown that event related potentials (ERPs) are highly sensitive in detecting deleterious sequelae of sports concussion on cognitive function. This study examined the sensitivities of EEG recordings at both sites P3a and P3b in detecting pervasive cognitive function changes in asymptomatic, multiply concussed athletes.

All subjects in this study were recruited from college football teams. A group who had never sustained a concussion was compared to a group of asymptomatic athletes with multiple concussions, a group who had sustained a concussion within the year, and another group whose most recent concussion had occurred more than two years prior to testing. All participants were exposed to an auditory, three-tone oddball paradigm while ERPs were recorded.

Results of the ERP recordings revealed significantly reduced P3a and P3b amplitudes in the recently concussed group. Those who had sustained a concussion more than two years earlier had P3a and P3b

amplitudes equivalent to those of controls.

Conclusion: This study found that asymptomatic, multiply concussed athletes who had sustained their most recent concussion between five and 12 months prior to testing had significant P3 and P3b amplitude reductions.

Theriault, M., et al. Electrophysiological Abnormalities in Well Functioning, Multiply Concussed Athletes. **Brain Inj**. 2009, October; 23 (11); 899-906.

INFLIXIMAB IMPROVES VASCULAR STIFFNESS IN RA

Patients with rheumatoid arthritis (RA) have a high risk of cardiovascular events. Observational studies have demonstrated improved cardiovascular survival in RA patients treated with tumor necrosis factor alpha (TNF-alpha) blockers, which also halt the progression of joint destruction. This study evaluated the effects of infliximab on vascular structure and stiffness in patients with RA.

Subjects were adults without traditional cardiovascular risk factors who failed two RA disease modifying regimens, including methotrexate. All had disease activity scores of greater than 5.1 on two separate occasions at least one month apart. Twenty-six subjects, ranging in age from 34 to 66 years, were randomized to receive either infliximab or saline infusion at weeks zero, two, and six, and every eight weeks thereafter, for a total of 54 weeks.

In the placebo group, subjects worsening at 14 weeks could change to open label infliximab at week 16. Vascular ultrasound was used to determine primary outcome variables, including vascular stiffness, structure, augmentation index, and carotid artery plaque at weeks 24 and 56. In the treatment arm, RA disease activity improved significantly, as measured by the number of tender or swollen joints, sedimentation rate, pain scores and DAS28. No significant changes occurred in blood pressure, lipid profiles or adiponectin.

Post hoc analysis of all infliximab recipients revealed significant improvement in pulse wave activity, an indicator of vascular stiffness, after 56 weeks (p=0.004). Carotid intima thickness and plaque did not change significantly.

Conclusion: This study of patients with rheumatoid arthritis found that infliximab can improve arterial stiffness, which may help explain improved cardiovascular outcomes among patients with RA receiving TNF-alpha blockers.

Wong, M., et al. Infliximab Improves Vascular Stiffness in Patients with Rheumatoid Arthritis. **Ann Rheum Dis**. 2009, August; 68: 1277-1284.

MANDATORY REPORTING OF ELDERLY IMPAIRED DRIVERS

Aged drivers are expected to account for as much as 25% of total driver fatalities in 2030, as compared to 14% currently. In 2001, the Oregon legislature required primary physicians and healthcare providers to report to the Department of Motor Vehicles persons whose cognitive or functional impairments affected their ability to operate a motor vehicle safely. This study reports on physician characteristics, driver characteristics and impairments and licensure outcomes for those reported as impaired.

Data compiled from all physician reports of impaired drivers generated under Oregon's mandatory impairment referral program were reviewed from June 2003 through 2006. Recorded data included demographics, date of the report, a description of the impairment, and the specialty of the reporting health care practitioner.

The majority of the 1,664 reported drivers were older than 80 years of age, with a preponderance of men. Reports in which the primary impairment was cognitive were over seven times more common than those in which the primary impairment was functional. In more than half of the reported cases, the physician reported memory and reaction time impairments. Only 10% of suspended drivers regained their driving privileges after a hearing or retesting. Drivers older than 80 years of age were six times less likely to regain their license than were those 59 years of age or younger.

Conclusion: This study of Oregon's law mandating physician reporting of impaired drivers found that the law resulted in the loss of driving privileges for less than one percent of the state's drivers who were over the age of 80 years,

although fewer than five percent in this age group regained their privileges after the suspension.

Snyder, K., et al. Outcome of Oregon's Law Mandating Physician Reporting of Impaired Drivers. **J Ger Psych Neur.** 2009, September; 22 (3): 161-165.

PROGRESSION OF ROTATOR CUFF TEARS TREATED NONOPERATIVELY

Rotator cuff tears are very common, especially in the elderly. It is unclear why some of these tears become symptomatic and progress in size, while others do not. This study investigated the long-term, structural outcomes of rotator cuff tears treated nonoperatively.

Subjects were selected from among a group of individuals between 1999 and 2005 who had sustained rotator cuff tears as documented by magnetic resonance imaging (MRI). All participants had been treated conservatively, with treatments including physical therapy, activity restrictions and cortisone injections. Patients were excluded from the study if they had demonstrated no improvement, had a recurrent dislocation history, had undergone previous surgery, had sustained major joint trauma or had a history of other inflammatory diseases.

Fifty-four patients, with a mean age of 58.8 years, and 59 shoulders, were ultimately examined. MRI scans were monitored over a seven-to 58-month time frame after the initial scanning. The relationship between increased tear size and elapsed time between the patient's first and last MRI scans was assessed with logistic regression.

Five rotator cuff tears decreased in size, 35 remained the same size, and 19 became larger. Over half of the 33 full thickness tears increased in size, as compared to eight percent of the partial thickness tears ($p=0.0005$). Progression in tear size occurred among those who were followed for more than 18 months, had full thickness tears, were older than 60 years of age, and had fatty infiltration evident on MRI.

Conclusion: This study found that factors associated with progression of rotator cuff tears included full thickness of tears, fatty

infiltration and an age of greater than 60 years.

Maman, E., et al. Outcomes of Nonoperative Treatment of Symptomatic Rotator Cuff Tears Monitored by Magnetic Resonance Imaging. **J Bone Joint Surg.** 2009, August 1; 91(8): 1898-1906.

REINJURY AFTER LATERAL ANKLE SPRAIN

Lateral ankle sprains account for 15 to 45% of all sports related injuries. Although considered minor injuries, these sprains can lead to persistent disability in athletes. This study evaluated the relationship between grade of acute, lateral ankle sprain and the risk of reinjury in elite track and field athletes.

All sprains were classified using a four-grade classification system. The same rehabilitation protocol was prescribed for all of the athletes. The rate of lateral ankle reinjury was recorded during the 24 months post-injury.

Of the 202 athletes studied, seventy-nine experienced a grade I injury, 81 experienced a grade II injury, 36 experienced a grade III-A injury, and six experienced a grade III-B injury. By 24-months follow-up, 36 of the 202 athletes (17.8%) had experienced another lateral ankle sprain.

At twenty-four months follow-up, repeat ankle sprains were noted among 14% of those with a grade I injury, 29% with a grade II injury, 5.6% with a grade III-A injury, and none with a grade III-B injury.

Conclusion: This study revealed that athletes with a grade I or grade II lateral ankle sprain are at increased risk of experiencing a reinjury within the first two years post-injury.

Malliaropoulos, N., et al. Reinjury after Acute Lateral Ankle Sprains in Elite Track and Field Athletes. **Amer J Sp Med.** 2009, September; 37(9); 755-761.

PONTINE INFARCTION WITH PURE MOTOR HEMIPARESIS

Pontine infarction is usually manifested by classical crossed syndromes such as Millard-Gubler syndrome, Foville syndrome and Raymond-Cestan syndrome. However, some clinical observations

have suggested that pure motor hemiparesis (PMH) can be caused by pontine infarction. This study prospectively observed the clinical and MRI features, risk factors and prognoses of patients with pontine infarctions with PMH or hemiplegia.

One hundred eighteen, consecutive patients with first-ever ischemic stroke were followed. Fifty of those presented with PMH or hemiplegia, and had negative acute CT scan results, with lesions subsequently confirmed by MRI. The clinical and neuroimaging features of the pontine infarctions were compared to those of the cerebral infarctions.

Over one year, the pontine infarctions with PMH accounted for 10.2% of all, first-ever ischemic stroke patients, and 24% of patients who presented with both PMH and hemiplegia. Patients with pontine infarctions tended to have higher frequencies of diabetes mellitus, dizziness at onset and a progressive course.

Conclusion: This study found that pontine infarctions may present as pure motor hemiparesis or hemiplegia, with nonvertiginous dizziness and a progressive course. Presenting with negative findings on initial CT, the pons lesion can be identified with subsequent MRI.

Ling, L., Pontine Infarction with Pure Motor Hemiparesis or Hemiplegia: A Prospective Study. **BMC Neur.** 2009; 9: 25.

WILLINGNESS TO UNDERGO CARPEL TUNNEL RELEASE

Carpal tunnel syndrome (CTS) is the most common compression neuropathy in the upper extremity. Treatment options for CTS depend upon symptom severity, underlying cause, and patient needs. This study assessed factors involved in patients' willingness to undergo surgical release for CTS.

This retrospective study reviewed the records of 282 patients seen between 2004 and 2007 with a diagnosis of CTS without a known cause. All had been recommended for carpal tunnel release by a single hand surgeon. During the waiting period, 36 patients canceled surgery. Those 36 patients were contacted by mail and asked to complete a questionnaire. Of the 246 patients who underwent surgery, 70 female

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homeworkers were randomly selected as controls, and were contacted by mail and asked to complete the survey. The surgery and cancellation groups were compared with regard to reasons for choosing or canceling surgery.

The highest ranked reason for choosing surgery was severity of symptoms, rather than fear of progression of symptoms. The highest ranked reason for canceling surgery was some degree of symptom improvement during the waiting period. However, subjects also expressed concern about surgical complications, including transient weakness, financial burden, scarring or pillar pain.

Conclusion: This study of women with carpal tunnel syndrome identified factors affecting patients' willingness to proceed with carpal tunnel release. Subjective symptom severity was found to be the most important reason for undergoing surgery.

Gong, H., et al. Factors Affecting Willingness to Undergo Carpal Tunnel Release. *J Bone Joint Surg.* 2009, September; 91-A(9): 2130-2136.

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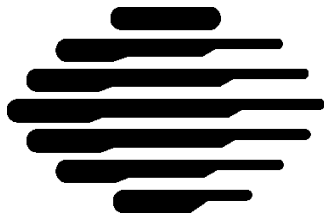
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