

2. LBP

Cytokines changes

ORIGINAL RESEARCH

Unexpectedly decreased plasma cytokines in patients with chronic back pain

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DOI <https://doi.org/10.2147/JPR.S153872>

Introduction: Chronic back pain is one of the most important socioeconomic problems that affects the global population. Elevated levels of inflammatory mediators, such as cytokines, have been correlated with pain, but their role in chronic back pain remains unclear. The effectiveness of anti-inflammatory drugs seems to be limited for chronic back pain. The authors wanted to investigate the levels of inflammatory mediators in long-term medically treated patients with persistent chronic back pain.

Methods: Cytokine plasma levels of patients with chronic back pain (n=23), compared to pain-free healthy controls (n=30), were investigated by immunoassay. Patients with chronic back pain were exposed to long-term conservative medical therapy with physiotherapy and anti-inflammatories, also combined with antidepressants and/or muscle-relaxants.

Results: The patients with chronic back pain expressed lower levels of the chemokines MCP1, CCL5, and CXCL6 compared to pain-free healthy controls. Significantly lower concentrations of the anti-inflammatory cytokines, interleukin (IL)-4 and granulocyte-colony stimulating factor were also found. Interestingly, levels of proinflammatory cytokines (IL-2, IL-6, IL-1 β , tumor necrosis factor alpha), IL-10, granulocyte-macrophage colony-stimulating factor, and stromal cell-derived factor 1 alpha showed no significant differences between both groups.

Conclusion: This decrease of inflammatory mediators in medically treated patients with chronic back pain is of unclear origin and might be either a long-term side effect of medical therapy or related to chronic pain. Further longitudinal research is necessary to elucidate the underlying cause of these findings.

Biopsychosocial factors in spinal pain**A scoping review of biopsychosocial risk factors and co-morbidities for common spinal disorders**

Bart N. Green, Claire D. Johnson, Scott Haldeman, Erin Griffith, Michael B. Clay, Edward J. Kane, Juan M. Castellote,

... <https://doi.org/10.1371/journal.pone.0197987>

Abstract**Objective**

The purpose of this review was to identify risk factors, prognostic factors, and comorbidities associated with common spinal disorders.

Methods

A scoping review of the literature of common spinal disorders was performed through September 2016. To identify search terms, we developed 3 terminology groups for case definitions: 1) spinal pain of unknown origin, 2) spinal syndromes, and 3) spinal pathology. We used a comprehensive strategy to search PubMed for meta-analyses and systematic reviews of case-control studies, cohort studies, and randomized controlled trials for risk and prognostic factors and cross-sectional studies describing associations and comorbidities.

Results

Of 3,453 candidate papers, 145 met study criteria and were included in this review. Risk factors were reported for group 1: non-specific low back pain (smoking, overweight/obesity, negative recovery expectations), non-specific neck pain (high job demands, monotonous work); group 2: degenerative spinal disease (workers' compensation claim, degenerative scoliosis), and group 3: spinal tuberculosis (age, imprisonment, previous history of tuberculosis), spinal cord injury (age, accidental injury), vertebral fracture from osteoporosis (type 1 diabetes, certain medications, smoking), and neural tube defects (folic acid deficit, anti-convulsant medications, chlorine, influenza, maternal obesity). A range of comorbidities was identified for spinal disorders.

Conclusion

Many associated factors for common spinal disorders identified in this study are modifiable. The most common spinal disorders are co-morbid with general health conditions, but there is a lack of clarity in the literature differentiating which conditions are merely comorbid versus ones that are risk factors. Modifiable risk factors present opportunities for policy, research, and public health prevention efforts on both the individual patient and community levels. Further research into prevention interventions for spinal disorders is needed to address this gap in the literature.

8. VISCERA

IBS and sex

Article in Press

Sex-based Differences in Incidence of Inflammatory Bowel Diseases—Pooled Analysis of Population-based Studies from Western Countries

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DOI: <https://doi.org/10.1053/j.gastro.2018.06.043>

Abstract

Background & Aims

Although the incidence of inflammatory bowel diseases (IBD) varies with age, few studies have examined variations between the sexes. We hypothesize that sex hormones are implicated in IBD pathogenesis. We therefore used population data from established cohorts to analyze sex differences in IBD incidence according to age of diagnosis.

Methods

We identified population-based cohorts of patients with IBD for which incidence and age data were available (17 distinct cohorts from 16 regions of Europe, North America, Australia, and New Zealand). We collected data through December 2016 on 95,605 incident cases of CD (42,831 male and 52,774 female) and 112,004 incident cases of UC (61,672 male and 50,332 female). We pooled incidence rate ratios of Crohn's disease (CD) and ulcerative colitis (UC) for the combined cohort and compared differences according to sex using random-effects meta-analysis.

Results

Female patients had a lower risk of CD during childhood, until the age range of 10–14 years (incidence rate ratio, 0.70; 95% CI, 0.53–0.93), but they had a higher risk of CD thereafter, which was statistically significant for the age groups of 25–29 years and older than 35 years. The incidence of UC did not differ significantly for female vs male patients (except for the age group of 5–9 years) until age 45 years; thereafter, men had a significantly higher incidence of UC than women.

Conclusions

In a pooled analysis of population-based studies, we found age of IBD onset to vary with sex. Sex hormones might affect pathogenesis of IBD in patients with epigenetic and genetic risk factors. Further studies are needed to investigate mechanisms of sex differences in IBD incidence.

10 A. CERVICAL SPINE**Clinical reasoning in neck pain patients**

Musculoskelet Sci Pract. 2018 Jun;35:8-17. doi: 10.1016/j.msksp.2018.01.011. Epub 2018 Feb 2.

The clinical reasoning process in randomized clinical trials with patients with non-specific neck pain is incomplete: A systematic review.

Maissan F¹, Pool J², de Raaij E³, Mollema J², Ostelo R⁴, Wittink H².

OBJECTIVE:

Primarily to evaluate the completeness of the description of the clinical reasoning process in RCTs with patients with non-specific neck pain with an argued or diagnosed cause i.e. an impairment or activity limitation. Secondly, to determine the association between the completeness of the clinical reasoning process and the degree of risk of bias.

DATA SOURCES:

Pubmed, Cinahl and PEDro were systematically searched from inception to July 2016.

STUDY SELECTION:

RCTs (n = 122) with patients with non-specific neck pain receiving physiotherapy treatment published in English were included.

DATA EXTRACTION:

Data extraction included study characteristics and important features of the clinical reasoning process based on the Hypothesis-Oriented Algorithm for Clinicians II (HOAC II)].

DATA SYNTHESIS:

Thirty-seven studies (30%) had a complete clinical reasoning process of which 8 (6%) had a 'diagnosed cause' and 29 (24%) had an 'argued cause'. The Spearman's rho association between the extent of the clinical reasoning process and the risk of bias was -0.2.

CONCLUSIONS:

In the majority of studies (70%) the described clinical reasoning process was incomplete. A very small proportion (6%) had a 'diagnosed cause'. Therefore, a better methodological quality does not necessarily imply a better described clinical reasoning process

12 A. WHIPLASH

Nerve irritation

RESEARCH REPORT**Evidence for Increased Magnetic Resonance Imaging Signal Intensity and Morphological Changes in the Brachial Plexus and Median Nerves of Patients With Chronic Arm and Neck Pain Following Whiplash Injury**

Authors: Jane Greening, PhD, MCSP¹, Kamakshi Anantharaman, MSc², Rupert Young, PhD², Andrew Dilley, PhD¹

Published: *Journal of Orthopaedic & Sports Physical Therapy*, 2018 **Volume:**48 **Issue:**7 **Pages:**523–532 **DOI:**10.2519/jospt.2018.7875

Background

Whiplash following a motor vehicle accident can result in chronic neck and arm pain. Patients frequently present with cutaneous hypersensitivities and hypoesthesia, but without obvious clinical signs of nerve injury. T2-weighted magnetic resonance imaging (MRI) has previously been used to identify nerve pathology.

Objectives

To determine whether there are signs of peripheral nerve pathology on MRI in patients with chronic arm and neck pain following whiplash injury.

Methods

This cross-sectional study used T2-weighted MRI to examine the brachial plexus and median nerve in patients and age-matched, healthy control subjects. Clinical examination included tests of plexus and nerve trunk mechanical sensitivity.

Results

The T2 signal intensity was greater in the brachial plexus and median nerve at the wrist in the patient group (mean intensity ratio = 0.52 ± 0.13 and 2.09 ± 0.33 , respectively) compared to the control group (mean intensity ratio = 0.45 ± 0.07 and 1.38 ± 0.31 , respectively; $P < .05$). Changes in median nerve morphology were also observed, which included an enlargement (mean area: patient group, $8.05 \pm 1.29 \text{ mm}^2$; control group, $6.52 \pm 1.08 \text{ mm}^2$; $P < .05$) and flattening (mean aspect ratio: patient group, 2.46 ± 0.53 ; control group, 1.62 ± 0.30 ; $P < .05$) at the proximal carpal row. All patients demonstrated signs of nerve trunk mechanical sensitivity.

Conclusion

These findings suggest that patients with chronic whiplash may have inflammatory changes and/or mild neuropathy, which may contribute to symptoms. *J Orthop Sports Phys Ther* 2018;48(7):523–532. Epub 24 Apr 2018. doi:10.2519/jospt.2018.7875

Keyword: inflammation, peripheral nervous system, whiplash-associated disorder

13 B. TMJ/ORAL**Periodontal disease and kidney problems**

Nephrology (Carlton). 2018 Jan 23. doi: 10.1111/nep.13225.

Periodontal and chronic kidney disease association: a systematic review and meta-analysis.

Kapellas K¹, Singh A^{1,2}, Bertotti M³, Nascimento G⁴, Jamieson LM¹; Perio-CKD collaboration.

AIM:

Chronic kidney disease (CKD) and kidney failure is increasing globally and evidence from observational studies suggest periodontal disease may contribute to kidney functional decline.

METHODS:

Electronic searches of the PubMed, EMBASE, Web of Science, Scopus and Cochrane Library databases were conducted for the purposes of conducting a systematic review. Hand searching of reference lists was also performed. Meta-analysis of observational studies involving periodontal disease and chronic kidney disease in adults was performed.

RESULTS:

A total of 17 studies were selected from an initial 4,055 abstracts. Pooled estimates indicated the odds of having CKD were 60% higher among patients with periodontitis: pooled OR 1.60 (95% CI 1.44 - 1.79, I^2 35.2%, $P=0.11$) compared to those without. Conversely, a similar magnitude but non-significant higher odds of having periodontal disease was found among people with CKD 1.69 (95% CI: 0.84, 3.40, I^2 =89.8%, $P<0.00$) versus non-CKD. Meta-regression revealed study quality based on the Newcastle-Ottawa Scale and statistical adjustment for potential confounders explained almost 35% of the heterogeneity in the studies investigating the association between CKD and periodontitis.

CONCLUSIONS:

Moderate evidence for a positive association between periodontitis and CKD exists. Evidence for the opposite direction is extremely weak based on significant heterogeneity between studies.

Periodontal disease and Diabetes

Clin Periodontol. 2018 Apr 3. doi: 10.1111/jcpe.12902.

Association between periodontal disease and gestational diabetes mellitus-A prospective cohort study.

Kumar A¹, Sharma DS¹, Verma M², Lamba AK², Gupta MM¹, Sharma S³, Perumal V⁴.

AIM:

This study aimed to determine the association between periodontal disease and gestational diabetes mellitus (GDM) and the effect of this association on pregnancy outcome in North Indian population.

MATERIALS AND METHODS:

A total of 584 primigravidae were recruited at 12-14 weeks of gestation. Their periodontal examination was carried out along with 75 g oral glucose load test at the time of recruitment. GDM was diagnosed as per the DIPSI (The Diabetes in Pregnancy Study group India) guidelines (≥ 140 mg/dl). Women with normal plasma glucose values underwent a repeat 75 g oral glucose load test at 24-28 weeks of gestation. All patients were followed up for pregnancy outcomes.

RESULTS:

Of 584 primigravida, 184 (31.5%) had gingivitis and 148 (25.3%) had periodontitis. Overall, 332 (56.8%) pregnant women had periodontal disease. It was associated with GDM with adjusted hazard ratio (aHR) of 2.85 (95%CI = 1.47-5.53). The occurrence of pre-eclampsia was associated with periodontal disease with aHR of 2.20 (95%CI = 0.86-5.60). If primigravidae had periodontal disease along with GDM, the risk of pre-eclampsia had shown increased aHR of 18.79 (95% CI = 7.45-47.40).

CONCLUSIONS:

The study shows a significant association of periodontal disease with GDM and an increased risk of developing pre-eclampsia due to this association.

Psychosocial and caries

Int J Paediatr Dent. 2018 Jun 21. doi: 10.1111/ipd.12375.

Protective psychosocial factors and dental caries in children and adolescents: a systematic review and meta-analysis.

da Silva AN¹, Alvares de Lima ST², Vettore MV³.

BACKGROUND:

Psychosocial protective factors include dispositional and family attributes that may reduce the occurrence of dental caries.

AIM:

This review analysed the evidence on the relationship between protective psychosocial factors and dental caries in children and adolescents.

DESIGN:

Primary studies involving children and adolescents were searched in the following electronic databases: Medline, SCOPUS, LILACS, SciELO, and Web of Science. The reference lists were also screened. Protective psychosocial factor descriptors were in accordance with the salutogenic theory. The outcome was clinical measure of dental caries. Quality assessments were performed using the Newcastle-Ottawa scale.

RESULTS:

The final search resulted in 35 studies, including 7 cohort, one case-control, and 27 cross-sectional studies. Most studies were of moderate quality. Meta-analyses revealed that low parental internal locus of control (cohort studies: OR = 1.42, 95% CI: 1.20-1.64; cross-sectional studies: OR = 1.30, 95% CI: 1.19-1.41), high parental external chance (OR = 1.20, 95% CI: 1.10-1.29), and high maternal sense of coherence (OR = 0.77, 95% CI: 0.62-0.93) were associated with dental caries in children. High social support (OR = 0.81, 95% CI: 0.68-0.93) and greater self-efficacy (OR = 1.50, 95% CI: 1.12-1.22) were also associated with dental caries in adolescents.

CONCLUSIONS:

The current evidence suggests that some salutogenic factors are important protective factors of dental caries during childhood and adolescence.

Precocious puberty

Int J Paediatr Dent. 2018 Jun 21. doi: 10.1111/ipd.12374.

Malocclusion and maxillofacial characteristics of young girls having precocious puberty.

de Paula Júnior DF¹, Mendonça EF², da Costa PSS³, Leles CR⁴.

AIM:

This study aimed to evaluate the dentofacial characteristics and need for orthodontic treatment in young girls having precocious puberty (PP).

DESIGN:

It was a cross-sectional study that included 39 girls, age ranging from 6 to 11 years old, with confirmed diagnosis of PP. The Dental Aesthetic Index (DAI) and the Index of Orthodontic Treatment Need (IOTN) were used to assess malocclusion and the need for orthodontic treatment, and cephalometric analysis was used for the diagnosis of facial growth abnormalities. Data analysis included descriptive statistics and one-sample t-test.

RESULTS:

Findings revealed high prevalence (64.1%) of severe and very severe malocclusion (DAI grades 3-4), and 82.1% of cases were classified as having moderate to high treatment need (IOTN grades 3-4). All linear cephalometric measures and most of the angular parameters differed significantly from the reference values, indicating a tendency for Class II molar relationship. There was a high proportion of the sample outside the reference value limits, ranging from 79.5% of cases below the reference limits for facial height to 59.0% of cases above the limits for incisor-mandibular plane angle.

CONCLUSIONS:

Results suggest that dental and craniofacial development may be associated with PP in young girls, which may be considered in the diagnosis and treatment decisions for orthopaedic/orthodontic intervention.

PrP and mobilization of TMJ

J Med Case Rep. 2018 May 27;12(1):148. doi: 10.1186/s13256-018-1637-8.

Anterior disc derangement with reduction of the temporomandibular joint: a case report.

Crockett KL^{1,2}, Bourassa R^{3,4}, Friesen T³.

BACKGROUND:

Temporomandibular dysfunction involving anterior disc derangement with or without reduction, secondary to posterior ligament insufficiency is typically managed conservatively with success in a majority of patients. When conservative management fails, the next step in the continuum of care is unclear. Platelet-rich plasma injection combined with a 3-week immobilization period may be effective in treating posterior ligament insufficiency following a period of physical therapy. The result of this case was exceptionally successful, with the patient reporting 100% improvement 6 months post-injection. Prior to this case, we predicted a 20% success rate based on her inability to maintain the effects of conservative management over the long term.

CASE PRESENTATION:

A 33-year-old white woman presented with temporomandibular dysfunction, which responded to an initial course of physical therapy aimed at restoring the mechanics of her temporomandibular joint, exercise management, and education on self-management strategies. She returned 20 months later and responded well to another course of physical therapy. Despite improvement in pain, range of motion, and mechanics, she continued to present with a reduction click at the end range of opening. The crisp and loud nature of the reduction click indicated a viable posterior ligament and reduction of the anteriorly displaced disc. She opted for platelet-rich plasma injection, provided by a chronic pain specialist with the assistance of a physical therapist. She was immobilized for 3 weeks, followed by a weaning period with reduced posterior support for an additional 5 weeks. Follow-up appointments with a physical therapist occurred at 3 weeks, 8 weeks, and 6 months post-injection.

CONCLUSIONS:

At 6 months, she reported 100% improvement. Objectively, there was no indication that the disc condyle relationship was disrupted. At 6 months post-platelet-rich plasma injection, preceded by a period of conservative physical therapy management, and followed with appropriate physical therapy follow-up, this individual had complete resolution of her anterior disc derangement with reduction.

13 C. AIRWAYS/SWALLOWING/SPEECH**Sleep conditions**

Auris Nasus Larynx. 2018 Jun 19. pii: S0385-8146(18)30106-8. doi: 10.1016/j.anl.2018.06.003.

Sleep hygiene-related conditions in patients with mild to moderate obstructive sleep apnea.

Jung SY¹, Kim HS¹, Min JY¹, Hwang KJ², Kim SW³.

OBJECTIVE:

Sleep hygiene-related conditions are factors that affect the symptoms experienced by patients with obstructive sleep apnea (OSA). However, very few studies have investigated the association between sleep hygiene and sleep symptoms, especially in patients with mild or moderate OSA. This study evaluated the relationship between factors related to sleep hygiene and clinical symptoms in patients with mild to moderate OSA.

METHODS:

One hundred and seventy-four patients who visited the Sleep Breathing Disorder Center at a tertiary academic center to evaluate suspected OSA were included. All patients underwent standard polysomnography (PSG) and the Epworth sleepiness scale (ESS) and questionnaires related to daytime and nighttime symptoms and sleep hygiene. Medical records were reviewed for demographic, clinical, and PSG parameters. Correlation analysis between sleep hygiene-related conditions and clinical symptoms in patients with mild to moderate OSA was performed.

RESULTS:

The correlation analysis between the nine categories of sleep hygiene and the three categories of clinical symptoms showed that, in the case of inadequate temperature and humidity conditions, the three categories of clinical symptoms were more severe (daytime symptoms $r=0.382$, nighttime symptoms $r=0.568$, ESS score $r=0.321$). Drinking alcohol before sleep (daytime symptoms $r=0.457$, nighttime symptoms $r=0.649$, ESS score $r=0.301$) and emotional excitement or arousal (daytime symptoms $r=0.378$, nighttime symptoms $r=0.545$, ESS score $r=0.341$) were correlated with greater severity of each of the clinical symptoms ($p<0.05$).

CONCLUSION:

Among the factors of sleep hygiene-related conditions, inadequate temperature and humidity, drinking alcohol before sleep, and emotional excitement or arousal were associated with symptoms of mild to moderate OSA. This study supports the hypothesis that patients with mild to moderate OSA can experience symptom relief if they are trained to correct lifestyle habits to maintain adequate sleep hygiene-related conditions.

Atrial Fib and sleep quality

Original Article

Associations of Sleep Quality with Incident Atrial fibrillation: A Meta-AnalysisRonpichai Chokesuwattanaskul MD Charat Thongprayoon MD Konika Sharma MB,
BS Soontharee Congrete MD Tanyanan Tanawuttiwat MD Wisit Cheungpasitporn MD<https://doi.org/10.1111/imj.13764>

Background/Objectives

The strong relationship between sleep apnea and atrial fibrillation (AF) is well-known. However, it remains unclear whether the sleep quality are related with AF. We performed this systematic review and meta-analysis to evaluate the associations of sleep duration, insomnia and frequent awakening with AF.

Methods

A systematic review was conducted in MEDLINE, EMBASE, Cochrane databases from inception through September 2017 to identify studies that evaluate the risk of AF in adults with short sleep duration, long sleep duration, insomnia, and/or frequent awakening. Effect estimates from the individual study were extracted and combined using random-effect, generic inverse variance method of DerSimonian and Laird.

Results

Ten observational studies (14,296,314 patients) were enrolled. The pooled ORs of AF in individuals with short sleep (<6 hours) and long sleep (>8 hours) were 1.20 (95% confidence interval (CI), 0.93-1.55, $I^2=66%$) and 1.24 (95% CI, 0.96-1.62, $I^2=58%$), respectively. There was no association between increase in sleep duration and AF, with a pooled OR of 0.97 (95% CI, 0.84-1.12, $I^2=0%$). However, there were significant associations of AF with insomnia and frequent awakening, with a pooled ORs of 1.30 (95% CI, 1.26-1.35, $I^2=3%$) and 1.36 (95% CI, 1.13-1.63, $I^2=55%$), respectively.

Conclusions

Our findings suggest an absence in association between AF and sleep duration but reveal the potential association between AF and both insomnia and frequent nocturnal awakening. As such, the further studies on association of AF and sleep qualities are warrant.

14. HEADACHES

Brain changes

The Journal of Headache and Pain December 2018, 19:48|

Exploration of intrinsic brain activity in migraine with and without comorbid depression

Mengmeng Ma Junran Zhang Ning Chen Jian Guo Yang Zhang Li He

Background

Major depressive disorder is a common comorbidity in migraineurs. Depression may affect the progression and prognosis of migraine. Few studies have examined the brain function in migraineurs that may cause this comorbidity. Here, we aimed to explore depression-related abnormalities in the intrinsic brain activity of interictal migraineurs with comorbid depression using resting-state functional magnetic resonance imaging.

Results

Significant main effects of migraine and depression provided evidence that migraine and depression jointly affected the left medial prefrontal cortex, which was thought to be the neural basis of self-referential mental activity in previous studies. Abnormalities in this region may contribute to determining the common symptoms of migraine and depression and even result in comorbidity. Additionally, migraineurs with comorbid depression had different developmental trajectories in the right thalamus and fusiform, which were associated with recognizing, transmitting, controlling and remembering pain and emotion.

Conclusions

Based on our findings, the abnormal mPFC which may contribute to determining the common symptoms in migraine and depression and may be a therapeutic target for migraineurs comorbid depression. The different developmental trajectory in thalamus and fusiform indicates that the comorbidity may arise through a specific mechanism rather than simple superposition of migraine and depression.

Aura

Headache. 2018 Jun 22. doi: 10.1111/head.13347.

Impact of Aura and Status Migrainosus on Readmissions for Vascular Events After Migraine Admission.

Velickovic Ostojic L¹, Liang JW², Sheikh HU¹, Dhamoon MS³.

OBJECTIVE:

-To estimate readmission rates for acute ischemic stroke (AIS), transient ischemic attack (TIA), subarachnoid hemorrhage, and intracerebral hemorrhage after an index admission for migraine, using nationally representative data.

METHODS:

-The Nationwide Readmissions Database was designed to analyze readmissions for all payers and uninsured, with data on >14 million US admissions in 2013. We used International Classification of Diseases, Ninth Revision, Clinical Modification codes to identify index migraine admissions with and without aura or status migrainosus, and readmissions for cerebrovascular events. Cox proportional hazards regression was performed for each outcome with aura and status migrainosus as main predictors, adjusting for age and vascular risk factors.

RESULTS:

-Out of 12,448 index admissions for migraine, 9972 (80.1%) were women, mean age was 45.5 ± 14.8 years, aura was present in 3038 (24.41%), and status migrainosus in 1798 (14.44%). The 30-day readmission rate (per 100,000 index admissions) was 154 for ischemic stroke, 86 for TIA, 42 for subarachnoid hemorrhage, and 17 for intracranial hemorrhage. In unadjusted models, aura was significantly associated with TIA (hazard ratio 2.43, 95% CI 1.39-4.24), but not AIS (1.26, 0.73-2.18), intracranial hemorrhage (1.86, 0.45-7.79) or subarachnoid hemorrhage (1.85, 0.44-7.75). When adjusting for age and vascular risk factors, aura remained significantly associated with TIA (2.13, 1.22-3.74). Status, in adjusted models, was significantly associated with subarachnoid hemorrhage readmission (4.83, 1.09-21.42).

CONCLUSIONS:

-In this large, nationally representative retrospective cohort study, migraine admission with aura was independently associated with TIA readmission, and status migrainosus was independently associated with subarachnoid hemorrhage. Further research would clarify the role of misdiagnosis and causal relationships underlying these strong associations.

25. WRIST AND HAND

PT and thumb pain

Musculoskelet Sci Pract. 2018 Jun;35:46-54. doi: 10.1016/j.msksp.2018.02.005. Epub 2018 Feb 21.

The effectiveness of physical therapies for patients with base of thumb osteoarthritis: Systematic review and meta-analysis.

Ahern M¹, Skyllas J², Wajon A³, Hush J⁴.

BACKGROUND:

Trapeziometacarpal osteoarthritis (known as base of thumb OA) is a common condition causing pain and disability worldwide.

OBJECTIVE:

The purpose of this review was to evaluate the effectiveness of multimodal and unimodal physical therapies for base of thumb osteoarthritis (OA) compared with usual care, placebo or sham interventions.

DESIGN:

Systematic review and meta-analysis.

METHOD:

We searched MEDLINE (PubMed), CINAHL, Embase, AMED, PEDro, Cochrane Database of Systematic Review, Cochrane Register of Controlled Trials (CENTRAL) from inception to May 2017. Randomized controlled trials involving adults comparing physical therapy treatment for base of thumb OA with an inactive control (placebo or sham treatment) and reported pain, strength or functional outcomes were included. Meta-analyses were performed where possible. Methodological risk of bias was assessed with the Cochrane Risk of Bias tool.

RESULTS:

Five papers with low risk of bias were included. Meta-analyses of mean differences (MD) with 95% confidence intervals (95% CI), were calculated for between-group differences in point estimates at 4 weeks post-intervention. Multimodal and unimodal physical therapies resulted in clinically worthwhile improvements in pain intensity (MD 2.9 [95% CI 2.8 to 3.0]; MD 3.1 [95% CI 2.5 to 3.8] on a 0-10 scale, respectively). Hand function improved following unimodal treatments (MD 6.8 points [95% CI 1.7 to 11.9] on a 0-100 scale) and after a multimodal treatment (MD 20.5 (95%CI -0.7 to 41.7).

CONCLUSIONS:

High quality evidence shows unimodal and multimodal physical therapy treatments can result in clinically worthwhile improvements in pain and function for patients with base of thumb OA.

26. CARPAL TUNNEL SYNDROME**Determining outcomes**

The Journal of Hand Surgery

Scientific article

Predicting Clinical Outcome After Surgical Treatment in Patients With Carpal Tunnel Syndrome

- M.C. Jansen, MSc^{*,†,‡}, S. Evers, MD^{*,†}, H.P. Slijper, PhD^{*,‡}, K.P. de Haas, MD[‡], X. Smit, MD, PhD^{*,‡}, S.E. Hovius, MD, PhD^{*,‡}, R.W. Selles, PhD^{*,†}
- <https://doi.org/10.1016/j.jhsa.2018.05.017>

Purpose

Carpal tunnel release (CTR) is typically offered to symptomatic patients with electrophysiological abnormalities when night orthoses no longer prevent waking with numbness and preferably before there is any static numbness, weakness, or atrophy. The ability to predict the amount of symptom relief after CTR could be beneficial for managing patient expectations and, therefore, improve treatment satisfaction. Therefore, the aim of this study was to identify predictors for symptom relief after CTR and to determine their contribution to symptom relief at 6 months after surgery.

Methods

A total of 1,049 patients who underwent CTR between 2011 and 2015 at 1 of 11 Xpert Clinics in the Netherlands were asked to complete online questionnaires at intake and 3 and 6 months after surgery. Patient demographics, comorbidities, and baseline scores were considered potential predictors for the amount of symptom relief on the Boston Carpal Tunnel Questionnaire (BCTQ) score, which was the primary outcome measure.

Results

A low score on the BCTQ at intake, a codiagnosis of a trigger finger, ulnar nerve neuropathy, trapeziometacarpal joint arthrosis, and instability or arthrosis of the wrist were associated with a smaller improvement in the BCTQ domains after a CTR at 6 months after surgery and accounted for 35% to 42% of the variance on the BCTQ domains in our multivariable regression models.

Conclusions

In this study, we showed that clinical severity of carpal tunnel syndrome at intake is the most important factor in estimating symptom relief after surgical treatment. Furthermore, this study contributes to a more precise understanding of the capabilities of CTR in relieving symptoms for different subgroups of patients. Results of our study can be used to manage patient expectation on symptom relief from CTR.

29. OA**HA helpful**

Eur J Orthop Surg Traumatol. 2018 Jul;28(5):915-922. doi: 10.1007/s00590-017-2083-9. Epub 2017 Nov 21.

Efficacy of a single intra-articular injection of ultra-high molecular weight hyaluronic acid for hip osteoarthritis: a randomized controlled study.

Clementi D¹, D'Ambrosi R^{2,3}, Bertocco P¹, Bucci MS⁴, Cardile C⁵, Ragni P⁴, Giaffreda G¹, Ragone V⁶.

BACKGROUND:

Viscosupplementation with hyaluronic acid (HA) is increasingly used for the treatment of hip osteoarthritis (OA). The purpose of this study was to compare the efficacy of intra-articular injections of an ultra-high molecular weight viscosupplement (UHMW-HA, Fermathron S) with a medium molecular weight hyaluronan (MMW-HA, Hyalubrix 60) in hip OA.

METHODS:

Fifty-four patients with hip OA grade 3 on the Kellgren/Lawrence scale were randomized. All infiltrations were performed under ultrasound guidance. Evaluation was performed preoperatively and at 1, 3, 6 and 12 months after infiltration. Patients were clinically evaluated using Lequesne index, VAS and WOMAC score.

RESULTS:

Fifty patients, including 27 in the MMW-HA group and 23 in the UHMW-HA group, completed the follow-up. No significant difference was found between the two groups in terms of VAS, WOMAC or Lequesne index preoperatively or at 1, 3, 6 and 12 months after viscosupplementation. A stratified analysis was performed to study the development over time of Lequesne index of patients aged ≤ 55 years, > 55 and ≤ 70 years and > 70 years and Lequesne index was different between the three age-stratified subgroups only in the MMW-HA group. The subgroup of older patients showed a higher Lequesne index than the subgroups of younger patients ($p < 0.05$).

CONCLUSIONS:

UHMW-HA is a safe and effective treatment for hip osteoarthritis. A single dose of UHMW-HA was as effective as two doses of MMW-HA resulting in similar reductions of pain and disability.

32 A. KNEE/ACL

Closed vs open

RESEARCH REPORT**The Effect of Open- Versus Closed-Kinetic-Chain Exercises on Anterior Tibial Laxity, Strength, and Function Following Anterior Cruciate Ligament Reconstruction: A Systematic Review and Meta-analysis**

Authors: Alyssa Perriman, PT, BPT^{1,2}, Edmund Leahy, PT, MPhty^{2,3}, Adam Ivan Semciw, PT, PhD⁴⁻⁷

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Background

There is controversy surrounding the early use of open-kinetic-chain (OKC) quadriceps-strengthening exercises following anterior cruciate ligament reconstruction (ACLR) due to the belief that increased strain on the graft could cause damage.

Objectives

To determine whether OKC quadriceps exercises result in differences in anterior tibial laxity, strength, function, quality of life, or adverse events in the ACLR population, when compared to closed-kinetic-chain (CKC) quadriceps exercises.

Methods

Seven electronic databases (MEDLINE, Embase, AMED, CINAHL, SPORTDiscus, PEDro, and the Cochrane Central Register of Controlled Trials) were searched through April 2017. A systematic review with meta-analysis was conducted on randomized controlled trials comparing OKC versus CKC exercises following ACLR. Outcomes of interest were tibial laxity, strength, and function. A methodological quality assessment of the included studies was completed, and the results were synthesized using meta-analysis and the Grading of Recommendations Assessment, Development and Evaluation (GRADE) approach.

Results

Ten studies were included in the review. The meta-analysis demonstrated low- to moderate-quality evidence of no between-group differences in anterior tibial laxity, strength, or patient-reported function at any time point. Meta-analysis was unable to be performed for functional outcomes.

Conclusion

There was limited to moderate-quality evidence of no difference in anterior tibial laxity, strength, patient-reported function, or physical function with early or late introduction of OKC exercises in the ACLR population, when compared to CKC exercises, at all follow-up time points.

Level of Evidence

Therapy, level 1a. *J Orthop Sports Phys Ther* 2018;48(7):552–566. Epub 23 Apr 2018.
doi:10.2519/jospt.2018.7656

Keyword: knee, physical therapy, rehabilitation

Jump training

Am J Sports Med. 2018 Jun;46(7):1650-1660. doi: 10.1177/0363546518759052. Epub 2018 Mar 20.

Clinical Efficacy of Jump Training Augmented With Body Weight Support After ACL Reconstruction: A Randomized Controlled Trial.

Elias ARC¹, Harris KJ², LaStayo PC^{3,4}, Mizner RL¹.

BACKGROUND:

Limited knee flexion and increased muscle co-contraction during jump landing are believed to diminish outcomes after anterior cruciate ligament (ACL) reconstruction. The efficacy of jump training to improve patients' mechanical and neuromuscular deficits is understudied.

HYPOTHESIS:

Jump training will improve functional, mechanical, and neuromuscular outcomes and higher repetition training augmented by body weight support will result in better retention of gains.

STUDY DESIGN:

Randomized controlled trial; Level of evidence, 1.

METHODS:

Thirty athletes (18 months after surgery) were screened, and 19 with mechanical deficits and limited clinical outcomes were enrolled in the trial. Testing included the International Knee Documentation Committee (IKDC) questionnaire, leg landing mechanics via motion analysis, knee joint effusion using a stroke test, and a surface electromyography-generated co-contraction index during a single-legged landing. Participants were randomly assigned to 1 of 2 groups: jump training with normal body weight (JTBW) and high-repetition jump training with body weight support (JTBS). Knee effusion grading throughout training was used to assess joint tolerance. Changes in outcomes over time were analyzed with mixed-effects modeling. Immediate outcomes were compared with retention testing at 8 weeks after training by use of 2-way analyses of variance with effects of time and group.

RESULTS:

Significant effects of time were found during the training phase for all outcome measures, but no effects of group or sex were found. IKDC score (pooled; mean \pm SD) increased from 76 ± 12 to 87 ± 8 ($P < .001$). Knee flexion during single-legged landing increased from $57^\circ \pm 11^\circ$ to $73^\circ \pm 9^\circ$ ($P < .001$). Average co-contraction index decreased from 37 ± 15 to 19 ± 6 ($P < .001$). All measures were retained over the retention period in both groups. The relative risk of knee effusion of the JTBW group versus the JTBS group was 4.2 (95% CI, 2.25-7.71; $P < .001$).

CONCLUSION:

Jump training mitigated some risk factors for second injury and osteoarthritis in patients after ACL reconstruction. Training made lasting improvements in physical function measures as well as mechanical and neuromuscular coordination deficits. Higher repetitions used with body weight support did not improve retention but substantially reduced risk for effusion.

CLINICAL RELEVANCE:

Jump training is an efficacious intervention for athletes with poor outcomes after ACL reconstruction, and training with body weight support lessens the risk for excessive joint stress during practice. Registration: NCT02148172 (ClinicalTrials.gov identifier).

Rotary laxity

Knee Surgery, Sports Traumatology, Arthroscopy pp 1–8|

High-grade rotatory knee laxity may be predictable in ACL injuries

- Volker Musahl Jeremy Burnham Jayson Lian Adam Popchak Eleonor Svantesson
Ryosuke Kuroda Stefano Zaffagnini Kristian Samuelsson

Purpose

Lateral compartment acceleration and translation have been used to quantify rotatory knee laxity in the setting of anterior cruciate ligament (ACL) injury; however, their relationship remains elusive. The purpose of this study was to examine the correlation between lateral compartment acceleration and translation during pivot shift testing. It was hypothesized that a correlation would exist in ACL-injured and uninjured knees, irrespective of sex, but would be greatest in knees with combined ACL and lateral meniscus tear.

Methods

Seventy-seven patients (34 females, 25.2 ± 9.0 years) undergoing primary single-bundle ACL reconstruction were prospectively enrolled in a 2-year study across four international centers. Patients underwent preoperative examination under anesthesia of the injured and uninjured knee using Image Analysis software and surface mounted accelerometer.

Results

A moderate correlation between lateral compartment acceleration and translation was observed in ACL-injured knees [$\rho = 0.36$, $p < 0.05$], but not in uninjured knees ($\rho = 0.17$, not significant (n.s.)). A moderate correlation between acceleration and translation was demonstrated in ACL-injured knees with lateral meniscus tears ($\rho = 0.53$, $p < 0.05$), but not in knees with isolated ACL-injury ($\rho = 0.32$, n.s.), ACL and medial meniscus tears ($\rho = 0.14$, n.s.), or ACL and combined medial and lateral meniscus tears ($\rho = 0.40$, n.s.). A moderate correlation between acceleration and translation was seen in males ($\rho = 0.51$, $p < 0.05$), but not in females ($\rho = 0.21$, n.s.). Largest correlations were observed in males with ACL and lateral meniscus tears ($\rho = 0.75$, $p < 0.05$).

Conclusion

Lateral compartment acceleration and translation were moderately correlated in ACL-injured knees, but largely correlated in males with combined ACL and lateral meniscus tears. ACL and lateral meniscus injury in males might, therefore, be suspected when both lateral compartment acceleration and translation are elevated. Surgeons should have a greater degree of suspicion for high-grade rotatory knee laxity in ACL-injured males with concomitant lateral meniscus tears. Future studies should investigate how these two distinct components of rotatory knee laxity—lateral compartment acceleration and translation—are correlated with patient outcomes and affected by ACL surgery.

33. MENISCUS

Option of care for tears

World J Orthop. 2014 Jul 18; 5(3): 233–241.

Published online 2014 Jul 18. doi: 10.5312/wjo.v5.i3.233 PMID: PMC4095015

PMID: 25035825

Treatment of meniscal tears: An evidence based approach

Simon C Mordecai, Nawfal Al-Hadithy, Howard E Ware, and Chinmay M Gupte

Abstract

Treatment options for meniscal tears fall into three broad categories; non-operative, meniscectomy or meniscal repair. Selecting the most appropriate treatment for a given patient involves both patient factors (e.g., age, co-morbidities and compliance) and tear characteristics (e.g., location of tear/age/reducibility of tear). There is evidence suggesting that degenerative tears in older patients without mechanical symptoms can be effectively treated non-operatively with a structured physical therapy programme as a first line. Even if these patients later require meniscectomy they will still achieve similar functional outcomes than if they had initially been treated surgically. Partial meniscectomy is suitable for symptomatic tears not amenable to repair, and can still preserve meniscal function especially when the peripheral meniscal rim is intact. Meniscal repair shows 80% success at 2 years and is more suitable in younger patients with reducible tears that are peripheral (e.g., nearer the capsular attachment) and horizontal or longitudinal in nature.

However, careful patient selection and repair technique is required with good compliance to post-operative rehabilitation, which often consists of bracing and non-weight bearing for 4-6 wk.

Keywords: Meniscus, Meniscectomy, Meniscal tear, Meniscal repair, Arthroscopic surgery

34. PATELLA**Shoes in runners**

J Sci Med Sport. 2018 Jun;21(6):574-578. doi: 10.1016/j.jsams.2017.09.593. Epub 2017 Oct 6.

The influence of cadence and shoes on patellofemoral joint kinetics in runners with patellofemoral pain.

Bonacci J¹, Hall M², Fox A³, Saunders N³, Shippersides T⁴, Vicenzino B⁵.

OBJECTIVES:

To determine the effect of a combination of a minimalist shoe and increased cadence on measures of patellofemoral joint loading during running in individuals with patellofemoral pain.

DESIGN:

Within-participant repeated measures with four conditions presented in random order: (1) control shoe at preferred cadence; (2) control shoe with +10% cadence; (3) minimalist shoe at preferred cadence; (4) minimalist shoe with +10% cadence.

METHODS:

Fifteen recreational runners with patellofemoral pain ran on an instrumented treadmill while three-dimensional motion capture data were acquired. Peak patellofemoral joint stress, joint reaction force, knee extensor moment and knee joint angle during the stance phase of running were calculated. One-way repeated measures ANOVA was used to compare the control condition (1) to the three experimental conditions (2-4).

RESULTS:

Running in a minimalist shoe at an increased cadence reduced patellofemoral stress and joint reaction force on average by approximately 29% ($p < 0.001$) compared to the control condition. Running in a minimalist shoe at preferred cadence reduced patellofemoral joint stress by 15% and joint reaction force by 17% ($p < 0.001$), compared to the control condition. Running in control shoes at an increased cadence reduced patellofemoral joint stress and joint reaction force by 16% and 19% ($p < 0.001$), respectively, compared to the control condition.

CONCLUSIONS:

In individuals with patellofemoral pain, running in a minimalist shoe at an increased cadence had the greatest reduction in patellofemoral joint loading compared to a control shoe at preferred cadence. This may be an effective intervention to modulate biomechanical factors related to patellofemoral pain.

35. KNEE/TOTAL**Gait changes**

J Arthroplasty. 2011 Aug; 26(5): 728–737.

doi: 10.1016/j.arth.2010.06.004 PMID: PMC3008304 NIHMSID: NIHMS216953

PMID: 20851566

Measuring Functional Improvement after Total Knee Arthroplasty Requires both Performance-Based and Patient-Report Assessments: A Longitudinal Analysis of Outcomes

Ryan L. Mizner, PhD, PT,^{1,2} Stephanie C. Petterson, PhD, PT,¹ Katie E. Clements, PT, DPT,¹ Joseph A Zeni, Jr., PhD, PT,¹ James Irrgang, PhD, PT, ATC,³ and Lynn Snyder-Mackler, ScD, PT, ATC¹

The purpose was to explore the responsiveness of both patient-report and performance-based outcome measures to determine functional changes during the acute and long-term postoperative recovery after total knee arthroplasty (TKA).

One hundred patients scheduled for unilateral TKA underwent testing preoperatively, 1 month, and 12 months postoperatively using the Delaware Osteoarthritis Profile. All physical performance measures decreased initially after surgery then increased in the long term, however the perceived function did not follow the same trend and some showed an increase immediately after surgery.

Patient-report measures were variable with no to small response early, but had excellent long-term responsiveness that was twice as large as performance measures. Patient perception fails to capture the acute functional declines after TKA and may overstate the long-term functional improvement with surgery.

37. OSTEOARTHRITIS/KNEE**Pain sensitization**

Pain. 2018 May 22. doi: 10.1097/j.pain.0000000000001288. [Epub ahead of print]

Pain Sensitization Associated with Non-Response Following Physiotherapy in People with Knee Osteoarthritis.

O'Leary H¹, Smart KM², Moloney NA³, Blake C⁴, Doody CM⁴.

In knee osteoarthritis (OA) pain sensitization has been linked to a more severe symptomatology, but the prognostic implications of pain sensitivity in people undergoing conservative treatment such as physiotherapy are not established.

This study aimed to prospectively investigate the association between features of pain sensitization and clinical outcome (non-response) following guideline-based physiotherapy in people with knee OA. Participants (n=156) with moderate/severe knee OA were recruited from secondary care. All participants completed self-administered questionnaires and underwent quantitative sensory testing (QST) at baseline, thereby establishing subjective and objective measures of pain sensitization. Participants (n=134) were later classified following a physiotherapy intervention, using treatment responder criteria (responder/non-responder). QST data was reduced to a core set of latent variables using principal component analysis. A hierarchical logistic regression model was constructed to investigate if features related to pain sensitization predicted non-response after controlling for other known predictors of poor outcome in knee OA. Higher temporal summation (TS) (OR 2.00, 95% CI 1.23 to 3.27) and lower pressure pain thresholds (PPT) (OR 0.48, 95% CI 0.29 to 0.81) emerged as robust predictors of non-response following physiotherapy, along with a higher comorbidity score.

The model demonstrated high sensitivity (87.8%) but modest specificity (52.3%). The independent relationship between pain sensitization and non-response may indicate an underlying explanatory association between neuroplastic changes in nociceptive processing and the maintenance of on-going pain and disability in knee OA pain.

These preliminary results suggest interventions targeting pain sensitization may warrant future investigation in this population.

PMID: 29794610 DOI: 10.1097/j.pain.0000000000001288

Comorbidities related to pain

Semin Arthritis Rheum. 2018 Jun;47(6):805-813. doi: 10.1016/j.semarthrit.2017.10.016. Epub 2017 Oct 31.

Presence of comorbidities and prognosis of clinical symptoms in knee and/or hip osteoarthritis: A systematic review and meta-analysis.

Calders P¹, Van Ginckel A².

Author information

Abstract

OBJECTIVE:

(i) To determine the association between the presence of comorbidities and severity of pain and physical dysfunction in people with knee and/or hip osteoarthritis; (ii) to explore associations between specific comorbidities (cardiac disease and/or hypertension, diabetes, depression, and back pain) and symptom severity.

METHODS:

Studies were identified through systematic searches in four electronic databases and grey literature, and, subsequently, methodologically appraised. Eligible citations entailed cross-sectional or longitudinal studies as well as randomised controlled trials providing data of a direct association between comorbidity presence and the severity of self-reported and/or performance-based symptoms of pain and/or physical functioning, in people with knee and/or hip osteoarthritis. We performed random-effects meta-analysis if at least two citations of low-to-moderate risk of bias were available. The quality of the body of evidence was determined using Cochrane-recommended methods.

RESULTS:

Of all eligible citations (n = 26), 17 studies were entered in meta-analysis. Moderate quality evidence revealed an association between having ≥ 1 general comorbidity and worsening of pain (regression coefficient (95% confidence interval (CI)): 0.18 (95% CI: 0.14,0.22)) and/or performance-based physical functioning (0.20 (95% CI: 0.10,0.29)). The presence of cardiac disease and/or hypertension (self-reported: 0.08 (95% CI: 0.01,0.16); performance-based: 0.11 (95% CI: 0.02,0.20)), or back pain (self-reported: 0.12 (95% CI: 0.04,0.20)) predicted deteriorated physical functioning. Co-existing diabetes was associated with worse pain (0.10 (95% CI: 0.02,0.17)). Other findings were non-significant and/or the evidence of poor quality.

CONCLUSIONS:

Greater comorbidity burden contributes to worse pain and performance-based physical function in people with knee and/or hip osteoarthritis. Suffering comorbid cardiac disease including hypertension, back pain or diabetes may have differential effects on symptom severity.

40. ANKLE SPRAINS AND INSTABILITY

Surgical considerations

Surgical management of chronic lateral ankle instability: a meta-analysis

- Yongxing Cao, Yuan Hong, Yang Xu, Yuan Zhu and Xiangyang Xu

Journal of Orthopaedic Surgery and Research 2018 **13**:159

<https://doi.org/10.1186/s13018-018-0870-6>

Background

A key point to surgical treatment of chronic lateral ankle instability is choosing a suitable surgical procedure. The purpose of this meta-analysis was to compare different surgical techniques for management of chronic lateral ankle instability.

Methods

We searched the Cochrane Library, MEDLINE, and EMBASE. All identified randomized and quasi-randomized controlled trials of operative treatment for chronic lateral ankle instability were included. Two review authors independently extracted data from each study and assessed risk of bias. Where appropriate, results of comparable studies were pooled.

Results

Seven randomized controlled trials were included for analysis. They fell in five clearly distinct groups. One study comparing two different kinds of non-anatomic reconstruction procedures (dynamic and static tenodesis) found two clinical outcomes favoring static tenodesis: better clinical satisfaction and fewer subsequent sprains. Two studies compared non-anatomic reconstruction versus anatomic repairment. In one study, nerve damage was more frequent in non-anatomic reconstruction group; the other one reported that radiological measurement of ankle laxity showed that non-anatomic reconstruction provided higher reduction of talar tilt angle. Two studies comparing two anatomic repairment surgical techniques (transosseous suture versus imbrication) showed no significant difference in any clinical outcome at the follow-up except operation time. One study compared two different anatomic repairment techniques. They found that the double anchor technique was superior with respect to the reduction of talar tilt than single anchor technique. One study compared an anatomic reconstruction procedure with a modified Brostrom technique. Primary reconstruction combined with ligament advanced reinforcement system results in better patient-scored clinical outcome, at 2 years post-surgery, than the modified Brostrom procedure.

Conclusions

There is limited evidence to support any one surgical technique over another surgical technique for chronic lateral ankle instability, but based on the evidence, we could still get some conclusions: (1) There are limitations to the use of dynamic tenodesis, which obtained poor clinical satisfaction and more subsequent sprains. (2) Non-anatomic reconstruction abnormally increased inversion stiffness at the subtalar level as compare with anatomic repairment. (3) Multiple types of modified Brostrom procedures could acquire good clinical results. (4) Anatomic reconstruction is a better procedure for some specific patients.

41 A. ACHILLES TENDON AND CALF**Strengthening of**

Sports Med. 2018 May 15. doi: 10.1007/s40279-018-0932-2.

Rate of Improvement of Pain and Function in Mid-Portion Achilles Tendinopathy with Loading Protocols: A Systematic Review and Longitudinal Meta-Analysis.

Murphy M^{1,2,3}, Travers M^{4,5}, Gibson W⁴, Chivers P^{6,7}, Debenham J⁴, Docking S⁸, Rio E^{8,9}.

BACKGROUND:

Mid-portion Achilles tendinopathy is prevalent within both the athletic and non-athletic populations and loading protocols for Achilles tendinopathy are effective over time, though the rate of symptom change throughout rehabilitation is unknown.

OBJECTIVE:

The objective of this study was to determine the rate of change in pain and function over time in patients while completing a loading protocol for mid-portion Achilles tendinopathy.

METHODS:

A systematic review and longitudinal meta-analysis was conducted as per the Preferred Reporting Items for Systematic Reviews and Meta-Analyses guidelines. The databases PubMed, CINAHL (Ovid) and CINAHL (EBSCO) were searched for articles published from inception until 31 July, 2017. Our search focused on clinical trials and cohort studies examining changes in pain and function when completing a loading protocol for mid-portion Achilles tendinopathy. The primary outcome measure assessing pain and function was the Victorian Institute of Sports Assessment-Achilles (VISA-A) questionnaire.

RESULTS:

A total of 31 separate cohorts (24 studies) were eligible, with follow-up ranging from 2 weeks to 6 months. The data were pooled to create the mean (standard deviation) of change from baseline at each time point. The data demonstrated an improvement in pain and function as early as 2 weeks that appeared to peak at 12 weeks with a mean (standard deviation) of 21.11 (6.61) points of change on the VISA-A.

CONCLUSION:

The improvement in pain and function during rehabilitation suggests future research should be directed toward investigating contributing mechanisms as tendon structure on imaging does not change within 2 weeks and muscular hypertrophy is not seen for at least 4 weeks following the inception of a loading protocol. Systematic Review Registry: PROSPERO registration number: CRD42017062737 (

https://www.crd.york.ac.uk/PROSPERO/display_record.php?RecordID=62737).

42. PLANTAR SURFACE**Heel pain**

Musculoskeletal Care. 2018 May 15. doi: 10.1002/msc.1246.

Psychosocial variables and presence, severity and prognosis of plantar heel pain: A systematic review of cross-sectional and prognostic associations.

Drake C¹, Mallows A², Littlewood C³.

OBJECTIVE:

Plantar heel pain (PHP) is often disabling, and persistent symptoms are common. Psychosocial variables are known to affect pain and disability but the association of these factors with PHP has yet to be established. The purpose of the present systematic review was to determine if psychosocial variables are associated with the presence, severity and prognosis of PHP.

METHODS:

A systematic review of the literature and qualitative synthesis was carried out. Electronic searches of MEDLINE, CINAHL, SPORTDiscus, PsycINFO and EMBASE were undertaken from the inception of the respective databases up to November 2017. Any study design incorporating measurements of psychosocial variables with participants with plantar heel pain were included. The quality of included articles was appraised using the Newcastle Ottawa Scale.

RESULTS:

Five articles from four studies were included in the review, with a total of 422 participants. Moderate-level evidence suggested a clinically unimportant association with the incidence of PHP and depression, anxiety and stress, and limited evidence suggested a clinically unimportant association with job dissatisfaction. Moderate-level evidence suggested that there may also be an association between depression, anxiety, stress and catastrophization and PHP pain, and between depression, anxiety, stress, catastrophization and kinesiophobia and PHP function. We also found moderate-level evidence that a psychological disorder may be associated with a poorer outcome to shockwave therapy.

CONCLUSION:

In light of this review, the association of psychosocial variables and plantar heel pain cannot be ruled out. Given recommendations to adopt an individualized and stratified approach to other musculoskeletal conditions, clinicians should remain vigilant to their presence.

45 A. MANUAL THERAPY LUMBAR & GENERAL**Manipulation better than ex alone in LBP**

Pain. 2018 Jul;159(7):1297-1307. doi: 10.1097/j.pain.0000000000001211.

Spinal manipulation and exercise for low back pain in adolescents: a randomized trial.

Evans R¹, Haas M, Schulz C, Leininger B, Hanson L, Bronfort G.

Low back pain (LBP) is common in adolescence, but there is a paucity of high-quality research to inform care.

We conducted a multicenter randomized trial comparing 12 weeks of spinal manipulative therapy (SMT) combined with exercise therapy (ET) to ET alone. Participants were 185 adolescents aged 12 to 18 years with chronic LBP. The primary outcome was LBP severity at 12, 26, and 52 weeks. Secondary outcomes included disability, quality of life, medication use, patient- and caregiver-rated improvement, and satisfaction. Outcomes were analyzed using longitudinal linear mixed effect models. An omnibus test assessing differences in individual outcomes over the entire year controlled for multiplicity. Of the 185 enrolled patients, 179 (97%) provided data at 12 weeks and 174 (94%) at 26 and 52 weeks.

Adding SMT to ET resulted in a larger reduction in LBP severity over the course of 1 year ($P = 0.007$). The group difference in LBP severity (0-10 scale) was small at the end of treatment (mean difference = 0.5; $P = 0.08$) but was larger at weeks 26 (mean difference = 1.1; $P = 0.001$) and 52 (mean difference = 0.8; $P = 0.009$). At 26 weeks, SMT with ET performed better than ET alone for disability ($P = 0.04$) and improvement ($P = 0.02$). The SMT with ET group reported significantly greater satisfaction with care at all time points ($P \leq 0.02$). There were no serious treatment-related adverse events.

For adolescents with chronic LBP, spinal manipulation combined with exercise was more effective than exercise alone over a 1-year period, with the largest differences occurring at 6 months. These findings warrant replication and evaluation of cost effectiveness.

Manipulation and spinal loading

Spine J. 2018 Jun;18(6):1041-1052. doi: 10.1016/j.spinee.2018.01.008. Epub 2018 Jan 31.

Does the application site of spinal manipulative therapy alter spinal tissues loading?

Funabashi M¹, Nougrou F², Descarreaux M³, Prasad N⁴, Kawchuk GN⁵.

BACKGROUND CONTEXT:

Previous studies found that the intervertebral disc (IVD) experiences the greatest loads during spinal manipulation therapy (SMT).

PURPOSE:

Based on that, this study aimed to determine if loads experienced by spinal tissues are significantly altered when the application site of SMT is changed.

STUDY DESIGN:

A biomechanical robotic serial dissection study.

SAMPLE:

Thirteen porcine cadaveric motion segments.

OUTCOME MEASURES:

Forces experienced by lumbar spinal tissues.

METHODS:

A servo-controlled linear actuator provided standardized 300 N SMT simulations to six different cutaneous locations of the porcine lumbar spine: L2-L3 and L3-L4 facet joints (FJ), L3 and L4 transverse processes (TVP), and the space between the FJs and the TVPs (BTW). Vertebral kinematics were tracked optically using indwelling bone pins; the motion segment was removed and mounted in a parallel robot equipped with a six-axis load cell. Movements of each SMT application at each site were replayed by the robot with the intact specimen and following the sequential removal of spinal ligaments, FJs and IVD. Forces induced by SMT were recorded, and specific axes were analyzed using linear mixed models.

RESULTS:

Analyses yielded a significant difference ($p < .05$) in spinal structures loads as a function of the application site. Spinal manipulative therapy application at the L3 vertebra caused vertebral movements and forces between L3 and L4 spinal segment in the opposite direction to when SMT was applied at L4 vertebra. Additionally, SMT applications over the soft tissue between adjacent vertebrae significantly decreased spinal structure loads.

CONCLUSION:

Applying SMT with a constant force at different spinal levels creates different relative kinetics of the spinal segments and load spinal tissues in significantly different magnitudes.

PA mobilization improved disc diffusion rate

Article | OPEN | Published: 29 May 2018

Short-term increase in discs' apparent diffusion is associated with pain and mobility improvements after spinal mobilization for low back pain

- Paul Thiry, François Reumont, Jean-Michel Brismée & Frédéric Dierick

Scientific Reports volume 8, Article number: 8281 (2018)

Pain perception, trunk mobility and apparent diffusion coefficient (*ADC*) within all lumbar intervertebral discs (IVDs) were collected before and shortly after posterior-to-anterior (PA) mobilizations in 16 adults with acute low back pain.

Using a pragmatic approach, a trained orthopaedic manual physical therapist applied PA mobilizations to the participants' spine, in accordance with his examination findings. ADC_{all} was computed from diffusion maps as the mean of anterior (ADC_{ant}), middle (ADC_{mid}), and posterior (ADC_{post}) portions of the IVD. After mobilization, pain ratings and trunk mobility were significantly improved and a significant increase in ADC_{all} values was observed. The greatest ADC_{all} changes were observed at the L₃-L₄ and L₄-L₅ levels and were mainly explained by changes in ADC_{ant} and ADC_{post} , respectively.

No significant changes in *ADC* were observed at L₅-S₁ level. The reduction in pain and largest changes in *ADC* observed at the periphery of the hyperintense IVD region suggest that increased peripheral random motion of water molecules is implicated in the IVD nociceptive response modulation.

Additionally, *ADC* changes were observed at remote IVD anatomical levels that did not coincide with the PA spinal mobilization application level.

45 D. MANUAL THERAPY EXTREMITIES**MT for PF pain**

Clin Rehabil. 2018 Jun;32(6):722-733. doi: 10.1177/0269215517753971. Epub 2018 Jan 12.

The effects of joint mobilization on individuals with patellofemoral pain: a systematic review.

Jayaseelan DJ^{1,2}, Scalzitti DA¹, Palmer G¹, Immerman A¹, Courtney CA³.

OBJECTIVE:

To investigate and synthesize the effects of joint mobilization on individuals with patellofemoral pain syndrome.

DATA SOURCES:

Five electronic databases (CINAHL, the Cochrane Central Register of Controlled Trials, PubMed, Scopus, and SPORTDiscus) were used.

REVIEW METHODS:

Each database was searched from inception to 1 November 2017. Randomized controlled trials investigating a manual therapy intervention, with or without co-interventions, for persons with patellofemoral pain were included. Two reviewers independently screened the retrieved literature and appraised the quality of the selected studies using the PEDro rating scale. A third reviewer was used in cases of discrepancy to create a consensus.

RESULTS:

A total of 361 articles were identified in the search. Twelve randomized trials with a total of 499 participants were selected for full review. Within-group improvements in pain and function were noted for the manual therapy groups. Between-group improvements for short-term outcomes (three months or less) were greatest when joint mobilization was directed to the knee complex and used as part of a comprehensive approach.

CONCLUSION:

In the articles reviewed, joint mobilization appears to be most effective in improving pain and function when coupled with other interventions, although its discrete effect is unclear due to the reviewed studies' design and reporting.

54. POSTURE

Changes in menopause

Osteoporosis International pp 1–6 | Cite as

Postural control is associated with muscle power in post-menopausal women with low bone mass

- N. Stolzenberg D. Felsenberg D. L. Belavy Summary

Older women with low bone mass are at higher risk of fracture and there is limited data on what is associated with risk of falls. We found explosive jumping to relate most strongly to postural control. It may be beneficial to include power or speed training into falls prevention programs.

Introduction

Post-menopausal women with low bone mass are at higher risk of bone fractures subsequent to falls. Understanding the correlates of postural control in this collective informs intervention design for falls prevention.

Methods

We examined postural control in single-leg stance on stable and unstable surfaces in 63 community-dwelling post-menopausal women with osteopenia or osteoporosis but without diagnosed neuromuscular, vestibular or arthritic diseases. Postural measures were compared to countermovement jump performance (height, force and power), leg-press strength (10 repetition maximum), calf muscle area and density (via peripheral quantitative computed tomography), body mass, height and age.

Results

On step-wise regression, peak countermovement jump power and jump height ($p \leq 0.014$), but not jump force, leg-press strength or calf muscle size, were related to postural control in single-leg stance on, respectively, an unstable surface (eyes open) and standing on a stable surface (eyes open). None of the parameters measured were significantly related to the postural control parameters in single-leg stance on a stable surface with eyes closed. With testing on the stable surface, body mass was associated with slow mean centre of pressure movement speed ($p \leq 0.030$).

Conclusions

Our findings show that, in post-menopausal women with low bone mass, neuromuscular power is a more important determinant of postural control than muscle strength or size. Our findings provide evidence to support the integration of power or speed training into falls prevention and balance training programs in post-menopausal women with osteopenia and osteoporosis.

59. PAIN**Kinesiophobia**

Physiotherapy. 2018 Jun;104(2):187-193. doi: 10.1016/j.physio.2017.10.001. Epub 2017 Oct 28.

Kinesiophobia is associated with pain intensity but not pain sensitivity before and after exercise: an explorative analysis.

Vaegter HB¹, Madsen AB², Handberg G³, Graven-Nielsen T⁴.

OBJECTIVE:

To compare clinical pain intensity, exercise performance, pain sensitivity and the effect of aerobic and isometric exercise on local and remote pressure pain thresholds (PPTs) in patients with chronic musculoskeletal pain with high and low levels of kinesiophobia.

DESIGN:

An experimental pre-post within-subject study.

SETTING:

An exercise laboratory in a multidisciplinary pain clinic.

PARTICIPANTS:

Fifty-four patients with chronic musculoskeletal pain.

INTERVENTIONS:

Acute aerobic and isometric leg exercises.

MAIN OUTCOME MEASURES:

Clinical pain intensity (numerical rating scale, range 0 to 10), Tampa Scale of Kinesiophobia, aerobic and isometric exercise performances (intensity and maximal voluntary contraction), and PPTs at local and remote body areas before and after exercise conditions.

RESULTS:

Patients with a high degree of kinesiophobia demonstrated increased pain intensity compared with patients with a low degree of kinesiophobia [high degree of kinesiophobia: 7.3 (1.6) on NRS; low degree of kinesiophobia: 6.3 (1.6) on NRS; mean difference 1.0 (95% confidence interval 0.08 to 1.9) on NRS]. Aerobic and isometric exercises increased PPTs, but no significant group differences were found in PPTs before and after exercise.

CONCLUSIONS:

Clinical pain intensity was significantly higher in patients with a high degree of kinesiophobia compared with patients with a low degree of kinesiophobia. Despite a difference in isometric exercise performance, the hypoalgesic responses after cycling and isometric knee exercise were comparable between patients with high and low degrees of kinesiophobia. If replicated in larger studies, these findings indicate that although kinesiophobic beliefs influence pain intensity, they do not significantly influence PPTs and exercise-induced hypoalgesia in patients with chronic musculoskeletal pain.