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Volume 25 Number 9 Published by Physicians In Physical Medicine and Rehabilitation September 5, 2017

DIETARY FIBER AND THE RISK OF KNEE OSTEOARTHRITIS

Previous studies have suggested that dietary fiber is associated with lower risks of cardiovascular disease, diabetes and mortality. Others have shown that dietary fiber can assist with improved blood pressure, circulating C-reactive protein (CRP) and improved glycemic control. Given these findings, this study assessed the association between fiber intake and osteoarthritis (OA) of the knee.

Data were harvested from the Osteoarthritis Initiative (OAI) and the Framingham study. The OAI is a longitudinal, prospective cohort including 4,796 men and women with or at risk of knee OA. The Framingham Offspring OA study involved adult children of the original Framingham study and spouses of offspring participants. The Offspring OA study investigated the inheritance of OA among study participants.

During a call back visit in 1993 through 1994 of the Framingham Study, 1,268 eligible patients underwent baseline weight-bearing radiographs of both knees, with these repeated from 2002 through 2005. In both studies, baseline data included medical history, social history and dietary history. Dietary fiber intake was compared with incident radiographic OA and symptomatic OA over the following nine years.

In both studies, total dietary fiber intake was found to be inversely associated with symptomatic OA ($p<0.03$). Compared with the lowest quartile, a significant dose—dependent, inverse relationship was found with increased fiber intake for the risk of symptomatic OA and knee worsening ($p<0.005$). No significant relationship was found between fiber intake and rheumatoid arthritis.

Conclusion: Using findings from two longitudinal studies, the authors found that high total fiber intake is correlated with a lower risk of symptomatic osteoarthritis.

Dai, Z., et al. Dietary Intake of Fiber and Risk of Knee Osteoarthritis in Two U.S., Prospective Cohorts. **Ann Rheum Dis.** 2017, August; 76 (8): 1411-1419.

RUNNING AND OSTEOARTHRITIS OF THE KNEE

Despite significant progress over recent decades, much remains unknown regarding the cause of knee osteoarthritis (OA). Some have suggested that excessive physiologic loading of normal joint structures, or normal loading of compromised structures, may accelerate the development of OA. This literature review and meta-analysis was designed to better understand the relationship between running and the development of knee OA.

Data were reviewed for studies including adult subjects, measuring exposure to any form of running or jogging, which included a comparison group and which assessed the signs or symptoms of OA of the knee. Data were extracted from those studies, with a random-effects meta-analysis performed.

A total of 15 studies, published between 1977 and 2010, were chosen for inclusion in the meta-analysis. The data revealed no significant difference in knee OA rates between runners and controls, although an elevated rate was found among elite runners, as compared with controls. Among studies using radiographic and imaging markers, no significant differences between runners and controls were found for most measurements. The meta-analysis suggested a protective effect of running against surgery resulting from OA.

Conclusion: This meta-analysis of the literature did not find a significant association between running and the diagnosis of OA, while some evidence does suggest a protective effect against OA-related surgery.

Timmins, K., et al. Running and Knee Osteoarthritis: Systematic Review and Meta-Analysis. **Am J Sports Med**. 2017, June; 45 (6): 1447-1457.

SURVIVAL IN MULTIPLE SCLEROSIS

Previous, longitudinal studies have revealed increased life expectancy in patients with Multiple Sclerosis (MS) over the last decades. This study was designed to better understand the change in mortality among patients with MS.

All patients in Hordaland County, Western Norway, with an onset of MS of between 1953 and 2012, were included in the study. Medical records were reviewed for year of birth, age at onset of first clinical symptom, age at diagnosis, gender, disease course and cause of death, when appropriate. Age at death was compared to life expectancy for the general Norwegian population.

Subjects were 1,388 patients with MS, among whom 38% were men and 62% women. By December of 2012, 21% had died. The median life expectancy for patients with MS was 74.7 years as compared with 81.8 years in the general population. Those diagnosed with RRMS had a longer life expectancy (77.8 years) than those diagnosed with PPMS (71.4 years). The main cause of death noted on the death certificate for those with MS was MS in 56.4% of the patients. After this, cardiovascular/cerebrovascular diseases and cancer were the most frequent, accounting for 14.8% and 14.1%, respectively.

The standardized mortality ratio was found to be 2.7 among patients with MS, as compared to the general population. This ratio was 3.1 for those with disease onset during the 1953 through 1974 period, 2.6 for those with disease onset during the 1975 through 1996 period and 0.7 for those with disease onset during the 1997 through 2012 period ($p<0.0001$), reflecting significant improvement in survival over time.

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Conclusion: This Norwegian study found that a diagnosis of MS reduces median life expectancy by 7.1 years, with survival improving steadily since 1953.

Lunde, H., et al. Survival and Cause of Death in Multiple Sclerosis: A 60-Year, Longitudinal, Population Study. **J Neurol, Neurosurg, Psych**. 2017, August; 88(8):621-625.

PIRIFORMIS SYNDROME TREATED WITH BOTULINUM TOXIN AND PHYSICAL THERAPY

Piriformis syndrome (PS) occurs when the piriformis muscle entraps the sciatic nerve, causing buttock pain, tenderness and sciatica. Some have estimated that, in older patients, this phenomenon may account for six to eight percent of sciatic pain. While botulinum toxin studies have demonstrated some success in the treatment of this disorder, no double-blind control studies have been reported.

This study included 56 patients, diagnosed with electromyographically confirmed PS. The participants were randomized to receive incobotulinum toxin A, 300 international units or a placebo injection, using EMG guidance. All subjects underwent 12 weeks of weekly physical therapy, with evaluations performed at weeks two, four, six, eight, 10 and 12. The outcome criteria included changes on a visual analog scale (VAS) for pain, changes in EMG variables and changes in the frequency and severity of adverse events.

Reductions in VAS pain scores were significant at weeks two through 12, with significantly greater improvements in the botulinum toxin group than in the control group ($p<0.0001$ for all comparisons). Flexion, adduction and internal rotation (FAIR) test scores for the posterior tibial, but not the fibular H reflexes improved significantly more in the botulinum group than in the placebo group at weeks two, four, six and eight ($p=0.003$ to 0.046).

Conclusion: This study of patients with piriformis syndrome found that combining incobotulinum toxin A injections with physical therapy enhances improvement in pain and nerve function as compared with physical therapy alone.

Fishman, L., et al. Electrophysiologically Identified Piriformis Syndrome Is Successfully Treated with Incobotulinum Toxin A and Physical Therapy. **Muscle Nerve.** 2017, August; 56 (2): 258-263.

ELECTROMAGNETIC TRANSDUCTION FOR LOW BACK PAIN

Studies of pulsed electromagnetic fields, approved by the FDA in 1979 for the treatment of bone fractures and non-unions, have suggested that this treatment can up-regulate anti-inflammatory factors, and down-regulate pro-inflammatory factors. This study assessed the efficacy of electromagnetic transduction therapy (EMTT) for the treatment of low back pain (LBP).

Subjects were adults presenting with nonspecific LBP, randomized to conventional, noninvasive treatment (n=44), or a combination of noninvasive treatment plus EMTT (n=44) for six weeks. The noninvasive treatment included physiotherapy with core stabilization, isometric strengthening and heat plus non-opiate analgesics. The EMTT group underwent two sessions per week for a total of eight sessions. Each session was of 20 minutes' duration, at 80mT, with an impulse frequency of 3 Hz and power of 30kV. The primary outcome measure was change in disability, assessed with the Oswestry Disability Index (ODI), and the change in subjective pain sensation, measured by a Visual Analog Scale (VAS).

VAS pain scores improved significantly better at 6 and 12 weeks in the EMTT group than in the control group ($p<0.001$ for both). In addition, ODI scores improved significantly more in the EMTT group than in the control group at both six ($p<0.001$) and 12 weeks ($p<0.001$).

Conclusion: This study of patients with low back pain found that electromagnetic transduction therapy can be a useful adjunct to conventional therapy for reducing pain and disability.

Krath, A., et al. Electromagnetic Transduction Therapy in Non-Specific Low Back Pain: A Prospective, Randomized, Controlled Trial. **J Orthop**. 2017; 14: 410-450.

PRESEASON ANXIETY AND DEPRESSION VERSUS PROSPECTIVE INJURY RISK

Each year, an estimated 40 to 50 percent of athletes sustain an injury during participation in National Collegiate Athletic Association

(NCAA) - sponsored sports. As previous data have suggested that a significant portion of NCAA athletes report either anxiety or depressive symptoms, this study was designed to determine the influence of preseason anxiety and depression on the risk of subsequent injury.

This investigation included male athletes, participating in baseball, basketball, football or wrestling, as well as female athletes, participating in basketball, field hockey, softball, soccer or volleyball, during the 2007 through 2011 seasons. All subjects completed a preseason baseline survey, which queried medical history, including data regarding anxiety and depressive symptoms. All were followed for the incidence of injuries, using the Sports Injury Monitoring System.

Subjects were 958 athletes, of whom 28.8% reported anxiety symptoms and 21.7% reported depressive symptoms. During the 2007 through 2011 seasons, the overall injury rate was 23.8 per 10,000 athletic exposures. Those reporting preseason anxiety symptoms had significantly higher injury rates than did those who did not (38.9 versus 16.3 athletic exposures; $p<0.001$). Overall, injury rates did not differ significantly between those with versus without preseason depressive symptoms (25.2 athletic exposures versus 23.1 athletic exposures per 10,000). However, male athletes with preseason depressive symptoms were more likely to sustain an injury than those without depressive symptoms (RR 1.3).

Conclusion: This prospective study of NCAA athletes found that preseason anxiety and depressive symptoms can increase the risk of athletic injury.

Li, H., et al. Preseason Anxiety and Depressive Symptoms and Prospective Injury Risk in Collegiate Athletes. **Am J Sports Med.** 2017, September; 45(9): 2148-2155.

AUTONOMIC DYSFUNCTION IN PATIENTS HOSPITALIZED WITH GUILLAIN-BARRÉ SYNDROME

Guillain-Barré syndrome (GBS) is the most common cause of acute neuromuscular paralysis. While autonomic dysfunction (AD) is a well-known complication of this disease, few studies have described the prevalence of AD sequelae in these patients. This study sought to better understand the prevalence of AD in patients with GBS.

This investigation sampled data from the Health Cost and Utilization Project (HCUP) Nationwide Inpatient Sample (NIS). The NIS is the largest, publicly available, all-payer hospital, inpatient care database in the United States. Hospitalizations for GBS were identified for the period of 2010 through 2011, with non-GBS hospitalized controls matched to cases 4:1 by age and gender.

Data included 2,587 patients with a primary admission diagnosis of GBS, and 10,348 controls. Variables associated with AD, which were found to be more prevalent among patients with GBS, included gastrointestinal complications, cardiac complications, syncope, tachycardia, genitourinary dysfunction, syndrome of inappropriate antidiuretic hormone secretion, and hyponatremia (all $p<0.001$), as well as ileus, bradycardia, bladder dysfunction, elevated blood pressure without diagnosis of hypertension, and Raynaud phenomenon (all $p<0.05$).

Conclusion: This study of patients hospitalized for Guillain-Barré syndrome found that a number of complications associated with autonomic dysfunction are more prevalent in these patients than in controls.

Anandan, C., et al. Prevalence of Autonomic Dysfunction in Hospitalized Patients with Guillain-Barré Syndrome. **Muscle Nerve.** 2017, August; 56(2): 331-333.

SUBARACHNOID HEMORRHAGE AND SERUM ALBUMIN

Poor nutritional status is associated with poorer outcome in a number of cardiovascular and cerebrovascular diseases. This study evaluated the impact of nutritional markers on new neurological deficits (NND), new infarct, mortality and neurological outcome following subarachnoid hemorrhage (SAH).

This prospective Indian study included adult patients, hospitalized for spontaneous aneurysmal SAH within 24 hours of hemorrhage. Symptoms, demographics and medical histories were obtained at admission, with laboratory assessment including serum albumin, total protein and hemoglobin. All underwent treatment with a standard protocol, with surgical intervention based upon the clinical presentation. For all patients, NND was determined as a surrogate measure of clinical vasospasm. The outcome assessment included new infarctions after presentation, mortality and Glasgow Outcome Scale (GOS) scores at three months.

Subjects were 273 adults, with a median age of 49.6 years, among whom 79% underwent craniotomy and aneurysmal clipping, while 11.7% underwent coiling. Of these, 101 (36.9%) developed NND. Those with lower admission albumin (less than 3.5 g/dL) had a significantly higher incidence of NND ($p<0.001$), new infarct ($p=0.001$), mortality ($p=0.04$) or unfavorable GOS ($p=0.03$), as compared to those with normal albumin levels.

Conclusion: This study of patients with spontaneous, subarachnoid hemorrhage found that patients with lower albumin levels at admission are at higher risk of NND, infarction, mortality and unfavorable GOS.

Kapoor, A., et al. Serum Albumin Level in Spontaneous Subarachnoid Hemorrhage: More than a Mere Nutritional Marker! **Br J Neurosurg.** 2017. DOI: 10.1080/02688697.2017.1344615.

BRAIN NETWORKS PREDICT PROGNOSIS IN DISORDERS OF CONSCIOUSNESS

In defining disorders of consciousness, including unresponsive wakefulness syndrome (UWS), minimally conscious state minus (MSC-) and minimally conscious state positive (MSC+), clinicians predominantly use behaviors observed at the bedside to arrive at diagnoses. A range of neuroimaging technologies have been proposed to assess ongoing brain activity, with EEG thought to be an attractive option, due to its portability, cost and feasibility for use at the bedside.

This study included 89 patients referred from clinical centers across Europe between 2008 and 2015. Of these, 23 were diagnosed with UWS, 17 with MCS- and 49 with MCS +. The subjects were assessed with high-density EEG recordings from 256 scalp sensors, taken before the start of a PET scan. From the high-density EEG data, receiver operating characteristic analysis was completed to estimate the ability of each of 21 brain network metrics to discriminate consciousness as evidenced by behavior or PET scan.

Of the patients with completed PET scans, 17 were PET negative and 81 were PET positive. Using EEG findings, key quantitative metrics were found that correlated with the continuum of behavioral recovery, ranging from unresponsive to fully conscious locked-in syndrome. These metrics were also found to correlate strongly with brain metabolism, allowing the PET based diagnoses of individual patients to be identified with 81% sensitivity and 82% specificity. Reviewing outcomes, as established by the Glasgow Outcome Scale-E (GOSE-E) at one year, the EEG data were able to discriminate between those with positive GOS-E outcomes and those without, with 92% sensitivity and 64% specificity.

Conclusion: This study of patients with disorders of consciousness found that high-density EEG can be useful in discriminating between disorders of consciousness, metabolic demands of the brain and prognosis.

Chennu, S., et al. Brain Networks Predict Metabolism, Diagnosis and Prognosis at the Bedside in Disorders of Consciousness. **Brain.** 2017, August; 140(8); 2120-2132.

UNMET NEED FOR SPECIALIZED REHABILITATION FOLLOWING NEUROSURGERY

Following a severe illness or injury, some with more complex needs require the expert skills and facilities of a specialized rehabilitation unit. With a strong body of evidence demonstrating the effectiveness and cost benefits of rehabilitation, this British study reviewed the use of this post-acute specialty service for patients discharged from neurosurgery.

This prospective, single center cohort followed all patients admitted to a neurosurgical unit for at least 48 hours. The patients were grouped into four diagnostic categories, including those with traumatic brain injury, spontaneous intracranial hemorrhage/vascular injury, oncological pathology or spinal pathology. All participants were assessed for the need of specialized rehabilitation, using a validated Patient Categorization Tool (PcAT).

The subjects were followed over time, comparing those who were, with those who were not, transferred to a rehabilitation unit. Data from the UKROC national clinical database of 2012 through 2015 were used to estimate the potential mean lifetime savings generated through transfer to a specialized rehabilitation program.

Of the patients reviewed, 70% had rehabilitation needs appropriate for a specialized rehabilitation transfer. Of these, only 20 (19%) were referred, and, of these, only 11 (10.5%) were admitted. The weekly savings and cost of care was estimated at 568 British pounds per week, with calculations suggesting that, at 49.6 weeks, the cost of the inpatient rehabilitation would be recouped. Using estimated survival data, the savings of going to the rehabilitation hospital was estimated to be 650,000 British pounds per person.

Conclusion: This British study of the neurosurgical patients requiring specialized rehabilitation found that only 10.5% of those who needed this care were actually transferred. The costs of care associated with each missed transfer was estimated.

Singh, R., et al. Unmet Need for Specialized Rehabilitation following Neurosurgery: Can We Maximize the Potential Costs-Benefits? **Br J Neurosurg**. 2017; 31 (2): 249-253.

EARLY PREDICTORS OF LONG-TERM OUTCOME AFTER CONCUSSIVE BLAST TRAUMATIC BRAIN INJURY

It has been estimated that 20% of deployed U.S. soldiers in the wars in Iraq and Afghanistan have suffered a traumatic brain injury (TBI). Among those with mild TBI occurring in combat, a poor outcome has been found in significantly greater numbers than among civilians with similar injuries. This study was designed to help identify early risk factors for long -term disability among those with blast-related, mild TBI.

Data were obtained concerning military service members deployed to combat between November of 2008 and July of 2013. Using Department of Defense criteria, subjects were identified with mild uncomplicated TBI due to blast exposure (TBI-B). None had a history of prior TBI or psychiatric diagnoses. Controls included combat-deployed soldiers without TBI. All subjects were evaluated at one and five years with standardized tests for neurobehavioral, neuropsychological and mental health performance.

The subjects included 50 patients with TBI-B and 44 controls. Compared with controls, at five years, those with TBI-B (n=50) had significantly poorer GOS-E ($p<0.001$) scores and scores on Quality of Life after Brain Injury questionnaires ($p<0.001$). At one year, poor outcome, as measured by the GOS-E, was found in 11% of combat-deployed controls and 72% of those with TBI-B.

In 36 of 50 patients with TBI-B, a decline was found in GOS-E from the one year to the five-year evaluation (72%), compared with 11% of the controls. In the TBI-B patients, worsening symptoms included post-traumatic stress disorder, sleep disorders and depression. Predictors of the five-year outcome included TBI diagnosis, preinjury intelligence, motor strength, verbal fluency and neurobehavioral symptom severity at one year.

Conclusion: This study of active duty military personnel found that most of those studied with a diagnosis of mild traumatic brain injury due to concussive blast had a poor functional outcome at one year, with this function worsening at five years.

McDonald, C., et al. Early Predictors of Five-Year Outcome after Concussive Traumatic Brain Injury. **JAMA Neurol.** 2017, July; 74 (7): 821-829.

DRIVING AFTER NEUROLOGIC IMPAIRMENT

In Europe, one percent of all drivers have licenses with restrictions due to health considerations. Patients who suffer a stroke or traumatic brain injury (TBI) often have a combination of cognitive and physical deficits. This study reviewed the ability to predict the return to driving in patients who had been hospitalized for a stroke or TBI.

Subjects included 61 men and 11 women ages 20-76 years who underwent inpatient rehabilitation in 2012 for either TBI (n=59) or a stroke (n=13). All had been referred for a driving evaluation. Data were harvested from inpatient records during their hospitalization for information concerning Glasgow Coma Scale (GCS) scores within the first 24 hours as well as functional independence measures at rehabilitation admission. The results of the driving evaluation were compared with these hospital assessment data.

At the driving assessment, 43% passed without restrictions, 39% passed with restrictions and 18% failed. For the patients with TBI, a

logistic regression model for predicting the passing of the driving reassessment without restrictions found significant correlations with the Glasgow Coma Scale (p=0.009) as well as the FIM motor scales (p=0.013). In the combined group analysis, the Motor FIM score was the only factor significantly correlated with passing the driving reassessment without restrictions.

Conclusion: This study of patients admitted to a rehabilitation hospital found that for those with TBI, Glasgow Coma Scale scores and FIM motor score were correlated with passing a driving assessment without restrictions, while in the group combining TBI with Stroke, only FIM-motor was associated.

Cizman, U et al. Influence of the Rehabilitation Outcome on Returning to Drive After Neurological Impairment. **Int J Rehabil Res.** 2017, June; 40(2):107–111.

HALDOL AND GASTROPARESIS IN THE EMERGENCY ROOM

Without publish guidelines for the treatment of gastroparesis symptoms in the emergency department, parental analgesic and anti-emetics are often administered. Despite these interventions, hospital admission for symptom control is common and contributes to significant resource utilization. This study evaluated the effect of haloperidol on gastroparesis.

This retrospective study reviewed data from an emergency department to identify patients who had received haloperidol as a 5 mg intramuscular injection for the treatment of gastroparesis between 2012 and 2015. The patients were case matched with themselves using the most recent previous visit for gastroparesis in which haloperidol was not administered.

Subjects were 52 patients with a mean age of 32 years, followed in the emergency room with a diagnosis of gastroparesis secondary to diabetes mellitus. The use of haloperidol was associated with a significant reduction in hospital admissions as compared to visits without the use of haloperidol (5/52 versus 14/52; p=0.02). No significant differences were seen between the haloperidol and the non-haloperidol visits in emergency room length of stay or hospital length of stay once admitted.

Conclusion: This retrospective study of patients seen in the emergency room with gastroparesis secondary to diabetes found that the use of haloperidol significantly reduces hospital admission and analgesia use.

Ramirez, R., et al. Haloperidol Undermining Gastroparesis Symptoms in the Emergency Department. **Am J Emerg Med.** 2017, Aug; 35(8): 1118-1120.

RELIABLE TECHNIQUE FOR INJECTION IN ULNAR NEUROPATHY AT THE ELBOW

Ulnar neuropathy at the elbow (UNE) is the second most common, focal peripheral neuropathy. For patients with idiopathic UNE, the best therapy remains unclear. This cadaveric study investigated the efficacy of an ultrasound guided technique for steroid injection at the elbow.

Subjects were fresh, non-embalmed cadavers, including six women and five men. The elbows were positioned in 90° of flexion, with an ultrasound transducer placed on the medial aspect of the elbow. The skin was penetrated with the injection needle halfway along the line connecting the medial epicondyle and the posterior tip of the olecranon, with the needle positioned just outside the perineurium of the ulnar nerve. The injectate included 1.5 mL of ink diluted with physiologic saline, which was injected until it became visible around the ulnar nerve. Injections were followed by an anatomic dissection.

In all 21 cases, the perineural sheath of the ulnar nerve was stained. In 57% of the specimens, the injection site was distal to the proximal rim of the arcuate ligament, while, in 29%, the site was exactly at the proximal border of the arcuate ligament, and in 14% it was distal to the ligament.

Conclusion: This cadaveric study found that a technique using ultrasound guidance can be very accurate in delivering the injectate to the perineural sheath of the ulnar nerve at the elbow.

Hamscha, U., et al. A Reliable Technique for Ultrasound-Guided Perineural Injection in Ulnar Neuropathy at the Elbow. **Muscle Nerve.** 2017, August; 56: 237-241.

KNEE DISORDERS IN MILITARY RECRUITS

A previous study found that more than one percent of Finnish military recruits are hospitalized annually due to knee injury during military service. This study further evaluated the incidence and risk factors of knee disorders and injuries among these military recruits.

This study comprised five cohorts of Finnish men performing their compulsory military service, with birth years included 1969, 1974, 1979, 1984 and 1989. From among these conscripts, randomly selected cohorts of 1,000 were chosen every fifth year beginning in 1969. One year before entering military service, and at entry to the service, evaluations were made of past medical history and current health issues. These data were reviewed for complaints due to disease and other disorders of the knee or any injury.

The cumulative incidence of knee symptoms among the recruits was 24.6%, with 20% requiring a visit to a healthcare professional. The peak incidence occurred during the first two months of military service. Multi-variate analysis revealed that the independent risk factors for knee symptoms during military service with a greatest relative risk (RR) were a history of symptoms of the gastrointestinal system (RR 1.67), a history of symptoms of the musculoskeletal system (1.59) and smoking (RR 1.24-1.37).

Conclusion: This study of military conscripts in the Finnish military found that 20% of these young men visited healthcare professionals for symptoms related to the knee, with the peak incidence occurring within the first two months of military service.

Pihlajamaki, H., et al. Incidence and Risk Factors of Exercise-–Related Knee Disorders in Young Adult Men. **BMC Musculoskelet Disord.** 2017; 18: 340.

HYPERTROPHIC CARDIOMYOPATHY VERSUS ATHLETE'S HEART THROUGH ECG

Over past decades, pre-participation screening of athletes has included a 12-lead ECG to identify presymptomatic cardiomyopathies. This study compared the accuracy of the criteria of the European Society of Cardiology (ESC) with that of the International Criteria (IC) for differentiation between hypertrophic cardiomyopathy (HCM) and athlete's heart.

This case control study included samples of patients with HCM and matched athletes of the same age. The HCM sample included 200 patients from the database of the Division of Cardiology of the University of Padua. The athletic control population included 563 athletes who underwent preparticipation screening at the Center for Sports Medicine Public Health System in Padua between 2015 and 2016. The ECG findings of all participants were evaluated for factors relevant to the diagnosis of HCM. Using these data, the 2010 and 2012 criteria were compared.

Using the ESC criteria, HCM was identified with a sensitivity and 95.5% and a specificity of 86.9%. Using the IC criteria lead to a significant increase in specificity, to 95.9%, and a nonsignificant reduction of sensitivity, to 93%.

Conclusion: This study, comparing the 2010 European Society of Cardiology and the 2017 International Criteria for diagnosing hypertrophic cardiomyopathy among athletes, found better specificity by using the International Criteria.

Zorzi, A., et al. Accuracy of the ECG for Differential Diagnosis between Hypertrophic Cardiomyopathy and Athlete's Heart: Comparison between the European Society of Cardiology (2010) and International (2017) Criteria. **Br J Sports Med.** 2017; 0: 1 -7. DOI: 10.1136/bjsports-2016-097438

PHYSICAL ACTIVITY AND SELF-WORTH IN CHILDREN

Studies have demonstrated that physical activity is associated with health benefits, including a decreased risk of type 2 diabetes, metabolic syndrome, cardiovascular disease, breast and colon cancer and all-cause mortality. Benefits also include reduced depression and anxiety. This study analyzed the relationship between physical activity and global self-worth in a cohort of children.

Data were collected from the Physical Health Activity Study Team (PHAST), a longitudinal cohort study of children ages eight to 10. Data collected included anthropometry, socioeconomic status, physical activity, aerobic fitness, motor coordination and psychological health. Written informed consent was obtained from the parents of 2,078 children.

Of these subjects, 1,581 were available at follow-up. All complete the Self-Perception Profile for Children (SPPC) Global Self-Worth (GSW) subscale to measure self-esteem. In addition, measurements were taken of height and weight, with body mass index calculated, as well as aerobic fitness and physical activity, over a one-year period. All were followed for an average of four years.

Increased physical activity was associated with greater GSW ($p<0.001$), independent of other physical measurements, while sedentary activity was not. In addition, aerobic fitness was associated with GSW ($p<0.001$), with BMI negatively associated ($p<0.001$).

Conclusion: This prospective study children ages eight to 10 found that physical activity is positively associated, and BMI is negatively associated with greater self-worth.

Reddon, H., et al. Physical Activity and Global Self-Worth in a Longitudinal Study of Children. **Med Sci Sports Exerc.** 2017, August; 49 (8): 1606-1613.

SURGICAL TREATMENT OF CERVICAL RADICULOPATHY

Treatment options for patients with cervical radiculopathy have included anterior cervical discotomy and fusion (ACDF) and cervical disc replacement (CDR), with new techniques including cervical foraminotomy. This literature review and meta-analysis was undertaken to better understand the efficacy of these three techniques.

Data were reviewed from publications between 1996 and 2016. Studies included randomized, controlled trials investigating the efficacy of ACDF, CDR and the minimally invasive posterior cervical foraminotomy (MI-PCF). From these studies were identified three, randomized, controlled studies comparing ACDF with CDR, and one comparing ACDF with MI–PCF. Outcome measures within the studies included the Neck Disability Index and the Visual Analog Scale for pain.

All studies suggested that each of the surgical techniques resulted in significant improvement in the clinical and functional outcomes of patients with a single-level, single-side, cervical radiculopathy. The lowest percentage of secondary surgical procedures occurred among those treated with CDR, while the lowest percentage of adverse events was found among those treated with MI–CPF.

Conclusion: This literature review and meta-analysis of patients with single-level cervical radiculopathy found that all of the procedures studied resulted in improvements in symptoms and function, with the fewest undergoing repeat surgeries having received CDR.

Gutman, J., et al. The Surgical Treatment of Cervical Radiculopathy: Meta-Analysis of Randomized, Controlled Trials. **Spine.** 2017. DOI: 10.1097/BRS. 0000000000002324.

EFFECTS OF EXERCISE IN HYPERGLYCEMIC INDIVIDUALS

Previous studies have suggested that the magnitude of postprandial glycemia levels seems to be more associated with vascular complications than are fasting blood glucose levels. This study evaluated the effects of exercise on postprandial glucose levels in patients with hyperglycemia.

Subjects were four women and eight men with a diagnosis of hyperglycemia who were not using glucose lowering medications. All completed dietary questionnaires, and participated in three test days, separated by at least six days. The test days included a bout of moderate exercise in a fasting state before breakfast (ExBr), a bout of moderate exercise after breakfast (BrEx) and a control test date without physical exercise (CON). Continuous glucose measurement was performed for 22 hours after breakfast. Glucose levels were compared by group.

No significant differences were seen among the three groups on the area under the glucose curve for the entire 22-hour period. However, a greater reduction in the area under the glucose curve occurred after the evening meal in the BrEx group, as compared to the ExBr group ($p=0.031$). Those in the BrEx group also had a greater decrease in the median of the 10 highest glucose levels over 22 hours, as compared with the control group ($p=0.012$), and as compared with the ExBr group ($p=0.009$).

Conclusion: This study found that moderate exercise after breakfast may attenuate glucose excursions during the subsequent 22 hours, as compared with exercise before breakfast or no exercise at all.

Nygaard, H., et al. Effects of Exercise in the Fasted and Postprandial State on Interstitial Glucose in

Hyperglycemic Individuals. **J Sports Sci Med.** 2017, June; 16(2): 254-263.

HEAT TREATMENT FOR DELAYED ONSET MUSCLE SORENESS

Delayed–onset muscle soreness (DOMS) is a common phenomenon among those who exceed their normal workout intensity. This soreness can persist for days, and can decrease performance. This study compared an over-the-counter heat modality applied for eight hours used either immediately after or 24 hours after exercise.

Subject were three groups of 20 adults ranging in age from 20-40 years. All groups underwent baseline evaluations and then an exercise program designed to induce DOMS. The patients were randomized to receive ThermaCare heat wraps, maintained for eight hours, with group A beginning immediately after exercise and group B beginning 24 hours after exercise. Group C had no heat applied, and served as the control. Patients were assessed with subjective pain measurements, blood sampling, and strength evaluations.

The control group demonstrated a 23.8% reduction in quadriceps strength the first day after exercise, with no difference between the control group and group B. There was no significant decline in Group A compared with baseline on any post exercise day. Pain peaked by two days post exercise. Significantly less pain was noted in Group A as compared to the other two groups on the first and second days post exercise ($p<0.01$). By the third day there was no difference between the three groups.

Conclusion: This study of adults 20-40 years of age found that low-level continuous heat wraps placed immediately after heavy exercise can reduce subsequent muscle soreness and reduce functional decline.

Petrofsky, J et al. The Efficacy of Sustained Heat Treatment on Delayed–Onset Muscle Soreness. **Clin J Sport Med.** 2017, July; 27 (4):329–337.

GREEN TEA AND COGNITION, MOOD AND BRAIN FUNCTION

Green tea has a long history of use in human culture, with a recent surge of interest in the health benefits of this drink. This systematic review focuses on the effects of green tea on cognition and human brain functions.

A literature review was conducted for studies of green tea or extracts of the tea (epigallocatechin gallate (EGCG) and l-theanine) on brain function. From this search, the authors isolated 16 experimental trials and five observational studies.

Neuroimaging studies revealed functional MRI evidence that green tea consumption could increase connectivity from the right parietal lobule to the middle frontal gyrus, improve cognitive task performance, and increase activation of the dorsolateral prefrontal cortex. A combination of green tea extract and l-theanine was found to improve cognitive function among those with mild cognitive impairment. The long-term use of green tea was found to be correlated with improved memory, executive function and information processing speed. Others found that EGCG intake has a calming effect which correlated with increased EEG alpha, beta and theta waves in the medial frontal gyrus. Studies of l-theanine found reduced anxiety, and when combined with caffeine improved attention, visual processing speed, and reduced fatigue. The routine consumption of green tea was found to reduce the risk of functional disability in those over 65 years of age, and improved cognitive impairment in those over the age of 55 years. The long-term benefits seemed best when consuming 100ml per day, with dose/benefits improving up to 500ml/day.

Conclusion: This literature review found that green tea and its components EGCG and l-theanine can improve cognition, affect and have long-term neuroprotective properties.

Mancini, E et al. Green Tea Effects on Cognition, Mood and Human Brain Function: A Systematic Review. **Phytomedicine.** 2017, October;34 (15):26-37.

NEUROLOGICAL TESTS BEFORE AND AFTER A BOXING TOURNAMENT

Historically, professional boxing has been considered dangerous, due to the repetitive exposure to head trauma that can lead to concussion or cumulative trauma injuries. Olympic style boxing has a less violent history, with no strong evidence supporting a relationship between it and chronic brain injury. This study was designed to determine the short term effects of Olympic style boxing on measurements of neurocognitive abilities.

Subjects included female boxers who participated in the 2016 Women's World Boxing championships. All subjects received pre-participation evaluations, with these repeated after they were eliminated from competition. The tests included the modified Balance Error Scoring System (mBESS), the King-Devick test and the 3m Timed Up and Go (TUG). A subset also completed the CogState computerized neurocognitive test.

Of the 285 female boxers from 64 countries who competed in the games, 61 (21%), ranging in age from 19-36 years agreed to participate. The mean time between assessments was 5.2 days. The majority of participants performed the same or better during the post-tournament testing as compared to the pre-tournament baseline testing. Processing speed, as measured by the maze chase task of the CogState test, was improved after the tournament as compared to baseline ($p<0.001$). In tests of balance and dual-task function, participants committed fewer errors at the post-tournament testing as compared to baseline on the mBESS test ($p<0.001$) as well as the TUG subtraction test accuracy scores ($p=0.02$). Finally, scores on the King-Devick visual function test were faster after competition than at baseline ($p=0.002$).

Conclusion: This study of female Olympic boxers found that, as a group, the participants actually improved after the tournament as compared with baseline in measures of postural stability, visual function and processing speed.

Howell, D et al. Neurological Tests Improve after Olympic Style Boxing: A Pre-Tournament and Post-Tournament Study In the 2016 Women's World Boxing Championships. **Br J Sport Med.** 2017, September; 51(18):1279-1284.

DEMENTIA TRENDS FROM THE EINSTEIN AGING STUDY

The world population older than 80 years of age is expected to increase more than 300% by the year 2050. This study reviewed data from the Einstein Aging Study to determine trends in observed dementia by year of birth.

Subjects were 70 years of age or older with no dementia at baseline,

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*Haewon Jennifer Lee, M.D.
Kenton Hagan, M.D.
Ann Hulme, M.D.
Tulsi Singh, M.D.
University of Penn., Philadelphia, PA

*Justin L. Weppner, D.O.
UVA, Charlottesville, VA

*Anna Coles, M.D.
Alicia Fuhrman, M.D.
University of Washington, Seattle, WA

*Joe Seacrist, M.D.
VCU, Richmond, VA

*Sean Smith, M.D.
Charles Gonzales, M.D.
Samuel Park, M.D.
Washington U. in St. Louis, St. Louis, MO

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

Subscription Manager
Michael P. Burke, M.S.

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who were recruited between 1993 and 2004. Annual assessments included a clinical neurologic examination, neuropsychological assessments, medical history, blood pressure, anthropometrics, and psychosocial evaluations. A medical history was obtained, with cognitive performance assessed using the DSM-IV, and depression assessed using the Geriatric Depression Scale.

Data were available for 1348 individuals with a mean baseline age of 78.5 years. From these, 150 incident cases of dementia were identified. Within each age range, the incidence of dementia was lower across sequential birth cohorts. Comparing this data to trends for stroke, myocardial infarction and diabetes, the trend in dementia data were found to be consistent with national data showing reductions in cardiovascular disease rates across the past decades.

Conclusion: Using data from the Einstein Aging Study, the authors found that the incidence of dementia has significantly decreased among individuals born after 1929.

Derby, C et al. Trends in Dementia Incidence in a Birth Cohort Analysis of the Einstein Aging Study. **JAMA Neurol.** 2017, September 5: doi:10.1001/jamaneurol.2017.1964.

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.**

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ISSN # 1081-1303
www.rehabinreview.com

REHAB IN REVIEW

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

This issue sponsored by an Allergan Educational Grant

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