

2. LBP

Depression

The pain, depression, disability pathway in those with low back pain: a moderation analysis of health locus of control

Paul Campbell,¹ Kate Hope,² Kate M Dunn¹

Abstract:

Low back pain (LBP) is common, impacts on the individual and society, and is a major health concern. Psychological consequences of LBP, such as depression, are significant barriers to recovery, but mechanisms for the development of depression are less well understood.

One potential mechanism is the individual's health locus of control (HLoC), that is, perception of the level of control an individual has over their health. The objective of this study is to investigate the moderation effect of HLoC on the pain–depression–disability pathway in those with LBP. The design is a nested cross-sectional analysis of two existing cohorts of patients (n=637) who had previously consulted their primary care physician about LBP. Measures were taken of HLoC, pain intensity and interference, depression, disability, and bothersomeness. Structural Equation Modeling analysis was applied to two path models that examined the pain to depression to disability pathway moderated by the HLoC constructs of Internality and Externality, respectively. Critical ratio (CR) difference tests were applied to the coefficients using pairwise comparisons. The results show that both models had an acceptable model fit and pathways were significant. CR tests indicated a significant moderation effect, with stronger pathway coefficients for depression for those who report low Internality (β 0.48), compared to those with high Internality (β 0.28).

No moderation effects were found within the Externality model. HLoC Internality significantly moderates the pain–depression pathway in those with LBP, meaning that those who have a low perception of control report greater levels of depression. HLoC may signify depression among people with LBP, and could potentially be a target for intervention.

Standing balance test

European Spine Journal pp 1–9 | Cite as

Reliability of the Kinematic Steadiness Index during one-leg standing in subjects with recurrent low back pain

Paul S. Sung Email author
Pamela Danial
Dongchul C. Lee

Purpose

To assess the reliability of standing time and the Kinematic Steadiness Index (KSI) in one-leg standing compared with the Timed Up and Go (TUG) test while considering anthropometric factors in subjects with recurrent low back pain (LBP).

Methods

Sixty-six individuals participated in the study. The data were collected on two different days, 1 week apart. The KSI of the core spine, using video motion-capture techniques, was based on the relative standing time and relative standstill time. The intraclass correlation coefficient ($ICC_{2,1}$) was compared for the reliability between measures. The covariates, such as age, Body Mass Index, and the Oswestry Disability Index (ODI), were analyzed for any interactions based on these measures.

Results

The standing time ($t = -1.01, p = 0.32$) and the KSI ($t = -1.70, p = 0.09$) were not significantly different between measures. The TUG results were not different between measures ($t = 1.01, p = 0.32$). The Cronbach's alpha for the standing time was 0.84, for KSI was 0.89, and for TUG was 0.76. The standing time and KSI demonstrated an interaction with age, while the TUG demonstrated an interaction with the ODI score.

Conclusions

The KSI during one-leg standing could help to develop a practical tool to justify quantity and quality of balance outcome measures, which identify balance deficits and core spine rehabilitation strategies in subjects with recurrent LBP.

Men and women treated differently

J Pain. 2017 Sep 22. pii: S1526-5900(17)30717-4. doi: 10.1016/j.jpain.2017.09.001.

Differential Impact of Patient Weight on Pain-Related Judgments About Male and Female Chronic Low Back Pain Patients.

Miller MM¹, Allison A², Trost Z³, De Ruddere L⁴, Wheelis T⁵, Goubert L⁴, Hirsh AT⁶.
Author information

Abstract

Compared to men, women report more pain and are at increased risk for having pain discounted or misattributed to psychological causes.

Overweight individuals experience high rates of pain and may receive suboptimal care due to provider bias. Research suggests the social consequences of being overweight are worse for women than men, and that gender and weight uniquely and interactively impact pain experience and care. Healthy participants (N=616) viewed six videos of back pain patients (1 female and 1 male of normal-weight, overweight, and obese categories) performing a functional task. Participants provided judgments/ratings regarding patient pain (intensity, interference, exaggeration), potential sources of patient pain (medical, psychological), and treatment recommendations (opioids, psychological therapy, seek workplace accommodations).

Results suggest that the pain of normal and overweight women and obese men was discounted (judged as less intense, less interfering, more exaggerated, and less attributable to medical factors) and judged as less in need of treatment (treated with less opioids and workplace accommodations).

Across all weight categories, women's pain was attributed more to psychological factors and was more likely to receive recommendations for psychological therapy than men's pain. These findings highlight the differential impact of patient weight on pain-related judgments about women and men.

Sham opioid use

Pain. 2017 Oct;158(10):1893-1902. doi: 10.1097/j.pain.0000000000000977.

Placebo effects of a sham opioid solution: a randomized controlled study in patients with chronic low back pain.

Klinger R¹, Kothe R, Schmitz J, Kamping S, Flor H.

This study tested the experimental placebo effect in a group of chronic pain patients. Forty-eight patients having chronic back pain participated in a randomized clinical trial that tested the efficacy of a sham opioid solution (NaCl) compared with an alleged neutral, completely inactive solution (NaCl). We shaped the placebo effect by 2 interventions: verbal instruction and conditioning. The patients were either told that the "solution reduces pain and improves physical capacity" or the "solution is neutral, a placebo." Half of each group was additionally conditioned (coupling solution with reduced experimental pain), yielding 4 subgroups with 12 participants each. Outcome measures were as follows: the patients' clinical back pain ratings and acute pain ratings (both examined by numerical rating scale 0-10) and self-rated functional capacity (0%-100%; time required for the exercise). Expected pain relief before and after solution intake was also assessed. The inactive solution (NaCl), when presented as an effective treatment (sham "opioid" solution), induced placebo analgesia as evident in lower ratings of the patients' clinical back pain ($F(3.12, 144.21) = 25.05, P < 0.001$), acute pain ratings ($F(1.99, 87.40) = 18.12, P < 0.01$), and time needed to complete a series of daily activities exercises ($F(1, 44) = 8.51, P < 0.01$) as well as increased functional capacity ($F(1, 44.00) = 19.42, P < 0.001$).

The 2 manipulations (instruction and conditioning) changed pain expectations, and they were maintained in both sham opioid groups. The results suggest that it may be clinically useful to explicitly integrate placebo analgesia responses into pain management.

3. DISC

Regenerative med

Treatment of lumbar degenerative disc disease-associated radicular pain with culture-expanded autologous mesenchymal stem cells: a pilot study on safety and efficacy

Christopher Centeno, Jason Markle, Ehren Dodson Ian Stemper, Christopher J. Williams, Matthew Hyzy, Thomas Ichim and Michael Freeman

Journal of Translational Medicine 2017 **15**:197
<https://doi.org/10.1186/s12967-017-1300-y>

Background

Degenerative disc disease (DDD) is a common cause of lower back pain with radicular symptoms and has a significant socioeconomic impact given the associated disability. Limited effective conservative therapeutic options result in many turning to surgical alternatives for management, which vary in the rate of success and also carry an increased risk of morbidity and mortality associated with the procedures. Several animal based studies and a few human pilot studies have demonstrated safety and suggest efficacy in the treatment of DDD with mesenchymal stem cells (MSCs). The use of bone marrow-derived MSCs for the treatment of DDD is promising and in the present study we report on the safety and efficacy findings from a registry based proof of concept study using a percutaneous intradiscal injection of cultured MSCs for the management of DDD with associated radicular symptoms.

Methods

Thirty-three patients with lower back pain and disc degeneration with a posterior disc bulge diagnosed on magnetic resonance imaging (MRI) met the inclusion criteria and were treated with culture-expanded, autologous, bone marrow-derived MSCs. Prospective registry data was obtained at multiple time intervals up to 6 years post-treatment. Collected outcomes included numeric pain score (NPS), a modified single assessment numeric evaluation (SANE) rating, functional rating index (FRI), measurement of the intervertebral disc posterior dimension, and adverse events.

Results

Three patients reported pain related to procedure that resolved. There were no serious adverse events (i.e. death, infection, or tumor) associated with the procedure. NPS change scores relative to baseline were significant at 3, 36, 48, 60, and 72 months post-treatment. The average modified SANE ratings showed a mean improvement of 60% at 3 years post-treatment. FRI post-treatment change score averages exceeded the minimal clinically important difference at all time points except 12 months. Twenty of the patients treated underwent post-treatment MRI and 85% had a reduction in disc bulge size, with an average reduction size of 23% post-treatment.

Conclusions

Patients treated with autologous cultured MSCs for lower back pain with radicular symptoms in the setting of DDD reported minor adverse events and significant improvements in pain, function, and overall subjective improvement through 6 years of follow-up.

5. SURGERY**Effectiveness of micro discectomy****Multidimensional long-term outcome analysis after single-level lumbar microdiscectomy: A retrospective single-centre study**

European Journal of Orthopaedic Surgery & Traumatology | October 04, 2017

Ahmadi SA, et al.

This study determined multidimensional long-term outcomes following mono-segmental microdiscectomy for lumbar disc herniation (LDH) in a large adult cohort treated at a tertiary care centre. According to findings, early surgical treatments afforded better outcomes. It was considered important to set time limits for conservative treatments in order to avoid pain chronification and worsening of overall outcomes that go along with belated surgery. Good outcomes were commonly attained in those with acute onset of pain, sequestered herniations and only mild degrees of immobilization and for these subjects, surgical treatment appeared best if indicated early.

Methods

Researchers performed a retrospective study on all patients undergoing surgical treatment for single-level LDH between 2003 and 2009 and, employed Oswestry Disability Index (ODI) questionnaire at follow-up.

They analyzed electronic patient records and imaging data.

Results

At researchers' institution, a total of 939 patients underwent single-level lumbar MD.

Data showed that 307 complete ODI forms (32.7%) were returned at a median follow-up of 48 months.

Mean ODI score was 24.04, and mean age was 58 years.

Researchers found that females reported slightly higher ODI scores (25.52 vs. 22.68).

They also observed that age and ODI score showed a statistically significant correlation.

In addition, findings demonstrated that early surgery yielded lower ODI scores with patients faring significantly worse if symptoms persisted for a year or longer (one-way ANOVA, $p < 0.001$).

Even among those operated later than 1 week after symptom onset, a sharp increase in ODI scores was evident.

It was also noted that sequestered herniations were associated with significantly lower ODI scores than contained discs on MRI (21.96 vs. 39.89).

As per results, surgical complications occurred in 17 cases (5.6%), 82 patients (26.7%) required additional surgery, 58 (18.9%) of those for recurrent disc herniations.

8. VISCERA

IBD and inflammation

Are adipocytokines inflammatory or metabolic mediators in patients with inflammatory bowel disease?

Therapeutics and Clinical Risk Management | October 05, 2017
Kahraman R, et al.

The adiponectin and leptin levels and insulin resistance (IR) in patients with inflammatory bowel disease (IBD) and the relationship between these factors and IBD characteristics were scrutinized in this study. It was demonstrated that leptin levels increased and adiponectin levels reduced in patients with IBD, which is thought to be associated with chronic inflammation. The impacts of adipocytokines in patients with IBD with inflammatory and metabolic processes should be researched in in further broader studies.

- Fasting serum leptin, adiponectin, glucose, and insulin levels, and additionally to inflammatory parameters, were measured in 105 patients with IBD (49 patients with Crohn's disease [CD], 56 patients with ulcerative colitis [UC]) and 98 healthy controls [HC].
- IR was assessed utilizing the Homeostatic Model Assessment of Insulin Resistance (HOMA-IR).
- Disease activity and severity in patients with UC were assessed utilizing the Truelove–Witts index, and patients with CD were evaluated using the Crohn's Disease Activity Index.
- Serum adiponectin levels were observed to be significantly lower in patients with CD and UC ($p < 0.001$).
- Serum leptin levels were also observed to be significantly higher in both the UC and CD groups ($p < 0.001$).
- When HOMA-IR levels were compared, no significant difference was detected for either the CD or UC groups compared with the controls.

Sleep and IBD**Impaired objective and subjective sleep in children and adolescents with inflammatory bowel disease compared to healthy controls**

Laura Mählmann Edith Holsboer-Trachsler, MD Serge Brand

Highlights

- This is the first investigation of objective sleep in paediatric inflammatory bowel disease (IBD).
- IBD in an active state of disease was associated with impaired objective sleep patterns.
- Sleep quality and inflammation indices were associated in a complex manner.
- Subjective sleep assessment serves as an indicator for objective sleep disturbances.

Objective

Poor sleep and higher inflammation markers are associated, and impaired sleep quality is common among patients with inflammatory bowel disease (IBD). However, information on sleep among children and adolescents with IBD is currently lacking. The aims of the present study were to compare subjective and objective sleep of children and adolescents with IBD with healthy controls and to shed more light on the relationship between sleep and inflammation. We expected that poor sleep, as assessed via sleep electroencephalography recordings, would be observed among participants with IBD, but particularly among participants in an active state of disease. Furthermore, we expected that poor sleep and higher inflammatory markers would be associated.

Methods

A total of 47 children and adolescents participated in the study; 23 were diagnosed with IBD (mean age: 13.88 years, 44% female). The IBD group was divided into a medically well adjusted “remission-group” (IBD-RE; $n = 14$) and a group with an “active state of disease” (IBD-AD; $n = 8$). Healthy controls (HC; $n = 24$) were age and gender matched. Participants completed self-rating questionnaires for subjective sleep disturbances. Anthropometric data, acute and chronic inflammatory markers (C-reactive protein [CRP] and erythrocyte sedimentation rate [ESR]) and objective sleep were considered.

Results

Compared to HC and IBD-RE, IBD-AD patients showed impaired objective sleep patterns (eg, more awakenings, longer sleep latency, and reduced stage 3 sleep). Linear relationships described the correlation between higher ESR and more stage 4 (minutes, percentage) sleep. Nonlinear relationships described the relation between ESR and subjective sleep quality (inverse U-shaped) and between CRP and sleep latency (U-shaped).

Conclusion

In children and adolescents with an active IBD, objective sleep was impaired and overall sleep quality and inflammation indices were associated in a complex manner. It seems advisable to include assessment of subjective sleep quality in the care of paediatric IBD patients as an additional indicator for objective sleep disturbances and inflammation.

Trial registration number

NCT02264275.

Constipation and inguinal hernias

Hernia. 2017 Aug;21(4):531-535. doi: 10.1007/s10029-017-1604-0. Epub 2017 Apr 9.

The effect of chronic constipation on the development of inguinal herniation.

Kartal A¹, Yalcın M², Citgez B³, Uzunkoy A⁴.

OBJECTIVE:

To investigate the effect of constipation on the development of inguinal herniation and type of herniation using the Constipation severity scale.

METHODS:

A total of 100 patients who underwent surgical inguinal hernia repair (study group) and 100 healthy volunteers without inguinal herniation (control group) were included in this study. The constipation severity scale was administered to all patients. The type of the herniation was classified using Nyhus scale during surgery and the side of the herniation was recorded on completed questionnaires. The obstructive defecation sub-scale score, colonic inertia sub-scale score, pain sub-scale score, and the total score were recorded for each patient and the association between constipation and the development of inguinal herniation was investigated.

RESULTS:

The mean age of patients in Group 1 and 2 was 40.92 ± 17.80 and 33.71 ± 9.13 , respectively. There was a significant difference between the two groups in terms of obstructive defecation and colonic inertia sub-scale scores ($p < 0.01$). In addition, except for the pain sub-scale score, there were significant differences between Nyhus hernia types with regard to sub-scale scores of the constipation severity scale in patients in Group 1 ($p < 0.01$).

CONCLUSION:

Significantly higher obstructive defecation subscale, colonic inertia subscale, pain subscale, and total scores in the study group as compared to controls shows that constipation may represent an important etiological factor for the development of inguinal herniation.

Inflammation and IBD

Neurogastroenterol Motil. 2017 Oct 4. doi: 10.1111/nmo.13223.

Inflammatory cell distribution in colon mucosa as a new tool for diagnosis of irritable bowel syndrome: A promising pilot study.

Boyer J¹, Saint-Paul MC¹, Dadone B¹, Patouraux S¹, Vivinus MH², Ouvrier D³, Michiels JF¹, Piche T³, Tulic MK^{4,5}.

BACKGROUND:

Currently, there are no histological criteria to diagnose irritable bowel syndrome (IBS). Our aims were (i) to examine the distribution of inflammatory cells in the colon of healthy and IBS subjects and (ii) to find histological diagnosis criteria for IBS.

METHODS:

Colonic biopsies were taken from four distinct regions of the colon from 20 controls (HC) and 11 patients with IBS (4 with constipation (IBS-C) and 7 with diarrhea (IBS-D) and embedded in paraffin. Macrophages, mast cells, eosinophils, and T lymphocytes were immunostained and positive cells counted.

KEY RESULTS:

In both HC and IBS patients, global cellularity decreased from the cecum to the rectum ($P < .01$) which is attributed to reduced number of macrophages ($P < .05$) and eosinophils ($P < .001$) but not T cells. Mast cells were reduced in IBS ($P < .05$) but not in HC, particularly in IBS-D ($P < .05$). Results showed higher number of macrophages in the left colon of IBS subjects than HC ($P < .05$).

CONCLUSION & INFERENCES:

Here we report a decreasing gradient of immune cells from the cecum to the rectum of the human colon. Although global cellularity cannot be used to distinguish between IBS and HC, closer analysis of macrophages and mast cells may be useful markers to confirm IBS histologically and to differentiate between IBS-C and IBS-D when clinical presentation alternates between constipation and diarrhoea. This pilot study remains to be confirmed with greater number of patients.

GERD and fibromyalgia

Pain. 2017 Oct;158(10):1971-1978. doi: 10.1097/j.pain.0000000000000994.

Bidirectional association between fibromyalgia and gastroesophageal reflux disease: two population-based retrospective cohort analysis.

Wang JC¹, Sung FC, Men M, Wang KA, Lin CL, Kao CH.
Author information

Abstract

Fibromyalgia (FM) tends to coexist with gastroesophageal reflux disease (GERD). This retrospective cohort study was conducted to determine the bidirectional association between FM and GERD, using a nationwide database, the National Health Insurance of Taiwan. We established 2 study arms, including 35,117 patients with FM in arm 1 and 34,630 patients with GERD in arm 2, newly diagnosed between 2000 and 2010. For each study arm, we randomly selected 4-fold subjects with neither FM nor GERD from the same database, frequency matched by sex, age, and diagnosis date, as the respective control cohorts. Incidence of GERD in arm 1 and incidence of FM in arm 2 were estimated by the end of 2011. The overall incidence of GERD was 1.6-fold greater in the FM cohort than in the non-FM cohort (12.0 and 7.61 per 1000 person-years, crude hazard ratio [HR] = 1.58, 95% confidence interval [CI] = 1.51-1.66), with an adjusted HR (aHR) of 1.27 (95% CI = 1.22-1.33) after controlling for sex, age, comorbidities, and medications. The GERD cohort ultimately had a 1.5-fold higher incidence of FM than the non-GERD cohort (5.76 vs 3.96 per 1000 person-years), with an aHR of 1.44 (95% CI = 1.29-1.60). The present study suggests a bidirectional relationship between FM and GERD. There is a greater risk of developing GERD for patients with FM than developing FM for patients with GERD.

CD and blood transfusions

Am J Epidemiol. 2017 Jun 30. doi: 10.1093/aje/kwx210.

No Evidence of Transfusion Transmission of Celiac Disease.

Ludvigsson JF, Lebwohl B, Green PHR, Murray JA, Hjalgrim H, Edgren G.

The vast majority of patients with Celiac disease (CD) have disease-specific antibodies.

If such antibodies-or another blood-borne factor involved in the causation of CD-are transmissible, it might be reflected by an increased risk of CD in individuals receiving blood from donors with incipient CD. In a retrospective nationwide cohort study of 1,058,289 individuals who received a blood transfusion between 1968 and 2012 in Sweden we examined the risk of transmission of CD (here defined as having villous atrophy on small intestinal biopsy) using Cox regression. We also examined if there were clusters of CD patients receiving blood transfusions from the same blood donor, independently of the known CD status of that donor. Some 9,455 transfused patients (0.9%) received a blood transfusion from a blood donor diagnosed with CD. Of these, 14 developed CD, corresponding to a hazard ratio of 1.0 (95% confidence interval: 0.9, 1.2) compared to recipients of transfusions from unaffected donors.

There were no CD events among recipients of plasma or platelet units from donors with CD. We found no evidence of CD clustering among blood recipients of blood from individual donors (P for trend = 0.28). This study suggests that CD is not transmitted through blood transfusions.

Breathing and pancreatitis

Magn Reson Imaging. 2017 Sep 26. pii: S0730-725X(17)30207-2. doi: 10.1016/j.mri.2017.09.014

Patient-adapted respiratory training: Effect on navigator-triggered 3D MRCP in painful pancreatobiliary disorders.

Zhu L¹, Sun ZY², Xue HD³, Liu D¹, Qian TY², Asbach P⁴, Jin ZY¹.

PURPOSE:

To compare the image quality of navigator-triggered (NT) 3D MR cholangiopancreatography (MRCP) with and without a patient-adapted respiratory training, in clinical patients with painful pancreatobiliary disorders.

MATERIALS AND METHODS:

With institutional review board approval, hospitalized patients with painful pancreatobiliary disorders who were scheduled for MRCP study were prospectively enrolled. The numerical rating scale (NRS) of abdominal pain during the examination was recorded. Special patient-adapted respiratory training was conducted before the examination. A control group of patients was enrolled with the same criteria, who received ordinary instructions only (n=60 for each group). A subgroup of patients (n=10) underwent MRCP studies with ordinary instructions first and with patient-adapted training later. Acquisition time was recorded. General image quality, degree of artifacts and visualization of 12 segments of the pancreatobiliary tree were rated on a five-point scale and compared between the groups.

RESULT:

Both groups had similar NRS of pain. There was a significant improvement in image quality ($p<0.01$) as well as visualization of right posterior hepatic duct ($p=0.045$), left lateral hepatic duct ($p=0.037$), and pancreatic duct ($p<0.01$ for head, body and tail segments) in patients receiving respiratory training. The other segments showed no significant differences. The percentage of patients with severe and extensive imaging artifacts decreased from 18.3%(11/60) to 8.3%(5/60). The acquisition time was shorter ($175\pm 54s$ vs $249\pm 67s$, $p<0.01$) in patients with respiratory training.

CONCLUSION:

Patient-adapted respiratory training improves the image quality of NT-MRCP in patients with painful pancreatobiliary disorders.

IBS diagnostic delay impacted outcomes

Diagnostic delay in inflammatory bowel disease increases the risk of intestinal surgery

World Journal of Gastroenterology | October 03, 2017

sponsor

Lee DW, et al.

The factors affecting diagnostic delay and outcomes of diagnostic delay in inflammatory bowel disease (IBD) were examined in this study. Among patients with Crohn's disease (CD) and ulcerative colitis (UC), a diagnostic delay was correlated with poor outcomes, like increased intestinal surgery risks.

Methods

- A total of 165 patients with Crohn's disease (CD) and 130 patients with ulcerative colitis (UC) were retrospectively studied.
- The patients were diagnosed and had follow-up durations > 6 mo at Korea University Ansan Hospital from January 2000 to December 2015.
- The physicians defined a diagnostic delay as the time interval between the first symptom onset and IBD diagnosis in which the 76th to 100th percentiles of patients were diagnosed.

Results

- In the patients with CD and UC, the median diagnostic time interval was 6.2 and 2.4 mo, respectively.
- Perianal discomfort before diagnosis (OR = 10.2, 95%CI: 1.93-54.3, P = 0.006) was associated with diagnostic delays in patients with CD among the initial symptoms.
- However, no clinical factor was associated with diagnostic delays in patients with UC.
- Factors associated with increased intestinal surgery risks in CD were diagnostic delays, stricturing type, and penetrating type were (OR = 2.54, 95%CI: 1.06-6.09; OR = 4.44, 95%CI: 1.67-11.8; OR = 3.79, 95%CI: 1.14-12.6, respectively).
- The only factor associated with increased intestinal surgery risks in UC was a diagnostic delay (OR = 6.81, 95%CI: 1.12-41.4).

11. UPPER C SPINE

Anterior fusion

World Neurosurg. 2017 Sep 26. pii: S1878-8750(17)31640-6. doi: 10.1016/j.wneu.2017.09.124.

Transoral Decompression And Stabilization Of The Upper Cervical Segments Of The Spine Using Custom-Made Implants In Various Pathological Conditions Of The Craniovertebral Junction.

Shkarubo AN¹, Kuleshov AA², Chernov IV¹, Vetrile MS², Lisyansky IN², Makarov SN², Ponomarenko GP², Spyrou M³.

Abstract

BACKGROUND:

Surgical treatment of patients with atlantoaxial instability caused by pathological changes of the skull base and craniovertebral junction combined with anterior compression of the brain stem is still associated with substantial technical difficulties and remains a matter of debate. Currently, anterior stabilization of the atlantoaxial junction is a promising approach that allows for the resection of the pathological lesion of the skull base and craniovertebral junction with subsequent stabilization of C1-C2 or C1-C3 in one stage.

METHODS:

In this article we present five clinical cases in which transoral decompression and anterior stabilization of the C1-C2 (four cases) and C1-C3 (one case of anterior-posterior stabilization) segments with custom-made fixation systems was used to treat various pathological conditions of the craniovertebral junction.

RESULTS:

In all cases, complete removal of the pathological lesion and decompression of the upper cervical spinal cord as well as reliable stabilization of the upper spinal segments were achieved. Some degree of movement in the cervical spine was preserved in all patients due to unfixed C0-C1 and C3-C7 segments in four cases and C0-C1 and C4-C7 in one case. Implant migration or instability was not observed in any of the cases. The follow-up period was from 1 to 4 years after surgery.

CONCLUSION:

The first experience of anterior fixation using individually manufactured C1-C2 and C1-C3 systems demonstrated their effectiveness. This approach can be safely used as an alternative or in combination with standard posterior stabilization methods. Innovative surgical technology, developed and implemented in our surgical practice allows for optimization of the surgical technique, reduces the number of perioperative complications, eliminates movement restrictions in the cervical spine, improves motor activity and makes earlier patient rehabilitation possible.

13 B. TMJ/ORAL**Bite force**

J Oral Rehabil. 2017 Oct 1. doi: 10.1111/joor.12578.

A 5-year longitudinal study of association of maximum bite force with development of frailty in community-dwelling older adults.

Iwasaki M^{1,2}, Akihiro Y³, Sato N⁴, Sato M¹, Minagawa K¹, Shimada M⁵, Nishimuta M⁶, Ansai T², Yoshitake Y⁷, Ono T⁴, Miyazaki H¹.

Abstract**OBJECTIVES:**

To determine whether maximum bite force (MBF), an objective measure of oral function, is associated with development of frailty in community-dwelling older adults.

METHODS:

This prospective cohort study included community-dwelling Japanese adults aged 75 years at baseline (n = 322). Baseline MBF was measured using an electronic recording device (Occlusal Force-Meter GM10). Follow-up examinations, including physical fitness and anthropometric evaluation and structured questionnaires, were administered annually over a 5-year period to determine the incidence of frailty, which was defined by the presence of three or more of the following five components derived from the Cardiovascular Health Study: low level of mobility, low physical activity level, weakness, shrinking, and poor endurance and energy. Adjusted hazard ratios (HRs) of incidence of frailty according to sex-stratified tertiles of baseline MBF were calculated using Cox proportional hazards regression models.

RESULTS:

During the follow-up, 49 participants (15.2%) developed frailty. Participants in the lower tertile of MBF exhibited a significantly greater risk of frailty than those in the upper tertile. After adjustment for sex, depression, diabetes, and Eichner index, the adjusted HRs for frailty in the upper through lower tertiles of MBF were 1.00 (reference), 1.27 (95% confidence interval [CI], 0.50-3.20), and 2.78 (95% CI, 1.15-6.72), respectively (P for trend = 0.01).

CONCLUSIONS:

Poor oral function, as indicated by low MBF, increases the risk of development of frailty among elderly men and women. This article is protected by copyright. All rights reserved.

Morphology**Comparison of temporomandibular joint and ramus morphology between class II and class III cases before and after bi-maxillary osteotomy**

Ran Iguchi, DDS Koichiro Ueki, DDS, PhD

DOI: <http://dx.doi.org/10.1016/j.jcms.2017.09.018>

Summary**Purpose**

The purpose of this study was to compare changes in temporomandibular joint (TMJ) and ramus morphology between class II and III cases before and after sagittal split ramus osteotomy (SSRO) and Le Fort I osteotomy.

Materials and Methods

The subjects were 39 patients (78 sides) who underwent bi-maxillary surgery. They consisted of 2 groups (18 class II cases and 21 class III cases), and were selected randomly from among patients who underwent surgery between 2012 and 2016. The TMJ disc tissue and joint effusion were assessed by magnetic resonance imaging (MRI) and the TMJ space, condylar height, ramus height, ramus inclination and condylar square were assessed by computed tomography (CT), pre- and post-operatively.

Results

The number of joints with anterior disc displacement in class II was significantly higher than that in class III ($P < 0.0001$). However, there were no significant differences between the two classes regarding ratio of joint symptoms and ratio of joint effusion pre- and post-operatively. Class II was significantly better than class III regarding reduction ratio of condylar height ($P < 0.0001$) and square ($P = 0.0005$).

Conclusion

The study findings suggest that condylar morphology could change in both class II and III after bi-maxillary surgery. The findings of the numerical analysis also demonstrated that reduction of condylar volume occurred frequently in class II, although TMJ disc position classification did not change significantly, as previously reported.

13 C. AIRWAYS/SWALLOWING/SPEECH

Breathing disorders

ORIGINAL RESEARCH

DEVELOPMENT OF A SCREENING PROTOCOL TO IDENTIFY INDIVIDUALS WITH DYSFUNCTIONAL BREATHING

Kyle Kiesel, PT, PhD¹ Tonya Rhodes¹
 Jacob Mueller, ATC¹ Alyssa Waninger¹ Robert Butler, PT, PhD²

ABSTRACT

Introduction: Dysfunctional breathing (DB) has been linked to health conditions including low back pain and neck pain and adversely affects the musculoskeletal system. Individuals with DB often have decreased pain thresholds and impaired motor control, balance, and movement. No single test or screen identifies DB, which is multi-dimensional, and includes biochemical, biomechanical, and psychophysiological components. Several tools assess and test for DB, but no screen exists to determine whether additional testing and assessment are indicated.

Purpose/Background: The purpose of this study was to develop a breathing screening procedure that could be utilized by fitness and healthcare providers to screen for the presence of disordered breathing. A diagnostic test study approach was utilized to establish the diagnostic accuracy of the newly developed screen for DB.

Methods: A convenience sample of 51 subjects (27 females, 27.0 years, BMI 23.3) were included. To test for DB related to the biochemical dimension, end-tidal CO₂ (ETCO₂) was measured with a capnography unit. To test for DB related to biomechanical dimension, the Hi-Lo test was utilized. To test for DB related to the psychophysiological dimension, the Self Evaluation of Breathing Symptoms Questionnaire (SEBQ) and Nijmegen questionnaires were utilized. Potential screening items that have been shown to be related to DB in previous research and that could be performed by non-health care personnel were utilized to create the index test including activity level, breath hold time (BHT), respiration rate, and the Functional Movement Screen (FMSTM).

Results: There were no strong correlations between the three measures of DB. Five subjects had normal breathing, 14 failed at least one measure, 20 failed at least two, and 12 failed all three. To develop screening items for each dimension, data were examined for association with failure. BHT and a four-item mini-questionnaire were identified as the most closely associated variables with failure of all three dimensions. A BHT of <25 seconds and four questions were combined and yielded a sensitivity of 0.89 (0.85-0.93) and a specificity of 0.60 (0.18-0.92) for clinical identification of DB.

Conclusion: Easily obtained clinical measures of BHT and four questions can be utilized to screen for the presence of DB. If the screen is passed, there is an 89% chance that DB is not present. If the screen is failed, further assessment is recommended.

Level of Evidence: 2b

Frequent urination and sleep

J Am Geriatr Soc. 2017 Sep 15. doi: 10.1111/jgs.15027.

Nocturia is Associated with Poor Sleep Quality Among Older Women in the Study of Osteoporotic Fractures.

Fung CH^{1,2}, Vaughan CP^{3,4}, Markland AD^{3,5}, Huang AJ⁶, Mitchell MN¹, Bliwise DL⁷, Ancoli-Israel S⁸, Redline S⁹, Alessi CA^{1,2}, Stone K¹⁰.

Abstract

OBJECTIVES:

(1) To examine relationships between frequency of nocturia and self-reported sleep quality and objective sleep measures in older women, and (2) to estimate the amount of variation in sleep measures that is specifically attributable to frequency of nocturia.

DESIGN AND SETTING:

Secondary, cross sectional analysis of the multicenter prospective cohort Study of Osteoporotic Fractures (SOF).

PARTICIPANTS:

Community-dwelling women aged ≥ 80 years.

MEASUREMENTS:

Frequency of nocturia in the previous 12 months, Pittsburgh Sleep Quality Index sleep quality subscale, and actigraphy-measured wake after sleep onset (WASO) and total sleep time (TST).

RESULTS:

Of 1,520 participants, 25% (n = 392) reported their nocturia frequency was 3-4 times/night and an additional 60% (n = 917) reported their nocturia frequency was 1-2 times/night. More frequent nocturia was associated with poor sleep quality (3-4/night: 26.8% reported fairly bad or very bad sleep quality; 1-2/night: 14.7%; 0/night: 7.7%; $P < .001$) and longer WASO (3-4/night: 89.8 minutes; 1-2/night: 70.6; 0/night: 55.5; $P < .001$). In nested regression models, a nocturia frequency of 3-4/night quadrupled the odds of poor sleep quality (odds ratio: 4.26 [95% CI 1.65, 11.01]; $P = .003$) and was associated with a 37-minute worsening in WASO (95% CI 26.0, 49.0; $P < .001$). Frequency of nocturia explained an additional 6% variation in WASO, above and beyond demographic, medical/psychiatric conditions, and medication factors ($\Delta R^2 = 0.06$).

CONCLUSIONS:

Nocturia is common among octogenarian and nonagenarian women and is independently associated with poor sleep quality and longer wake time at night. Interventions that improve nocturia may be useful in improving sleep quality and wake time at night.

14. HEADACHES**Hippocampus changes**

Headache. 2017 Oct 4. doi: 10.1111/head.13193.

Structural Co-Variance Patterns in Migraine: A Cross-Sectional Study Exploring the Role of the Hippocampus.

Chong CD¹, Dumkrieger GM^{1,2}, Schwedt TJ¹.

OBJECTIVE: To interrogate hippocampal morphology and structural co-variance patterns in migraine patients and to investigate whether structural co-variance patterns relate to migraine disease characteristics.

BACKGROUND: Migraine is associated with structural alterations in widespread cortical and subcortical regions associated with the sensory, cognitive, and affective components of pain processing. Recent studies have shown that migraine patients have differences in hippocampal structure and function relative to healthy control subjects, but whether hippocampal structure relates to disease characteristics including frequency of attacks, years lived with migraine and symptoms of allodynia remains unknown. Furthermore, this study investigated hippocampal volume co-variance patterns in migraineurs, an indirect measure of brain network connectivity. Here, we explore differences in hippocampal volume and structural co-variance patterns in migraine patients relative to healthy controls and examine whether these hippocampal measures relate to migraine disease burden.

METHODS:

This study included 61 migraine patients and 57 healthy control subjects (healthy controls: median age = 34.0, IQR = 19.0; migraine patients: median age = 35.0, IQR = 17.5; $P = .65$). Regional brain volumes were automatically calculated using FreeSurfer version 5.3. Symptoms of allodynia were determined using the Allodynia Symptom Checklist 12 (ASC-12). Structural co-variance patterns were interrogated using pairwise correlations and group differences in correlation strength were estimated using Euclidian distance. A stepwise regression was used to investigate the relationship between structural co-variance patterns with migraine burden.

RESULTS:

Migraine patients had less left hippocampal volume (healthy controls: left hippocampal volume = 4276.8 mm³, SD = 425.3 mm³, migraine patients: left hippocampal volume = 4089.5 mm³, SD = 453.9 mm³, $P = .02$) and less total (right plus left) hippocampal volume (healthy controls: total hippocampal volume = 8690.8 mm³, SD = 855.1 mm³; migraine patients: total hippocampal volume = 8341.8 mm³, SD = 917.9 mm³; $P = .03$) compared to healthy controls. Migraineurs had stronger structural covariance between the hippocampi and cortico-limbic regions in the frontal lobe (inferior opercular gyrus), temporal lobe (planum temporale, amygdala), parietal lobe (angular gyrus, precuneus), and the cerebellar white matter. Results of a stepwise regression showed that hippocampal volumes and the interactions between hippocampal volumes with the volumes of other cortico-limbic regions associate with migraine-related allodynia but not with headache frequency or years lived with migraine.

CONCLUSION:

Migraineurs have less hippocampal volume and stronger hippocampal-cortico-limbic connectivity compared to healthy controls. Hippocampal volumes and measures of hippocampal volume connectivity with other cortico-limbic network regions associate with symptoms of allodynia.

26. CARPAL TUNNEL SYNDROME

Long term success of surgery

Long-term outcome of carpal tunnel release surgery in patients with severe carpal tunnel syndrome

The Bone & Joint Journal | October 03, 2017
Tang CQY, et al.

This study assessed the patient-reported long-term outcome of carpal tunnel release (CTR) for electrophysiologically severe carpal tunnel syndrome (CTS). At a mean of nine years following CTR, favorable outcome and good rates of satisfaction were attained, even in patients with bilateral severe CTS. Furthermore, compared with open surgery, endoscopic CTR had a higher rate of numbness resolution and, the outcome did not significantly differ between the dominant and non-dominant hand.

Methods

- Researchers reviewed the long-term outcome of 40 patients with bilateral severe CTS who underwent 80 CTRs (46 open, 34 endoscopic) between 2002 and 2012.
- Patient-reported outcomes of numbness resolution, the Boston Carpal Tunnel Questionnaire (BCTQ) score, and patient satisfaction were studied as outcomes.

Results

- 9.3 years was the mean follow-up.
- Complete resolution of numbness, persistent numbness and, recurrent numbness was reported by 93.8%, 3.8%, and 2.5% patients, respectively.
- Findings demonstrated that the mean BCTQ symptom score was 1.1 (sd 0.3; 1.0 to 2.55) and the mean Boston function score was 1.15 (sd 0.46; 1.0 to 3.5).
- Researchers found that 72.5% of patients were asymptomatic and had no functional impairment.
- Poorer outcomes were seen in men versus women and in patients < 55 years than patients ≥ 55 years.
- Data reported that all patients who had undergone endoscopic CTR reported complete resolution of numbness compared with 89.1% of those who had undergone open release ($p = 0.047$).
- Additionally, no significant outcome difference was noted between dominant and non-dominant hands.
- Researchers found that patient satisfaction rates were good and there were no adverse events.

US to identify

Arch Phys Med Rehabil. 2017 Sep 22. pii: S0003-9993(17)31115-2. doi: 10.1016/j.apmr.2017.08.489.

The Accuracy of Ultrasonography for the Diagnosis of Carpal Tunnel Syndrome: A Systematic Review and Meta-analysis.

Torres-Costoso A¹, Martínez-Vizcaíno V², Álvarez-Bueno C³, Ferri-Morales A¹, Cavero-Redondo I⁴.

Abstract

OBJECTIVE:

To evaluate the accuracy of inlet and outlet ultrasonography measurements for the diagnosis of carpal tunnel syndrome (CTS).

DATA SOURCES:

We systematically searched MEDLINE, EMBASE, the Cochrane Library and the Web of Science databases, from inception to February 2017.

STUDY SELECTION:

Observational studies comparing the diagnostic accuracy of inlet and outlet ultrasonography measurements were selected.

DATA EXTRACTION:

Random effects models for the diagnostic odds ratio (dOR) values computed by Moses' constant for a linear model and 95% confidence intervals (CIs) were used to calculate the accuracy of the test. Hierarchical summary receiver operating characteristic curves (HSROC) were used to summarize overall test performance.

DATA SYNTHESIS:

Twenty-eight published studies were included in the meta-analysis. The pooled dOR values for the diagnosis of CTS were 31.11 (95%CI 20.42-47.40) for inlet and 16.94 (95%CI 7.58-37.86) for outlet level measurements. The 95% confidence region for the point that summarizes overall test performance of the included studies occurred where the cut offs ranged from 9.0 to 12.6 mm² for inlet and from 9.5 to 10.0 mm² for outlet level measurements.

CONCLUSIONS:

Both ultrasonography measurements for the diagnosis of CTS showed sufficient accuracy for their use in clinical settings, though the overall accuracy was slightly higher for inlet than for outlet level measurements. The addition of outlet and inlet measurements doesn't increase the accuracy for the diagnosis. Therefore, the inlet level ultrasonography measurement appears to be an appropriate method for the diagnosis of CTS.

28. REPLACEMENTS

Outcomes not affected by severity

The Influence of Radiological Severity and Symptom Duration of Osteoarthritis on Postoperative Outcome After Total Hip Arthroplasty – Prospective cohort study

Bariq Al-Amiry, MD John Gaber, MD Bakir Kadum, MD, PhD Torkel Brismar, MD, PhD, Arkan S. Sayed-Noor, MD, PhD, FRCS \ DOI: <http://dx.doi.org/10.1016/j.arth.2017.09.051>

Abstract**Background**

We aimed to investigate the influence of preoperative radiological severity and symptom duration of hip osteoarthritis (OA) on the postoperative functional outcome, quality of life as well as abductor muscle strength after total hip arthroplasty (THA).

Methods

In this prospective cohort study, we studied 250 patients. Preoperatively, we evaluated the function with the Western Ontario and McMaster Universities Osteoarthritis (WOMAC) index and quality of life with EQ-5D. At 1-year after THA, the same scores and also hip abductor muscle strength were measured in 222 patients. We divided the cohort twice, first according to the radiological OA severity [Kellgren-Lawrence classification (KL)] and then according to the OA symptom duration. We investigated whether the preoperative KL class and symptom duration influenced the 1-year WOMAC (primary outcome measure) or EQ-5D and abductor muscle strength (secondary outcome measures).

Results

The crude results showed that the KL class and symptom duration had no influence ($p=0.90$ and $p=0.20$ respectively) on the 1-year WOMAC. Younger age, male sex and lower BMI were associated with a better function. Regarding 1-year EQ-5D, the crude results showed that BMI and KL class had no influence ($p=0.83$ and $p=0.39$ respectively). The adjusted results showed that only age and sex influenced the postoperative EQ-5D. No influence of the tested factors was found on the 1-year abductor muscle strength.

Conclusion

Preoperative radiological OA severity and symptom duration had no influence on the outcome of THA and should probably not affect the decision about timing the operative intervention.

34. PATELLA**Hip taping**

Clin J Sport Med. 2017 Sep;27(5):438-443. doi: 10.1097/JSM.0000000000000392.

Effects of Femoral Rotational Taping on Dynamic Postural Stability in Female Patients With Patellofemoral Pain.

Song CY¹, Lin JJ, Chang AH.

OBJECTIVE:

To investigate the effects of femoral rotational taping on task performance, dynamic postural control, and pain during the Star Excursion Balance Test (SEBT) in patients with patellofemoral pain (PFP) compared to healthy controls.

DESIGN:

Case-control study, pretest-posttest.

SETTING:

Laboratory.

PARTICIPANTS:

Twenty-four female participants (16 with PFP, 8 controls).

INTERVENTIONS:

Participants in both the PFP and control groups performed SEBT with no taping, sham taping, and femoral rotational taping.

MAIN OUTCOME MEASURES:

The maximum anterior excursion distance, 3-dimensional hip and knee kinematics of the stance leg, and pain score (VAS) during SEBT were recorded. The coefficients of variance (CV) of kinematic data gathered from electromagnetic sensors on pelvis and femur were calculated to represent segmental stability.

RESULTS:

When performing the SEBT in the anterior direction, application of femoral rotational taping increased maximum excursion distance (65.57% vs 66.15% leg length, $P = 0.027$), decreased hip adduction excursion (47.6 vs 32.1 degrees, $P = 0.010$), and pain (3.34 vs 2.38, $P = 0.040$) in the PFP group. Femoral rotational taping also improved the medial-lateral (7.1 vs 4.6, $P = 0.015$) and proximal-distal stability (7.5 vs 4.5, $P = 0.020$) of the pelvis, and medial-lateral stability (7.2 vs 6.1, $P = 0.009$) of the femur.

CONCLUSIONS:

The results support the use of femoral rotational taping for improving dynamic postural control and reducing pain during SEBT.

CLINICAL RELEVANCE:

Femoral rotational taping could be used in the management of young female patients with PFP.

Adult and adolescent PFP

BRIEF REPORT

Characteristics and Outcome of Patellofemoral Pain in Adolescents: Do They Differ From Adults?

Authors: Marienke van Middelkoop, PhD¹, Rianne A. van der Heijden, MD¹, Sita M.A. Bierma-Zeinstra, PT, PhD^{1,2}

Published: *Journal of Orthopaedic & Sports Physical Therapy*,
2017 Volume:47 Issue:10 Pages:801–805 DOI:10.2519/jospt.2017.7326

Abstract

Study Design

Case series with 1-year follow-up.

Background

Most of the recommendations for the diagnosis, treatment, and prognosis of patellofemoral pain (PFP) are based on research performed in adults. The literature suggests that there are potential differences between adolescents and adults with PFP.

Objectives

To investigate differences in characteristics, symptoms, and prognosis at 1-year follow-up between adolescents and adults with PFP.

Methods

Data from 64 patients with PFP, assessed at baseline and 1-year follow-up, were used. At baseline, data on demographics, symptoms, and coping strategies were obtained by questionnaire. Physical examination included strength and flexibility measurements of the quadriceps and hamstrings. At 1-year follow-up, a questionnaire was used to collect data on pain, function, and recovery. Differences between adolescents (14–18 years) and adults (18–40 years) were analyzed using regression techniques, adjusted for sex, body mass index, and the presence of bilateral pain.

Results

Of the 64 patients with PFP included at baseline, 78.1% were available for follow-up. At baseline, adolescents with PFP had a significantly lower body mass index (20.7 versus 24.9 kg/m²) and a greater percentage of bilateral pain (70% versus 43.2%) than adults with PFP. There were no differences in reported pain and symptoms between the 2 groups. In total, 25% of the adolescents regarded themselves as recovered after 1 year, compared to 22.7% of the adults (adjusted $P = .725$).

Conclusion

The sample size of the study, in relation to the number of statistical tests performed, urges caution in the interpretation of the results. In contrast to what has been suggested previously, only minor differences seem to exist between adolescents and adults with PFP. In both groups, PFP is clearly not a self-limiting disease, with nearly 75% of those in this study reporting persistent pain at 1-year follow-up.

35. KNEE/TOTAL

Instability

Medial rather than lateral knee instability correlates with inferior patient satisfaction and knee function after total knee arthroplasty

The Knee | October 03, 2017

sponsor

Tsukiyama H, et al.

This study assessed the impact of joint laxity on clinical outcome after total knee arthroplasty (TKA), presuming that medial joint laxity correlates with inferior patient satisfaction and knee function, although lateral joint laxity is allowed to a certain degree in TKA. An inferior postoperative outcome resulted from knees with medial joint laxity during flexion and, there was no impact of lateral joint laxity on patient satisfaction or function. Notably, care should be taken to maintain medial joint stability during the TKA procedure.

Emotional state and success

Arch Orthop Trauma Surg. 2017 Sep 30. doi: 10.1007/s00402-017-2797-5.

Influence of anxiety and pain catastrophizing on the course of pain within the first year after uncomplicated total knee replacement: a prospective study.

Bierke S¹, Petersen W².

Abstract

PURPOSE:

Prolonged postoperative pain is a frequent problem after uncomplicated total knee replacement (TKR). The purpose of this study was to evaluate the effect of anxiety and pain catastrophizing on postoperative pain after TKR.

METHODS:

A total of 150 patients were enrolled in this prospective study. Preoperatively, anxiety was assessed using the State-Trait Anxiety Inventory (STAI) and pain catastrophizing was assessed using the Pain Catastrophizing Scale (PCS). The primary outcome measure was postoperative pain on a numerical rating scale (NRS). The secondary outcome parameters were the different Knee Osteoarthritis Outcome Score (KOOS) subscales and patient satisfaction. Intergroup differences were tested with an independent t test. The odds ratio was calculated to determine the probability of an unsatisfactory outcome.

RESULTS:

Preoperatively and at 6 and 12 months postoperatively, patients with anxiety and particularly patients with pain catastrophizing usually had a higher NRS score, lower knee function before and after surgery, and higher dissatisfaction. These intergroup differences were significant preoperatively and at 6 months postoperatively.

CONCLUSIONS:

Psychopathologic factors, particularly pain catastrophizing, have an impact on postoperative pain after TKR. Preoperative screening and concurrent treatment of the diagnosed psychological disorder may improve patient-perceived outcomes

37. OSTEOARTHRITIS/KNEE**Physical activity**

Med Sci Sports Exerc. 2017 Oct 2. doi: 10.1249/MSS.0000000000001433.

Objectively Measured Physical Activity and Risk of Knee Osteoarthritis.

Qin J¹, Barbour KE, Nevitt MC, Helmick CG, Hootman JM, Murphy LB, Cauley JA, Dunlop DD.

PURPOSE:

To examine the association between objectively measured physical activity and risk of developing incident knee osteoarthritis (OA) in a community-based cohort of middle-aged and older adults.

METHODS:

We used data from the Osteoarthritis Initiative (OAI), an ongoing prospective cohort study of adults aged 45 to 83 at initial enrollment with elevated risk of symptomatic knee OA. Moderate-vigorous physical activity (MVPA) was measured by a uniaxial accelerometer for seven continuous days in two data collection cycles, and was categorized as inactive (<10 minutes/week), low activity (10-<150 minutes/week), and active (\geq 150 minutes/week). Incident knee OA based on radiographic and symptomatic OA and joint space narrowing were analyzed as outcomes over four years of follow-up. Participants free of the outcome of interest in both knees at study baseline were included (sample sizes ranged from 694 to 1,331 for different outcomes). We estimated hazard ratio (HR) and its 95% confidence intervals (CI).

RESULTS:

In multivariate adjusted analyses, active MVPA participation was not significantly associated with risk of incident radiographic knee OA (HR: 1.52; 95% CI: 0.68-3.40), symptomatic knee OA (HR: 1.17; 95% CI: 0.44-3.09), or joint space narrowing (HR: 0.87; 95% CI: 0.37-2.06), when compared with inactive MVPA participation. Similar results were found for participants with low activity MVPA.

CONCLUSION:

MVPA was not associated with the risk of developing incident knee OA or joint space narrowing over four years of follow-up among OAI participants who are at increased risk of knee OA

45 C. MANUAL THERAPY THORACIC**Neuroendocrine response**

RESEARCH REPORT

Neuroendocrine Response Following a Thoracic Spinal Manipulation in Healthy Men

Authors: Kesava Kovanur Sampath, PT, MOst¹, Erik Botnmark, PT¹, Ramakrishnan Mani, PT, PhD¹, James David Cotter, PhD², Rajesh Katare, PhD³, Pujika Emani Munasinghe, BSc³, Steve Tumilty, PT, PhD¹

Published: *Journal of Orthopaedic & Sports Physical Therapy*,
2017 Volume:47 Issue:9 Pages:617–627 DOI:10.2519/jospt.2017.7348

Study Design

Controlled laboratory study.

Background

Spinal manipulation (SM) can trigger a cascade of responses involving multiple systems, including the sympathetic nervous system and the endocrine system, specifically, the hypothalamic-pituitary axis. However, no manual therapy study has investigated the neuroendocrine response to SM (ie, sympathetic nervous system-hypothalamic-pituitary axis) in the same trial.

Objective

To determine short-term changes in sympathetic nervous system activity, heart rate variability, and endocrine activity (cortisol, testosterone, and testosterone-cortisol [T/C] ratio) following a thoracic SM.

Methods

Twenty-four healthy men aged between 18 and 45 years were randomized into 2 groups: thoracic SM (n = 12) and sham (n = 12). Outcome measures were salivary cortisol (micrograms per deciliter), salivary testosterone (picograms per milliliter), T/C ratio, heart rate variability, and changes in oxyhemoglobin concentration of the right calf muscle (micromoles per liter). Measurements were done before and at 5 minutes, 30 minutes, and approximately 6 hours after intervention.

Results

A statistically significant group-by-time interaction was noted for T/C ratio ($P < .05$) and salivary cortisol ($P < .01$) concentrations. Significant between-group differences were noted for salivary cortisol concentration at 5 minutes (mean difference, 0.35; 95% confidence interval: 0.12, 0.6; interaction: $P < .01$) and for T/C ratio at 6 hours postintervention (mean difference, -0.09 ; 95% confidence interval: -0.16 , -0.04 ; $P = .02$). However, SM did not differentially alter oxyhemoglobin, testosterone, or heart rate variability relative to responses in the sham group.

Conclusion

Thoracic SM resulted in an immediate decrease in salivary cortisol concentration and reduced T/C ratio 6 hours after intervention. A pattern of immediate sympathetic excitation was also observed in the SM group.

45 D. MANUAL THERAPY EXTREMITIES**Knee OA Maitland vs Mulligan****Immediate effects of Maitland mobilization versus Mulligan Mobilization with Movement in Osteoarthritis knee- A Randomized Crossover trial**

Ramya V. Rao Ganesh Balthillaya Anupama Prabhu Asha Kamath

DOI: <http://dx.doi.org/10.1016/j.jbmt.2017.09.017>

Abstract**Background**

Maitland Mobilization or Mulligan Mobilization with Movement (MWM) approaches have been widely used clinically for pain relief and improving mobility in Osteoarthritis knee. However the experimental evidence supporting the usage of these mobilization techniques as sole interventions in management of Osteoarthritis knee is insufficient.

Objective

To determine from Maitland Mobilization and Mulligan MWM, which mobilization technique will be more effective in reducing pain and improving mobility and function in OA knee immediately after the intervention.

Study design

Randomized Crossover trial.

Materials and methods

30 subjects with osteoarthritis knee were recruited and 15 each were randomly allocated to two intervention sequences-one sequence was where Maitland was given first followed by Mulligan and the other was where Mulligan was given first followed by Maitland with a washout period of 48 h in between the two interventions. Numeric Pain Rating Scale (NPRS), Timed Up and Go (TUG) test and Pain free Squat Angle were the outcome measures measured before and immediately after both interventions.

Results

Using Repeated Measures ANOVA for analysis of outcomes between and within interventions, no significant differences were seen between Maitland Mobilization and Mulligan MWM, for NPRS, TUG and Pain free Squat Angle ($p = 0.18$, $p = 0.27$, $p = 0.17$) respectively whereas within the interventions both Maitland and Mulligan all outcome measures showed significant changes ($p < 0.001$).

Conclusion

Thus it can be seen that Maitland mobilization and Mulligan MWM, both are equally effective in osteoarthritis knee in reducing pain and improving functional mobility and pain free squat angle immediately post treatment.

Shoulder A/P mob

August 2017 Volume 30, Pages 25–33

Differences between clinician- and self-administered shoulder sustained mobilization on scapular and shoulder muscle activity during shoulder abduction: A repeated-measures study on asymptomatic individuals**Highlights**

- Sustained glide reduced activity of most scapular and shoulder muscles.
- At immediate follow-up, muscle activity levels were similar to baseline.
- Clinical significance of muscle activity change is to be determined.
- Sustained glide may modify shoulder mechanics and/or afferent sensory input.

Abstract**Background**

Sustained glenohumeral postero-lateral glide administered by a clinician is commonly used in the management of patients with shoulder pain. This technique reduced shoulder muscle activity in asymptomatic individuals, but it is unknown whether a self-administered version of the mobilization leads to similar neuromuscular response. This study compared the effect of sustained shoulder mobilizations (performed by a physiotherapist) with self-administered mobilization (with a belt) on activity levels of scapular and glenohumeral shoulder muscles.

Methods

Twenty-two individuals participated in this study, which had a cross-over, repeated measures design. Seven shoulder muscles (upper and lower trapezius, supraspinatus, infraspinatus, posterior deltoid, middle deltoid, and serratus anterior) were monitored using surface electromyography (SEMG) during shoulder abduction performed with a clinician-administered sustained mobilization, and with self-administered sustained mobilization. Muscle activity levels were measured prior, during and after the sustained glide was applied to the shoulder. Mixed-effect models for repeated measures were used for within- and between-condition comparisons.

Results

There was no carry-over effect. Within-condition comparisons suggest that both interventions lead to changes in scapular and shoulder muscle activity levels. No differences between clinician-administered and self-administered mobilizations at intervention and follow-up were found for the monitored muscles, with the exception of upper trapezius.

Conclusions

In young, asymptomatic individuals, self- or clinician-administered sustained mobilizations reduced activity levels of most scapular and shoulder muscles during shoulder abduction. This effect was observed only while the sustained glides were applied to the shoulder. At the immediate follow-up, muscle activity levels were similar to baseline measurements.

46 A. UPPER LIMB NEUROMOBILIZATION**Fluid distribution**

October 2017 Volume 31, Pages 45–51

Effect of neurodynamic mobilization on fluid dispersion in median nerve at the level of the carpal tunnel: A cadaveric study

M. Boudier-Revéret JM. Brismée PS. Sizer Jr. V. Feipel PM. Dugailly S. Sobczak

PlumX Metrics

DOI: <http://dx.doi.org/10.1016/j.msksp.2017.07.004>**Highlights**

- Neurodynamic mobilizations are effective on fluid diffusion.
- The present study showed there is no difference between both, tensioning and sliding techniques on fluid diffusion.
- We recommend the incorporation of sliding techniques especially in sensitized patients.

Abstract**Objectives**

To evaluate the effect of neurodynamics mobilization (NDM) on an artificially induced edema in the median nerve at the level of the carpal tunnel in unembalmed cadavers and to assess whether NDM tensioning techniques (TT) and NDM sliding techniques (SLT) induce similar effects on intraneural fluid dispersion.

Design

Fourteen upper extremities of seven unembalmed cadavers were used in this study. A biomimetic solution was injected directly under the epineurium of the median nerve at the level of the proximal transverse carpal ligament. The initial dye spread was allowed to stabilize and measured with a digital caliper. Tensioning and sliding techniques were applied following a randomized crossover design to each upper extremity and were performed for a total of 5 min each. Post-intervention dye spread measurements were taken after each technique.

Results

After the first mobilization, the mean longitudinal dye spread (7.5 ± 6.6 mm) was significantly greater ($p = 0.024$) compared to the stabilized dye spread. There was a significant longitudinal diffusion effect with both, TT ($p = 0.018$) and SLT ($p = 0.016$), with no statistically significant difference between techniques ($p = 0.976$). The order in which techniques were administered did not influence the diffusion.

Conclusion

Five minute of passive NDM in the form of tensioning or sliding technique induced significant fluid dispersion in the median nerve at the carpal tunnel of unembalmed human cadavers. This study provides support for clinical mechanism of NDM in reducing intraneural edema.

50 A. MOTOR CONTROL**Development and LBP****RESEARCH REPORT****Does Motor Development in Infancy Predict Spinal Pain in Later Childhood? A Cohort Study**

Authors: Steven J. Kamper, PhD^{1,2}, Christopher M. Williams, PhD²⁻⁴, Lise Hestbaek, PhD^{5,6}

Published: *Journal of Orthopaedic & Sports Physical Therapy*,
2017 **Volume:**47 **Issue:**10 **Pages:**763–768 **DOI:**10.2519/jospt.2017.7484

Study Design

Longitudinal cohort study.

Background

Spinal pain is responsible for a huge personal and societal burden, but its etiology remains unclear. Deficits in motor control have been associated with spinal pain in adults, and delayed motor development is associated with a range of health problems and risks in children.

Objective

To assess whether there is an independent relationship between the age at which infants first sit and walk without support and spinal pain at 11 years of age.

Methods

Data from the Danish National Birth Cohort were analyzed, using the age at which children first sat and first walked without support as predictors. Parents reported the predictors when the children were 6 months and 18 months of age, and also provided information in response to a comprehensive list of covariates, including child sex, birth weight, and cognitive development; socioeconomic indicators; and parental health variables. Outcomes were measured at 11 years of age using the Young Spine Questionnaire, which assesses the presence and intensity of spinal pain. Data were analyzed using multivariable logistic regression models to estimate determinants of neck, thoracic, lumbar, and multisite pain.

Results

The analyses included data from approximately 23 000 children and their parents. There were no consistent independent associations between the age at first sitting or walking and spinal pain at the age of 11. Odds ratios were between 0.95 and 1.00 for the various pain sites.

Conclusion

The age at which a child first sits or walks without support does not influence the likelihood that he or she will experience spinal pain in later childhood.

Level of Evidence

Prognosis, level 4. *J Orthop Sports Phys Ther* 2017;47(10):763–768.
*doi:*10.2519/jospt.2017.7484

52. EXERCISE**Pilates vs extension for LBP****Randomized clinical trial The effects of selective Pilates versus extension-based exercises on rehabilitation of low back pain**

Vahid Mazloum Mansour Sahebozamani , Amirhossein Barati Nouzar Nakhaee Pouya Rabiei
PlumX Metrics

DOI: <http://dx.doi.org/10.1016/j.jbmt.2017.09.012>

Abstract**Introduction**

Chronic non-specific low back pain (LBP) may lead to functional impairment and physical disability. The aim of this study was to compare the effects of selective Pilates (SP) and extension-based (EB) exercises on pain, lumbar spine curvature, lumbar forward flexion range of motion (ROM), and physical disability in such individuals.

Materials and methods

In this randomized clinical trial, Forty-seven patients with chronic non-specific LBP (Mean of age: 39.7 years) were randomly allocated into either SP (N = 16), EB (N = 15), or control (N = 16) groups. The measurements included pain intensity, physical disability, lumbar forward bending ROM, and lumbar spine curvature at the baseline, after receiving the 6-week interventions, and also following one month of cessation of the exercises. The analysis of covariance (ANCOVA) and Post-hoc Bonferroni tests were administered to compare the three groups after the interventions and one month later ($P < 0.05$).

Results

More significant improvement was observed in SP group compared to the subjects receiving EB exercises in terms of pain, ROM, and physical disability ($P < 0.001$), however, there was no significant difference between the two experimental groups for lumbar curvature ($P > 0.05$). Furthermore; in follow-up, the patients in SP group significantly achieved a higher level of pain intensity improvement and lumbar flexion ROM than the EB exercises ($P < 0.001$).

Conclusions

It is estimated that core muscles activation and improving lumbopelvic rhythm in SP training may play a role in decreasing pain and physical disability in chronic LBP patients. Further high-quality studies are required to investigate the details of this mechanism.

53. CORE**Martial arts sounds core activation****Comparison between the Ki-hap technique and verbal encouragement on activation of abdominal muscles in healthy participants**

Chang-Yong Kim Hyeong-Dong Kim

Abstract

The aim of this study was to investigate the comparison between a Ki-hap defined as a psyching-up technique, and verbal encouragement defined as a verbal command by a third party, on abdominal muscle activation during performance of the crunch exercise in healthy participants.

Ninety participants were randomly allocated to the following three groups: crunch only exercise group (CG, $n_1 = 30$), crunch exercise with Ki-hap group (CKG, $n_2 = 30$), and crunch exercise with Ki-hap and verbal encouragement group (CKVG, $n_3 = 30$). The interventions were conducted over three trials in each group, and measurements on each participant were performed by a single examiner. The activation of the rectus abdominis (RA), external oblique (EO), and internal oblique (IO) muscles were evaluated using electromyography (EMG) during performance of the crunch exercise in the CG, CKG, and CKVG. Our results showed a significantly greater increase in the EMG patterns of all muscles during performance of the crunch exercise in the CKG ($p < 0.05$) compared to those in the CG and CKVG. The results also showed that there was a significantly greater increase in the activation of the EO and IO muscles in the CKVG ($p < 0.05$) compared with that in the CG.

These findings demonstrated that the addition of the Ki-hap technique and verbal encouragement during performance of the crunch exercise improves activation of the abdominal muscles.

54. POSTURE**Flexed posture proprioception**

October 2017 Volume 31, Pages 9–20

Repeated end range spinal movement while seated abolishes the proprioceptive deficit induced by prolonged flexed sitting posture. A study assessing the statistical and clinical significance of spinal position sense

Vasileios Korakakis Giannis Giakas Vasilis Sideris Rodney Whiteley

DOI: <http://dx.doi.org/10.1016/j.msksp.2017.06.003>**Highlights**

- Sitting in a sustained flexed posture adversely effects spinal proprioception.
- This proprioceptive deficit can be ameliorated by 10 end-range flexion/extension movements.
- The magnitude of the proprioceptive deficits is small in absolute terms, and likely clinically insignificant.

Background Sustained spinal flexion has been proposed to affect the properties of spinal tissues, increase postural muscle's activation latency and act detrimentally on proprioception.

Objectives This study evaluated the effect of flexed posture (FP) on spinal proprioception and assessed the immediate effect of spinal movement on the presumable flexion-induced proprioceptive deficit.

Design Clinical measurement study.

Methods

Marker-based kinematic analyses of the head, spine, and pelvis were conducted on 50 individuals. Subjects were educated in a lordotic sitting posture (IOSP) that they reproduced immediately; after 10 and 30 min in FP; and after sagittal spinal movement. Nine sagittal angles were calculated. Absolute error (AE) and constant error (CE) were used to evaluate repositioning accuracy. Repeated measures ANOVA was used to test for significant differences in angles obtained among postures, as well as for the AE and CE calculated from the trials.

Results

No significant differences were found in reposition error (RE) after immediate reproduction of IOSP (all $p > 0.0083$). Following FP AEs presented significant differences for head (4.1°), head protraction (1.9°), head tilt (2.1°), lumbar (3.2°) and pelvis angle (2.1°). CEs revealed significant differences for head protraction (-1.8°) and lumbar angle (-3.5°). No significant differences were found for AE and CE after spinal sagittal movement (all $p > 0.0083$).

Conclusions

Prolonged FP can affect spinal position sense, but sagittal spinal movement can abolish the proprioceptive deficit. The significant differences documented, may be of limited clinical utility given their magnitude, and the reliability data presented may be of use in reinterpreting previously documented proprioceptive analyses.

55. SCOLIOSIS**Fused movement patterns**

Spine J. 2017 Sep 27. pii: S1529-9430(17)30895-1. doi: 10.1016/j.spinee.2017.08.221.

Spine kinematics exhibited during the stop-jump by physically-active individuals with adolescent idiopathic scoliosis and spinal fusion.

Kakar RS¹, Li Y², Brown CN³, Kim SH⁴, Oswald TS⁵, Simpson KJ⁶.

BACKGROUND CONTEXT:

After spinal fusion, adolescent idiopathic scoliosis individuals (SF-AIS) often return to exercise and sport. However, the movements SF-AIS use to compensate for the loss of spinal flexibility during high-effort tasks are not known.

PURPOSE:

To compare, between SF-AIS and healthy controls (CON) groups, the spinal kinematics of the trunk segments displayed during the stop-jump, a maximal effort task.

STUDY DESIGN:

Case Controlled design **METHODS:** Ten SF-AIS (physically active; posterior-approach spinal fusion: 11.2 ± 1.9 fused segments; post-op time: $2 \pm .6$ yrs; and 9 CON individuals, pair matched for gender, age (17.4 ± 1.3 yr, 20.6 ± 1.5 yr, respectively), mass (63.50 ± 12.2 kg, 66.40 ± 10.9 kg), height (1.69 ± 0.09 m, 1.72 ± 0.08 m) and level of physical activity participated. SF-AIS and CON performed 5 acceptable trials of the stop-jump task. Spatial locations of 21 retro-reflective trunk and pelvis markers were recorded via high-speed motion capture methodology. Mean differences and analysis of covariance (jump height = covariate, $p < .05$) were used to compare the groups' relative (RelAng) and segmental (SegAng) angles of the 3 trunk segments (trunk segments = upper trunk [UT: C7 to T8], middle trunk [MT: T9 to T12], lower trunk [LT: L1 to L5]) for each rotation plane in the 3 phases of interest (flight, stance and the vertical flight phases).

RESULTS:

No significant group differences for jump height and RelAng were detected in the 3 phases of stop-jump. SF-AIS displayed 3.2° greater transverse plane RelAng of LT compared to CON ($p = .059$) in the stance phase. Group differences for RelAng ranged from 0° to 15.3° . For SegAng in stance phase, LT demonstrated greater SegAng in the sagittal and frontal plane (mean difference: $3.2^\circ - 6.2^\circ$) while SegAng for MT was 5.1° greater in sagittal plane and had a tendency of 2° greater displacement in frontal plane ($p = .070$). In the vertical flight phase greater LT displacement in frontal plane was observed for SF-AIS than CON. In the flight phase, LT had a tendency for greater SegAng for SF-AIS than CON in transverse plane ($p = .089$).

CONCLUSION:

Overall, SF-AIS individuals who participate in physical activity on a regular basis are able to demonstrate similar trunk kinematics during a high intensity stop-jump task as their matched healthy peers. Fewer group differences for relative angular displacements of the spine were observed than anticipated. This finding suggests that the fused MT appeared to be moving synchronously with the LT, thereby suggesting a compensatory adaptation of SF-AIS to achieve sufficient trunk movements during this high-effort movement.

56. ATHLETICS

Hypermobility in young athlete's

RESEARCH REPORT

Hypermobility in Adolescent Athletes: Pain, Functional Ability, Quality of Life, and Musculoskeletal Injuries

Authors: Heidi Schmidt, PT, MHS¹, Trine Lykke Pedersen, MSS¹, Tina Junge, PT, PhD^{1,2}, Raoul Engelbert, PT, PhD^{3,4}, Birgit Juul-Kristensen, PT, PhD^{1,5}

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2017 **Volume:**47 **Issue:**10 **Pages:**792–800 **DOI:**10.2519/jospt.2017.7682

Study Design Cross-sectional.

Background Generalized joint hypermobility (GJH) may increase pain and likelihood of injuries and also decrease function and health-related quality of life (HRQoL) in elite-level adolescent athletes.

Objective

To assess the prevalence of GJH in elite-level adolescent athletes, and to study the association of GJH with pain, function, HRQoL, and musculoskeletal injuries.

Methods

A total of 132 elite-level adolescent athletes (36 adolescent boys, 96 adolescent girls; mean \pm SD age, 14.0 \pm 0.9 years), including ballet dancers (n = 22), TeamGym gymnasts (n = 57), and team handball players (n = 53), participated in the study. Generalized joint hypermobility was classified by Beighton score as GJH4 (4/9 or greater), GJH5 (5/9 or greater), and GJH6 (6/9 or greater). Function of the lower extremity, musculoskeletal injuries, and HRQoL were assessed with self-reported questionnaires, and part of physical performance was assessed by 4 postural-sway tests and 2 single-legged hop-for-distance tests.

Results

Overall prevalence rates for GJH4, GJH5, and GJH6 were 27.3%, 15.9%, and 6.8%, respectively, with a higher prevalence of GJH4 in ballet dancers (68.2%) and TeamGym gymnasts (24.6%) than in team handball players (13.2%). There was no significant difference in lower extremity function, injury prevalence and related factors (exacerbation, recurrence, and absence from training), HRQoL, or lengths of hop tests for those with and without GJH. However, the GJH group had significantly larger center-of-pressure path length across sway tests.

Conclusion

For ballet dancers and TeamGym gymnasts, the prevalence of GJH4 was higher than that of team handball players. For ballet dancers, the prevalence of GJH5 and GJH6 was higher than that of team handball players and the general adolescent population. The GJH group demonstrated larger sway in the balance tests, which, in the current cross-sectional study, did not have an association with injuries or HRQoL. However, the risk of having (ankle) injuries due to larger sway for the GJH group must be studied in future longitudinal studies. *J Orthop Sports Phys Ther* 2017;47(10):792–800. doi:10.2519/jospt.2017.7682

59. PAIN**Analysis of adolescent LBP****RESEARCH REPORT****Low Back Pain With Impact at 17 Years of Age Is Predicted by Early Adolescent Risk Factors From Multiple Domains: Analysis of the Western Australian Pregnancy Cohort (Raine) Study**

Authors: Anne Smith, PhD¹, Darren Beales, PhD¹, Peter O'Sullivan, PhD¹, Natasha Bear, MSc¹, Leon Straker, PhD¹

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2017 **Volume:**47 **Issue:**10 **Pages:**752–762 **DOI:**10.2519/jospt.2017.7464

Study Design

Prospective cohort study of the Western Australian Pregnancy Cohort (Raine) Study.

Background

Low back pain (LBP) commonly develops in adolescence and is a significant risk factor for adult LBP. A broad range of factors have been associated with the development of adolescent LBP, but prior literature has limitations related to characterization of LBP and the scope of risk factors considered.

Objective

This study aimed to identify potential factors contributing to the development of LBP, with and without impact, at 17 years of age, utilizing a broad range of exposures at 14 years of age.

Methods

Data from 1088 participants (52.1% female) with “no LBP,” “LBP with minimal impact,” and “LBP with impact” at 17 years of age and a range of measures from multiple domains, including spinal pain, physical, psychological, social, and lifestyle, at 14 years of age were collected for the study. Multivariable multinomial logistic regression was used to estimate the association of potential mechanistic factors at 14 years of age with LBP at 17 years of age.

Results

Female sex and back pain at 14 years of age were strongly associated with LBP at 17 years of age. Potential mechanistic factors for LBP outcomes at 17 years of age included exposures from the pain (neck/shoulder pain) and physical domains (standing posture subgroup membership, back muscle endurance, throwing distance), psychological domain (somatic complaints, aggressive behavior), social domain (socioeconomic area), and lifestyle domain (exercise out of school).

Conclusion

The findings support the multidimensional nature of adolescent LBP and highlight the challenge this presents for epidemiological research, clinical practice, and prevention initiatives in the general population.

Hypermobile syndrome in adolescents

RESEARCH REPORT

Pain-Related Fear and Its Disabling Impact in Hypermobile Adolescents With Chronic Musculoskeletal Pain

Authors: Thijs van Meulenbroek, PT, MSc^{1,2}, Ivan P.J. Huijnen, PT, PhD^{1,2}, Carlijn M.H. Wiertz, MD¹, Jeanine A. Verbunt, MD, PhD^{1,2}

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2017 **Volume:**47 **Issue:**10 **Pages:**775–781 **DOI:**10.2519/jospt.2017.7282

Study Design

Cross-sectional study.

Background

Chronic musculoskeletal pain (CMP) has a negative impact on physical functioning. During adolescence, joint hypermobility is a potential risk factor for developing CMP, and pain-related fear contributes to the persistence of CMP. Whether pain-related fear and hypermobility are related, and even reinforce each other, resulting in a stronger association with perceived level of disability, is still unknown.

Objectives

To evaluate whether pain-related fear has a stronger association with disability in hypermobile compared to nonhypermobile adolescents with CMP.

Methods

The study included 116 adolescents with CMP. The presence of hypermobility was assessed using the Beighton score. Measures of pain intensity, age, sex, and pain-related fear were collected and included in the multivariable model. Hierarchical regression analysis, with disability as the dependent variable, was used to examine the interaction between hypermobility and pain-related fear.

Results

Hypermobile adolescents with CMP do not have more pain-related fear compared to nonhypermobile adolescents with CMP. There was no interaction effect between hypermobility and pain-related fear in explaining disability ($\beta = .20$, $P = .42$). Similarly, perceived harmfulness of balance-related activities was not more strongly associated with disability in hypermobile adolescents with CMP.

Conclusion

The association of pain-related fear with the perceived level of disability is not more pronounced in hypermobile compared to nonhypermobile adolescents with CMP. *J Orthop Sports Phys Ther* 2017;47(10):775–781. Epub 12 Sep 2017. doi:10.2519/jospt.2017.7282

Pain and touch

v BMC Neurol. 2017 Sep 15;17(1):184. doi: 10.1186/s12883-017-0963-6.

Low threshold unmyelinated mechanoreceptors can modulate pain.

Habig K¹, Schänzer A², Schirner W³, Lautenschläger G³, Dassinger B⁴, Olausson H⁵, Birklein F⁶, Gizewski ER⁷, Krämer HH³.

BACKGROUND:

Human, hairy skin contains a subgroup of C-fibers, the C-low threshold mechanoreceptive afferents ((C-LTMR) C-tactile or C-touch (CT) fibers) that are linked with the signaling of affective aspects of human touch. Recent studies suggest an involvement of these afferents in the modulation of pain in healthy volunteers. Small fiber neuropathy (SFN) is associated with a damage of C-fibers. Therefore, an impairment of C-LTMRs can be assumed. We aimed to elaborate a possible role of CT-afferents in pain modulation by investigating healthy volunteers and SFN-patients.

METHODS:

Experiment I: 20 SFN-patients (12 women, median age 52.0 years) and 20 healthy controls (14 women, median age 43.0 years) participated in this prospective fMRI and psychophysical study. Heat-pain (HP), CT-targeted touch (slow brushing) and HP combined with CT-targeted touch were applied in randomized order to the left shank in a block design. The participants rated pain intensity on a visual analogue scale. Experiment II: We investigated a possible impact of pain intensity on CT induced pain modulation (10 healthy participants). The intensity of HP stimulation was chosen to induce pain intensity 50/100 (NRS). HP stimulation was applied with and without CT-targeted touch.

RESULTS:

Experiment I: CT-stimulation was sufficient to reduce heat pain in healthy participants ($p = 0.016$), but not in SFN-patients. HP induced pain intensity was significantly higher (32,2 vs 52,6) in SFN-patients. During HP, bold responses in pain associated areas were observed in both groups. Additional CT-stimulation elicited no significant difference of bold responses compared to HP. Experiment II: In healthy volunteers, we reproduced a significant reduction of HP intensity by CT-stimulation ($p = 0.038$).

CONCLUSIONS:

CT input seems to be sufficient to modulate pain, independent of intensity of the pain stimulus. As a prerequisite, the CT fibers have to be intact as in healthy volunteers. If CT fibers are impaired - as in SFN -, CT-targeted touch does not modulate pain intensity. The location of CT-induced pain modulation might be attributed to the level of the dorsal horn since the cortical activation pattern of heat pain with and without CT-targeted touch did not differ in healthy subjects and in SFN-patients.

Offset analgesia and chronic pain

Pain. 2017 Oct;158(10):1951-1959. doi: 10.1097/j.pain.0000000000000989.

Disrupted offset analgesia distinguishes patients with chronic pain from healthy controls.

Kobinata H¹, Ikeda E, Zhang S, Li T, Makita K, Kurata J.

Offset analgesia (OA) represents a disproportionately large decrease of pain perception after a brief, temporary increment of thermal pain stimulus and was reported attenuated in patients with neuropathic pain.

We examined whether OA depends on the increment duration before offset, and whether individual features of OA distinguish patients with chronic pain and healthy controls. We used a Peltier-type thermal stimulator and OA paradigms including 5-, 10-, or 15-s duration of 1°C-increment (T₂) over 45°C. We first examined OA response, on the left volar forearm, at 3 different T₂'s in 40 healthy volunteers, and OA and constant stimulus responses in 12 patients with chronic pain and 12 matched healthy controls. We measured magnitude of OA ([INCREMENT]OA) and maximum visual analogue scale (VAS) latency (time to peak VAS) during constant stimulus for each individual. Pain perception kinetics were compared with analysis of variance and sought for correlations with psychophysical parameters with a significance threshold at $P < 0.05$. In healthy controls, longer T₂ at 10 or 15 seconds resulted in larger [INCREMENT]OA compared with T₂ at 5 seconds ($P = 0.04$). In patients, [INCREMENT]OA was significantly smaller than controls at T₂ = 5 or 10 seconds ($P < 0.05$) but grew comparable at T₂ = 15 seconds with controls. Maximum VAS latency was longer in patients than in controls and negatively correlated with [INCREMENT]OA in patients. An OA index ([INCREMENT]OA/[maximum VAS latency]) proved diagnostic of chronic pain with an area under the receiver operating characteristic curve at 0.897.

Patients with chronic pain showed impairment of OA and reduced temporal sharpening of pain perception, which might imply possible disturbance of the endogenous pain modulatory system.

Adolescents and pain

RESEARCH REPORT**Increased Substance Use and Poorer Mental Health in Adolescents With Problematic Musculoskeletal Pain**

Authors: Nicola McLaren, MPhil¹, Steven J. Kamper, PhD^{2,3}, Rebecca Hodder, BPsych^{1,2,4}, John Wiggers, PhD^{1,4}, Luke Wolfenden, PhD^{1,4}, Jennifer Bowman, PhD⁵, Elizabeth Campbell, PhD⁴, Julia Dray, BPsych⁵, Christopher M. Williams, PhD^{1,2,4}

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2017 **Volume:**47 **Issue:**10 **Pages:**705–711 **DOI:**10.2519/jospt.2017.7441

Study Design

Cross-sectional study.

Background

Adolescents with musculoskeletal pain are thought to be at greater risk of modifiable health risk behaviors, but little is known about these behaviors in adolescents with problematic pain.

Objective

To describe the prevalence of substance use (tobacco smoking, alcohol consumption, and illicit drugs) and poor mental health in adolescents with problematic musculoskeletal pain, compared to those without such pain.

Methods

Data on self-reported pain, substance use, and poor mental health were collected from 1831 year 9 students (age range, 14–16 years). Participants were considered to have problematic pain if they reported experiencing pain at least monthly over a 6-month period that also required medication or impacted 1 or more of the following: school or work, daily activities, and leisure or sporting activities.

Results

Almost half (46%) of the participants experienced problematic pain. Adolescents with problematic pain, compared to those without pain, reported higher substance use and poorer mental health: tobacco smoking in the last 4 weeks, 12% versus 7% (odds ratio [OR] = 1.76; 95% confidence interval [CI]: 1.25, 2.28); alcohol consumption in the last 4 weeks, 30% versus 20% (OR = 1.68; 95% CI: 1.34, 2.11); illicit drug use, 13% versus 6% (OR = 2.18; 95% CI: 1.55, 3.07); lower Mental Health Inventory scores ($\beta = -11.43$; standard error [SE], 0.96; $P < .05$), indicating poorer mental health; and higher Strengths and Difficulties Questionnaire total scores ($\beta = 3.67$; SE, 0.29; $P < .05$), indicating greater difficulties.

Conclusion

Adolescents with problematic pain report higher smoking, alcohol use, and use of illicit drugs and poorer mental health than adolescents without problematic pain. The experience of problematic pain could be an important consideration for substance use and chronic disease prevention. This trial is registered with the Australian New Zealand Clinical Trials Registry (reference number

61. FIBROMYALGIA**GERD and FM**

Pain. 2017 Oct;158(10):1971-1978. doi: 10.1097/j.pain.0000000000000994.

Bidirectional association between fibromyalgia and gastroesophageal reflux disease: two population-based retrospective cohort analysis.

Wang JC¹, Sung FC, Men M, Wang KA, Lin CL, Kao CH.
Author information

Abstract

Fibromyalgia (FM) tends to coexist with gastroesophageal reflux disease (GERD). This retrospective cohort study was conducted to determine the bidirectional association between FM and GERD, using a nationwide database, the National Health Insurance of Taiwan. We established 2 study arms, including 35,117 patients with FM in arm 1 and 34,630 patients with GERD in arm 2, newly diagnosed between 2000 and 2010. For each study arm, we randomly selected 4-fold subjects with neither FM nor GERD from the same database, frequency matched by sex, age, and diagnosis date, as the respective control cohorts. Incidence of GERD in arm 1 and incidence of FM in arm 2 were estimated by the end of 2011. The overall incidence of GERD was 1.6-fold greater in the FM cohort than in the non-FM cohort (12.0 and 7.61 per 1000 person-years, crude hazard ratio [HR] = 1.58, 95% confidence interval [CI] = 1.51-1.66), with an adjusted HR (aHR) of 1.27 (95% CI = 1.22-1.33) after controlling for sex, age, comorbidities, and medications. The GERD cohort ultimately had a 1.5-fold higher incidence of FM than the non-GERD cohort (5.76 vs 3.96 per 1000 person-years), with an aHR of 1.44 (95% CI = 1.29-1.60). The present study suggests a bidirectional relationship between FM and GERD. There is a greater risk of developing GERD for patients with FM than developing FM for patients with GERD.

Visceral problems

Pain. 2017 Oct;158(10):1925-1937. doi: 10.1097/j.pain.0000000000000992.

Visceral pain as a triggering factor for fibromyalgia symptoms in comorbid patients.

Costantini R¹, Affaitati G, Wesselmann U, Czakanski P, Giamberardino MA.

Fibromyalgia syndrome (FMS) is a central sensitization syndrome; however, peripheral pain sources potentially exacerbate its symptoms of chronic diffuse musculoskeletal pain and hyperalgesia.

This prospective study evaluated visceral pain as a possible triggering factor for FMS pain and hyperalgesia in comorbid patients. Women with (1) FMS + irritable bowel syndrome (IBS); (2) FMS + primary dysmenorrhea (Dys); (3) FMS + Dys secondary to endometriosis (Endo); (4) FMS + colon diverticulosis (Div) were compared with FMS-only women, for fibromyalgia pain (number and intensity of episodes and analgesic consumption) over comparable periods and for somatic hyperalgesia (electrical and pressure pain thresholds) in painful (tender points) and control areas (trapezius, deltoid, quadriceps muscles, and overlying subcutis and skin). In comorbid subgroups, FMS symptoms were also reassessed after treatment of the visceral condition or no treatment. All comorbid groups vs FMS-only had significantly higher FMS pain (number/intensity of episodes and analgesic consumption) and hyperalgesia in deep somatic tissues (subcutis and muscle) at all sites ($0.05 < P < 0.0001$). Visceral pain (number of IBS days, painful menstrual cycles, and abdominal pain episodes from diverticulitis) correlated directly with all parameters of FMS pain and inversely with muscle pain thresholds at all sites ($0.03 < P < 0.0001$).

Fibromyalgia syndrome pain and hyperalgesia in all tissues and all sites significantly decreased in patients after visceral comorbidity treatment (dietary for 6 months [IBS], hormonal for 6 months [dysmenorrhea], laser [endometriosis], and surgery [diverticulosis]) ($0.05 < P < 0.0001$) vs no change in untreated patients. Visceral pain enhances FMS symptoms, probably augmenting the level of central sensitization typical of the syndrome. Systematic assessment and treatment of visceral pain comorbidities should be a part of FMS management strategy.

62 A. NUTRITION/VITAMINS**Vit. D and pregnancy**

Int J Obes (Lond). 2017 Aug 4. doi: 10.1038/ijo.2017.182.

The relationship between maternal 25-hydroxyvitamin D status in pregnancy and childhood adiposity and allergy: an observational study.

Boyle VT¹, Thorstensen EB¹, Thompson JMD^{2,3}, McCowan LME³, Mitchell EA², Godfrey KM⁴, Poston L⁵, Wall CR⁶, Murphy R⁷, Cutfield W¹, Kenealy T⁷, Kenny LC^{8,9}, Baker PN^{1,10}.
Author information

Abstract**BACKGROUND:**

Vitamin D insufficiency (defined as $<75 \text{ nmol l}^{-1}$) is widespread among pregnant women around the world and has been proposed to influence offspring outcomes in childhood and into adult life, including adiposity and allergy. Disorders, including asthma and eczema, are on the rise among children. Our aim was to investigate the relationship between maternal 25-hydroxyvitamin D status in pregnancy and offspring adiposity, asthma and eczema in childhood.

SUBJECTS AND METHODS:

Maternal 25-hydroxyvitamin D concentrations were analysed in serum samples collected at 15 weeks' gestation from 1710 participants of the prospective Screening for Pregnancy Endpoints cohort study. The offspring of 1208 mothers were followed up at age 5-6 years. Data collected included height, weight, percentage body fat (PBF, measured by bioimpedance) and history of asthma and eczema. Multivariable analysis controlled for maternal body mass index (BMI), age and sex of the child and season of serum sampling.

RESULTS:

Complete data were available for 922 mother-child pairs. Each 10 nmol l^{-1} increase in maternal 25-hydroxyvitamin D concentration at 15 weeks' gestation was associated with a decrease in offspring PBF of 0.2% (95% confidence interval 0.04-0.36%, $P=0.01$) after adjustment for confounders but was not related to child BMI z-score. Maternal mean (\pm s.d.) 25-hydroxyvitamin D concentration was similar in children who did and did not have asthma (71.7 ± 26.1 vs $73.3 \pm 27.1 \text{ nmol l}^{-1}$, $P=0.5$), severe asthma (68.6 ± 28.6 vs $73.3 \pm 26.8 \text{ nmol l}^{-1}$, $P=0.2$) and eczema (71.9 ± 27.0 vs $73.2 \pm 27.0 \text{ nmol l}^{-1}$, $P=0.5$).

CONCLUSIONS:

The finding of a relationship between maternal vitamin D status and adiposity in childhood is important, particularly because vitamin D insufficiency in pregnancy is highly prevalent. The association between maternal vitamin D supplementation in pregnancy and adiposity in the offspring merits examination in randomised controlled trials. International Journal of Obesity advance online publication, 19 September 2017; doi:10.1038/ijo.2017.182.

63. PHARMACOLOGY

Antibiotics and mortality

Long-term risk of acute myocardial infarction, stroke, and death with outpatient use of clarithromycin: A retrospective cohort study

American Journal of Epidemiology | September 25, 2017

Mosholder AD, et al.

The physicians investigated the long-term risk of acute myocardial infarction, stroke, and death with outpatient use of clarithromycin. This retrospective cohort study concluded that outpatient clarithromycin use was correlated with long-term mortality increases, with evidence for a similar, smaller increase with erythromycin.

Methods

- The physicians performed this retrospective cohort study of subjects enrolled in the United Kingdom Clinical Practice Research Datalink from 2000-2013 evaluated long-term risks of death, stroke, and acute myocardial infarction (AMI) in adults prescribed clarithromycin.
- For this study, subjects were outpatients aged 40-85 years.
- They prescribed clarithromycin, doxycycline, or erythromycin (287,748, 267,729, and 442,999 patients, respectively), or *H. pylori* eradication therapy with a proton pump inhibitor, amoxicillin, and either clarithromycin (27,639 patients) or metronidazole (14,863 patients).
- With Cox proportional hazards regression, they analyzed time to death, stroke, or AMI.

Results

- Following one clarithromycin vs. one doxycycline prescription, the long-term hazard ratio (HR) for death was 1.29 (95% confidence interval (CI) 1.21, 1.25), increasing to 1.62 (95% CI 1.43, 1.84) for 5+ prescriptions of clarithromycin vs. 5+ prescriptions for doxycycline.
- Erythromycin demonstrated smaller risks vs. doxycycline.
- After clarithromycin, stroke and AMI were also increased, but with smaller HRs than mortality.
- The HR for mortality following clarithromycin vs. metronidazole regimens was 1.09 (95% CI 1.00, 1.18) for *H. pylori* eradication, and was higher (1.65, 95% CI 0.88, 3.08) following 2+ prescriptions in subjects not on statins at baseline.