

## 2. LBP

### Biopsychosocial model and LBP

#### **A Path Analysis of the Effects of Biopsychosocial Factors on the Onset of Nonspecific Low Back Pain in Office Workers**

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DOI: <https://doi.org/10.1016/j.jmpt.2017.10.012>

#### **Objective**

The purpose of this study was to develop a conceptual model for the association between various biopsychosocial factors and nonspecific low back pain (LBP) in a sample of office workers.

#### **Methods**

A 1-year prospective cohort study of 669 healthy office workers was conducted. At baseline, a self-administered questionnaire and standardized physical examination were employed to gather biopsychosocial data. Follow-up data were collected every month for the incidence of LBP. A regression model was built to analyze factors predicting the onset of LBP. Path analysis was performed to examine direct and indirect associations between identified risk factors and LBP.

#### **Results**

The onset of LBP was predicted by history of LBP, frequency of rest breaks, and psychological demand, measured by the Job Content Questionnaire. All 3 factors directly related to LBP; history of LBP was the strongest effector on the onset of LBP. History of LBP and frequency of rest breaks had indirect effects on LBP that were mediated through psychological demand, and frequency of rest breaks was the most influential effector on psychological demand.

#### **Conclusions**

Three risk factors were identified to predict onset LBP, including history of LBP, frequency of rest breaks, and psychological demand. Each factor had direct effects on the development of LBP. Also, history of LBP and frequency of rest breaks had indirect effects on LBP that were mediated through psychological demand.

## LBP and knee pain

**Interaction between low back pain and knee pain contributes to disability level in individuals with knee osteoarthritis: A cross-sectional study**

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DOI: <https://doi.org/10.1016/j.joca.2018.06.012>

**Objective**

To test the hypothesis that the interaction between low back pain (LBP) and knee pain intensity contributes to the disability level of individuals with knee osteoarthritis (OA).

**Design**

Community-dwelling participants with knee OA (Kellgren/Lawrence [K/L] grade  $\geq 1$ ) were enrolled. LBP and its severity were identified using questionnaires. Knee pain severity and disability level were evaluated using the Japanese Knee Osteoarthritis Measure subscale. Multiple linear regression analyses were performed to examine the effect of the LBP–knee pain interaction, an independent variable, on disability, a dependent variable.

**Results**

A total of 260 participants (age, 48–88 years; 77.7% women) were included. Of them, 151 (58.1%) had LBP. The LBP–knee pain interaction was significantly associated with disability after the adjustment for covariates. A post-hoc subgroup analysis revealed that the relationship between knee pain intensity and disability level was higher in individuals with LBP (beta: 0.621 points; 95% confidence interval [CI]: 0.511 to 0.731 points) than in those without LBP (beta: 0.402 points; 95% CI: 0.316 to 0.487 points).

**Conclusions**

LBP interacts with knee pain intensity and contributes to disability level in individuals with knee OA. Coexisting LBP and knee pain had a stronger impact on disability level than LBP or knee pain alone. These findings highlight the potential deteriorative effects of the LBP–knee interaction on disability. Maximal treatment effects for disability might be achieved when LBP and knee pain are targeted simultaneously, rather than separately.

## 5. SURGERY

### Osteophytes change biomechanics of the LS

#### The Spine Journal

#### The biomechanical influence of anterior vertebral body osteophytes on the lumbar spine: a finite element study

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<https://doi.org/10.1016/j.spinee.2018.07.001>Get rights and content

#### Abstract

#### Background Context

Anterior vertebral body osteophytes are common with degeneration but their biomechanical influence on the whole lumbar spine remains unclear.

#### Purpose

To investigate the biomechanical influence of anterior vertebral body osteophytes on the whole lumbar spine.

#### Study Design/Setting

This is a study using finite element analysis.

#### Outcome Measures

Intersegmental rotation, maximum Mises stress and intradiscal pressure on the intervertebral discs of different lumbar levels were calculated.

#### Methods

A finite element model of an intact lumbar spine was constructed and validated against *in vitro* studies. The modified models, which had different degrees of anterior vertebral body osteophyte formation in combination with disc space narrowing, were applied with physiological loadings.

#### Results

The lumbar levels with various degrees of osteophyte formation altered the kinematics of these levels, which also affected the whole lumbar spine. In flexion and lateral bending, the segment that was one level inferior to the vertebra with osteophyte formation showed a trend towards increased range of motion. On the intervertebral discs that were one level inferior to the osteophyte formation level, a trend towards increase in the maximum von Mises stress was found on the annulus.

#### Conclusions

Segments adjacent to levels with anterior vertebral body osteophytes showed increased intersegmental rotation and maximum stress. Further clinical observation should be performed to verify the results *in vivo*.

## 7. PELVIC ORGANS/WOMAN'S HEALTH

### Complications of following c Section

Arch Gynecol Obstet. 2018 Aug;298(2):273-277. doi: 10.1007/s00404-018-4801-x. Epub 2018 May 24.

#### **Complicated primary cesarean delivery increases the risk for uterine rupture at subsequent trial of labor after cesarean.**

Salman L<sup>1,2</sup>, Hirsch L<sup>2,3</sup>, Shmueli A<sup>1,2</sup>, Krispin E<sup>1,2</sup>, Wiznitzer A<sup>1,2</sup>, Gabbay-Benziv R<sup>4,5</sup>.

#### *PURPOSE:*

To evaluate whether cesarean delivery (CD) indication, labor status, and other primary CD characteristics affect the risk for uterine rupture in subsequent deliveries.

#### *METHODS:*

A case-control study of women attempting trial of labor after cesarean (TOLAC) in a single, tertiary, university-affiliated medical center (2007-2016). Deliveries complicated by uterine rupture were matched to successful vaginal birth after cesarean (VBAC) deliveries in a 1:3 ratio. Indication, labor status and post-partum complications (postpartum hemorrhage and postpartum infection) at primary CD were compared between study and control group.

#### *RESULTS:*

During study period, there were 75,682 deliveries, of them, 3937 (5.2%) were TOLAC. Study group included 53 cases of uterine rupture at TOLAC and 159 women with successful VBAC. Women in study group had significantly lower rates of previous VBAC (15.1 vs. 28.9%,  $p = 0.047$ ). Rate of postpartum complications at primary CD was significantly higher in women with TOLAC complicated by uterine rupture (7.5 vs. 1.9%, respectively,  $p = 0.042$ ). Utilizing the multivariate logistic regression analysis, postpartum complications remained an independent risk factor for uterine rupture in the following TOLAC (aOR 4.07, 95% CI 1.14-14.58,  $p = 0.031$ ).

#### *CONCLUSION:*

Postpartum hemorrhage and infection, in primary CD, seem to be associated with increased risk for uterine rupture during subsequent TOLAC.

**Pelvic floor dysfunction in Fibromyalgia**

Neurourol Urodyn. 2018 Jul 4. doi: 10.1002/nau.23723.

**Pelvic floor dysfunction in women with fibromyalgia and control subjects: Prevalence and impact on overall symptomatology and psychosocial function.**

Carrillo-Izquierdo MD<sup>1</sup>, Slim M<sup>2</sup>, Hidalgo-Tallon J<sup>3</sup>, Calandre EP<sup>4</sup>.

*AIMS:*

To evaluate the prevalence, distress, and impact of pelvic floor dysfunction (PFD) symptomatology in women with fibromyalgia and control women. We also aimed to evaluate the impact of PFD symptomatology on several psychosocial measures such as mood, sleep, pain, and quality of life.

*METHODS:*

We conducted a cross-sectional study in women with fibromyalgia and control women from the general population. Using a structured survey, we collected sociodemographic and clinical data, assessed the prevalence of PFD and evaluated the distress (PFDI-20) and the impact (PFIQ-7) caused by its symptomatology. Using Spanish-validated questionnaires, we also evaluated mood and sleep disturbances, bodily pain, and quality of life in subjects with and without PFD. In participants with fibromyalgia, we assessed the severity and impact of the disease using the Fibromyalgia Impact Questionnaire (FIQR).

*RESULTS:*

Two hundred and twenty-six patients with fibromyalgia and 222 control women completed the surveys. Two hundred and twenty patients (93%) and 140 controls (63%) reported PFD-related symptoms. Both the scores of distress ( $143.1 \pm 5.7$  vs  $96.1 \pm 4.8$ ,  $P < 0.0001$ ) and impact ( $122.4 \pm 5.6$  vs  $100.6 \pm 6.4$ ,  $P < 0.0001$ ) caused by PFD symptoms were significantly higher in women with fibromyalgia than in controls. There was a significant positive relationship between fibromyalgia severity and both PFDI-20 ( $r^2 = 0.32$ ,  $P < 0.0001$ ) and PFIQ-7 scores ( $r^2 = 0.375$ ,  $P < 0.0001$ ). Depression severity, sleep disturbances, bodily pain, and low quality of life were highest in women with fibromyalgia and PFD and lowest in control women without PFD.

*CONCLUSIONS:*

PFD-related symptoms were significantly more frequent in women with fibromyalgia than in controls. PFD symptomatology, when present, negatively influenced mood, sleep quality, and quality of life of both patients with fibromyalgia and controls.

## 8. VISCERA

### Dysphagia

J Clin Gastroenterol. 2018 Aug;52(7):607-613. doi: 10.1097/MCG.0000000000000903.

#### **Role of Esophageal Motility, Acid Reflux, and of Acid Suppression in Nonobstructive Dysphagia.**

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##### *GOALS:*

The present study was aimed at evaluating, in dysphagic patients, the role of high-resolution manometry (HRM) findings, presence of gastroesophageal reflux disease (GERD), and proton-pump inhibitor (PPI) therapy on dysphagia perception.

##### *BACKGROUND:*

A relevant proportion of patients with nonobstructive dysphagia present normal esophageal HRM findings. Patients with GERD often complain of dysphagia and factors, such as hypersensitivity, might be involved in its occurrence.

##### *STUDY:*

In total, 37 nonerosive reflux disease (NERD) patients with only dysphagia (group 1) and 52 patients with both dysphagia and typical GERD symptoms (group 2) were evaluated with symptom scores, HRM combined with impedance and 24 hours impedance-pH monitoring. In total, 44 NERD patients, not presenting dysphagia, underwent the same protocol. A total of 22/37 group 1 patients [11 with pathologic acid exposure time (AET)] were treated with esomeprazole 40 mg o.i.d for 4 weeks and were reassessed during the last week of therapy.

##### *RESULTS:*

A total of 15/37 group 1 patients (40%), 27/52 group 2 patients (52%), and 19/44 (43%) NERD patients presented pathologic AET [P=not significant (NS)]. Group 1 patients with a pathologic AET showed a significantly lower mean distal contractile integral (DCI) and a significant correlation ( $\rho=-0.71$ ) between individual DCI and total bolus transit time values. During PPI therapy, in group 1 patients with pathologic AET, the mean dysphagia score value decreased significantly [7.5 (range, 3 to 9) before, 4 (range, 2 to 6) during PPI;  $P<0.01$ ] and mean DCI value increased significantly.

##### *CONCLUSIONS:*

In total, 40% of dysphagic patients show a pathologic AET and reduced peristaltic vigor. In these patients, an adequate PPI therapy significantly decreases dysphagia frequency and severity and improves the esophageal peristaltic force.

**Appendix removal and increased chance of developing Lupus**

Clin Rheumatol. 2018 Jul 3. doi: 10.1007/s10067-018-4192-1

**Women who had appendectomy have increased risk of systemic lupus erythematosus: a nationwide cohort study.**

Chung WS<sup>1,2,3</sup>, Lin CL<sup>4,5</sup>, Hsu CY<sup>6</sup>.

The appendix is involved in immune function, and an appendectomy may alter the immune system.

Studies evaluating the relationship between previous appendectomy and the risk of systemic lupus erythematosus (SLE) are lacking. This nationwide cohort study investigated the incidence and risk of SLE in patients who underwent appendectomy. Patients aged > 20 years who received appendectomy from 2000 to 2011 were identified from the National Health Insurance Research Database and assigned to the appendectomy cohort. Patients without appendectomy were randomly selected from the NHIRD and assigned to the control cohort; they were frequency matched to each study patient at a 4:1 ratio by sex, age, and index year.

All patients were followed until SLE diagnosis, withdrawal from the National Health Insurance program, or the end of 2011. We used Cox models to estimate the hazard ratio (HR) and 95% confidence interval (CI) to compare the risk of SLE between the appendectomy and control cohorts. From 23.74 million people in the cohort, 80,582 patients undergoing appendectomy and 323,850 patients without appendectomy were followed for 723,438 and 2,931,737 person-years, respectively. The appendectomy cohort had a 2.04-fold higher risk of SLE than the control cohort (adjusted HR = 2.04, 95% CI = 1.52-2.76).

Women aged  $\leq 49$  years who underwent appendectomy had a 2.27-fold higher risk of SLE than the corresponding controls (adjusted HR = 2.27, 95% CI = 1.62-3.19). Women aged  $\leq 49$  years who underwent appendectomy have a significantly higher risk of SLE.

**12 A. WHIPLASH****Recovery process****Exploring patients' experiences of the whiplash injury-recovery process – a meta-synthesis****Authors** Söderlund A, Nordgren L, Sterling M, Stålnacke BM**Published** 29 June 2018 Volume 2018:11 Pages 1263—1271**DOI** <https://doi.org/10.2147/JPR.S158807>**Purpose:** The aim of this study was to conduct a meta-synthesis to analyze qualitative research findings and thereby understand patients' experiences of whiplash-associated disorders (WAD) and the injury-recovery process.**Materials and methods:** A qualitative meta-synthesis, which is an interpretive integration of existing qualitative findings, was performed. The databases PubMed, PsychINFO, Scopus, and Web of Science were searched. The Critical Assessment Skills Programme was used to assess the quality of the included studies.**Results:** Four studies were included. The synthesis resulted in several codes, 6 categories, and 3 themes (distancing from normalcy, self-efficacy in controlling the life situation after the injury, and readjustment and acceptance) that described the participants' pain beliefs, their WAD-related life situation and their future expectations and acceptance. Changes in self-image were difficult to cope with and likely led to perceived stigmatization. Struggling with feelings of loss of control appeared to lead to low confidence and insecurity. Focusing on increasing knowledge and understanding the pain and its consequences were believed to lead to better strategies for handling the situation. Furthermore, recapturing life roles, including returning to work, was challenging, but an optimistic outlook reinforced symptom improvements and contributed to feelings of happiness.**Conclusion:** The results of the present study provide a comprehensive understanding of patients' complex, multifaceted experiences of WAD, and the injury-recovery process. The findings can guide us in the development of new ways to evaluate and manage WAD. The results also indicate that a more patient-centered approach is needed to determine the depth and breadth of each patient's problems.

**12 B. CERVICAL SURGERIES****Males experience more complications with fusions**

Spine (Phila Pa 1976). 2018 Aug 1;43(15):1025-1030. doi: 10.1097/BRS.0000000000002512.

**Sex Differences for Anterior Cervical Fusion: Complications and Length of Stay.**

Basques BA<sup>1</sup>, Hijji FY, Khechen B, Haws BE, Mayo BC, Massel DH, Louie PK, Cardinal KL, Guntin JA, Singh K.

**STUDY DESIGN:**

Retrospective cohort.

**OBJECTIVE:**

To assess differences in baseline characteristics between sexes of patients undergoing anterior cervical discectomy and fusion (ACDF) and risk factors for adverse outcomes according to sex.

**SUMMARY OF BACKGROUND DATA:**

ACDF is a common treatment for cervical spine disease. To reduce the rate of complications, risk factors associated with adverse events have been identified. However, few studies have examined the risk for inferior outcomes or complications after ACDF by sex.

**METHODS:**

The American College of Surgeons National Surgical Quality Improvement Program (ACS-NSQIP) database was used to identify patients who underwent ACDF from 2005 through 2014. Data collected included demographics, comorbidities, operative characteristics, and postoperative adverse events. Demographic and comorbidity variables were compared between men and women using chi-squared analysis. Perioperative outcomes were compared between groups using multivariate linear regression or Poisson regression with robust error variance controlling for preoperative characteristics.

**RESULTS:**

In the 20,383 patients who met inclusion criteria, the male cohort was slightly older, less likely to be normal weight or morbidly obese, and had a higher incidence of diabetes and hypertension ( $P < 0.001$  for each). Male sex was associated with a greater risk of any adverse event (relative risk = 1.2;  $P = 0.043$ ), as well as any severe adverse event (relative risk = 1.4;  $P = 0.001$ ). Moreover, male sex exhibited longer operative times compared to the female group (127 vs. 117 min;  $\beta = 10$ ;  $P < 0.001$ ).

**CONCLUSION:**

The results of the current study suggest male sex is associated with an increased risk of adverse events following ACDF. Male sex has previously been demonstrated to correlate with medical comorbidities, which may be partly responsible for the increased morbidity. Because of the contrasting evidence throughout the literature, further studies are required to better elucidate this effect.

**13 B. TMJ/ORAL****Periodontitis and breast CA**

J Clin Periodontol. 2018 Jul 5. doi: 10.1111/jcpe.12982.

**Periodontal disease and susceptibility to breast cancer: a meta-analysis of observational studies.**

Shi T<sup>1</sup>, Min M<sup>1</sup>, Sun C<sup>2</sup>, Zhang Y<sup>1</sup>, Liang M<sup>1</sup>, Sun Y<sup>1,3</sup>.

**OBJECTIVE:**

While some individual studies have suggested an association between periodontal disease and breast cancer, there has not been a formal meta-analysis that collates the existing evidence supporting the hypothesis that periodontal disease leads to a higher risk of developing breast cancer. Accordingly, this meta-analysis was conducted.

**METHODS:**

Relevant studies published until April 2018 were retrieved and were screened according to established inclusion criteria. Risk ratios (RRs) with 95% confidence intervals (CIs) were calculated to assess the association between periodontal disease and the risk of breast cancer and fixed effect models were used according to the results of the heterogeneity test.

**RESULTS:**

Eight studies, involving 168,111 individuals, were identified as having explored the association between periodontal disease and breast cancer. Summary estimates in view of adjusted data showed that periodontal disease did increase susceptibility to breast cancer (RR = 1.19, 95%CI: 1.11 - 1.26,  $I^2 = 17.6\%$ ), with robust results confirmed by sensitivity analysis.

**CONCLUSION:**

Our results provided evidence of a modest positive association between periodontal disease and breast cancer. Implementation of practical measures to prevent and treat periodontal disease is of great public health significance. Moreover, additional studies are recommended to explore this topic in more detail. This article is protected by copyright. All rights reserved.

**Periodontitis and peripheral vascular disease**

BMC Cardiovasc Disord. 2018 Jul 6;18(1):141. doi: 10.1186/s12872-018-0879-0.

**Association between periodontitis and peripheral artery disease: a systematic review and meta-analysis.**

Yang S<sup>1</sup>, Zhao LS<sup>1</sup>, Cai C<sup>1</sup>, Shi Q<sup>1</sup>, Wen N<sup>2</sup>, Xu J<sup>3</sup>.

**BACKGROUND:**

Inflammation is a common feature of both peripheral arterial disease (PAD) and periodontitis. Some studies have evaluated the association between PAD and periodontitis. However, there is still no specialized meta-analysis that has quantitatively assessed the strength of the association. Thus, we conducted this meta-analysis to critically assess the strength of the association between PAD and periodontitis.

**METHODS:**

PubMed, Embase, and the Cochrane Library were searched for observational studies of the association between periodontitis and PAD in February 2018. Risk ratios (RRs) and their 95% confidence intervals (CIs) from included studies were pooled to evaluate the strength of the association between periodontitis and PAD. Weighted mean differences (WMDs) and their 95% CIs were pooled to compare the difference in periodontal-related parameters between PAD and non-PAD patients.

**RESULTS:**

Seven studies including a total of 4307 participants were included in the meta-analysis. The pooled analysis showed that there was a significant difference in the risk of periodontitis between PAD patients and non-PAD participants (RR = 1.70, 95% CI = 1.25-2.29, P = 0.01). There was also a significant difference in number of missing teeth between PAD patients and non-PAD participants (WMD = 3.75, 95% CI = 1.31-6.19, P = 0.003). No significant difference was found in clinical attachment loss between PAD patients and non-PAD participants (WMD = - 0.05, 95% CI = - 0.03-0.19, P = 0.686).

**CONCLUSION:**

In conclusion, the results of this meta-analysis revealed a significant relationship between periodontitis and PAD. Moreover, our study indicated that PAD patients had more missing teeth than control subjects did. Further high-quality and well-designed studies with specific inclusion and exclusion criteria are required to strengthen the conclusions of this study.

**13 C. AIRWAYS/SWALLOWING/SPEECH****SA and BP**

Blood Press Monit. 2018 Aug;23(4):175-184. doi: 10.1097/MBP.0000000000000324.

**Beneficial response of blood pressure to short-term continuous positive airway pressure in Chinese patients with obstructive sleep apnea-hypopnea syndrome.**

Wang X<sup>1</sup>, Qiu J<sup>2</sup>, Wang Y<sup>1</sup>, Cai Z<sup>1</sup>, Lu X<sup>1</sup>, Li T<sup>1</sup>.

*BACKGROUND:*

Obstructive sleep apnea-hypopnea syndrome (OSAHS) is common in people with hypertension and cardiac rhythm disorder. The objectives of this study were to determine the effect of short-term continuous positive airway pressure (CPAP) on blood pressure (BP) and cardiac rhythm in Chinese patients with moderate to severe OSAHS.

*PATIENTS AND METHODS:*

Eligible patients in the two hospitals were consecutively enrolled into the prospective study. Ambulatory BP monitoring and Holter monitoring were both performed for 24 h in 214 patients who previously encountered a full night polysomnography. Ambulatory BP was measured again in the follow-up of 59 patients with OSAHS who underwent home CPAP for 30 days, whereas Holter was repeated within 2-3 days after institution of CPAP therapy in 15 patients with OSAHS.

*RESULTS:*

Fifty-one patients with OSAHS with hypertension who used CPAP for at least 4 h/night received 30 days of CPAP treatment. Added CPAP on usual antihypertension treatment showed that systolic BP, diastolic BP, and mean arterial BP were significantly reduced at night (5.08, 3.05, and 3.73 mmHg, respectively), in the morning (6.31, 4.83, and 5.32 mmHg, respectively), and during the whole a day (3.09, 2.60, and 2.76 mmHg, respectively). There were no significant changes in daytime BP values but did reduce daytime BP by 2.09, 2.37, and 2.28 mmHg, respectively. In addition, CPAP therapy resulted in abolition of most sinus pauses and atrioventricular block in the 15 patients with OSAHS having coexisting pathologically rhythm disturbances, whereas the effect on other types of arrhythmia was not effective enough.

*CONCLUSION:*

Short-term CPAP reduced BP modestly in patients with OSAHS with hypertension, especially in the morning and at night-time.

**Melatonin helps sleep**

PLoS Med. 2018 Jun 18;15(6):e1002587. doi: 10.1371/journal.pmed.1002587. eCollection 2018 Jun.

**Efficacy of melatonin with behavioural sleep-wake scheduling for delayed sleep-wake phase disorder: A double-blind, randomised clinical trial.**

Sletten TL<sup>1,2</sup>, Magee M<sup>1,2</sup>, Murray JM<sup>1,2</sup>, Gordon CJ<sup>2,3,4</sup>, Lovato N<sup>2,5</sup>, Kennaway DJ<sup>6</sup>, Gwini SM<sup>7,8</sup>, Bartlett DJ<sup>3</sup>, Lockley SW<sup>1,2,9</sup>, Lack LC<sup>5</sup>, Grunstein RR<sup>2,3,10</sup>, Rajaratnam SMW<sup>1,2,9</sup>; Delayed Sleep on Melatonin (DeSoM) Study Group.t

**BACKGROUND:** Delayed Sleep-Wake Phase Disorder (DSWPD) is characterised by sleep initiation insomnia when attempting sleep at conventional times and difficulty waking at the required time for daytime commitments. Although there are published therapeutic guidelines for the administration of melatonin for DSWPD, to our knowledge, randomised controlled trials are lacking. This trial tested the efficacy of 0.5 mg melatonin, combined with behavioural sleep-wake scheduling, for improving sleep initiation in clinically diagnosed DSWPD patients with a delayed endogenous melatonin rhythm relative to patient-desired (or -required) bedtime (DBT). **METHODS:** This randomised, placebo-controlled, double-blind clinical trial was conducted in an Australian outpatient DSWPD population. Following 1-wk baseline, clinically diagnosed DSWPD patients with delayed melatonin rhythm relative to DBT (salivary dim light melatonin onset [DLMO] after or within 30 min before DBT) were randomised to 4-wk treatment with 0.5 mg fast-release melatonin or placebo 1 h before DBT for at least 5 consecutive nights per week. All patients received behavioural sleep-wake scheduling, consisting of bedtime scheduled at DBT. The primary outcome was actigraphic sleep onset time. Secondary outcomes were sleep efficiency in the first third of time in bed (SE T1) on treatment nights, subjective sleep-related daytime impairment (Patient Reported Outcomes Measurement Information System [PROMIS]), PROMIS sleep disturbance, measures of daytime sleepiness, clinician-rated change in illness severity, and DLMO time.

**FINDINGS:**

Between September 13, 2012 and September 1, 2014, 307 participants were registered; 116 were randomised to treatment (intention-to-treat n = 116; n = 62 males; mean age, 29.0 y). Relative to baseline and compared to placebo, sleep onset occurred 34 min earlier (95% confidence interval [CI] -60 to -8) in the melatonin group. SE T1 increased; PROMIS sleep-related impairment, PROMIS sleep disturbance, insomnia severity, and functional disability decreased; and a greater proportion of patients showed more than minimal clinician-rated improvement following melatonin treatment (52.8%) compared to placebo (24.0%) (P < 0.05). The groups did not differ in the number of nights treatment was taken per protocol. Post-treatment DLMO assessed in a subset of patients (n = 43) was not significantly different between groups. Adverse events included light-headedness, daytime sleepiness, and decreased libido, although rates were similar between treatment groups. The clinical benefits or safety of melatonin with long-term treatment were not assessed, and it remains unknown whether the same treatment regime would benefit patients experiencing DSWPD sleep symptomology without a delay in the endogenous melatonin rhythm.

**CONCLUSIONS:**

In this study, melatonin treatment 1 h prior to DBT combined with behavioural sleep-wake scheduling was efficacious for improving objective and subjective measures of sleep disturbances and sleep-related impairments in DSWPD patients with delayed circadian phase relative to DBT. Improvements were achieved largely through the sleep-promoting effects of melatonin, combined with behavioural sleep-wake scheduling.

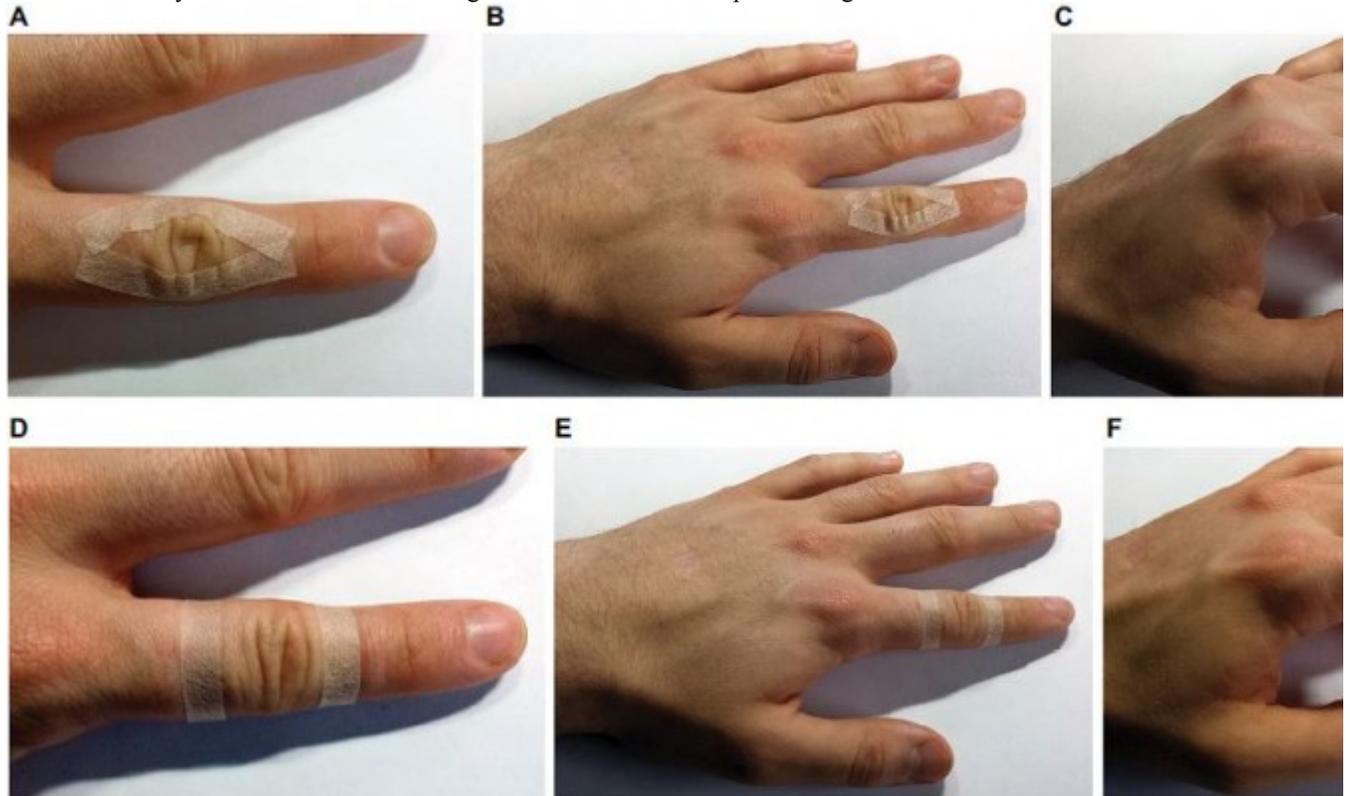
## 25. WRIST AND HAND

## Kinesio taping helps OA of the fingers

**Kinesiology taping reduces the pain of finger osteoarthritis: a pilot single-blinded two-group parallel randomized trial**

**Authors** Wade RG, Paxman CB, Tucker NC, Southern S

**Published** 3 July 2018 Volume 2018:11 Pages 1281— 1288 **DOI** <https://doi.org/10.2147/JPR.S153071>



**Objectives:** Osteoarthritis (OA) is the most common arthropathy of the hand, and current treatments carry risks of adverse events. Supportive (kinesiology) tape may be analgesic and provide functional improvement, with a low risk of adverse outcomes. We experimented with supportive tape for OA of the proximal interphalangeal joint (PIPJ) of the finger in this pilot randomized trial.

**Methods:** This two-group parallel randomized trial recruited adults with OA of the PIPJ of the finger. We excluded patients lacking capacity or the ability to safely apply the tape. Participants were randomized to receive kinesiology tape on the dorsum of the finger, blind to grouping. Pain was the primary outcome, which was recorded on a visual analog scale (VAS). Secondary outcomes were hand function and adverse reactions. Bootstrapped between-group analyses are reported.

**Results:** Ten patients were included and randomized and provided complete data. There was no significant difference in pain between the groups (mean difference of 0.4 VAS units [95% confidence interval {CI} – 1.6, 0.7],  $p=0.4$ ). Overall, the application of kinesiology tape reduced reported pain by 6% (mean reduction of 0.6 VAS units [95% CI 0, 1.2],  $p=0.04$ ). Taping did not affect hand function or digital range of motion. There were difficulties in recruiting individuals owing to the lack of dedicated research staff.

**Conclusion:** Kinesiology taping may reduce the pain of OA in the finger; however, whether this is a true effect, placebo effect, Hawthorne phenomenon, or due to a statistical error (ie, type 1 error due to underpowering) is unclear. Hence, further trials are required.

## TFCC repair

Arch Orthop Trauma Surg. 2018 Jul 4. doi: 10.1007/s00402-018-2995-9.

**Prognostic factors for the outcome of arthroscopic capsular repair of peripheral triangular fibrocartilage complex tears.**

Roh YH<sup>1</sup>, Yun YH<sup>2</sup>, Kim DJ<sup>2</sup>, Nam M<sup>2</sup>, Gong HS<sup>3</sup>, Baek GH<sup>3</sup>.

*BACKGROUND:*

Little information is available about prognostic factors of arthroscopic capsular repair for peripheral triangular fibrocartilage complex (TFCC) lesions. The purpose of this study was to analyze factors that affect the treatment outcomes of arthroscopic capsular repair for peripheral TFCC tears.

*METHODS:*

This study retrospectively enrolled 60 patients who were treated with arthroscopic outside-in capsular repair for peripheral TFCC tears. Functional survey, including pain numeric rating scale (NRS) on an ulnar provocation test, distal radio-ulnar joint (DRUJ) stress test, Disability of the Arm, Shoulder, and Hand (DASH) score, and satisfaction with treatment, was conducted at 12-month follow-up. Patients who were enthusiastic or satisfied comprised the satisfied group, and those who were noncommittal or disappointed the dissatisfied group. Demographic, clinical, and arthroscopic findings were compared between the satisfied and dissatisfied groups.

*RESULTS:*

The mean pain NRS and DASH scores exhibited significant clinical improvement at the 12-month follow-up. Out of the total participants, 46 were satisfied and 14 were dissatisfied about the treatment, with significantly more female subjects in the dissatisfied group than in the satisfied one. The patients in the satisfied group had a shorter duration of symptoms, were more likely to have trauma history, and exhibited positive DRUJ stress test results compared to the dissatisfied group. There were no significant group differences in age, hand dominance, work level, and the extent of ulnar plus variance. Multivariable analysis revealed that female gender, a longer duration of symptoms, or negative DRUJ stress test results were associated with an increased disability after arthroscopic TFCC repair.

*CONCLUSION:*

Female gender, a longer duration of symptom, and a negative DRUJ stress test are associated with a higher likelihood of treatment failure after arthroscopic outside-in capsular repair of peripheral TFCC tears.

**32 A. KNEE/ACL****Sooner surgery better results**

Knee Surgery, Sports Traumatology, Arthroscopy  
pp 1–7|

**Anterior cruciate ligament reconstruction performed within 12 months of the index injury is associated with a lower rate of medial meniscus tears**

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**Purpose**

To verify the correlation of time to surgery with the prevalence of concomitant intra-articular injuries detected on arthroscopy during anterior cruciate ligament (ACL) reconstruction.

**Methods**

The medical records of 653 patients who underwent ACL reconstruction surgery were retrospectively analyzed. Univariate and multivariate logistic regression analysis was performed to identify factors that were associated with the presence of at least one intra-articular injury, medial meniscus tears, lateral meniscus tears and chondral injuries at the time of surgery. Further univariate analysis was conducted to determine the earliest time-point for surgery, after which the rate of concomitant injuries was significantly higher.

**Results**

Longer time to surgery (OR 1.019 95% CI 1.010, 1.028,  $p = 0.000$ ), male sex (OR 1.695 95% CI 1.074, 2.675  $p = 0.023$ ), and higher BMI (OR 1.050 95% CI 1.006, 1.097  $p = 0.025$ ) were correlated with a higher prevalence of medial meniscus tears. There was an increased prevalence of medial meniscus tears when surgery was carried out more than 12 months after the index injury (OR 2.274 95% CI 1.469, 3.522,  $p = 0.000$ ). The correlation between longer time to surgery and chondral injuries approached statistical significance (OR 1.006 95% CI 0.999, 1.012,  $p = 0.073$ ). However, a longer time to surgery was not associated with an increased prevalence of lateral meniscus tears (OR 1.003 95% CI 0.998, 1.009,  $p = \text{n.s.}$ ).

**Conclusions**

Longer time to surgery is associated with an increased prevalence of medial meniscus tears in ACL reconstruction. Surgery performed within 12 months of the index injury reduces the prevalence of medial meniscus tears. Prioritizing males and overweight patients for counselling and early intervention can be considered.

### 33. MENISCUS

Pre determined dysfunctions can lead to easier tear

#### **Does discoid lateral meniscus have inborn peripheral rim instability? Comparison between intact discoid lateral meniscus and normal lateral meniscus.**

Kim JH, et al. Arch Orthop Trauma Surg. 2018.

Authors

Kim JH<sup>1</sup>, Bin SI<sup>2</sup>, Lee BS<sup>3</sup>, Kim JM<sup>3</sup>, Kim NK<sup>4</sup>, Lee CR<sup>5</sup>.

**INTRODUCTION:** Little is known about peripheral rim instability (PRI) of adult discoid lateral meniscus (DLM). We compared PRI of the intact DLM (iDLM) to those of intact normal lateral meniscus (LM) in adult patients and also investigated whether there was any association between PRI and DLM tears.

**MATERIALS AND METHODS:** We investigated PRI in 17 DLMs and 60 normal LMs without tears during arthroscopic surgery for medial compartmental pathologies between June 2012 and October 2015. We also investigate PRI of torn DLM (tDLM) excluding peripheral tear to compare the PRI between intact and torn DLM. Stability parameters were measured using a probing hook and arthroscopic ruler at the anterior, middle, and posterior parts of the peripheral rim of the menisci: translating the anterior horn (AH) and mid-body (MB) and lifting the posterior horn (PH).

**RESULTS:** AH and PH instabilities were greater in the iDLM group than in the iLM group ( $2.2 \pm 1.4$  vs.  $0.9 \pm 1.4$  mm,  $p = 0.006$  and  $3.4 \pm 1.7$  vs.  $1.7 \pm 1.2$  mm,  $p = 0.004$ , respectively). However, there was no significant difference in MB instability between two groups. In addition, no significant difference was observed in all the parameters between the iDLM and tDLM groups.

**CONCLUSION:** Both iDLM and tDLM had greater PRI of the AH and PH than the iLM in adult patients. Thus, the DLM is prone to tear and careful inspection is needed not to overlook PRI of a DLM even if the peripheral attachment is intact.

**LEVEL OF EVIDENCE:** Level 3, comparative study of anatomical instability of living subjects.

**45 A. MANUAL THERAPY LUMBAR & GENERAL****Impact of manipulation****Journal of Manipulative and Physiological Therapeutics****Motor Neuron Excitability Attenuation as a Sequel to Lumbosacral Manipulation in Subacute Low Back Pain Patients and Asymptomatic Adults: A Cross-Sectional H-Reflex Study**Jeanmarie R. Burke PhD<sup>b</sup> Paul Dougherty DC<sup>b</sup><https://doi.org/10.1016/j.jmpt.2017.10.015>**Objective**

The purpose of the study was to compare a time series of tibial nerve H-reflex trials between patients with subacute low back pain (LBP) and asymptomatic adults using pre and post high-velocity, low-amplitude (HVLA) spinal manipulation (SM) and control procedures.

**Methods**

Asymptomatic adults ( $n = 66$ ) and patients with subacute LBP ( $n = 45$ ) were randomized into 3 lumbosacral procedures: side-posture positioning, joint preloading with no thrust, and HVLA SM. A time series of 40  $H_{\max}/M_{\max}$  ratios at a rate of 0.1 Hz were recorded in blocks of 10 trials at baseline and after the lumbosacral procedures at time points corresponding to immediately after, 5 minutes after, and 10 minutes after the procedure. Descriptive time series analysis techniques included time plots, outlier detection, and autocorrelation functions. A mixed analysis of variance model (group  $\times$  procedure  $\times$  time) was used to compare the effects of lumbosacral procedures on  $H_{\max}/M_{\max}$  ratios between the patients with subacute LBP and asymptomatic participants.

**Results**

The time series analysis and the significant lumbosacral  $\times$  time interaction term ( $P < .05$ ) indicated that inhibition of the  $H_{\max}/M_{\max}$  ratios at the 10-second postlumbosacral procedure time point was greatest after the HVLA SM procedure. The effects of lumbosacral procedures on  $H_{\max}/M_{\max}$  ratios were similar between patients with subacute LBP and asymptomatic participants.

**Conclusions**

Although nonspecific effects of movement or position artifacts on the  $H_{\max}/M_{\max}$  ratio were present, a reliable and valid attenuation of the  $H_{\max}/M_{\max}$  ratio occurred as a specific aspect of HVLA SM in both asymptomatic adults and patients with subacute LBP.

**48 B. TRIGGER POINTS NEEDLING/ACUPUNCTURE****Chronic pain and acupuncture**

J Pain. 2018 May;19(5):455-474. doi: 10.1016/j.jpain.2017.11.005. Epub 2017 Dec 2.

**Acupuncture for Chronic Pain: Update of an Individual Patient Data Meta-Analysis.**

Vickers AJ<sup>1</sup>, Vertosick EA<sup>2</sup>, Lewith G<sup>3</sup>, MacPherson H<sup>4</sup>, Foster NE<sup>5</sup>, Sherman KJ<sup>6</sup>, Irnich D<sup>7</sup>, Witt CM<sup>8</sup>, Linde K<sup>9</sup>; Acupuncture Trialists' Collaboration.

Despite wide use in clinical practice, acupuncture remains a controversial treatment for chronic pain. Our objective was to update an individual patient data meta-analysis to determine the effect size of acupuncture for 4 chronic pain conditions. We searched MEDLINE and the Cochrane Central Registry of Controlled Trials randomized trials published up until December 31, 2015. We included randomized trials of acupuncture needling versus either sham acupuncture or no acupuncture control for nonspecific musculoskeletal pain, osteoarthritis, chronic headache, or shoulder pain. Trials were only included if allocation concealment was unambiguously determined to be adequate. Raw data were obtained from study authors and entered into an individual patient data meta-analysis. The main outcome measures were pain and function. An additional 13 trials were identified, with data received for a total of 20,827 patients from 39 trials. Acupuncture was superior to sham as well as no acupuncture control for each pain condition (all  $P < .001$ ) with differences between groups close to .5 SDs compared with no acupuncture control and close to .2 SDs compared with sham. We also found clear evidence that the effects of acupuncture persist over time with only a small decrease, approximately 15%, in treatment effect at 1 year. In secondary analyses, we found no obvious association between trial outcome and characteristics of acupuncture treatment, but effect sizes of acupuncture were associated with the type of control group, with smaller effects sizes for sham controlled trials that used a penetrating needle for sham, and for trials that had high intensity of intervention in the control arm. We conclude that acupuncture is effective for the treatment of chronic pain, with treatment effects persisting over time. Although factors in addition to the specific effects of needling at correct acupuncture point locations are important contributors to the treatment effect, decreases in pain after acupuncture cannot be explained solely in terms of placebo effects. Variations in the effect size of acupuncture in different trials are driven predominantly by differences in treatments received by the control group rather than by differences in the characteristics of acupuncture treatment.

*PERSPECTIVE:*

Acupuncture is effective for the treatment of chronic musculoskeletal, headache, and osteoarthritis pain. Treatment effects of acupuncture persist over time and cannot be explained solely in terms of placebo effects. Referral for a course of acupuncture treatment is a reasonable option for a patient with chronic pain.

### 54. POSTURE

#### analysis of lordosis

##### Journal Summaries in Orthopedics

##### **Lumbar lordosis does not correlate with pelvic incidence in the cases with the lordosis apex located at L3 or above**

European Spine Journal — Tono O, et al. | July 13, 2018

Authors tested the presumption that the relationship between PI and L1–S1 lumbar lordosis (LL) is always positive, even in cases with different lumbar sagittal profiles.

They stratified the subjects into three groups: the upper group with an apex between L1 and L3 (UppA, n=19), the middle group with an apex from L3/4 to L4/5 (MidA, n=67), and the lower group with an apex at L5 or below (LowA, n=14). Contrary to the hypothesis, in the cases with apex above L3, association between PI and LL was not significant.

This suggested to take into account the whole sagittal alignment as the relationship between PI and LL is not always constant. Findings suggested a positive significant association of LL and PI in the MidA and LowA groups, but not in the UppA group.

## 56. ATHLETICS

## Factors of adductor tear

Arthroscopy: The Journal of Arthroscopic & Related Surgery

**Radiographic Risk Factors and Signs of Abductor Tears in the Hip**

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<https://doi.org/10.1016/j.arthro.2018.03.039> Get rights and content

**Purpose** The purpose of this study is to identify radiographic risk factors (RRFs) and radiographic signs of abductor tendon tears.

**Methods** Between April 2008 and October 2015, patients with intraoperative diagnosis of partial- or full-thickness abductor tear noted at the time of open or endoscopic treatment were included in this study. Exclusion criteria included lack of preoperative standard supine pelvic radiograph, lack of preoperative magnetic resonance imaging (MRI), or abductor tear not present at the time of operative intervention. Patients were matched by age  $\pm 5$  years, gender, and body mass index  $\pm 5$  with patients with no abductor pathology by clinical exam and MRI. A standardized supine anterior-posterior pelvis radiograph was performed on all patients. The radiographs were evaluated for RRF (pelvic width, body weight moment arm, abductor moment arm, abductor angle, pelvic height) and signs of abductor tendon pathology (greater trochanteric enthesophyte). Femoral version was measured on MRI when images were available. Statistical analysis was performed and included bivariate and multivariate analyses.

**Results**

There were 152 patients with abductor tears identified at the time of surgery out of 2,838 eligible patients matched with 125 patients without abductor tendon pathology. The study institution was unable to perform a 1:1 match because of the advanced age of the abductor tendon group, which led to a greater age in the abductor group ( $n = 58$ ) versus the control group ( $n = 54$ ;  $P = .01$ ). In abductor group the average age was 58, and 137 of 152 (90%) patients were female; in the control group the average age was 54, with 111 of 125 (89%) patients being female. Abductor tear patients were treated with surgical repair. The RRFs found with bivariate analysis were an increased pelvic width (14.8 cm for abductor tears vs 14.3 cm for control;  $P < .001$ ), body weight moment arm (11.1 cm vs 10.9 cm;  $P < .001$ ), and abductor moment arm (7.8 cm vs 7.6 cm;  $P < .001$ ); decreased femoral anteversion (7.6° vs 10.6°;  $P = .045$ ); and enthesophyte presence (41% vs 3%;  $P < .001$ ). Multivariate regression analysis of all variables showed that teardrop distance and enthesophyte presence were the 2 variables most predictive of abductor tears, and other variables did not significantly increase or decrease the likelihood of tear when these 2 variables were considered. The presence of an enthesophyte on the greater trochanter was notable for an odds ratio of 20.7 of having an abductor tear.

**Conclusions**

Patients with abductor tears have a wider pelvis, longer abductor moment arm, and longer body weight moment arm and have greater trochanteric enthesophyte as noted on nearly half of patients with an abductor tear. Presence of an enthesophyte was noted to have an odds ratio of 20.7 and a positive predictive value of 94% for having an abductor tendon tear. The 2 variables predictive of abductor tendon tear when controlling for all variables were enthesophyte presence and teardrop distance, with no other variables significantly increasing or decreasing the likelihood of tear when these 2 variables were considered.

**61. FIBROMYALGIA****Physical activity**

Clin Rheumatol. 2018 May 12. doi: 10.1007/s10067-018-4139-6.

**Differences in daily objective physical activity and sedentary time between women with self-reported fibromyalgia and controls: results from the Canadian health measures survey.**

Bernard P<sup>1,2,3</sup>, Hains-Monfette G<sup>4,5</sup>, Atoui S<sup>4,5</sup>, Kingsbury C<sup>4,5</sup>.

Physical activity and sedentary behaviors are important modifiable factors that influence health and quality of life in women with fibromyalgia. The purpose of this study was to compare objectively assessed physical activity and sedentary time in women self-reporting fibromyalgia with a control group. Data were drawn from the Canadian Health Measures Survey cycles 1, 2, and 3 conducted by Statistics Canada. We included women aged 18 to 79 years with complete accelerometer data. We performed one-way analyses of covariance (adjusted-for socio-demographic and health factors) to determine mean differences in physical activity and sedentary variables (minutes per day of moderate and vigorous physical activity, light physical activity, sedentary and daily steps) between women with and without fibromyalgia. In total, 4132 participants were included. A cross-sectional weighted analysis indicated that 3.1% of participants self-reported a diagnosis of fibromyalgia. Participants with fibromyalgia spent less time than controls engaged in moderate and vigorous physical activity ( $M = 19.2$  min/day ( $SE = 0.7$ ) versus  $M = 9.1$  min/day ( $SE = 1.2$ ),  $p = 0.03$ ,  $\eta^2 = 0.01$ ). No significant differences were found for daily time spent in light physical activity, sedentary activities, and number of steps. Women participants with self-reported fibromyalgia spent significantly less time in moderate and vigorous physical activity than control. Physical activity promotion interventions for women with self-reported fibromyalgia should, as a priority, target physical activities with moderate to vigorous intensity.

**Learning changes**

*Pain*. 2018 Jul;159(7):1268-1276. doi: 10.1097/j.pain.0000000000001207.

**Reduced selective learning in patients with fibromyalgia vs healthy controls.**

Meulders A<sup>1,2,3</sup>, Boddez Y<sup>2,4,5</sup>, Blanco F<sup>6</sup>, Van Den Houte M<sup>1,2</sup>, Vlaeyen JWS<sup>1,2,3</sup>.

Impaired selective fear learning has been advanced as a core mechanism involved in excessive spreading of protective responses such as pain-related fear and avoidance leading to disability in chronic pain conditions.

Using the litmus test for selective learning effects, the blocking procedure, we tested the hypothesis that patients with fibromyalgia (FM) show less selective threat learning than healthy controls (HCs). We introduce a novel selective learning task based around a clinical diary scenario. On a trial-by-trial basis, participants rated whether they expected certain situations (A, B, Z, and X) in the diary of a fictive FM patient would trigger pain in that patient. The procedure did not involve any experimental pain induction because the verbal outcomes "pain" or "no pain" were used. During the elemental acquisition phase, one situation was followed by "pain" (A+, eg, "Kim slept badly, and reports pain"), whereas another situation was followed by "no pain" (Z-, eg, "Kim was stressed, and reports no pain"). During the compound acquisition phase, another situation (X), referred to as the blocked stimulus, was presented in compound with a previously pain-eliciting situation and also paired with "pain" (AX+, eg, Kim slept badly" and "Kim has vacuumed," and reports pain). Simultaneously, a novel situation was introduced and also followed by "pain" (B+).

Within-group comparisons showed blocking (ie, significant difference between B and X) in the HCs, but not in the patients with FM. This study is the first in directly assessing differences in selective learning between patients with FM and HCs using a blocking procedure.

**62 A. NUTRITION/VITAMINS****Glucosamine and Chondroitin**

Journal of Orthopaedic Surgery and Research

December 2018, 13:170|

**Effectiveness and safety of glucosamine and chondroitin for the treatment of osteoarthritis: a meta-analysis of randomized controlled trials**

- Xiaoyue Zhu Dandong Wu Jiesheng Rong Liying JiangObjective

To assess the symptomatic effectiveness and safety of oral symptomatic slow-acting drugs (SYSADOAs) on the treatment of knee and/or hip osteoarthritis, such as chondroitin, glucosamine, and combination treatment with chondroitin plus glucosamine.

**Methods**

We searched electronic database including PubMed, Embase, Cochrane Library, and the reference lists of relevant articles published from inception to May 22, 2018. An updated meta-analysis was performed to assess the effectiveness of these slow-acting drugs for osteoarthritis.

**Results**

Twenty-six articles describing 30 trials met our inclusion criteria and were included in the meta-analysis. The estimates between chondroitin and placebo showed that chondroitin could alleviate pain symptoms and improve function. Compared with placebo, glucosamine proved significant effect only on stiffness improvement. However, the combination therapy did not have enough evidence to be superior to placebo. Additionally, there was no significant difference in the incidence of AEs and discontinuations of AEs when compared with placebo.

**Conclusions**

Given the effectiveness of these symptomatic slow-acting drugs, oral chondroitin is more effective than placebo on relieving pain and improving physical function. Glucosamine showed effect on stiffness outcome. Regarding on the limited number of combination therapy, further studies need to investigate the accurate effectiveness. This information accompanied with the tolerability and economic costs of included treatments would be conducive to making decisions for clinicians.

**63. PHARMACOLOGY****Low dose NSAID decreases chances of GI CA**

Epidemiology Research

**Maintenance use of non-steroidal anti-inflammatory drugs and risk of gastrointestinal cancer in a nationwide population-based cohort study in Sweden**

1. Nele Brusselaers<sup>1,2</sup>, Jesper Lagergren<sup>3,4</sup>

Abstract

**Objectives** Aspirin and other non-steroidal anti-inflammatory drugs (NSAIDs) are potential candidates for chemoprevention of gastrointestinal cancer. We aimed to assess the association between contemporary NSAID use ( $\geq 180$  days) and gastrointestinal cancer.

**Design** Nationwide Swedish population-based cohort study (2005–2012).

**Setting** Sweden

**Participants** All adults exposed to maintenance NSAIDs use (aspirin,  $n=783\ 870$ ; unselective NSAIDs,  $n=566\ 209$ , selective cyclo-oxygenase (COX)-2 inhibitors,  $n=17\ 948$ ) compared with the Swedish background population of the same age, sex and calendar period.

**Outcome measures** The risk of different gastrointestinal cancer types expressed as standardised incidence ratios (SIR) and 95% CIs, taking into account concurrent proton pump inhibitors (PPIs) and statins usage.

**Results** The SIR for gastrointestinal cancer for aspirin use was 1.02 (95% CI 1.00 to 1.04), with clearly reduced risk for long-term users (SIR=0.31, 95% CI 0.30 to 0.33 for 5.5–7.7 years), but an increased risk for short-term users (SIR=2.77, 95% CI 2.69 to 2.85), and stronger protective effect for low-dose aspirin (SIR=0.86, 95% CI 0.85 to 0.88). Users of non-selective NSAIDs showed an overall decreased risk of gastrointestinal cancer (SIR=0.79, 95% CI 0.77 to 0.82), in particular for cancer of the stomach, colorectum and oesophagus, and the SIRs were further decreased among long-term users. Users of selective COX-2 inhibitors showed a SIR=0.89 (95% CI 0.73 to 1.09) for gastrointestinal cancers. Both aspirin and unselective NSAIDs users who also were using PPIs, had higher risks for all gastrointestinal cancer types; and lower risk if using statins.

**Conclusion** Long-term use of (low-dose) aspirin and non-selective NSAIDs was associated with a decreased risk of all gastrointestinal cancer types.