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INCIDENCE OF SECOND ANTERIOR CRUCIATE LIGAMENT TEAR

The risk of anterior cruciate ligament (ACL) injury after an ACL reconstruction has been reported to be as high as one third. This study was designed to better understand the incidence of second ACL injuries in a population-based cohort, and to determine risk factors associated with these injuries.

Data were obtained through the Rochester Epidemiology Project, a medical record linkage system with access to complete medical records for all residents of Olmsted County, Minnesota. This database was reviewed for all occurrences of ACL tears between January, 1990, and December, 2000. Second ACL tears were defined as any that occurred after the primary injury, and until December 2015.

Between 1990 and 2000, of the 1,107 acute tears, six percent were second tears. Of these, 33.3% involved the ipsilateral graft and 66.7% involved the contralateral ACL. Among individuals less than 20 years of age, the graft failure rate was 5.9%, while the failure rate for those under 16 years of age was 1.8%. Of the failures, the allograft had the highest rate of second tears, accounting for 26.9%, followed by hamstring autografts at 11.4%, and patella autografts at 6.3%. Multivariate regression analysis revealed that use of an allograft was the single significant independent variable predicting second ACL injuries ($p < 0.001$). The probability of a second ACL injury was highest among those 17 to 25 years of age, followed by those 26 to 35 years of age.

Conclusion: This observational cohort study of citizens of Olmsted County, Minnesota, found that six percent of ACL repairs were second repairs, with 66.7% of these

occurring on the side contralateral to the initial surgery.

Schilaty, N., et al. Incidence of Second Anterior Cruciate Ligament Tears (1990 to 2000) and Associated Factors in a Specific Geographic Locale. *Am J Sport Med.* 2017, July; 45(7): 1567-1573.

RETURN TO WORK AFTER SEVERE TRAUMATIC BRAIN INJURY

After a severe traumatic brain injury (TBI), data regarding return to work (RTW) are often based on self-reported labor market attachment (LMA) data, which are susceptible to recall and lost to follow-up bias. This study was designed to better understand employment data up to five years after a severe TBI.

Both RTW and LMA data were retrieved from the DREAM register, a national register of public assistance benefits. Subjects included all patients 15 years of age or older living in Denmark, who were admitted to a neurorehabilitation unit with a severe TBI between 2004 and 2012. These patients were matched with up to four controls from the general population. A national registry and the register of public assistance benefits were used to assess return to work and obtain LMA data.

At one and five years post-injury, personal income involved primarily health-related benefits in 80.7% and 69.7%, respectively. In the general population controls, these percentages were 22.1% and 19.5%. The attempt to return to work within two years post-injury was 30% among all persons with severe TBI. At one and two years post-injury, the LMA prevalences were 11% and 16%, respectively. From 2-1/2 years to five years post-injury the LMA prevalence declined to 11%. The LMA among the general population was stable, at 70%.

Conclusion: This study of adults in Denmark found that, among patients with severe traumatic brain injury, 30% attempted to return to work, and 16% achieved stable employment.

Odgaard, L., et al. Return to Work after Severe Traumatic Brain Injury: A Nationwide Follow-Up Study. *J Head Trauma Rehabil.* 2017, May/June; 32(3):E57-E 64.

BRACING OF RECONSTRUCTED AND OSTEOARTHROTIC KNEES

Radiographic knee osteoarthritis (OA) is evident in more than 50% of people at 10-20 years after anterior cruciate ligament (ACL) reconstruction. This study compared the efficacy of an unloader brace, either with or without varus realignment for patients after ACL reconstruction.

Subjects were 19 patients with a primary ACL reconstruction 5-20 years prior to recruitment who demonstrated valgus malalignment as well as symptomatic and radiographic OA of the knee. Subjects performed hopping, stair ascent and stair descent tasks under three conditions including; no brace, unadjusted brace with a sagittal plane support and no varus alignment, and an adjusted brace with sagittal plane support and varus realignment. Quantitative motion analysis was performed during each examination, with kinematic and external joint movements computed.

There was no difference in pain during hopping or stair climbing between any of the three test conditions. Compared with no brace, the brace conditions increased the maximum knee flexion angle occurring at initial ground contact ($p < 0.001$). The adjusted brace condition increased the maximum external knee flexion moment ($p = 0.001$). There were no significant differences in kinetics or moments

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between the adjusted and unadjusted brace conditions.

Conclusion: This study of patients with ACL reconstruction and osteoarthritis of the knee found that, compared with no bracing, an unloader brace can positively modulate the kinematics and external joint moments during activity, with no additional positive effect found with the use of varus realignment.

Hart, H et al. Bracing of the Reconstructed and Osteoarthritic Knee during High Dynamic Load Tasks. *Med Sci Sports Exerc.* 2017, June; 49 (6):1086–1096.

LUMBAR SPINE STENOSIS SURGERY FOR OCTOGENARIANS

Degenerative lumbar spine stenosis causes functional disability, with back and lower extremity pain, particularly in older individuals. This study investigated the effect of decompressive surgery without fusion in patients over the age of 80 years.

This retrospective study included all patients 80 years of age and older who underwent decompressive surgery for symptomatic lumbar spinal canal stenosis between January of 2006 and August of 2013. Of the 121 patients identified, 82% were alive at the time of follow-up (November through December of 2013), with questionnaires completed by 72 patients. The participants were queried for the severity of pain symptoms, using a visual analog scale, and for walking distance,

compared prior to and after surgery. Patient satisfaction scores were also obtained.

The VAS scores improved from an average of 7.2 at baseline to 4.5 at follow-up ($p < 0.001$), while walking distance improved from a mean of 147 m to 340 m at follow-up ($p < 0.001$).

Conclusion: This retrospect of study of patients, 80 years of age or older, all undergoing lumbar spine stenosis decompression, found significant improvement in pain and function after surgery.

Antoniadis, N., et al. Decompression Surgery for Lumbar Spinal Canal Stenosis in Octogenarians: A Single Center Experience of 121 Consecutive Patients. *Br J Neurosurg.* 2017, February; 31(1); 67-71.

INHIBITION OF PARKINSONIAN TREMOR WITH TRANSCUTANEOUS ELECTRICAL NERVE STIMULATION

Approximately 70% of patients with Parkinson's disease (PD) exhibit a resting tremor. Research has demonstrated that a cutaneous reflex evoked by stimulating finger skin may result in an inhibitory effect via pre-motor neuron interneurons. This study was designed to determine whether tremor in patients with PD can be reduced through stimulation with a transcutaneous cutaneous nerve stimulation (TENS) unit.

Eight patients with idiopathic PD with tremor dominant symptoms were recruited. Surface electromyography activity was recorded from multiple muscles in the upper extremity. Electrodes of a TENS unit were placed within the innervation zone of the superficial radial nerve. Electrical stimulation was then delivered in incremental steps until the subject felt a noticeable sensation at the dorsal skin (cutaneous perceptual amplitude (CPA)). The stimulus amplitude was then increased until the subject perceived a radiating sensation from the dorsal skin to the fingers (radiating threshold (RT)). The resting tremor of the hand was then recorded during cutaneous stimulation at 1.5 to 1.7 times the RT. During stimulation, the mean suppression of tremor across all joints was 61.56%. The suppression appeared to occur mainly in distal joints and muscles.

The tremor recurred after stimulation was discontinued.

Conclusion: This study of patients with Parkinsonian tremor found that sensory stimulation of the radial nerve using a TENS unit can reduce resting tremor.

Hao, M., et al. Inhibition of Parkinsonian Tremor with Cutaneous Afferent Evoked by Transcutaneous Electrical Nerve Stimulation. *J Neuroeng Rehab.* 2017; 14:75. DOI 10.1186/s12984-017-0286-2.

MINOCYCLINE AND ALLODYNIA

Minocycline is a second-generation, semi-synthetic tetracycline used as a broad-spectrum antibiotic. In addition to its

antimicrobial effects, it has been shown to suppress pain sensation by a number of mechanisms. This study was designed to determine whether minocycline can be used to inhibit muscular hypersensitivity.

An experimental model of hypersensitivity was created using repetitive, acute noxious/painful stimuli, through intramuscular injections of one mL of five percent hypertonic saline, administered into the right tibialis anterior at 48-hour intervals. These injections began after the subjects had been randomized to pretreatment with either a placebo or minocycline, 100 mg, twice per day for seven days. After each noxious injection, the subjects were asked to provide an account of pain intensity on a visual analog scale. These ratings were compared between groups.

By session five, muscle soreness was significantly greater in the placebo group than in the minocycline group, both in the ipsilateral ($p < 0.0001$) and contralateral limbs ($p < 0.0001$). The contralateral cold pain threshold in placebo-treated participants was lower than that of the minocycline-treated participants ($p = 0.0006$).

Conclusion: This study of experimental allodynia found that pretreatment with minocycline can reduce the onset of hypersensitivity.

Samour, M., et al. Minocycline Prevents Muscular Pain Hypersensitivity and Cutaneous Allodynia Produced by Repeated Intramuscular Injections of Hypertonic Saline in Healthy Human Participants. *J Pain.* 2017, August; 18(8): 994-

1005.

BIPHOSPHONATES FOR COMPLEX REGIONAL PAIN SYNDROME

Complex regional pain syndrome, type I, (CPRS-1) is characterized by pain, swelling and vasomotor disorders, often leading to severe disability. Several studies have reported that bisphosphonates may have significant analgesic efficacy for a number of bone related pathologies. This review summarized the findings concerning bisphosphonate use for the treatment of pain in CPRS-1.

After a literature search, 258 articles were identified, from which four trials, thought to be of moderate to good quality, were chosen for analysis.

From the data, it was determined that bisphosphonate use resulted in significant short-term pain relief, (within 30 to 40 days), as well as pain relief at two to three months ($p < 0.001$ for both comparisons). Significantly better improvement in motion scores, as well as in physical functioning, as measured by the SF-36 was found in the bisphosphonate group than in the placebo group. No serious side effects were reported

Conclusion: This literature review and meta-analysis of randomized, controlled trials of bisphosphonate for the treatment of complex regional pain syndrome, type I, found that this medication can reduce pain and improve function.

Chevreau, M., et al. Bisphosphonates for Treatment of Complex Regional Pain Syndrome, Type I: A Systematic Literature Review and Meta-Analysis of Randomized, Controlled Trials versus Placebo. *Joint Bone Spine*. 2017, Jul; 84(4): 393-399.

HIP ARTHROPLASTY FOR FEMORACETABULAR IMPINGEMENT

Femoral acetabular impingement (FAI) has been implicated as a cause of hip pain, decreased function and osteoarthritis (OA). This study evaluated 10-year outcomes and hip survival following hip arthroscopy for FAI, comparing the results of labral debridement with those of labral repair.

Subjects were 169 patients undergoing arthroscopic hip surgery for FAI, all treated by single surgeon. Following surgery, the subjects were limited to 20 pounds of toe-touch weight bearing, and underwent four hours of continuous passive motion

daily for the first two weeks. Those who underwent microfracture had weight bearing restrictions and passive motion extended to eight weeks. Patient-reported outcome measures were collected for up to 10 years postoperatively. The primary outcome measure was the HipOutcome Score (HOS) Activities of Daily Living (ADL) subscale.

Subjects included 79 patients undergoing labral repair and 75 undergoing debridement, with 94% available at 10-year follow-up. The Kaplan-Meier estimated survivorship of the entire population with total hip arthroplasty (THA) as the end point was 91% at 1 year, 75% at 5 years, and 63% at 10 years. A multivariate analysis showed an increased risk of THA for those with joint space of less than two mm ($p < 0.001$), acetabular microfracture ($p=0.036$) and an increased age at surgery ($p < 0.001$). There was no difference between the debridement and repair group in the primary outcome.

Conclusion: This long-term follow-up of patients undergoing hip arthroscopy for femoral acetabular impingement found that labral debridement or repair results in significant improvements in patient-reported outcomes and satisfaction. However, of the patients followed, 34% required conversion to total hip arthroplasty.

Travis, M., et al. Survivorship and Outcomes 10 Years Following Hip Arthroscopically for Femoral Acetabular Impingement: Labral Debridement Compared with Labral Repair. *JBJS*. 2017, June; 99(12): 997-1004.

BACTERIA IN ACHILLES TENDON RUPTURES

Spontaneous Achilles tendon (AT) ruptures are often associated with pre-existing, chronic, pathological changes. The causes of these pathological changes are not fully understood. As bacterial involvement has been observed in a number of case reports of tendinopathy, this study assessed whether there is a relationship between AT ruptures and bacteria.

Subjects were recruited from among patients who had consented for surgical repair of a spontaneous AT rupture, as well as from a control group from patients undergoing elective ACL reconstruction (a healthy hamstring control group). Tissue samples were harvested from the stump ends of

ruptured Achilles tendons, with control samples obtained from hamstring tendon grafts that were harvested for ACL reconstruction. DNA was extracted from the samples, and histology preparations were made for comparison.

Subjects included 20 patients with Achilles tendon rupture and 23 undergoing ACL reconstruction. Bacterial 16S rDNA was found in five of the 20 ruptured ATs, and in none of the controls ($p=0.016$). The species of bacteria identified were predominantly of the genus staphylococcus. No significant differences were noted in the histologic appearance between the bacterial DNA positive and DNA negative samples from the ruptured ATs.

Conclusion: This study of patients with spontaneous Achilles tendon ruptures found the presence of bacterial DNA in 25% of the tendons, with none present in unruptured control tendons.

Rolf, C., et al. Presence of Bacteria in Spontaneous Achilles Tendon Ruptures. *Am J Sports Med*. 2017, July; 45(9): 2061-2067.

BODY MASS INDEX AND GAINS AFTER JOINT REPLACEMENT

Some data have indicated a higher risk of osteoarthritis (OA) among individuals with an elevated body mass index (BMI). This study was designed to better understand the relationship between a patient's BMI and functional outcome after a total joint replacement (TJR).

This prospective, national cohort enrolled patients from high-volume centers in more than 100, community, orthopedic practices in 22 states in United States. Data included physical function, joint pain, BMI, and a number of covariates. Function was measured with the Short Form-36 Physical Component Summary (PCS) summary score at baseline and six months, with mental health measured with the SF-36 mental component summary score. Pain severity was measured using the Hip Disability and Osteoarthritis Outcome Score (KOOS).

Subjects were 2,040 patients undergoing total hip replacement (THR) and 2,964 undergoing total knee replacement (TKR). A greater obesity level was associated with more pain at baseline but greater postoperative pain relief in all TJRs, so the average postoperative KOOS pain scores did not differ significantly according to BMI

status. In addition, PCS function levels improved similarly at all BMI levels, though the 6-month function levels were worse at six months for both the TKR and THR patients ($p < 0.001$ for both).

Conclusion: This large, prospective study of patients undergoing total joint replacement found that pain relief at six months is similar in all BMI categories. Among those undergoing total hip replacement, only those with severe and morbid obesity had less functional gains.

Li, W., et al. Functional Gain and Pain Relief after Total Joint Replacement According to Obesity Status. *JBJS*. 2017, July 19; 99(14): 1183-1189.

ARTHROSCOPIC KNEE SURGERY IN MIDDLE-AGED PATIENTS WITH MENISCAL SYMPTOMS

Recent data have brought into question whether surgical intervention is appropriate for patients with meniscal lesions. This study evaluated whether knee arthroscopic surgery, combined with exercise, provides additional, long-term benefit at three-year follow-up.

Subjects were 150 adults, 45 to 64 years of age, with symptomatic knee pain, all with a suspected meniscal injury. The groups were randomized to undergo physical therapy only or to receive surgical intervention in addition to the therapy. All patients were allowed full weight bearing activities immediately after surgery. Outcome measures included the EuroQuol 5 Dimensions (EQ-5D) and the Knee Injury and Osteoarthritis Outcome Score (KOOS), with evaluations completed at three, 12 and 36 months after baseline.

Significant improvement was noted in both treatment groups on the KOOS pain subscore at three-year follow-up ($p < 0.001$). However, the between group difference at three years did not differ significantly between the groups ($p = 0.216$). At one year, pain improvement was significantly greater in the surgical group than in the nonsurgical group ($p = 0.005$). However, at three years differences between groups on the EQ-5D Quality of Life Index were not significant ($p = 0.31$).

Conclusion: This study of middle-aged adults with meniscal injury found that arthroscopic surgery may provide better pain relief at one year than exercise alone, with this difference no longer significant at three years.

Gauffin, H., et al. Knee Arthroscopic Surgery in Middle-Aged Patients with Meniscal Symptoms. A Three-Year Follow-Up of a Prospective, Randomized Study. *Am J Sports Med*. 2017, July; 45(9): 2077-2084.

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.

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.

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.

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.

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.

Subjects 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 ThermoCare 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.

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. Multivariate 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.

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.

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.

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.

VITAMIN D AND RHEUMATOID ARTHRITIS

Vitamin D, a pro-hormone, is thought to play a potential immune-suppressive role, and to exert endocrine action on the immune system cells, generating anti-inflammatory and immunomodulatory effects. This study was designed to better understand the relationship between vitamin D and rheumatoid arthritis (RA).

The study was a *post hoc* analysis of data collected for the Comorbidities in Rheumatoid Arthritis (COMORA) study, an observational, cross-sectional, multicenter, international study of adults with RA. Data were collected for 1,413 patients from 15 countries. Demographic characteristics and disease specific variables were reported, including drug use and vitamin D supplementation. Disease activity was evaluated by DAS28 scores, characterized as high, moderate, low or in remission. In addition, functional impact of the disease was evaluated by the Health Assessment Questionnaire (HAQ). Current vitamin D levels were collected, and characterized as normal if Vitamin D levels were 30 ng/mL or more, insufficient if 10 to 30 ng/mL and deficient if < 10 ng/mL.

The status of vitamin D levels was normal in 36.9%, insufficient in 54.6% and deficient in 8.5% of the subjects. Normal vitamin D status was found in over 50% of patients only in the United States and Italy, and in zero percent of those in Egypt, the Netherlands and the United Kingdom. Vitamin D levels were inversely correlated with DAS28 scores (< 0.001).

Conclusion: This multi-national study of patients with rheumatoid

arthritis found an inverse association between disease activity and vitamin D levels.

Hajjaj-Hassouni, N., et al. Evaluation of Vitamin D Status and Rheumatoid Arthritis and Its Association with Disease Activity across 15 Countries: "The COMORA Study". *Intern J Rheum*. Volume 2017 (2017), Article ID 5491676, 8 pages. <https://doi.org/10.1155/2017/5491676>.

SYSTOLIC AND PULSE PRESSURE VERSUS OSTEOARTHRITIS OF THE KNEE

Osteoarthritis (OA) is the most common form of arthritis, with at least 30 million adults in the United States diagnosed with clinical OA. Previous studies have suggested an association between metabolic syndrome factors and incident OA. This longitudinal study, nested within the Osteoarthritis Initiative (OAI), explored the association between blood pressure and incident OA.

Eligible subjects were participants of the OAI with no OA at baseline. Blood pressure was measured at baseline, and at 12 and 36 months' follow-up, with pulse pressure (PP) calculated as systolic blood pressure (SBP) minus diastolic blood pressure (DBP). Data were also recorded for physical activity, medication use, and knee radiographs. Radiographic OA (ROA) was defined as a Kellgren and Lawrence grade of two or higher. Covariates included gender, age and body mass index (BMI).

Data were available for 1,930 participants with a mean age of 59.2 years and mean BMI of 27.2 kg/m². A significant increase in the annual rates of ROA was noted with increased SBP and PP quartiles. This was not true of DBP. This association persisted after adjusting for age, gender, BMI and medication use.

Conclusion: This study found that higher systolic blood pressure and pulse pressure, but not diastolic blood pressure, are associated with an increased risk of osteoarthritis of the knee.

Lo, G et al. Systolic and Pulse Pressure Associated with Incident Knee Osteoarthritis: Data from the Osteoarthritis Initiative. *Clin Rheum*. 2017, September; 36(9): 2121-2128.

NEEDLING VERSUS SHOCKWAVE THERAPY FOR CALCIFIC TENDINITIS

Calcific tendinitis of the shoulder can cause pain in the shoulder and upper arm, with decreased function. This study evaluated two, relatively new treatments: ultrasound guided needling (UN) and radial shockwave therapy (RSWT), as treatment options for this condition. This prospective study included 25 patients referred for painful calcific tendinitis. Those randomized to undergo UN received 40 mg of corticosteroid in the subacromial bursa, followed by a local anesthetic, and then ultrasound guided piercing of the calcification with 18-gauge needles. This process was followed by flushing with normal saline. Those in the RSWT group underwent four sessions, one week apart. Each session consisted of 500 pulses of 1.5 bar with a frequency of 4.5 Hz, followed by 2,000 pulses of 2.5 bar with a frequency of 10 Hz. All patients were assessed for pain using the Numeric Rating Scale (NRS), with clinical outcomes measured by the Oxford shoulder score and the Constant Murley score.

From baseline to six-week follow-up, compared to the RSWT group, the UN group showed better improvement in calcium deposits ($p = 0.029$), in the Oxford shoulder scores and better (though not statistically significant) improvement the Constant Murley scores. The study was terminated early secondary to the high pain levels reported at six weeks by the subjects in the RSWT group.

Conclusion: This study of patients with calcific tendinitis of the shoulder found ultrasound-guided needling superior to shockwave therapy for reducing calcification and improving shoulder function.

Boer, F., et al. Ultrasound-Guided Needling vs Radial Shockwave Therapy in Calcific Tendinitis of the Shoulder: A Prospective Randomized Trial. *J Ortho*. 2017; 14: 466-469.

PREOPERATIVE OBESITY AND OUTCOME OF LUMBAR DISC SURGERY

Obesity has been implicated as an important factor in the clinical decision making for patients with lumbar intervertebral herniation.

During surgery, obese patients present specific technical challenges, and have an increased risk of perioperative complications, including wound infection, blood loss and increased hospital stay. This prospective study explored the functional outcomes of obese patients after lumbar disc surgery. This prospective study included adults with isolated radicular symptoms secondary to lumbar disc herniation. Body mass index (BMI) was calculated prior to open lumbar microdiscectomy. Outcome measures included a visual analog score to assess the severity of symptoms, the Rowland Morris Disability Questionnaire and the SF-36 Health Survey. In addition, return to work and return to driving were documented. Obesity was defined as a BMI of 30 kg/m² or above.

Of the 107 participants, 34.5% were obese. Prior to surgery, 66.2% of the non-obese and 55.6% of the obese patients were working, with the loss of employment attributed to pain. At three and 12 months, no significant differences were seen between the groups in improvement in back pain, leg pain, paresthesias

or numbness. Postoperative quality of life scores improved significantly in both groups at three and 12 months post-surgery, with no significant difference between the two groups (p=0.119). At three and 12 months, the groups did not differ significantly in the percentage who returned to work, returned to driving or perceived their surgery as successful.

Conclusion: This prospective study of patients undergoing microscopic lumbar discectomy found that obesity did not significantly impact improvement in quality of life, return to work or improvement in pain.

Brennan, P., et al. Pre-Operative Obesity Does Not Predict Poorer Symptom Control and Quality of Life after Lumbar Disc Surgery. *J Neurosurg.* 2017, September; 7(6): 1-6. <http://dx.doi.org/10.1080/02688697.2017.1354122>.

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