

## 2. LBP

### Sedentary family leads to sedentary children

Eur J Pain. 2018 Sep 3. doi: 10.1002/ejp.1311

#### **Familial factors predicting recovery and maintenance of physical activity in people with low back pain: insights from a population-based twin study.**

Zadro JR<sup>1,2</sup>, Shirley D<sup>3</sup>, Duncan GE<sup>4</sup>, Ferreira PH<sup>3</sup>.

##### *BACKGROUND:*

It is unknown how familial factors influence the recovery from low back pain (LBP) and the maintenance activity behaviours. We aimed to investigate whether individual and within-family physical activity (PA) and sedentary behaviour influenced recovery from LBP, and maintenance of PA and sedentary behaviour in people with and without LBP.

##### *METHODS:*

Longitudinal logistic regression analyses were performed on adult twins from the Washington State Twin Registry. First, individual and within-family (based on co-twin data) sufficient PA (at least 75 minutes of vigorous-intensity PA, or 150 minutes of moderate-intensity PA per week) and high leisure sitting time ( $\geq 3$  hours/day) were our exposure variables (baseline). LBP within the past 3 months at follow-up defined non-recovery (outcome). Second, within-family sufficient PA and high leisure sitting time were our exposure variables (baseline) and our outcomes were individual PA and sitting time at follow-up. All analyses were adjusted for follow-up length (range: 1-7 years) and confounding variables.

##### *RESULTS:*

Individual and within-family PA and sitting time were not associated with recovery. Within-family PA and sitting time predicted individual maintenance of PA (OR=1.47, 95%CI: 1.17-1.84, n=1,388 twins) and sitting time (OR=1.41, 95%CI: 1.10-1.82, n=1,534). Within-family PA and sitting time had the strongest effects on those without (OR=1.79, 95%CI: 1.33-2.41, n=788) and with LBP (OR=1.90, 95%CI: 1.32-2.76, n=698), respectively.

##### *CONCLUSION:*

Having active family members increased the likelihood of continuing to be active (particularly for those without LBP), while having sedentary family members increased the likelihood of maintaining sedentary behaviours (particularly for those with LBP).

## 7. PELVIC ORGANS/WOMAN'S HEALTH

### Diet and breast CA

#### **Adherence to lifestyle-related cancer prevention guidelines and breast cancer incidence and mortality**

Gabriella Cifu Hannah Arem

DOI: <https://doi.org/10.1016/j.annepidem.2018.09.002>

#### **Background**

Breast cancer is the most common cancer in women. Many lifestyle factors have been associated with an increased risk of breast cancer incidence and mortality. An index-based approach to analyzing adherence to American Cancer Society (ACS) guidelines as a whole may better explain associations between lifestyle variables and breast cancer incidence and mortality.

#### **Methods**

We created an index based on ACS-specific guidelines, including body mass index (BMI), physical activity, alcohol intake, tobacco use, daily time spent watching television, and certain dietary habits. Cox proportional hazards regression was used to model the association between the lifestyle index and primary breast cancer and breast cancer specific mortality in the NIH-AARP cohort.

#### **Results**

We identified 7,088 women with incident breast cancer, 1,162 deaths overall, and 462 deaths due to breast cancer. Compared with the lowest quintile of lifestyle index score (meeting fewest guidelines), women in the highest quintile had a 24% lower risk of breast cancer (HR=0.76, 95% CI: 0.70, 0.82) and 37% lower risk of all-cause mortality (HR=0.63, 95% CI: 0.53, 0.76), while the association with breast cancer-specific mortality was non-significant.

#### **Conclusions**

Healthier pre-diagnosis lifestyle is associated with a decreased risk of breast cancer and all-cause mortality in the NIH-AARP cohort.

### 8. VISCERA

#### Nitrate intake reduces CV disease

##### Journal Summaries in Family Medicine

##### **Relationship of dietary nitrate intake from vegetables with cardiovascular disease mortality: A prospective study in a cohort of older Australians**

European Journal of Nutrition

Liu AH, et al. | September 21, 2018

In a sample of older Australians ( $\geq 49$  years of age) without diabetes or major cardiovascular disease (CVD; at baseline), researchers examined the relationship between nitrate intake from vegetables and CVD outcomes. Participants were followed-up for 14 years. Data demonstrated an inverse association of vegetable nitrate intake with CVD mortality, independent of lifestyle and cardiovascular risk factors in this population.

These results supported the findings from a recent report that intake of vegetable nitrate lowers the risk of CVD mortality in older women was confirmed in the results and further extended these findings to older men.

### Replacing red meat with fish did not statistically reduce the risk of PAD

#### Journal Summaries in Family Medicine

#### **Substitution of poultry and red meat with fish and the risk of peripheral arterial disease: A Danish cohort study**

European Journal of Nutrition —  
Lasota AN, et al. | September 21, 2018

Researchers investigated associations between substitutions of poultry and red meat intake with fish (total, lean, or fatty) and the risk of peripheral arterial disease (PAD).

Data from a Danish cohort of middle-aged adults who completed food frequency and lifestyle questionnaires at baseline were used to identify participants with valid diagnoses of PAD. Researchers explored substitutions of 150 g/week of either poultry or red meat (processed or unprocessed) with 150 g/week of fish (total, lean or fatty).

Outcomes suggested a possible lower risk of PAD in association with substituting red meat with fish (especially fatty fish), although the risk reduction seemed not statistically significant. Risk of PAD remained unchanged when poultry was replaced with fish.

**Low fat Dairy early menopause****A Prospective Study of Dairy Food Intake and Early Menopause**

Alexandra C Purdue-Smithe Brian W Whitcomb JoAnn E Manson Susan E Hankinson Bernard A Rosner Lisa M Troy Elizabeth R Bertone-Johnson

*American Journal of Epidemiology*, kwy212, <https://doi.org/10.1093/aje/kwy212>

Early natural menopause, the cessation of ovarian function prior to age 45, affects ~10% of women and increases risk of cardiovascular disease and other conditions.

Laboratory evidence suggests a potential role of dairy foods in the ovarian aging process; however, no prior epidemiologic studies have evaluated how dairy intake is associated with risk of early menopause.

We therefore evaluated how intakes of total, low-fat, high-fat and individual dairy foods are associated with early menopause in the Nurses' Health Study II. Women who were premenopausal at the start of follow-up in 1991 were followed until 2011 for early menopause. Food frequency questionnaires were used to assess dietary intake. In Cox proportional hazards models adjusting for age, smoking, and other factors, total baseline dairy intake of  $\geq 4$  servings/day versus  $< 4$  servings/week was associated with 23% lower risk of early menopause (95% confidence interval (CI): 0.64, 0.93;  $P$ -trend = 0.08).

Associations appeared to be limited to low-fat dairy foods ( $\geq 2$  servings/day versus  $< 3$  servings/month HR: 0.83; 95% CI: 0.68, 1.01;  $P$ -trend = 0.02), whereas high-fat dairy intake was not associated with early menopause. Low-fat dairy foods may represent a modifiable risk factor to reduce risk of early menopause among premenopausal women.

## Daily Aspirin increases risk of mortality

### **Journal Summaries in Gastroenterology**

Effect of aspirin on cardiovascular events and bleeding in the healthy elderly  
 New England Journal of Medicine — McNeil JJ, et al. | September 18, 2018

Given that aspirin is a well-established therapy for the secondary prevention of cardiovascular events, researchers intended to determine its role in the primary prevention of cardiovascular disease (defined as fatal coronary heart disease, nonfatal myocardial infarction, fatal or nonfatal stroke, or hospitalization for heart failure) particularly in older persons who have an increased risk. According to the findings obtained, the use of low-dose aspirin brought about an altogether higher risk of major hemorrhage and did not result in a significantly lower risk of cardiovascular disease vs placebo in this randomized trial involving healthy elderly persons who did not have known cardiovascular disease.

#### Methods

- Researchers enlisted community-dwelling men and women in Australia and the United States who were 70 years of age or older (or  $\geq 65$  years of age among blacks and Hispanics in the United States) and did not have cardiovascular disease, dementia, or disability from 2010 through 2014.
- Study participants were randomly assigned to receive 100 mg of enteric-coated aspirin or placebo.
- A composite of death, dementia, or persistent physical disability was the primary end point; results for this end point are reported in another article in the *Journal*.
- Major hemorrhage and cardiovascular disease (defined as fatal coronary heart disease, nonfatal myocardial infarction, fatal or nonfatal stroke, or hospitalization for heart failure) were the included secondary end points.

#### Results

- According to the findings obtained, out 19,114 people who were enlisted in the trial, 9525 were assigned to receive aspirin and 9589 to receive placebo.
- It was noted that the rate of cardiovascular disease was 10.7 events per 1000 person-years in the aspirin group and 11.3 events per 1000 person-years in the placebo group (hazard ratio, 0.95; 95% confidence interval [CI], 0.83 to 1.08) after a median of 4.7 years of follow-up.
- Findings revealed that the rate of major hemorrhage was 8.6 events per 1000 person-years and 6.2 events per 1000 person-years, respectively (hazard ratio, 1.38; 95% CI, 1.18 to 1.62;  $P < 0.001$ ).

## 12 A. WHIPLASH

### Whiplash analysis

December 2018 Volume 38, Pages 23–29

#### **Relationship between neck motion and self-reported pain in patients with whiplash associated disorders during the acute phase**

Helios De Rosario María José Vivas María Isabel Sinovas Álvaro Page

- Perceived pain of whiplash associated disorders is related to neck motion measures.
- Range and smoothness of neck flexion are consistently related to pain perception.

#### Background

Biomechanical measures quantify motor control and functional deficits in Whiplash Associated Disorders (WAD), but few studies relate those measures to the clinical scales that are routinely used to assess patients. Most studies are limited to chronic neck pain, and report poor to moderate correlations.

#### Objective

To define a statistical model that relates measures of neck kinematics with clinical scales of neck pain, in WAD patients during the rehabilitation process in the acute phase (less than 3 months since the accident).

#### Methods

96 WAD patients self-assessed their pain using VAS and NPQ, and passed neck motion tests as part of their rehabilitation program. Four regression models were fitted to analyze the effects of the measured kinematic parameters and subject-specific characteristics on VAS and NPQ. Model errors were compared to minimal clinically significant differences.

#### Results

Multiple correlation coefficients of the models were between 0.74 and 0.90. More than 66% of that correlation was accounted for by subject-specific factors, and most of the other half by the measured kinematic parameters. Range of motion of flexion-extension and axial rotation, and harmonicity of flexion-extension, were the variables most consistently related to the decrease of pain. The error of the models was within the MCSD in more than 50% of the observations.

#### Conclusions

Part of the individual progression of pain and pain-related disability in acute WAD patients, as rated by NPQ and VAS, can be mapped to objective kinematic parameters of neck mobility tests, like ranges of motion, velocities, repeatability and harmonicity of movements.

### Neck specific exercises helps

Scientific Reports | (2018) 8:12409 | DOI:10.1038/s41598-018-30556-w 1  
www.nature.com/scientificreports N

### **Neck-specific exercise may reduce radiating pain and signs of neurological deficits in chronic whiplash - Analyses of a randomized clinical trial**

Maria Landén Ludvigsson<sup>1,2</sup>, Gunnel Peterson<sup>1,3</sup> & Anneli Peolsson<sup>1</sup>

Up to 90% of people with neurological deficits following a whiplash injury do not recover and cervical muscle dysfunction is common.

The aim of this multicentre, randomized controlled trial was to examine whether two versions of neck-specific exercise or prescription of physical activity (PPA) can improve radiating arm pain and clinical signs that can be associated with neurological deficits in people with chronic whiplash associated disorders (WAD). Participants with chronic WAD, arm symptoms and signs associated with neurological deficits (n=171) were randomized to: 12 weeks of neck-specific exercise without (NSE) or with a behavioural approach (NSEB), or PPA.

Pain/loathsomeness frequency, six measures of arm pain/paraesthesia (VAS scales), and four clinical neurological tests were evaluated after 3 months.

The NSE group reported the lowest frequency and lowest levels of arm pain, the highest proportion of participants with at least 50% pain reduction and the highest proportion of normal arm muscle force. The NSEB group reported increased normal tendon reflexes. No improvements were recorded for the PPA group. Neck-specific exercise may improve arm pain and decrease signs of neurological deficits, but the addition of a behavioral approach does not seem to be of additional benefit.

**13 B. TMJ/ORAL****Dry needling helps TMJ patients**

Braz J Phys Ther. 2018 Aug 22. pii: S1413-3555(18)30051-0. doi: 10.1016/j.bjpt.2018.08.008.

**The effectiveness of dry needling for patients with orofacial pain associated with temporomandibular dysfunction: a systematic review and meta-analysis.**

Vier C<sup>1</sup>, Almeida MB<sup>2</sup>, Neves ML<sup>1</sup>, Santos ARSD<sup>1</sup>, Bracht MA<sup>3</sup>.

**BACKGROUND:**

Orofacial pain of myofascial origin is often associated with temporomandibular joint dysfunction, affects chewing muscles and may lead to functional limitations. Dry needling is an intervention commonly used for inactivating myofascial pain trigger points.

**OBJECTIVE:**

To systematically review the effects of dry needling on orofacial pain of myofascial origin in patients with temporomandibular joint dysfunction.

**METHODS:**

This systematic review has pain intensity as primary outcome. Searches were conducted on April 13th, 2018 in eight databases, without publication date restrictions. We selected randomized controlled trials published in English, Portuguese, or Spanish, with no restrictions regarding subject ethnicity, age or sex.

**RESULTS:**

Seven trials were considered eligible. There was discrepancy among dry needling treatment protocols. Meta-analysis showed that dry needling is better than other interventions for pain intensity as well as than sham therapy on pressure pain threshold, but there is very low-quality evidence and a small effect size. There were no statistically significant differences in other outcomes.

**CONCLUSION:**

Clinicians can use dry needling for the treatment of temporomandibular joint dysfunction, nevertheless, due the low quality of evidence and high risk of bias of some included studies, larger and low risk of bias trials are needed to assess the effects of dry needling on orofacial pain associated with temporomandibular joint dysfunction.

**13 C. AIRWAYS/SWALLOWING/SPEECH****Testosterone and impaired sleep**

World Journal of Urology pp 1–5| Cite as

**Impaired sleep is associated with low testosterone in US adult males: results from the National Health and Nutrition Examination Survey**

- Premal Patel Benjamin Shiff Taylor P. Kohn Ranjith Ramasamy

**Purpose**

Testosterone deficiency has been linked to several adverse health outcomes and recent data have suggested that abnormal sleep quality may result in lower testosterone levels. We assessed the effect of self-reported sleep patterns on serum testosterone while controlling for co-morbidities, and baseline demographics.

**Materials and methods**

Using data collected from the 2011–2012 National Health and Nutrition Examination Survey (NHANES), we extracted serum total testosterone level, sleep duration, demographic, and co-morbidities for men aged 16 years and older. Univariate and multivariate linear regression was used to estimate the association of number of hours slept, co-morbidities, and demographics with serum testosterone.

**Results**

Among the 9756 individuals in the NHANES dataset, 2295 (23.5%) were males 16 years and older with a median (interquartile range) age of 46 years (29–62) who also had serum testosterone levels drawn. Median serum testosterone level was 377 ng/dL (IQR: 279–492 ng/dL). Median number of hours slept was 7 h (IQR: 6–8 h). On multivariate linear regression, we found serum testosterone decreased by 0.49 ng/dL per year of age ( $p = 0.04$ ), 5.85 ng/dL per hour loss of sleep ( $p < 0.01$ ) and 6.18 ng/dL per unit of body mass index (BMI) increase ( $p < 0.01$ ).

**Conclusions**

Among men aged 16–80 in the United States, we found increasing age, impaired sleep and elevated BMI is associated with low testosterone. It is important, therefore, that evaluation and treatment of reduced serum testosterone should also include improving sleep duration in combination with weight management.

**Vestibular disorders linked to OSA**

J Sleep Res. 2017 Aug;26(4):487-494. doi: 10.1111/jsr.12516. Epub 2017 Mar 20.

**Integrating postural and vestibular dimensions to depict impairment in moderate-to-severe obstructive sleep apnea syndrome patients.**

Micarelli A<sup>1,2</sup>, Liguori C<sup>2</sup>, Viziano A<sup>1</sup>, Izzi F<sup>2</sup>, Placidi F<sup>2</sup>, Alessandrini M<sup>1</sup>.

Vestibular dysfunction was linked to moderate-to-severe obstructive sleep apnea syndrome (OSAS) patients in literature.

However, due to a lack of knowledge among valid and recent implementations conceived to study postural control on static posturography (SP) and vestibulo-ocular reflex (VOR) gain under physiological conditions (video Head Impulse Test; vHIT), the aim of this work was to integrate (i) VOR changes via vHIT implementation, (ii) postural arrangement by studying both classical parameters and frequency spectra (PS) and (iii) correlation between these findings, polygraphic (PG) and subjective scores along Dizziness Handicap Inventory (DHI) and Epworth Sleepiness Scale (ESS). Thus, 32 moderate-to-severe OSAS patients and 32 healthy subjects - studied by using PG, DHI and ESS - underwent vHIT and SP posturographic assessment.

Analysis of variance was performed to disclose between-group effects and correlation analysis was implemented between otoneurological, PG, DHI and ESS values. OSAS group demonstrated a significant decay of VOR gain and an increase in both frequency spectra PS values, especially within the low-frequency interval, and in classical posturographic SP parameters. Further, positive and negative correlations between mean SaO<sub>2</sub> and gain and low frequency interval spectra PS were found, respectively.

Strengthening previous hypothesis related to brainstem chronic hypoxemia phenomena affecting vestibular network, implementation of these data could generate future attentions (i) for screening under physiological conditions postural and vestibular detriments in OSAS subjects, especially exposed at risk settings, and (ii) among PG parameters, such as mean SaO<sub>2</sub>, to propose further reliable tools in monitoring postural and vestibular decay in these patients demonstrating PG parameters detriments.

**Head rotation decreases OSA in supine**

Sleep Breath. 2017 Dec;21(4):821-828. doi: 10.1007/s11325-017-1525-2. Epub 2017 Jun 12.

**Influence of head position on obstructive sleep apnea severity.**

Zhu K<sup>1,2</sup>, Bradley TD<sup>2,3</sup>, Patel M<sup>2</sup>, Alshaer H<sup>4,5,6</sup>.

**OBJECTIVE:**

Supine body orientation plays an important role in precipitating upper airway collapse in a significant proportion of obstructive sleep apnea (OSA) patients known to have supine-predominant OSA (OSA<sub>sup</sub>). Traditionally, trunk position is used to assess OSA<sub>sup</sub>, but the role of the head position has not been established. We hypothesized that head position influences OSA independently of trunk position.

**METHODS:**

Head and trunk positions were determined from subjects undergoing overnight polysomnography. The apnea-hypopnea index (AHI), rapid eye movement (REM), and non-REM sleep time of all trunk and head positions (lateral and supine) were calculated and compared against the complete supine position, i.e., head and trunk supine.

**RESULTS:**

In 26 subjects, lateral rotation of the head to the right or left with the trunk supine resulted in a significant reduction in AHI from  $36.0 \pm 22.5$  to  $25.8 \pm 16.6$  ( $p = 0.008$ ), and an AHI drop  $<10$  in 27% of patients. The "trunk lateral-head lateral" position resulted in a more dramatic reduction in AHI from  $31.6 \pm 20.2$  to  $4.1 \pm 4.1$  ( $p < 0.0001$ ). The distributions of REM and non-REM sleep were not different among positions. In the subgroup with a body mass index (BMI)  $<32 \text{ kg/m}^2$  (15 subjects), the AHI reduction with lateral head rotation was significant ( $p = 0.005$ ) but not in remaining 11 obese patient with a BMI  $\geq 32 \text{ kg/m}^2$  ( $p = 0.24$ ).

**CONCLUSION:**

OSA severity with the trunk in the supine position decreased significantly when the head rotated from supine to lateral, particularly in non-obese patients. These results demonstrate an important influence of head position on the AHI, independently of trunk position and sleep stage, in patients with OSA.

**Head posture and respiratory function**

Biomed Res Int. 2018 Jul 12;2018:4518269. doi: 10.1155/2018/4518269. eCollection 2018.

**Effect of Different Head-Neck Postures on the Respiratory Function in Healthy Males.**

Zafar H<sup>1</sup>, Albarrati A<sup>2</sup>, Alghadir AH<sup>1</sup>, Iqbal ZA<sup>1</sup>.

Normal respiration is a very intricate function that comprises mechanical as well as nonmechanical components. It is shown to be affected by various factors including age, lifestyle, disease, and change in posture. With the increased use of hand held devices, everyone is prone to poor sitting postures like forward head posture.

The purpose of this study was to evaluate the effect of assumed forward head posture and torticollis on the diaphragm muscle strength. A sample of 15 healthy males, aged 18-35 years, was recruited for this study. All subjects performed spirometry to measure the forced expiratory volume in 1 second (FEV<sub>1</sub>), the forced vital capacity (FVC), and FEV<sub>1</sub>/FVC ratio. SNIP was measured during upright sitting, induced forward head posture, and torticollis. Subject's mean age (SD) was 23(6) years. The SNIP score of the subjects during sitting with FHP was lower as compared to that during upright sitting. It decreased significantly during induced right torticollis position. This is the first study exploring the impact of different head and neck positions on respiratory function.

Alteration of head and neck positions had an immediate negative impact on respiratory function. Clinicians should be prompted to assess respiratory function when assessing individuals with mal-posture.

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### Supine position and sleep apnea

Sleep Med Rev. 2014 Feb;18(1):7-17. doi: 10.1016/j.smrv.2013.01.005. Epub 2013 May 10.

#### **Supine position related obstructive sleep apnea in adults: pathogenesis and treatment.**

Joosten SA<sup>1</sup>, O'Driscoll DM<sup>2</sup>, Berger PJ<sup>3</sup>, Hamilton GS<sup>4</sup>.

#### **Author information**

#### **Abstract**

The most striking feature of obstructive respiratory events is that they are at their most severe and frequent in the supine sleeping position: indeed, more than half of all obstructive sleep apnea (OSA) patients can be classified as supine related OSA.

Existing evidence points to supine related OSA being attributable to unfavorable airway geometry, reduced lung volume, and an inability of airway dilator muscles to adequately compensate as the airway collapses. The role of arousal threshold and ventilatory control instability in the supine position has however yet to be defined. Crucially, few physiological studies have examined patients in the lateral and supine positions, so there is little information to elucidate how breathing stability is affected by sleep posture. The mechanisms of supine related OSA can be overcome by the use of continuous positive airway pressure. There are conflicting data on the utility of oral appliances, while the effectiveness of weight loss and nasal expiratory resistance remains unclear.

Avoidance of the supine posture is efficacious, but long term compliance data and well powered randomized controlled trials are lacking. The treatment of supine related OSA remains largely ignored in major clinical guidelines. Supine OSA is the dominant phenotype of the OSA syndrome.

This review explains why the supine position so favors upper airway collapse and presents the available data on the management of patients with supine related OSA.

**Posture and OSA**

J Oral Maxillofac Res. 2017 Sep 30;8(3):e4. doi: 10.5037/jomr.2017.8304. eCollection 2017 Jul-Sep.

**Pharyngeal Airway Dimensions and Head Posture in Obstructive Sleep Apnea Patients with and without Morphological Deviations in the Upper Cervical Spine.**

Sonnesen L<sup>1</sup>, Petersson A<sup>2</sup>, Berg S<sup>3</sup>, Svanholt P<sup>1</sup>.

**OBJECTIVES:**

The aim of the study was to analyse differences in pharyngeal airway dimensions and head posture between obstructive sleep apnea patients with and without morphological deviations in the upper cervical spine and to analyse associations between pharyngeal airway dimensions and head posture in the total sample.

**MATERIAL AND METHODS:**

The sample comprised 53 obstructive sleep apnea (OSA) patients of which 32.1% had upper spine morphological deviations. Accordingly two groups were defined: 17 OSA patients with morphological deviations in the upper spine and 36 without upper spine deviations. Pharyngeal airway dimensions in terms of distances, cross-sectional areas and volume and upper spine morphological deviations were evaluated on cone-beam computed tomography. Head posture was evaluated on two-dimensional generated lateral cephalograms. Differences were analysed and adjusted for age and gender by multiple linear regression analysis.

**RESULTS:**

OSA patients with upper spine morphological deviations had a significantly more backward and curved neck posture (OPT/HOR,  $P < 0.01$ ; OPT/CVT,  $P < 0.05$ ) compared to OSA patients without spine deviations. No significant differences were found in airway dimensions between patients with and without upper spine deviations. In the total group significant associations were found between head posture and pharyngeal airway distances and cross-sectional area at the nasal floor, epiglottis and hyoid bone level ( $P < 0.05$ ,  $P < 0.01$ ,  $P < 0.001$ ). No significant association was found between head posture and airway volume.

**CONCLUSIONS:**

The results may contribute to differentiate obstructive sleep apnea patients and thereby may prove valuable in diagnosis and treatment planning of obstructive sleep apnea patients.

**Twin posture and sleep apnea**

J Oral Rehabil. 2018 May;45(5):378-385. doi: 10.1111/joor.12620. Epub 2018 Mar 9.

**Heritability of the airway structure and head posture using twin study.**

Kang JH<sup>1</sup>, Sung J<sup>2</sup>, Song YM<sup>3</sup>, Kim YH<sup>4</sup>.

Inherited traits of obstructive sleep apnoea (OSA) may have link to the heritability of the airway anatomy.

The aim of this study was to investigate heritability of the airway anatomy by comparing skeletal and soft tissue features of Korean monozygotic twins (MZ) and dizygotic twins (DZ). In total, 72 participants (mean age,  $41.5 \pm 5.9$  years; 40 males, 32 females) including 48 MZ (24 pairs) and 24 DZ (12 pairs) with same sex were participated. The craniofacial, craniovertebral, hyoideal and pharyngeal parameters were measured using lateral cephalograms. The genetic analysis was performed using Falconer's method. High heritability was detected in the hyoid position and inclination of the cervical column. The velopharyngeal and hypopharyngeal dimensions showed higher heritability compared to those of the nasopharynx and oropharynx. The body mass index (BMI) had interactions with the nasopharyngeal and hypopharyngeal dimensions and length of the tongue and soft palate. The mandibular growth had correlations with the nasopharyngeal and hypopharyngeal dimensions.

The vertical skeletal relationships appeared to have interaction with the nasopharyngeal, velopharyngeal and hypopharyngeal dimensions, as well as length of the tongue and soft palate. A forwarded inclination of the cervical columns was seen in connections with BMI and the nasopharyngeal and hypopharyngeal dimensions.

The airway structures and head postures seemed to be under strong genetic controls. The airway dimensions had associations with BMI, head postures and skeletal structures which showed high heritability.

Forwarded head postures would be physiological adaptations of compromised airway adequacy by increased BMI and retrognathia.

**Sleep postures and OSA**

PLoS One. 2018 Mar 14;13(3):e0194204. doi: 10.1371/journal.pone.0194204. eCollection 2018.

**Cerebral vasoreactivity in response to a head-of-bed position change is altered in patients with moderate and severe obstructive sleep apnea.**

Gregori-Pla C<sup>1</sup>, Cotta G<sup>1</sup>, Blanco I<sup>1</sup>, Zirak P<sup>1</sup>, Giovannella M<sup>1</sup>, Mola A<sup>2</sup>, Fortuna A<sup>2</sup>, Durduran T<sup>1,3</sup>, Mayos M<sup>2,4</sup>.

**MOTIVATION:**

Obstructive sleep apnea (OSA) can impair cerebral vasoreactivity and is associated with an increased risk of cerebrovascular disease. Unfortunately, an easy-to-use, non-invasive, portable monitor of cerebral vasoreactivity does not exist. Therefore, we have evaluated the use of near-infrared diffuse correlation spectroscopy to measure the microvascular cerebral blood flow (CBF) response to a mild head-of-bed position change as a biomarker for the evaluation of cerebral vasoreactivity alteration due to chronic OSA. Furthermore, we have monitored the effect of two years of continuous positive airway pressure (CPAP) treatment on the cerebral vasoreactivity.

**METHODOLOGY:**

CBF was measured at different head-of-bed position changes (supine to 30° to supine) in sixty-eight patients with OSA grouped according to severity (forty moderate to severe, twenty-eight mild) and in fourteen control subjects without OSA. A subgroup (n = 13) with severe OSA was measured again after two years of CPAP treatment.

**RESULTS:**

All patients and controls showed a similar CBF response after changing position from supine to 30° (p = 0.819), with a median (confidence interval) change of -17.5 (-10.3, -22.9)%. However, when being tilted back to the supine position, while the control group (p = 0.091) and the mild patients with OSA (p = 0.227) recovered to the initial baseline, patients with moderate and severe OSA did not recover to the baseline (9.8 (0.8, 12.9)%, p < 0.001) suggesting altered cerebral vasoreactivity. This alteration was correlated with OSA severity defined by the apnea-hypopnea index, and with mean nocturnal arterial oxygen saturation. The CBF response was normalized after two years of CPAP treatment upon follow-up measurements.

**CONCLUSION:**

In conclusion, microvascular CBF response to a head-of-bed challenge measured by diffuse correlation spectroscopy suggests that moderate and severe patients with OSA have altered cerebral vasoreactivity related to OSA severity. This may normalize after two years of CPAP treatment.

### Face types and head posture

J Soc Bras Fonoaudiol. 2011 Dec;23(4):315-20.

#### **Facial type and head posture of nasal and mouth-breathing children.**

Bolzan Gde P<sup>1</sup>, Souza JA, Boton Lde M, Silva AM, Corrêa EC.

#### **PURPOSE:**

To verify the facial type and the head posture of nasal and mouth-breathing children from habitual and obstructive etiologies, as well as to correlate the morphological facial index to the head angulation position in the sagittal plane.

#### **METHODS:**

Participants were 59 children with ages between 8 years and 11 years and 10 months. All subjects were undergone to speech-language pathology screening, otorhinolaryngologic evaluation, and nasopharyngoscopy, allowing the constitution of three groups: nasal breathers--15 children; mouth breathers from obstructive etiology--22 children; and habitual mouth breathers--22 children. In order to determine facial type and morphological facial index, the height and the width of the face were measured using a digital caliper. The head posture was assessed through physical examination and computerized photogrammetry.

#### **RESULTS:**

It was verified the predominance of short face in nasal breathers, and long face in mouth breathers. There was an association among facial type and breathing mode/mouth breathing etiology: the brachyfacial type was more frequent among nasal breathers, and less frequent in subjects with obstructive nasal breathing. Head posture was similar in all three groups. No correlation was found between morphological facial index and head posture.

#### **CONCLUSION:**

The brachyfacial type favors the nasal-breathing mode and the head posture is not influenced by breathing mode and by the etiology of mouth breathing, as well as it is not related to facial type.

## 16. CONCUSSIONS

### Post-concussion changes

#### Changes in Measures of Cervical Spine, Vestibulo-ocular Reflex, Dynamic Balance and Divided Attention Following Sport-Related Concussion in Elite Youth Ice Hockey Players

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#### Background

Concussion is a commonly occurring injury. The extent to which the cervical spine, vestibulo-ocular reflex (VOR), dynamic balance and divided attention are affected following concussion is not well understood.

#### Objective

To evaluate acute changes in measures of 1) cervical spine, 2) VOR function, 3) dynamic balance and 4) tasks of divided attention in elite youth ice hockey players following a sport-related concussion.

#### Methods

Elite 13-17 year old ice hockey players completed cervical spine measures [cervical flexor endurance test (CFE), head perturbation test, anterolateral strength, cervical flexion rotation test, joint position error], VOR [head thrust test, dynamic visual acuity (DVA) (clinical and computerized)], dynamic balance [Functional Gait Assessment (FGA)] and divided attention [Walking While Talking (WWT) test] preseason and following concussion.

#### Results

At least one test was completed by 69/97 (71%) players (a maximum of 55 for any one test) at both preseason and acutely post concussion (median 4 days post concussion). After Bonferroni corrections ( $\alpha=0.00625$ ), using Wilcoxon Signed-Rank Test, cervical spine measures were significantly worse following concussion compared to baseline [CFE ( $z=-5.20$ ,  $p<0.00001$ ), anterolateral neck strength ( $z_{\text{left}}=-5.36$ ,  $p<0.0001$ ;  $z_{\text{right}}=-5.45$ ,  $p<0.0001$ ) and head perturbation test ( $z=-4.63$ ,  $p<0.001$ )]. Time taken to complete a complex task of divided attention relative to normal walking speed was faster (improved) compared to preseason ( $z=-2.59$ ,  $p=0.0096$ ). There was no change in VOR or dynamic balance following concussion.

#### Conclusions

Measures of cervical spine function and divided attention were altered following concussion. However, tests of VOR and dynamic balance were not significantly different than baseline. Future research to evaluate the mechanism underlying these changes is warranted. *J Orthop Sports Phys Ther*, Epub 27 Jul 2018. doi:10.2519/jospt.2018.8258

## 34. PATELLA

### PFJ trajectories

#### Exploratory Study of 6-month Pain Trajectories in Individuals With Predominant Patellofemoral Osteoarthritis: A Cohort Study

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#### Study Design

Prospective longitudinal cohort study.

#### Background

Knowledge of patellofemoral (PF) osteoarthritis (OA) pain trajectories is vital for clinicians and patients to make disease-specific decisions regarding treatment options and tailor coping strategies.

#### Objectives

To describe pain trajectories of people living with PF OA presenting to a chronic care management program. Second, to explore baseline characteristics associated with different trajectories.

#### Methods

Eighty-eight participants presenting to a chronic care management program reported their worst pain over the previous week at baseline, 6, 12, 18 and 26 weeks using a 10-cm visual analogue scale. Trajectories (classes) were identified using latent class growth analysis. Demographics, pain, physical performance, strength, quality of life, mental health and lower limb/foot structural measures obtained at baseline were assessed for association with trajectory class membership.

#### Results

Class 1 (28%) exhibiting high persistent pain from baseline (6.8cm ± 1.7cm), and persisting through time (p=0.52). Class 2 (57%) exhibited moderate baseline pain (4.8cm ± 1.7cm), which also remained persistent (p=0.97). Individuals in class 3 (15%) exhibited low improving pain (baseline pain: 2.6cm ± 1.2cm) through time (p=0.017). Baseline measures of poor Knee injury and Osteoarthritis Outcome Scores, local and proximal sensitivity to pressure and weaker knee extensors were associated with increased odds (range: 1.03 (1.0, 1.07) to 16.24 (2.53, 104.34)) of following the high pain trajectory.

#### Conclusion

In people with PF OA presenting to a chronic care management program, distinct pain trajectories appear to exist. Baseline variables may be useful for identifying individuals at risk of poorer prognosis. Larger studies are needed to confirm such utility.

#### Level of Evidence

Prognosis, Level 2b. *J Orthop Sports Phys Ther*, Epub 12 Sep 2018. doi:10.2519/jospt.2019.8354

**35. KNEE/TOTAL****Biofeedback helps re-training****Comparison of 2 Forms of Kinetic Biofeedback on the Immediate Correction of Knee Extensor Moment Asymmetry Following Total Knee Arthroplasty During Decline Walking**

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**Published:** *Journal of Orthopaedic & Sports Physical Therapy*,  
2018 **Volume:**0 **Issue:**0 **Pages:**1–23 **DOI:**10.2519/jospt.2019.7800

**Study Design**

Controlled laboratory study; cross-sectional.

**Background**

Individuals with total knee arthroplasty (TKA) display inter-limb knee extensor moment asymmetry during level walking that is exacerbated as task demands are increased. Studies utilizing biofeedback to correct inter-limb knee extensor moment asymmetry following TKA have reported mixed results.

**Objective**

To compare the immediate effect of two forms of real-time kinetic biofeedback [vertical ground reaction force (vGRF) or knee extensor moment (KEM)] on improving inter-limb peak knee extensor moment symmetry during the weight acceptance phase of decline walking in persons who have undergone TKA.

**Methods**

Thirty participants (17 men;  $61.9 \pm 8.5$  years old;  $\text{BMI } 28.4 \pm 3.7 \text{ kg/m}^2$ ) were allocated to either a vGRF or KEM real-time biofeedback group. Peak knee extensor moment inter-limb asymmetry was obtained during both non-biofeedback and biofeedback decline walking trials 3 months following TKA.

**Results**

Significant inter-limb asymmetry in peak knee extensor moment was observed in both groups during the non-biofeedback condition. KEM biofeedback group resulted in a significant improvement in peak knee extensor moment asymmetry ( $p=0.01$ ). No change in peak knee extensor moment asymmetry was observed in the vGRF biofeedback group.

**Conclusion**

KEM biofeedback has an immediate effect on improving peak knee extensor moment asymmetry 3 months post-TKA. *J Orthop Sports Phys Ther*, Epub 20 Aug 2018.  
*doi:*10.2519/jospt.2019.7800

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

Clin Rheumatol. 2018 Aug 30. doi: 10.1007/s10067-018-4263-3.

**Home exercise therapy to improve muscle strength and joint flexibility effectively treats pre-radiographic knee OA in community-dwelling elderly: a randomized controlled trial.**

Suzuki Y<sup>1</sup>, Iijima H<sup>1,2</sup>, Tashiro Y<sup>1</sup>, Kajiwara Y<sup>1</sup>, Zeidan H<sup>1</sup>, Shimoura K<sup>1</sup>, Nishida Y<sup>1</sup>, Bito T<sup>1</sup>, Nakai K<sup>1</sup>, Tatsumi M<sup>1</sup>, Yoshimi S<sup>1</sup>, Tsuboyama T<sup>1</sup>, Aoyama T<sup>3</sup>.

To compare the efficacy and adherence rates of two parallel home exercise therapy programs—multiple exercise (training and stretching the knee and hip muscles) and control (training the quadriceps muscles)—on knee pain, physical function, and knee extension strength in community-dwelling elderly individuals with pre-radiographic knee osteoarthritis (OA).

One hundred patients with medial knee pain were randomly allocated to one of two 4-week home exercise programs. Individuals with a Kellgren/Lawrence (K/L) grade 0 or 1 OA (pre-radiographic knee OA) in the medial compartment were enrolled. Primary outcomes were knee pain (visual analog scale), self-reported physical function (Japanese Knee Osteoarthritis Measure [JKOM]), and isometric maximum muscle strength of the knee extensor measured using a hand-held dynamometer.

A total of 52 patients (28 [53.8%] in the multiple exercise group, 24 [46.2%] in the control group) completed the trial. The JKOM activities of daily living and general health conditions outcomes improved significantly in the multiple exercise group compared to the control group (JKOM activities of daily living, beta = - 0.76; 95% confidence interval [CI], - 1.39 to - 0.13; p = 0.01; JKOM general health conditions, beta = - 0.25; 95% CI, - 0.48 to - 0.01; p = 0.03).

The home exercise compliance rates of the multiple exercise and control groups were 96.6 and 100%, respectively. When targeting pre-radiographic knee OA in community-dwelling elderly, it is important to implement home exercise programs that aim to improve muscle strength and joint flexibility rather than knee extension muscle power only.

**41 A. ACHILLES TENDON AND CALF****Recommendations for treatment**

Br J Sports Med. 2018 Aug 31. pii: bjsports-2017-098913. doi: 10.1136/bjsports-2017-098913.

**Exercise, orthoses and splinting for treating Achilles tendinopathy: a systematic review with meta-analysis.**

Wilson F<sup>1</sup>, Walshe M<sup>2</sup>, O'Dwyer T<sup>1</sup>, Bennett K<sup>3</sup>, Mockler D<sup>4</sup>, Bleakley C<sup>5</sup>.

**OBJECTIVES:**

To assess the efficacy of exercise, orthoses and splinting on function, pain and quality of life (QoL) for the management of mid-portion and insertional Achilles tendinopathy, and to compare different types, applications and modes of delivery within each intervention category.

**DESIGN:**

Systematic review and meta-analysis.

**DATA SOURCES:**

Medline, CINAHL, Embase, AMED, WHO ICTRP, Web of Science, PEDro and Cochrane Library from inception to October 2017. Citation tracking of published studies and conference proceedings and contacting experts in the field.

**STUDY ELIGIBILITY CRITERIA:**

Controlled clinical trials evaluating either exercise, orthoses or splinting for the management of Achilles tendinopathy.

**METHODS:**

Independent reviewers undertook searches, screening and risk of bias appraisal. Primary outcomes of interest were function, pain and QoL.

**RESULTS:**

Twenty-two studies were included (1137 participants). Moderate level evidence favoured eccentric exercise over control for improving pain and function in mid-portion tendinopathy. Moderate level evidence favoured eccentric exercise over concentric exercise for reducing pain. There was moderate level evidence of no significant difference in pain or function between eccentric exercise and heavy slow resistance exercise. There was low level evidence that eccentric exercise was not superior to stretching for pain or QoL. There was moderate level evidence that a combined exercise protocol was not superior to a lower dosage protocol for improving functional performance. There was moderate to low level evidence of a significant difference in pain (mean difference (MD) 6.3 mm, 95% CI -4.45 to 17.04, moderate) or function (MD 1.83 Victoria Institute of Sport Assessment points, 95% CI -7.47 to 11.12, low) between high-dose and low-dose eccentric training. There was high to moderate level evidence of no difference in pain (moderate) or function (high) between orthoses and control. There was low level evidence of no significant benefit in adding a night splint to an eccentric exercise programme for function, and moderate level evidence for no reduction in pain (MD -3.50, 95% CI -10.49 to 3.48). Eccentric exercise was not superior to splinting for pain (moderate evidence) or function (low level evidence).

**SUMMARY:**

We conditionally recommend exercise for improving pain and function in mid-portion Achilles tendinopathy. The balance of evidence did not support recommendation of one type of exercise programme over another. We conditionally recommend against the addition of a splint to an eccentric exercise protocol and we do not recommend the use of orthoses to improve pain and function in Achilles tendinopathy.

**45 A. MANUAL THERAPY LUMBAR & GENERAL****LBP helped with diaphragm technique**

Arch Phys Med Rehabil. 2018 Sep;99(9):1720-1729. doi: 10.1016/j.apmr.2018.04.022. Epub 2018 May 19.

**Osteopathic Manipulative Treatment Including Specific Diaphragm Techniques Improves Pain and Disability in Chronic Nonspecific Low Back Pain: A Randomized Trial.**

Martí-Salvador M<sup>1</sup>, Hidalgo-Moreno L<sup>1</sup>, Doménech-Fernández J<sup>2</sup>, Lisón JF<sup>3</sup>, Arguisuelas MD<sup>4</sup>.

**OBJECTIVE:**

To investigate the effects of an osteopathic manipulative treatment (OMT), which includes a diaphragm intervention compared to the same OMT with a sham diaphragm intervention in chronic nonspecific low back pain (NS-CLBP).

**DESIGN:**

Parallel group randomized controlled trial.

**SETTING:**

Private and institutional health centers.

**PARTICIPANTS:**

Participants (N=66) (18-60y) with a diagnosis of NS-CLBP lasting at least 3 months.

**INTERVENTIONS:**

Participants were randomized to receive either an OMT protocol including specific diaphragm techniques (n=33) or the same OMT protocol with a sham diaphragm intervention (n=33), conducted in 5 sessions provided during 4 weeks.

**MAIN OUTCOME MEASURES:**

The primary outcomes were pain (evaluated with the Short-Form McGill Pain Questionnaire [SF-MPQ] and the visual analog scale [VAS]) and disability (assessed with the Roland-Morris Questionnaire [RMQ] and the Oswestry Disability Index [ODI]). Secondary outcomes were fear-avoidance beliefs, level of anxiety and depression, and pain catastrophization. All outcome measures were evaluated at baseline, at week 4, and at week 12.

**RESULTS:**

A statistically significant reduction was observed in the experimental group compared to the sham group in all variables assessed at week 4 and at week 12 (SF-MPQ [mean difference -6.2; 95% confidence interval, -8.6 to -3.8]; VAS [mean difference -2.7; 95% confidence interval, -3.6 to -1.8]; RMQ [mean difference -3.8; 95% confidence interval, -5.4 to -2.2]; ODI [mean difference -10.6; 95% confidence interval, -14.9 to 6.3]). Moreover, improvements in pain and disability were clinically relevant.

**CONCLUSIONS:**

An OMT protocol that includes diaphragm techniques produces significant and clinically relevant improvements in pain and disability in patients with NS-CLBP compared to the same OMT protocol using sham diaphragm techniques.

**Pain relief with MT on oncology patients**

Integr Cancer Ther. 2018 Aug 31:1534735418796954. doi: 10.1177/1534735418796954

**Osteopathic Manipulative Treatment Effect on Pain Relief and Quality of Life in Oncology Geriatric Patients: A Nonrandomized Controlled Clinical Trial.**

Arienti C<sup>1</sup>, Bosisio T<sup>2</sup>, Ratti S<sup>3</sup>, Miglioli R<sup>1</sup>, Negrini S<sup>1,4</sup>.

**PURPOSE:**

The aim of present study was to study the effect of osteopathic manipulation on pain relief and quality of life improvement in hospitalized oncology geriatric patients.

**METHODS:**

A nonrandomized controlled clinical trial was performed in the Oncology Rehabilitation Unit, Milan, Italy, from September 2015 to March 2016. Twenty-three older cancer patients were enrolled and allocated in 2 experimental groups: the study group (OMT group, N = 12) underwent osteopathic manipulative treatment in addition to physiotherapy, and the control group (PT group, N = 12) underwent only physiotherapy. At enrollment (T0), 24 recruited oncology patients completed the sociodemographic forms and were evaluated for pain intensity and quality of life by an external examiner. All patients were reevaluated every week (T1, T2, T3, and T4) for pain intensity and at the end of the study treatment (T4) for quality of life. A standard level of significance was set at  $\alpha < .05$ .

**RESULTS:**

The 2 groups did not significantly differ in age (  $P = .682$ ), body mass index (  $P = .413$ ), or gender (  $P = 1$ ). The osteopathic manipulative treatment added to physiotherapy produced a significant reduction in Numeric Rating Scale (NRS) scores both at T2 (  $P = .004$ ) and T4 (  $P = .002$ ). The difference in quality of life improvements between T0 and T4 was not statistically significant. NRS improved in the PT group at T4. Between-group analysis of NRS and quality of life with the Mann-Whitney test did not show any significant difference between the 2 treatments.

**CONCLUSIONS:**

Our study showed a significant improvement in pain relief and a nonsignificant improvement in quality of life in hospitalized geriatric oncology patients during osteopathic manipulative treatment.

## MDT reliable system for spinal pain

**Reliability of Mechanical Diagnosis and Therapy System in Patients With Spinal Pain: A Systematic Review**

**Authors:** Alessandra Narciso Garcia, PT<sup>1</sup>, Lucíola da Cunha Menezes Costa, PhD<sup>1</sup>, Fabrício Soares de Souza, FT, MSc<sup>1</sup>, Matheus Oliveira de Almeida, FT, PhD<sup>1</sup>, Amanda Costa Araujo, FT<sup>1</sup>, Mark Hancock, PhD<sup>2</sup>, Leonardo Oliveira Pena Costa, PhD<sup>1,3</sup>

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2018 **Volume:**0 **Issue:**0 **Pages:**1–39 **DOI:**10.2519/jospt.2018.7876

**Study Design** Systematic review.

**Background**

An updated summary of the evidence for the reliability of Mechanical Diagnosis and Therapy (MDT) System in patients with spinal pain is needed.

**Objective**

To investigate the evidence on the intra and inter-rater reliability of MDT system in patients with spinal pain.

**Methods**

Search strategies on MEDLINE, CINAHL, EMBASE, PEDro and Scopus were conducted. We included any study design as long as reliability of the MDT method was tested in patients with spinal pain. We collected data on the reliability of MDT to identify: main and sub-syndromes, directional preference, centralization phenomenon and lateral shift. The methodological quality of studies was assessed using the Quality appraisal tool for studies of diagnostic reliability and The Guidelines for Reporting Reliability and Agreement Studies checklists.

**Results**

Twelve studies were included (eight studies on back pain, pooled n=2160 patients; three studies on neck pain, pooled n=45 patients; and three studies recruited mixed spinal conditions, pooled n=389 patients). Studies investigating back pain patients reported kappa estimates ranging from 0.26-1.0 (main and sub-syndromes); 0.27-0.90 (directional preference) and 0.11-0.70 (centralization phenomenon). Kappa estimates for studies investigating neck pain ranged from 0.47 to 0.84 (main and sub-syndromes) and 0.46 (directional preference). In mixed populations kappa estimates ranged from 0.56-0.96 (main and sub-syndromes).

**Conclusion**

The MDT system appears to have acceptable inter-rater reliability for classifying patients with back pain into main/sub-syndromes, when applied by therapists who have completed the credentialing examination, but unacceptable reliability in other therapists. We found conflicting evidence regarding the reliability of MDT system in patients with neck pain or mixed pain locations. *J Orthop Sports Phys Ther*, Epub 22 Jun 2018. doi:10.2519/jospt.2018.7876

Keyword: back pain, McKenzie method, neck pain, reproducibility

**45 D. MANUAL THERAPY EXTREMITIES****MT helps knee OA**

Physiotherapy. 2018 Sep;104(3):264-276. doi: 10.1016/j.physio.2018.05.003. Epub 2018 Jun 2.

**Effects of orthopaedic manual therapy in knee osteoarthritis: a systematic review and meta-analysis.**

Anwer S<sup>1</sup>, Alghadir A<sup>2</sup>, Zafar H<sup>3</sup>, Brismée JM<sup>4</sup>.

**OBJECTIVE:**

This systematic review to aimed to evaluate the effects of orthopaedic manual therapy (OMT) on pain, improving function, and physical performance in patients with knee osteoarthritis (OA).

**DATA SOURCES:**

Four databases (PubMed, Web of Science, CENTRAL, and CINAHL) were searched.

**STUDY SELECTION:**

Trials were required to compare OMT alone or OMT in combination with exercise therapy, with exercise therapy alone or control.

**DATA EXTRACTION:**

Data extraction and risk assessment were done by two independent reviewers. Outcome measures were visual analogue scale (VAS), Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) pain score, WOMAC function score, WOMAC global score, and stairs ascending-descending time.

**RESULTS:**

Eleven randomized controlled trials were included (494 subjects), four of which had a PEDro score of 6 or higher, indicating adequate quality. The results of the meta-analysis indicated that reduction of VAS score in OMT compared with the control group was statistically insignificant (SDM: -0.59; 95% CI: -1.54 to -0.36; P=0.224). The reduction of VAS score in OMT compared with exercise therapy group was statistically significant (SDM: -0.78; 95% CI: -1.42 to -0.17; P=0.013). The reduction of WOMAC pain score in OMT compared with the exercise therapy group was statistically significant (SDM: -0.79; 95% CI: -1.14 to -0.43; P=0.001). Similarly, the reduction of WOMAC function score in OMT compared with the exercise therapy group was statistically significant (SDM: -0.85; 95% CI: -1.20 to -0.50; P=0.001). However, the reduction of WOMAC global score in OMT compared with the exercise therapy group was statistically insignificant (SDM: -0.23; 95% CI: -0.54 to -0.09; P=0.164). The reduction of stairs ascending-descending time in OMT compared with the exercise therapy group was statistically significant (SDM: -0.88; 95% CI: -1.48 to -0.29; P=0.004).

**CONCLUSIONS:**

This review indicated OMT compared with exercise therapy alone provides short-term benefits in reducing pain, improving function, and physical performance in patients with knee OA.

**46 B. LOWER LIMB NEUROMOILIZATION****Helps pain in RA patients**

Z Rheumatol. 2018 Aug 15. doi: 10.1007/s00393-018-0521-7

**A brief report on the clinical trial on neural mobilization exercise for joint pain in patients with rheumatoid arthritis.**

Lau YN<sup>1</sup>, Ng J<sup>1</sup>, Lee SY<sup>1</sup>, Li LC<sup>1</sup>, Kwan CM<sup>1</sup>, Fan SM<sup>1</sup>, Leung BPL<sup>2</sup>, Lo CN<sup>3,4</sup>.

**BACKGROUND:**

In rheumatoid arthritis (RA) synovitis, activation of synoviocytes and infiltration of adaptive immune cells leads to synovial hyperplasia and joint swelling. Under the elevated extra-neural pressure, free nerve endings release neuropeptides, calcitonin gene-related peptide, and substance P, thus promoting neurogenic inflammation.

**OBJECTIVE:**

This study aimed to assess the effect of therapeutic neural mobilization (NM) exercises targeting the nervous system on disease impact in RA patients.

**METHODS:**

A total of 21 RA patients were randomized into NM (n = 11) and control (n = 10) groups. NM group patients performed NM exercises targeting the median, musculocutaneous, femoral, and saphenous nerve, as well as the entire nervous system twice daily for 4-8 weeks. Control RA patients performed gentle joint mobilization exercises targeting the same joints. Primary outcome was the change in pre-/post-treatment score in the validated Rheumatoid Arthritis Impact of Disease (RAID). Secondary outcome was erythrocyte sedimentation rate (ESR).

**RESULTS:**

There were no significant differences between the groups at baseline. No adverse events were observed and compliance was over 90%. Post-treatment, favorable changes were observed in the NM group RAID score: -5.1 vs. -0.8; weighted RAID score: -0.79 vs. -0.15. ESR was reduced in the NM group, albeit non-significantly. Regarding the RAID score domains, the NM group demonstrated significant improvements in pain and coping.

**CONCLUSION:**

The current data indicate a beneficial effect of NM exercises on pain and self-efficacy in our RA patients. Larger clinical studies are warranted to determine the clinical effectiveness of NM as a treatment for pain for RA patients and simultaneously address immune and neuropeptide modulation through NM.

**48 A. STM****STM helps neck and cranial pain****Effects of sternocleidomastoid muscle and suboccipital muscsoft tissue release on muscle hardness and pressure pain of the sternocleidomastoid muscle and upper trapezius muscle in smartphone users with latent trigger points**Kim, Seong-Joong, PT<sup>a,b</sup>; Lee, Jung-Hoon, PT, PhD<sup>c,\*</sup>

Medicine: September 2018 - Volume 97 - Issue 36 - p e12133

doi: 10.1097/MD.00000000000012133

Few studies have been performed regarding the reduction of pain in the upper trapezius (UT) muscle by applying interventions to the sternocleidomastoid (SCM) muscle, which is innervated by the same nerves.

The purpose of this study was to investigate the effects of soft tissue release intervention on the SCM and suboccipital muscles with regard to muscle hardness and pressure pain threshold (PPT) of the SCM and UT muscles in smartphone users with latent myofascial trigger points (MTrPs) in the UT muscle.

Seventeen smartphone users (5 men and 12 women) with latent MTrPs in the UT muscle participated in the study. This study used a single blinding, cross-over design, wherein sternocleidomastoid soft tissue release (SSTR) and suboccipital release (SR) were applied on the subjects in random order one week apart. Muscle hardness and the PPT of the SCM and UT muscles were assessed before and after the intervention.

After SSTR was applied, the SCM and UT muscles showed a significant decrease in muscle hardness and a significant increase in PPT. After SR was applied, the UT muscle showed a significant decrease in muscle hardness and a significant increase in PPT. When comparing the amount of change between the SSTR and SR interventions, significant differences were found for SCM muscle hardness and PPT of the UT muscle in the SSTR intervention, compared with the SR intervention.

Therefore, we suggest that, to reduce pain in the UT muscle, it may be useful to apply intervention directly to the UT muscle, as well as to the SCM muscle, which is innervated by the same nerve.

### MFR helps neck pain

Int J Health Sci (Qassim). 2018 Sep-Oct;12(5):51-59.

#### **A randomized controlled trial to study the effect of gross myofascial release on mechanical neck pain referred to upper limb.**

Gauns SV<sup>1</sup>, Gurudut PV<sup>1</sup>.

#### **OBJECTIVE:**

Mechanical neck pain (NP) with referred pain to upper limb is a common problem and often leads to functional impairment of common activities of daily living. The present study is undertaken to study and compare the effect of gross myofascial release (MFR) of upper limb and neck alone with conventional physiotherapy against only conventional treatment in subjects with mechanical NP referred to upper limb in terms of cervical endurance, pain, range of motion, and function.

#### **METHODS:**

Design: This was an experimental study; a total of 40 subjects clinically diagnosed with mechanical NP along with referred pain between the age group of 20 and 50 years. Intervention: Control group was given conventional treatment of hot moist pack, TENS, and stretching and strengthening exercise, and experimental group was given gross MFR of the neck and upper limb in addition to conventional therapy. Treatment was given for 6 consecutive days. Outcome measures used were pressure biofeedback to measure cervical endurance, goniometer for cervical ROM, Northwick Park NP questionnaire, and disabilities of arm, shoulder, and hand questionnaire.

#### **RESULTS:**

Statistically significant change was present for pain, cervical flexure endurance, ROM, and functional abilities with  $P < 0.05$  for both the groups except for neck flexor endurance in control group.

#### **CONCLUSION:**

Gross MFR of upper limb and neck is an effective technique for subjects with mechanical NP and has a faster rate of improvement.

**52. EXERCISE****Caution with post-surgical blood flow restriction****Blood Flow Restricted Resistance Exercise as a Post-Orthopedic Surgery Rehabilitation Modality: A Review of Venous Thromboembolism Risk**

**Authors:** Colin W. Bond, MS<sup>1-4</sup>, Kyle J. Hackney, PhD<sup>4</sup>, Scott L. Brown, DPT, OCS, SCS<sup>3</sup>, Benjamin C. Noonan, MD, MS<sup>1-3</sup>

**Published:** *Journal of Orthopaedic & Sports Physical Therapy*, 2018 **Volume:0 Issue:0 Pages:1–29 DOI:10.2519/jospt.2019.8375**

**Synopsis**

Restoration of skeletal muscle mass and strength are critical to successful outcomes following orthopedic surgery. Blood flow restricted resistance exercise (BFR) has emerged as an attractive candidate to augment traditional low intensity physical rehabilitation exercise, and has yielded successful outcomes over a wide variety of applications.

BFR is well tolerated and safe for the majority of individuals, though the post-surgical orthopedic patient has additional considerations due to their heightened risk for venous thromboembolism (VTE). While the pathogenesis of VTE is multifactorial and individual specific, it is commonly described as a combination of blood stasis, endothelial injury, and alterations in the constituents of the blood leading to hypercoagulability.

The collective literature suggests that, given the pathogenic mechanisms of VTE, the finite use of a wide, partially occluding cuff during resistance exercise should be low risk and that the likelihood of BFR directly causing a VTE event is remote. Alternatively, it is plausible that BFR may enhance blood flow and promote fibrinolysis. Of greater concern would be the individual with preexisting asymptomatic VTE, which could be dislodged during BFR. Though, it is unknown if the direct risk associated with BFR is greater than the risk associated with traditional exercise alone.

Presently, there are no universally agreed upon standards indicating which post-surgical orthopedic patients may perform BFR safely. While excluding all post-surgical orthopedic patients from performing BFR may be overly precautionary, clinicians need to thoroughly screen for VTE signs and symptoms, be cognizant of each patient's risk factors, and use proper equipment and prescriptions methods prior to initiating BFR. *J Orthop Sports Phys Ther, Epub 12 Sep 2018. doi:10.2519/jospt.2019.8375*

**56. ATHLETICS****Osgood-Schlatter disease in soccer players**

Orthop J Sports Med. 2018 Aug 28;6(8):2325967118792192. doi: 10.1177/2325967118792192. eCollection 2018 Aug.

**Pathogenic Factors Associated With Osgood-Schlatter Disease in Adolescent Male Soccer Players: A Prospective Cohort Study.**

Watanabe H<sup>1</sup>, Fujii M<sup>2</sup>, Yoshimoto M<sup>3</sup>, Abe H<sup>4</sup>, Toda N<sup>4</sup>, Higashiyama R<sup>5</sup>, Takahira N<sup>1</sup>.

**BACKGROUND:**

A previous cross-sectional study reported that pathogenic factors associated with Osgood-Schlatter disease (OSD) in adolescent athletes include increased quadriceps muscle tightness, lower leg malalignment, and development of apophysitis in the tibial tuberosity.

**PURPOSE:**

To confirm these pathogenic factors associated with OSD in a longitudinal study with regard to physical function and performance.

**STUDY DESIGN:**

Cohort study; Level of evidence, 2.

**METHODS:**

In this study, 37 boys (mean age, 10.2 ± 0.4 years) were recruited from 2 soccer teams at an elementary school. This cohort study was conducted over an observation period of 1 year, with measurements recorded at baseline, followed by screening for OSD every 6 months. Variables evaluated at baseline included physical function (morphometry, joint flexibility, and lower extremity alignment), presence of Sever disease, and kicking motion.

**RESULTS:**

Pathogenic factors associated with OSD in the support leg of adolescent male soccer players included height, weight, body mass index, quadriceps femoris muscle tightness in the kicking and support legs, and gastrocnemius muscle tightness, soleus muscle tightness, and medial longitudinal arch in the support leg. Additional factors included a diagnosis of Sever disease and distance from the lateral malleolus of the support leg's fibula to the center of gravity during kicking.

**CONCLUSION:**

The onset of OSD was found to be affected by many factors, including developmental stage, physical attributes, and pre-existing apophysitis. In particular, a diagnosis of Sever disease and backward shifting of the center of gravity during kicking increased the risk of the subsequent onset of OSD, suggesting that these factors are very important as a possible focus for interventions.

**59. PAIN****Joint hypermobility**

<https://jnnp.bmj.com/content/85/8/e3.40>

**JOINT HYPERMOBILITY AND AUTONOMIC HYPERACTIVITY: RELEVANCE TO NEURODEVELOPMENTAL DISORDERS**

**Objective** To test the hypothesis that Joint hypermobility and autonomic dysfunction are over-expressed within neurodevelopmental disorders. Joint hypermobility is a widespread poorly recognized connective tissue condition with affected individuals overrepresented among panic and anxiety disorders, irritable bowel syndrome, fibromyalgia, and chronic fatigue. The relevance of hypermobility to neuropsychiatric disorders of developmental origin is currently unknown, despite anecdotal case reports and clinical suspicion of a link. Autonomic nervous system dysregulation, typically postural tachycardia syndrome is often found in hypermobile individuals. Interestingly, differences in amygdala and superior temporal cortex anatomy have been reported in hypermobile populations and functional abnormalities in patients with autism.

**Method** Thirty-seven adults with neurodevelopmental disorder, 205 patients attending general psychiatric clinics without neurodevelopmental diagnosis and 29 healthy controls were recruited. Hypermobility was assessed using the Beighton scale (BS) and autonomic symptoms using the Autonomic Symptoms and Quality of Life Score (ASQoLS: orthostatic, gastrointestinal, bladder, secretomotor, sudomotor and sleep domains).

**Results** The neurodevelopmental cohort had a mean age of 34.6 years (27 male). Nineteen had Attention Deficit Hyperactivity Disorder (ADHD), 4 Autistic Spectrum Disorder (ASD), 1 Tourette Syndrome (TS) and the remainder combinations of ADHD, ASD and TS. Nine had co-morbid affective disorder. Eighteen patients (48.6%) were classified as hypermobile (BS $\geq$ 4) compared to 67/204(32.7%) in the general psychiatric group (p=0.048) and 3/29(10.3%) in healthy controls (p=0.007) and this prevalence was also significantly higher than reported in a large general population cohort (1156/6022, 19.19%, p<0.001). Mean autonomic dysfunction score was significantly higher in the neurodevelopmental cohort compared to controls (mean $\pm$ SEM: neurodevelopmental disorder patients, 45.8 $\pm$ 4.86; controls, 8.5 $\pm$ 1.62). This effect was seen across all sub-scales of the ASQoLS. Total autonomic dysfunction score did not differ significantly between neurodevelopmental cohort and the general psychiatric group, however neurodevelopmental disorder patients had significantly higher scores on orthostatic and gastrointestinal disturbance subscales.

**Conclusion** We demonstrate for the first time that rates of hypermobility and symptoms of autonomic dysfunction are particularly high in adults with neurodevelopmental diagnoses. It is likely that the importance of hypermobility and autonomic dysfunction to the generation and maintenance of psychopathology in neurodevelopmental disorders is poorly appreciated. Work underway (autonomic testing, fMRI) will test the hypothesis that autonomic reactivity and interoceptive sensitivity predispose to the expression of psychiatric symptoms, particularly anxiety. It is further hypothesized that inefficient neural co-ordination of efferent autonomic drive with imprecise interoceptive representations may be amplified in hypermobile individuals.

In hypermobility, this mechanism might explain increased vulnerability to stress sensitive and developmental neuropsychiatric conditions.