

REHAB IN REVIEW

TM

WWW.REHABINREVIEW.COM

Volume 21 Number 7

Published by Physicians
In Physical Medicine and Rehabilitation

July 5, 2013

YOGA AND EXECUTIVE FUNCTION

Yoga has gained significant attention and popularity as an exercise and stretching technique. While physical gains have been documented, the mental and cognitive changes resulting from this exercise remain relatively unexplored. This study examined the acute effects of yoga on cognitive performance.

Thirty female, college-age participants completed three testing sessions, including a yoga exercise session, an aerobic exercise session and a control baseline session. A within-subjects repeated measures design required participants to visit the laboratory on three separate days during which they had not previously participated in any form of physical activity. Maximal aerobic capacity (VO₂max) was estimated by the participant's performance on a modified Balke submaximal treadmill test. Cognitive performance was measured with the Flanker task and the N – back test after each condition.

Cognitive performance did not significantly change after the aerobic exercise condition, as compared with baseline. Cognitive performance after yoga was superior, with shorter reaction times and increased accuracy, as compared with both the aerobic and the baseline conditions.

Conclusion: This study, comparing the effects of yoga with those of aerobic exercise, found that yoga improved cognitive performance more than did aerobic exercise.

Gothe, N., et al. The Acute Effects of Yoga on Executive Function. *J Phys Activity Health*. 2013, May; 10: 488-495.

ASSOCIATION BETWEEN ATHEROSCLEROSIS AND OSTEOARTHRITIS

Previous studies have found a higher risk of cardiovascular death

among patients with knee or hip osteoarthritis (OA). While some studies have indicated that atherosclerosis is associated with OA, the data remain inconclusive. This study further investigated the role that atherosclerosis plays in the prevalence, incidence and progression of OA.

Data were obtained from the Rotterdam study, instigated in 1989 to investigate the occurrence and determinants of diseases in the middle age and older population. All inhabitants at least 55 years of age of the Ommoord district of Rotterdam were invited to participate in the study. Baseline measures obtained between 1990 and 1993 included home interview and physical examination. Follow-up data were collected at visits from 1997 to 2000 and 2002 to 2005. Those with radiographs of the knees, hips and hands at baseline were assessed at follow-up for progression of OA. In addition, atherosclerosis was estimated using ultrasonography of both carotid arteries. A multivariate logistic regression model was used estimate the relationship between atherosclerosis and the presence and progression of OA.

Of the patients completing the study, the average age at baseline was 68.2 years, with 58% women. After adjustment for confounding variables, intima media thickness was found to be associated with the prevalence of knee OA, as well as with the progression of metacarpophalangeal OA in women. In addition, carotid plaque was associated with distal interphalangeal (DIP) joint OA and with metacarpophalangeal OA in women. No associations were found for men.

Conclusion: This study revealed a significant association between atherosclerosis and osteoarthritis of the DIP, metacarpophalangeal and knee joints in women. This was not the case for men.

Hoeven, T., et al. Association of Atherosclerosis with Presence and Progression of Osteoarthritis: The Rotterdam Study. *Ann Rheum Dis*. 2013, May; 72(5): 646-651.

DENTAL PROPHYLAXIS AND ISCHEMIC STROKE

It has been estimated that over 90% of the world's population has mild to advance periodontal disease (PD). As studies have demonstrated that PD is one of the risk factors for non-hemorrhagic stroke, this study was designed to determine whether dental prophylaxis reduces the incidence of ischemic stroke.

This retrospective study employed data of the Taiwanese National Health Insurance Research Database, in order to estimate the incidence and hazard ratio of ischemic stroke. Data were retrieved from January of 2000 to December of 2010. The cohort was divided into three groups based upon the treatment for PD received. The subjects were followed until the occurrence of hospitalization with ischemic stroke or death, or until the end of the study if no stroke or death occurred.

Among the 719,436 subjects, the incidence rate (IR) of ischemic stroke was 0.25%/year. Among those with PD, subjects who received dental prophylaxis had the lowest stroke IR (0.14%/year), subjects with intensive treatment or tooth extraction had a higher IR(0.39%/year) and subjects without PD treatment had the highest IR (0.48%/year and p<0.001).

Conclusion: This study demonstrates that, among individuals with periodontal disease, dental prophylaxis and intensive periodontal treatment may significantly reduce the risk of ischemic stroke.

Lee, Y., et al. Dental Prophylaxis and Periodontal Treatment are Protective

Editor-in-Chief

David T. Burke, M.D., M.A.
Emory University, Atlanta, GA

Executive Editor

Randolph L. Roig, M.D.
Emory University, Atlanta, GA

Copy Editor

Roberta Alysoun Bell, Ph.D.
Emory University, Atlanta, GA

Contributing Editors

*Amy Cao, M.D.
BCM/UT Alliance, Houston, TX

*Jennifer Knowlton, M.D.
East Carolina University, Greenville, NC

*Jacob Lee, D.O.
Lisa Foster, M.D.
Laura Jones, M.D.
Patrick Nguyen, M.D.
Walter Sussman, D.O.
David Tran, M.D.
Mikhail Zhukalin, D.O.
Emory University, Atlanta, GA

*Joshua S. Sole, M.D.
Mayo Clinic, Rochester, MN

*Richard Chang, M.D., MPH
Mikiko Murakami, D.O.
Mount Sinai Med. Ctr., New York, NY

*Christina Marciniak, M.D.
Ashwin Babu, M.D.
Samuel K. Chu, M.D.
Marissa H. Cohler, M.D.
Geneva Jacobs, M.D.
Zack McCormick, M.D.
Maria E. Reese, M.D.
N.W.U./R.I.C., Chicago, IL

*Elizabeth Nguyen, M.D.
NYP, Columbia-Cornell, NY, NY

*Jackson Liu, M.D.
NYU/Rusk Inst. of Rehab Med, NY, NY

*Craig Best, D.O.
*Kashif Saeed, M.D.
Daniel Bunzol, M.D.
James Spendley, D.O.
Rush University Medical Center,
Chicago, IL

*Alan Vo, D.O.
Sinai Hospital, UMD, Baltimore, MD

*Matthew Dounel, M.D., MPH
SUNY Downstate, Brooklyn, NY

*Vikram Arora, D.O.
William J. Bonner, M.D.
Christopher Connor, D.O.
Temple Univ./UPenn., Philadelphia, PA

*Alice Hon, M.D.
G. N. Lacerda, M.D.
Lawrence P. Lai, M.D., MS
UMDNJ/Kessler Rehab, Newark, NJ

*Usman F. Ahmad, D.O.
University of Miami, Miami, FL

*Jessica Mack, M.D., MS
*Seth Swank, D.O.
University of Michigan, Ann Arbor, MI

*Todd Beery, D.O.
UPenn Health System, Philadelphia, PA
*Thiru Annaswamy, M.D.
Bradley Cubitt, M.D.

Factors to Ischemic Stroke. **Stroke**.
2013, April; 44(4):1026–1030.

CARTILAGE REPAIR WITH MAGNETIC MESENCHYMAL STEM CELLS

Recently, a number of studies have evaluated the utility of cartilage repair using mesenchymal stem cells (MSCs), with findings demonstrating that confining the cells to cartilage defects without a scaffold is difficult. This study was designed to demonstrate the utility of a cell delivery system using magnetically labeled MSCs (m-MSC) and an external magnetic force.

This animal study included 16 pigs ages six to seven months with a surgically created full thickness cartilage defect. The animals were randomized into three groups. The study group included those injected with m-MSCs, with the cells directed to the cartilage defect using an external magnetic force for 10 minutes. At one week, the accumulation of the cells was histologically examined in one knee, with the cartilage evaluated at arthroscopic surgery at six and 12 weeks. In the G group, the patella was faced upward, filled with MSCs and held for 10 minutes. In the control group, only phosphate – buffer saline was injected.

Arthroscopic observation found that, in the treatment group the magnetic force pulled the m-MSCs toward the cartilage defect and after 10 minutes the cells were retained within the defect. At six weeks, the mean arthroscopic scores were 10.4 in the treatment group, 8.8 in the G group and 7.4 in the control group ($p=0.009$). At 12 weeks, the mean arthroscopic scores were 12.8 in the treatment group, 10.5 in the G group and 9.5 in the control group, demonstrating significance between the treatment and the control group ($p=0.019$). At 12 weeks, at macroscopic assessment, reparative tissue in the treatment group had a smooth surface and good integration at the margins. The tissue in the G and the control group had rough surfaces and discernible edges. Excellent histologic integration was seen only in the treatment group.

Conclusion: This animal study suggests that magnetically labeled stem cells, directed to cartilage defects by external magnetic fields,

may provide a potential therapeutic option for treating cartilage defects.

Kamei, G et al. Articular Cartilage Repair with Magnetic Mesenchymal Stem Cells. **Am J Sport Med**. 2013, June;41(6) 1255 – 1264.

STEM CELL TREATMENT FOR OSTEOCHONDRAL LESIONS OF THE TALUS

Osteochondral lesions of the talus (OTL) include injuries of the talar articular cartilage and adjacent bone. Invasive interventions include marrow stimulation techniques, such as subchondral drilling, curettage, micro-abrasion and microfracture, as well as various restorative techniques. The principal aim of marrow stimulation treatments is the recruitment of pluripotent mesenchymal cells from the bone marrow that leads to fibrous tissue covering the lesion. This study investigated the utility of using mesenchymal stem cells (MSC), combined with arthroscopic marrow stimulation, to treat osteochondral lesions of the talus.

This retrospective study included 107 consecutive patients diagnosed with OTL, all of whom were treated with arthroscopic marrow stimulation between May of 2008 and December of 2011. Of these, the first 77 ankles were treated with arthroscopic marrow stimulation alone (group A), and the following 35 with both MSC injection and stimulation (group B). The mean follow-up periods were 21.8 months in group A and 19.7 months in group B, with all assessed through clinical and radiologic analyses.

The mean visual analogue scale score significantly improved in both groups as compared with baseline, and was significantly better in group B ($p<0.001$). In addition, results on the American Orthopedic Foot and Ankle Society Ankle Hind Foot Scale significantly improved in both groups, with better scores noted in group B than in group A ($p<0.001$). Activity levels were significantly improved in group B ($p=0.041$), but not in group A.

Conclusion: This study of patients over 50 years of age with osteochondral lesions of the talus found that combining mesenchymal stem cell injections with marrow stimulation may improve pain and

clinical outcomes more than stimulation alone.

Kim, Y., et al. Clinical Outcomes of Mesenchymal Stem Cell Injection with Arthroscopic Treatment in Older Patients with Osteochondral Lesions of the Talus. **Am J Sport Med.** 2013, June; 41(5): 1090-1099.

ORAL HEALTH AND FRAILTY

Oral health has been the focus of recent studies related to function, well-being, and mortality. This study assessed the association between oral health and frailty in community dwelling elderly individuals.

Questionnaires were sent to 1,374 individuals, representing 998,528 individuals age 60 or older in São Paulo. Frailty was examined by identifying the presence or absence of five characteristics, including weight loss, weakness, slowness, exhaustion and low level of physical activity. The presence of three or more of these characteristics was defined as frail, one or two as pre-frail, and zero as non-frail. Independent variables were sociodemographic data, general health, chronic diseases, tobacco abuse and oral health measures, including number of teeth, use of dental prosthesis, presence of decayed teeth, clinical attachment loss and periodontal pocket.

The prevalence of frailty among the cohort was 8.5%, with 50.8% considered non-frail. Bivariate analysis revealed that frailty was associated with two sociodemographic variables, age and schooling, both general health factors, self-reported chronic diseases and smoking, and three of five oral health measures, including the number of teeth, clinical attachment loss and the need for a dental prosthesis. Subjects with a need for a dental prosthesis had a 46% greater chance of being pre-frail than those without such a need. Having more teeth was significantly associated with a lower chance of frailty.

Conclusion: This study of elderly individuals in Brazil found that the need for a dental prosthesis was significantly associated with frailty.

Bof de Andrade, et al. Relationship between Oral Health and Frailty in Community Dwelling Elderly

Individuals in Brazil. **J Am Ger Soc.** 2013, May; 61(5): 809–814.

SEVERE DEFICIENCY OF VITAMIN D AND RHEUMATOID ARTHRITIS ACTIVITY

Previous studies have noted that vitamin D, in its physiologically active form 1,25(OH)₂D₃, has immunoregulatory activities. Some have demonstrated that vitamin D intake is inversely associated with the risk of rheumatoid arthritis (RA). This study assessed the association between serum levels of vitamin D and disease activity in a group of patients with RA.

Three hundred two consecutive patients with RA who were seen in a rheumatology clinic were invited to participate in this study. The participants were evaluated at their regular visit with disease activity scores, pain visual analogue scale scores and serum samples. Blood samples were analyzed for the presence of rheumatoid factor and for anti-cyclic citrullinated peptide (CCP). The level of 25-hydroxyvitamin D₃ (25-OH-D₃) was determined, with deficiency defined as a value lower than 50 nmol per liter.

Subjects were 302 patients with RA, with a mean age of 62.5 years and a mean time since diagnosis of 10.5 years. The rheumatoid factor was positive in 243 patients (80.5 %), and anti-CCP was positive in 203 patients (67.4 %). No significant relationship was found between serum levels of 25-hydroxyvitamin D and Disease Activity Scores (DAS28), nor number of swollen joints. Slightly over 33% of the patients with RA had low levels of vitamin D.

Compared to patients with normal 25-OH-D₃, a higher percentage of the subset of patients with very low serum levels of vitamin D (≤15 nmol/l) had a positive rheumatoid factor, higher CRP, higher number of patients treated with at least three DMARDs and a higher number of patients with high disease activity DAS28 scores of >5.

Conclusion: This study of patients with rheumatoid arthritis found that, among those with very low levels of Vitamin D, 20% had very high disease activity.

Haga, H., et al. Severe Deficiency of 25-Hydroxyvitamin D is Associated

with High Disease Activity and Rheumatoid Arthritis. **Clin Rheum.** 2013, May; 32(5): 629-633.

PERIODONTITIS AND RHEUMATOID ARTHRITIS

Rheumatoid arthritis (RA) has been associated with many genetic and environmental factors, among which tobacco abuse has been well established.

Recently, epidemiological studies have reported a higher prevalence of periodontitis in patients with RA than among non-RA controls. This study sought to better understand the association between periodontitis and the development of RA.

This nationwide, population-based study included patients registered in the National Health Insurance Program, which covers 90% of the population of Taiwan. All patients newly diagnosed with RA who were at least 16 years of age were identified, with the control group matched for age, gender and initial diagnosis date. Periodontitis severity was assessed by the number of periodontitis related visits and the cumulative cost of periodontitis related visits before the index date.

The study identified 13,779 newly diagnosed patients with RA, and 137,790 matched, non-RA patients. The cumulative incidence of RA between 2001 and 2006 was 0.64%. The history of periodontitis was significantly associated with newly diagnosed RA, with an odds ratio of 1.16. This relationship remained significant after adjusting for potential confounders.

Conclusion: This population study found that a history of periodontitis increases the risk for a subsequent diagnosis of rheumatoid arthritis.

Chen, H., et al. Association between a History of Periodontitis and the Risk of Rheumatoid Arthritis: A Nationwide, Population-Based, Case-Control Study. **Ann Rheum Dis.** 2013, July; 72(7): 1206-1211.

BACTERIA AND MODIC CHANGES IN VERTEBRAE

Modic changes (MCs) are bone edema in vertebrae, which are commonly associated with low back pain. Previous studies have

suggested that pathogenic mechanisms resulting in MC may include both mechanical and infective causes. This study was designed to investigate whether herniated nucleus material from lumbar disc herniation is infected with anaerobic bacteria, and whether those with infections are more likely to develop MCs than are those with sterile discs or aerobic infections.

This study included patients in the ages of 18 and 65 years of age undergoing primary surgery at a single spinal level for lumbar disc herniation. At the time of surgery the nucleus material was evacuated and cultured for identification of bacteria, with further tissue analysis for bacterial DNA. The patients had an MRI at baseline and 1–2 years after surgery.

Sixty-one patients were included in the study, with a mean age of 46.4 years. In total, the cultures were positive in 28 of the 61 patients with anaerobic cultures positive in 26 patients and both aerobic and anaerobic organisms positive in two. In the discs with anaerobic bacteria isolated, 80% developed new MCs in vertebrae adjacent to the herniated discs compared with 44% of those with negative cultures and 0% of those with aerobic cultures. The association between a positive anaerobic culture and new Modic changes was highly significant ($p=0.0038$) with an odds ratio 5.6.

Conclusion: This study of patients undergoing surgery for lumbar disc herniation found that 46% were found to have microorganisms in extruded nuclear material with anaerobic bacteria associated with the development of Modic changes

Albert, H et al. Does Nuclear Tissue Infected With Bacteria Following Disc Herniation Lead to Modic Changes In The Adjacent Vertebrae? *Eur Spine J*. 2013, April; 22: 690-696

TREATMENT OF MENTAL STRESS-INDUCED MYOCARDIAL ISCHEMIA

During the last three decades, the association of emotional distress and myocardial ischemic activity has been well studied. Recent evidence suggests that selective serotonin reuptake inhibitors (SSRIs) may reduce mental stress-induced hyperdynamic response, metabolic

risk factors and platelet activity. This study investigated whether citalopram affects mental stress-induced myocardial ischemia (MSIMI).

This randomized, double-blind trial included patients with clinically stable congestive heart disease and MSIMI. All participants underwent mental and exercise stress testing during baseline, and were randomized to receive either citalopram or a matched placebo for six weeks. Dosing of the study medication was titrated to 20 mg per day. Mental and exercise stress testing was repeated at the end of the six-week intervention.

A total of 127 participants were randomized, with 64 allocated to receive citalopram and 63 to receive a placebo. At the end of six weeks, 34% of patients taking citalopram had an absence of MSIMI during mental stressors, as compared with 17.5% of the placebo group ($p=0.04$). The association between citalopram use and MSIMI improvement remained significant after adjusting for gender and baseline resting LVEF ($p=0.05$). Rates of exercise-induced ischemia were slightly lower in the treatment group, although this difference did not reach statistical significance.

Conclusion: This study of patients with stable coronary heart disease found that treatment with an SSRI can significantly improve the occurrence of mental stress-induced myocardial ischemia.

Jiang, W., et al. Effect of Citalopram on Mental Stress-Induced Myocardial Ischemia: Results of the REMIT Trial. *JAMA*. 2013, May 22/29; 309(20): 2139–2149.

RISK AND SEVERITY OF SPINAL CORD INJURY AFTER MINOR TRAUMA

Cases have been reported of tetraplegic or tetraparesis after minor trauma to the cervical spine, among individuals without preceding neurologic symptoms. This study investigated the spinal canal diameter and space available for the cord at the level of the disk in patients suffering from acute cervical spinal cord injury (SCI) after minor trauma to the cervical spine.

Patients suffering from acute cervical SCI resulting from minor trauma, all admitted between 2000 and 2010, were included in the study.

Those with minor, flexion/extension trauma to the cervical spine and without SCI were identified as controls. All subjects underwent MR imaging of the cervical spine, with cord, canal, and bone dimensions identified.

Upon radiologic review, significant differences were seen between the SCI and control groups in spinal canal/vertebral body ratio, space available for the cord, and canal to cord ratio ($p<0.001$ for all comparisons). A minimum sagittal disc-level canal diameter of 8 mm was found to have the largest positive predictive value in predicting SCI.

Conclusion: This study of patients with mild cervical trauma found that those at risk of acute spinal cord injury can be identified by using a disc-level canal diameter cutoff value of 8 mm.

Aebli, N., et al. Predicting the Risk and Severity of Acute Spinal Cord Injury after a Minor Trauma to the Cervical Spine. *Spine J*. 2013, June; 13: 597–604.

LONG-TERM COGNITIVE IMPAIRMENT AFTER ISCHEMIC STROKE IN YOUNG ADULTS

Approximately 10-14% of ischemic strokes occur among adults, ages 18 to 50 years. While the motor recovery of these patients is considered reasonably good, few studies address cognitive outcome in the short-term, and fewer in the long-term. This study was designed to investigate long-term cognitive performance after a first ever young ischemic stroke.

This study included consecutive patients, seen between January 1980 and November 2010 with a first ever ischemic stroke. At stroke onset, patients were 18 to 50 years old, and were admitted a medical facility in the Netherlands. Controls were recruited from among the patients' spouses, relatives or social environment, matched for age, sex, and level of education, and with no history of transient ischemic attack or stroke. Neuropsychological tests were administered between November 2009 and December 2011.

The study population included 277 patients with ischemic stroke and 146 controls. The mean age at stroke onset was 40 years. Patients with ischemic stroke had a worse

cognitive performance on six cognitive domains at a mean of 11 years follow-up as compared with controls. These included processing speed, working memory, immediate memory, delayed memory, attention, and executive function ($p < 0.0001$ for all comparisons). The most common deficits included processing speed, working memory and attention.

Conclusion: This study of young patients with first ever ischemic stroke found that a substantial portion of patients have cognitive deficits, even 11 years after their stroke.

Schaapsmeeders, P et al. Long-Term Cognitive Impairment after First Ever Ischemic Stroke in Young Adults. **Stroke**; 2013, June; 44 (6):1621 – 1628

CHANGES IN SEXUAL FUNCTION AFTER TRAUMATIC BRAIN INJURY

While there is evidence of sexual problems among many persons with moderate to severe traumatic brain injury (TBI), little is known about the evolution of these problems over time. As most studies report on sexual functioning at one year or more after injury, this study was designed to investigate the longitudinal changes in sexual function at six and 12 months post-injury.

Participants were 222 persons with moderate to severe TBI, each admitted to one of six TBI NIDRR model system inpatient rehabilitation units. All patients were followed in the community at six and 12 months after injury. The subjects were assessed at admission with the Derogatis Interview for Sexual Functioning–Self-Report 20 (DISF-SR), the Global Sexual Satisfaction Index (GSSI) and the Glasgow Coma Scale. Changes from six to 12 months post-injury were documented.

Scores on the DISF-SR showed a lack of change in perception of sexual function in three of four subsets. Only the arousal subset demonstrated improvement from six to 12 months ($p = 0.05$). No scores on the other subscales showed any significant change over time. Satisfaction with sexual function was noted in 72% of the individuals at six months and 71% at one year.

Conclusion: This study of patients with moderate to severe

traumatic brain injury found that sexual function and satisfaction is relatively stable from six to 12 months post-injury.

Hanks, R., et al. Changes in Sexual Functioning from Six to 12 Months following Traumatic Brain Injury: A Prospective TBI Model System Multicentered Study. **J Head Trauma Rehab**. 2013, May/June; 28(3): 179-185.

ALTERATIONS IN THE SCAPULAR HUMERAL RHYTHM IN BASEBALL PITCHERS

During the throwing movement, the scapula acts as the kinetic fulcrum between the humerus and the trunk, as the humerus moves from abduction, extension and external rotation, to adduction, flexion and internal rotation. Scapular upward rotation during arm elevation is characterized by the activation and coupling of the serratus anterior, and lower trapezius, with the upper trapezius and rhomboids. Fatigue due to pitching can lead to the uncoupling of these muscle groups, leading to an increased risk of injury. This study used a portable motion analysis device to assess the change in scapular humeral rhythm (SRH) in baseball pitchers after a throwing session.

Thirteen baseball pitchers, with a mean age of 20 years, were assessed with a portable motion tracking system. This system included motion trackers (MTx) with 3-D accelerometers, 3-D gyroscopes and 3-D magnetometers combined to calculate the 3-D orientation of the pitching motion. Four MTxs were positioned over the sternum, scapula, humerus, and forearm of the pitching arm. The subjects were evaluated for SRH changes, before throwing, after 60 pitches and 24 hours after the pitching session.

Scapular humeral rhythm changes were found in 11 of the 13 pitchers with no changes found in two. Of the 11, three pitchers showed incomplete restoration, and five showed complete restoration after 24 hours. Three pitchers showed persistence of SRH changes at 24 hours.

Conclusion: This study using a portable motion analysis system found that scapular humeral rhythm changes occurred in 85% of pitchers,

with a varying ability to recover at 24 hours.

Pellegrini, a et al. Motion Analysis Assessment of Alterations In The Scapulo – Humeral Rhythm After Throwing In Baseball Pitchers. **Musculoskeletal Surg** 2013, June; 97: S9 –S13

ANABOLIC STEROIDS FOR CHRONIC PRESSURE ULCERS

Chronic pressure ulcers are a significant source of morbidity and mortality in persons with spinal cord injury. Treatment of these wounds remains an expensive and lengthy process. Some have advocated for the use of anabolic steroids for the treatment of these wounds. This study was designed to evaluate the effectiveness of oxandrolone for the treatment of non-healing, full thickness pressure ulcers in patients with chronic SCI.

This parallel group, placebo-controlled, randomized study included persons with SCI and chronic, full thickness pressure ulcers enrolled in 16 inpatient spinal cord injury services at Veterans Affairs medical centers. Patients were randomized to receive either oxandrolone 10 mg twice per day ($n = 108$) or placebo ($n = 104$) until the ulcer was healed, or for 24 weeks. The primary outcome measure was a healed ulcer with secondary outcome being the percentage that remained healed at eight week follow-up.

At week 24, 24% of pressure ulcers in the treatment group and 29.8% in the placebo group had healed. Pressure ulcers remained healed at eight weeks follow-up in 16.7% of the treatment group and 15.4% of the placebo group. Liver enzymes were elevated in 32.4% of the treatment group and 2.9% of the placebo group ($p < 0.001$).

Conclusion: This study of patients with a spinal cord injury and with chronic pressure ulcers found no benefit from the use of anabolic steroids for the treatment of these wounds

Bauman, W et al. Effect of Oxandrolone on the Healing Of Chronic Pressure Ulcers in Persons with Spinal Cord Injury. **Ann Intern Med**. 2013, May 21; 158(10):718-726

CORE STRENGTHENING VERSUS AEROBIC EXERCISE FOR LOW BACK PAIN

Exercise prescription is often the first choice of treatment for patients with low back pain (LBP). However, there is limited evidence that one type of exercise is superior to another. This study compared the effect of trunk specific exercises with aerobic exercise for the treatment of LBP.

Sixty-four individuals were randomized in this single center, single-blind, controlled study. Eligible subjects had non-radiating low back pain of at least 12 weeks' duration, with no history of disc herniation, fracture, prior surgery or inflammatory joint disease. All participants completed an eight-week program of 50 of 60 minutes of exercise classes three times per week. The trunk specific group performed Pilates, while the aerobic group performed stationary cycling. Subjective questionnaires were completed at eight weeks and at six months.

The Pilates group demonstrated significantly greater reductions in visual analogue scale scores and Oswestry Low Back Pain and Disability Index scores at eight weeks than did the cycling group. In addition, disability scores were significantly better in the Pilates group than in the aerobic group at eight weeks ($p=0.018$). However, no significant difference was observed between the groups at six months.

Conclusion: This study of patients with chronic, nonspecific low back pain found that eight weeks of Pilates is superior to aerobic exercise for reducing pain and disability, although this difference dissolved at six-month follow-up.

Marshallm, P., et al. Pilates Exercise or Stationary Cycling for Chronic, Nonspecific Low Back Pain: Does It Matter? A Randomized, Controlled Trial Six-Month Follow-Up. *Spine*. DOI:10.1097/RS.0b013e318297c1e5.

FOOT DROP STIMULATION VERSUS ANKLE FOOT ORTHOSIS

Patients with stroke often have a pattern of weakness resulting in the inability to actively dorsiflex during the swing phase of gait, referred to as foot drop. The traditional treatment for persistent foot drop is an ankle foot orthosis (AFO) that holds the foot in a

neutral position. An alternative to the AFO is a foot drop stimulator (FDS), designed to stimulate the common peroneal nerve. This study compared FDS and AFO for the treatment of foot drop among people with stroke.

This multicenter trial included patients who were at least three months post-stroke with a demonstrated gait speed of less than or equal to 0.8 m/s. The patients were randomized to wear either a surface FDS or a standard AFO. At 30 weeks, the control group crossed over to the FDS group for an additional 12 weeks. Outcome measures were obtained at baseline, and after six, 12 and 30 weeks. The primary outcome measure was the comfortable and fast walking speed with a 10 m walk test. Secondary outcomes included a measure of body structure and function, several activity measures to assess functional mobility, walk endurance, balance and participation level measures.

At 30 weeks, both comfortable and fast gait speed improved in both groups. No significant differences were found between the groups in comfortable gait speed improvement. No between group differences were noted in the number of steps per day at week six. The total user satisfaction survey score at 12 weeks was significantly higher in the FDS group than in the control group ($p<0.001$), with this difference persisting at week 30. The number of patients who fell during the study period did not differ significantly between the two groups.

Conclusion: This study of patients with foot drop due to stroke found significant improvements with the use of either an ankle foot orthosis or a foot drop stimulator, although higher user satisfaction was noted in the stimulator group.

Kluding, P., et al. Foot Drop Stimulation versus Ankle Foot Orthosis after Stroke. Thirty-Week Outcomes. *Stroke*. 2013, June ; 44: 1660-1669.

DEPRESSION AND RISK OF STROKE IN MIDDLE-AGED WOMEN

While the development of depression after stroke is a well-recognized phenomenon, the role of depression as a risk factor for stroke is less well understood. This study

was designed to better determine the association between depression and incidence of stroke in a population-based cohort of middle-aged women.

This study included participants from the Australian Longitudinal Study on Women's Health, a population-based study of women born in 1921 to 1926, 1946 to 1951 and 1973 to 1978. Subjects were women in the 1946 to 1951 cohort with incident stroke determined at follow-up surveys in 2001, 2004, 2007 and 2010. Death and cause of death were identified through the National Death Index. Depressive symptoms were assessed at each survey using the Center for Epidemiological Studies Depression Scale and antidepressant use. Lifestyle and physiologic stroke risk factors were also determined at each follow-up survey.

At survey two, the mean age was 52.5 years and the prevalence of depression was 25.1%, with a similar prevalence seen in subsequent surveys. At follow-up, 177 first-ever strokes had occurred, with a stroke prevalence of 1.5%. In the primary analysis, depression was associated with an increased risk of stroke (odds ratio 2.41), which remained significant after controlling for age, socioeconomic status, lifestyle and physiologic stroke risk factors (odds ratio 1.94).

Conclusion: This prospective study found a strong association between depression and subsequent risk of stroke among middle-aged women.

Jackson, C., et al. Depression and Risk of Stroke in Middle-Aged Women. A Prospective, Longitudinal Study. *Stroke*. 2013, June; 44(6): 1555-1560.

ADALIMUMAB FOR AXIAL SPONDYLOARTHRITIS

Axial spondyloarthritis can be categorized into ankylosing spondylitis and non-radiographic axial spondyloarthritis (nr-axSpA). As both groups have comparable clinical manifestations and disease burden, anti-tumor necrosis factor therapy is often a new treatment recommendation when treatment with nonsteroidal anti-inflammatory drugs has failed. This study assessed the efficacy of adalimumab for the treatment of nr-axSpA.

Patients were included who fulfilled the Assessment Of Spondyloarthritis International Society (ASAS) criteria for axial spondyloarthritis, Bath Ankylosing Spondylitis disease activity index score of greater than or equal to four, back pain of at least four on a 10 cm visual analogue scale and inadequate response to nonsteroidal anti-inflammatory drugs. The patients were randomized to receive either adalimumab or placebo with the primary endpoint set as the ASAS 40 at week 12.

Of the 185 patients studied ASAS 40 was achieved at week 12 in 36% of the Adalimumab group and 15% of the placebo group ($p < 0.001$). MRI findings of inflammation significantly decreased from the initial scan after 12 weeks of treatment with adalimumab. Adverse events in the treatment group including nausea in 8.2%, diarrhea in 7.2% and upper respiratory tract infection in 4.1%.

Conclusion: This study of patients with non-radiographic axial spondyloarthritis found that treatment with an antitumor necrosis factor (Adalimumab) can effectively control disease activity and decrease inflammation.

Sieper, J., et al. Efficacy and Safety of Adalimumab in Patients with Non-Radiographic Axial Spondyloarthritis: Results of a Randomized Placebo-Controlled Trial (ABILITY-1). **Ann Rheum Dis.** 2013, June; 72(6):815-822

ADRENOCORTICOTROPIC HORMONE FOR ACUTE GOUT

Current guidelines for the treatment of acute gout include the use of nonsteroidal anti-inflammatory drugs and colchicine. These medications are often contraindicated, especially among hospitalized patients. Adrenocorticotrophic hormone (ACTH) has been suggested as an alternative treatment, with its use documented as early as 60 years ago. This study reports the experience of one facility in the use of ACTH as a first-line treatment for gout.

This retrospective study included 181 cases of gout among hospitalized patients treated with ACTH. Data collected included medical history and comorbidities, as well as sociodemographic information.

Patients were treated with one mg of synthetic ACTH intramuscularly, with no treatments with colchicine or nonsteroidal anti-inflammatory drugs. Treatment response was defined as an attenuation of signs of inflammation, as recorded in the medical record, and a lack of use of steroids, NSAIDs or analgesics for two days following the attack.

The study patients had a mean age of 74.24 years, with hypertension in 81% and cardiovascular disease in 55%. Of the patients treated, a response to treatment was noted in 78% following the day of ACTH administration. The nonresponders were treated with a second ACTH injection the day following the first, with 83% of these patients responding. Side effects included four cases of skin reaction, one episode of headache and one episode of dizziness. Of the responders, 11.34% suffered a second gouty attack at a median of four days after the initial attack. Diabetic patients demonstrated an increase in fasting glucose at 24 hours but not at 48 hours after the injection.

Conclusion: This retrospective study of hospitalized patients with gout suggests that ACTH may be an effective and safe first line treatment for acute attacks.

Doussis, D et al ACTH As First-Line Treatment For Acute Gout In 181 Hospitalized Patients. **Joint Bone Spine** 2013, May; 80(3): 291 – 294

RAPID BLOOD PRESSURE LOWERING AFTER INTRACEREBRAL HEMORRHAGE

Acute intracerebral hemorrhage affects more than one million people annually worldwide, with the outcome determined by the volume and growth of the underlying hematoma. As blood pressure often becomes elevated after ICH, and is a predictor of outcome, this study was designed to determine the safety and effectiveness of early and intensive lowering of blood pressure.

This international, multicenter, prospective, randomized, open treatment, blinded trial included 2,839 patients with a spontaneous intracerebral hemorrhage, presenting within six hours, and with systolic blood pressure elevation. The patients randomized to an intensive treatment group were targeted for

systolic blood pressure reductions to less than 140 mg/Hg within one hour of randomization, and maintained for the next seven days. Participants assigned to a standard treatment group underwent blood pressure lowering if their systolic blood pressure was higher than 180 mm Hg. The subjects were assessed for severity of stroke using the National Institutes of Health Stroke Scale, the Glasgow Coma Scale, and brain scan at baseline and at 24 hours. The primary outcome measure was the proportion of participants with poor outcome, defined as death or major disability at 90 days after randomization.

From October of 2008 through August of 2012, a total of 2,839 participants were enrolled. At 90 days, 52% in the intensive treatment group and 55.6% in the standard treatment group had a poor outcome ($p = 0.06$). The rate of death from any cause was similar between the intensive and the standard treatment groups (11.9% and 12%, respectively) as was the percent of the deaths attributed to the intracerebral hemorrhage (61.4% and 65.3%, respectively). However a significantly lower, average modified Rankin score was seen among those in the intensive treatment group ($p = 0.04$).

Conclusion: This randomized, controlled trial found that intensive lowering of blood pressure within one hour of treatment onset does not significantly reduce the rate of death or major disability, but does seem to improve the functional outcome, as compared to standard treatment.

Anderson, C., et al. Rapid Blood Pressure Lowering in Patients with Acute Intracerebral Hemorrhage. **N Eng J Med.** 2013 DOI: 10.1056/NEJMoa1214609

PRESCRIPTION OPIOIDS AND ERECTILE DYSFUNCTION

Opioid use for chronic noncancer back pain is increasingly common. Sexual dysfunction is often associated with chronic pain, but has also been associated with opioid use, as well as with depression, which often accompanies chronic pain. This study was designed to determine the association between use of medication for erectile dysfunction and the use of opioid therapy.

(Continued from page 2)

*Thiru Annaswamy, M.D.
Bradley Cubitt, M.D.
Lauren Fisher, M.D.
UTSW Medical Center, Dallas TX

*Rachel Hallmark, M.D., Ph.D.
UVA, Charlottesville, VA

*Ryan Solinsky, M.D.
University of Washington, Seattle, WA

*Bonnie Weigert, M.D.
University of Wisconsin, Madison, WI

*William Robbins, M.D.
Don Tower, D.O.
VCU, Richmond, VA

*Adam J. Schulte, M.D.
Ikram Malik, M.D.
Britney Ramgopal, M.D.
H. Orson Setzer, D.O.
Washington University, St. Louis, MO

Executive Editor Emeritus
Donald F. Langenbeck, Jr., M.D.

Subscription Manager
Michael P. Burke, M.S.

***Regional Managing Editors have
attested that they have no financial
conflict of interest when choosing
articles that appear in Rehab in
Review.**

From electronic data, ambulatory adults 18 years of age or older were identified with a diagnosis of back pain, excluding those with underlying systemic disease or trauma. Prescription data were reviewed six months before the initial back pain visit and thereafter for data concerning opioid use and medications for erectile dysfunction.

From the data 11,327 males were identified with a diagnosis of back pain upon at least one visit in 2004. The probability of receiving medications for erectile dysfunction or testosterone replacement increased consistently with increasing dose and duration of opioid therapy ($p < 0.001$). When combined, these medications were prescribed for 13.1% of males receiving long-term opioids, as compared with 6.7% among those with back pain and no opioid therapy.

Conclusion: This study of male patients seen in a clinic for low back pain found that prescriptions for erectile dysfunction or testosterone replacement are associated with both the dose and the duration of opioid therapy.

Deyo, R., et al. Prescription Opioids for Back Pain and Use of Medications for Erectile Dysfunction. *Spine*. 2013, May 15; 38(11): 909-915.

Rehab in Review (RIR) is produced monthly by physicians in the field of Physical Medicine and Rehabilitation (PM&R), with the cooperation and assistance of Emory University School of Medicine, Department of Rehabilitation Medicine. The summaries appearing in this publication are intended as an aid in reviewing the broad base of literature relevant to this field. These summaries are not intended for use as the sole basis for clinical treatment, or as a substitute for the reading of the original research.

The Emory University School of Medicine designates this journal based activity for a maximum of 3 AMA PRA Category 1 Credits™. Physicians should only claim credit commensurate with the extent of their participation in the activity. The Emory University School of Medicine is accredited by the ACCME to provide continuing medical education for physicians.

RIR is affiliated with the Association of Academic Physiatrists, the World Health Organization, and the Chinese and Indian Societies of PM&R and endorsed by the International Society of Physical and Rehabilitation Medicine.

Private subscriptions are available by email at rehabinreview@aol.com or by fax or phone at (800) 850-7388.

ISSN # 1081-1303

www.rehabinreview.com



REHAB IN REVIEW

Produced by the Department of
Rehabilitation Medicine, Emory
University School of Medicine



EMORY
UNIVERSITY
SCHOOL OF
MEDICINE

Department of
Rehabilitation
Medicine

Expanding the frontier of rehabilitation sciences in research, teaching, and patient care