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TENECTEPLASE VERSUS ALTEPLASE BEFORE THROMBECTOMY FOR ISCHEMIC STROKE

For patients with acute ischemic stroke, treatment with alteplase, infused over one hour, has been successful for large vessel occlusions. Tenecteplase is a genetically modified variant of this medication, with greater fibrin specificity and a longer half-life. This study, the Endovascular Therapy for Ischemic Stroke (EXTEND-IA TNK) trial, compare the efficacy of these two medications, administered before endovascular thrombectomy within 4.5 hours of symptom onset.

This randomized, open label, blinded outcome study included patients with ischemic stroke, with large vessel occlusion of the internal carotid, middle cerebral or basilar artery, who were eligible for endovascular thrombectomy. The patients were randomized to receive tenecteplase at 0.25 mg/kg of body weight, or alteplase at 0.9 mg/kg of body weight, with treatment administered within 4.5 hours of onset. The primary outcome variable was the restoration of blood flow to greater than 50% of the involved territory.

Reperfusion of greater than 50% was observed in 22% of the tenecteplase group and 10% of the alteplase group (p=0.002 for noninferiority). At 90 days, the median scores on the modified Rankin scale were superior in the tenecteplase group as compared with the alteplase group (p=0.04).

Conclusion: This study of patients with ischemic stroke found that, prior to thrombectomy, the incidence of reperfusion and functional outcome were noninferior in patients treated with tenecteplase as compared with alteplase.

Campbell, B., et al. Tenecteplase versus Alteplase before Thrombectomy for Ischemic Stroke. **N Eng J Med.** 2018, April 26; 378 (17): 1573-1582.

BIOLOGIC DISEASE-MODIFYING ANTI-RHEUMATIC DRUGS AND THE INCIDENCE OF HIP AND KNEE REPLACEMENT

Tumor necrosis factor-alpha inhibitors (TNFi) have been the mainstay of biologic disease modifying anti-rheumatic drugs since their introduction in the late 90s. This study investigated whether treatment with biologic disease-modifying anti-rheumatic drugs (DMARDs) may have altered the incidence of hip or knee replacements.

This Danish study used the Danish National Patient Register to identify patients with rheumatoid arthritis (RA) treated between 1996 and 2011. For each of the patients with RA, the authors matched up to 10 persons from the general population. From the records, prescriptions of DMARDS were identified. In addition, the five-year age and gender standardized incidence rates for total hip arthroplasty (THA) and total knee arthroplasty (TKA) were evaluated and compared between groups.

Subjects were 30,404 patients with incident RA and 297,916 controls. In 1996, the five-year incidence of THA was 8.72 per 1,000 patient years among patients with RA, and 2.89 per 1,000 patient years for controls. For TKA, the five-year incidence was 5.87 per 1,000 patient years for patients with RA and 0.42 per 1,000 patient years for controls. Before the introduction of DMARDs, there was a increasing trend in the incidence of THR among patients with RA. After the introduction of DMARDs, the rates of THA and TKA decreased among patients with RA (p=0.004 and p=0.083 respectively), while increasing among the general population (p=0.04 and p=0.003 respectively).

Conclusion: This Danish study of patients with rheumatoid arthritis found a significantly higher rate of hip and knee replacement compared to the general population, with that rate decreasing after introduction of disease-modifying anti-rheumatic drugs.

Cordtz, R., et al. Incidence of Hip and Knee Replacement in Patients with Rheumatoid Arthritis following the Introduction of Biologic DMARDs: Uninterrupted Time-Series Analysis Using Nationwide Danish Healthcare Registers. **Ann Rheum Dis.** 2018, May; 77(5): 684-689.

SEX AFTER AMPUTATION

Studies have demonstrated that common psychological variables after limb loss include depression, anxiety and body image concerns. This study investigated whether amputation is associated with sexual function as a result of its influence on the psychological condition of the patient.

Subjects were 49 men with unilateral or bilateral lower limb amputation. All participants were asked to complete the Hospital Anxiety and Depression Scale (HADS), the Beck Depression Inventory-second edition (BDI-II), the Body Image Quality of Life Inventory (BIQLI), the Sexual Activity Questionnaire, the Golombok-Rust Inventory of Sexual Satisfaction (GRISS) and the Body Exposure During Sexual Activities Questionnaire (BESAQ).

The subjects ranged in age from 25 to 87 years, with a median age of 56.7 years. Half of the subjects with lower limb amputation were not currently sexually active. That proportion contrasted with 14% of males and 17% of females in the general population. Scores on the GRISS indicated sexual function problems in over 60% of the sexually active individuals, including 69% of

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the males and 38% of the females. High levels of sexual dysfunction were associated with levels of depression ($p<0.015$), body exposure self-consciousness ($p<0.005$) and anxiety ($p<0.005$). Body exposure self-consciousness during sexual activity was the greatest predictor of sexual dysfunction.

Conclusion: This study of patients with lower limb amputations found that sexual dysfunction is related to high levels of anxiety, depression and body exposure self-consciousness.

Woods. L., et al. Sex after Amputation: The Relationships between Sexual Functioning, Body Image, Mood and Anxiety in Persons with a Lower Limb Amputation. **Disabil Rehab.** 2018; 40 (14): 1663-1670.

RASAGILINE FOR SLEEP IN PARKINSON'S DISEASE

Sleep disturbances are frequent in Parkinson's disease (PD) and are associated with an impaired quality of life. Rasagiline, a selective irreversible monoamine oxidase B inhibitor, has been found to be effective in improving motor function in patients with early PD. Rasagiline has also been found to improve sleep quality, as assessed by questionnaires. This study further explored the effect of rasagiline on sleep quality in patients with PD, using polysomnography (PSG).

Subjects were 50 to 85 years of age, diagnosed with PD, all with sleep disturbances as assessed by the Pittsburgh Sleep Quality Index. After a baseline polysomnographic study, the participants were randomized to receive a placebo or rasagiline, one mg per day for eight weeks. Parameters measured included sleep maintenance/ efficiency, measured with PSG, changes in motor function, as measured by the Unified Parkinson's Disease Rating Scale, and questions measuring sleep quality.

At eight weeks, sleep maintenance was significantly improved as compared with baseline, with a 16% improvement in sleep maintenance ($p=0.024$) and a 12.1% improvement in sleep efficiency ($p=0.097$). In addition, significant improvement was noted in the Epsworth Sleepiness scale ($p=0.011$), wake time after sleep onset ($p=0.048$), and the arousal index ($p=0.019$). Due to the paucity of subjects, a comparison with the controls was not made.

Conclusion: This study of patients with Parkinson's disease found that treatment with rasagaline resulted in improvement in sleep, as measured by polysomnography.

Schrempf, W., et al. Rasagiline Improves Polysomnographic Sleep Parameters in Patients with Parkinson's Disease: A Double-Blind, Baseline, Controlled Trial. **Euro J Neurol.** 2018, April; 25(4): 672-679.

FINGOLIMOD AS FIRST LINE TREATMENT FOR RELAPSING REMITTING MULTIPLE SCLEROSIS

For patients with relapsing-remitting multiple sclerosis (RRMS), it is accepted practice to initiate disease modifying drug (DMARD) therapy as early as possible. Fingolimod is the first approved oral disease modifying therapy (DMT) worldwide and is available as a first line treatment in Switzerland. This study investigated the efficacy of fingolimod for the treatment of RRMS.

This observational, multicenter, cross-sectional study included patients treated at 19 Swedish clinics specializing in multiple sclerosis (MS). A retrospective analysis was made of patients with RRMS treated for at least six months with fingolimod. The annualized relapse rate was calculated, with secondary data collected on freedom from disability progression and treatment retention.

Of the patients reviewed, 28.5% were treated with fingolimod as a first -line therapy. Over a median of 31.1 months, 77.7% remained free from relapse. Of these patients, 90.3% remained free from progression of disability, and 94.4% remained the same or moved to a lower grade disability category. Freedom from relapse was realized by 91.7% at one year, 82.5% at two years and 76.9% at three years. Treatment retention was found to be high, with 7.8% continuing treatment at 36 months.

Conclusion: This study of patients with RRMS found that the use of fingolimod as a first-line treatment resulted in a significant percentage being free from relapse at three years.

Zecca, C., et al. Real-Life, Long-Term Effectiveness of Fingolimod in Swiss Patients with Relapsing-Remitting Multiple Sclerosis. **Eur J Neurol.** 2018, May; 25(5): 762-767.

TENS PLUS THERAPEUTIC ULTRASOUND FOR CHRONIC NECK PAIN

The combination of transcranial electrical stimulation (TENS) and therapeutic ultrasound (US) is a widely used treatment strategy for patients with chronic neck pain (CNP). The effects of this combination have not been studied in detail. This study investigated the efficacy of this treatment combination.

Subjects were 64 patients with nonspecific CNP, divided to receive TENS plus US or to a control group. All were adults with pain for longer than 12 weeks. The therapy program consisted of 10 sessions of TENS plus therapeutic US, applied five days per week for two weeks, with the TENS applied to the lumbar spine for 30 minutes and US applied to the cervical paravertebral muscles for five minutes.

Assessment of neck pain included activity and resting Visual Analog Scales for neck pain (VAS-N), the Perceived Stress Scale (PSS), the Neck Disability Index (NDI) and the Epworth Sleepiness Scale (ESS) administered at baseline and after treatment completion. The control group subjects were evaluated on the first visit and two weeks after that visit.

Compared to the control group, greater improvement was noted in the treatment group in NDI scores ($p<0.001$), PSS scores ($p<0.037$), VAS-N at rest ($p<0.001$) and VAS-N with activity ($p<0.001$).

Conclusion: This study of patients with chronic neck pain found that a combination of TENS plus therapeutic ultrasound can reduce pain and improve physical function.

Sayilir, S., et al. The Short-Term Effects of TENS Plus Therapeutic Ultrasound Combinations on Chronic Neck Pain. **Complement Ther Clin Pract.** 2018. 31: 278-281.

SYSTEMIC EFFECTS OF EPIDURAL STEROID INJECTIONS

Previous studies have suggested that even single injections of epidural corticosteroids can result in adrenal suppression. As cortisol suppression is associated with a variety of risk factors, this study was designed to better understand the systemic effects of these injections.

Data were obtained from a prospective, multicenter, double-blind, randomized, controlled trial, comparing epidural injections with corticosteroid plus a local anesthetic, to that of a local anesthetic alone for the treatment of pain associated with lumbar spinal stenosis. Participants were at least 50 years of age, with an average pain rating of five or more on a 10-point visual analog scale. At baseline and at three weeks, all subjects provided a morning fasting serum sample from which to measure cortisol levels.

At three-week follow-up, cortisol levels in patients treated with corticosteroid plus lidocaine were 2.3 mircograms/dL lower that in those treated with lidocaine only ($p=0.003$). Those in the corticosteroid group had a 14.4% reduction cortisol at week three, while the lidocaine groups had an 8.2% increase in cortisol ($p=0.002$). The effect differed by corticosteroid used. The average three-week cortisol reductions were 41% and 41.6% from baseline in the methylprednisolone and triamcinolone groups as compared with lidocaine ($p=0.005$ and $p<0.001$, respectively). In contrast, those treated with betamethasone and dexamethasone did not differ significantly from the lidocaine group.

Conclusion: This study of patients receiving epidural injections for pain associated with spinal stenosis found significant cortisol suppression at three weeks among patients injected with methylprednisolone and triamcinolone.

Friedly, J., et al. Systemic Effects of Epidural Steroid Injections for Spinal Stenosis. **Pain** 2018, May; 159(5): 876-883.

LAVENDER OIL FOR KNEE OSTEOARTHRITIS

It is estimated that approximately 27 million Americans have osteoarthritis (OA), with this prevalence expected to increase to 70 million in upcoming decades. As pharmacologic treatments are often less than fully effective, and have various side-effects, some have looked to complementary therapies as an alternative. As previous research has suggested that lavender oil may be helpful for patients with neck pain, this study reviewed its effects on patients with OA of the knee.

Subjects were adult patients referred to outpatient rheumatology clinics with a diagnosis of OA of the knee, with pain levels of four or greater on a 10-point visual analog scale. The participants were randomized to receive aroma massage, placebo massage or to a control group. Those in the aromatherapy group received 50 cc of a mixture of three percent lavender oil and 97% sweet almond oil. The placebo control group received only almond oil. All subjects were asked to massage the affected knee nine times within three weeks, at a fixed time of day, while sitting in a chair. The control group received no massage. All were assessed with the WOMAC OA Index, at baseline, immediately after the treatment, then one and four weeks after the intervention.

Immediately and at one week after intervention, the aromatherapy group had significant better ADL scores than did the control group ($p=0.001$ and $p=0.03$, respectively). However, the significance was not sustained at four weeks.

Conclusion: This study of patients with osteoarthritis of the knee suggests that lavender essential oil massage may have a positive but short term effect on disability.

Nasiri, A., et al. Aromatherapy Massage with Lavender Essential Oil in the Prevention of Disability and ADLs in Patients with Osteoarthritis of the Knee: A Randomized, Controlled Clinical Trial. **Complement Ther Clin Pract.** 2018, February; 30: 116-121.

LAVENDER AS A PRESURGICAL ANXIOLYTIC

Aromatherapy involves the use of essential oils obtained from plants to improve health and wellness. Among these, lavender oil has been studied for its effects on affective disorders. This study assessed the effect of lavender oil on presurgical anxiety levels of patients scheduled for cholecystectomy.

Adult patient scheduled for laparoscopic cholecystectomy surgery were assessed at baseline

for sociodemographics, medical history and knowledge of aromatherapy. The patients were assessed for anxiety levels at two hours before surgery, using the State Anxiety Inventory (SAI). The treatment group received lavender oil application through the inhalation of five drops for five to ten minutes. Twenty minutes after completion of the lavender oil inhalation, the SAI was reapplied. In the control group, the SAI was repeated at 20 to 25 minutes after the first application, with no intervening intervention.

Compared with the baseline anxiety scores, the control group worsened significantly ($p<0.05$), while the lavender oil group improved significantly ($p<0.05$).

Conclusion: This non-blinded study of patients who were awaiting gallbladder surgery found that lavender oil decreased anxiety levels at a time when the control group's anxiety was increasing.

Saritas, S., et al. Effect of Lavender Oil on Anxiety Levels of Patients before Laparoscopic Cholecystectomy. **Complement Ther Clin Pract.** 2018, August; 32: 51-54.

REDEFINING SACROILIITIS

As low-grade bone edema (BME) in the sacroiliac (SI) joints has been reported in up to 25% of healthy adults with nonspecific low back pain, the diagnostic utility of magnetic resonance imaging (MRI) to discriminate these features from early spondyloarthritis becomes uncertain. This study explored the frequency and distribution of BME and structural lesions in the SI joints of athletes from a variety of sports.

Subjects were 20 healthy, recreational runners and 22 healthy, professional hockey players, 18 to 40 years of age. All underwent MRI evaluation of the SI joint, with blinded determinations of sacroiliitis as proposed by the Assessment of Spondyloarthritis International Society (ASAS). For this analysis, each SI joint was divided into eight joint quadrants. Lesions were compared by groups and by location.

The mean numbers of SI joint quadrants demonstrating BME were 3.1 in recreational runners and 3.6 in hockey players. The most affected region was the posterior lower ilium, followed by the anterior upper sacrum. The proportions of subjects meeting the definition for active sacroiliitis were 35% of the recreational runners before running, 30% after running, and 40.9% of the hockey players. The mean numbers of SI joint quadrants affected by BME were 5.4 and 6.3 in recreational runners before and after running, respectively, and 5.8 in hockey players.

Conclusion: Using the ASAS definition, this study of recreational runners and elite hockey athletes found MRI evidence of active sacroiliitis in 30-41%.

Weber, U., et al. Frequency and Anatomic Distribution of Magnetic Resonance Imaging Features in the Sacroiliac Joints of Young Athletes. Exploring Background Noise towards a Data-Driven Definition of Sacroiliitis in Early Spondyloarthritis. **Arthr Rheumatol.** 2018, May; 70 (5): 736-745.

INTRA-ARTICULAR AND INTRAOSSEOUS PLATELET RICH PLASMA INJECTIONS FOR KNEE OSTEOARTHRITIS

For patients with osteoarthritis (OA) of the knee, intra-articular injections of hyaluronic acid (HA) and platelet rich plasma (PRP) have been used as nonsurgical treatments. A new technique of PRP injection has been introduced, combining intraosseous (IO) infiltration with intra-articular (IA) injection. This study compares the efficacy of IO injections of PRP combined with IA injections of either HA or PRP.

Subjects were 99 patients with unilateral OA of the knee, ages 40 to 73 years, with an average body mass index (BMI) of 18-32.5 kg/m^2. The patients were randomized to receive injections of PRP 2 mL placed IA and IO at the tibial plateau and medial femoral condyle every two weeks (group A), PRP 6 mL IA (group B) or seven weekly IA injections of HA 2 mL (group C). The primary outcome variable was the Western Ontario and McMaster Universities (WOMAC) score, with patients evaluated before treatment and at one, three, six, 12 and 18 months from the last injection.

Improvement on the visual analog scale (VAS) for pain was noted in all groups from pretreatment to one and three months follow-up, with significantly greater pain reduction in group A, as compared to groups B and C. The WOMAC total scores indicated significant improvement in group A at every follow-up time point, while those of groups B and C were not significantly improved at the 18th month.

Conclusion: This study of patients with osteoarthritis of the knee found that combining intra-articular and intraosseous injections of platelet rich plasma may be more effective in relieving pain and improving daily activities than are intra-articular injections of PRP or HA.

Su, K., et al. Comparison of Hyaluronic Acid and PRP Intra-Articular Injection with Combined Intra-Articular and Intraosseous PRP Injections to Treat Patients with Knee Osteoarthritis. **Clin Rheumatol** 2018, May; 37 (5): 1341-1350.

PREDICTORS OF SUCCESSFUL OUTCOMES AFTER HYALURONIC ACID INJECTIONS OF THE KNEE

Hyaluronic acid (HA) injections are commonly performed for patients with knee osteoarthritis (OA). However, studies of the effectiveness of these injections have produced mixed results. This study was designed to determine which factors best predict a successful outcome among those injected with HA for OA of the knee.

This prospective, observational study included 102 patients with OA of the knee. Twenty-six patients (25%) had KL grade I OA, 32 (31%) had grade II OA and 44 (43%) had grade III OA. All participants completed standardized surveys, including a visual analog scale (VAS) for pain and the Knee Injury and Osteoarthritis Outcome score (KOOS). Treatment success was defined as a minimum of 20-point improvement on the 100-point VAS or improvement in at least half of the Knee Injury and Osteoarthritis Outcome score (KOOS) categories of pain, symptoms, function and quality of life. The subjects received one HA injection per week for three weeks, with surveys completed at each injection and at three months after the final injection.

Of the 102 patients, 57% had a successful response. Those with grade I or grade II OA were significantly more likely to respond to injections than were patients with grade III OA ($p=0.001$). Those who responded positively to the first

injection were 2.3 times more likely to have a positive response at follow-up (p=0.001). Among patients with grade II OA, those over 60 years of age were two times more likely to respond than were those who were younger (p=0.009). There was no significant effect on response to treatment by smoking status, body mass index, gender, race, brand of injection or initial survey score.

Conclusion: This study of patients with osteoarthritis of the knee found that factors associated with a better long-term response to hyaluronic acid injections were grade I or II OA, a positive response to the first of three injections, and age over 60 years.

Bowman, E., et al. Hyaluronic Acid Injections for Osteoarthritis of the Knee: Predictors of Successful Treatment. **Int Orthop**. 2018, April; 42(4): 733-740.

BONE MINERAL DENSITY WITH A HISTORY OF SECONDARY AMENORRHEA

Peak bone mass is thought to occur around the age of 20 years. This study assessed the relationship between secondary amenorrhea during the teenage years and bone mineral density (BMD) in female athletes in their 20s.

Subjects were elite female athletes participating in high-level competition, all older than 20 years of age when visiting the Medical Center Japan Institute of Sport Sciences from 2013 to 2015. Those who had taken hormone therapies or used oral contraceptives or trans-dermal estradiol were excluded. All underwent a medical examination, with a history including whether the participant had experienced more than one year of menstrual deficiency during the teen years, age of initiation of current sport, history of stress fracture, time of last training and body mass index (BMI). A detailed history of the menstrual cycle was taken, with the subjects then divided into those with more than one year of menstrual deficiency and amenorrhea in their 20s (group A), regular menstruation in their teens and secondary amenorrhea and their 20s (group B) or regular menstruation in both the teens and 20s (group C). All underwent assessment of bone mineral density, as well as blood collection for assessment of hormones.

Of the 210 participants, 18.6% had low BMD, 13.8% had had secondary amenorrhea in their teens and 18.6% had a low current BMI. Group A exhibited significantly lower BMD than groups B and C ($p<0.001$ for both), and BMD was significantly lower in group B than in group C ($p<0.001$). A significant, positive relationship was found between BMI and BMD in the lumbar spine ($p<0.001$). Multivariable logistic regression analysis revealed that factors associated with low BMD were secondary amenorrhea in the teens (Odds Ratio (OR) 7.1; $p<0.001$) and BMI at present (OR 0.56; $p<0.001$).

Conclusion: This study of elite female athletes found that those with secondary amenorrhea for at least one year during their teenage years were at greater risk of low bone mineral density in their 20s.

Nose-Ogura, S., et al. Low Bone Mineral Density in Elite Female Athletes with A History of Secondary Amenorrhea in Their Teens. **Clin J Sport Med**. 2018; 0: 1-6.

PROGNOSIS OF PRESSURE ULCERS AFTER HIP FRACTURE

After a fragility hip fracture (a fracture which occurs with minimal trauma), estimates of the risk of skin pressure injury vary from 8.8% to 55%. This study was designed to identify predictive factors of pressure ulcers among elderly individuals hospitalized with fragility hip fractures.

This prospective study included elderly patients admitted to the emergency department with a diagnosis of fragility hip fracture. The subjects were followed for the occurrence of pressure ulcers, with secondary outcomes including mortality within 30 days, surgical complications, urinary tract infections, pneumonia and lateral popliteal or sciatic nerve paralysis. Variables thought to be related to the onset of hip fractures were divided into intrinsic properties, extrinsic properties (thickness of stretcher mattress in the emergency department, degree of pain, type of surgery, ICU admission days, restraints used and hospital equipment used to prevent ulcers), and hospital organization (time from fracture to emergency department, length of stay in the emergency department and time from arrival to surgery).

Subjects were 467 adults 65 years of age and older with a mean hospital length of stay of nine days. Of the 127 patients who developed a pressure ulcer, 46 were grade two or higher, with a higher incidence among those 81 years of age and older. Correcting for age, the multivariate analysis found that factors independently associated with the onset of skin ulcers were bone fixation surgery ($p=0.012$) and placing the limb in a foam rubber splint ($p<0.0005$). The use of an alternate pressure mattress was associated with a reduced risk.

Conclusion: This study of patients with fragility fracture found that issues associated with the risk of pressure ulcers included age greater than 81 years, bone fixation surgery and an increased time with the use of a rubber splint.

Forni, C., et al Prospective Prognostic Cohort Study of Pressure Injuries in Older Adult Patients with Hip Fractures. **Adv Skin Wound Care**. 2018, May; 31(5): 218-224.

KNEE REPLACEMENT INFECTION AND BODY MASS INDEX

Obesity and overweight are worldwide health epidemics, with obesity associated with earlier total joint arthroplasties and higher revision rates. This retrospective study of patients who received a total knee arthroplasty (TKA) was designed to better understand the association between surgical site infection (SSI) and obesity.

Subjects were 839 patients who had undergone routine, primary TKA between April of 2007 and March of 2008. The subjects were divided by body mass index (BMI) according to the World Health Organization's (WHOs) classifications as normal, overweight, obese class I, obese class II and obese class III. The rate of infection was assessed for each of these weight categories.

Of the 839 patients, the mean BMI was 31.9kg/m^2, with 9.8% in the WHO normal BMI range, 31.7% overweight, 30.9% obese class I, 19.0% class II and 8.7% obese class III. Among the cohort, superficial SSI occurred in 2.6%, and deep SSI in 1.5%. When subjects were grouped

as either obese or not obese, no significant difference was seen between the groups. However, the risks of superficial and deep SSI were 4.2 and 6.97 times greater respectively in the obese class III group compared with the other weight groups (p=0.009 and p=0.003, respectively).

Conclusion: This study of patients undergoing total knee arthroplasty found that a greater risk of superficial and deep surgical site infections was higher only among those with a body mass index of 40kg/m^2 or greater.

Wilson, C., et al. Surgical Site Infection in Overweight and Obese Total Knee Arthroplasty Patients. **J Orthop.** 2018, June; 15(2): 328-333.

TAI CHI FOR FIBROMYALGIA

Previous studies have demonstrated that tai chi may be beneficial for patients with fibromyalgia (FM). This study compared the relative effectiveness of tai chi (TC) with that of aerobic exercise for patients diagnosed with FM.

Patients with a diagnosis of FM were randomly assigned to one of five treatment groups, including TC once or twice per week for 12 or 24 weeks (TC1/12, TC2/12, TC1/24, TC2/24), or aerobic exercise twice per week for 24 weeks (A2/24). The primary outcome variable was the change in scores on the Revised Fibromyalgia Impact Questionnaire (FIQR) from baseline to 24 weeks. Patients were monitored for drug use during the course of the study.

Subjects were 226 patients with a mean age of 52 years and an average duration of pain of nine years. Compared to baseline, FIQR scores improved for all participants in all five treatment groups at each follow-up. At 24 weeks, the combined TC groups improved significantly more than did the A2/24 group in FIQR scores (p = 0.03). However, this finding only exceeded the prespecified threshold for clinically significant improvement when the TC2/24 group was compared to the A2/24 group (p<0.001). Compared to the A2/24 group, better scores were noted in the TC2/24 group for patients' global assessment scores (p=0.006), HADS depression scores (p=0.01), Beck depression scores (p=0.049), coping strategies scores (p=0.002), anxiety scores (p=0.008) and arthritis self-efficacy scores (p=0.002).

Conclusion: This study of patients with fibromyalgia found that tai chi produced greater symptom improvement than did aerobic exercise.

Wang, C., et al. Effect of Tai Chi Versus Aerobic Exercise for Fibromyalgia: Comparative Effectiveness Randomized, Controlled Trial. **BMJ**. 2018: 360.

EGG CONSUMPTION AND CARDIOVASCULAR DISEASE

Previous studies regarding cardiovascular disease have produced inconsistent conclusions about the association between egg consumption and coronary heart disease or stroke. This study was designed to better understand the association between the consumption of eggs and cardiovascular disease.

This prospective, cohort study included adults, ages 30 to 79 years, from geographically diverse sites in China. At baseline, all were queried about their dietary habits, including habitual egg consumption. Responses were divided into those reporting their consumption of eggs as daily, 4 to 6 days per week, 1 to 3 days per week, 1 to 3 days per month and never or rarely. Covariates from the questionnaire included sociodemographic characteristics, lifestyle behaviors, medical history and family history of heart attack and stroke.

Subjects were 461,213 adults with an average age of 50.7 years, with a median of 8.9 years follow-up. Compared to those with no egg consumption, the adjusted hazard ratios for those with daily consumption were 0.89 for coronary heart disease, 0.88 ischemic heart disease, 0.86 major coronary events, 0.74 for hemorrhagic stroke and 0.94 ischemic stroke (p<0.05 for all comparisons). Each increase of one egg per week was associated with an eight percent lower risk of hemorrhagic stroke. Daily consumers had an 18% lower risk of cardiovascular disease-related death and a 28% lower risk of hemorrhagic stroke-related death compared to non-consumers.

Conclusion: This Chinese study, with results similar to those of other large studies, found that daily egg consumption is associated with a lower risk of cardiovascular disease and stroke.

Qin, C., et al. Associations of Egg Consumption with Cardiovascular Disease in a Cohort Study of 0.5 Million Chinese Adults. **Heart.** 2018; 0: 1-8. doi:10.1136/heartjnl-2017-312651.

MILD TRAUMATIC BRAIN INJURY AND DEMENTIA

The association between mild traumatic brain injury (TBI) and dementia has not been clearly established. This study examined the association between TBI and the diagnosis of dementia in veterans who receive care in the Veterans Health Administration (VHA) health care system.

This retrospective review included all patients seen at the VHA who received a diagnosis of TBI between 2001 and 2014. These patients were compared to a matched sample from among veterans without a TBI. Severity of the TBI and loss of consciousness were recorded. Prevalent dementia was defined using a comprehensive list of ICD-9 codes.

The final cohort included 170,779 veterans with at least one TBI and a matched control of equal size without TBI. TBI severity included 9.9% with mild TBI without loss of consciousness, 12.9% with mild TBI with loss of consciousness, 30.8% with mild TBI with unknown loss of consciousness and 46.4% with moderate or severe TBI. Dementia was diagnosed in 2.6% of veterans without TBI and 6.1% of those with TBI. The adjusted hazard ratios for dementia were 2.36 for those with mild TBI without loss of consciousness, 2.51 for mild TBI with loss of consciousness, 3.19 for mild TBI with loss of consciousness status unknown and 3.77 for moderate to severe TBI. A diagnosis of dementia occurred at an average of 1.5 years earlier in those with a history of TBI as compared to control.

Conclusion: This cohort study of military veterans found that even those with a mild traumatic brain injury without loss of consciousness have more than a two-fold increased risk of dementia.

Barnes, D., et al. Association of Mild Traumatic Brain Injury, with and

without Loss of Consciousness, with Dementia in U.S. Military Veterans. **JAMA Neurol.** doi:10.1001/jamaneurol.2018.0815

IMPACT OF ANEMIA ON IN-HOSPITAL COMPLICATIONS AFTER ISCHEMIC STROKE

Previous studies of patients with acute stroke have noted an association between anemia at admission and worse outcomes. This study was designed to determine the effect of anemia at admission on medical complications during hospitalization.

This prospective, cohort study, included consecutive patients admitted with ischemic stroke. Anemia at admission was determined by the World Health Organization definition. Eight, pre-specified complications were studied, including urinary tract infection, hemorrhagic transformation, gastrointestinal bleeding, deep vein thrombosis, pulmonary embolism, seizures and brain herniation. The data were reviewed to assess the association between anemia and hospital medical complications.

Subjects were 2,647 ischemic stroke patients, of whom 648 had anemia on admission. The adjusted odds ratio (OR) for at least one medical complication for patients with anemia on admission was 1.539 ($p<0.001$). The OR for pneumonia during hospitalization was 1.707 ($p<0.001$), for gastrointestinal bleeding was 2.245 ($p=0.01$) and for thromboembolism was 3.443 ($p=0.001$).

Conclusion: This study of patients admitted with an ischemic stroke found that anemia was independently associated with total in -hospital complications, especially pneumonia, gastrointestinal bleeding and thromboembolism.

Wei, C., et. al., Impact of Anemia on In-Hospital Complications after Ischemic Stroke. **Eur J Neurol.** 2018, May; 25(5): 768-774.

ANTICHOLINERGIC MEDICATIONS AND THE LONG-TERM RISK OF FALLS

Drugs with anticholinergic properties include antispasmodics, antiparkinsonian drugs, antidepressants and antipsychotics, among others. This study was designed to better understand the association between the use of anticholinergic drugs among the elderly and the risk of falls with hip fracture.

This case control study identified individuals 60 years of age or older with a hip fracture diagnosis during the year 2015. These individuals were matched with two controls who had not sustained a hip fracture. Data collection included socio-demographics, diagnoses and drugs prescribed within the previous month. These medications were categorized by pharmacological groups, with the total anticholinergic load of each medication calculated using the Anticholinergic Risk Scale (ARS). The association between this load and the risk of a fall with a hip fracture was determined.

Subjects were 300 patients with hip fracture and 600 controls, with a mean age of 81.6 years. A multivariate analysis revealed that the relative risk of falls with hip fractures increased among those receiving proton pump inhibitors ($p=0.017$), systemic corticosteroids ($p<0.046$) or conventional antipsychotic medications ($p=0.029$). Those with ARS scores of two and three had a significantly increased risk of fracture, with each additional point increasing the risk of fracture by 11.6%. In addition, two cities were identified as locations associated with a greater risk of fracture.

Conclusion: This study of patients 60 years of age or older found that anticholinergic medications, with combined anticholinergic loads of two or more, are associated with an increased risk of falls with hip fracture.

Machado-Duque, M., et al. Drugs with Anticholinergic Potential and Risk of Falls with Hip Fracture in the Elderly Patients: A Case-Controlled Study. **J Geriatr Psychiatry Neurol**. 2018, March; 31 (2): 63-69.

EXPOSURE TO ROADWAY POLLUTION AND LUNG FUNCTION

Previous studies have demonstrated that short-term exposure to ambient pollution is acutely harmful to adult lung function. This study examined the effect on lung function of proximity to a major roadway and annual exposure to particulate matter (<2.5 μm in diameter (PM2.5).

Subjects were 2,545 patients from the Framingham Offspring and Third Generation Cohort who had undergone inspiratory lung computerized tomography (CT) scans, and who were not currently smoking. All underwent CT scan for evaluation of pulmonary structural parameters and the presence of emphysema. The distance from a patient's home to a major roadway was calculated, and the density of fine particle matter at the home address was estimated. The data were adjusted for age, gender, height, weight, median value of the home, population density, education level, smoking history and date of CT scan.

Subjects had a mean age of 60.1 years, with 11% demonstrating CT evidence of emphysema. Proximity to a major roadway was associated with significantly higher inspiratory lung volume but no significant relationships were found between proximity and lung mass, lung density, odds of emphysema or airway lumen. Former smokers had a significantly increased odds of emphysema ($p=0.05$).

Conclusion: This study, from the Framingham cohort, found that people living closer to a major road, while having higher average inspiratory lung volumes, had no evidence of an association between ambient pollution and radiographic measures of emphysema or airway disease.

Rice, M., et al. Exposure to Traffic Emissions and Fine Particulate Matter and Computer Tomography Measures of the Lung and Airways. **Epidem**. 2018; 29: 333-342.

BOTULINUM TOXIN FOR TENNIS ELBOW

Lateral epicondylar tendinopathy is thought to be induced by repetitive motion of the wrist and digit extensors. This study assess the analgesic effects of low-dose Botulinum toxin A (BoNT-A) injections for the treatment of chronic lateral epicondylar tendinopathy.

Subjects were 60 adults with lateral epicondylar tendinopathy, resistant to medical treatments for more than six months. The subjects were randomized to receive 40 international units of BoNT-A injected

(Continued from page 2)

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at the extensor carpi radialis brevis, or normal saline, with confirmation using electromyographic stimulation. Pain was measured at 30, 60 and 90 days using a 100 point visual analog scale.

At 30 and 90 days follow-up a > 50% reduction in pain intensity was reported by more in the treatment group (31% and 51% respectively) than in the placebo group (16.7% and 25% respectively), reaching significance only at 90 days (p=0.11, and p=0.005 respectively). Those reporting no symptoms or only occasional pain at 90 days included 51.7% of the treatment and 21.4% of the placebo group (p<0.01). Clinically assessed paresis persisted in 17% of the treatment and 0% of the placebo group at 90 days.

Conclusion: This randomized controlled study of patients with chronic lateral epicondylar tendinopathy found that an injection with 30 units of Botulinum toxin A could significantly reduce pain intensity.

Creuze, A et al. Short-Term Effect Of Low Dose, Electromyography Guided Botulinum Guided Injection In The Treatment Of Chronic Lateral Epicondylar Tendinopathy. **J Bone Joint Surg.** 2018, May 16; 100 (10):818-826.

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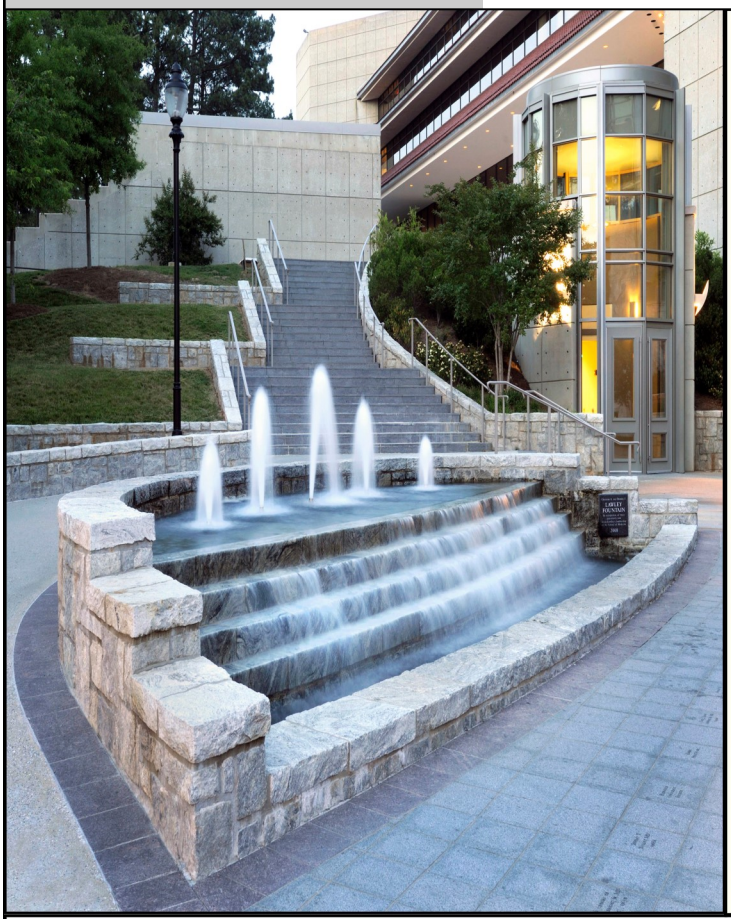

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