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SHAM SURGERY FOR SLAP LESIONS

Superior labrum anterior posterior (SLAP) lesion describes a combined detachment of the long head of the biceps tendon and the superior labrum from the glenoid rim. Labral repair is the most common procedure to treat these injuries, although this procedure has been found to have high rates of complications and poor outcomes. This study assessed the clinical effectiveness of labral repair and biceps tenodesis in patients with type II SLAP lesions.

This sham controlled, double-blind study included patients, 18 to 60 years of age, with shoulder pain unresponsive to conventional treatment. All had MRI findings indicating a SLAP lesion. The participants underwent a diagnostic arthroscopy, and were then randomized to undergo a labral repair, a biceps tenodesis or a sham surgery. The two primary outcome measures were the Rowe score and the Western Ontario Shoulder Instability Index (WOSI), administered at six and 12 months post-surgery. Secondary measures included the Oxford Instability Shoulder Score (OISS), the EuroQol (EQ-5D, EQ-VAS) for generic health-related quality-of-life and change in pain from baseline to follow-up.

Of the 118 patients randomized, all had significant improvement on the primary and secondary outcome measures, with no significant between-group differences found in the change from baseline at six or 24 months. At one-year follow-up, 84% of the sham surgery group, 83% of the labrum repair group and 89% of the tenodesis group reported good or excellent results.

Conclusion: This randomized, double-blind, sham-controlled trial of adults with symptomatic SLAP II shoulder injuries found labral repair and biceps tenodesis to be no better than sham surgery for improving objective and subjective shoulder scores.

Schroder, C., et al. Sham Surgery versus Labral Repair or Biceps Tenodesis for Type II SLAP Lesions of the Shoulder: A Three-Armed, Randomized Trial. **Br J Sports Med.** 2017, December; 51(24): 1759-1766.

THROMBECTOMY UP TO 24 HOURS AFTER STROKE

Previous, nonrandomized studies of patients with ischemic stroke have found that patients with a mismatch between the volume of brain tissue that may be salvaged and the volume of infarcted tissue may benefit from reperfusion. This study, the DAWN (DWI of CTP Assessment with Clinical Mismatch in the Triage of Wake-Up in Late Presenting Strokes undergoing gs with Trevo) trial, assessed the efficacy of thrombectomy up to 24 hours after stoke onset.

Subjects were 206 patients with occlusion of the intracranial internal carotid artery, the first segment of the middle cerebral artery, or both, all of whom had a mismatch between the severity of the clinical deficits and the infarct volume. The participants were randomized to thrombectomy plus standard medical care or to standard medical care alone. The primary endpoints were the modified Rankin scale (mRS), including the mean score at 90 days, and the percentage of those patients functionally independent (mRS of zero to two) at 90 days.

At 90 days, scores on the mRS were 5.5 in the thrombectomy group and 3.4 in the control group. Functional independence at 90 days was achieved by 49% of the thrombectomy group and 13% of the control group. The rate of neurologic deterioration was 14% of the thrombectomy group and 26% of the control group (p=0.04).

Conclusion: This study of patients with acute stroke, all with a mismatch between clinical deficit and infarct, found that improved outcomes could be achieved with thrombectomy if completed up to 24 hours after stroke onset.

Nogueira, R., et al. Thrombectomy 6 to 24 Hours after Stroke with a Mismatch between Deficit and Infarct. **N Engl J Med**. 2017 10.1056/ NEJMoa1706442

TOBACCO ABUSE AND MUSCULOSKELETAL INJURIES

Tobacco use is the largest, preventable cause of disease and premature death in the United States. Approximately 32% of active duty service members report the use of tobacco. This literature review was designed to clarify the effect of tobacco use on the occurrence of musculoskeletal injuries among military personnel.

A literature search was completed for studies including lower-extremity overuse injuries and tobacco use among military personnel. From this review, 18 articles were chosen for inclusion.

Of those studies which measured smoking as yes/no, the median relative risk (RR) of injury compared with nonsmokers was 1.33. When the level of smoking was considered, each progressive level had a significantly elevated RR of injury, as compared with that of nonsmokers ($p < 0.001$). Compared to those that did not smoke, the increase in RRs for the lowest level of smoking were 43% for women and 26% for men, while the increase for the highest level were 56% for women and 84% for men.

Conclusion: This literature review and meta-analysis of military personnel found that smokers are at a significantly increased risk for musculoskeletal injury.

Bedno, S., et al. Meta-Analysis of Cigarette Smoking and Musculoskeletal Injuries in Military Training. **Med Sci Sport Exerc.** 2017, November; 49(11): 2191-2197.

EFFECT OF NICOTINE ON STRENGTH, POWER AND AEROBIC PERFORMANCE

The World Anti-Doping Agency (WADA) placed nicotine into its monitoring program in 2012. This study was designed to determine whether nicotine, through its stimulatory effect on the central nervous system, is ergogenic at low doses.

Subjects were nine, non-smoking, athletic males who had regularly competed in sports three or more times per week for the previous two years. The participants were asked to complete five, maximal contractions of the dominant quadriceps, including isometric, concentric and eccentric contractions, followed by three, maximal, vertical counter movement jumps and a 30-second Wingate test. Before each trial, the athletes were randomized to receive 2 mg nicotine, 4 mg nicotine or placebo gum to chew.

The peak leg extension torques in the isometric, concentric and eccentric conditions were all significantly improved in the 2 mg nicotine condition, as compared with placebo ($p<0.05$ for all comparisons). This effect was not found in the 4 mg nicotine group. There was no effect of either dose of nicotine on jump performance.

Conclusion: This study found that chewing low-dose nicotine gum prior to exercise can significantly improve leg extensor torque.

Mundel, T., et al. A Randomized, Placebo–Controlled, Crossover Study Investigating the Effects of Nicotine Gum on Strength, Power and Anaerobic Performance in Nicotine-Naive Active Males. **Sports Med-Open** 2017; 3: 5.

URIC ACID FOR STROKE PATIENTS

The treatment of acute ischemic stroke (AIS) has evolved with the introduction of mechanical thrombectomy (MT) over the past several years. However, recanalization may not salvage the ischemic penumbra. This is due, in part, to the oxidative stress mediated reperfusion injury. In a previous study, the introduction of uric acid (UA) to alteplase in patients with AIS treated within 4.5 hours after the clinical onset resulted in a better distribution of the modified Rankin scale (mRS) scores. This study assessed the effect of UA among patient treated with mechanical thrombectomy.

This study, the URICO-ICTUS, was a multi-center, randomized, placebo controlled trial, conducted in 10 Spanish stroke centers. All patients with AIS arriving within 4.5 hours after onset were randomized to receive intravenous infusion of 1,000 mg of UA or placebo, and underwent MT within eight hours of stroke onset. The primary outcome variable was a mRS score of 0-2 (a “good” outcome) at 90 days.

Of the 421 patients enrolled, 45 received IV alteplase and mechanical thrombectomy, with 24 treated with UA and 21 treated with placebo. Those in the UA group had significant improvement in the percent rated as having of good functional outcome, with an adjusted hazard ratio of 2.2. In addition, the proportion of those with complete independence at 90 days was greater among those treated with UA, improving 24% more in the intervention group than in the control group.

Conclusion: This study found that, among patients with acute ischemic stroke treated with IV alteplase and mechanical thrombectomy, treatment with uric acid resulted in a 19% increase in the proportion of good outcomes at 90 days, and a 24% improvement in the number with complete independence.

Chamorro, A., et al. Uric Acid Therapy Improves the Outcomes of Stroke Patients Treated with Intravenous Tissue Plasminogen Activator and Mechanical Thrombectomy. **Intern J Stroke.** 2017, June; 12(4): 377-382.

ELECTRONIC DEVICE USE AND THE MEDIAN NERVE AT THE CARPAL TUNNEL

Frequent use of electronic devices may result in repetitive strain injury. This study of electronic device users compared subjective and objective data focusing on the median nerve at the carpal tunnel.

Subjects were university students between 18 and 25 years of age. Questionnaires determined the frequency and duration of electronic device use and self-reported musculoskeletal pain in the neck, shoulder, back, elbow and wrist/hand in the past 12 months. From these data, the students were classified as intensive electronic device users (over five hours per day), or non-

intensive users (under five hours per day). The carpal tunnel was evaluated with the Phalen's and Durkin's tests, and the median nerve at the carpal tunnel evaluated by ultrasound.

The mean daily use by intensive users was 9.1 hours, and that by nonintensive users was 2.8 hours. Intensive users had positive Durkin's test results more frequently ($p<0.01$), and had a larger wrist circumference in the right hand ($p<0.05$), than did nonintensive users. Median nerve cross-sectional areas were significantly larger in the intensive users at most of the levels of the wrist, and demonstrated greater bowing of the transverse carpal ligament. Total time of use of devices on a typical day was strongly related to pain intensity ($p=0.002$), duration of symptoms of the wrist/hand ($p=0.005$) and ultrasound findings.

Conclusion: This study of college students found that overuse of electronic devices may adversely affect the median nerve within the carpal tunnel.

Woo, E., et al. Effects of Electronic Device Overuse by University Students in Relation to Clinical Status and Anatomical Variations of the Median Nerve and Transverse Carpal Ligament. **Muscle Nerve.** 2017, Nov 5; 56(5): 873-880.

BONE UNION AFTER BALLOON KYPHOPLASTY

Among patients with osteoporotic vertebral body fractures, balloon kyphoplasty (BKP) has been shown to have effective clinical outcomes. This retrospective study reviewed the frequency of bone union after this procedure, and the correlation between bone union and symptom relief.

This retrospective study reviewed the charts of patients receiving BKP at one institution over four years. All subjects underwent balloon kyphoplasty, with an evaluation of bone union by lateral x-ray and CT scan. The presence of back pain before BKP and at the final follow-up examination was evaluated using a VAS. The difference in the mean VAS scores between the bone union group (UG) and the non-union group (NUG) was analyzed using a t-test.

Of the patients seen during the study, 36 were followed for more than two years. Of these, 75% exhibited bone union at the final examination. Pain scores improved in all cases. There was no significant difference in pain scores at two years between those with union and those without union.

Conclusion: This retrospective study of patients undergoing balloon kyphoplasty for vertebral fractures found that, at two years, 25% had not achieved bone union.

Tarukado, K., et al. Does an Osteoporotic Vertebral Fracture Treated by Balloon Kyphoplasty Successfully Achieve Bone Union During the Follow-Up? A Retrospective Study with a Minimum Two-Year Follow-Up. **J Orthop.** 2017, Aug 9; 14(4): 480-483.

ROMOSOZUMAB VERSUS ALENDRONATE FOR FRACTURE PREVENTION IN OSTEOPOROSIS

Post-menopausal women are at higher risk for osteoporosis, due to a sharp drop in protective estrogen levels. Osteoporosis can lead to fractures, which carry significant morbidity and mortality. A novel drug, romosozumab, is a binder and inhibitor of sclerostin, with the net effect of increased bone formation. In this study, romosozumab was compared to alendronate, for efficacy in reducing the risk of recurrent fracture in post-menopausal women who had sustained a previous fracture.

This multicenter, randomized, double blinded, controlled trial included post-menopausal women who had previously sustained at least one fracture, including vertebral fractures. The women were randomized to receive romosozumab for 12 months, or alendronate for 12 months. At 12 months, both groups were prescribed alendronate for the next 12 months.

At 24 months, new vertebral, nonvertebral and hip fractures were fewer (48%, 19%, and 38% fewer, respectively) in the romosozumab group than in the alendronate group ($p<0.001$, $p=0.02$ and $p=0.04$, respectively). Overall, the romosozumab group had a 27% lower risk of clinical fractures than did the alendronate group. At 24 months, the changes in bone mineral density at the lumbar spine were 15.2% in the romosozumab group and 7.1% in the alendronate group. At the hip, these percentages were 7.1% in the romosozumab group and 3.4% in the alendronate group.

Saag K., et al. Romosozumab or Alendronate for Fracture Prevention in Women with Osteoporosis. **N Engl J Med.** 2017, Oct 12; 377 (15): 1417-1427.

BLOOD FLOW RESTRICTION EXERCISE FOR PATELLOFEMORAL PAIN

For many patients with patellofemoral pain (PFP), joint loads from exercise at 60% to 70% of the one-repetition maximum (1RM) may cause symptoms to flare. As training with blood flow restriction (BFR) exercise at 20% to 30% of the 1RM can induce muscle strengthening, this study compared the effects of standard training with that of BFR exercise in patients with PFP.

Subjects were 69 patients, 18 to 40 years of age, with atraumatic PFP persisting for longer than eight weeks. Subjects were randomized to a standard exercise group or a BFR group. Those assigned to the BFR group achieved blood flow restriction with a pneumatic cuff, while performing one set of 30 repetitions and then three sets of 15 repetitions, at 30% of the 1RM. The standard exercise group underwent three sets of seven to ten repetitions, at 70% of 1RM, with a placebo BFR. Outcome measures included pain, assessed with a visual analog scale (VAS), with the subjects indicating their worst pain in the prior week, pain with activities of daily living and pain related to function (the Kujala Patellofemoral Score).

At eight-week follow-up, the mean change in worst pain, and that of pain with function did not differ between the groups. There was a 93% greater reduction in pain with ADLs in the BFR group than in the standard group ($p=0.022$), and a 49% greater improvement in knee extension torque in the BFR group than in the standard exercise group, although that finding failed to achieve statistical significance ($p=0.073$).

Conclusion: This study of patients with chronic patellofemoral pain found that blood flow restriction training for eight weeks may be more effective for strengthening and pain reduction than standard exercise.

Giles, L., et al. Quadriceps Strengthening, with and without Blood Flow Restriction, in the Treatment of Patellofemoral Pain: A Double-Blind, Randomized Trial. **Br J Sport Med.** 2017, December; 51(23): 1688-1694.

HYALURONIC ACID FOR SUPRASPINATOUS TENDONOPATHY

For patients presenting with tendinopathy, intratendinous injections of corticosteroids are common and appeared to reduce inflammation and pain. However, the risk-benefit ratio of their use in tendinopathy remains controversial. A recently introduced intervention is the peritendinous administration of hyaluronic acid (HA), with promising results in clinical trials. This trial assessed the efficacy of peritendinous HA in patients with persistent supraspinatus tendinopathy.

Subjects were 85 adults, 18 to 60 years of age, with supraspinatus tendinopathy of at least four weeks' duration. The subjects were randomized to either an HA group, treated with physical therapy plus a subacromial injection of HA (40 mg sodium hyaluronate/2 mL), or a control group, treated with physical therapy only. The primary endpoint was efficacy, as assessed using the American Shoulder and Elbow Surgeons (ASES) Standardized Shoulder Assessment Form.

At 90 days, the VAS score decreased by a mean of 5.3 points in the controls, and 6.4 points in the HA group. The ADL scores improved by a mean of 9.8 points in the controls and 11 in the HA group. Neither comparison reached statistical significance. The number of rehabilitation sessions needed for recovery were fewer in the treatment group than in the control group ($p<0.01$), with patients in the HA group returning to their preinjury activity levels 12 days earlier than those in the control group ($p=0.013$).

Conclusion: This prospective trial of patients with chronic supraspinatus tendinopathy, suggests that subacromial hyaluronic acid injections may increase the speed of recovery.

Flores, C., et al. Efficacy and Tolerability of Peritendinous Hyaluronic Acid in Patients with Supraspinatus Tendinopathy: A Multicenter, Randomized, Controlled Trial. **Sports Med.** 2017; 3: 22.

OPIOID DEMAND BEFORE AND AFTER ACL RECONSTRUCTION

With an opioid epidemic having been declared, it is important to understand interventions that effect the consumption of opioids. This retrospective study investigated opioid demand after anterior cruciate ligament reconstruction (ACLR) surgery.

This retrospective study utilized the procedural terminology code (CPT) to identify patients who underwent ACLR surgery between 2007 and 2014. Those with opioid prescriptions in the three months before the surgery were considered preoperative users. Postoperative prescription fill rates were tracked for one year after surgery.

Data were available for 4946 ACLRs. Of these 1716 (35%) filled an opioid pain prescription in the three months before surgery. At three months after surgery 7.24% of the patients were still filling opioid prescriptions. Those patients using opioids before surgery were 5.35 times more likely to fill opioid prescriptions at three months after surgery, and 6.42 times more likely at 12 months. Chronic opioid users were 10.5 times more likely to be filling opioid prescriptions at five months after ACLR.

Conclusion: This study found that the risk that opioids would be prescribed at three months after ACL reconstruction was five times greater among those who had recently taken opioids before surgery.

Anthony, C et al. Opioid Demand Before and After Anterior Cruciate Ligament Reconstruction. **Am J Sport Med.** 2017, November; 45 (13): 3098–3103.

PRESCRIPTION OPIOID USE, MISUSE, AND USE DISORDERS IN UNITED STATES ADULTS

In the United States (US), prescription opioid overdose deaths have more than quadrupled between 1999 and 2015. This study was designed to estimate the prevalence of prescription opioid use, misuse and use disorders among US adults.

In 2015, the Substance Abuse and Mental Health Services Administration (SAMHSA) conducted the nationally representative National Survey on Drug Use and Health (NSDUH), a face-to-face household interview survey. Participants were asked about lifetime and past-year use and misuse of prescription opioids. The NSDUH defined prescription opioid misuse as using opioids "in any way that a doctor did not direct you to use them". Prescription opioid use disorder was defined on the basis of the 11 diagnostic criteria for prescription opioid dependence or abuse specified in the *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition* (DSM-IV).

With data from 51,200 adult respondents, it was estimated that 37.8% of U.S. adults had used prescription opioids in the previous year, and 4.7% had misused them. It was estimated that 0.8% had a prescription opioid use disorder. Men, college graduates and adults 18 to 49 years of age had a lower prevalence of prescription opioid use. Among those with opioid prescription use, misuse was more commonly reported among those with low family income and among the uninsured or unemployed.

Conclusion: This nationwide study found that roughly one third of adults in the United States had used an opioid in the previous year, and that 11.5 million reported having misused a prescription opioid at least once in the prior year.

Han, B., et al. Prescription Opioid Use, Misuse, and Use Disorders in U.S. Adults: 2015 National Survey on Drug Use and Health. **Ann Intern Med.** 2017, September 5; 167(5): 293-301.

AEROBIC EXERCISE AND COGNITIVE CONTROL IN CHRONIC STROKE

Cognitive control/executive dysfunction is particularly associated with reduced functional capacity among patients with chronic stroke. This study examined the immediate effect of a single session of aerobic exercise on cognitive control and attention among patients with chronic stroke.

Subjects were adults with a history of ischemic or hemorrhagic stroke at least six months prior, who had full use of at least one arm and one hand. These participants completed a baseline session in two experimental sessions. During the exercise session, a two-minute, self-paced warmup was followed by 20 minutes of exercise, corresponding to 45% to 55% of the heart rate reserve that had been established during submaximal exercise testing. An EEG was recorded throughout the procedure. The subjects were assessed before and after exercise using a modified Eriksen Flanker task.

Improvements in EEG measures after exercise included a greater

P300 amplitude at Fz at 40 minutes after exercise than after rest (p=0.007). The P300 latency was also shorter at 20 minutes after exercise compared with that after rest, for both congruent (p=0.02) and incongruent (p=0.003) conditions. Analyses of response time revealed a main effect for congruency, such that the average response time was shorter for congruent stimuli, as compared with incongruent stimuli (p<0.001). Accuracy was better at pre-exercise than at 20 minutes (p=0.01) or 40 minutes (p=0.03) postintervention. This corresponded to improvement in EEG findings.

Conclusion: This study suggests that cognitive control and speed of information processing may be augmented 20 to 40 minutes after aerobic exercise among people with chronic stroke.

Swatridge, K., et al. The Acute Effects of Aerobic Exercise on Cognitive Control among People with Chronic Stroke. **J Stroke Cerebrovas Dis**. 2017, Dec; 26(12): 2742-2748.

POST-STROKE RECRUDESCENCE

After a stroke, the worsening of neurologic deficits in the setting of altered metabolic factors is a frequently encountered phenomenon, known as post-stroke recrudescence (PSR). As this phenomenon may be difficult to distinguish from recurrent stroke or seizures, this article describes the clinical imaging phenotype, risk factors and clinical outcome of PSR.

This retrospective study included patients readmitted after an acute ischemic stroke from January of 2000 through November of 2015. A random selection of charts was reviewed for the word "recrudescence". The diagnosis of PSR included transient worsening or recurrence of residual focal neurologic deficits, chronic stroke on imaging, an absence of acute lesions on diffusion-weighted MRI, cerebral ischemia considered unlikely and no evidence of seizure.

PSR was identified at an average of 3.9 years after the stroke. Features were compared between PSR admissions and control admissions, in which the same patient did not experience recrudescence. PSR can occur after ischemic or hemorrhagic stroke. Factors occurring more often in the PSR group were infection, in 52.3% versus 7.7% of the controls, with the most common of these being a urinary or pulmonary Infection, as well as hypotension (p=0.04), hyponatremia (p=0.01) and benzodiazepine use (p=0.02).

Conclusion: This retrospective study of patients hospitalized for stroke found that post-stroke recrudescence was most commonly the result of urinary or pulmonary infection, followed by hyponatremia or benzodiazepine use.

Topcuoglu, M., et al. Recrudescence of Deficits after Stroke: Clinical and Imaging Phenotype Common Triggers and Risk Factors. **JAMA Neurol.** 2017; 74(9): 1048-1055.

NEUROLOGICAL TEST RESULTS BEFORE AND AFTER BOXING

Professional boxing has been considered dangerous, due to repetitive exposure to head trauma, which can lead to concussion and/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 neurocognitive abilities.

Subjects were female boxers participating in the 2016 Women's World Boxing Championships. All subjects underwent pre-participation evaluations, repeated after they were eliminated from competition. Tests included the modified Balance Error Scoring System (mBESS), the King-Devick Test and the 3m Timed Up and Go (TUG) test. A subset of the subjects 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 to 36 years agreed to participate. King-Devick visual function test scores (p=0.02) were better at post-tournament testing than at pre-tournament baseline testing. Processing speed, as measured by the Maze Chase task of the CogState test, was also improved after the tournament, as compared to baseline (p<0.001). On tests of balance and dual-task function, participants committed fewer errors on post-tournament testing, as compared to baseline, on the mBESS test (p<0.001) and the TUG subtraction test accuracy scores (p=0.02).

Conclusion: This study of female Olympic boxers found that, as a group, the participants actually improved after the tournament, as compared with baseline, on 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 Sports Med.** 2017, September; 51(18): 1279-1284.

SAUNA VERSUS CARDIOVASCULAR FITNESS AND MORTALITY

Cardiorespiratory fitness is consistently, inversely and independently associated with the risk of cardiovascular disease (CVD) and all-cause mortality. In addition, recent studies have shown that frequent sauna bathing is independently associated with a reduced risk of cardiovascular and all-cause mortality, as well as dementia. This study was designed to determine whether sauna bathing confers additional survival benefits in those with high cardiorespiratory fitness (CRF).

This prospective study of 2,277, middle aged, Finnish men assessed baseline characteristics of participants, including CRF. CRF was categorized into low and high fitness, while frequency of sauna bathing (FSB) was categorized into low frequency or high frequency (three or seven sauna sessions per week, respectively). The men were followed for a median of 26.1 years for cardiovascular and all-cause mortality.

The age-adjusted analysis revealed that, compared to men with low CRF, the hazard ratio (HR) of CVD-related mortality for those with high CRF was 0.34. Using those with a low CRF and low FSB as a reference, the HR of CVD-related mortality was 0.33 among those with low FSB and a high CRF, and 0.27 for those with a high CRF and a high FSB. Among those with low CRF, those with high FSB, had a HR for CVD mortality or all-cause mortality of 0.65 and 0.72 respectively.

Conclusion: This study suggests that both cardiorespiratory fitness and frequency of sauna use are independently associated with reduced mortality and cardiovascular related death.

Kunutsor, S., et al. Joint Associations of Sauna Bathing and

Cardiorespiratory Fitness on Cardiovascular and All-Cause Mortality Risk: A Long-Term, Prospective, Cohort Study. **Ann Med**, 2017, October 16: 1-8.

RIVAROXABAN WITH OR WITHOUT ASPIRIN AND CARDIOVASCULAR DISEASE

Among patients with cardiovascular disease, five to ten percent experience recurrent events each year. When used for secondary prevention, aspirin results in a 19% lower risk of major adverse cardiac events. This study, the Cardiovascular Outcomes for People Using Anticoagulation Strategy (COMPASS) trial assessed whether rivaroxaban alone, or in combination with aspirin, is superior to aspirin alone, for the prevention of recurrent cardiovascular events.

Subjects were patients with coronary artery disease with stable atherosclerotic vascular disease. The participants were randomized to receive; a) rivaroxaban 2.5 mg twice daily, plus aspirin 100 mg daily(RA), b) rivaroxaban 5 mg twice daily, plus placebo(RP), or c) placebo, twice daily, plus aspirin 100 mg once daily (AP). In addition, the patients were randomized to receive pantoprazole, 40 mg once a day or a placebo. The subjects were followed at one and six months, and then at six-month intervals. The primary outcome variable was a composite of cardiovascular death, stroke or myocardial infarction. The primary safety outcome was major bleeding.

At a mean follow-up of 23 months, the primary outcome of cardiovascular death, stroke or myocardial infarction occurred in 4.1% of the RA group, 4.9% of the RP group and 5.4% of the AP group. Compared with the AP group, the hazard ratio for the primary outcome in the RA group was 0.76 ($p<0.001$). Major bleeding occurring in more patients in the RA group than in the AP group ($p<0.001$). Major bleeding events occurred in more patients in the RP group than in the AP group ($p<0.001$).

Conclusion: This study of patients with stable atherosclerotic vascular disease found that those treated with rivaroxaban, 5 mg twice per day, plus 100 mg of aspirin per day, had better cardiovascular outcomes and more major bleeding events than those assigned to aspirin alone.

Eikelboom, J., et al. Rivaroxaban, with or without Aspirin, in Stable Cardiovascular Disease. **N Engl J Med.** 2017, October 5; 377(14): 1319 -1330.

RESIDUAL STRENGTH DEFICITS WITH ADDUCTOR CANAL BLOCKADE FOR ANTERIOR CRUCIATE LIGAMENT RECONSTRUCTION

Over the past decade, femoral nerve blockade (FNB) has been frequently utilized as a postoperative analgesic after anterior cruciate ligament (ACL) reconstruction. This block has been associated with reduced quadriceps strength and a delayed return to sport. As an alternative, adductor canal blockade (ACB) was introduced as a more distal blockade, with a potential reduction in strength loss. This study of patients undergoing ACL repair compared the clinical outcomes of patients receiving one of these two blocks.

This retrospective review included patients 16 years or older who underwent ACL reconstruction between January of 2010 and January of 2015. A chart review identified 211 patients receiving FNB and 30 receiving ACB. For all subjects, isokinetic testing was performed six months postoperatively.

At six months after surgery, a multivariate analysis revealed that those in the ACB group had greater side-to-side deficits than did the FNB group in mean total work (fast activation), and in flexion ($p=0.04$), with no significant difference in peak torque percentage deficits (slow activation). The side-to-side deficit in quadriceps strength at fast speed was 7.5% worse for those receiving ACB blockade.

Conclusion: This retrospective study of patients undergoing anterior cruciate ligament reconstruction found greater strength deficits in the quadriceps at six months among those receiving ACB compared to those receiving FNB blockade for postoperative analgesia.

Christiansen, J., et al. Isokinetic Strength Deficits Six Months after Adductor Canal Blockade for Anterior Cruciate Ligament Reconstruction. **Orthop J Sports Med**. 2017, November; 5(11) DOI: 10.1177/2325967117736249.

HEEL-RISE DEFICIT AFTER ACHILLES TENDON RUPTURE

After an Achilles tendon rupture, a major complication is that of the tendon healing in an elongated position. This study explored ankle biomechanics, calf muscle recovery tendon length, and outcome, six years after an Achilles injury.

Data for this study were derived from a cohort of 201 patients enrolled in randomized, controlled trials, where surgery was compared with conservative treatment of Achilles tendon injury. All subjects were assessed with the Limb Symmetry Index (LSI) of their heel-rise height, calculated as the injured side divided by healthy side × 100. Patient-reported outcome measures included the Achilles Tendon Total Rupture Score (ATRS), the Physical Activity Scale (PAS), and the Foot and Ankle Outcome Score (FAOS). The Achilles tendon length was measured using ultrasound. Subjective and objective outcome measures were compared between those with an LSI of less than 15% and those with an LSI of more than 30%.

At follow-up, no significant differences were found in patient-reported outcome measures between the less than 15% group and the more than 30% group. However, significant differences were found at six years, favoring the less than 15% group, in eccentric plantar flexor power, concentric plantar flexion power and peak Achilles tendon force.

Conclusion: This study found that, after an Achilles tendon rupture, those with a greater than 30% side-to-side difference in heel rise height at one year had greater chronic deficits in the injured limb and ankle kinetics, as compared to those with a less than 15% side-to-side difference.

Brorsson, A., et al. Heel-Rise Height Deficit One Year after Achilles Tendon Rupture Relates to Changes in Ankle Biomechanics Years after Injury. **Am J Sport Med**. 2017, Nov; 45(13): 3060-3068.

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 addressed the

prevalence of AD manifestations in these patients. This investigation was designed to identify the prevalence of AD among patients with GBS.

This study sampled data from the Health Costing Utilization Project Nationwide Inpatient Sample (NIS). From this database, patients hospitalized for GBS, and non-GBS controls, were identified for the period 2010 through 2011. Logistic regression models were used to compare subjects with and without GBS for 27 different comorbidities.

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

Conclusion: This study of patients hospitalized for GBS found that a number of symptoms associated with autonomic dysfunction were 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.

FEDERAL HEALTH CENTER CLINICIANS' JOB SATISFACTION

Over the past 10 years, medical practices have been exposed to multiple health system changes. This study assessed longitudinal changes in professional satisfaction in a nationally sampling of federally qualified health centers (FQHCs).

Surveys were sent to all 503 FQHCs that participated in the Centers for Medicare and Medicaid Services' Advanced Primary Care Practice Demonstration. At these sites, clinicians and staff members who worked at least thirty hours per week were asked to complete the survey. These survey instruments assessed three measures of professional satisfaction (overall satisfaction, burnout and intent to leave), five measures of work environment (work control, stress, time pressure, practice atmosphere and top-of-license activity) and thirteen measures of practice culture (for example, adaptive reserve and communication openness). One set of surveys was sent in April through August of 2013, and the second set in June through October of 2014. The changes in responses were compared between these two time periods.

Results on three of five work environment measures worsened significantly over time, with adjusted, standardized differences of −8.3 % for work control and −11.2 % for low-stress environment. The proportion of respondents reporting a hectic/ chaotic practice atmosphere increased from 31.6 % in the early wave to 40.1 % in the late wave. Twelve of thirteen practice culture measures worsened significantly over time. The greatest declines were for teamwork, at −26.4 %, and facilitative leadership, at −23.3 %.

Conclusion: This study of federally qualified health center clinicians and staff found that, between 2013 and 2014, a significant decline occurred in most measures of professional satisfaction, work environment and practice culture.

Frieberg, M., et al. Federally Qualified Health Center Clinicians and Staff Increasingly Dissatisfied with Workplace Conditions. **Health Affairs.** 2017; 36: 8.

INCREASED SEDENTARY BEHAVIOR ASSOCIATED WITH HIGHER ALL-CAUSE MORTALITY

Some estimates have suggested that adults are sedentary for 9-10 hours per day. Studies which have linked sedentary behavior to health outcomes have relied on self-reported sedentary time, subject to reporting bias. This prospective cohort study was designed to examine the association between objectively measured sedentary time and all-cause mortality.

Data concerning 7985 black and white adults ages 45 years or older were retrieved from the REGARDS (Reasons for Geographic and Racial Differences in Stroke) database, designed to examine racial and regional disparities in stroke. Sedentary time was measured using a hip mounted accelerometer. The participants were stratified into quartiles according to total sedentary time, and separately for mean secondary bout duration. The primary outcome measure was all-cause mortality.

Sedentary behavior accounted for 77.4% of wear time, equivalent to 12.3 hours per day. Total sedentary time was associated with all-cause mortality in a nonlinear, dose-dependent fashion ($p<0.001$). The mean sedentary bout duration was significantly associated with all-cause mortality in a nonlinear manner ($p < 0.001$) with a markedly increased risk for mortality observed for sedentary bouts of 10 minutes or longer. Accumulating a higher percentage of sedentary time in bouts of 1 to 29 minutes was associated with less of an increased risk for all-cause mortality than accumulating this time in longer bouts. The highest risk category was for those with high sedentary time and high bout duration.

Conclusion: Both total volume of sedentary time and prolonged individual bouts of sedentary activity are associated with all-cause mortality.

Diaz K. et al. Patterns of Sedentary Behavior and Mortality in U.S. Middle-Aged and Older Adults: A National Cohort Study. **Ann Intern Med.** 2017, October; 167(7):465-475.

POST-STROKE DIASTOLIC BLOOD PRESSURE AND RISK OF RECURRENT EVENTS

Hypertension is the most common, and leading risk factor for stroke. Recent clinical trials and expert consensus guidelines have typically focused on the issue of systolic blood pressure (SBP) targets for reducing vascular risk. However, little is known about the relationship between diastolic BP (DBP) and vascular outcomes after a stroke.

This study is a post hoc analysis from the Vitamin Intervention for Stroke Prevention (VISP) trial A multicenter trial dataset involving 3680 recent (<4 months) noncardioembolic stroke patients. Subjects were categorized by mean DBP level (mmHg) during follow-up: low/normal (<70 mmHg), normal (70 to <80 mmHg), high/normal (80–89 mmHg) and high (≥90 mmHg). Pulse pressure (PP) was prespecified by three categories of <60, 60 to <70, and ≥70 mmHg. Independent associations of mean DBP level with major vascular events (MVEs) and ischemic stroke were assessed.

MVEs occurred in 20.7% of the low/normal, 15.1% of the normal,

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16.9% of the high/normal and 19.2% of the high DBP groups. Stroke occurred in 9.9%, 6.8%, 8.5% and 10.8% of these groups, respectively. Compared with the normal DBP group, the risk of MVEs was higher in the low/normal DBP group (adjusted hazard ratio 1.33). Among those with SBP 120 to <140 mmHg, the risk of MVEs (HR 1.89) and stroke (HR 2.87) was higher in subjects with PP ≥70 (mean DBP 62.4 mmHg) than those with the lowest PP (mean DBP 78.0 mmHg) and, among those with SBP <120 mmHg, PP 60 to <70 mmHg (mean DBP 52.7 mmHg) was associated with increased risk of stroke (5.85).

Conclusion: Diastolic BP levels in the low/normal range, particularly accompanied by an increased PP of >60, confer an increased risk of MVEs and stroke among patients with a recent non-cardioembolic stroke.

Park, J.-H. Post-Stroke Diastolic Blood Pressure and Risk of Recurrent Vascular Events. **Eur J Neurol.** 2017, November**;** 24(11): 1416–1423.

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