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## 2. LBP

### Treatment of hips helps LBP

J Eval Clin Pract. 2017 Jan 27. doi: 10.1111/jep.12705.

#### **Effects of manual therapy and exercise targeting the hips in patients with low-back pain-A randomized controlled trial.**

Bade M<sup>1</sup>, Cobo-Estevez M<sup>2</sup>, Neeley D<sup>3</sup>, Pandya J<sup>4</sup>, Gunderson T<sup>5</sup>, Cook C<sup>6</sup>.

#### *RATIONALE:*

The benefits of providing manual therapy and exercise targeting the hips in individuals with mechanical low-back pain (LBP) are not well established.

#### *OBJECTIVES:*

The objective in this study is to determine whether a formal prescriptive treatment protocol for the hips improves outcomes in patients with a primary complaint of mechanical LBP.

#### *METHODS:*

Eighty-four (84) subjects (50 males, 46.1 ± 16.2 years) were randomized to 1 of 2 groups: pragmatic treatment of the lumbar spine only (LBP) (n = 39) or pragmatic treatment of the lumbar spine and prescriptive treatment of bilateral hips (LBP + HIP) (n = 45). Pragmatic treatment of the lumbar spine was based upon published clinical guidelines. Prescriptive treatment of the hips involved the use of 3 hip exercises targeting the gluteal musculature and 3 mobilization techniques targeting the hips. Subjects were assessed at baseline, 2 weeks, and at discharge with the following measures: Modified Oswestry Disability Index, Numeric Pain Rating Scale, a global rating of change (GRoC) score, the patient acceptable symptom state (PASS), and patient satisfaction.

#### *RESULTS:*

At 2 weeks, significant differences between groups differences were found in GRoC and patient satisfaction ( $P < .05$ ) favoring the LBP + HIP group. At discharge, there were significant differences on the Modified Oswestry Disability Index, numeric pain rating scale, GRoC, and patient satisfaction favoring the LBP + HIP group ( $P < .05$ ). Effect sizes were small to medium.

#### *CONCLUSION:*

Our findings suggest that a prescriptive treatment of the hips may be of clinical value to individuals presenting with the primary complaint of mechanical LBP.



**Radiology to LBP**

Int J Rheum Dis. 2017 Feb 16. doi: 10.1111/1756-185X.13026.

**Chronic low back pain and its association with lumbar vertebrae and intervertebral disc changes in adults. A case control study.**

Karunanayake AL<sup>1</sup>, Pathmeswaran A<sup>2</sup>, Wijayaratne LS<sup>3</sup>.

*AIM:*

This study was done to determine the association between chronic low back pain and vertebral fractures, intervertebral disc space (IDS) narrowing, vertebral osteophytes and spondylolisthesis among adults.

*METHOD:*

This case control study was done in Sri Lanka. Cases were patients with low back pain and controls were without low back pain. Postero-anterior and lateral radiographs of lumbar sacral spine of both groups were studied. To detect vertebral fractures in fourth and fifth lumbar vertebrae, anterior and posterior heights of vertebrae were measured using a Vernier caliper and antero-posterior ratio (A/P) was calculated. Having an A/P ratio value of  $< 0.89$  was considered as a vertebral fracture. Presence of disc space narrowing, vertebral osteophytes and spondylolisthesis was assessed by two radiologists working independently. Bivariate and logistic regression analysis was done to find associations.

*RESULTS:*

There were 140 cases and 140 controls. Mean (SD) age for cases was 51.6 (17) years. Mean (SD) age for controls was 50 (15) years. Females made up 62% of cases and controls. Fifth lumbar vertebral fracture (odds ratio [OR] = 10.2;  $P = 0.001$ ), fourth lumbar vertebral fracture (OR = 2.5;  $P = 0.017$ ) and IDS narrowing (OR = 4.15,  $P = 0.009$ ) had a significant association with low back pain and vertebral osteophytes and spondylolisthesis did not have a significant association with low back pain.

*CONCLUSION:*

Only vertebral fractures and IDS narrowing had a significant association with chronic low back pain.

## LBP rx

Ann Intern Med. 2017 Feb 14. doi: 10.7326/M16-2459.

**Nonpharmacologic Therapies for Low Back Pain: A Systematic Review for an American College of Physicians Clinical Practice Guideline.**

Chou R<sup>1</sup>, Deyo R<sup>1</sup>, Friedly J<sup>1</sup>, Skelly A<sup>1</sup>, Hashimoto R<sup>1</sup>, Weimer M<sup>1</sup>, Fu R<sup>1</sup>, Dana T<sup>1</sup>, Kraegel P<sup>1</sup>, Griffin J<sup>1</sup>, Grusing S<sup>1</sup>, Brodt ED<sup>1</sup>.

*BACKGROUND:*

A 2007 American College of Physicians guideline addressed nonpharmacologic treatment options for low back pain. New evidence is now available.

*PURPOSE:*

To systematically review the current evidence on nonpharmacologic therapies for acute or chronic nonradicular or radicular low back pain.

*DATA SOURCES:*

Ovid MEDLINE (January 2008 through February 2016), Cochrane Central Register of Controlled Trials, Cochrane Database of Systematic Reviews, and reference lists.

*STUDY SELECTION:*

Randomized trials of 9 nonpharmacologic options versus sham treatment, wait list, or usual care, or of 1 nonpharmacologic option versus another.

*DATA EXTRACTION:*

One investigator abstracted data, and a second checked abstractions for accuracy; 2 investigators independently assessed study quality.

*DATA SYNTHESIS:*

The number of trials evaluating nonpharmacologic therapies ranged from 2 (tai chi) to 121 (exercise). New evidence indicates that tai chi (strength of evidence [SOE], low) and mindfulness-based stress reduction (SOE, moderate) are effective for chronic low back pain and strengthens previous findings regarding the effectiveness of yoga (SOE, moderate). Evidence continues to support the effectiveness of exercise, psychological therapies, multidisciplinary rehabilitation, spinal manipulation, massage, and acupuncture for chronic low back pain (SOE, low to moderate). Limited evidence shows that acupuncture is modestly effective for acute low back pain (SOE, low). The magnitude of pain benefits was small to moderate and generally short term; effects on function generally were smaller than effects on pain.

*LIMITATION:*

Qualitatively synthesized new trials with prior meta-analyses, restricted to English-language studies; heterogeneity in treatment techniques; and inability to exclude placebo effects.

*CONCLUSION:*

Several nonpharmacologic therapies for primarily chronic low back pain are associated with small to moderate, usually short-term effects on pain; findings include new evidence on mind-body interventions.

**PT helps**

Spine (Phila Pa 1976). 2017 Feb;42(3):E169-E176. doi: 10.1097/BRS.0000000000001734.

**Individualized Physical Therapy Is Cost-Effective Compared With Guideline-Based Advice for People With Low Back Disorders.**

Hahne AJ<sup>1</sup>, Ford JJ, Surkitt LD, Richards MC, Chan AY, Slater SL, Taylor NF.

*STUDY DESIGN:*

A cost-utility analysis within a randomized controlled trial was conducted from the health care perspective.

*OBJECTIVE:*

The aim of this study was to determine whether individualized physical therapy incorporating advice is cost-effective relative to guideline-based advice alone for people with low back pain and/or referred leg pain ( $\geq 6$  weeks,  $\leq 6$  months duration of symptoms).

*SUMMARY OF BACKGROUND DATA:*

Low back disorders are a burdensome and costly condition across the world. Cost-effective treatments are needed to address the global burden attributable to this condition.

*METHODS:*

Three hundred participants were randomly allocated to receive either two sessions of guideline-based advice alone ( $n = 144$ ), or 10 sessions of individualized physical therapy targeting pathoanatomical, psychosocial and neurophysiological factors, and incorporating advice ( $n = 156$ ). Data relating to health care costs, health benefits (EuroQol-5D) and work absence were obtained from participants via questionnaires at 5, 10, 26, and 52-week follow-ups.

*RESULTS:*

Total health care costs were similar for both groups: mean difference \$27.03 [95% confidence interval (95% CI): -200.29 to 254.35]. Health benefits across the 12-month follow-up were significantly greater with individualized physical therapy: incremental quality-adjusted life years = 0.06 (95% CI: 0.02-0.10). The incremental cost-effectiveness ratio was \$422 per quality-adjusted life year gained. The probability that individualized physical therapy was cost-effective reached 90% at a willingness-to-pay threshold of \$36,000. A saving of \$1995.51 (95% CI: 143.98-3847.03) per worker in income was realized in the individualized physical therapy group relative to the advice group. Sensitivity and subgroup analyses all revealed a dominant position for individualized physical therapy; hence, the base case analysis was the most conservative.

*CONCLUSION:*

Ten sessions of individualized physical therapy incorporating advice is cost-effective compared with two sessions of guideline-based advice alone for people with low back disorders.

### 3. DISC

#### T2 relaxation

BMC Med Imaging. 2017 Jan 31;17(1):9. doi: 10.1186/s12880-017-0182-z.

#### **T2 relaxation time for intervertebral disc degeneration in patients with upper back pain: initial results on the clinical use of 3.0 Tesla MRI.**

Xie R<sup>1,2</sup>, Ruan L<sup>3</sup>, Chen L<sup>1</sup>, Zhou K<sup>1</sup>, Yuan J<sup>1</sup>, Ji W<sup>4</sup>, Jing G<sup>1</sup>, Huang X<sup>1</sup>, Shi Q<sup>5</sup>, Chen C<sup>6</sup>.

Author information

Abstract

#### *BACKGROUND:*

Magnetic resonance imaging (MRI) is a useful non-invasive tool for evaluating abnormalities of intervertebral discs. However, there are few studies which applied functional MRI techniques to investigate degenerative changes in cervical and cervicothoracic junction (CTJ) spine among adults. The aim of this study was to compare T2 relaxation time measurement evaluation with morphological grading for assessing cervical and CTJ intervertebral discs (IVD) in the patients suffering neck, shoulder, and upper back pain.

#### *METHODS:*

Sixty-three patients (378 IVDs) and 60 asymptomatic volunteers (360 IVDs) of the cervical and CTJ discs were assessed using a 3.0 T magnetic resonance imaging (MRI) protocol, including an sagittal T2 relaxation time protocol. The relaxation time values of the nucleus pulposus (NP) were recorded and all discs were visually graded according to Pfirman's grading system. The correlation between T2 relaxation time values and qualitative clinical grading of degeneration, patient age, sex and anatomic level were analyzed RESULTS: There is a clear trend of decreasing mean T2 values of the NP associate with increasing Pfirman grades (C2-T1) for both patients and asymptomatic volunteers. Significant T2 differences were seen among grades I-V ( $P < 0.05$ ). However, grade V was not observed in the CTJ. Linear correlation analysis revealed a strong negative association between T2 values of the NP and Pfirman grade ( $r = -0.588$ ,  $r = -0.808$ ) of C2-7 and C7T1. Age were also significantly correlated NP T2 values ( $r = -0.525$ ,  $r = -0.723$ ) for patients and volunteers. Moreover, the receiver operating characteristic analysis for average measures in a range from 0.70-0.79 (C2-7) to 0.84-0.89 (C7T1) for patients.

#### *CONCLUSIONS:*

T2 quantitation provides a more sensitive and robust approach for detecting and characterizing the early stage of IVD degeneration and age-associated disc changes.

## 5. SURGERY

### Sensory changes

Eur Spine J. 2017 Feb 6. doi: 10.1007/s00586-017-4979-9.

#### **Association between pain sensitivity in the hand and outcomes after surgery in patients with lumbar disc herniation or spinal stenosis.**

Lindbäck Y<sup>1</sup>, Tropp H<sup>2</sup>, Enthoven P<sup>3</sup>, Gerdle B<sup>4</sup>, Abbott A<sup>3,5</sup>, Öberg B<sup>3</sup>.

Author information

Abstract

#### *PURPOSE:*

To investigate the association between pain sensitivity in the hand pre-surgery, and patient-reported outcomes (PROs) in function, pain and health pre- and post-surgery in patients with disc herniation or spinal stenosis.

#### *METHODS:*

This is a prospective cohort study with 82 patients. Associations between pressure-, cold- and heat pain threshold (PPT, CPT, HPT) in the hand pre-surgery and Oswestry, VAS pain, EQ-5D, HADS, and Self-Efficacy Scale, pre- and three months post-surgery; were investigated with linear regression.

#### *RESULTS:*

Patients with disc herniation more sensitive to pressure pain pre-surgery showed lower function and self-efficacy, and higher anxiety and depression pre-surgery, and lower function, and self-efficacy, and higher pain post-surgery. Results for cold pain were similar. In patients with spinal stenosis few associations with PROs were found and none for HPT and PROs.

#### *CONCLUSIONS:*

Altered pain response in pressure- and cold pain in the hand, as a sign of widespread pain pre-surgery had associations with higher pain, lower function and self-efficacy post-surgery in patients with disc herniation.

7. PELVIC ORGANS/WOMAN'S HEALTH

Celiac disease and vaginal delivery

**Mode of delivery and risk of celiac disease: Risk of celiac disease and age at gluten introduction cohort study**

The Journal of Pediatrics, 02/13/2017

Lionetti E, et al.

The clinicians examined and concluded that in children genetically predisposed to celiac disease (CD), the mode of delivery did not influence the risk of developing CD.

Methods

- By telephone interview, the clinicians recorded information on the mode of delivery of children participating in the Risk of Celiac Disease and Age at Gluten Introduction study, a multicenter, prospective intervention trial that compared early and delayed introduction of gluten in infants with at least 1 first-degree relative affected with CD.
- The human leukocyte antigen genotype was determined at 15 months of age, and serologic screening for CD was performed at 15, 24, and 36 months of age and at 5, 8, and 10 years of age.
- Patients with positive serologic findings underwent intestinal biopsy.
- The prevalence of CD autoimmunity and overt CD at 5 years of age, according to the mode of delivery was considered as the primary outcome.

Results

- The study-group included 553 children at CD risk because of positivity for human leukocyte antigen-DQ2, -DQ8, or both.
- They obtained data on the mode of delivery from 431 of 553 children; 233 of 431 children were born by vaginal delivery (54%).
- At 5 years of age, the prevalence of CD autoimmunity or overt CD was not different between children born by cesarean or vaginal delivery (24% and 19%,  $P = .2$ ; 19% and 14%,  $P = .2$  respectively, by the log-rank test).

## Contraceptives and CA

Am J Obstet Gynecol. 2017 Feb 8. pii: S0002-9378(17)30179-5. doi: 10.1016/j.ajog.2017.02.002.

**Lifetime cancer risk and combined oral contraceptives: the Royal College of General Practitioners' Oral Contraception Study.**

Iversen L<sup>1</sup>, Sivasubramaniam S<sup>2</sup>, Lee AJ<sup>2</sup>, Fielding S<sup>2</sup>, Hannaford PC<sup>2</sup>.

Author information

Abstract

**BACKGROUND:**

Oral contraceptives have been used by hundreds of millions of women around the world. Important questions remain regarding the very long-term cancer risks associated with oral contraception. Despite previous research important questions remain about the safety of these contraceptives: i) how long do endometrial, ovarian and colorectal cancer benefits persist for? ii) does combined oral contraceptive use during the reproductive years produce new cancer risks later in life? and iii) what is the overall balance of cancer among past users as they enter the later stages of their lives?

**OBJECTIVES:**

To examine the very long-term cancer risks or benefits associated with use of combined oral contraceptives, including the estimated overall life-time balance.

**STUDY DESIGN:**

46,022 women recruited to the UK Royal College of General Practitioners' Oral Contraception Study during 1968/69 were followed-up for up to 44 years. Directly standardised rates of specific and any cancer were calculated for ever and never users of combined oral contraceptives; standardised for age, parity, social class and smoking. Attributable risk percentage and preventive fraction percentage were calculated. Poisson regression adjusting for the same variables was used to estimate incidence rate ratios (IRR) between ever and never users, and examine effects by time since last oral contraceptive use **RESULTS:** There were 4661 ever users with at least one cancer during 884,895 woman-years of observation and 2341 never users with at least one cancer during 388,505 woman-years of observation. Ever use of oral contraceptives was associated with reduced colorectal (IRR 0·81, 99% confidence interval, CI 0·66 to 0·99), endometrial (IRR 0·66, 99% CI 0·48 to 0·89), ovarian (IRR 0·67, 99% CI 0·50 to 0·89) and lymphatic and haematopoietic cancer (IRR 0·74, 99% CI 0·58 to 0·94). An increased risk of lung cancer was seen only among ever users who smoked at recruitment. An increased risk of breast and cervical cancer seen in current and recent users appeared to be lost within about five years of stopping oral contraception, with no evidence of either cancer recurring at increased risk in ever users with time. There was no evidence of new cancer risks appearing later in life among women who had used oral contraceptives. Thus, the overall balance of cancer risk among past users of oral contraceptives was neutral with the increased risks counterbalanced by the endometrial, ovarian and colorectal cancer benefits that persist at least 30 years.

**CONCLUSIONS:**

Most women who choose to use oral contraceptives do not expose themselves to long-term cancer harms; instead many benefit from important reductions in some cancers which persist for many years after stopping.

## Prostrate CA &amp; milk

Int J Cancer. 2017 Feb 10. doi: 10.1002/ijc.30642.

**Dairy intake in relation to prostate cancer survival.**

Downer MK<sup>1,2,3</sup>, Batista JL<sup>1,3</sup>, Mucci LA<sup>1,3</sup>, Stampfer MJ<sup>1,2,3</sup>, Epstein MM<sup>4</sup>, Håkansson N<sup>5</sup>, Wolk A<sup>6</sup>, Johansson JE<sup>7</sup>, Andrén O<sup>7</sup>, Fall K<sup>1,6,7</sup>, Andersson SO<sup>7</sup>.

Author information

Abstract

Dairy intake has been associated with increased risk of advanced prostate cancer.

Two US cohort studies reported increased prostate cancer-specific mortality with increased high-fat milk intake. We examined whether dairy and related nutrient intake were associated with prostate cancer progression in a Swedish patient population with high dairy consumption. We prospectively followed 525 men with newly-diagnosed prostate cancer (diagnosed 1989-1994). We identified and confirmed deaths through February 2011 (n=222 prostate cancer-specific, n=268 from other causes). Cox proportional hazards regression was used to calculate hazard ratios (HR) and 95% confidence intervals (CI) for the associations between food or nutrient intake and prostate cancer-specific death. On average, patients consumed 5.0 servings/day of total dairy products at diagnosis. In the whole population, high-fat milk intake was not associated with prostate cancer-specific death (95% CI: 0.78, 2.10; p-trend=0.32; multivariate-adjusted model). However, among patients diagnosed with localized prostate cancer, compared to men who consumed <1 servings/day of high-fat milk, those who drank  $\geq 3$  servings/day had an increased hazard of prostate cancer mortality (HR=6.10; 95% CI: 2.14, 17.37; p-trend=0.004; multivariate-adjusted model). Low-fat milk intake was associated with a borderline reduction in prostate cancer death among patients with localized prostate cancer.

These associations were not observed among patients diagnosed with advanced stage prostate cancer. Our data suggest a positive association between high-fat milk intake and prostate cancer progression among patients diagnosed with localized prostate cancer. Further studies are warranted to investigate this association and elucidate the mechanisms by which high-fat milk intake may promote prostate cancer progression. This article is protected by copyright. All rights reserved.



**8. VISCERA****Diet and GERD**

Curr Opin Gastroenterol. 2017 Mar;33(2):107-111. doi: 10.1097/MOG.0000000000000337.

**Diet and gastroesophageal reflux disease: role in pathogenesis and management.**

Sethi S<sup>1</sup>, Richter JE.

Author information

Abstract

*PURPOSE OF REVIEW:*

Gastroesophageal reflux disease (GERD) is a common disease that presents with a variety of symptoms including heartburn and acid regurgitation. Although dietary modification is currently regarded as first-line therapy for the disease, the role of diet in the pathogenesis and management of GERD is still poorly understood. The present article aims to review recent literature that examines the relationship of diet and GERD.

*RECENT FINDINGS:*

Increased awareness of medications side effects and widespread overuse has brought nonpharmacological therapies to the forefront for the management of GERD. Recent findings have established the important role of nutrition for the managements of symptoms of GERD. Increasing scientific evidence has produced objective data on the role of certain trigger foods, whereas population studies endorse decreased reflux symptoms by following certain diets. Obesity has been linked with increased symptoms of GERD as well. Furthermore, the importance of lifestyle techniques such as head of bed elevation and increased meal to sleep time may provide nonpharmacologic methods for effective symptom control in GERD.

*SUMMARY:*

We provide a comprehensive review on the association between diet and its role in the development and management of GERD

**IBS and MS association**

Neurol. 2017 Feb;264(2):254-259. doi: 10.1007/s00415-016-8340-8. Epub 2016 Nov 22.

**Multiple sclerosis and inflammatory bowel diseases: a systematic review and meta-analysis.**

Kosmidou M<sup>1</sup>, Katsanos AH<sup>2</sup>, Katsanos KH<sup>3</sup>, Kyritsis AP<sup>2,4</sup>, Tsivgoulis G<sup>5,6</sup>, Christodoulou D<sup>3</sup>, Giannopoulos S<sup>7,8</sup>.

Author information

Abstract

The association between multiple sclerosis (MS) and inflammatory bowel disease (IBD) has been suggested, apart from their common epidemiological and immunological patterns, also due to observations of increased incidence of both IBD among MS patients and MS among IBD patients.

We estimated the risk of concurrent IBD and MS comorbidity, using data from all available case-control studies. We calculated the corresponding Risk ratios (RRs) in each included case-control study to express the risk of IBD and MS concurrence at a given population. We performed additional subgroup analyses according to the type of registry from which the data of the cases were exported (IBD or MS registry) and the IBD type (Crohn's disease, CD or Ulcerative colitis, UC). We included 10 studies, comprising a total of 1,086,430 patients (0.08% of them with concurrent IBD and MS). Pooled RR for IBD/MS comorbidity was 1.54 (95% CI 1.40-1.67;  $p < 0.0001$ ) with no differences ( $p = 0.91$ ) among IBD and MS registries (RR 1.53, 95% CI 1.36-1.72,  $p < 0.001$  for MS comorbidity in IBD patients vs. RR 1.55, 95% CI 1.32-1.81,  $p < 0.001$  for IBD comorbidity in MS patients).

No difference was also found on the risk of MS comorbidity among patients with CD or UC (RR 1.52, 95% CI 1.34-1.72,  $p < 0.001$  vs. RR 1.55, 95% CI 1.38-1.74,  $p < 0.001$ ;  $p$  for subgroup differences: 0.84). In all analyses no evidence of heterogeneity or publication bias was detected. Both IBD and MS patients seem to have a fifty-percent increased risk of MS or IBD comorbidity, respectively, with no apparent differences between patients with CD or UC.

**10 A. CERVICAL SPINE****Interventions**

Disabil Rehabil. 2017 Jan 13:1-5. doi: 10.1080/09638288.2016.1276638.

**The processes underpinning reductions in disability among people with chronic neck pain. A preliminary comparison between two distinct types of physiotherapy intervention.**

Thompson DP<sup>1</sup>, Woby SR<sup>2</sup>.

Author information

Abstract

**PURPOSE:**

To establish whether different processes underpin changes in disability in people with neck pain who underwent two types of active physiotherapy intervention.

**MATERIALS AND METHODS:**

This study was a sub-analysis of a randomized controlled trial assessing whether the addition of Interactive Behavioral Modification Therapy (a cognitively informed physiotherapy treatment) to a Progressive Neck Exercise Program improved outcome in patients with chronic neck pain. Regression analyses were performed to determine the extent to which demographics, changes in pain, and changes in certain cognitive factors were related to changes in disability.

**RESULTS:**

In the progressive neck exercise group, changes in levels of pain intensity were the only factor significantly related to change in disability, explaining 33% of the variance. In the interactive behavioral modification therapy group, changes in pain intensity, and catastrophizing together explained 54% of the variance in change in disability. Only changes in catastrophizing displayed a significant  $\beta$  value in the final model.

**CONCLUSIONS:**

Different processes appear to underpin changes in disability in patients undergoing cognitively informed physiotherapy to those undergoing a primarily exercise-based approach. Implications for rehabilitation Certain cognitive factors are known to be related to levels of disability in patients with chronic neck pain Specifically targeting these factors results in more patients making a clinically meaningful reduction in disability Different processes appear to underpin reductions in disability when people with neck pain are treated with cognitively informed physiotherapy to when treated with exercise alone, which may account for why more patients improve when treated in this manner. Reductions in catastrophizing appear to be particularly important and efforts should be made to assess and treat catastrophic thoughts in people with chronic neck pain.

**12 A. WHIPLASH****Visual feedback**

J Orthop Sports Phys Ther. 2017 Feb 3:1-33. doi: 10.2519/jospt.2017.6891

**The Effect of Visual Feedback of the Neck During Movement in People With Chronic Whiplash-Associated Disorders: An Experimental Study.**

Don S<sup>1,2</sup>, De Kooning M<sup>1,2</sup>, Voogt L<sup>3,2</sup>, Ickmans K<sup>1,2,4</sup>, Daenen L<sup>1,2</sup>, Nijs J<sup>1,2,4</sup>.

Author information

Abstract

Study Design Controlled laboratory study.

**Background** Chronic whiplash-associated disorder (WAD) is an important health issue associated with poor recovery outcomes. Sensorimotor incongruence (SMI), defined as a mismatch between the efference copy in the brain and afferent sensory feedback from the body, is proposed as a possible underlying cause of chronic pain.

**Objectives** To determine whether SMI causes sensory disturbances or pain in people with chronic WAD and healthy controls.

**Methods** Study participants (30 participants with chronic WAD and 34 healthy controls) participated in a visual feedback experiment involving the neck and a bimanual coordination experiment involving the arms. In both experimental setups, SMI was induced by modifying the visual feedback during movement. Sensory disturbances and pain were the primary outcome measures. **Results** A statistically significant difference in perceived sensory disturbance between conditions was found in the WAD group ( $p < .0001$ ). Intensity scores were highest for induced SMI, but only for visual feedback of the neck and not for visual feedback of the arms. This effect was not present in the control group ( $p = .139$ ). SMI did not affect pain in either group.

**Conclusion** Persons with chronic WAD are more susceptible to sensory disturbances owing to SMI and this effect is specific for the region affected by pain. The hypothesis that SMI causes pain was not substantiated by the results of the present study.

## 13. CRANIUM/TMJ

### CBT and sleep

#### Cognitive and behavioral therapies in the treatment of insomnia: A meta-analysis

Sleep Medicine Reviews , 02/10/2017

van Straten A, et al.

The meta-analysis reveals that cognitive behavioral treatment for insomnia (CBTI) is effective in the treatment of insomnia either its components or the full package.

#### Methods

- In this study, 87 randomized controlled trials were included, comparing 118 treatments (3724 patients) to non-treated controls (2579 patients).

#### Results

- In general, the interventions effectively affected: insomnia severity index (ISI;  $g=0.98$ ), sleep efficiency (SE;  $g=0.71$ ), Pittsburgh sleep quality index (PSQI;  $g=0.65$ ), wake after sleep onset (WASO;  $g=0.63$ ) and sleep onset latency (SOL;  $g=0.57$ ), number of awakenings (NWAK;  $g = 0.29$ ) and sleep quality (SQ;  $g = 0.40$ ).
- As per this study, the smallest effect was on total sleep time (TST;  $g=0.16$ ).
- Compare to self-help interventions or face-to-face interventions with fewer sessions, Face-to-face treatments of at least 4 sessions seem to be more effective.
- Otherwise, the outcomes appear to be quite robust (similar for patients with or without comorbid disease, younger or older patients, using or not using sleep medication).

**Teachers and vocal problems****Musculoskeletal Pain and Occupational Variables in Teachers With Voice Disorders and in Those With Healthy Voices—A Pilot Study**

Jhonatan da Silva Vitor Larissa Thaís Donalson Siqueira Vanessa Veis Ribeiro Janine Santos Ramos Alcione Ghedini Brasolotto Kelly Cristina Alves Silverio  Correspondence information about the author Kelly Cristina Alves Silverio

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DOI: <http://dx.doi.org/10.1016/j.jvoice.2016.12.021>

**Purpose**

This study aimed to compare musculoskeletal pain perception in teachers with voice disorders and in those with healthy voices, and to investigate the relationship between musculoskeletal pain and occupational variables (ie, work journey per week and working period).

**Method**

Forty-three classroom teachers were divided into two groups: dysphonic group (DG), 32 classroom teachers with voice complaints and voice disorders; and non-DG, 11 classroom teachers without voice complaints and who are vocally healthy. The musculoskeletal pain investigation survey was used to investigate the frequency and intensity of the pain. Occupational variables, such as work journey per week and working period, were investigated by the Voice Production Condition—Teacher questionnaire. The statistical tests used were the Spearman correlation ( $P \leq 0.05$ ) and the Mann-Whitney  $U$  test ( $P \leq 0.05$ ).

**Results**

There was no difference between the frequency and the intensity of musculoskeletal pain regarding dysphonia. Work journey per week was positively related to the frequency and the intensity of laryngeal pain in the DG. The working period had a negative relationship to the frequency and the intensity of musculoskeletal pain in the submandibular region in the DG.

**Conclusion**

Classroom teachers with voice disorders and those with healthy voices do not have differences regarding the frequency and the intensity of musculoskeletal pain. Besides dysphonia the pain is an important symptom to be considered in classroom teachers. The occupational variables contributed to the presence of musculoskeletal pain in the region near the larynx, which appears to be directly proportional to work journey per week and inversely proportional to the working period.

**Sleep apnea and exercise**

Sleep Breath. 2017 Feb 14. doi: 10.1007/s11325-017-1477-6.

**The effect of acute aerobic exercise on hemostasis in obstructive sleep apnea.**

Martin RA<sup>1</sup>, Strosnider C<sup>1</sup>, Giersch G<sup>1</sup>, Womack CJ<sup>1</sup>, Hargens TA<sup>2</sup>.

Author information

Abstract

**PURPOSE:**

Individuals with obstructive sleep apnea (OSA) have an altered hemostatic balance; however, the exercise response is less described. The purpose of this study is to determine the hemostatic response after acute aerobic exercise in obstructive sleep apnea.

**METHODS:**

Eighteen males (nine OSA vs. nine controls) were recruited from the university and local community. Individuals with evidence of cardiovascular, pulmonary, or metabolic disease were excluded. An apnea-hypopnea index (AHI) of >5 was a criterion for OSA. Subjects performed a treadmill exercise test at 35 and 70% predicted VO<sub>2</sub> reserve during the morning hours. Pre-exercise blood samples were obtained after 15 min supine rest and within 2 min following exercise. Repeated measures ANOVA were performed for factor VIII antigen, tissue plasminogen activator (tPA) antigen, tPA activity, and PAI-1 activity. Correlational analysis compared resting and post-exercise hemostatic factors with age, BMI, and AHI.

**RESULTS:**

Mean AHI was 13.00 ± 12.6. No exercise × condition interactions were observed for hemostatic markers. There was a main effect for exercise in factor VIII, tPA antigen, and tPA activity in both groups. PAI-1 activity tended to be elevated in OSA (145%) compared to controls which remained after exercise (205%) (P = 0.05). Post-exercise FVIII/Ag correlated with BMI (r = 0.52), while resting tPA/Ag correlated with AHI (r = 0.49) and age (r = 0.50).

**CONCLUSION:**

The hemostatic response after acute aerobic exercise is unaffected in mild OSA, although PAI-1 activity seems to be elevated, reducing fibrinolytic potential. BMI seems to correlate with FVIII/Ag, while tPA/Ag is associated with AHI and age.

**14. HEADACHES****STM and neuro mob helps**

Arch Phys Med Rehabil. 2017 Feb;98(2):211-219.e2. doi: 10.1016/j.apmr.2016.08.466. Epub 2016 Sep 10.

**Effectiveness of a Treatment Involving Soft Tissue Techniques and/or Neural Mobilization Techniques in the Management of Tension-Type Headache: A Randomized Controlled Trial.**

Ferragut-Garcías A<sup>1</sup>, Plaza-Manzano G<sup>2</sup>, Rodríguez-Blanco C<sup>3</sup>, Velasco-Roldán O<sup>1</sup>, Pecos-Martín D<sup>4</sup>, Oliva-Pascual-Vaca J<sup>3</sup>, Llabrés-Bennasar B<sup>5</sup>, Oliva-Pascual-Vaca Á<sup>6</sup>.

Author information

Abstract

**OBJECTIVE:**

To evaluate the effects of a protocol involving soft tissue techniques and/or neural mobilization techniques in the management of patients with frequent episodic tension-type headache (FETTH) and those with chronic tension-type headache (CTTH).

**DESIGN:**

Randomized, double-blind, placebo-controlled before and after trial.

**SETTING:**

Rehabilitation area of the local hospital and a private physiotherapy center.

**PARTICIPANTS:**

Patients (N=97; 78 women, 19 men) diagnosed with FETTH or CTTH were randomly assigned to groups A, B, C, or D.

**INTERVENTIONS:**

(A) Placebo superficial massage; (B) soft tissue techniques; (C) neural mobilization techniques; (D) a combination of soft tissue and neural mobilization techniques.

**MAIN OUTCOMES MEASURES:**

The pressure pain threshold (PPT) in the temporal muscles (points 1 and 2) and supraorbital region (point 3), the frequency and maximal intensity of pain crisis, and the score in the Headache Impact Test-6 (HIT-6) were evaluated. All variables were assessed before the intervention, at the end of the intervention, and 15 and 30 days after the intervention.

**RESULTS:**

Groups B, C, and D had an increase in PPT and a reduction in frequency, maximal intensity, and HIT-6 values in all time points after the intervention as compared with baseline and group A (P<.001 for all cases). Group D had the highest PPT values and the lowest frequency and HIT-6 values after the intervention.

**CONCLUSIONS:**

The application of soft tissue and neural mobilization techniques to patients with FETTH or CTTH induces significant changes in PPT, the characteristics of pain crisis, and its effect on activities of daily living as compared with the application of these techniques as isolated interventions.



## Cluster vagal nerve stim.

**Effects of non-invasive vagus nerve stimulation on attack frequency over time and expanded response rates in patients with chronic cluster headache: A post hoc analysis of the randomised, controlled PREVA study**

The Journal of Headache and Pain, 02/15/2017

Gaul C, et al.

Compared to the standard of care (SoC) alone, prophylactic non-invasive vagus nerve stimulation (nVNS) led to rapid, significant, and sustained reductions in chronic cluster headache attack frequency within 2 weeks after its addition to SoC and was associated with significantly higher  $\geq 25\%$ ,  $\geq 50\%$ , and  $\geq 75\%$  response rates. With a high degree of confidence, among patients with chronic cluster headache, the rapid decrease in weekly attack frequency justifies a 4-week trial period to identify responders to nVNS. **Findings**

- A total of 97 patients with chronic cluster headache entered a 4-week randomised phase to receive nVNS + SoC (n = 48) or SoC alone (n = 49) after a 2-week baseline phase.
- In this study, all 92 patients who continued into a 4-week extension phase received nVNS + SoC.
- nVNS + SoC led to a significantly lower mean weekly attack frequency by week 2 of the randomised phase; the attack frequency remained significantly lower in the nVNS + SoC group through week 3 of the extension phase ( $P < 0.02$ ) compared with SoC alone.
- In the nVNS + SoC group, attack frequencies were significantly lower at all study time points than they were at baseline ( $P < 0.05$ ).
- With nVNS + SoC, response rates were significantly greater than with SoC alone when response was defined as attack frequency reductions of  $\geq 25\%$ ,  $\geq 50\%$ , and  $\geq 75\%$  from baseline ( $\geq 25\%$  and  $\geq 50\%$ ,  $P < 0.001$ ;  $\geq 75\%$ ,  $P = 0.009$ ).
- With nVNS + SoC, the 100% response rate was 8% and 0% with SoC alone.

**With aura brain activity changes**

J Headache Pain. 2017 Dec;18(1):8. doi: 10.1186/s10194-016-0716-8. Epub 2017 Jan 25.

**Interictal brain activity differs in migraine with and without aura: resting state fMRI study.**

Faragó P<sup>1</sup>, Tuka B<sup>1,2</sup>, Tóth E<sup>1</sup>, Szabó N<sup>1,3</sup>, Király A<sup>1</sup>, Csete G<sup>1</sup>, Szok D<sup>1</sup>, Tajti J<sup>1</sup>, Párdutz Á<sup>1</sup>, Vécsei L<sup>1,2</sup>, Kincses ZT<sup>4,5</sup>.

**Author information****Abstract****BACKGROUND:**

Migraine is one of the most severe primary headache disorders. The nature of the headache and the associated symptoms during the attack suggest underlying functional alterations in the brain. In this study, we examined amplitude, the resting state fMRI fluctuation in migraineurs with and without aura (MWA, MWOA respectively) and healthy controls.

**METHODS:**

Resting state functional MRI images and T1 high-resolution images were acquired from all participants. For data analysis we compared the groups (MWA-Control, MWA-MWOA, MWOA-Control). The resting state networks were identified by MELODIC. The mean time courses of the networks were identified for each participant for all networks. The time-courses were decomposed into five frequency bands by discrete wavelet decomposition. The amplitude of the frequency-specific activity was compared between groups. Furthermore, the preprocessed resting state images were decomposed by wavelet analysis into five specific frequency bands voxel-wise. The voxel-wise amplitudes were compared between groups by non-parametric permutation test.

**RESULTS:**

In the MWA-Control comparison the discrete wavelet decomposition found alterations in the lateral visual network. Higher activity was measured in the MWA group in the highest frequency band (0.16-0.08 Hz). In case of the MWA-MWOA comparison all networks showed higher activity in the 0.08-0.04 Hz frequency range in MWA, and the lateral visual network in in higher frequencies. In MWOA-Control comparison only the default mode network revealed decreased activity in MWOA group in the 0.08-0.04 Hz band. The voxel-wise frequency specific analysis of the amplitudes found higher amplitudes in MWA as compared to MWOA in the in fronto-parietal regions, anterior cingulate cortex and cerebellum.

**DISCUSSION:**

The amplitude of the resting state fMRI activity fluctuation is higher in MWA than in MWOA. These results are in concordance with former studies, which found cortical hyperexcitability in MWA.

**Mindfulness**

J Headache Pain. 2017 Dec;18(1):15. doi: 10.1186/s10194-017-0728-z. Epub 2017 Feb 4.

**Mindfulness and pharmacological prophylaxis after withdrawal from medication overuse in patients with Chronic Migraine: an effectiveness trial with a one-year follow-up.**

Grazzi L<sup>1</sup>, Sansone E<sup>2</sup>, Raggi A<sup>2</sup>, D'Amico D<sup>3</sup>, De Giorgio A<sup>4</sup>, Leonardi M<sup>2</sup>, De Torres L<sup>2</sup>, Salgado-García F<sup>5</sup>, Andrasik F<sup>5</sup>.

Author information

Abstract

**BACKGROUND:**

Chronic Migraine (CM) is a disabling condition, worsened when associated with Medication Overuse (MO). Mindfulness is an emerging technique, effective in different pain conditions, but it has yet to be explored for CM-MO. We report the results of a study assessing a one-year course of patients' status, with the hypothesis that the effectiveness of a mindfulness-based approach would be similar to that of conventional prophylactic treatments.

**METHODS:**

Patients with CM-MO (code 1.3 and 8.2 of the International Classification of Headache Disorders-3Beta) completed a withdrawal program in a day hospital setting. After withdrawal, patients were either treated with Prophylactic Medications (Med-Group), or participated in a Mindfulness-based Training (MT-Group). MT consisted of 6 weekly sessions of guided mindfulness, with patients invited to practice 7-10 min per day. Headache diaries, the headache impact test (HIT-6), the migraine disability assessment (MIDAS), state and trait anxiety (STAI Y1-Y2), and the Beck Depression Inventory (BDI) were administered before withdrawal and at each follow-up (3, 6, 12 after withdrawal) to patients from both groups. Outcome variables were analyzed in separate two-way mixed ANOVAs (Group: Mindfulness vs. Pharmacology x Time: Baseline, 3-, 6-, vs. 12-month follow-up).

**RESULTS:**

A total of 44 patients participated in the study, with the average age being 44.5, average headache frequency/month was 20.5, and average monthly medication intake was 18.4 pills. Data revealed a similar improvement over time in both groups for Headache Frequency (approximately 6-8 days reduction), use of Medication (approximately 7 intakes reduction), MIDAS, HIT-6 (but only for the MED-Group), and BDI; no changes on state and trait anxiety were found. Both groups revealed significant and equivalent improvement with respect to what has become a classical endpoint in this area of research, i.e. 50% or more reduction of headaches compared to baseline, and the majority of patients in each condition no longer satisfied current criteria for CM.

**CONCLUSIONS:**

Taken as a whole, our results suggest that the longitudinal course of patients in the MT-Group, that were not prescribed medical prophylaxis, was substantially similar to that of patients who were administered medical prophylaxis

## 16. CONCUSSIONS

### Exercise return

Scand J Med Sci Sports. 2017 Jan 20. doi: 10.1111/sms.12844.

#### **Do post concussion-like symptom responses change following exercise or sports participation in a non-concussed cohort?**

Balasundaram AP<sup>1,2</sup>, Athens J<sup>3</sup>, Schneiders AG<sup>4</sup>, McCrory P<sup>5</sup>, Sullivan SJ<sup>2</sup>.

Author information

Abstract

The purpose of this study were; 1) To determine the reliable change in post concussion-like symptoms reported following self-selected exercise or sports activities. 2) To explore the potential influence of gender and exercise parameters on post concussion-like symptoms reported by a non-concussed cohort following exercise/training. A pre-post observational design was used. A convenience sample of students aged 18-30 years who visited a university recreation centre to engage in their chosen exercise activity, and a purposeful sample of men's and women's rugby union players engaged in their regular training sessions. All participants reported their symptoms using the SCAT2 post-concussion symptom scale, and exercise variables such as type, duration, volume and intensity were collected pre and post-exercise. The reliable change index was used to determine the change in symptom scores reported from pre-to-post-exercise/training. Multiple linear regression analysis was used to model the exercise variables to explain the impact on the reporting of symptoms. A total of 260 participants (146 males and 114 females) completed their self-selected exercise activity or rugby union training.

Approximately two-thirds of all participants did not demonstrate a change (increase or decrease) in total symptom score (201/260, 77.9%) and/or symptom severity score (212/260, 81.9%) from pre to post-exercise/training. The symptom response following exercise or sports training did not change in the majority of participants. Clinicians need to be aware of these findings in order to make informed decisions on return-to-play following a concussive brain injury. This article is protected by copyright. All rights reserved.

**19. GLENOHUMERAL/SHOULDER****Central representation of shoulder pain**

Pain Pract. 2017 Feb;17(2):267-280. doi: 10.1111/papr.12502. Epub 2016 Oct 14.

**Central Pain Processing in Patients with Shoulder Pain: A Review of the Literature.**

Noten S<sup>1,2</sup>, Struyf F<sup>1</sup>, Lluch E<sup>2,3</sup>, D'Hoore M<sup>1</sup>, Van Looveren E<sup>1</sup>, Meeus M<sup>1,2,4</sup>.

Author information

Abstract

**BACKGROUND:**

Shoulder pain is a common health problem in which changes in shoulder structure cannot always explain the patient's perceived pain. Central sensitization (CS) might play a role in a subgroup of these patients.

**METHODS:**

The literature was systematically reviewed to address the role of CS in patients with shoulder pain. Electronic databases PubMed and Web of Knowledge were searched for relevant studies.

**RESULTS:**

Eighteen full-text articles were included, methodological quality was scored, and information was extracted. Studies were clustered on those studying patients with musculoskeletal (MSK) shoulder pain and those studying patients with hemiplegic shoulder pain (HSP). In particular, quantitative sensory testing revealed hyperalgesia for pressure pain in the MSK group, whereas these results were inconsistent in patients with HSP. Conditioned pain modulation was reduced in patients with MSK shoulder pain, but functioned normally in the HSP group.

**CONCLUSION:**

This review has shown that great progress has been made toward a better understanding of neurophysiologic pain mechanisms in patients with shoulder pain. The presence of generalized mechanical hyperalgesia, allodynia, and impaired conditioned pain modulation in patients with MSK shoulder pain indicates the involvement of the central nervous system. Widespread somatosensory abnormalities observed in patients with HSP could suggest a central origin for their shoulder pain and predispose patients with HSP to develop CS, although results are inconsistent. Additional research is required adopting different assessment methods (especially dynamic methods) to establish the role of CS in patients with shoulder pain.

**20 A. ROTATOR CUFF****Recovery**

J Shoulder Elbow Surg. 2017 Jan 25. pii: S1058-2746(16)30575-4. doi: 10.1016/j.jse.2016.11.002.

**Speed of recovery after arthroscopic rotator cuff repair.**

Kurowicki J<sup>1</sup>, Berglund DD<sup>1</sup>, Momoh E<sup>1</sup>, Disla S<sup>1</sup>, Horn B<sup>1</sup>, Giveans MR<sup>1</sup>, Levy JC<sup>2</sup>.

Author information

Abstract

**BACKGROUND:**

The purpose of this study was to delineate the time taken to achieve maximum improvement (plateau of recovery) and the degree of recovery observed at various time points (speed of recovery) for pain and function after arthroscopic rotator cuff repair.

**METHODS:**

An institutional shoulder surgery registry query identified 627 patients who underwent arthroscopic rotator cuff repair between 2006 and 2015. Measured range of motion, patient satisfaction, and patient-reported outcome measures were analyzed for preoperative, 3-month, 6-month, 1-year, and 2-year intervals. Subgroup analysis was performed on the basis of tear size by retraction grade and number of anchors used.

**RESULTS:**

As an entire group, the plateau of maximum recovery for pain, function, and motion occurred at 1 year. Satisfaction with surgery was >96% at all time points. At 3 months, 74% of improvement in pain and 45% to 58% of functional improvement were realized. However, only 22% of elevation improvement was achieved ( $P < .001$ ). At 6 months, 89% of improvement in pain, 81% to 88% of functional improvement, and 78% of elevation improvement were achieved ( $P < .001$ ). Larger tears had a slower speed of recovery for Single Assessment Numeric Evaluation scores, forward elevation, and external rotation. Smaller tears had higher motion and functional scores across all time points. Tear size did not influence pain levels.

**CONCLUSION:**

The plateau of maximum recovery after rotator cuff repair occurred at 1 year with high satisfaction rates at all time points. At 3 months, approximately 75% of pain relief and 50% of functional recovery can be expected. Larger tears have a slower speed of recovery.

**22 A. IMPINGEMENT****Stretching program helps**

J Sport Rehabil. 2017 Jan 17:1-20. doi: 10.1123/jsr.2016-0182.

**Stretching Exercises for Shoulder Impingement Syndrome: Effects of 6-Week Program on Shoulder Tightness, Pain and Disability Status.**

Turgut E<sup>1</sup>, Duzgun I<sup>1</sup>, Baltaci G<sup>2</sup>.

Author information

Abstract

**CONTEXT:**

Increasing soft tissue flexibility and joint mobility is one of the important aims of the shoulder impingement syndrome (SIS).

**OBJECTIVE:**

The aim of this study was to investigate the effects of stretching program on posterior capsule tightness, pectoralis minor tightness, pain severity and disability status in SIS.

**DESIGN:**

Single-group pre-test post-test design.

**SETTING:**

University outpatient clinic.

**PARTICIPANTS:**

Eighteen participants diagnosed with subacromial impingement syndrome ( $34.8 \pm 9.4$  years old, symptoms duration  $5.8 \pm 4.9$  months) were included.

**INTERVENTION:**

The six-week self-stretching program for pectoralis minor, posterior capsule, levator scapula and, latissimus dorsi was performed.

**MAIN OUTCOME MEASURES:**

Posterior capsule tightness, pectoralis minor tightness, pain severity (visual analog scale), and self-reported shoulder related pain and disability status (Shoulder Pain and Disability Index) were used to assess the changes flexibility and symptoms.

**RESULTS:**

Comparisons showed that there was significantly less posterior capsule and pectoralis minor tightness, less pain severity on activity and at night, and less disability score reported after six-week stretching program ( $p < 0.05$ ). There was no statistically significant difference in pain severity at rest after stretching program performed ( $p > 0.05$ ).

**CONCLUSIONS:**

The findings of the study showed that flexibility, pain severity and disability gains can be achieved with six-week stretching exercise training for participants with SIS. Therefore, shoulder girdle stretching exercises should be recommended to apply in early shoulder rehabilitation program.

**26. CARPAL TUNNEL SYNDROME****Surgery vs. PT = same results**

J Orthop Sports Phys Ther. 2017 Feb 3:1-43. doi: 10.2519/jospt.2017.7090.

**The Effectiveness of Manual Therapy versus Surgery on Self-Reported Function, Cervical Range of Motion and Pinch Grip Force in Carpal Tunnel Syndrome: A Randomized Clinical Trial.**

Fernández-de-Las-Peñas C<sup>1</sup>, Cleland J<sup>2,3</sup>, Palacios-Ceña M<sup>1</sup>, Fuensalida-Novo S<sup>1</sup>, Pareja JA<sup>4</sup>, Alonso-Blanco C<sup>1</sup>.

Author information

Abstract

**Study Design** Randomized parallel-group trial. **Background** Carpal tunnel syndrome (CTS) is a common pain condition that can be managed surgically or conservatively.

**Objective** To compare the effectiveness of manual therapy versus surgery for improving self-reported function, cervical range of motion, and pinch grip tip in women with CTS.

**Methods** In this randomized clinical trial, 100 women with CTS were randomly allocated to either a manual therapy (n=50) or a surgery (n=50) group. The primary outcome was self-rated hand function, assessed with the Boston Carpal Tunnel Questionnaire (BCTQ). Secondary outcomes included active cervical range of motion, pinch tip grip force and symptoms severity subscale of the BCTQ. Patients were assessed at baseline, and 1, 3, 6, and 12 months after the last treatment by an assessor unaware of group assignment. Analysis was by intention to treat with mixed ANCOVAs adjusted for baseline scores. **Results** At 12 months, 94 women completed the follow-up. Analyses showed statistically significant differences in favour of manual therapy at 1 month for self-reported function ( $\Delta$  -0.8, 95%CI -1.1 to -0.5) and pinch tip grip force on the symptomatic side (thumb-index finger:  $\Delta$ 2.0, 1.1 to 2.9; thumb-little finger:  $\Delta$ 1.0, 0.5 to 1.5). Improvements in self-reported function and pinch grip force were similar between both groups at 3, 6 and 12 months. Both groups reported similar improvements in symptoms severity at all follow-up periods. No significant changes were observed for pinch tip grip force on the less symptomatic side and in cervical range of motion in either group.

**Conclusion** Manual therapy and surgery had similar effectiveness for improving self-reported function, symptom severity and pinch tip grip force on the symptomatic hand in women with CTS. Neither manual therapy nor surgery resulted in changes in cervical range of motion. Level of Evidence Therapy, Level 1b. Prospectively registered September 3, 2014 on [www.clinicaltrials.gov](http://www.clinicaltrials.gov) (NCT02233660). J Orthop Sports Phys Ther, Epub 3 Feb 2017. doi:10.2519/jospt.2017.7090.



**36. KNEE/EXERCISE**

**Prevention**

**EXERCISE-BASED KNEE INJURY PREVENTION CLINICAL PRACTICE GUIDELINES**

1. Amelia Arundale Mario Bizzini irelle Giordano Joseph Godge Timothy Hewett<sup>4</sup>, David Logerstedt<sup>5</sup>, Bert Mandelbaum<sup>3</sup>, David Scalzitti<sup>6</sup>, Holly Silvers-Granelli<sup>1</sup>, Lynn Snyder-Mackler<sup>1</sup>

**Background** Knee injuries are prevalent in cutting, pivoting, and jumping sports. Studies have investigated the effects of exercise-based knee injury prevention programs, however no clinical practice guidelines (CPG) exist.

**Objective** 1) Review the evidence for exercise-based knee injury prevention programs, 2) identify if there are exercise-based knee injury prevention programs that are effective for particular groups of athletes, 3) explore the evidence for dosage and delivery of exercise-based knee injury prevention programs, 4) provide information on how exercise-based knee injury prevention should be implemented.

**Design** Systematic review for CPG development.

**Setting** Multiple.

**Patients (or Participants)** Healthy, active individuals, particularly athletes participating in cutting, pivoting, and jumping sports.

**Interventions (or Assessment of Risk Factors)** A systematic review of literature was performed via PubMed, Scopus, SportDiscus, CINAHL, and the Cochrane databases for relevant articles addressing the effects of an exercise-based knee injury prevention program. The final search was performed in April, 2016 to identify all articles published prior to that point.

**Main Outcome Measurements** The effects and outcomes of exercise-based knee injury prevention programs.

**Results** Thirty-seven studies met the inclusion criteria for this CPG. Exercise-based knee injury prevention programs have a low implementation cost and large relative risk reductions. Clinicians should implement an exercise-based knee injury prevention program for all athletes involved in cutting and pivoting type sports to reduce the number of significant knee injuries. The program should be implemented two to three times per week in the preseason and one to three times per week in the competitive season. It should consist of a combination of plyometric training, strength and power exercises, balance and dynamic stabilization training, core strengthening, technique training, and/or sports-specific drills.

**Conclusions** This CPG will provide evidence based guidance for clinicians in choosing and implementing exercise-based knee injury prevention programs appropriate for the athlete(s) they work with.

**37. OSTEOARTHRITIS/KNEE**

Ther ex

Rheumatol Int. 2017 Mar;37(3):399-407. doi: 10.1007/s00296-016-3646-5. Epub 2017 Jan 11.

**The effects of therapeutic exercises on pain, muscle strength, functional capacity, balance and hemodynamic parameters in knee osteoarthritis patients: a randomized controlled study of supervised versus home exercises.**Kuru Çolak T<sup>1</sup>, Kavlak B<sup>2</sup>, Aydoğdu O<sup>2</sup>, Şahin E<sup>2</sup>, Acar G<sup>2</sup>, Demirbüken İ<sup>2</sup>, Sarı Z<sup>2</sup>, Çolak İ<sup>3</sup>, Bulut G<sup>3</sup>, Polat MG<sup>2</sup>.

Author information

Abstract

The aim of the study was to compare the effects of low-intensity exercise programs for lower extremities, either supervised or at home, on pain, muscle strength, balance and the hemodynamic parameters of knee osteoarthritis (OA) patients. This randomized study included 78 patients with knee OA in 2 groups of supervised and home-based exercise program. Exercises were applied to the first group in the clinic as a group exercise program and were demonstrated to the second group to be performed at home. Before and after the 6-week exercise program, assessment was made of pain, quadriceps and hamstring muscle strengths, 6-min walk test (6MWT), and non-invasive hemodynamic parameters.

Results of the 78 patients, 56 completed the study. Pain, muscle strength, and 6MWT scores showed significant improvements in both groups. There were also significant differences in the amount of change in pain and muscle strength (pain:  $p = 0.041$ , Rqdc: 0.009, Lqdc: 0.013, Rhms: 0.04) which indicated greater improvements in the supervised group. The balance scores of supervised group showed a significant improvement ( $p = 0.009$ ). No significant change was determined in hemodynamic parameters of either group.

**Conclusion** according to the results of this study showed that low-intensity lower extremity exercises conducted in a clinic under the supervision of a physiotherapist were more effective than home-based exercises in reducing post-activity pain levels and improving quadriceps and right hamstring muscle strength. Both the supervised and home exercise programs were seen to be effective in reducing rest pain and increasing 6 MW distance in knee osteoarthritis patients.

**Aerobic exercise**

Clin Rehabil. 2017 Feb 1:269215517691085. doi: 10.1177/0269215517691085.

**The Ottawa panel clinical practice guidelines for the management of knee osteoarthritis. Part three: Aerobic exercise programs.**

Brosseau L<sup>1</sup>, Taki J<sup>2</sup>, Desjardins B<sup>3</sup>, Thevenot O<sup>3</sup>, Fransen M<sup>4</sup>, Wells GA<sup>5</sup>, Mizusaki Imoto A<sup>6</sup>, Toupin-April K<sup>7</sup>, Westby M<sup>8</sup>, Álvarez Gallardo IC<sup>9</sup>, Gifford W<sup>10</sup>, Laferrière L<sup>11</sup>, Rahman P<sup>12</sup>, Loew L<sup>13</sup>, De Angelis G<sup>13</sup>, Cavallo S<sup>13</sup>, Shallwani SM<sup>13</sup>, Aburub A<sup>13</sup>, Bennell KL<sup>14</sup>, Van der Esch M<sup>15</sup>, Simic M<sup>16</sup>, McConnell S<sup>17</sup>, Harmer A<sup>1</sup>, Kenny GP<sup>3</sup>, Paterson G<sup>18</sup>, Regnaud JP<sup>19</sup>, Lefevre-Colau MM<sup>20</sup>, McLean L<sup>1</sup>.

Author information

Abstract

**OBJECTIVES:**

To identify effective aerobic exercise programs and provide clinicians and patients with updated, high-quality recommendations concerning traditional land-based exercises for knee osteoarthritis.

**METHODS:**

A systematic search and adapted selection criteria included comparative controlled trials with strengthening exercise programs for patients with knee osteoarthritis. A panel of experts reached consensus on the recommendations using a Delphi survey. A hierarchical alphabetical grading system (A, B, C+, C, D, D+, or D-) was used, based on statistical significance ( $P < 0.5$ ) and clinical importance ( $\geq 15\%$  improvement).

**RESULTS:**

The five high-quality studies included demonstrated that various aerobic training exercises are generally effective for improving knee osteoarthritis within a 12-week period. An aerobic exercise program demonstrated significant improvement for pain relief (Grade B), physical function (Grade B) and quality of life (Grade C+). Aerobic exercise in combination with strengthening exercises showed significant improvement for pain relief (3 Grade A) and physical function (2 Grade A, 2 Grade B).

**CONCLUSION:**

A short-term aerobic exercise program with/without muscle strengthening exercises is promising for reducing pain, improving physical function and quality of life for individuals with knee osteoarthritis.

## Strengthening exercise

Clin Rehabil. 2017 Feb 1:269215517691084. doi: 10.1177/0269215517691084.

**The Ottawa panel clinical practice guidelines for the management of knee osteoarthritis.  
Part two: Strengthening exercise programs.**

Brosseau L<sup>1</sup>, Taki J<sup>2</sup>, Desjardins B<sup>3</sup>, Thevenot O<sup>3</sup>, Fransen M<sup>4</sup>, Wells GA<sup>5</sup>, Mizusaki Imoto A<sup>6</sup>, Toupin-April K<sup>7</sup>, Westby M<sup>8</sup>, Álvarez Gallardo IC<sup>9</sup>, Gifford W<sup>10</sup>, Laferrière L<sup>11</sup>, Rahman P<sup>12</sup>, Loew L<sup>13</sup>, De Angelis G<sup>13</sup>, Cavallo S<sup>13</sup>, Shallwani SM<sup>13</sup>, Aburub A<sup>13</sup>, Bennell KL<sup>14</sup>, Van der Esch M<sup>15</sup>, Simic M<sup>16</sup>, McConnell S<sup>17</sup>, Harmer A<sup>18</sup>, Kenny GP<sup>19</sup>, Paterson G<sup>20</sup>, Regnaud JP<sup>21</sup>, Lefevre-Colau MM<sup>22</sup>, McLean L<sup>23</sup>.

Author information

Abstract

*OBJECTIVE:*

To identify effective strengthening exercise programs and provide rehabilitation teams and patients with updated, high-quality recommendations concerning traditional land-based exercises for knee osteoarthritis.

*METHODS:*

A systematic search and adapted selection criteria included comparative controlled trials with strengthening exercise programs for patients with knee osteoarthritis. A panel of experts reached consensus on the recommendations using a Delphi survey. A hierarchical alphabetical grading system (A, B, C+, C, D, D+ or D-) was based on statistical significance ( $p < 0.5$ ) and clinical importance ( $\geq 15\%$  improvement).

*RESULTS:*

The 26 high-quality studies identified demonstrated that various strengthening exercise programs with/without other types of therapeutic exercises are generally effective for improving knee osteoarthritis management within a six-month period. Strengthening exercise programs demonstrated a significant improvement for pain relief (four Grade A, ten Grade B, two Grade C+), physical function (four Grade A, eight Grade B) and quality of life (three Grade B). Strengthening in combination with other types of exercises (coordination, balance, functional) showed a significant improvement in pain relief (three Grade A, 11 Grade B, eight Grade C+), physical function (two Grade A, four Grade B, three Grade C+) and quality of life (one Grade A, one Grade C+).

*CONCLUSION:*

There are a variety of choices for strengthening exercise programs with positive recommendations for healthcare professionals and knee osteoarthritis patients. There is a need to develop combined behavioral and muscle-strengthening strategies to improve long-term maintenance of regular strengthening exercise programs.

**Mind body exercise**

Clin Rehabil. 2017 Jan 1;269215517691083. doi: 10.1177/0269215517691083.

**The Ottawa panel clinical practice guidelines for the management of knee osteoarthritis. Part one: Introduction, and mind-body exercise programs.**

Brosseau L<sup>1</sup>, Taki J<sup>2</sup>, Desjardins B<sup>3</sup>, Thevenot O<sup>3</sup>, Fransen M<sup>4</sup>, Wells GA<sup>5</sup>, Imoto AM<sup>6</sup>, Toupin-April K<sup>7</sup>, Westby M<sup>8</sup>, Gallardo IC<sup>9</sup>, Gifford W<sup>10</sup>, Laferrrière L<sup>11</sup>, Rahman P<sup>12</sup>, Loew L<sup>13</sup>, Angelis G<sup>13</sup>, Cavallo S<sup>13</sup>, Shallwani SM<sup>13</sup>, Aburub A<sup>13</sup>, Bennell KL<sup>14</sup>, Van der Esch M<sup>15</sup>, Simic M<sup>16</sup>, McConnell S<sup>17</sup>, Harmer A<sup>18</sup>, Kenny GP<sup>3</sup>, Paterson G<sup>19</sup>, Regnaud JP<sup>20</sup>, Lefevre-Colau MM<sup>21</sup>, McLean L<sup>1</sup>.

**Author information****Abstract****OBJECTIVE:**

To identify effective mind-body exercise programs and provide clinicians and patients with updated, high-quality recommendations concerning non-traditional land-based exercises for knee osteoarthritis.

**METHODS:**

A systematic search and adapted selection criteria included comparative controlled trials with mind-body exercise programs for patients with knee osteoarthritis. A panel of experts reached consensus on the recommendations using a Delphi survey. A hierarchical alphabetical grading system (A, B, C+, C, D, D+, D-) was used, based on statistical significance ( $P < 0.5$ ) and clinical importance ( $\geq 15\%$  improvement).

**RESULTS:**

The four high-quality studies identified demonstrated that various mind-body exercise programs are promising for improving the management of knee osteoarthritis. Hatha Yoga demonstrated significant improvement for pain relief (Grade B) and physical function (Grade C+). Tai Chi Qigong demonstrated significant improvement for quality of life (Grade B), pain relief (Grade C+) and physical function (Grade C+). Sun style Tai Chi gave significant improvement for pain relief (Grade B) and physical function (Grade B).

**CONCLUSION:**

Mind-body exercises are promising approaches to reduce pain, as well as to improve physical function and quality of life for individuals with knee osteoarthritis.

**Prolo**

Int Orthop. 2017 Feb 11. doi: 10.1007/s00264-017-3422-5.

**Proliferative injection therapy for osteoarthritis: a systematic review.**

Krstičević M<sup>1</sup>, Jerić M<sup>2</sup>, Došenović S<sup>3,4</sup>, Jeličić Kadić A<sup>4,5</sup>, Puljak L<sup>6</sup>.

Author information

Abstract

**PURPOSE:**

To systematically analyse randomised controlled trials (RCTs) about efficacy and safety of proliferative injection therapy (prolotherapy) for treatment of osteoarthritis (OA).

**METHODS:**

CENTRAL, Embase and MEDLINE were searched. Two reviewers independently conducted screening and data extraction. RCTs were assessed with the Cochrane risk of bias tool. Type of treatment, study design, dosing, efficacy outcomes and safety outcomes were analysed. The protocol was registered in PROSPERO (CRD42016035258).

**RESULTS:**

Seven RCTs were included, with 393 participants aged 40-75 years and mean OA pain duration from three months to eight years. Follow-up was 12 weeks to 12 months. Studies analysed OA of the knee joint (n = 5), first carpometacarpal joint (n = 1) and finger joints (n = 1). Various types of prolotherapy were used; dextrose was the most commonly used irritant agent. All studies concluded that prolotherapy was effective treatment for OA. No serious adverse events were reported. The studies had considerable methodological limitations.

**DISCUSSION:**

Limited evidence from low-quality studies indicates a beneficial effect of prolotherapy for OA management. The number of participants in these studies was too small to provide reliable evidence.

**CONCLUSIONS:**

Current data from trials about prolotherapy for OA should be considered preliminary, and future high-quality trials on this topic are warranted.

**45 A. MANUAL THERAPY LUMBAR & GENERAL****Hip rx helps LBP**

J Eval Clin Pract. 2017 Jan 27. doi: 10.1111/jep.12705.

**Effects of manual therapy and exercise targeting the hips in patients with low-back pain-A randomized controlled trial.**

Bade M<sup>1</sup>, Cobo-Estevez M<sup>2</sup>, Neeley D<sup>3</sup>, Pandya J<sup>4</sup>, Gunderson T<sup>5</sup>, Cook C<sup>6</sup>.

Author information

Abstract

**RATIONALE:**

The benefits of providing manual therapy and exercise targeting the hips in individuals with mechanical low-back pain (LBP) are not well established.

**OBJECTIVES:**

The objective in this study is to determine whether a formal prescriptive treatment protocol for the hips improves outcomes in patients with a primary complaint of mechanical LBP.

**METHODS:**

Eighty-four (84) subjects (50 males, 46.1 ± 16.2 years) were randomized to 1 of 2 groups: pragmatic treatment of the lumbar spine only (LBP) (n = 39) or pragmatic treatment of the lumbar spine and prescriptive treatment of bilateral hips (LBP + HIP) (n = 45). Pragmatic treatment of the lumbar spine was based upon published clinical guidelines. Prescriptive treatment of the hips involved the use of 3 hip exercises targeting the gluteal musculature and 3 mobilization techniques targeting the hips. Subjects were assessed at baseline, 2 weeks, and at discharge with the following measures: Modified Oswestry Disability Index, Numeric Pain Rating Scale, a global rating of change (GRoC) score, the patient acceptable symptom state (PASS), and patient satisfaction.

**RESULTS:**

At 2 weeks, significant differences between groups differences were found in GRoC and patient satisfaction ( $P < .05$ ) favoring the LBP + HIP group. At discharge, there were significant differences on the Modified Oswestry Disability Index, numeric pain rating scale, GRoC, and patient satisfaction favoring the LBP + HIP group ( $P < .05$ ). Effect sizes were small to medium.

**CONCLUSION:**

Our findings suggest that a prescriptive treatment of the hips may be of clinical value to individuals presenting with the primary complaint of mechanical LBP.

**Lumbar manips. Variations**

Spine (Phila Pa 1976). 2017 Jan 15;42(2):E71-E77. doi: 10.1097/BRS.0000000000001725.

**Patient-Induced Reaction Forces and Moments Are Influenced by Variations in Spinal Manipulative Technique.**

D'Angelo K<sup>1</sup>, Triano JJ, Kawchuk GN, Howarth SJ.

Author information

Abstract

*STUDY DESIGN:*

An in vivo biomechanical study.

*OBJECTIVE:*

The aim of the present study was to quantify and compare the reaction loads for two spinal manipulation therapy (SMT) procedures commonly used for low back pain using a biomechanical computer model.

*SUMMARY OF BACKGROUND DATA:*

Contemporary computer-driven rigid linked-segment models (LSMs) have made it feasible to analyze low back kinetics and kinematics during various activities including SMT procedures. Currently, a comprehensive biomechanical model analyzing actual differences in loading effects between different SMT procedures is lacking.

*METHODS:*

Twenty-four healthy/asymptomatic participants received a total of six SMT applications, representing all combinations of two similar SMT procedures within three patient hip flexion angles. All contact forces, patient torso kinematics, and inertial properties were entered into a dynamic three-dimensional LSM to calculate lumbar reaction forces and moments. Peak net applied force along with the maximums, minimums, and ranges for each component of the three-dimensional reaction force and moment vectors during each SMT procedure was analyzed.

*RESULTS:*

One specific SMT technique (lumbar spinous pull) produced greater maximum anterior-posterior reaction force and both lateral bending and axial twisting reaction moments compared to the other technique (lumbar push procedure [all  $P \leq 0.034$ ]). SMT trials without hip flexion had lower maximum medial-lateral reaction force and range compared to those with 45 and 90 degrees of hip flexion (all  $P \leq 0.041$ ). There were no interactions between procedure and hip angle for any of the dependent measurements.

*CONCLUSION:*

The technique used to apply SMT and the participant's initial hip orientation induced significantly different actions on the low back. These findings and future research can improve patient outcomes and safety by informing clinicians on how to best use SMT given specific types of low back pain.

*LEVEL OF EVIDENCE: 2.*

MT research



J Man Manip Ther. 2016 Dec;24(5):241-252.

**A systematic review of orthopaedic manual therapy randomized clinical trials quality.**

Riley SP<sup>1</sup>, Swanson B<sup>2</sup>, Brismée JM<sup>3</sup>, Sawyer SF<sup>3</sup>.

Author information

Abstract

*Study Design:* Systematic review and meta-analysis.

*Objectives:* To conduct a systematic review and meta-analysis of randomized clinical trials (RCTs) in the orthopaedic manual therapy (OMT) literature from January 2010 to June 2014 in order to determine if the CONSORT checklist and Cochrane Risk of Bias (RoB) assessment tools: (1) are reliable; (2) have improved the reporting and decreased the risk of bias in RCTs in the OMT literature; (3) differ based on journal impact factor (JIF); and (4) scores are associated with each other.

*Background:* The CONSORT statement is used to improve the accuracy of reporting within RCTs. The Cochrane RoB tool was designed to assess the risk of bias within RCTs. To date, no evaluation of the quality of reporting and risk of bias in OMT RCTs has been published.

*Methods:* Relevant RCTs were identified by a literature review from January 2010 to June 2014. The identified RCTs were assessed by two individual reviewers utilizing the 2010 CONSORT checklist and the RoB tool. Agreement and a mean composite total score for each tool were attained in order to determine if the CONSORT and RoB tools were reliable and varied by year and impact factor.

*Results:* A total of 72 RCTs in the OMT literature were identified. A number of categories within the CONSORT and RoB tools demonstrated prevalence-adjusted bias-adjusted kappa (PABAK) scores of less than 0.20 and from 0.20 to 0.40. The total CONSORT and RoB scores were correlated to each other ( $r = 0.73$ ; 95% CI 0.60 to 0.82;  $p < 0.0001$ ). There were no statistically significant differences in CONSORT or RoB scores by year. There was a statistically significant correlation between both CONSORT scores and JIF ( $r = 0.64$ , 95% CI 0.47 to 0.76;  $p < 0.0001$ ), and between RoB scores and JIF ( $r = 0.42$ , 95% confidence interval 0.21-0.60;  $p < 0.001$ ). There was not a statistically significant correlation between JIF and year of publication.

*Conclusion:* Our findings suggest that the CONSORT and RoB have a number of items that are unclear and unreliable, and that the quality of reporting in OMT trials has not improved in recent years. Improvements in reporting are necessary to allow advances in OMT practice. **Level of Evidence:** 1A.

## 45 B. MANUAL THERAPY CERVICAL

Cardiac changes with PA mob

**The immediate cardiovascular response to joint mobilization of the neck- A randomized, placebo-controlled trial in pain-free adults**

Emmanuel Y. Yung Cheongeun Oh Michael S. Wong Jason Grimes Erica M. Barton ,  
Muhammad I. Ali David Cameron

DOI: <http://dx.doi.org/10.1016/j.msksp.2017.01.013>

**Highlights**

- The neurophysiological system that alters pain overlap with blood pressure.
- Following acute pain, the resting SBP may increase in some normotensive adults.
- Sympatho-excitation from usual JM dosage increasing SBP may be deleterious.
- It is essential to explore other JM dosing regimen to possibly decrease SBP.
- The alternative JM dosage resulted in decreased SBP in normotensive adults vs placebo.

**Abstract****Background**

Some normotensive patients can have a spike in resting systolic blood pressure (SBP) in response to acute neck pain. Applying the typical dosage of mobilization may potentially result in a sympatho-excitatory response, further increasing resting SBP. Therefore, there is a need to explore other dosage regimens that could result in a decrease in SBP.

**Objectives**

To compare the blood pressure (BP) and heart rate (HR) response of pain-free, normotensive adults when receiving unilateral posterior-to-anterior mobilization (PA) applied to the neck versus its corresponding placebo (PA-P).

**Study design**

Double-Blind, Randomized Clinical Trial.

**Methods**

44 (18 females) healthy, pain-free participants (mean age,  $23.8 \pm 3.04$  years) were randomly allocated to 1 of 2 groups. Group 1 received a PA-P in which light touch was applied to the right 6th cervical vertebra. Group 2 received a PA to the same location. BP and HR were measured prior to, during, and after the application of PA or PA-P. A mixed-effect model of repeated measure analysis was used for statistical analysis.

**Results**

During-intervention, the PA group had a significant reduction in SBP, while the placebo group had an increase in SBP. The change in SBP during-intervention was significantly different between the PA and the placebo group ( $p$ -value = 0.003). There were no significant between-group differences found for HR and diastolic BP (DBP). The overall group-by-time interaction was statistically significant for SBP ( $p$ -value = 0.01).

**Conclusions**

When compared to placebo, the dosage of applied PA resulted in a small, short-lived drop in SBP not exceeding the minimal detectable change.

**Adverse events**

Musculoskelet Sci Pract. 2017 Jan 23;28:32-38. doi: 10.1016/j.msksp.2017.01.008

**Adverse events associated with the use of cervical spine manipulation or mobilization and patient characteristics: A systematic review.**

Kranenburg HA<sup>1</sup>, Schmitt MA<sup>2</sup>, Puenteadura EJ<sup>3</sup>, Luijckx GJ<sup>4</sup>, van der Schans CP<sup>5</sup>.

Author information

Abstract

Cervical spinal manipulation (CSM) and cervical mobilization are frequently used in patients with neck pain and headache.

Pre-manipulative cervical instability and arterial integrity tests appear to be unreliable in identifying patients at risk for adverse events. It would be valuable if patients at risk could be identified by specific characteristics during the preliminary screening.

Objective was to identify characteristics of 1) patients, 2) practitioners, 3) treatment process and 4) adverse events (AE) occurring after CSM or cervical mobilization. A systematic search was performed in PubMed, Embase, CINAHL, Web-of-science, AMED, and ICL (Index Chiropractic Literature) up to December 2014.

Of the initial 1043 studies, 144 studies were included, containing 227 cases. 117 cases described male patients with a mean age of 45 (SD 12) and a mean age of 39 (SD 11) for females. Most patients were treated by chiropractors (66%). Manipulation was reported in 95% of the cases, and neck pain was the most frequent indication. Cervical arterial dissection (CAD) was reported in 57% (P = 0.21) of the cases and 45.8% had immediate onset symptoms. The overall distribution of gender for CAD is 55% (n = 71) for female and therefore opposite of the total AE. Patient characteristics were described poorly.

No clear patient profile, related to the risk of AE after CSM, could be extracted. However, women seem more at risk for CAD. There seems to be under-reporting of cases. Further research should focus on a more uniform and complete registration of AE using standardized terminology.

### 45 D. MANUAL THERAPY EXTREMITIES

Knee MT

Musculoskeletal Care. 2016 Nov 18. doi: 10.1002/msc.1166.

**Treatment effectiveness and fidelity of manual therapy to the knee: A systematic review and meta-analysis.**

Salamh P<sup>1</sup>, Cook C<sup>1</sup>, Reiman MP<sup>1</sup>, Sheets C<sup>2</sup>.

Author information

Abstract

Manual therapy (MT) is a commonly used treatment for knee osteoarthritis (OA) but to date only one systematic review has explored its effectiveness.

The purpose of the present study was to perform a systematic review and meta-analysis of the literature, to determine the effectiveness and fidelity of studies using MT techniques in individuals with knee OA. Relevant studies were assessed for inclusion. Effectiveness was measured using effect sizes, and methodological bias and treatment fidelity were both explored. Effect sizes were calculated using standardized mean differences (SMD) based on pooled data depending on statistical and clinical heterogeneity, as well as risk of bias. The search captured 2,969 studies; after screening, 12 were included. Four had a low risk of bias and high treatment fidelity. For self-reported function, comparing MT with no treatment resulted in a large effect size (standardized mean difference [SMD] 0.84), as did adding MT to a comparator treatment (SMD 0.78). A significant difference was found for pain when adding MT to a comparator treatment (SMD 0.73).

The findings in the present meta-analytical review support the use of MT versus a number of different comparators for improvement in self-reported knee function. Lesser support is present for pain reduction, and no endorsement of functional performance can be made at this time.

**48 A. STM**

In HA's

Arch Phys Med Rehabil. 2017 Feb;98(2):211-219.e2. doi: 10.1016/j.apmr.2016.08.466. Epub 2016 Sep 10.

**Effectiveness of a Treatment Involving Soft Tissue Techniques and/or Neural Mobilization Techniques in the Management of Tension-Type Headache: A Randomized Controlled Trial.**

Ferragut-Garcías A<sup>1</sup>, Plaza-Manzano G<sup>2</sup>, Rodríguez-Blanco C<sup>3</sup>, Velasco-Roldán O<sup>1</sup>, Pecos-Martín D<sup>4</sup>, Oliva-Pascual-Vaca J<sup>3</sup>, Llabrés-Bennasar B<sup>5</sup>, Oliva-Pascual-Vaca Á<sup>6</sup>.

**Author information**

**Abstract**

**OBJECTIVE:**

To evaluate the effects of a protocol involving soft tissue techniques and/or neural mobilization techniques in the management of patients with frequent episodic tension-type headache (FETTH) and those with chronic tension-type headache (CTTH).

**DESIGN:**

Randomized, double-blind, placebo-controlled before and after trial.

**SETTING:**

Rehabilitation area of the local hospital and a private physiotherapy center.

**PARTICIPANTS:**

Patients (N=97; 78 women, 19 men) diagnosed with FETTH or CTTH were randomly assigned to groups A, B, C, or D.

**INTERVENTIONS:**

(A) Placebo superficial massage; (B) soft tissue techniques; (C) neural mobilization techniques; (D) a combination of soft tissue and neural mobilization techniques.

**MAIN OUTCOMES MEASURES:**

The pressure pain threshold (PPT) in the temporal muscles (points 1 and 2) and supraorbital region (point 3), the frequency and maximal intensity of pain crisis, and the score in the Headache Impact Test-6 (HIT-6) were evaluated. All variables were assessed before the intervention, at the end of the intervention, and 15 and 30 days after the intervention.

**RESULTS:**

Groups B, C, and D had an increase in PPT and a reduction in frequency, maximal intensity, and HIT-6 values in all time points after the intervention as compared with baseline and group A (P<.001 for all cases). Group D had the highest PPT values and the lowest frequency and HIT-6 values after the intervention.

**CONCLUSIONS:**

The application of soft tissue and neural mobilization techniques to patients with FETTH or CTTH induces significant changes in PPT, the characteristics of pain crisis, and its effect on activities of daily living as compared with the application of these techniques as isolated interventions.

**48 B. TRIGGER POINTS NEEDLING/ACUPUNCTURE**

In HA's

Clin J Pain. 2017 Feb;33(2):109-115. doi: 10.1097/AJP.0000000000000387.

**Myofascial Trigger Points and Migraine-related Disability in Women With Episodic and Chronic Migraine.**

Ferracini GN<sup>1</sup>, Florencio LL, Dach F, Chaves TC, Palacios-Ceña M, Fernández-de-Las-Peñas C, Bevilaqua-Grossi D, Speciali JG.

Author information

Abstract

*OBJECTIVE:*

The aim of this study was to investigate the differences in the presence of head and neck-shoulder trigger points (TrPs) between women with episodic or chronic migraine and their association with migraine-related disability.

*MATERIALS AND METHODS:*

One hundred forty-three women, aged 18 to 60 years, with migraine were recruited to participate in this study. Migraine-related disability was evaluated with the Migraine Disability Assessment Questionnaire. TrPs were explored bilaterally within the masseter, temporalis, suboccipital, sternocleidomastoid, upper trapezius, and splenius capitis muscles.

*RESULTS:*

Ninety-eight women exhibited episodic migraine, whereas 45 had chronic migraine. Women with chronic migraine reported a higher related disability than those with episodic migraine ( $P=0.045$ ). Women with episodic migraine had a similar number of TrPs (total number:  $4.3\pm 3.3$ ; active TrPs:  $3.0\pm 2.9$ ; and latent TrPs:  $1.3\pm 2.1$ ) to those with chronic migraine (total number:  $4.8\pm 3.2$ ; active TrPs:  $3.4\pm 2.9$ ; and latent TrPs:  $1.4\pm 1.9$ ). No linear association was observed between the number of TrPs and migraine-related disability in women with episodic or chronic migraine.

*CONCLUSIONS:*

Women with episodic and chronic migraine had a similar number of TrPs. TrPs may be considered a trigger factor that can facilitate the onset of migraine or also can potentially be a promoting factor for pain once the migraine attack has started and hence may contribute to related disability. Nevertheless, we observed that the number of TrPs in the head and neck-shoulder muscles in an interictal state was not associated with the degree of migraine-related disability, suggesting a multifactorial nature of self-perceived disability in this population

**Impact of Dry needling**

J Orthop Sports Phys Ther. 2017 Feb 3:1-41. doi: 10.2519/jospt.2017.7096.

**The Effectiveness of Trigger Point Dry Needling for Musculoskeletal Conditions by Physical Therapists: A Systematic Review and Meta-analysis.**Gattie E<sup>1</sup>, Cleland JA<sup>2</sup>, Snodgrass S<sup>3</sup>.

Author information

Abstract

Study Design Systematic review and meta-analysis.

Background Dry needling is being utilized by an increasing number of physical therapists in the United States and throughout the world in the treatment of musculoskeletal pain.

Objective To examine the short and long term effectiveness of dry needling delivered by a physical therapist for any musculoskeletal pain condition. Methods Electronic databases were searched. Eligible randomized controlled trials included human subjects with musculoskeletal conditions that were treated with dry needling performed by a physical therapist compared with control or other intervention. The overall quality of the evidence was assessed using the GRADE approach.

Results Initial search returned 218 articles. After screening 13 were included. PEDro quality scale scores ranged 4-9 out of maximum score of 10 with a median score of 7. Eight meta-analyses were performed. In the immediate to 12 weeks follow-up period studies provided evidence that dry needling may decrease pain and increase pressure pain threshold when compared to control/sham or other treatment. At 6 to 12 months dry needling was favored for decreasing pain, but the treatment effect was not statistically significant. Dry needling when compared to control/sham treatment provides a statistically significant effect on functional outcomes, but does not when compared to other treatments.

**Conclusion** Very low to moderate quality evidence suggests that dry needling performed by physical therapists is more effective than no treatment, sham dry needling, or other treatments for reducing pain and improving pressure pain threshold in patients presenting with musculoskeletal pain in the immediate to 12 week follow-up period. Low quality evidence suggests superior outcomes with dry needling for functional outcomes when compared to no treatment or sham needling. However, no difference in functional outcomes exists when compared to other physical therapy treatments. Evidence of long-term benefit of dry needling is currently lacking.

Level of Evidence Therapy, level 1a. J Orthop Sports Phys Ther, Epub 3 Feb 2017.  
doi:10.2519/jospt.2017.7096.

**51. CFS/BET****Tai chi**

BMJ Open. 2017 Feb 6;7(2):e013661. doi: 10.1136/bmjopen-2016-013661.

**Systematic review and meta-analysis: Tai Chi for preventing falls in older adults.**

Huang ZG<sup>1</sup>, Feng YH<sup>2</sup>, Li YH<sup>1</sup>, Lv CS<sup>1</sup>.

Author information

Abstract

**OBJECTIVE:**

It remains unclear whether Tai Chi is effective for preventing falls in older adults. We undertook this systematic review to evaluate the preventive effect of Tai Chi by updating the latest trial evidence.

**DESIGN:**

Systematic review and meta-analysis.

**METHODS:**

The Cochrane Library, MEDLINE and EMBASE were searched up to February 2016 to identify randomised trials evaluating Tai Chi for preventing falls in older adults. We evaluated the risk of bias of included trials using the Cochrane Collaboration's tool. Results were combined using random effects meta-analysis.

**OUTCOME MEASURES:**

Number of fallers and rate of falls.

**RESULTS:**

18 trials with 3824 participants were included. The Tai Chi group was associated with significantly lower chance of falling at least once (risk ratio (RR) 0.80, 95% CI 0.72 to 0.88) and rate of falls (incidence rate ratio (IRR) 0.69, 95% CI 0.60 to 0.80) than the control group. Subgroup analyses suggested that the preventive effect was likely to increase with exercise frequency (number of fallers:  $p=0.001$ ; rate of falls:  $p=0.007$ ) and Yang style Tai Chi was likely to be more effective than Sun style Tai Chi (number of fallers:  $p=0.01$ ; rate of falls:  $p=0.001$ ). The results might be influenced by publication bias as the funnel plots showed asymmetry. Sensitivity analyses by sample size, risk of bias and comorbidity showed no major influence on the primary results.

**CONCLUSIONS:**

Tai Chi is effective for preventing falls in older adults. The preventive effect is likely to increase with exercise frequency and Yang style Tai Chi seems to be more effective than Sun style Tai Chi.

**52. EXERCISE****Exercise and genetics**

Sports Med Open. 2017 Dec;3(1):4. doi: 10.1186/s40798-016-0073-9. Epub 2017 Jan 10.



**The Beneficial Effects of Physical Activity: Is It Down to Your Genes? A Systematic Review and Meta-Analysis of Twin and Family Studies.**

Zadro JR<sup>1</sup>, Shirley D<sup>2</sup>, Andrade TB<sup>2</sup>, Scurrah KJ<sup>3</sup>, Bauman A<sup>4</sup>, Ferreira PH<sup>2</sup>.

Author information

Abstract

*BACKGROUND:*

There is evidence for considerable heterogeneity in the responsiveness to regular physical activity (PA) which might reflect the influence of genetic factors. The aim of this systematic review was to assess whether the response to a PA intervention for measures of body composition and cardiorespiratory fitness is (i) correlated within twin pairs and/or families and (ii) more correlated in monozygotic twins (MZ) compared to dizygotic twins (DZ), which would be consistent with genetic effects.

*METHODS:*

We performed electronic database searches, combining key words relating to "physical activity" and "genetics", in MEDLINE, CINAHL, EMBASE, SPORTS Discuss, AMED, PsycINFO, WEB OF SCIENCE, and SCOPUS from the earliest records to March 2016. Twin and family studies were included if they assessed body composition and/or cardiorespiratory fitness following a PA intervention, and provided a heritability estimate, maximal heritability estimate, or within MZ twin pair correlation ( $r_{MZ}$ ). Data on heritability (twin studies), maximal heritability (family studies), and the  $r_{MZ}$  were extracted from included studies, although heritability estimates were not reported as small sample sizes made them uninformative.

*RESULTS:*

After screening 224 full texts, nine twin and five family studies were included in this review. The pooled  $r_{MZ}$  in response to PA was significant for body mass index ( $r_{MZ} = 0.69$ ,  $n = 58$ ), fat mass ( $r_{MZ} = 0.58$ ,  $n = 48$ ), body fat percentage ( $r_{MZ} = 0.55$ ,  $n = 72$ ), waist circumference ( $r_{MZ} = 0.50$ ,  $n = 27$ ), and  $VO_2\max$  ( $r_{MZ} = 0.39$ ,  $n = 48$ ), where "n" represents the total number of twin pairs from all studies. Maximal heritability estimates ranged from 0-21% for measures of body composition, and 22-57% for cardiorespiratory fitness. Twin studies differed in sample age, baseline values, and PA intervention, although the exclusion of any one study did not affect the results.

*CONCLUSIONS:*

Shared familial factors, including genetics, are likely to be a significant contributor to the response of body composition and cardiorespiratory fitness following PA. Genetic factors may explain individual variation in the response to PA.

### 53. CORE

Pain induced contraction changes

Eur J Pain. 2017 Jan 20. doi: 10.1002/ejp.993.

**Pain-evoked trunk muscle activity changes during fatigue and DOMS.**Larsen LH<sup>1,2</sup>, Hirata RP<sup>1</sup>, Graven-Nielsen T<sup>1</sup>.

Author information

Abstract

**BACKGROUND:**

Muscle pain may reorganize trunk muscle activity but interactions with exercise-related muscle fatigue and delayed onset muscle soreness (DOMS) is to be clarified.

**METHODS:**

In 19 healthy participants, the trunk muscle activity during 20 multi-directional unpredictable surface perturbations were recorded after bilateral isotonic saline injections (control) and during unilateral and bilateral hypertonic saline-induced low back pain (LBP) in conditions of back muscle fatigue (Day-1) and DOMS (Day-2). Pain intensity and distribution were assessed by visual analogue scale (VAS) scores and pain drawings. The degree of fatigue and DOMS were assessed by Likert scale scores. Root-mean-square electromyographic (RMS-EMG) signals were recorded post-perturbation from six bilateral trunk muscles and the difference from baseline conditions (Delta-RMS-EMG) was extracted and averaged across abdominal and back muscles.

**RESULTS:**

In DOMS, peak VAS scores were higher during bilateral control and bilateral saline-induced pain than fatigue ( $p < 0.001$ ) and during bilateral compared with unilateral pain ( $p < 0.001$ ). The saline-induced pain areas were larger during DOMS than fatigue ( $p < 0.01$ ). In response to surface perturbations during fatigue and DOMS, the back muscle Delta-RMS-EMG increased during bilateral compared with unilateral pain and control injections ( $p < 0.001$ ) and decreased during unilateral pain compared with control injections ( $p < 0.04$ ). In DOMS compared with fatigue, the post-perturbation Delta-RMS-EMG in back muscles was higher during bilateral pain and lower during unilateral pain ( $p < 0.001$ ). The abdominal Delta-RMS-EMG was not significantly affected.

**CONCLUSION:**

Facilitated and attenuated back muscle responses to surface perturbations in bilateral and unilateral LBP, respectively, was more expressed during exercise-induced back muscle soreness compared with fatigue.

**SIGNIFICANCE:**

Back muscle activity decreased during unilateral and increased during bilateral pain after unpredictable surface perturbations during muscle fatigue and DOMS. Accumulation effects of DOMS on pain intensity and spreading and trunk muscle activity after pain-induction.

**56. ATHLETICS****Youth athletics and problems**

Eur J Sport Sci. 2017 Jan 18:1-8. doi: 10.1080/17461391.2016.1275820.

**Compelling overuse injury incidence in youth multisport athletes.**

Rejeb A<sup>1</sup>, Johnson A<sup>1</sup>, Vaeyens R<sup>2</sup>, Horobeanu C<sup>1</sup>, Farooq A<sup>1</sup>, Witvrouw E<sup>1</sup>.

Author information

Abstract

The present investigation was carried out to examine the incidence and pattern of injuries in adolescent multisport athletes from youth sports academy.

Injury data were prospectively collected from 166 athletes during the seasons from 2009 to 2014. A total of 643 injuries were identified, 559 (87.0%) were time-loss injuries. The overall injury incidence was 5.5 (95% confidence interval CI: 5.1-6.0), the incidence of time-loss injuries was 4.8 (95% CI: 4.4-5.2), the incidence of growth conditions was 1.2 (95% CI: 1.0-1.4) and incidence of serious injuries was 0.6 (95% CI: 0.5-0.8) per 1000 h of exposure. The prevalence of overuse injuries was 50.3%. Growth conditions represented 20.0%. Most of the injuries (67.0%) involved the lower extremities, and both foot and ankle were the most predominant injured body parts (22.0%). Knee injuries were mostly from overuse (50 vs. 23,  $p = .02$ ), whereas foot and ankle injuries resulted from an acute mechanism (94 vs. 31,  $p < .0001$ ). Minor and moderate injuries accounted for 87.0%. Muscle, tendon and osteochondrosis injuries accounted for 52.0% of all injuries. Comparing groups, squash sport was having the highest injury incidence (8.5 injuries per athlete). Higher exposure was associated with greater overuse relative risk (RR = 1.03, 95% CI: 1.01-1.014,  $p < .001$ ).

In conclusion, the results of this study identified a high incidence of injuries in this youth sports population. Striking was the prevalence of overuse injuries of 50%, which suggests the need for injury prevention protocols for adolescent highly trained athletes.

**LBP and twins**

Spine J. 2017 Feb 2. pii: S1529-9430(17)30040-2. doi: 10.1016/j.spinee.2017.01.015

**Are people with chronic low back pain meeting the physical activity guidelines? a co-twin control study.**

Zadro JR<sup>1</sup>, Shirley D<sup>2</sup>, Amorim A<sup>2</sup>, Pérez-Riquelme F<sup>3</sup>, Ordoñana JR<sup>4</sup>, Ferreira PH<sup>2</sup>.

Despite a large amount of research investigating physical activity (PA) levels in people with chronic low back pain (LBP), no study has investigated whether people with chronic LBP are meeting the World Health Organisation (WHO) PA guidelines. Furthermore, with genetics and the early shared environment substantially influencing the presence of LBP, and PA engagement, these factors could confound the association between LBP and PA and need to be controlled for.

**PURPOSE:** To investigate the association between chronic LBP and meeting the PA guidelines, while controlling for the effects of genetics and early shared environment.

**DESIGN:** Cross-sectional co-twin control study.

**PATIENT SAMPLE:** A cross-sectional analysis was performed on 1,588 twins from the Murcia Twin Registry in Spain with available data on LBP and PA from the 2013 data collection wave.

**OUTCOME MEASURES:** The exposure and outcome variables in our study were self-reported. Twins reporting a history of chronic LBP were asked follow-up questions to inform on the presence of recent LBP (within the past 4 weeks), previous LBP (no pain within the past 4 weeks), and persistent LBP (no pain-free month in the last 6 months). These were our exposure variables. Our outcome variable was meeting the WHO PA guidelines, which involved at least 75 minutes of vigorous-intensity PA, or at least 150 minutes of moderate-intensity PA per week.

**METHODS:** To investigate the association between chronic LBP and meeting the PA guidelines we first performed a multivariate logistic regression on the total sample of twins. Co-variables entered the model if the univariate association between the co-variable, and both the exposure and outcome reached a significance of  $p < 0.2$ . Second, to adjust for the influence of genetics and early shared environment we performed a conditional multivariate logistic regression on complete twin pairs discordant for LBP. The Murcia Twin Registry is supported by Fundación Séneca, Regional Agency for Science and Technology, Murcia, Spain (08633/PHCS/08 & 15302/PHCS/10) and the Ministry of Science and Innovation, Spain (PSI11560-2009). Funding for this project has also been received from Fundación MAPFRE (2012). The authors declare that there are no conflicts of interest.

#### **RESULTS:**

There was a significant inverse association between recent LBP and meeting the PA guidelines (OR=0.71,  $p=0.034$ ). When controlling for genetics and early shared environment this association disappeared. There was no association between previous (OR=0.95,  $p=0.779$ ) or persistent LBP (OR=0.78,  $p=0.192$ ) and meeting the PA guidelines.

#### **CONCLUSION:**

Twins with recent LBP are less likely to meet the PA guidelines than those with no history of chronic LBP, highlighting the importance of incorporating PA promotion in the treatment of these individuals. Genetics and early shared environment appear to be confounding the association between LBP and PA, although this needs to be further tested in larger twin samples.

<https://www.ncbi.nlm.nih.gov/pubmed/28163210>

**Athletics and LBP**

#### **EPIDEMIOLOGY OF BACK PAIN IN SPORTS: A CROSS-SECTIONAL STUDY**

1. Daniela Fett Katharina Trompeter, Petra Platen

## Abstract

**Background** Back pain (BP) is a frequent health problem in the general population resulting in enormous costs for the health care system. It is also one of the most frequently occurring complaints in sports.

**Objective** To determine lifetime prevalence (LTP), 12-months prevalence (12-mP) and point prevalence (PP) of BP regarding the pain intensity and the localization at the spine in German elite athletes compared to an active control group (CG) and to identify potential risk factors for BP.

**Design** The study was designed as a cross-sectional retrospective survey.

**Setting** A validated online BP questionnaire (Kourinka, 1987; von Korff, 1992) was sent by the German Olympic Sports Confederation to approximately 4,000 athletes, and to a CG of 253 physically active but non-elite sports students.

**Participants** N=1114 athletes (m=46.5%, f=53.1%, 20.9±4.8 years, 176.5±11.5 cm, 71.0±10.3 kg) and 166 physically active students (m=74.7%, f=24.1%, 21.2±2.0 years, 180.0±8.0 cm, 74.0±14.5 kg) took part.

**Main Outcome Measurements** LTP, 12-mP, PP and risk factors of BP were determined.

**Results** LTP of BP was 88.5%, 12-mP was 81.1% and PP was 49.0%, compared with 80.7%, 70.0% and 42.8%, respectively in the CG. The LTP and 12-mP in athletes were significantly higher than in the CG. The most often occurred localization was the lower back. Regarding the sports disciplines individually LTP of BP ranged between 58–100%. High prevalence rates of 95–100% were found in fencing, rowing, water-polo, diving, shooting and dancing.

**Conclusions** Findings indicate that BP is a present problem in athletes. Especially sports with high mechanical loads on the spine seem to be affected. Athletes, physicians and coaches should be aware of this, and seek to identify specific prevention programs, especially in high-risk sports. These programs should be part of elite athletes' daily training.

## 59. PAIN

### Brain changes in chronic pain

Eur J Pain. 2017 Feb 1. doi: 10.1002/ejp.1003.

**Brain changes associated with cognitive and emotional factors in chronic pain: A systematic review.**

Malfliet A<sup>1,2,3,4</sup>, Coppieters I<sup>2,4</sup>, Van Wilgen P<sup>1,2,5</sup>, Kregel J<sup>2,4</sup>, De Pauw R<sup>4</sup>, Dolphens M<sup>4</sup>, Ickmans K<sup>1,2,3</sup>.

Author information

Abstract

An emerging technique in chronic pain research is MRI, which has led to the understanding that chronic pain patients display brain structure and function alterations.

Many of these altered brain regions and networks are not just involved in pain processing, but also in other sensory and particularly cognitive tasks. Therefore, the next step is to investigate the relation between brain alterations and pain related cognitive and emotional factors. This review aims at providing an overview of the existing literature on this subject. Pubmed, Web of Science and Embase were searched for original research reports. Twenty eight eligible papers were included, with information on the association of brain alterations with pain catastrophizing, fear-avoidance, anxiety and depressive symptoms. Methodological quality of eligible papers was checked by two independent researchers. Evidence on the direction of these associations is inconclusive. Pain catastrophizing is related to brain areas involved in pain processing, attention to pain, emotion and motor activity, and to reduced top-down pain inhibition. In contrast to pain catastrophizing, evidence on anxiety and depressive symptoms shows no clear association with brain characteristics. However, all included cognitive or emotional factors showed significant associations with resting state fMRI data, providing that even at rest the brain reserves a certain activity for these pain-related factors.

Brain changes associated with illness perceptions, pain attention, attitudes and beliefs seem to receive less attention in literature.

***SIGNIFICANCE:***

This review shows that maladaptive cognitive and emotional factors are associated with several brain regions involved in chronic pain. Targeting these factors in these patients might normalize specific brain alterations.

**Neuropathic skin pain**

Pain. 2017 Mar;158(3):516-525. doi: 10.1097/j.pain.0000000000000791.

**Biomarkers of neuropathic pain in skin nerve degeneration neuropathy: contact heat-evoked potentials as a physiological signature.**

Wu SW<sup>1</sup>, Wang YC, Hsieh PC, Tseng MT, Chiang MC, Chu CP, Feng FP, Lin YH, Hsieh ST, Chao CC.

Author information

Abstract

Contact heat-evoked potentials (CHEPs) have become an established method of assessing small-fiber sensory nerves; however, their potential as a physiological signature of neuropathic pain symptoms has not been fully explored.

To investigate the diagnostic efficacy in examining small-fiber sensory nerve degeneration, the relationship with skin innervations, and clinical correlates with sensory symptoms, we recruited 188 patients (115 men) with length-dependent sensory symptoms and reduced intraepidermal nerve fiber (IENF) density at the distal leg to perform CHEP, quantitative sensory testing, and nerve conduction study. Fifty-seven age- and sex-matched controls were enrolled for comparison of CHEP and skin innervation. Among patients with neuropathy, 144 patients had neuropathic pain and 64 cases had evoked pain. Compared with quantitative sensory testing and nerve conduction study parameters, CHEP amplitudes showed the highest sensitivity for diagnosing small-fiber sensory nerve degeneration and exhibited the strongest correlation with IENF density in multiple linear regression. Contact heat-evoked potential amplitudes were strongly correlated with the degree of skin innervation in both patients with neuropathy and controls, and the slope of the regression line between CHEP amplitude and IENF density was higher in patients with neuropathy than in controls. Patients with evoked pain had higher CHEP amplitude than those without evoked pain, independent of IENF density. Receiver operating characteristic analysis showed that CHEP had better performance in diagnosing small-fiber sensory nerve degeneration than thermal thresholds. Furthermore, CHEPs showed superior classification accuracy with respect to evoked pain.

**In conclusion**, CHEP is a sensitive tool to evaluate pathophysiology of small-fiber sensory nerve and serves as a physiological signature of neuropathic pain symptoms.

**Genetics and pain**

J Psychiatr Res. 2017 Jan 30;89:65-72. doi: 10.1016/j.jpsychires.2017.01.015.

**An observational study of the impact of genetic testing for pain perception in the clinical management of chronic non-cancer pain.**

Sharma M<sup>1</sup>, Kantorovich S<sup>2</sup>, Lee C<sup>2</sup>, Anand N<sup>2</sup>, Blanchard J<sup>2</sup>, Fung ET<sup>2</sup>, Meshkin B<sup>2</sup>, Brenton A<sup>3</sup>, Richeimer S<sup>4</sup>.

Author information

Abstract

**OBJECTIVE:**

Pain levels are a key metric in clinical care. However, the assessment of pain is limited to basic questionnaires and physician interpretation, which yield subjective data. Genetic markers of pain sensitivity, such as single nucleotide polymorphisms in the catechol-O-methyltransferase gene, have been shown to be associated with pain perception and have been used to provide objective information about a patient's pain. The goal of this study was to determine if physician treatment adjustments based on genetic tests of pain perception resulted in improved outcomes for patients.

**MATERIAL AND METHODS:**

A prospective, longitudinal study was conducted with 134 chronic non-cancer pain patients genotyped for pain perception-related catechol-O-methyltransferase haplotypes. Physicians were provided with patients' results and asked to document 1) their assessment of benefit of the genetic test; 2) treatment changes made based on the genetic test; and 3) patient clinical responses to changes implemented.

**RESULTS:**

Based on genetic testing results, physicians adjusted treatment plans for 40% of patients. When medication changes were made based on genetic testing results, 72% of patients showed improvement in clinical status. When non-pharmacological actions were performed, 69% of physicians felt their patients' clinical status improved. Moreover, physicians believed the genetic test results were consistent with patient pain levels in 85% of cases.

**CONCLUSIONS:**

These results demonstrate that providing personalized medicine with genetic information related to pain perception affected physician clinical decision-making for a substantial proportion of patients in this study, and that the availability and utilization of this information was a contributing factor in clinical improvement.

Widespread pain

Pain. 2017 Mar;158(3):430-439. doi: 10.1097/j.pain.0000000000000777.



**Conditioned pain modulation in patients with nonspecific chronic back pain with chronic local pain, chronic widespread pain, and fibromyalgia.**

Gerhardt A<sup>1</sup>, Eich W, Treede RD, Tesarz J.

Author information

Abstract

Findings considering conditioned pain modulation (CPM) in chronic back pain (CBP) are contradictory. This might be because many patients with CBP report pain in further areas of the body, and altered CPM might influence spatial extent of pain rather than CBP per se. Therefore, we compared CPM in patients with CBP with different pain extent.

Patients with fibromyalgia syndrome (FMS), for whom CPM impairment is reported most consistently, were measured for comparison. Based on clinical evaluation and pain drawings, patients were categorized into chronic local back pain (CLP; n = 53), chronic widespread back pain (CWP; n = 32), and FMS (n = 92). Conditioned pain modulation was measured by the difference in pressure pain threshold (test stimuli) at the lower back before and after tonic heat pain (conditioning stimulus). We also measured psychosocial variables. Pressure pain threshold was significantly increased in CLP patients after tonic heat pain ( $P < 0.001$ ) indicating induction of CPM. Conditioned pain modulation in CLP was significantly higher than that in CWP and FMS ( $P < 0.001$ ), but CPM in CWP and FMS did not differ. Interestingly, a higher number of painful areas (0-10) were associated with lower CPM ( $r = 0.346$ ,  $P = 0.001$ ) in CBP but not in FMS ( $r = -0.013$ ,  $P = 0.903$ ). Anxiety and depression were more pronounced in FMS than in CLP or CWP ( $P$  values  $< 0.01$ ).

Our findings suggest that CPM dysfunction is associated with CWP and not with FMS as suggested previously. FMS seems to differ from CWP without FMS by higher psychosocial burden. Moreover, patients with CBP should be stratified into CLP and CWP, and centrally acting treatments targeting endogenous pain inhibition seem to be more indicated the higher the pain extent.

**61. FIBROMYALGIA**

Pain patterns

Arthritis Care Res (Hoboken). 2017 Feb 9. doi: 10.1002/acr.23214.

**The impact of moving from a widespread to multi-site pain definition on other fibromyalgia symptoms.**

Dean LE<sup>1</sup>, Arnold L<sup>2</sup>, Crofford L<sup>3</sup>, Bennett R<sup>4</sup>, Goldenberg D<sup>5</sup>, Fitzcharles MA<sup>6</sup>, Paiva ES<sup>7</sup>, Staud R<sup>8</sup>, Clauw D<sup>9</sup>, Sarzi-Puttini P<sup>10</sup>, Jones GT<sup>1</sup>, Ayorinde A<sup>1</sup>, Fluß E<sup>1</sup>, Beasley M<sup>1</sup>, Macfarlane GJ<sup>1</sup>.

**Author information**

**Abstract**

**OBJECTIVES:**

The current study investigated whether associations between pain and the additional symptoms associated with fibromyalgia are different in persons with chronic widespread (CWP) compared to multi-site pain (MSP), with or without joint areas.

**PATIENTS/METHODS:**

Six studies were utilized: 1958 British birth cohort, EpiFunD, Kid LBP, MUSICIAN, SHAMA and WHEST (females) studies. MSP was defined as the presence of pain in  $\geq 8/\geq 10$  body sites (adults/children) indicated on 4-view body manikins; conducted firstly to include joints (+joints) and secondly without (-joints). The relationship between pain and fatigue, sleep disturbance, somatic symptoms and mood impairment, were assessed using logistic regression. Results are presented as odds ratios (OR), with 95% confidence intervals (CI).

**RESULTS:**

There were 34,818 participants across the study populations (adults: mean age range 42-56yrs, % male 43-51 (excluding WHEST), CWP prevalence 12-17%). Amongst those reporting MSP, the proportion reporting CWP ranged between 62-76%. Amongst those reporting the symptoms associated with fibromyalgia, there was an increased likelihood of reporting pain, the magnitude of which were similar regardless of definition used. For example, within WHEST; reporting moderate/severe fatigue (Chalder fatigue scale 4-11) was associated with over a 5-fold increase in likelihood of reporting pain [CWP OR 5.2, 95%CI 3.9-6.9; MSP+joints 6.5, 5.0-8.6; MSP-joints 6.5, 4.7-9.0].

**DISCUSSION:**

This large-scale study demonstrates that, regardless of pain definition used, the magnitude of association between pain and other associated symptoms of fibromyalgia are similar. This supports the continued collection of both when classifying fibromyalgia but highlights that pain may not require to follow the definition outlined within the 1990ACR criteria. This article is protected by copyright. All rights reserved.

**Central sensitization**

Clin Rheumatol. 2017 Feb 4. doi: 10.1007/s10067-017-3557-1

**Pain extent is associated with pain intensity but not with widespread pressure or thermal pain sensitivity in women with fibromyalgia syndrome.**

Barbero M<sup>1</sup>, Fernández-de-Las-Peñas C<sup>2,3,4</sup>, Palacios-Ceña M<sup>5,6</sup>, Cescon C<sup>1</sup>, Falla D<sup>7</sup>.

Author information

Abstract

Widespread pain is considered a sign of central sensitization in people with chronic pain.

Our aim was to examine whether pain extent, assessed from the pain drawing, relates to measures from quantitative sensory testing in fibromyalgia syndrome (FMS). Thirty women with FMS and no other co-morbid conditions completed pain drawings (dorsal and ventral views) and clinical and related disability questionnaires. Pain extent and pain frequency maps were obtained from the pain drawings using a novel customized software. Pressure pain thresholds were assessed over the 18 tender points considered by the 1990 American College of Rheumatology criteria for FMS diagnosis and over two additional standardized points. Heat and cold pain thresholds were also assessed on the dorsal aspect of the neck, the dorsal aspect of the wrist, and the tibialis anterior. Spearman's correlation coefficients were used to assess the relationship between pain extent and quantitative sensory testing outcomes as well as clinical symptoms. Larger extent of pain was associated with a higher pain intensity (dorsal area:  $r_s = 0.461$ ,  $P = 0.010$ ; total area:  $r_s = 0.593$ ,  $P = 0.001$ ), younger age (ventral area:  $r_s = -0.544$ ,  $P = 0.002$ ; total area:  $r_s = -0.409$ ,  $P = 0.025$ ), shorter history of pain (ventral area:  $r_s = -0.367$ ,  $P = 0.046$ ), and higher cold pain thresholds over the tibialis anterior muscle ( $r_s = -0.406$ ,  $P = 0.001$ ).

No significant association was observed between pain extent and the remaining outcomes. Pain drawings constitute an easy and accurate approach to quantify widespread pain. Larger pain extent is associated with pain intensity but not with signs of central sensitization in women with FMS

## 62 A. NUTRITION/VITAMINS

### Protein

Am J Clin Nutr. 2017 Feb 8. pii: ajcn136762. doi: 10.3945/ajcn.116.136762.

**Dietary protein is associated with musculoskeletal health independently of dietary pattern: the Framingham Third Generation Study.**

Mangano KM<sup>1,2</sup>, Sahni S<sup>2,3</sup>, Kiel DP<sup>2,3</sup>, Tucker KL<sup>4</sup>, Dufour AB<sup>2,3</sup>, Hannan MT<sup>2,3</sup>.

Author information

Abstract

**Background:** Above-average dietary protein, as a single nutrient, improves musculoskeletal health. Evaluating the link between dietary protein and musculoskeletal health from a whole-diet perspective is important, as dietary guidelines focus on dietary patterns.

**Objective:** We examined the prospective association of novel dietary protein food clusters (derived from established dietary pattern techniques) with appendicular lean mass (ALM), quadriceps strength (QS), and bone mineral density (BMD) in 2986 men and women, aged 19-72 y, from the Framingham Third Generation Study.

**Design:** Total protein intake was estimated by food-frequency questionnaire in 2002-2005. A cluster analysis was used to classify participants into mutually exclusive groups, which were determined by using the percentage of contribution of food intake to overall protein intake. General linear modeling was used to 1) estimate the association between protein intake (grams per day) and BMD, ALM, appendicular lean mass normalized for height (ALM/ht<sup>2</sup>), and QS (2008-2011) and to 2) calculate adjusted least-squares mean outcomes across quartiles of protein (grams per day) and protein food clusters.

**Results:** The mean  $\pm$  SD age of subjects was 40  $\pm$  9 y; 82% of participants met the Recommended Daily Allowance (0.8 g  $\cdot$  kg body weight<sup>-1</sup>  $\cdot$  d<sup>-1</sup>). The following 6 dietary protein food clusters were identified: fast food and full-fat dairy, fish, red meat, chicken, low-fat milk, and legumes. BMD was not different across quartiles of protein intake ( $P$ -trend range = 0.32-0.82); but significant positive trends were observed for ALM, ALM/ht<sup>2</sup> ( $P < 0.001$ ), and QS ( $P = 0.0028$ ). Individuals in the lowest quartile of total protein intake (quartile 1) had significantly lower ALM, ALM/ht<sup>2</sup>, and QS than did those in the higher quartiles of intake (quartiles 2-4; ( $P$  ranges = 0.0001-0.003, 0.0007-0.003, and 0.009-0.05, respectively). However, there were no associations between protein clusters and any musculoskeletal outcome in adjusted models.

**Conclusions:** In a protein-replete cohort of adults, dietary protein is associated with ALM and QS but not with BMD. In this study, dietary protein food patterns do not provide further insight into beneficial protein effects on muscle outcomes.

### Sweet beverages

Am J Clin Nutr. 2017 Feb 8. pii: ajcn140145. doi: 10.3945/ajcn.116.140145.

**Frontostriatal and behavioral adaptations to daily sugar-sweetened beverage intake: a randomized controlled trial.**Burger KS<sup>1</sup>.

Author information

Abstract

**Background:** Current obesity theories suggest that the repeated intake of highly palatable high-sugar foods causes adaptations in the striatum, parietal lobe, and prefrontal and visual cortices in the brain that may serve to perpetuate consumption in a feed-forward manner. However, the data for humans are cross-sectional and observational, leaving little ability to determine the temporal precedence of repeated consumption on brain response.

**Objective:** We tested the impact of regular sugar-sweetened beverage intake on brain and behavioral responses to beverage stimuli. **Design:** We performed an experiment with 20 healthy-weight individuals who were randomly assigned to consume 1 of 2 sugar-sweetened beverages daily for 21 d, underwent 2 functional MRI sessions, and completed behavioral and explicit hedonic assessments.

**Results:** Consistent with preclinical experiments, daily beverage consumption resulted in decreases in dorsal striatal response during receipt of the consumed beverage ( $r = -0.46$ ) and decreased ventromedial prefrontal response during logo-elicited anticipation ( $r = -0.44$ ). This decrease in the prefrontal response correlated with increases in behavioral disinhibition toward the logo of the consumed beverage ( $r = 0.54$ ;  $P = 0.02$ ). Daily beverage consumption also increased precuneus response to both juice logos compared with a tasteless control ( $r = 0.45$ ), suggesting a more generalized effect toward beverage cues. Last, the repeated consumption of 1 beverage resulted in an explicit hedonic devaluation of a similar nonconsumed beverage ( $P < 0.001$ ).

**Conclusions:** Analogous to previous reports, these initial results provide convergent data for a role of regular sugar-sweetened beverage intake in altering neurobehavioral responses to the regularly consumed beverage that may also extend to other beverage stimuli. Future research is required to provide evidence of replication in a larger sample and to establish whether the neurobehavioral adaptations observed herein are specific to high-sugar and/or nonnutritive-sweetened beverages or more generally related to the repeated consumption of any type of food.

**63. PHARMACOLOGY**

NSAIDS for neck pain

Ann Rheum Dis. 2017 Feb 2. pii: annrheumdis-2016-210597. doi: 10.1136/annrheumdis-2016-210597.

**Non-steroidal anti-inflammatory drugs for spinal pain: a systematic review and meta-analysis.**

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Abstract

**BACKGROUND:**

While it is now clear that paracetamol is ineffective for spinal pain, there is not consensus on the efficacy of non-steroidal anti-inflammatory drugs (NSAIDs) for this condition. We performed a systematic review with meta-analysis to determine the efficacy and safety of NSAIDs for spinal pain.

**METHODS:**

We searched MEDLINE, EMBASE, CINAHL, CENTRAL and LILACS for randomised controlled trials comparing the efficacy and safety of NSAIDs with placebo for spinal pain. Reviewers extracted data, assessed risk of bias and evaluated the quality of evidence using the Grade of Recommendations Assessment, Development and Evaluation approach. A between-group difference of 10 points (on a 0-100 scale) was used for pain and disability as the smallest worthwhile effect, as well as to calculate numbers needed to treat. Random-effects models were used to calculate mean differences or risk ratios with 95% CIs.

**RESULTS:**

We included 35 randomised placebo-controlled trials. NSAIDs reduced pain and disability, but provided clinically unimportant effects over placebo. Six participants (95% CI 4 to 10) needed to be treated with NSAIDs, rather than placebo, for one additional participant to achieve clinically important pain reduction. When looking at different types of spinal pain, outcomes or time points, in only 3 of the 14 analyses were the pooled treatment effects marginally above our threshold for clinical importance. NSAIDs increased the risk of gastrointestinal reactions by 2.5 times (95% CI 1.2 to 5.2), although the median duration of included trials was 7 days.

**CONCLUSIONS:**

NSAIDs are effective for spinal pain, but the magnitude of the difference in outcomes between the intervention and placebo groups is not clinically important. At present, there are no simple analgesics that provide clinically important effects for spinal pain over placebo. There is an urgent need to develop new drug therapies for this condition.