

## ABSTRACTS

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## 2. LBP

### Balance responses

#### **Balance recovery reactions in individuals with recurrent nonspecific low back pain: effect of attention**

Gait and Posture, 12/22/2015

Etemadi Y, et al.

People who suffer from Low Back Pain (LBP) demonstrate impaired postural control. Deficits in sensory–motor systems have been proposed to be related to these changes. These findings imply altered cognitive regulation of dynamic balance in patients with LBP and suggest that the adopted strategy might alter depending upon the characteristics of the postural challenge.

#### Methods

- Twenty subjects with recurrent non–specific LBP and 20 healthy controls participated.
- They stood on a moveable platform with each foot placed on a separate force plate.
- They were asked to maintain their balance (a) while expecting translations of the support surface at two sizes of perturbation (b) with and without performing a cognitive (auditory Stroop) task.
- The outcomes included reaction time (RT), latency, initial velocity and amplitude of center of pressure response for balance, and RT for cognitive performance.

#### Results

- Compared to the healthy group, LBP group demonstrated delayed RT and latency, and reduced initial velocity ( $P < 0.05$ ). Moreover, they had slower Stroop RT ( $F = 70.88, P < 0.001$ ).
- Concurrent performance of tasks resulted in increased Stroop RT ( $F = 3.42, P = 0.03$ ) and adaptation in initial velocity ( $F = 6.70, P = 0.01$ ).
- At the smaller size of perturbation, cognitive load increased velocity in LBP group but decreased this variable in the healthy group.
- When the cognitive load was added at the larger size of perturbation, velocity of response decreased in LBP group ( $P < 0.05$ ).

## Pain modulation and nociceptive effects

December 2015 Volume 20, Issue 6, Pages 763–768

**Pro-nociceptive and anti-nociceptive effects of a conditioned pain modulation protocol in participants with chronic low back pain and healthy control subjects**

Martin Rabey Cheryl Poon Jonathan Wray Chutiporn Thamajaree Ryan East Helen Slater

DOI: <http://dx.doi.org/10.1016/j.math.2015.02.011>

- CPM responses vary from facilitatory to inhibitory in controls and people with LBP.
- 73% of people with LBP show facilitatory responses to CPM testing.
- 69% of healthy controls do not show facilitatory responses to CPM testing.

Abstract

Background

People with chronic pain may exhibit pro-nociceptive phenotypes characterised partly by reduced conditioned pain modulation (CPM). Characterising variability in CPM in people with chronic low back pain (CLBP) may inform management.

Objectives

To investigate pro/anti-nociceptive effects of a CPM protocol in age/sex-matched healthy controls (HCs) and people with CLBP.

Design

Case-controlled trial (64 participants/group).

Method

The CPM protocol involved: test stimulus (TS) (noxious pressure applied by algometer to lumbar region); conditioning stimulus (CS) (noxious heat applied by thermode to dorsal hand). CPM recruitment was measured by the change in pain intensity (rated on a numeric rating scale (NRS)) of the TS in the presence and absence of the CS.

Results

Responses to this CPM protocol were variable for both groups with measures consistent with either inhibitory or facilitatory effects. A significantly greater proportion of facilitatory responses were seen in the CLBP cohort compared to HCs (73% versus 31%). In response to the CS, participants with CLBP demonstrated a mean increase in NRS scores (mean 1.3 points;  $p < 0.001$ ), while HCs did not (mean  $-0.2$  points;  $p = 0.35$ ) and the between-group difference in change scores was significant (mean 1.4 points;  $p < 0.001$ ; effect size (Hedges'  $g$ ): 1.03).

**Conclusion**

In HCs and participants with CLBP this CPM protocol elicited responses consistent with varying pro/anti-nociceptive effects. The higher proportion of participants with CLBP demonstrating a facilitatory response suggests a pro-nociceptive phenotype may characterise this cohort.

Keywords:

Conditioned pain modulation, Chronic low back pain, Pro-nociceptive, Palpation

### Yoga and LBP

#### **A qualitative study of predominantly low income minority participants in a yoga trial for chronic low back pain**

Complementary Therapies in Medicine, 12/21/2015

Keosaian JE, et al.

The aim of this study is to explore the experiences of low-income minority adults taking part in a yoga dosing trial for chronic low back pain. Yoga is a multidimensional treatment for low back pain that has the potential to favorably impact health in a predominantly low-income minority population.

#### Methods

- Individual semi-structured interviews were conducted with nineteen participants recruited from a randomized yoga dosing trial for predominantly low-income minority adults with chronic low back pain.
- Interviews discussed the impact of yoga on low back pain and emotions; other perceived advantages or disadvantages of the intervention; and facilitators and barriers to practicing yoga.
- Interviews were audio taped and transcribed, coded using ATLAS.ti software, and analyzed with inductive and deductive thematic analysis methods.

#### Results

- Participants viewed yoga as a means of pain relief and attributed improved mood, greater ability to manage stress, and enhanced relaxation to yoga.
- Overall, participants felt empowered to self-manage their pain.
- Some found yoga to be helpful in being mindful of their emotions and accepting of their pain.
- Trust in the yoga instructors was a commonly cited facilitator for yoga class attendance.
- Lack of time, motivation, and fear of injury were reported barriers to yoga practice.

### 3. DISC

#### DNA factors

PLoS One. 2015 Dec 3;10(12):e0144177. doi: 10.1371/journal.pone.0144177. eCollection 2015.

#### **Relationship between Initial Telomere Length, Initial Telomerase Activity, Age, and Replicative Capacity of Nucleus Pulposus Chondrocytes in Human Intervertebral Discs: What Is a Predictor of Replicative Potential?**

Lee JS<sup>1,2</sup>, Jeong SW<sup>2</sup>, Cho SW<sup>1</sup>, Juhn JP<sup>1</sup>, Kim KW<sup>1,2</sup>.

Author information

#### Abstract

There is evidence that telomere length (TL), telomerase activity (TA), and age are related to the replicative potential of human nucleus pulposus chondrocytes (NPCs). However, it has not yet been established if any of these factors can serve as predictors of the replicative potential of NPCs. To establish predictors of the replicative potential of NPCs, we evaluated potential relationships between replicative capacity of NPCs, initial TL (telomere length at the first passage), initial TA (telomerase activity at the first passage), and age. Nucleus pulposus specimens were obtained from 14 patients of various ages undergoing discectomy. NPCs were serially cultivated until the end of their replicative lifespans. Relationships among cumulative population doubling level (PDL), initial TL, initial TA, and age were analyzed. Initial TA was negatively correlated with age ( $r = -0.674$ ,  $P = 0.008$ ). However, no correlation between initial TL and age was observed. Cumulative PDL was also negatively correlated with age ( $r = -0.585$ ,  $P = 0.028$ ). Although the cumulative PDL appeared to increase with initial TL or initial TA, this trend was not statistically significant.

In conclusion, age is the sole predictor of the replicative potential of human NPCs, and replicative potential decreases with age. Initial TL and initial TA are not predictors of replicative potential, and can serve only as reference values.

PMID: 26633809

## 8. VISCERA

### IBS and medical students

Turk J Gastroenterol. 2015 Dec 17. doi: 10.5152/tjg.2015.150333.

#### **A systematic review of the prevalence and risk factors of irritable bowel syndrome among medical students.**

Ibrahim NK<sup>1</sup>.

Author information

Abstract

#### **BACKGROUND/AIMS:**

Irritable bowel syndrome (IBS) represents a great challenge to public health, particularly among medical students. The aim of the study was to determine the global prevalence and risk factors of IBS among medical students.

#### **MATERIALS AND METHODS:**

Data were obtained through searches in PubMed, Ovid, the Cochrane database, Embase, Google scholar, Institute for Scientific Information (ISI) "Web of Science," and Medline from 1990 to June 2015. The search terms included "Irritable Bowel Syndrome" and "Medical students" and "prevalence, risk factors". More than 100 articles were reviewed, scrutinized, and critically appraised for the eligibility criteria, and the relevant articles were selected.

#### **RESULTS:**

Sixteen studies were identified, and the prevalence of IBS among medical students ranged from 9.3% to 35.5%. The relatively high prevalence among medical students may be attributed to their special stressful learning environment. Some studies found that female gender, family history of IBS, psychiatric stress, anxiety, depression, infections, dietary factors, and sleep disorders were associated with IBS.

#### **CONCLUSION:**

A relatively high prevalence of IBS was prevalent among medical students. Annual screening of IBS and introduction of stress management courses are recommended.

PMID: 26674980

### IBS and iron deficiency

#### **The burden of anaemia in patients with inflammatory bowel diseases**

Digestive and Liver Diseases, 12/22/2015

Testa A, et al.

The authors aim to evaluate the prevalence and causes of anaemia (AN) in inflammatory bowel diseases (IBD). In Southern Italy, AN is common in IBD and is more frequent in active disease and hospitalized patients. Iron deficiency still remains the major cause of AN in IBD.

#### Methods

- The authors prospectively performed a one-year multicentre observational study including all IBD cases attending six Units.
- They also investigated patients' main serological parameters.

#### Results

- The study population included 965 IBD patients (582 CD; 383 UC), of whom 142 were in-patients and 823 out-patients.
- AN was diagnosed in 134 out of 965 IBD patients (14%).
- No significant difference in AN prevalence was

## Gluten sensitivity

Clin Gastroenterol Hepatol. 2015 Sep;13(9):1604-12.e3. doi: 10.1016/j.cgh.2015.01.029. Epub 2015 Feb 19.

**Small Amounts of Gluten in Subjects With Suspected Nonceliac Gluten Sensitivity: A Randomized, Double-Blind, Placebo-Controlled, Cross-Over Trial.**

Di Sabatino A<sup>1</sup>, Volta U<sup>2</sup>, Salvatore C<sup>1</sup>, Biancheri P<sup>1</sup>, Caio G<sup>2</sup>, De Giorgio R<sup>2</sup>, Di Stefano M<sup>1</sup>, Corazza GR<sup>3</sup>.

Author information

Abstract

**BACKGROUND & AIMS:**

There is debate over the existence of nonceliac gluten sensitivity (NCGS) intestinal and extraintestinal symptoms in response to ingestion of gluten-containing foods by people without celiac disease or wheat allergy. We performed a randomized, double-blind, placebo-controlled, cross-over trial to determine the effects of administration of low doses of gluten to subjects with suspected NCGS.

**METHODS:**

We enrolled 61 adults without celiac disease or a wheat allergy who believed ingestion of gluten-containing food to be the cause of their intestinal and extraintestinal symptoms. Participants were assigned randomly to groups given either 4.375 g/day gluten or rice starch (placebo) for 1 week, each via gastrosoluble capsules. After a 1-week gluten-free diet, participants crossed over to the other group. The primary outcome was the change in overall (intestinal and extraintestinal) symptoms, determined by established scoring systems, between gluten and placebo intake. A secondary outcome was the change in individual symptom scores between gluten vs placebo.

**RESULTS:**

According to the per-protocol analysis of data from the 59 patients who completed the trial, intake of gluten significantly increased overall symptoms compared with placebo ( $P = .034$ ). Abdominal bloating ( $P = .040$ ) and pain ( $P = .047$ ), among the intestinal symptoms, and foggy mind ( $P = .019$ ), depression ( $P = .020$ ), and aphthous stomatitis ( $P = .025$ ), among the extraintestinal symptoms, were significantly more severe when subjects received gluten than placebo.

**CONCLUSIONS:**

In a cross-over trial of subjects with suspected NCGS, the severity of overall symptoms increased significantly during 1 week of intake of small amounts of gluten, compared with placebo. Clinical trial no: ISRCTN72857280.

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**KEYWORDS:**

Extraintestinal; Gluten; Intestinal; Nonceliac Gluten Sensitivity; Placebo

- Exploring the Strange New World of Non-Celiac Gluten Sensitivity. [Clin Gastroenterol Hepatol. 2015]

PMID: 25701700

## The gut and the heart

Journal Scan / Research · December 17, 2015

### Pathogenic Gut Flora in Patients With Chronic Heart Failure

#### TAKE-HOME MESSAGE

- The authors sought to determine correlations between pathogenic gut flora and disease severity, venous blood congestion, and inflammation in patients with chronic heart failure (CHF). Patients with CHF had considerably larger counts of pathogenic bacteria and fungi (*Candida* species) compared with controls. Patients with CHF also had altered intestinal permeability, increased right atrial pressure, and increased inflammation compared with controls, and these measures were more pronounced in patients with moderate to severe NYHA functional class compared with patients with mild functional class. Intestinal inflammation, intestinal permeability, and right atrial pressure were mutually interrelated.
- Patients with CHF have large quantities of intestinal pathogenic bacteria and *Candida* and increased intestinal permeability associated with inflammation, venous blood congestion as measured by right atrial pressure, and disease severity as measured by NYHA functional class.

**OBJECTIVES** The goal of this study was to measure the presence of pathogenic gut flora and intestinal permeability (IP) and their correlations with disease severity, venous blood congestion, and inflammation in patients with chronic heart failure (CHF). **BACKGROUND** Evidence suggests that translocation of gut flora and/or their toxins from the intestine to the bloodstream is a possible trigger of systemic CHF inflammation. However, the relation between pathogenic gut flora and CHF severity, as well as IP, venous blood congestion as right atrial pressure (RAP), and/or systemic inflammation (C-reactive protein [CRP]), is still unknown. **METHODS** This study analyzed 60 well-nourished patients in stable condition with mild CHF (New York Heart Association [NYHA] functional class I to II; n = 30) and moderate to severe CHF (NYHA functional class III to IV; n = 30) and matched healthy control subjects (n = 20). In all subjects, the presence and development in the feces of bacteria and fungi (*Candida* species) were measured; IP according to cellobiose sugar test results was documented. The study data were then correlated with RAP (echocardiography) and systemic inflammation. **RESULTS** Compared with normal control subjects, the entire CHF population had massive quantities of pathogenic bacteria and *Candida* such as *Campylobacter* ( $85.3 \pm 3.7$  CFU/ml vs.  $1.0 \pm 0.3$  CFU/ml;  $p < 0.001$ ), *Shigella* ( $38.9 \pm 12.3$  CFU/ml vs.  $1.6 \pm 0.2$  CFU/ml;  $p < 0.001$ ), *Salmonella* ( $31.3 \pm 9.1$  CFU/ml vs 0 CFU/ml;  $p < 0.001$ ), *Yersinia enterocolitica* ( $22.9 \pm 6.3$  CFU/ml vs. 0 CFU/ml;  $p < 0.0001$ ), and *Candida* species ( $21.3 \pm 1.6$  CFU/ml vs.  $0.8 \pm 0.4$  CFU/ml;  $p < 0.001$ ); altered IP ( $10.2 \pm 1.2$  mg vs.  $1.5 \pm 0.8$  mg;  $p < 0.001$ ); and increased RAP ( $12.6 \pm 0.6$  mm Hg) and inflammation ( $12.5 \pm 0.6$  mg/dl). These variables were more pronounced in patients with moderate to severe NYHA functional classes than in patients with the mild NYHA functional class. Notably, IP, RAP, and CRP were mutually interrelated (IP vs. RAP,  $r = 0.55$ ,  $p < 0.0001$ ; IP vs. CRP,  $r = 0.78$ ,  $p < 0.0001$ ; and RAP vs. CRP,  $r = 0.78$ ,  $p < 0.0001$ ).

**CONCLUSIONS** This study showed that patients with CHF may have intestinal overgrowth of pathogenic bacteria and *Candida* species and increased IP associated with clinical disease severity, venous blood congestion, and inflammation.

**10 A. CERVICAL SPINE****Depression and chronic neck pain**

J Pain. 2015 Dec;16(12):1288-99. doi: 10.1016/j.jpain.2015.09.002. Epub 2015 Sep 21.

**Psychosocial, Physical, and Neurophysiological Risk Factors for Chronic Neck Pain: A Prospective Inception Cohort Study.**

Shahidi B<sup>1</sup>, Curran-Everett D<sup>2</sup>, Maluf KS<sup>3</sup>.

Author information

**Abstract**

The purpose of this investigation was to identify modifiable risk factors for the development of first-onset chronic neck pain among an inception cohort of healthy individuals working in a high-risk occupation.

Candidate risk factors identified from previous studies were categorized into psychosocial, physical, and neurophysiological domains, which were assessed concurrently in a baseline evaluation of 171 office workers within the first 3 months of hire. Participants completed monthly online surveys over the subsequent year to identify the presence of chronic interfering neck pain, defined as a Neck Disability Index score  $\geq 5$  points for 3 or more months. Data were analyzed using backward logistic regression to identify significant predictors within each domain, which were then entered into a multivariate regression model adjusted for age, sex, and body mass index. Development of chronic interfering neck pain was predicted by depressed mood (odds ratio [OR] = 3.36, 95% confidence interval [CI] = 1.10-10.31,  $P = .03$ ), cervical extensor endurance (OR = .92, 95% CI, .87-.97,  $P = .001$ ), and diffuse noxious inhibitory control (OR = .90, 95% CI, .83-.98,  $P = .02$ ) at baseline.

These findings provide the first evidence that individuals with preexisting impairments in mood and descending pain modulation may be at greater risk for developing chronic neck pain when exposed to peripheral nociceptive stimuli such as that produced during muscle fatigue.

***PERSPECTIVE:***

Depressed mood, poor muscle endurance, and impaired endogenous pain inhibition are predisposing factors for the development of new-onset chronic neck pain of nonspecific origin in office workers. These findings may assist with primary prevention by allowing clinicians to screen for individuals at risk of developing chronic neck pain.

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***KEYWORDS:***

Neck pain; chronic; prospective; risk factors

PMID: 26400680

### 13. CRANIUM/TMJ

#### Sleep metabolic rate

Primary Care and Journal Scan / Research · December 17, 2015

#### Resting Metabolic Rate Varies by Race and Sleep Duration Obesity

##### TAKE-HOME MESSAGE

The authors of this randomized study evaluated the effect of sleep restriction on resting metabolic rate and respiratory quotient. Participants restricted to 4 hours/night of sleep for 5 nights had a decreased resting metabolic rate compared with no change in the control group. Resting metabolic rate returned to baseline after 1 night of 12-hour recovery sleep. In both the control and sleep-restricted groups, black participants had a lower resting metabolic rate and a higher respiratory quotient compared with white participants.

Many studies have shown that when sleep is reduced weight is gained. This seems counterintuitive. If you are awake longer, then you should be burning more calories and you should lose weight. What researchers have shown in the past, however, is that the less sleep you get, the more time you are awake and the more calories you will eat. These excess calories translate into weight gain.

This current research is looking at the metabolic side. What happens to your resting metabolic rate (RMR) when you reduce your sleep? Does it go up, down, or stay the same? In this study, 11 controls slept 10 hours per night. The other group of 36 patients slept 4 hours per night for 5 nights then 12 hours for 1 night for recovery.

The RMR for the reduced-sleep group was actually lower than it was for the control group. The RMR makes up about 60% to 70% of our energy expenditure per day; therefore, a reduction in RMR would mean fewer calories burned and hence lead to more weight gain. Now, the reduction in calories burned was small at 50 Kcal per day; but day after day of reduced energy expenditure would translate into significant weight gain over time. So, the lack of sleep is a double whammy: you eat more and you burn less.

This makes sense if you think about it in survival terms. If you are not sleeping when you should be, then your body thinks that you must be in “danger” because it is not safe to sleep. If you are in danger, then you should load up on calories and supplies to do battle, and also conserve your energy for the war. Fortunately, you are probably not fighting a battle, so day after day of lack of sleep translates to thousands of calories conserved and hence weight gain.

**Periodontal disease and pancreatic CA**

Pancreas. 2016 Jan;45(1):134-41. doi: 10.1097/MPA.0000000000000419.

**Investigating the Association Between Periodontal Disease and Risk of Pancreatic Cancer.**

Chang JS<sup>1</sup>, Tsai CR, Chen LT, Shan YS.

Author information

Abstract

**OBJECTIVE:**

Periodontal disease (PD) is increasingly recognized as an emerging risk factor for various systemic diseases, including diabetes, cardiovascular diseases, and cancer. The current study examined the association between PD (periodontitis, gingivitis, and others) and pancreatic cancer.

**METHODS:**

A total of 139,805 subjects with PD and 75,085 subjects without PD were identified from the National Health Insurance Research Database of Taiwan. Cox proportional hazards regression was performed to compare the incidence of pancreatic cancer between the 2 groups.

**RESULTS:**

Periodontal disease was positively associated with pancreatic cancer risk (hazard ratio [HR], 1.55; 95% confidence interval [CI], 1.02-2.33). This positive association occurred predominantly among those aged 65 years or older (HR, 2.17; 95% CI, 1.03-4.57) and was not observed among those aged younger than 65 years (HR, 0.83; 95% CI, 0.52-1.34). Further analysis showed that PD is a risk factor for pancreatic cancer independent of diabetes, hyperlipidemia, allergies, viral hepatitis, peptic ulcer, pancreatitis, chronic obstructive pulmonary disease (as a proxy for cigarette smoking), and alcoholic-related conditions (as a proxy for alcohol drinking).

**CONCLUSIONS:**

Our results indicated a significantly positive association between PD and risk of pancreatic cancer. The underlying biological mechanisms for the positive association between PD and pancreatic cancer require further investigation.

PMID: 26474422

**14. HEADACHES****Migraine and trigeminal neuralgia**

Cephalalgia. 2015 Dec 20. pii: 0333102415623069.

**Increased risk of trigeminal neuralgia in patients with migraine: A nationwide population-based study.**

Lin KH<sup>1</sup>, Chen YT<sup>2</sup>, Fuh JL<sup>3</sup>, Wang SJ<sup>4</sup>.

Author information

Abstract

**OBJECTIVES:**

The objectives of this article are to evaluate the association between migraine and trigeminal neuralgia and to investigate the effects of age, sex, migraine subtype, and comorbid risk factors on trigeminal neuralgia development.

**METHODS:**

This population-based cohort study was conducted using data from Taiwan's National Health Insurance Research Database. Individuals aged  $\geq 20$  years with neurologist-diagnosed migraine between 2005 and 2009 were included. A non-headache age-, sex-, and propensity score-matched control cohort was selected for comparison. All participants were followed until the end of 2010, death, or the occurrence of trigeminal neuralgia. Cox proportional hazards regression was used to calculate hazard ratios (HRs) and 95% confidence intervals (CIs) for comparison of the risk of trigeminal neuralgia between groups.

**RESULTS:**

Both cohorts (n = 137,529 each) were followed for a mean of 3.1 years. During the follow-up period, 575 patients (421,581 person-years) in the migraine cohort and 88 matched controls (438,712 person-years) were newly diagnosed with trigeminal neuralgia (incidence rates, 136.39 and 20.06/100,000 person-years, respectively). The HR for trigeminal neuralgia was 6.72 (95% CI, 5.37-8.41; p < 0.001). The association between migraine and trigeminal neuralgia remained significant in sensitivity analyses. Among migraine subtypes, patients with migraine with aura were at greater risk of trigeminal neuralgia development. No other significant interaction was identified in subgroup analyses.

**CONCLUSIONS:**

Migraine is a previously unidentified risk factor for trigeminal neuralgia. The association between these conditions suggests a linked underlying mechanism, which is worthy of further exploration.

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**KEYWORDS:**

Trigeminal neuralgia; migraine; risk factors

PMID: 26692399

**Oxidative stress**

Headache. 2015 Dec 7. doi: 10.1111/head.12725.

**Migraine Triggers and Oxidative Stress: A Narrative Review and Synthesis.**

**Borkum JM<sup>1,2</sup>.**

Author information

Abstract

**BACKGROUND:**

Blau theorized that migraine triggers are exposures that in higher amounts would damage the brain. The recent discovery that the TRPA1 ion channel transduces oxidative stress and triggers neurogenic inflammation suggests that oxidative stress may be the common denominator underlying migraine triggers.

**OBJECTIVE:**

The aim of this review is to present and discuss the available literature on the capacity of common migraine triggers to generate oxidative stress in the brain.

**METHODS:**

A Medline search was conducted crossing the terms "oxidative stress" and "brain" with "alcohol," "dehydration," "water deprivation," "monosodium glutamate," "aspartame," "tyramine," "phenylethylamine," "dietary nitrates," "nitrosamines," "noise," "weather," "air pollutants," "hypoglycemia," "hypoxia," "infection," "estrogen," "circadian," "sleep deprivation," "information processing," "psychosocial stress," or "nitroglycerin and tolerance." "Flavonoids" was crossed with "prooxidant." The reference lists of the resulting articles were examined for further relevant studies. The focus was on empirical studies, in vitro and of animals, of individual triggers, indicating whether and/or by what mechanism they can generate oxidative stress.

**RESULTS:**

In all cases except pericranial pain, common migraine triggers are capable of generating oxidative stress. Depending on the trigger, mechanisms include a high rate of energy production by the mitochondria, toxicity or altered membrane properties of the mitochondria, calcium overload and excitotoxicity, neuroinflammation and activation of microglia, and activation of neuronal nicotinamide adenine dinucleotide phosphate (NADPH) oxidase. For some triggers, oxidants also arise as a byproduct of monoamine oxidase or cytochrome P450 processing, or from uncoupling of nitric oxide synthase.

**CONCLUSIONS:**

Oxidative stress is a plausible unifying principle behind the types of migraine triggers encountered in clinical practice. The possible implications for prevention and for understanding the nature of the migraine attack are discussed.

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**KEYWORDS:**

TRPA1; antioxidants; migraine; oxidative stress; triggers

PMID: 26639834

## 16. CONCUSSIONS

PT's have good knowledge of

Phys Ther. 2015 Dec 4.

### **Concussion Attitudes and Beliefs, Knowledge, and Clinical Practice: A Survey of Physical Therapists.**

Yorke AM<sup>1</sup>, Littleton S<sup>2</sup>, Alsalaheen BA<sup>3</sup>.

Author information

Abstract

#### **BACKGROUND:**

A concussion is considered a mild TBI that may cause physical, cognitive, affective, and sleep dysfunction. Physical therapists have been identified as a health care provider involved in the multidisciplinary care of a patient with concussion.

#### **OBJECTIVE:**

The purpose of this study was to describe the current attitudes and beliefs, knowledge, and practice of physical therapists in the management of patients with concussion.

#### **METHODS:**

A 55 question electronic survey divided into six sections: (1) demographics, (2) current practice, (3) concussion legislation, (4) attitudes and beliefs, (5) concussion knowledge, and (6) clinical decision making was developed and distributed online through selected APTA sections.

#### **RESULTS:**

A total of 1,272 physical therapists completed the survey. Seventy percent of the respondents (n=894) reported having concussion training. While supportive of the role of the physical therapist in the management of a person with concussion, the respondents demonstrated less confidence when making return to play decisions. Respondents correctly answered on average 13 (out of 15) concussion knowledge questions with gaps exhibited in understanding the clinical utilization of concussion severity scales, the conservative management of youth who sustain a concussion, and anticipated normal CT/MRI after a concussion. When provided with clinical scenarios, respondents were able to recognize when a referral to a physician was indicated; however, demonstrated variability in identifying a need for vestibular or manual physical therapy.

#### **LIMITATIONS:**

Convenience sampling was utilized limiting its generalizability to the physical therapy profession as a whole.

#### **CONCLUSION:**

Physical therapists demonstrated a solid foundation of concussion knowledge, but gaps still existed. Future professional development opportunities should be developed to target identified gaps in knowledge and current practice patterns.

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PMID: 26637654

**Depression**

Phys Sportsmed. 2015 Nov 26:1-6.

**Depression as a Modifying Factor in Sport-Related Concussion: A Critical Review of the Literature.**

Solomon GS<sup>1</sup>, Kuhn AW<sup>2</sup>, Zuckerman SL<sup>1</sup>.

Author information

**Abstract**

Since its third iteration in 2008, the international Concussion in Sport Group (CISG) has delineated several 'modifying factors' that have the potential to influence the management of sport-related concussions (SRC).

One of these factors is co- and pre-morbidities, which includes migraines, mental health disorders, attention-deficit hyperactive disorder (ADHD), learning disability, and sleep disorders. Mental health disorders, and in particular, depression, have received some attention in the management of SRC and in this review we summarize the empirical evidence for its inclusion as a modifying factor. This review is divided into three main bodies of findings: (1) the incidence and prevalence of depression and depressive symptoms in non-concussed and concussed athletes, with comparison made to the general population; (2) managing the post-concussion athlete and accounting for premorbid depressive symptoms; and (3) depression as a long-term effect of repetitive head trauma.

Overall, it has been reported that certain subpopulations of athletes have similar or even higher rates of depressive symptoms when compared to the general population. The challenge of accounting for these baseline-depressive symptoms while managing the post-concussive athlete is stressed. And lastly, the prevalence of depression and its relationship to concussion in later-life is discussed.

**KEYWORDS:**

Depression; anxiety disorders; concussion; mental health; mood disorders; sports

PMID: 26567843

## Neurocognitive impairment

Am J Sports Med. 2015 Dec;43(12):3055-61. doi: 10.1177/0363546515606430. Epub 2015 Oct

**Near Point of Convergence After a Sport-Related Concussion: Measurement Reliability and Relationship to Neurocognitive Impairment and Symptoms.**

Pearce KL<sup>1</sup>, Sufrinko A<sup>1</sup>, Lau BC<sup>2</sup>, Henry L<sup>1</sup>, Collins MW<sup>1</sup>, Kontos AP<sup>3</sup>.

Abstract

**BACKGROUND:**

Convergence insufficiency (CI) is a common binocular vision deficit after a sport-related concussion (SRC). CI may result in visual discomfort and vision-mediated functional difficulties such as slowed reading and compromised attention, leading to impaired academic, work, and sport performance.

**PURPOSE:**

To test the reliability of repeated near point of convergence (NPC) measurements in a sample of athletes after an SRC; compare the symptoms and cognitive impairment of athletes with normal NPC to those with CI after an SRC; and explore the relationship among age, sex, learning disability, migraine history, and CI.

**STUDY DESIGN:**

Cross-sectional study; Level of evidence, 3.

**METHODS:**

A total of 78 athletes (mean age, 14.31 ± 2.77 years) who were seen a mean 5.79 ± 5.63 days after an SRC were administered 3 trials of an NPC assessment, along with neurocognitive (Immediate Post-Concussion Assessment and Cognitive Testing [ImPACT]) and symptom assessments. Patients were divided into normal NPC (NPC ≤ 5 cm; n = 45) and CI (NPC > 5 cm; n = 33) groups. Intraclass correlation coefficients (ICCs) and repeated-measures analyses of variance (ANOVAs) assessed the consistency of NPC across the 3 trials. The ANOVAs were employed to examine differences on neurocognitive composites and symptoms between the normal NPC and CI groups. Stepwise regressions (controlling for age and symptom scores on the Post-Concussion Symptom Scale [PCSS]) were conducted to evaluate the predictive utility of the NPC distance for neurocognitive impairment.

**RESULTS:**

Groups did not differ on demographic or injury characteristics. NPC differed between trial 1 and trials 2 (P = .02) and 3 (P = .01) for the CI group but not the normal NPC group. Internal consistency was high across NPC measurements (ICC range, 0.95-0.98). Patients with CI performed worse on verbal memory (P = .02), visual motor speed (P = .02), and reaction time (P = .001,  $\eta^2(2) = .13$ ) and had greater total symptom scores (P = .02) after the injury. Results of hierarchical regression revealed that the NPC distance contributed significantly to the model for reaction time (P < .001).

**CONCLUSION:**

CI was common (~42%) in athletes evaluated within 1 month after an SRC. Athletes with CI had worse neurocognitive impairment and higher symptom scores than did those with normal NPC. Clinicians should consider routinely screening for NPC as part of a comprehensive concussion evaluation to help inform treatment recommendations, academic accommodations, and referrals for vision therapy. **KEYWORDS:** concussion; convergence insufficiency; eye injuries; neurocognitive impairment

PMID: 26453625

**20 A. ROTATOR CUFF****PRP not yet for repairs**

Am J Sports Med. 2015 Dec;43(12):3071-6. doi: 10.1177/0363546515572777. Epub 2015 Mar 12.

**Platelet-Rich Plasma Reduces Retear Rates After Arthroscopic Repair of Small- and Medium-Sized Rotator Cuff Tears but Is Not Cost-Effective.**

Vavken P<sup>1</sup>, Sadoghi P<sup>2</sup>, Palmer M<sup>3</sup>, Rosso C<sup>4</sup>, Mueller AM<sup>5</sup>, Szoelloesy G<sup>5</sup>, Valderrabano V<sup>5</sup>.  
Abstract

**BACKGROUND:**

It has been suggested that platelet-rich plasma (PRP) improves healing after arthroscopic rotator cuff repair. The current literature provides ample but inconsistent data on this topic.

**PURPOSE:**

To systematically review the current in vivo evidence for the use of platelet concentrates (PRP) in the arthroscopic treatment of rotator cuff tears to assess effectiveness, safety, and cost-effectiveness.

**STUDY DESIGN: Meta-analysis and cost-effectiveness analysis.****METHODS:**

Published evidence from controlled, human trials of rotator cuff repair augmented with platelet concentrates was systematically gathered, and data on retear rates were extracted. Mathematical and clinical heterogeneity was evaluated, and fixed-effect meta-analysis was performed to calculate the risk ratio (RR) of retears and the number needed to treat (NNT). Subgroup analyses were made for small/medium tears (n = 404) and large/massive tears (n = 374). Cost-effectiveness was assessed using data from this meta-analysis and using cost data from the literature, including extensive sensitivity analyses, to calculate the incremental cost-effectiveness ratio (ICER).

**RESULTS:**

Thirteen studies published between 2010 and 2014 were identified for analysis. The RR for retear for all patients was 0.87 (95% CI, 0.67-1.12; P = .286). For small- and medium-sized tears (<3 cm), the RR for retear was 0.60 (95% CI, 0.37-0.97), consistent with a significant difference in favor of PRP use (P = .038). This translated into an NNT of 14 (95% CI, 7-125). However, at an ICER of US\$127,893 per quality-adjusted life year gained, assuming a 5% revision rate, the use of PRP was not cost-effective for small- and medium-sized tears.

**CONCLUSION:**

In large tears, even with double-row repair, the beneficial effects of PRP alone are insufficient to compensate the progressed tissue damage. The study data suggest that PRP may promote healing of small- and medium-sized tears to reduce retear rates. However, despite the substantial biological effect, at current cost, the use of PRP is not cost-effective in arthroscopic repair of small- and medium-sized tears.

**KEYWORDS:**

PRP; cost-effectiveness; evidence-based medicine; platelet; rotator cuff

PMID: 25767267

**26. CARPAL TUNNEL SYNDROME****CTS and work**

Best Pract Res Clin Rheumatol. 2015 Jun;29(3):440-53. doi: 10.1016/j.berh.2015.04.026. Epub 2015 May 27.

**Carpal tunnel syndrome and work.**

Newington L<sup>1</sup>, Harris EC<sup>2</sup>, Walker-Bone K<sup>3</sup>.

Author information

**Abstract**

Carpal tunnel syndrome (CTS) is the most common peripheral nerve entrapment syndrome, and it frequently presents in working-aged adults. Its mild form causes 'nuisance' symptoms including dysaesthesia and nocturnal waking.

At its most severe, CTS can significantly impair motor function and weaken pinch grip. This review discusses the anatomy of the carpal tunnel and the clinical presentation of the syndrome as well as the classification and diagnosis of the condition. CTS has a profile of well-established risk factors including individual factors and predisposing co-morbidities, which are briefly discussed.

There is a growing body of evidence for an association between CTS and various occupational factors, which is also explored. Management of CTS, conservative and surgical, is described. Finally, the issue of safe return to work post carpal tunnel release surgery and the lack of evidence-based guidelines are discussed.

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**KEYWORDS:**

Carpal tunnel syndrome; Occupation; Repetition; Return to work; Vibration

PMID: 26612240

**32 A. KNEE/ACL****Net ball mechanics**

J Sports Sci. 2015 Dec 8:1-7.

**Mechanisms of anterior cruciate ligament injuries in elite women's netball: a systematic video analysis.**

Stuelcken MC<sup>1</sup>, Mellifont DB<sup>1</sup>, Gorman AD<sup>1</sup>, Sayers MG<sup>1</sup>.

**Author information****Abstract**

This study involved a systematic video analysis of 16 anterior cruciate ligament (ACL) injuries sustained by elite-level netball players during televised games in order to describe the game situation, the movement patterns involved, the player's behaviour, and a potential injury mechanism. Eight of the ACL injuries were classified as "indirect contact" and eight as "non-contact". Two common scenarios were identified. In Scenario A the player was jumping to receive or intercept a pass and whilst competing for the ball experienced a perturbation in the air. As a result the player's landing was unbalanced with loading occurring predominantly on the knee of the injured side. In Scenario B the player was generally in a good position at ground contact, but then noticeably altered the alignment of the trunk before the landing was completed. This involved rotating and laterally flexing the trunk without altering the alignment of the feet. Apparent knee valgus collapse on the knee of the injured side was observed in 3/6 Scenario A cases and 5/6 Scenario B cases.

Players may benefit from landing training programmes that incorporate tasks that use a ball and include decision-making components or require players to learn to cope with being unbalanced.

**KEYWORDS:**

Anterior cruciate ligament (ACL) injury; landing; netball; video analysis

**32 B. KNEE/PCL****Stability**

Am J Sports Med. 2015 Dec;43(12):3077-92. doi: 10.1177/0363546515572770. Epub 2015 Mar 16.

**Emerging Updates on the Posterior Cruciate Ligament: A Review of the Current Literature.**

LaPrade CM<sup>1</sup>, Civitaresse DM<sup>1</sup>, Rasmussen MT<sup>1</sup>, LaPrade RF<sup>2</sup>.

Author information

**Abstract**

The posterior cruciate ligament (PCL) is recognized as an essential stabilizer of the knee.

However, the complexity of the ligament has generated controversy about its definitive role and the recommended treatment after injury. A proper understanding of the functional role of the PCL is necessary to minimize residual instability, osteoarthritic progression, and failure of additional concomitant ligament graft reconstructions or meniscal repairs after treatment. Recent anatomic and biomechanical studies have elucidated the surgically relevant quantitative anatomy and confirmed the codominant role of the anterolateral and posteromedial bundles of the PCL. Although nonoperative treatment has historically been the initial treatment of choice for isolated PCL injury, possibly biased by the historically poorer objective outcomes postoperatively compared with anterior cruciate ligament reconstructions, surgical intervention has been increasingly used for isolated and combined PCL injuries. Recent studies have more clearly elucidated the biomechanical and clinical effects after PCL tears and resultant treatments.

This article presents a thorough review of updates on the clinically relevant anatomy, epidemiology, biomechanical function, diagnosis, and current treatments for the PCL, with an emphasis on the emerging clinical and biomechanical evidence regarding each of the treatment choices for PCL reconstruction surgery.

It is recommended that future outcomes studies use PCL stress radiographs to determine objective outcomes and that evidence level 1 and 2 studies be performed to assess outcomes between transtibial and tibial inlay reconstructions and also between single- and double-bundle PCL reconstructions.

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**KEYWORDS:**

anatomy; double bundle; knee; posterior cruciate ligament; posterior translation; stress radiographs

PMID: 25776184

### 33. MENISCUS

#### Meniscal roots

Am J Sports Med. 2015 Dec;43(12):3034-44. doi: 10.1177/0363546515605086. Epub 2015 Oct

#### **The Degeneration of Meniscus Roots Is Accompanied by Fibrocartilage Formation, Which May Precede Meniscus Root Tears in Osteoarthritic Knees.**

Park do Y<sup>1</sup>, Min BH<sup>2</sup>, Choi BH<sup>3</sup>, Kim YJ<sup>4</sup>, Kim M<sup>4</sup>, Suh-Kim H<sup>5</sup>, Kim JH<sup>6</sup>.

Abstract

#### **BACKGROUND:**

Fibrocartilage metaplasia in tendons and ligaments is an adaptation to compression as well as a pathological feature during degeneration. Medial meniscus posterior roots are unique ligaments that resist multidirectional forces, including compression.

#### **PURPOSE:**

To characterize the degeneration of medial meniscus posterior root tears in osteoarthritic knees, with an emphasis on fibrocartilage and calcification.

#### **STUDY DESIGN: Cross-sectional study; Level of evidence, 3.**

#### **METHODS:**

Samples of medial meniscus posterior roots were harvested from cadaveric specimens and patients during knee replacement surgery and grouped as follows: normal reference, no tear, partial tear, and complete tear. Degeneration was analyzed with histology, immunohistochemistry, and real-time polymerase chain reaction. Uniaxial tensile tests were performed on specimens with and without fibrocartilage. Quantifiable data were statistically analyzed by the Kruskal-Wallis test with the Dunn comparison test.

#### **RESULTS:**

Thirty, 28, and 42 samples harvested from 99 patients were allocated into the no tear, partial tear, and complete tear groups, respectively. Mean modified Bonar tendinopathy scores for each group were 3.97, 9.31, and 14.15, respectively, showing a higher degree of degeneration associated with the extent of the tear ( $P < .05$  for all groups). The characterization of root matrices revealed an increase in fibrocartilage according to the extent of the tear. Tear margins revealed fibrocartilage in 59.3% of partial tear samples and 76.2% of complete tear samples, with a distinctive cleavage-like shape. Root tears with a similar shape were induced within fibrocartilaginous areas during uniaxial tensile testing. Even in the no tear group, 56.7% of samples showed fibrocartilage in the anterior margin of the root, adjacent to the meniscus. An increased stained area of calcification and expression of the ectonucleotide pyrophosphatase/phosphodiesterase 1 gene were observed in the complete tear group compared with the no tear group ( $P < .0001$  and  $P = .24$ , respectively).

#### **CONCLUSION:**

Fibrocartilage and calcification increased in medial meniscus posterior roots, associated with the degree of the tear. Both findings, which impair the ligament's resistance to tension, may play a pivotal role during the pathogenesis of degenerative meniscus root tears in osteoarthritic knees. Fibrocartilage and calcification may be useful as diagnostic markers as well as markers of degeneration, which may aid in determining the treatment modality in meniscus root tears. The presence of fibrocartilage in intact roots may suggest an impending tear in osteoarthritic knees.

**KEYWORDS:** *calcification; fibrocartilage; ligament degeneration; meniscus root tears*

PMID: 26430056

**37. OSTEOARTHRITIS/KNEE****Exercise helps**

Br J Sports Med. 2015 Dec;49(24):1554-7. doi: 10.1136/bjsports-2015-095424. Epub 2015 Sep 24.

**Exercise for osteoarthritis of the knee: a Cochrane systematic review.**

Fransen M<sup>1</sup>, McConnell S<sup>2</sup>, Harmer AR<sup>1</sup>, Van der Esch M<sup>3</sup>, Simic M<sup>1</sup>, Bennell KL<sup>4</sup>.

Author information

Abstract

**OBJECTIVE:**

To determine whether land-based therapeutic exercise is beneficial for people with knee osteoarthritis (OA) in terms of reduced joint pain or improved physical function and quality of life.

**METHODS:**

Five electronic databases were searched, up until May 2013. Randomised clinical trials comparing some form of land-based therapeutic exercise with a non-exercise control were selected. Three teams of two review authors independently extracted data and assessed risk of bias for each study. Standardised mean differences immediately after treatment and 2-6 months after cessation of formal treatment were separately pooled using a random effects model.

**RESULTS:**

In total, 54 studies were identified. Overall, 19 (35%) studies reported adequate random sequence generation, allocation concealment and adequately accounted for incomplete outcome data. However, research results may be vulnerable to selection, attrition and detection bias. Pooled results from 44 trials indicated that exercise significantly reduced pain (12 points/100; 95% CI 10 to 15) and improved physical function (10 points/100; 95% CI 8 to 13) to a moderate degree immediately after treatment, while evidence from 13 studies revealed that exercise significantly improved quality of life immediately after treatment with small effect (4 points/100; 95% CI 2 to 5). In addition, 12 studies provided 2-month to 6-month post-treatment sustainability data which showed significantly reduced knee pain (6 points/100; 95% CI 3 to 9) and 10 studies which showed improved physical function (3 points/100; 95% CI 1 to 5).

**CONCLUSIONS:**

Among people with knee osteoarthritis, land-based therapeutic exercise provides short-term benefit that is sustained for at least 2-6 months after cessation of formal treatment.

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PMID: 26405113

**Inflammation and sensitization****Joint inflammation is associated with pain sensitization in knee osteoarthritis: The Multicenter Osteoarthritis Study**

Arthritis & Rheumatism, 11/12/2015

Neogi T, et al.

**P**ain sensitization is associated with pain severity in knee osteoarthritis, but its cause in humans is not well-understood. The authors examined whether inflammation, assessed as synovitis and effusion on MRI, or mechanical load, assessed as bone marrow lesions (BMLs), were associated with sensitization in knee osteoarthritis. Inflammation, as evidenced by synovitis or effusion, is associated with pain sensitization in knee osteoarthritis. In contrast, BMLs do not appear to contribute to sensitization in knee osteoarthritis.

**Methods**

- Subjects in the Multicenter Osteoarthritis Study, a NIH-funded cohort of persons with or at risk of knee osteoarthritis, had knee radiographs and MRIs, and standardized quantitative sensory testing (QST) measures (temporal summation, pressure pain threshold (PPT)) at the wrist and patellae obtained at baseline and two years later.
- Authors examined the relation of synovitis, effusion, and BMLs to temporal summation and PPT cross-sectionally and longitudinally.

**Results**

- There were 1111 subjects in the study sample (mean age 67, mean BMI 30, 62% female).
- Synovitis was associated with a significant decrease in PPT at the patella (i.e., more sensitized) over two years (adjusted beta:  $-0.30$ , 95% CI  $-0.52$  to  $-0.08$ ).
- Effusion was similarly associated with a decrease in PPT at the wrist ( $-0.24$ , 95% CI  $-0.41$  to  $-0.24$ ) and with risk of incident temporal summation (adjusted OR 1.54, 95% CI 1.01–2.36).
- BMLs were not associated with either QST measure.

**38 A. FOOT AND ANKLE****Stretching**

J Athl Train. 2015 Dec 3.

**Ankle-Dorsiflexion Range of Motion After Ankle Self-Stretching Using a Strap.**

Jeon IC<sup>1</sup>, Kwon OY<sup>1</sup>, Yi CH<sup>1</sup>, Cynn HS<sup>1</sup>, Hwang UJ<sup>1</sup>.

Author information

Abstract

**CONTEXT:**

A variety of ankle self-stretching exercises have been recommended to improve ankle-dorsiflexion range of motion (DFROM) in individuals with limited ankle dorsiflexion. A strap can be applied to stabilize the talus and facilitate anterior glide of the distal tibia at the talocrural joint during ankle self-stretching exercises. Novel ankle self-stretching using a strap (SSS) may be a useful method of improving ankle DFROM.

**OBJECTIVE:**

To compare the effects of 2 ankle-stretching techniques (static stretching versus SSS) on ankle DFROM.

**DESIGN:** *Randomized controlled clinical trial.*

**SETTING:**

University research laboratory.

**PATIENTS OR OTHER PARTICIPANTS:**

Thirty-two participants with limited active dorsiflexion (<20°) while sitting (14 women and 18 men) were recruited.

**MAIN OUTCOME MEASURE(S):**

The participants performed 2 ankle self-stretching techniques (static stretching and SSS) for 3 weeks. Active DFROM (ADFROM), passive DFROM (PDFROM), and the lunge angle were measured. An independent t test was used to compare the improvements in these values before and after the 2 stretching interventions. The level of statistical significance was set at  $\alpha = .05$ .

**RESULTS:**

Active Both DFROM and PDFROM were greater in both stretching groups after the 3-week interventions. However, ADFROM, PDFROM, and the lunge angle were greater in the SSS group than in the static-stretching group ( $P < .05$ ).

**CONCLUSIONS:**

Ankle self-stretching using a strap SSS is recommended to improve ADFROM, PDFROM, and lunge angle in individuals with limited DFROM.

**KEYWORDS:**

injury prevention; limited ankle dorsiflexion; rehabilitation

PMID: 26633750

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**38 B. FOOT TYPES****Pronated and pain**

Gerontology. 2015 Dec 9.

**Foot Pain and Pronated Foot Type Are Associated with Self-Reported Mobility Limitations in Older Adults: The Framingham Foot Study.**

Menz HB<sup>1</sup>, Dufour AB, Katz P, Hannan MT.

Author information

Abstract

**BACKGROUND:**

The foot plays an important role in supporting the body when undertaking weight-bearing activities. Aging is associated with an increased prevalence of foot pain and a lowering of the arch of the foot, both of which may impair mobility.

**OBJECTIVE:**

To examine the associations of foot pain, foot posture and dynamic foot function with self-reported mobility limitations in community-dwelling older adults.

**METHODS:**

Foot examinations were conducted on 1,860 members of the Framingham Study in 2002-2005. Foot posture was categorized as normal, planus or cavus using static pressure measurements, and foot function was categorized as normal, pronated or supinated using dynamic pressure measurements. Participants were asked whether they had foot pain and any difficulty performing a list of eight weight-bearing tasks. Multivariate logistic regression and linear regression models were used to examine the associations of foot pain, posture, function and ability to perform these activities.

**RESULTS:**

After adjusting for age, sex, height and weight, foot pain was significantly associated with difficulty performing all eight weight-bearing activities. Compared to those with normal foot posture and function, participants with planus foot posture were more likely to report difficulty remaining balanced [odds ratio (OR) = 1.40, 95% confidence interval (CI) 1.06-1.85; p = 0.018] and individuals with pronated foot function were more likely to report difficulty walking across a small room (OR = 2.07, 95% CI 1.02-4.22; p = 0.045). Foot pain and planus foot posture were associated with an overall mobility limitation score combining performances on each measure.

**CONCLUSION:**

Foot pain, planus foot posture and pronated foot function are associated with self-reported difficulty undertaking common weight-bearing tasks. Interventions to reduce foot pain and improve foot posture and function may therefore have a role in improving mobility in older adults.

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PMID: 26645379

**39 B. SHOES****Minimalist shoe wear and OA**

Clin Biomech (Bristol, Avon). 2015 Dec;30(10):1194-201. doi: 10.1016/j.clinbiomech.2015.08.004. Epub 2015 Aug 14.

**Long-term use of minimal footwear on pain, self-reported function, analgesic intake, and joint loading in elderly women with knee osteoarthritis: A randomized controlled trial.**

Trombini-Souza F<sup>1</sup>, Matias AB<sup>1</sup>, Yokota M<sup>1</sup>, Butugan MK<sup>1</sup>, Goldenstein-Schainberg C<sup>2</sup>, Fuller R<sup>2</sup>, Sacco IC<sup>3</sup>.

**BACKGROUND:**

Efforts have been made to retard the progressive debilitating pain and joint dysfunction in patients with knee osteoarthritis. We aimed to evaluate the therapeutic effect of a low-cost minimalist footwear on pain, function, clinical and gait-biomechanical aspects of elderly women with knee osteoarthritis.

**METHODS:**

Throughout a randomized, parallel and controlled clinical trial, fifty-six patients with medial knee osteoarthritis were randomly allocated to an intervention (n=28) or control group (n=28), and assessed at baseline and after three and six months. The intervention involved wearing Moleca(®) footwear for at least 6h/day, 7days/week, over 6months. The pain subscale of the Western Ontario and McMaster Universities Osteoarthritis Index was the primary outcome. The secondary outcomes were the other subscales, Lequesne score, distance walked in 6 min, knee oedema and effusion, knee adduction moment and paracetamol intake. Intention-to-treat analysis was performed using two-way casewise ANOVA (< .05) and Cohen's d coefficient.

**FINDINGS:**

Intervention group showed improvement in pain (effect size: 1.41, p<.001), function (effect size: 1.22, p=.001), stiffness (effect size: 0.76, p=.001), Lequesne score (effect size: 1.07, p<.001), and reduction by 21.8% in the knee adduction moment impulse (p=.017) during gait wearing Moleca(®). The analgesic intake was lower in the intervention group.

**INTERPRETATION:**

The long-term use of Moleca(®) footwear relieves pain, improves self-reported function, reduces the knee loading while wearing Moleca(®), refrains the increase of analgesic intake in elderly women with knee osteoarthritis and can be considered as a conservative mechanical treatment option. ClinicalTrials.gov (NCT01342458).

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**KEYWORDS:**

Biomechanics; Elderly; Gait; Knee osteoarthritis; Randomized controlled clinical trial; Shoes; Women

PMID: 26307181

**Balance and soccer shoes**

Muscles Ligaments Tendons J. 2015 Oct 20;5(3):208-13. doi: 10.11138/mltj/2015.5.3.208.

**Effect of different types of shoes on balance among soccer players.**

Notarnicola A<sup>1</sup>, Maccagnano G<sup>2</sup>, Pesce V<sup>2</sup>, Tafuri S<sup>3</sup>, Mercadante M<sup>4</sup>, Fiore A<sup>2</sup>, Moretti B<sup>1</sup>.

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

in soccer, balance ability is important to reduce non-contact injuries. The effect of footwear on balance is poorly understood in this sport. Soccer boots and futsal trainers need to guarantee a good grip on compliant surfaces. Running shoes are designed to reduce friction on rigid surfaces. The purpose of the present study was to investigate these types of shoes on balance ability.

**METHODS:**

twenty-four healthy male volunteers were recruited from amateur soccer teams. They were asked to perform the BESS (Balance Error Scoring System) test to measure the number of instability episodes in 6 conditions: double-leg, single-leg, and tandem stances on firm and foam surfaces. Anova with factor (several shoes) and Bonferroni were used to compare the means of two subtotal scores (firm and foam surface) and the final total score (BESS).

**RESULTS:**

the three shoe models led to greater stability than when the subject was barefoot ( $p=0.001$ ). Only on the firm surface the soccer boots were statistically better than futsal trainers ( $p=0.009$ ).

**CONCLUSIONS:**

the lack of stability while barefoot could be explained by the fact that with shoes there is a greater surface area, which produces a sensory filter that leads to posture modifications to improve stability. The greater stability, that was found in the three types of footwear, could be guaranteed by the design to reduce friction (for running shoes) and by the presence of studs (for soccer boots and futsal trainers).

**KEYWORDS:**

barefoot; boots; futsal; runner; sport; stability

**45 A. MANUAL THERAPY LUMBAR & GENERAL****Neuro-endocrine changes**

Med Hypotheses. 2015 Dec;85(6):819-24. doi: 10.1016/j.mehy.2015.10.003. Epub 2015 Oct 14.

**Measureable changes in the neuro-endocrinal mechanism following spinal manipulation.**

Kovanur Sampath K<sup>1</sup>, Mani R<sup>2</sup>, Cotter JD<sup>3</sup>, Tumilty S<sup>2</sup>.

Author information

**Abstract**

The autonomic nervous system and the hypothalamic-pituitary-adrenal axis have been shown to be dysfunctional in a number of chronic pain disorders.

Spinal manipulation is a therapeutic technique used by manual therapists, which may have widespread neuro-physiological effects. The autonomic nervous system has been implicated to modulate these effects. A theory is proposed that spinal manipulation has the potential to be used as a tool in restoring the autonomic nervous system balance. Further, it is also hypothesised that through its anatomical and physiological connections, the autonomic nervous system activity following a thoracic spinal manipulation may have an effect on the hypothalamic-pituitary-adrenal axis and therefore pain and healing via modulation of endocrine and physiological processes.

To substantiate our hypothesis we provide evidence from manual therapy studies, basic science and animal studies. According to the proposed theory, there will be measurable changes in the neuro-endocrinal mechanisms following a thoracic spinal manipulation. This has far-reaching implications for manual therapy practice and research and in the integration of spinal manipulation in the treatment of a wide array of disorders.

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PMID: 26464145

**45 B. MANUAL THERAPY CERVICAL****C 1 facet dislocation**

December 2015 Volume 20, Issue 6, Pages 783–789

**Atlanto-axial facet displacement during rotational high-velocity low-amplitude thrust: An in vitro 3D kinematic analysis**

Luca Buzzatti Steven Probyn Peter Van Roy Erik Cattrysse

DOI: <http://dx.doi.org/10.1016/j.math.2015.03.006>

**Highlights**

- We analysed the displacement of in vitro C1–C2 joint facets during HVLA thrust.
- The displacement induced was unintentional, unpredictable and not reproducible.
- The displacement induced did not exceed 1 mm during the thrust.
- The technique seems not to be able to endanger vital structures.

**Abstract****Background**

Very little is known about the kinematics of the upper cervical spine in particular during Manual Therapy techniques. In fact no data about displacement of the atlanto-axial joint during High-Velocity Low-Amplitude (HVLA) thrust are available. Knowing the precise kinematics of these vertebrae might allow a better comprehension of such important technique and possible vital structures involvement.

**Methods**

A Zebris CMS20 ultrasound-based motion tracking system was adopted. Twenty fresh human cervical specimens were used in this study. Facet joint displacements of C1 relative to C2 were analysed during three consecutive HVLA thrusts into rotation. Displacement during the thrust and the maximum displacement reached with the manoeuvre were analysed.

**Results**

Descriptive statistics showed a mean Norm displacement during the thrust of 0.5 mm (SD  $\pm$  0.5). The maximum displacement, representing the overall facet movement from neutral to end-range position, indicated a Norm value of 6.0 mm (SD  $\pm$  3.4). Heterogeneous displacement directions were found during the thrust. Intra and inter-rater reliability reached an insufficient reproducibility level. Considering the amount of displacement induced, no statistical significant differences between the registrations were shown.

**Conclusion**

Displacement during the execution of HVLA thrust is unintentional, unpredictable and not reproducible. On the other hand and in accordance with other studies, the displacement induced with the present technique seems not to be able to endanger vital structure on the Spinal Cord and the Vertebral Artery. This study also adds to a better comprehension of the kinematic of the atlanto-axial segment during the performance of HVLA manipulation.

**Keywords:**

HVLA thrust, Kinematic, Atlanto-axial, Displacement, In vitro

### VA dissections

BMJ Case Rep. 2015 Nov 12;2015. pii: bcr2015212568. doi: 10.1136/bcr-2015-212568.

#### **Vertebral artery dissection in evolution found during chiropractic examination.**

Futch D<sup>1</sup>, Schneider MJ<sup>2</sup>, Murphy D<sup>3</sup>, Grayev A<sup>4</sup>.

Author information

#### Abstract

A 30-year-old woman presented to an emergency department with sudden onset of transient loss of left peripheral vision.

Owing to a history of migraine headaches, she was released with a diagnosis of ocular migraine. Two days later, she sought chiropractic care for the chief symptom of severe neck pain. The chiropractor suspected the possibility of vertebral artery dissection (VAD). No manipulation was performed; instead, MR angiography (MRA) of the neck was obtained, which revealed an acute left VAD with early thrombus formation. The patient was placed on aspirin therapy. Repeat MRA of the neck 3 months later revealed resolution of the thrombus, without progression to stroke.

This case illustrates the importance for all healthcare providers who see patients with neck pain and headache to be attentive to the symptomatic presentation of possible VAD in progress.

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PMID: 26564115

**45 C. MANUAL THERAPY THORACIC****PA mob****Immediate effects of thoracic spinal mobilisation on erector spinae muscle activity and pain in patients with thoracic spine pain: a preliminary randomised controlled trial**

Physiotherapy, 12/21/2015

PecosMartín D, et al. –

The aim of this study is to investigate the activity of the thoracic erector spinae muscles and perceived pain intensity immediately after central postero–anterior (PA) mobilisation of the thoracic spine. These preliminary findings indicate that grade III central mobilisation over the most symptomatic thoracic segment reduces thoracic erector spinae activity during extension of the trunk in people with non–specific thoracic spine pain.

**Methods**

- Randomised, placebo–controlled, experimental design.
- Four participants with non–specific thoracic pain were randomised to the experimental group [grade III central PA mobilisation performed for 3 minutes at the level of the seventh thoracic vertebra (T7)] or the placebo group (less than grade I central PA mobilisation performed for 3 minutes at T7).
- Before and immediately after PA mobilisation, surface electromyography (EMG) was recorded from the thoracic erector spinae muscles as the participants performed 10° spine extension from a prone position for 10 seconds.
- Each participant rated their pain intensity as an investigator performed grade III central PA over the most symptomatic thoracic segment, and the pressure pain threshold (PPT) was evaluated bilaterally over the erector spinae muscles.

**Results**

- The EMG amplitude of thoracic erector spinae activity was reduced significantly after the intervention in the experimental group ( $P < 0.05$ ), but not in the placebo group.
- The difference between the groups was significant {pre–post change: placebo –14 [standard deviation (SD) 50] mV, experimental 28 (SD 48) mV; mean difference –42 mV; 95% confidence interval of the difference –76 to 7;  $P < 0.05$ } albeit small (Grissom = 0.44).
- However, both groups showed a significant reduction in pain immediately after the intervention, and both groups showed a similar pre–post change in PPT.

**52. EXERCISE****Exercise and LBP**

BMC Sports Sci Med Rehabil. 2015 Dec 4;7:31. doi: 10.1186/s13102-015-0025-6. eCollection 2015.

**Effects of a home-exercise therapy programme on cervical and lumbar range of motion among nurses with neck and lower back pain: a quasi-experimental study.**

Freimann T<sup>1</sup>, Merisalu E<sup>2</sup>, Pääsuke M<sup>3</sup>.

Author information

Abstract

**BACKGROUND:**

Cervical and lumbar range of motion limitations are usually associated with musculoskeletal pain in the neck and lower back, and are a major health problem among nurses. Physical exercise has been evaluated as an effective intervention method for improving cervical and lumbar range of motion, and for preventing and reducing musculoskeletal pain. The purpose of this study was to investigate the effects of a home-exercise therapy programme on cervical and lumbar range of motion among intensive care unit nurses who had experienced mild to moderate musculoskeletal pain in the neck and or lower back during the previous six months.

**METHODS:**

A quasi-experimental study was conducted among intensive care unit nurses at Tartu University Hospital (Estonia) between May and July 2011. Thirteen nurses who had suffered musculoskeletal pain episodes in the neck and or lower back during the previous six months underwent an 8-week home-exercise therapy programme. Eleven nurses without musculoskeletal pain formed a control group. Questions from the Nordic Musculoskeletal Questionnaire and the 11-point Visual Analogue Scale were used to select potential participants for the experimental group via an assessment of the prevalence and intensity of musculoskeletal pain. Cervical range of motion and lumbar range of motion in flexion, extension, lateral flexion and (cervical range of motion only) rotation were measured with a digital goniometer. A paired t-test was used to compare the measured parameters before and after the home-exercise therapy programme. A Student's t-test was used to analyse any differences between the experimental and control groups.

**RESULTS:**

After the home-exercise therapy, there was a significant increase ( $p < 0.05$ ) in cervical range of motion in flexion, extension, lateral flexion and rotation, and in lumbar range of motion in lateral flexion. Cervical range of motion in flexion was significantly higher ( $p < 0.01$ ) in the experimental group compared to the control group after therapy.

**CONCLUSIONS:**

Our results suggest an 8-week intensive home-exercise therapy programme may improve cervical and lumbar range of motion among intensive care nurses. Further studies are needed to develop this simple but effective home-exercise therapy programme to help motivate nurses to perform such exercises regularly.

**TRIAL REGISTRATION:**

Current Controlled Trials ISRCTN19278735. Registered 27 November 2015.

**KEYWORDS:** *Cervical range of motion; Exercise therapy; Lumbar range of motion; Musculoskeletal pain* PMID: 26640694

**53. CORE****Core trunk strength in athletes**

Sports Med. 2015 Nov 20.

**The Role of Trunk Muscle Strength for Physical Fitness and Athletic Performance in Trained Individuals: A Systematic Review and Meta-Analysis.**

Prieske O<sup>1</sup>, Muehlbauer T<sup>2</sup>, Granacher U<sup>2</sup>.

Author information

Abstract

**BACKGROUND:**

The importance of trunk muscle strength (TMS) for physical fitness and athletic performance has been demonstrated by studies reporting significant correlations between those capacities. However, evidence-based knowledge regarding the magnitude of correlations between TMS and proxies of physical fitness and athletic performance as well as potential effects of core strength training (CST) on TMS, physical fitness and athletic performance variables is currently lacking for trained individuals.

**OBJECTIVE:**

The aims of this systematic review and meta-analysis were to quantify associations between variables of TMS, physical fitness and athletic performance and effects of CST on these measures in healthy trained individuals.

**DATA SOURCES:**

PubMed, Web of Science, and SPORTDiscus were systematically screened from January 1984 to March 2015.

**STUDY ELIGIBILITY CRITERIA:**

Studies were included that investigated healthy trained individuals aged 16-44 years and tested at least one measure of TMS, muscle strength, muscle power, balance, and/or athletic performance.

**STUDY APPRAISAL AND SYNTHESIS METHODS:**

Z-transformed Pearson's correlation coefficients between measures of TMS and physical performance were aggregated and back-transformed to r values. Further, to quantify the effects of CST, weighted standardized mean differences (SMDs) of TMS and physical performance were calculated using random effects models. The methodological quality of CST studies was assessed by the Physiotherapy Evidence Database (PEDro) scale.

**RESULTS:**

Small-sized relationships of TMS with physical performance measures ( $-0.05 \leq r \leq 0.18$ ) were found in 15 correlation studies. Sixteen intervention studies revealed large effects of CST on measures of TMS (SMD = 1.07) but small-to-medium-sized effects on proxies of physical performance ( $0 \leq \text{SMD} \leq 0.71$ ) compared with no training or regular training only. The methodological quality of CST studies was low (median PEDro score = 4).

**CONCLUSIONS:**

Our findings indicate that TMS plays only a minor role for physical fitness and athletic performance in trained individuals. In fact, CST appears to be an effective means to increase TMS and was associated with only limited gains in physical fitness and athletic performance measures when compared with no or only regular training.

PMID: 26589515

**54. POSTURE****Body awareness and pain**

J Behav Med. 2015 Dec;38(6):876-85. doi: 10.1007/s10865-015-9676-8. Epub 2015 Sep 4.

Body awareness and pain habituation: the role of orientation towards somatic signals.

Ginzburg K<sup>1</sup>, Tsur N<sup>2,3</sup>, Karmin C<sup>4</sup>, Speizman T<sup>4</sup>, Tourgeman R<sup>4</sup>, Defrin R<sup>4,5</sup>.

Author information

**Abstract**

Although body awareness and pain perception are considered to be parts of the interoceptive system, the relationship between them is unclear. This study examines the association between body awareness and pain habituation, hypothesizing that this association is moderated by pain catastrophizing and mindfulness. Sixty subjects received a mildly aversive electrical stimulus for 60 s, during which they were requested to rate the amount of perceived pain. Complete habituation was indicated by abolition of pain sensation; partial habituation was indicated by a decrease in pain sensation. Individuals who demonstrated complete habituation had lower levels of pain catastrophizing and lower levels of mindfulness. As hypothesized, the association between body awareness and pain habituation was moderated by pain catastrophizing: Among low pain catastrophizers, the higher the body awareness, the stronger the tendency to exhibit complete habituation. Among high pain catastrophizers, the higher the body awareness, the greater the likelihood to present partial habituation.

**KEYWORDS:**

Body awareness; Mindfulness; Pain catastrophizing; Pain habituation

PMID: 26341355

**Fatigue and posture**

J Strength Cond Res. 2015 Nov 20.

**Dynamic Postural Control in Female Athletes and Non-Athletes following a Whole-Body Fatigue Protocol.**

Baghbani F<sup>1</sup>, Woodhouse L, Gaeini AA.

Author information

**Abstract**

Postural control is a crucial element in regular training of athletes, development of complex technical movement, and injury prevention; however, distributing factor of the postural control such as fatigue have been neglected by athletic trainers in novice and inexperienced athletes.

The objective of this study was to compare changes in dynamic postural control of young female athletes and non-athletes after a fatigue protocol. Thirty females (15 athletes and 15 non-athletes) with no orthopedic problems were recruited to participate in this study. All participants completed the pre-SEBT (Star Excursion Balance Test) in eight directions at baseline; then they performed a 20- minute fatigue protocol following which post-SEBT was measured. Rating of perceived exertion was measured using the Borg scale immediately before, mid-way through (i.e. after the third station), and after performing the fatigue protocol (i.e. immediately before the post-SEBT). Female non-athlete groups had significant differences in dynamic balance performance after fatigue in the medial, posteromedial, and posterior directions ( $p < 0.01$ ) measured by SEBT. Athletes, however, showed no significant changes after the fatigue protocol.

Our results indicates the importance of evaluation and monitoring of dynamic postural control of the novice with progressing the exercise time. Our findings could also help coaches to develop trainings focused on the three directions of medial, posteromedial, and posterior directions and aimed at exercises increasing fatigue resistance.

PMID: 26605804

**56. ATHLETICS****Agility**

Sports Med. 2015 Dec 15.

**Agility in Team Sports: Testing, Training and Factors Affecting Performance.**

Paul DJ<sup>1</sup>, Gabbett TJ<sup>2</sup>, Nassis GP<sup>3</sup>.

Author information

Abstract

**BACKGROUND:**

Agility is an important characteristic of team sports athletes. There is a growing interest in the factors that influence agility performance as well as appropriate testing protocols and training strategies to assess and improve this quality.

**OBJECTIVE:**

The objective of this systematic review was to (1) evaluate the reliability and validity of agility tests in team sports, (2) detail factors that may influence agility performance, and (3) identify the effects of different interventions on agility performance.

**METHODS:**

The review was undertaken in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses guidelines. We conducted a search of PubMed, Google Scholar, Science Direct, and SPORTDiscus databases. We assessed the methodological quality of intervention studies using a customized checklist of assessment criteria.

**RESULTS:**

Intraclass correlation coefficient values were 0.80-0.91, 0.10-0.81, and 0.81-0.99 for test time using light, video, and human stimuli. A low-level reliability was reported for youth athletes using the video stimulus (0.10-0.30). Higher-level participants were shown to be, on average, 7.5 % faster than their lower level counterparts. Reaction time and accuracy, foot placement, and in-line lunge movement have been shown to be related to agility performance. The contribution of strength remains unclear. Efficacy of interventions on agility performance ranged from 1 % (vibration training) to 7.5 % (small-sided games training).

**CONCLUSIONS:**

Agility tests generally offer good reliability, although this may be compromised in younger participants responding to various scenarios. A human and/or video stimulus seems the most appropriate method to discriminate between standard of playing ability. Decision-making and perceptual factors are often propositioned as discriminant factors; however, the underlying mechanisms are relatively unknown. Research has focused predominantly on the physical element of agility. Small-sided games and video training may offer effective methods of improving agility, although practical issues may hinder the latter.

PMID: 26670456

**58. RUNNING****IT band syndrome**

BMC Musculoskelet Disord. 2015 Nov 16;16(1):356. doi: 10.1186/s12891-015-0808-7.

**Biomechanical risk factors associated with iliotibial band syndrome in runners: a systematic review.**

Aderem J<sup>1</sup>, Louw QA<sup>2</sup>.

Author information

Abstract

**BACKGROUND:**

Iliotibial band syndrome is the second most common running injury. A gradual increase in its occurrence has been noted over the past decade. This may be related to the increasing number of runners worldwide. Since the last systematic review, six additional papers have been published, providing an opportunity for this review to explore the previously identified proximal risk factors in more detail. The aim of this systematic review is thus to provide an up to date quantitative synthesis of the trunk, pelvis and lower limb biomechanical risk factors associated with Iliotibial band syndrome in runners and to provide an algorithm for future research and clinical guidance.

**METHODS:**

An electronic search was conducted of literature published up until April 2015. The critical appraisal tool for quantitative studies was used to evaluate methodological quality of eligible studies. Forest plots displayed biomechanical findings, mean differences and confidence intervals. Level of evidence and clinical impact were evaluated for each risk factor. A meta-analysis was conducted where possible.

**RESULT:**

Thirteen studies were included (prospective (n = 1), cross-sectional (n = 12)). Overall the methodological score of the studies was moderate. Female shod runners who went onto developing Iliotibial band syndrome presented with increased peak hip adduction and increased peak knee internal rotation during stance. Female shod runners with Iliotibial band syndrome presented with increased: peak knee internal rotation and peak trunk ipsilateral during stance.

**CONCLUSION:**

Findings indicate new quantitative evidence about the biomechanical risk factors associated with Iliotibial band syndrome in runners. Despite these findings, there are a number of limitations to this review including: the limited number of studies, small effect sizes and methodological shortcomings. This review has considered these shortcomings and has summarised the best available evidence to guide clinical decisions and plan future research on Iliotibial band syndrome aetiology and risk.

PMID: 26573859

**Pacing**

Med Sci Sports Exerc. 2015 Dec 15.

**Altering Pace Control and Pace Regulation: Attentional Focus Effects during Running.**

Brick NE<sup>1</sup>, Campbell MJ, Metcalfe RS, Mair JL, MacIntyre TE.

Author information

Abstract

**PURPOSE:**

To date there are no published studies directly comparing self-controlled and externally-controlled pace endurance tasks. However, previous research suggests pace control may impact on cognitive strategy use and effort perceptions. The primary aim of this study was to investigate the effects of manipulating perception of pace control on attentional focus, physiological, and psychological outcomes during running. A secondary aim was to determine the reproducibility of self-paced running performance when regulated by effort perceptions.

**METHODS:**

Twenty experienced endurance runners completed four 3 km time-trials on a treadmill. Subjects completed two self-controlled pace (SC), one perceived exertion clamped (PE), and one externally-controlled pace (EC) time-trial. PE and EC were completed in a counterbalanced order. Pacing strategy for EC and perceived exertion instructions for PE replicated subjects' fastest SC time-trial.

**RESULTS:**

Subjects reported a greater focus on cognitive strategies such as relaxing and optimizing running action during EC than SC. Mean heart rate was 2% lower during EC than SC despite an identical pacing strategy. Perceived exertion did not differ between the three conditions. However, increased internal sensory monitoring coincided with elevated effort perceptions in some subjects during EC, and a 10% slower completion time for PE ( $13.0 \pm 1.6$  min) than SC ( $11.8 \pm 1.2$  min).

**CONCLUSION:**

Altering pace control and pace regulation impacted on attentional focus. External control over pacing may facilitate performance, particularly when runners engage attentional strategies conducive to improved running efficiency. However, regulating pace based on effort perceptions alone may result in excessive monitoring of bodily sensations and a slower running speed. Accordingly, attentional focus interventions may prove beneficial for some athletes to adopt task-appropriate attentional strategies to optimize performance.

PMID: 26673128

**59. PAIN****Kinesio Taping can decrease pain**

Br J Sports Med. 2015 Dec;49(24):1558-66. doi: 10.1136/bjsports-2014-094151. Epub 2015 Jan 16.

**Kinesio taping in musculoskeletal pain and disability that lasts for more than 4 weeks: is it time to peel off the tape and throw it out with the sweat? A systematic review with meta-analysis focused on pain and also methods of tape application.**

Lim EC<sup>1</sup>, Tay MG.  
Author information

Abstract

**INTRODUCTION:**

In recent years, Kinesio tape has been used to support injured muscle and joints, and relieve pain. We compared the pain and disability in individuals with chronic musculoskeletal pain who were treated with Kinesio taping with those using minimal or other treatment approaches.

**METHODS:**

Searches of eight major electronic databases were conducted. Data for pain and disability scores were extracted. Meta-analyses (wherever possible) with either a fixed or random effect(s) model, standardised mean differences (SMDs) and tests of heterogeneity were performed.

**RESULTS:**

Seventeen clinical-controlled trials were identified and included in the meta-analyses. When compared to minimal intervention, Kinesio taping provided superior pain relief (pooled SMD=-0.36, 95% CI -0.64 to -0.09, p=0.009) but the pooled disability scores were not significantly different (pooled SMD=-0.41, 95% CI -0.83 to 0.01, p=0.05). No significant differences were found when comparing Kinesio taping to other treatment approaches for pain (pooled SMD=-0.44, 95% CI -1.69 to 0.82, p=0.49) and disability (pooled SMD=0.08, 95% CI -0.27 to 0.43, p=0.65).

**DISCUSSION:**

Kinesio taping is superior to minimal intervention for pain relief. Existing evidence does not establish the superiority of Kinesio taping to other treatment approaches to reduce pain and disability for individuals with chronic musculoskeletal pain.

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**KEYWORDS:**

Meta-analysis; Taping and bracing

PMID: 25595290

**60. COMPLEX REGIONAL PAIN****Graded exposure**

BMJ Open. 2015 Dec 1;5(12):e008283. doi: 10.1136/bmjopen-2015-008283.

**Pain exposure physical therapy (PEPT) compared to conventional treatment in complex regional pain syndrome type 1: a randomised controlled trial.**

Barnhoorn KJ<sup>1</sup>, van de Meent H<sup>2</sup>, van Dongen RT<sup>3</sup>, Klomp FP<sup>4</sup>, Groenewoud H<sup>5</sup>, Samwel H<sup>6</sup>, Nijhuis-van der Sanden MW<sup>7</sup>, Frölke JP<sup>8</sup>, Staal JB<sup>9</sup>.

**Abstract**

**OBJECTIVE:** *To compare the effectiveness of pain exposure physical therapy (PEPT) with conventional treatment in patients with complex regional pain syndrome type 1 (CRPS-1) in a randomised controlled trial with a blinded assessor.*

**SETTING:** *The study was conducted at a level 1 trauma centre in the Netherlands.*

**PARTICIPANTS:** *56 adult patients with CRPS-1 participated. Three patients were lost to follow-up.*

**INTERVENTIONS:** *Patients received either PEPT in a maximum of five treatment sessions, or conventional treatment following the Dutch multidisciplinary guideline.*

**MEASUREMENTS:**

Outcomes were assessed at baseline and at 3, 6 and 9 months after randomisation. The primary outcome measure was the Impairment level Sum Score-Restricted Version (ISS-RV), consisting of visual analogue scale for pain (VAS-pain), McGill Pain Questionnaire, active range of motion (AROM) and skin temperature. Secondary outcome measures included Pain Disability Index (PDI); muscle strength; Short Form 36 (SF-36); disability of arm, shoulder and hand; Lower Limb Tasks Questionnaire (LLTQ); 10 m walk test; timed up-and-go test (TUG) and EuroQol-5D.

**RESULTS:**

The intention-to-treat analysis showed a clinically relevant decrease in ISS-RV (6.7 points for PEPT and 6.2 points for conventional treatment), but the between-group difference was not significant (0.96, 95% CI -1.56 to 3.48). Participants allocated to PEPT experienced a greater improvement in AROM (between-group difference 0.51, 95% CI 0.07 to 0.94; p=0.02). The per protocol analysis showed larger and significant between-group effects on ISS-RV, VAS-pain, AROM, PDI, SF-36, LLTQ and TUG.

**CONCLUSIONS:**

We cannot conclude that PEPT is superior to conventional treatment for patients with CRPS-1. Further high-quality research on the effects of PEPT is warranted given the potential effects as indicated by the per protocol analysis.

**TRIAL REGISTRATION NUMBERS:**

NCT00817128 and NTR 2090.

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**KEYWORDS: PAIN MANAGEMENT; REHABILITATION MEDICINE**

PMID: 26628523

**65. NEUROLOGICAL CONDITIONS****Exercise and MS**

Med Sci Sports Exerc. 2015 Dec 11.

**Exercising Impacts on Fatigue, Depression, and Paresthesia in Female Patients with MS.**

Razazian N<sup>1</sup>, Yavari Z, Farnia V, Azizi A, Kordavani L, Bahmani DS, Holsboer-Trachsler E, Brand S.

Author information

Abstract

**PURPOSE:**

Multiple Sclerosis (MS) is a chronic progressive autoimmune disease impacting both body and mind. Typically, patients with MS report fatigue, depression and paresthesia. Standard treatment consists of immune modulatory medication, though there is growing evidence that exercising programs have a positive influence on fatigue and psychological symptoms such as depression. We tested the hypothesis that, as in addition to the standard immune regulatory medication, either yoga or aquatic exercise can ameliorate both fatigue and depression, and we examined whether these interventions also influence paresthesia compared to a non-exercise control condition.

**METHODS:**

Fifty-four women with MS (mean age: M=33.94 years, SD=6.92) were randomly assigned to one of the following conditions: yoga; aquatic exercise; non-exercise control. Their existing immune modulatory therapy remained unchanged. Participants completed questionnaires covering symptoms of fatigue, depression, and paresthesia, both at baseline and on completion of the study eight weeks later.

**RESULTS:**

Compared to the non-exercise control condition and over time, fatigue, depression, and paresthesia decreased significantly in the yoga and aquatic exercise groups. On study completion, the likelihood of reporting moderate to severe depression was 35-fold higher in the non-exercise control condition than in the intervention conditions (yoga and aquatic exercising values collapsed).

**CONCLUSION:**

The pattern of results suggests that for females with MS and treated with standard immune regulatory medication, exercise training programs such as yoga and aquatic exercising positively impacts on core symptoms of MS, namely fatigue, depression, and paresthesia. Exercise training programs should be considered in the future as possible complements to standard treatments.

PMID: 26656775