

2. LBP

Concepts of instabilities

Are Stability and Instability Relevant Concepts for Back Pain?

- AUTHORS

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Synopsis

Individuals with back pain are often diagnosed with spine instability, despite the fact that it is unclear whether the spine is susceptible to unstable behavior.

The spine is a complex system with many elements that cannot be directly observed, which makes the study of spine function, and direct assessment of spine instability difficult. What is known is that trunk muscle activation is adjusted to meet stability demands, which highlights that the central nervous system closely monitors threats to spine stability. The spine appears to be protected by neural and mechanical coupling that prevent erroneous motor control from producing segmental instability; however, this neural and mechanical coupling could be problematic in an injured spine.

Finally, instability traditionally contemplated from a mechanical and control perspective could potentially be applied to study processes involved in pain sensitization, and possibly back pain that is iatrogenic in nature. This commentary argues for a more contemporary and broadened view of stability that integrates interdisciplinary knowledge in order to capture the complexity of back pain. *J Orthop Sports Phys Ther, Epub 25 Apr 2019. doi:10.2519/jospt.2019.8144*

7. PELVIC ORGANS/WOMAN'S HEALTH

Maternal alcohol consumption

Eur J Obstet Gynecol Reprod Biol. 2019 Feb 20;236:148-153. doi: 10.1016/j.ejogrb.2019.02.005.

Fetal growth and maternal alcohol consumption during early pregnancy.

Reynolds CME1, Egan B2, O'Malley EG3, McMahon L3, Sheehan SR3, Turner MJ3.

OBJECTIVE:

The relationship between light maternal alcohol consumption and fetal outcome remains contentious and the professional advice women receive is conflicting. The aim of this large epidemiological study was to examine the relationship between fetal growth and maternal alcohol behaviour before and during early pregnancy.

STUDY DESIGN:

Clinical and sociodemographic details of women who delivered a baby weighing ≥ 500 g during the eight years 2010-18 were analysed. Details on lifestyle behaviour before pregnancy and at the time of the first antenatal hospital visit were computerised using a standardised questionnaire.

RESULTS:

Of 68,925 women, 33.6% abstained from alcohol consumption before pregnancy and 98.4% reported they were abstaining at their first antenatal visit. Only 1.2% reported light consumption (1-2 units/week, median 1.0 IQR 1.0), 0.4% reported moderate/heavy consumption (>3 units/week, median 4.0 IQR 4.0) and 0.3% reported binge drinking (>5 units in one sitting, median 3.0 IQR 4.0). Women who consumed alcohol in binges were more likely to be <30 years whereas women who consumed alcohol weekly were more likely to be ≥ 30 years. Women who consumed any alcohol during early pregnancy were more likely to be multiparous, Irish-born, to have an unplanned pregnancy, to be unemployed, on medications for depression or anxiety, current smokers and abusing illicit drugs. In the absence of persistent smoking or illicit drug abuse, there was no relationship between light alcohol consumption during early pregnancy and the subsequent mean birth weight, preterm delivery (%), small-for-gestational age (%) and mean neonatal head circumference.

CONCLUSION(S):

Women who consume alcohol should continue to be advised of the fetal and maternal risks of heavy consumption and, if applicable, of the need to quit smoking and avoid illicit drugs. However, women who have consumed alcohol before realising that they were pregnant or who consumed alcohol in light amounts during early pregnancy, may be reassured that their alcohol consumption did not impact adversely on their baby's growth.

Pesticides and autism

BMJ. 2019 Mar 20;364:l962. doi: 10.1136/bmj.l962.

Prenatal and infant exposure to ambient pesticides and autism spectrum disorder in children: population based case-control study.

von Ehrenstein OS^{1,2}, Ling C², Cui X^{2,3,4}, Cockburn M⁵, Park AS², Yu F⁶, Wu J⁷, Ritz B^{2,8,9}.

*OBJECTIVE:*To examine associations between early developmental exposure to ambient pesticides and autism spectrum disorder.

*DESIGN:*Population based case-control study.

*SETTING:*California's main agricultural region, Central Valley, using 1998-2010 birth data from the Office of Vital Statistics.

*POPULATION:*2961 individuals with a diagnosis of autism spectrum disorder based on the Diagnostic and Statistical Manual of Mental Disorders, fourth edition, revised (up to 31 December 2013), including 445 with intellectual disability comorbidity, were identified through records maintained at the California Department of Developmental Services and linked to their birth records. Controls derived from birth records were matched to cases 10:1 by sex and birth year.

*EXPOSURE:*Data from California state mandated Pesticide Use Reporting were integrated into a geographic information system tool to estimate prenatal and infant exposures to pesticides (measured as pounds of pesticides applied per acre/month within 2000 m from the maternal residence). 11 high use pesticides were selected for examination a priori according to previous evidence of neurodevelopmental toxicity in vivo or in vitro (exposure defined as ever v never for each pesticide during specific developmental periods).

MAIN OUTCOME MEASURE:

Odds ratios and 95% confidence intervals using multivariable logistic regression were used to assess associations between pesticide exposure and autism spectrum disorder (with or without intellectual disabilities) in offspring, adjusting for confounders.

RESULTS:

Risk of autism spectrum disorder was associated with prenatal exposure to glyphosate (odds ratio 1.16, 95% confidence interval 1.06 to 1.27), chlorpyrifos (1.13, 1.05 to 1.23), diazinon (1.11, 1.01 to 1.21), malathion (1.11, 1.01 to 1.22), avermectin (1.12, 1.04 to 1.22), and permethrin (1.10, 1.01 to 1.20). For autism spectrum disorder with intellectual disability, estimated odds ratios were higher (by about 30%) for prenatal exposure to glyphosate (1.33, 1.05 to 1.69), chlorpyrifos (1.27, 1.04 to 1.56), diazinon (1.41, 1.15 to 1.73), permethrin (1.46, 1.20 to 1.78), methyl bromide (1.33, 1.07 to 1.64), and myclobutanil (1.32, 1.09 to 1.60); exposure in the first year of life increased the odds for the disorder with comorbid intellectual disability by up to 50% for some pesticide substances.

CONCLUSION:

Findings suggest that an offspring's risk of autism spectrum disorder increases following prenatal exposure to ambient pesticides within 2000 m of their mother's residence during pregnancy, compared with offspring of women from the same agricultural region without such exposure. Infant exposure could further increase risks for autism spectrum disorder with comorbid intellectual disability.

Birth weight and heart disease

J Am Heart Assoc. 2019 May 7;8(9):e011524. doi: 10.1161/JAHA.118.011524.

Association of High Birth Weight With Incident Heart Failure in the ARIC Study.

Rashid A¹, Agarwala A², Novak E², Brown DL².

Background Traditional risk factors for heart failure--coronary heart disease, hypertension, diabetes mellitus, obesity, and smoking--only account for about 50% of cases. Thus, the identification of novel risk factors is of significant public health importance. As high birth weight infants are at increased risk for obesity and diabetes mellitus later in life, which are both risk factors for the development of heart failure, we sought to assess the association of high birth weight with incident heart failure in the ARIC (Atherosclerosis Risk in Communities) study.

Methods and Results The ARIC study is a biracial prospective community-based investigation of 15 792 individuals aged 45 to 64 years at baseline. Study participants who were born premature or born a twin were excluded from this analysis, resulting in 9820 participants who provided either their birth weight category (low, medium, high) or exact birth weight. After adjusting for differences in demographics, risk factors, and comorbidities, compared with medium birth weight, those with high birth weight had a significantly increased risk of incident heart failure (hazard ratio, 1.27; 95% CI, 1.05-1.54 [P=0.014]). The hazard for all-cause mortality for high birth weight compared with medium birth weight was 1.16 (95% CI, 0.99-1.34; P=0.06). There was no association of high birth weight with myocardial infarction (hazard ratio, 1.06; 95% CI, 0.84-1.34 [P=0.6]).

Conclusions High birth weight was associated with a significantly increased hazard of incident heart failure independent of traditional risk factors and a trend toward an increased hazard of death. A history of high birth weight should be ascertained in young adults for primordial prevention of heart failure and in older adults for primary prevention.

Air pollution and breast CA risk

Int J Cancer. 2019 Mar 28. doi: 10.1002/ijc.32308.

Association between ambient air pollution and breast cancer risk: The multiethnic cohort study.

Cheng I^{1,2}, Tseng C³, Wu J⁴, Yang J¹, Conroy SM¹, Shariff-Marco S^{1,2}, Li L³, Hertz A⁵, Gomez SL^{1,2,5}, Le Marchand L⁶, Whittemore AS⁷, Stram DO³, Ritz B⁸, Wu AH³.

Previous studies using different exposure methods to assess air pollution and breast cancer risk among primarily whites have been inconclusive.

Air pollutant exposures of particulate matter and oxides of nitrogen were estimated by kriging (NO_x , NO_2 , PM_{10} , $\text{PM}_{2.5}$), land use regression (LUR, NO_x , NO_2) and California Line Source Dispersion model (CALINE4, NO_x , $\text{PM}_{2.5}$) for 57,589 females from the Multiethnic Cohort, residing largely in Los Angeles County from recruitment (1993-1996) through 2010. Cox proportional hazards models were used to examine the associations between time-varying air pollution and breast cancer incidence adjusting for confounding factors. Stratified analyses were conducted by race/ethnicity and distance to major roads. Among all women, breast cancer risk was positively but not significantly associated with NO_x (per 50 parts per billion [ppb]) and NO_2 (per 20 ppb) determined by kriging and LUR and with $\text{PM}_{2.5}$ and PM_{10} (per $10 \mu\text{g}/\text{m}^3$) determined by kriging. However, among women who lived within 500 m of major roads, significantly increased risks were observed with NO_x (hazard ratio [HR] = 1.35, 95% confidence interval [95% CI]: 1.02-1.79), NO_2 (HR = 1.44, 95% CI: 1.04-1.99), PM_{10} (HR = 1.29, 95% CI: 1.07-1.55) and $\text{PM}_{2.5}$ (HR = 1.85, 95% CI: 1.15-2.99) determined by kriging and NO_x (HR = 1.21, 95% CI: 1.01-1.45) and NO_2 (HR = 1.26, 95% CI: 1.00-1.59) determined by LUR.

No overall associations were observed with exposures assessed by CALINE4. Subgroup analyses suggested stronger associations of NO_x and NO_2 among African Americans and Japanese Americans. Further studies of multiethnic populations to confirm the effects of air pollution, particularly near-roadway exposures, on the risk of breast cancer is warranted.

Arm lymphedema and breast removal

Cancer. 2019 May 15;125(10):1683-1692. doi: 10.1002/cncr.31962. Epub 2019 Jan 11.

Progressive resistance training to prevent arm lymphedema in the first year after breast cancer surgery: Results of a randomized controlled trial.

Ammitzbøll G¹, Johansen C^{1,2}, Lanng C³, Andersen EW⁴, Kroman N^{3,5}, Zerahn B⁶, Hyldegaard O⁷, Wittenkamp MC⁸, Dalton SO¹.

BACKGROUND:

Existing research suggests that progressive resistance training (PRT) after breast cancer (BC) surgery is safe, but the preventive effect on arm lymphedema has yet to be determined.

METHODS:

Women aged 18 to 75 years who were undergoing BC surgery with axillary lymph node dissection were eligible for the study. Recruited on the day of surgery, participants were allocated to intervention or usual care by computer randomization. The intervention consisted of PRT 3 times per week: in the first 20 weeks as a supervised group exercise and in the last 30 weeks as a self-administered exercise. The primary outcome was arm lymphedema, which was defined as a >3% increase in the interlimb volume difference by water displacement. Measurements were made at the baseline and at a 12-month follow-up by physiotherapists blinded to group allocation. Analyses of effects included t tests and regression models; missing data were addressed by multiple imputation.

RESULTS:

Among the 158 randomized women, no mean group difference was found in arm volume (0.3%; 95% confidence interval, -1.7% to 2.3%) or lymphedema incidence (adjusted odds ratio, 1.2; 95% confidence interval, 0.5-2.8). None of the participants exited the program because of adverse events.

CONCLUSIONS:

This study provides no evidence that PRT can prevent arm lymphedema in the first year after BC, but the results corroborate the importance and safety of resistance training for patients, including women at high risk for lymphedema.

Prostate cancer – alcohol seems safe**Alcohol intake and risk of lethal prostate cancer in the Health Professionals Follow-Up Study**

Journal of Clinical Oncology —

Downer MK, et al. | April 29, 2019

In this study, researcher determined if alcohol intake among men at risk of prostate cancer is related to diagnosis of lethal prostate cancer and if consumption among males with nonmetastatic prostate cancer is related to metastasis or mortality. In all, they found a slightly lower risk of lethal prostate cancer among cancer-free men who consumed alcohol vs abstainers. They also observed a lower risk of progression to lethal disease in relation to red wine consumption among men with prostate cancer. According to findings, moderate alcohol consumption is safe for patients with prostate cancer.

Methods

- The study sample for analysis of alcohol intake among men at risk of prostate cancer consisted of 47,568 cancer-free men from the Health Professionals Follow-Up Study (1986-2012).
- A total of 5,182 with non-metastatic prostate cancer during follow-up was included in the analyses of alcohol intake among men with prostate cancer.
- The investigators assessed lethal prostate cancer and death in relation to total alcohol, red and white wine, beer, and liquor intake.
- They used multivariate Cox proportional hazards regression to estimate hazard ratios (HRs) and 95% CIs.

Results

- A lower risk of lethal prostate cancer was observed among alcohol drinkers without a dose-response link.
- Among patients with prostate cancer, there was no association of total alcohol intake with progression to lethal prostate cancer; however, a lower risk was observed in relation to moderate red wine intake.
- Compared with none, a lower risk of death was reported in relation to 15 to 30 g/d of total alcohol after prostate cancer diagnosis; the same was reported for red wine.

8. VISCERA

Vegan diet and blood pressure

Am J Med. 2019 Mar 6. pii: S0002-9343(19)30171-8. doi: 10.1016/j.amjmed.2019.01.044.

THE EFFECT OF VEGAN DIETS ON BLOOD PRESSURE IN ADULTS: A META-ANALYSIS OF RANDOMIZED, CONTROLLED TRIALS.

Lopez PD¹, Cativo EH¹, Atlas SA¹, Rosendorff C².

BACKGROUND:

Vegan diets are increasing in popularity and have beneficial effects on glycemia and blood lipids, but the evidence is inconclusive regarding their effect on blood pressure. The purpose of this study was to review the effect of vegan diets on blood pressure in adults.

METHODS:

We searched MEDLINE, EMBASE, CENTRAL and ClinicalTrials.gov for records that compared a vegan diet to any less restrictive diet and reported pre- and post-intervention systolic and diastolic blood pressures. Two reviewers independently screened abstracts for randomized, controlled clinical trials in individuals ≥ 18 years of age and older. We used the PRISMA guidelines to select 11 clinical trials from 1673 records. Data synthesis was performed through a random-effects model.

RESULTS:

The pooled data included 983 participants. Compared to less restrictive diets, a vegan diet did not result in a significant change in systolic (-1.33mmHg; 95% CI -3.50 to 0.84; $p=0.230$) or diastolic (-1.21mmHg; 95% CI -3.06 to 0.65; $p=0.203$) blood pressure. A pre-specified subgroup analysis of studies with baseline systolic blood pressure ≥ 130 mmHg revealed that a vegan diet resulted in a mean decrease in the systolic (-4.10mmHg; 95% CI -8.14 to -0.06; $p=0.047$) and diastolic (-4.01mmHg; 95% CI -5.97 to -2.05; $p=0.000$) blood pressures.

CONCLUSION:

The changes in blood pressure induced by a vegan diet without caloric restrictions are comparable to those induced by dietary approaches recommended by medical societies and portion-controlled diets

13 D. SLEEP**Sleep apnea**

JAMA Otolaryngol Head Neck Surg. 2019 Apr 11. doi: 10.1001/jamaoto.2019.0281

Association of Positive Airway Pressure Prescription With Mortality in Patients With Obesity and Severe Obstructive Sleep Apnea: The Sleep Heart Health Study.

Lisan Q^{1,2,3}, Van Sloten T^{1,2,4,5}, Marques Vidal P⁶, Haba Rubio J⁷, Heinzer R⁷, Empana JP^{1,2}.

IMPORTANCE:

The association of positive airway pressure (PAP) with reduced mortality in patients with obstructive sleep apnea (OSA) remains uncertain.

OBJECTIVE:

To investigate the association between PAP prescription and mortality.

DESIGN, SETTING, AND PARTICIPANTS:

This multicenter, population-based cohort study evaluated data from the Sleep Heart Health Study (SHHS), a long-term observational cohort study that included participants between 1995 and 1998, with a mean follow-up of 11.1 years. Analyses were performed in September 2018. Within the SHHS, we compared patients with obesity and severe OSA with (n = 81) and without (n = 311) prescription of PAP therapy, after matching patients from each group by age, sex, and apnea-hypopnea index.

EXPOSURES:

Self-reported use of PAP.

MAIN OUTCOMES AND MEASURES:

All-cause mortality.

RESULTS:

Of 392 study participants, 316 (80.6%) were men, and mean (SD) age was 63.1 (11.0) years. Ninety-six deaths occurred; 12 among the prescribed-PAP group and 84 among the nonprescribed-PAP group, yielding crude incidence rates of 12.8 vs 24.7 deaths per 1000 person-years. In Cox multivariate analysis, the hazard ratio (HR) of all-cause mortality for prescribed PAP therapy was 0.38 (95% CI, 0.18-0.81). After propensity matching, the HR of all-cause mortality for prescribed PAP therapy was 0.58 (95% CI, 0.35-0.96). According to survival curves, the difference in mortality appears 6 to 7 years after initiation of PAP therapy.

CONCLUSIONS AND RELEVANCE:

Positive airway pressure prescription is associated with reduced all-cause mortality, and this association appears several years after PAP initiation. If replicated, these findings may have strong clinical implications.

14 HEADACHES**Migraines and reduce muscular endurance**

J Orthop Sports Phys Ther. 2019 Mar 26:1-24. doi: 10.2519/jospt.2019.8816.

Cervical Muscular Endurance Performance in Women With and Without Migraine.

Florencio LL¹, de Oliveira IV², Lodovichi SS², Bragatto MM², Benatto MT², Dach F², Fernández-de-Las-Peñas C¹, Bevilaqua-Grossi D².

STUDY DESIGN:

Cross-sectional, controlled laboratory study.

BACKGROUND:

Despite previous evidence, the association between migraines and cervical muscular performance is unclear.

OBJECTIVE:

To compare the differences in neck flexor and extensor muscle endurance between women with and without migraine.

METHODS:

Twenty-six women with migraine and 26 age-matched women without migraine or headache were assessed using clinical tests of neck flexor and extensor muscle endurance. The holding time (s) was compared between the groups, using the Mann-Whitney U test for independent samples.

RESULTS:

Patients with migraine exhibited a lower holding time for both neck extensor endurance ($P = .001$) and neck flexor endurance ($P < .001$) than the controls. The median neck flexor holding time was 35.0 s for the migraine group and 60.5 s for the control group. The migraine group sustained the neck extensor endurance test position for a median of 166.5 s, in contrast to 290.5 s for the control group. Both groups reported a similar level of neck pain during the endurance tests ($P > .05$); however, only individuals in the migraine group reported pain in the head during testing.

CONCLUSION:

Females with migraine demonstrated decreased neck flexor and extensor endurance compared to females without migraine; which may indicate an association between migraine and reduced performance of the neck muscles. J Orthop Sports Phys Ther, Epub 26 Mar 2019. doi:10.2519/jospt.2019.8816.

20 A. ROTATOR CUFF**To inject or not****Rotator Cuff–Related Shoulder Pain: To Inject or Not to Inject?**

Published: *Journal of Orthopaedic & Sports Physical Therapy*,
2019 **Volume:**49 **Issue:**5 **Pages:**289–293 **DOI:**10.2519/jospt.2019.0607

The most common source of shoulder pain is thought to involve the tendons of the rotator cuff and associated structures around the subacromial space. A generic diagnostic term has been suggested, *rotator cuff-related shoulder pain* (RCRSP), which is an overarching clinical term that includes a number of conditions, such as subacromial impingement syndrome, subacromial pain syndrome, and rotator cuff tendinopathy. The management of RCRSP may include exercise, surgery, or injection therapy.

Those who perform or recommend injection therapy for RCRSP have a duty of care to provide advice on the expected benefits and outcomes, as well as the potential risks and associated harms. Clinicians also need to consider what medication to inject, where to inject it, and how to inject it. The aim of this Viewpoint is to discuss these issues. *J Orthop Sports Phys Ther* 2019;49(5):289–293. doi:10.2519/jospt.2019.0607

30 A. HIP IMPINGEMENT

Comparisons

Midterm Outcomes Following Repair of Capsulotomy Versus Nonrepair in Patients Undergoing Hip Arthroscopy for Femoroacetabular Impingement With Labral Repair

Ioanna K. Bolia, M.D., Ph.D.^a Lorenzo Fagotti, M.D.^a Karen K. Briggs, M.P.H., M.B.A.^a, Marc J. Philippon, M.D.^{a,b}

Purpose

The purpose of this study was to compare the midterm outcomes and conversion to total hip arthroplasty (THA) rate in patients who had repair of the capsulotomy versus nonrepair following arthroscopic hip labral repair and correction of femoroacetabular impingement (FAI).

Methods

All patients undergoing primary arthroscopic hip labral repair and correction of FAI between 2005 and 2012 were eligible for this study. Exclusion criteria were age < 18 years, lateral center-edge angle < 25°, previous hip procedures, femoral avascular necrosis, radiographic joint space \leq 2 mm, or microfracture at arthroscopy. Patients who did not have the capsulotomy repaired were matched 1:2 with patients who had the capsulotomy repaired. Patients were matched by age, gender, and intraoperative procedures. The primary outcome score was the Hip Outcome Score Daily Living (HOS-ADL).

Results

Forty-two patients (18 female patients, 24 male patients) without repair of the capsulotomy were matched with 84 patients with repaired capsulotomy. The average age for both groups was 38 ± 15 years. Patients in the nonrepair group were 6.8 (95% confidence interval, 1.2-52) times more likely to undergo THA compared with the repair group. There was no difference in revision rate between the 2 groups. The mean follow-up time was 7.3 ± 2.7 years and 6.4 ± 2.3 years for the nonrepair and repair group, respectively ($P = .107$). Patients in the repair group had significantly higher HOS-ADL ($P = .01$) and modified Harris hip score (mHHS; $P = .007$). The percentage of patients who reached minimum clinically important difference was significantly higher in the repair group for HOS-ADL ($P = .002$) and HOS-Sport ($P = .036$) compared with the nonrepair group. However, there was no difference in the percentage of patients who reached minimal important change for the mHHS ($P = .060$). Following hip arthroscopy, the average alpha angle was $41.6^\circ \pm 6^\circ$ in the nonrepair group and $40.8^\circ \pm 3^\circ$ in the repair group.

Conclusions

Patients who undergo arthroscopic FAI correction and hip labral repair with repair of the capsulotomy had higher HOS-ADL and mHHS scores at midterm follow-up compared with patients with nonrepair, and the percentage of patients who reached the minimum clinically important difference was significantly higher in the repair group for HOS-ADL and HOS-Sport compared with the nonrepair group. In addition, a lower rate of conversion to THA was seen in the repair group

32 A. KNEE/ACL**To repair MCL or not****Outcomes of Grade III Medial Collateral Ligament Injuries Treated Concurrently With Anterior Cruciate Ligament Reconstruction: A Multicenter Study**

Presented at the 2017 AOSSM Specialty Day, San Diego, CA.

Robert W. Westermann, M.D.a,* Kurt P. Spindler, M.D.c Laura J. Huston, M.S.d

DOI: <https://doi.org/10.1016/j.arthro.2018.10.138>

Purpose

To evaluate differences in repair and nonoperatively managed grade III medial collateral ligament (MCL) injuries during anterior cruciate ligament (ACL) reconstruction.

Methods

Patients enrolled in a multicenter prospective longitudinal group who underwent unilateral primary ACL reconstruction between 2002 and 2008 were evaluated. Patients with concomitant grade III MCL injuries treated either operatively or nonoperatively were identified. Concurrent injuries, subsequent surgeries, surgical chronicity, and MCL tear location were analyzed. Patient-reported outcomes were measured at time of ACL reconstruction and 2-year follow-up.

Results

Initially, 3,028 patients were identified to have undergone primary ACL reconstruction during the time frame; 2,586 patients completed 2-year follow-up (85%). Grade III MCL tears were documented in 1.1% (27 of 2,586): 16 operatively managed patients and 11 nonoperatively treated MCLs during ACL reconstruction. The baseline Knee Injury and Osteoarthritis Outcome Score (KOOS) and International Knee Documentation Committee scores were lower in patients who underwent operative MCL treatment. Reoperation rates for arthrofibrosis were 19% after repair and 9% after conservative management ($P = .48$). At 2 years, both groups significantly improved; however, the nonoperative MCL group maintained superior patient-reported outcomes in terms of minimal clinically important differences, but these differences did not reach statistical significance (KOOS sports/recreation [88.2 vs 74.4, $P = .10$], KOOS knee-related quality of life [81.3 vs 68.4, $P = .13$], and International Knee Documentation Committee [87.6 vs 76.0, $P = .14$]). Tibial-sided MCL injuries were associated with clinically inferior baseline scores compared with femoral-sided MCL (KOOS knee-related quality of life, 34.4 vs 18.5, $P = .09$), but these differences resolved by 2 years. Surgical chronicity did not influence 2-year outcome.

Conclusions

Both operative and nonoperative management of MCL tears in our patient group demonstrated clinical improvements between study enrollment and 2-year follow-up. MCL surgery during ACL reconstruction was assigned to patients with worse symptoms at enrollment and was associated with worse outcomes at 2 years. A subset of patients with severe combined ACL and medial knee injuries may benefit from operative management; however, that population has yet to be defined.

45 C. MANUAL THERAPY THORACIC**One time thoracic manipulation helps neck pain****Immediate and Short Term Effects of Thoracic Spine Manipulation in Patients With Cervical Radiculopathy: A Randomized Controlled Trial**

- AUTHORS Ian A. Young, PT, DSc, OCS, SCS^{1,2}, Federico Pozzi, PT, PhD³, James Dunning, DPT, FAAOMPT^{2,4}, Richard Linkonis, PT, DPT⁵, Lori A. Michener, PT, PhD, ATC³

Study Design Multicenter randomized controlled trial.

Background Thoracic spine thrust manipulation has been shown to improve patient-rated outcomes for individuals with neck pain. However, there is limited evidence for effectiveness in patients with cervical radiculopathy (CRAD).

Objectives To compare the immediate and short-term effects of thoracic manipulation to those of a sham thoracic manipulation in patients with CRAD.

Methods Participants with CRAD were randomized to receive manipulation (N=22) or sham manipulation (N=21) of the thoracic spine. Outcomes were measured at baseline and immediately and 48-72 hours after manipulation. Repeated measures ANOVA analyzed the numeric pain rating scale (NPRS) for neck and upper extremity pain, neck disability index (NDI), cervical range of motion (ROM), and deep neck flexor endurance test. Post-hoc independent t-test assessed difference between groups at the two-follow ups. Mean changes, between group differences over time with 95% confidence intervals, and associated effect sizes were calculated. Chi-square test analyzed the score on the global rating of change scale (GROC) for neck and upper extremity pain, centralization of symptoms, and beliefs about receiving the active manipulation treatment.

Results

Neck and upper extremity pain, cervical ROM, NDI, and deep neck flexor endurance all showed significant 2-way interactions for group and time ($P < .01$). At both follow-up time points, the manipulation group had lower neck pain ($P < .01$), better cervical range of motion ($P < .01$), lower NDI score ($P < .01$), and better deep neck flexor endurance ($P = .02$) compared to sham manipulation group. The manipulation group had moderate to large effect size changes over time. No between group differences for upper extremity pain were found at immediate ($P = .34$) and 48-72hrs ($P = .18$) follow-ups. Following treatment at 48-72hrs, a greater proportion of participants in the manipulation group reported improvement ($GROC \geq 4$) in neck and upper extremity symptoms ($P < .01$); centralization of symptoms ($P < .01$); and belief that they received an active manipulation ($P = .01$), compared to the sham manipulation group.

Conclusion

One session of thoracic manipulation may result in improvements in pain disability, CROM and deep neck flexor endurance in patients with CRAD. Patients treated with manipulation are more likely to report at least moderate change in their neck and upper extremity symptoms up to 48-72 hours following treatment.

Level of Evidence

Therapy, Level 2. *J Orthop Sports Phys Ther*, Epub 25 Apr 2019. doi:10.2519/jospt.2019.8150

63. PHARMACOLOGY

Acetaminophen safety

J Am Geriatr Soc. 2019 Mar 26. doi: 10.1111/jgs.15861.

Acetaminophen Safety: Risk of Mortality and Cardiovascular Events in Nursing Home Residents, a Prospective Study.

Girard P¹, Sourdet S^{1,2}, Cantet C^{1,2}, de Souto Barreto P^{1,2}, Rolland Y^{1,2}.

BACKGROUND:

Acetaminophen is the most widely used analgesic today. A recent systematic review found increased adverse events and mortality at therapeutic dosage. Our aim was to challenge these results in a large sample of older adults living in nursing homes (NHs).

DESIGN:

Prospective study using data from the Impact of Educational and Professional Supportive Interventions on Nursing Home Quality Indicators project (IQUARE), a multicenter, individually tailored, nonrandomized controlled trial in NHs across southwestern France.

SETTING/PARTICIPANTS:

We studied data from 5429 participants living in 175 NHs (average age, 86.1 ± 8.1 years; 73.9% women).

MEASUREMENTS:

All prescriptions obtained at baseline were analyzed by a pharmacist for acetaminophen use as stand-alone or associated. Myocardial infarction (MI) and strokes were reported from participants' medical records at 18-month follow-up. Dates of death were obtained. Data collection was done through an online questionnaire at baseline and at 18 months by NH staff. Analyses were realized in our total population and a population matched on propensity score of acetaminophen intake. Six models were run for each outcome.

RESULTS:

A total of 2239 participants were taking, on average, 2352 ± 993 mg of acetaminophen daily. Results for mortality were: hazard ratio (HR) = 0.97 (95% confidence interval [CI] = 0.86-1.10). No associations between acetaminophen intake and the risk of mortality or MI were found. In one of our models, acetaminophen intake was associated with a significant increased risk of stroke in diabetic subjects (OR = 3.19; 95% CI = 1.25-8.18; P = .0157). [Correction added March 16, 2019, after first publication online. In the previous sentence, "HR" was mistakenly used instead of "OR".]

CONCLUSION: Despite old age, polypharmacy, and polymorbidity, acetaminophen was found safe for most, but not all, of our NH study population. Pain management in NHs is a health priority, and acetaminophen remains a good therapeutic choice as a first-line analgesic. More studies are needed on older diabetic patients.