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A cohort study comparing the serum levels of pro- or anti-inflammatory cytokines in patients with lumbar radicular pain and healthy subjects.

Wang K\(^1\), Bao JP\(^2\), Yang S\(^3\), Hong X\(^2\), Liu L\(^2\), Xie XH\(^2\), Wu XT\(^4,5\).

**Author information**

Abstract

**PURPOSE:**
The factors influencing the presence or absence of pain in sciatica secondary to disc herniation remain incompletely understood. We hypothesized that the imbalance in inflammatory cytokines is implicated in the generation of pain. In our study, serum levels of pro-inflammatory and anti-inflammatory cytokines were investigated among patients with severe sciatica; the serum levels were compared with those of patients with mild sciatica and healthy subjects.

**METHODS:**
In this prospective study, blood protein levels of the pro-inflammatory cytokines, namely, interleukin-6 (IL-6), interleukin-8 (IL-8), and tumor necrosis factor-α (TNF-α), and the anti-inflammatory cytokines, namely, interleukin-4 (IL-4) and interleukin-10 (IL-10), of 58 patients with severe sciatica, 50 patients with mild sciatica, and 30 healthy control subjects were analyzed through ELISA. Physical and mental health symptoms were determined using the Oswestry Disability Index (ODI) and short form-36 (SF-36) questionnaire. Spearman rank correlation coefficient was also determined to calculate the correlation between the scores obtained from the questionnaires and the serum levels of cytokines.

**RESULTS:**
IL-6 protein was detected in the three groups and median levels were about 1.5 times higher in patients with severe sciatica than the mild sciatica group (p = 0.02) and the controls (p = 0.03). Median levels of IL-8 in sciatica patients were higher than those of the healthy controls (p = 0.001 for severe sciatica, p = 0.02 for mild sciatica). The TNF-α protein values were approximately twofold higher in the severe sciatica group than in the mild sciatica group (p < 0.01) and in the healthy control group (p < 0.01). Median levels of IL-4 were about 2.5-fold higher in mild sciatica (p < 0.01) and about twofold higher in patients with severe sciatica (p = 0.012) when compared with controls. Median protein levels of IL-10 showed a trend to be higher in patients with mild sciatica compared with severe sciatica (p < 0.013) and with healthy controls (p < 0.01). ODI was significantly correlated with IL-6 (r = 0.394, p = 0.013), TNF-α (r = 0.629, p < 0.001), and IL-10 (r = -0.415, p = 0.009). ODI was not significantly correlated with IL-4 (r = -0.174, p = 0.29) and IL-8 (r = -0.133, p = 0.418).

**CONCLUSIONS:**
These findings support our hypothesis that sciatica pain is accompanied by the imbalance in inflammatory cytokines.

**KEYWORDS:** Cytokines; Inflammation; Interleukins; Pain; Tumor necrosis factor-alpha

PMID:26684469
Physical Therapy or Advanced Imaging as First Management Strategy Following a New Consultation for Low Back Pain in Primary Care: Associations with Future Health Care Utilization and Charges.

Fritz JM, Brennan GP, Hunter SJ.

Abstract

**OBJECTIVE:**
Compare health care utilization and charges for low-back-pain (LBP) patients receiving advanced imaging or physical therapy as a first management strategy following a new primary care consultation.

**DATA SOURCE:**
Electronic medical record (EMR) and insurance claims data.

**STUDY DESIGN:**
Retrospective analysis of propensity-matched groups.

**DATA COLLECTION/EXTRACTION:**
Claims and EMR data were used. Utilization and LBP-related charges over a 1-year period were extracted from claims data.

**PRINCIPAL FINDINGS:**
In the propensity-matched sample (n = 406), advanced imaging recipients had higher odds of all utilization outcomes. Charges were higher with advanced imaging by an average $4,793 (95 percent CI: $3,676, $5,910).

**CONCLUSIONS:**
For patients with LBP whom newly consulted primary care referred for additional management, advanced imaging as a first management was associated with higher health care utilization and charges than physical therapy.

**KEYWORDS:** Physical therapy; imaging; low back pain; primary care

PMID:25772625
Comparative Associations of Working Memory and Pain Catastrophizing With Chronic Low Back Pain Intensity.

Simon CB\textsuperscript{1}, Lentz TA\textsuperscript{2}, Bishop MD\textsuperscript{3}, Riley JL 3rd\textsuperscript{4}, Fillingim RB\textsuperscript{5}, George SZ\textsuperscript{6}.

**Author information**

**Abstract**

**BACKGROUND:**
Because of its high global burden, determining biopsychosocial influences of chronic low back pain (CLBP) is a research priority. Psychological factors such as pain catastrophizing are well established. However, cognitive factors like working memory require further investigation to be clinically useful.

**OBJECTIVE:**
Determine how working memory and pain catastrophizing are associated with CLBP measures of daily pain intensity and movement-evoked pain intensity.

**DESIGN:**
Cross-sectional analysis of individuals with ≥3 months CLBP (n=60) compared to pain-free controls (n=30).

**METHOD:**
Participants completed measures of working memory, pain catastrophizing and daily pain intensity. Movement-evoked pain intensity was assessed using the Back Performance Scale. Outcome measures were compared between individuals with CLBP and those pain-free using ANOVA modeling. Associations were determined using multivariate regression analyses.

**RESULTS:**
CLBP participants (mean age=47.7, 68% females) had lower working memory performance (p=.008) and higher pain catastrophizing (p<.001) compared to pain-free controls (mean age=47.6, 63% females). For CLBP individuals, only working memory remained associated with daily pain intensity (R\textsuperscript{2}=.07, standardized Beta=-.308, p=.041) and movement-evoked pain intensity (R\textsuperscript{2}=.14, standardized Beta=-.502, p=.001) after accounting for age, sex, education and interactions between pain catastrophizing and working memory.

**LIMITATIONS:**
Cross-sectional design prevented prospective analysis. Findings are also not indicative of overall working memory (e.g. spatial) or cognitive performance.

**CONCLUSION:**
Working memory demonstrated the strongest association with daily pain and movement-evoked pain intensity compared to and after accounting for established CLBP factors. Future research will elucidate the prognostic value of working memory on prevention and/or recovery of CLBP.

PMID:26700272
5. SURGERY

Adolescent disc surgery


Outcome of surgical treatment of lumbar disc herniation in young individuals.

Strömqvist F¹, Strömqvist B², Jönsson B², Gerdhem P³, Karlsson MK².

Author information

Abstract

Lumbar disc herniation (LDH) is uncommon in youth and few cases are treated surgically. Very few outcome studies exist for LDH surgery in this age group. Our aim was to explore differences in gender in pre-operative level of disability and outcome of surgery for LDH in patients aged ≤ 20 years using prospectively collected data. From the national Swedish SweSpine register we identified 180 patients with one-year and 108 with two-year follow-up data ≤ 20 years of age, who between the years 2000 and 2010 had a primary operation for LDH. Both male and female patients reported pronounced impairment before the operation in all patient reported outcome measures, with female patients experiencing significantly greater back pain, having greater analgesic requirements and reporting significantly inferior scores in EuroQol (EQ-5D-index), EQ-visual analogue scale, most aspects of Short Form-36 and Oswestry Disabilities Index, when compared with male patients. Surgery conferred a statistically significant improvement in all registered parameters, with few gender discrepancies. Quality of life at one year following surgery normalised in both males and females and only eight patients (4.5%) were dissatisfied with the outcome. Virtually all parameters were stable between the one- and two-year follow-up examination. LDH surgery leads to normal health and a favourable outcome in both male and female patients aged 20 years or younger, who failed to recover after non-operative management. Cite this article: Bone Joint J 2015;97-B:1675-82.

KEYWORDS: PROMs; boys; gender; girls; lumbar disc herniation; outcome; surgery

PMID: 26637684
7. PELVIC ORGANS/WOMAN’S HEALTH

Human milk


Early Gut Colonization With Lactobacilli and Staphylococcus in Infants: The Hygiene Hypothesis Extended.

Salminen S¹, Endo A, Isolauri E, Scalabrin D.

Author information

Abstract

OBJECTIVES:
The aim of the present study was to assess the mode of delivery and type-of-feeding impact on gut microbiota. We demonstrated higher fecal bifidobacteria in infants who were breast-fed (BF) or fed formula with prebiotics polydextrose (PDX) and galactooligosaccharides (GOS) versus formula without prebiotics. Here, we tested feces of that cohort for lactobacilli and Staphylococcus aureus, 2 types of bacteria present in breast milk.

METHODS:
In a double-blind, randomized study, 21- to 30-day-old term infants vaginally delivered and exclusively formula-fed received a cow's milk-based formula (control, n=80) or the same formula with 4 g/L (1:1 ratio) of PDX/GOS (PDX/GOS, n=77). A reference BF group (n=71) was included. Stool samples were obtained at baseline and after 30 and 60 days of feeding to assess fecal bacteria by quantitative real-time polymerase chain reaction.

RESULTS:
Pairwise comparisons between baseline-adjusted means log10 colony-forming unit per gram feces of total lactobacilli counts (8.37 in control, 8.46 in PDX/GOS, and 8.42 in BF) showed a significant difference only between PDX/GOS and control at 30 and 60 days combined (P=0.035), utilizing generalized estimating equations method. Baseline-adjusted odds ratio (OR) of colonization with S aureus was lower in control (OR 0.47, 95% confidence interval 0.22-1.00, P=0.049) and PDX/GOS (OR 0.44, 95% confidence interval 0.21-0.94, P=0.03) groups versus the BF group.

CONCLUSIONS:
Bacteria found in breast milk, such as lactobacilli and S aureus can also be found in infant feces. S aureus, traditionally considered harmful, may aid in educating the coevolving immune system. Modifying formula by adding prebiotics may bring gut microbiota closer to that of BF infants in terms of beneficial microbes.

PMID:26230902
Human milk in premature infants


Human milk oligosaccharides in premature infants: absorption, excretion, and influence on the intestinal microbiota.

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Abstract

\textbf{BACKGROUND:}

Human milk oligosaccharides (HMOs) shape the intestinal microbiota in term infants. In premature infants, alterations in the intestinal microbiota (dysbiosis) are associated with risk of necrotizing enterocolitis (NEC) and sepsis, and the influence of HMOs on the microbiota is unclear.

\textbf{METHODS:}

Milk, urine, and stool specimens from 14 mother-premature infant dyads were investigated by mass spectrometry for HMO composition. The stools were analyzed by next-generation sequencing to complement a previous analysis.

\textbf{RESULTS:}

Percentages of fucosylated and sialylated HMOs were highly variable between individuals but similar in urine, feces, and milk within dyads. Differences in urine and fecal HMO composition suggest variability in absorption. Secretor status of the mother correlated with the urine and fecal content of specific HMO structures. Trends toward higher levels of Proteobacteria and lower levels of Firmicutes were noted in premature infants of nonsecretor mothers. Specific HMO structures in the milk, urine, and feces were associated with alterations in fecal Proteobacteria and Firmicutes.

\textbf{CONCLUSION:}

HMOs may influence the intestinal microbiota in premature infants. Specific HMOs, for example those associated with secretor mothers, may have a protective effect by decreasing pathogens associated with sepsis and NEC, while other HMOs may increase dysbiosis in this population.

PMID:26322410
8. VISCERA

Anti-inflammatory and bowls


Role of Nonsteroidal Anti-Inflammatory Drugs in Exacerbations of Inflammatory Bowel Disease.

Long MD1, Kappelman MD, Martin CF, Chen W, Anton K, Sandler RS.

Author information

Abstract

GOALS:
To determine the role of nonsteroidal anti-inflammatory drugs (NSAIDs) in activation of inflammatory bowel disease (IBD).

BACKGROUND:
NSAIDs may activate inflammatory pathways in IBD.

STUDY:
Crohn's and Colitis Foundation of American Partners is an ongoing cohort study of patients living with IBD. All data are self-reported using the internet. We identified a subcohort of participants whose disease activity, based on short Crohn's Disease Activity Index and simple clinical colitis activity index, indicated remission. Pattern of use of NSAIDs was measured at baseline, and disease activity assessment was performed 6 months later. We used multivariate binomial regression to determine effects of NSAIDs on disease activity.

RESULTS:
A total of 791 individuals in remission had baseline and follow-up data available for analysis. Of these, 247 Crohn's disease (CD) patients (43.2%) and 89 ulcerative colitis (UC) patients (40.6%) reported NSAID use. CD patients with NSAID use ≥5 times/month had greater risk of active disease at follow-up (23% vs. 15%, P=0.04; [adjusted risk ratio (RR), 1.65; 95% confidence interval (CI), 1.12-2.44). No effect was observed in patients with UC (22% vs. 21%, P=0.98; adjusted RR, 1.25; 95% CI, 0.81-1.92). Acetaminophen use was associated with active disease at follow-up in CD (adjusted RR, 1.72; 95% CI, 1.11-2.68).

CONCLUSIONS:
Regular (≥5 times/mo) NSAID and acetaminophen use were associated with active CD, but not UC. Less frequent NSAID use was not associated with active CD or UC. These findings indicate that regular NSAID use may increase CD activity, or that NSAID use may be a marker of a less robust remission; thus reflecting subclinical disease activity.

PMID:26485106
GERD and diet


The role of diet in the overlap between gastroesophageal reflux disease and functional dyspepsia.

Chirila I1, Morariu ID, Barboi OB, Drug VL.

Author information

Abstract

BACKGROUND/AIMS:
The prevalence of functional dyspepsia partially overlaps with gastroesophageal reflux disease (GERD), and this suggests common pathogenic mechanisms. The role of diet in these conditions is still under investigation. The present study evaluated the type of diet associated with functional dyspepsia and GERD.

MATERIALS AND METHODS:
A representative sample of subjects was invited to the family doctors' office, and an interview-based questionnaire was administered to diagnose functional dyspepsia and GERD (using Rome III and Montreal criteria, respectively) and to evaluate eating habits and the frequency of food intake. Correlation and regressions were used for statistical analyses, and the results were presented as odds ratio and 95% confidence interval.

RESULTS:
In total, 184 subjects participated in a 4-month study. Functional dyspepsia was present in 7.6%, and GERD was present in 31.0%. The predictors for dyspepsia were low educational level (22.4, 3.3-150.1, p=0.001), consumption of canned food, and the use of alcoholic drinks at least weekly. The predictors for GERD were advanced age and the use of canned food (13.9, 3.6-53.9, p<0.001) or fast food (4.6, 1.7-12.1, p=0.002).

CONCLUSION:
This study provides new data on the overlap of GERD and functional dyspepsia and reveals that these disorders may be associated with the consumption of canned food, fast food, and alcoholic beverages.

PMID: 26728864
IBP and gluten free diet

Efficacy of a Gluten-free Diet in Subjects With Irritable Bowel Syndrome-Diarrhea Unaware of Their HLA-DQ2/8 Genotype

Imran Aziz, MRCP Nick Trott, RD Rebecca Briggs, RD John R. North, BSc (Hons) Marios Hadjivassiliou, MD, FRCPm David S. Sanders, MD, FRCP, FACG

Background & Aims
A gluten-containing diet alters bowel barrier function in patients with irritable bowel syndrome-diarrhea (IBS-D), particularly those who are positive for human leukocyte antigen (HLA) allele DQ2/8. We studied the effects of a gluten-free diet (GFD) in patients with IBS-D who have not previously considered the effects of gluten in their diet and were unaware of their HLA-DQ2/8 genotype.

Methods
We performed a prospective study of 41 patients with IBS-D (20 HLA-DQ2/8–positive and 21 HLA-DQ2/8–negative) at the Royal Hallamshire Hospital in Sheffield, United Kingdom, from September 2012 through July 2015. All subjects were placed on a 6 week GFD following evaluation by a dietician. Subjects completed validated questionnaires at baseline and week 6 of the GFD. The primary endpoint was mean change in IBS symptom severity score (IBS-SSS); a 50 point reduction was considered to indicate a clinical response. Secondary endpoints were changes in hospital anxiety and depression score, fatigue impact score, and short form 36 results. Clinical responders who chose to continue a GFD after the study period were evaluated on average 18 months later to assess diet durability, symptom scores, and anthropometric and biochemical status.

Results
A 6 week GFD reduced IBS-SSS by ≥50 points in 29 patients overall (71%). The mean total IBS-SSS decreased from 286 before the diet to 131 points after 6 weeks on the diet (P<.001)—the reduction was similar in each HLA-DQ group. However, HLA-DQ2/8–negative subjects had a greater reduction in abdominal distension (P=.04). Both groups had marked mean improvements in hospital anxiety and depression scores, fatigue impact score, and short form 36 results, although HLA-DQ2/8–positive subjects had a greater reduction in depression score and increase in vitality score than HLA-DQ2/8–negative subjects (P=.02 and P=.03, respectively). Twenty-one of the 29 subjects with a clinical response (72%) planned to continue the GFD long term; 18 months after the study they were still on a GFD, with maintained symptom reductions, and demonstrated similar anthropometric and biochemical features compared to baseline.

Conclusion
A dietitian-led GFD provided sustained benefit to patients with IBS-D. The symptoms that improved differed in magnitude according to HLA-DQ status.

Key words: clinical trial, gastrointestinal symptoms, food, carbohydrates
Spicy food


The relationship between spicy food intake and chronic uninvestigated dyspepsia among Iranian adults.

Saneei P1,2,3, Sadeghi O1,2,3, Feizi A4, Keshteli AH5,6, Daghaghzadeh H5, Esmailzadeh A1,3,7, Adibi P5.

Abstract

OBJECTIVE:
This cross-sectional study was undertaken to assess the association between spicy foods consumption and chronic uninvestigated dyspepsia (CUD) in a large sample of Iranian adults.

SUBJECTS:
In this cross-sectional study, we assessed spicy foods consumption of 4763 Iranian adults living in Isfahan province using a dietary habit questionnaire. A modified validated version of the Rome III questionnaire was used to assess CUD-related symptoms. CUD was defined as having one or more of the following characteristics: bothersome postprandial fullness, early satiation and/or epigastric pain or epigastric burning at least often in the past 3 months. Information on meal regularity, meal frequency, intra-meal fluid drinking as well as other potential confounders was also collected.

RESULTS:
CUD was prevalent in 15.3% (n=703) of participants. Frequent consumption of spicy foods (≥10 times/week) was associated with greater odds of having CUD (OR: 1.64; 95% CI: 1.09-2.49). This relationship was significant even after adjustment for diet-related practices and body mass index (OR: 1.66; 95% CI: 1.00-2.78). There was a significant positive association between spicy foods consumption and postprandial fullness (OR: 1.76; 95% CI: 1.29-2.40) and epigastric pain (OR: 1.78; 95% CI: 1.30-2.44). However, no significant relationship was observed between frequent spicy food consumption and early satiation.

CONCLUSION:
High consumption of spicy foods was associated with greater odds of CUD, frequent postprandial fullness and epigastric pain. Further studies, particularly of prospective nature, are needed to confirm our findings. This article is protected by copyright. All rights reserved.

KEYWORDS: chronic uninvestigated dyspepsia; early satiation; epigastric pain; postprandial fullness; spicy foods

PMID:26686235
IBS and emotional therapies


Short- and Long- Term Efficacy of Psychological Therapies for Irritable Bowel Syndrome: A Systematic Review and Meta-analysis.

Laird KT, Tanner-Smith EE, Russell AC, Hollon SD, Walker LS.

Abstract

BACKGROUND & AIMS:
Several meta-analyses have demonstrated the efficacy of psychological therapies for reducing gastrointestinal (GI) symptoms in patients with irritable bowel syndrome (IBS). However, no meta-analysis has investigated the duration of these effects. We performed a meta-analysis to assess the immediate, short-term, and long-term efficacy of psychotherapy for reducing GI symptoms in adults with IBS.

METHODS:
We searched PubMed, PsycINFO, Science Direct, and ProQuest Dissertations and Theses through August 15th 2015 for randomized controlled trials that compared psychological therapy to an active or non-active comparison condition (controls) for treatment of GI symptoms in adults with IBS.

RESULTS:
Forty-one trials were included in our meta-analysis, comprising data from 2290 individuals (1183 assigned to psychotherapy and 1107 assigned to a control condition). Compared to a mixed group of control conditions, psychological therapies had a medium effect on GI symptom severity ($d^- = 0.69$) immediately after treatment. On average, individuals who received psychotherapy had a greater reduction in GI symptoms following treatment than 75% of individuals assigned to a control condition. After short-term follow-up periods (1-6 months after treatment) and long-term follow-up periods (6-12 months after treatment), this effect remained significant and medium in magnitude ($d^- = 0.76$ and $d^- = 0.73$, respectively).

CONCLUSIONS:
Psychological therapies reduce GI symptoms in adults with IBS. These effects remained significant and medium in magnitude after short- and long-term follow-up periods.

KEYWORDS: abdominal pain; empirically supported therapies; evidence-based treatment; functional gastrointestinal disorder

PMID:26721342
IBS and cell changes


The Association between Serrated Epithelial Changes and Colorectal Dysplasia in Inflammatory Bowel Disease.


Author information

Abstract

BACKGROUND:
Serrated epithelial change (SEC) is a histological finding in long standing colitis that may be associated with dysplasia. Our primary aim was to determine the incidence of dysplasia and colorectal cancer (CRC) in inflammatory bowel disease (IBD) patients with SEC. Secondary aims were to determine the rate of location concordance between SEC and dysplasia/CRC and to identify other risk factors associated with dysplasia in IBD patients with SEC.

METHODS:
A retrospective, descriptive, observational study was performed by searching the Pathology Data System at a single tertiary referral center for a histologic finding of "serrated epithelial change." The patient's first pathology specimen with SEC was designated the index SEC. All subsequent pathology reports were evaluated for the occurrence and location of dysplasia or CRC. Univariable and multivariable logistic regression were performed to identify predictors of dysplasia.

RESULTS:
There were 187 patients with confirmed IBD and one or more histologic findings of SEC without prior dysplasia. Mean IBD duration was 16 years, and median follow-up time was 28 months. The rate of high-grade dysplasia or CRC was 17 per 1000 patient-years. Thirty-nine of 187 patients (21%) had synchronous or metachronous dysplasia or CRC. Location concordance was 68%. Multivariable analysis found SEC on follow-up examinations, older age at IBD diagnosis, male gender, and a first degree relative with CRC were associated with dysplasia in IBD patients with SEC.

CONCLUSIONS:
This uncontrolled study describes a high frequency of dysplasia in patients with a histologic finding of SEC. SEC seen on successive scopes further increased the risk of dysplasia. Further controlled studies are needed to determine if SEC is a pre-cancerous lesion in IBD patients and if SEC can be endoscopically identified.

KEYWORDS: Crohn’s disease; colorectal cancer; dysplasia; inflammatory bowel disease; serrated epithelial change; ulcerative colitis

PMID: 26709112
CD in Asia


Prevalence of Celiac disease in Asia: A systematic review and meta-analysis.

Singh P¹, Arora S², Singh A³, Strand TA⁴, Makharia GK³.

Author information

Abstract

BACKGROUND AND AIM:
Celiac disease (CD) is emerging in Asia. While a few population-based studies from Asia have reported a prevalence of CD from 0.1% to 1.3%, the exact prevalence of CD in Asia is not known. We conducted a systematic review and meta-analysis to estimate the prevalence of CD in Asia.

METHODS:
On search of literature, we found 1213 articles, of which 18 articles were included. Diagnosis of CD was based on European Society of Pediatric Gastroenterology, Hepatology and Nutrition guidelines.

RESULTS:
Pooled sero-prevalence of CD in Asia was 1.6% in 47,873 individuals based on positive anti-tissue transglutaminase and/or anti-endomysial antibodies. Pooled prevalence of biopsy proven CD in Asia was 0.5% in 43,955 individuals. The prevalence of CD among females was higher than in males (0.5% vs 0.4%, P = 0.04). The pooled prevalence of CD was 0.3% in Iran, 0.5% in Turkey, 0.6% in India and 0.7% in Israel. The pooled prevalence of CD was significantly higher in Israel and India as compared to that in Iran.

CONCLUSIONS:
CD is not uncommon in Asia and the sero-prevalence and prevalence of CD in Asia is 1.6% and 0.5%, respectively. The prevalence of CD varies with gender and geographic location. There is a need for population-based prevalence studies in many Asian countries to properly estimate the burden of CD in Asia. This article is protected by copyright. All rights reserved.

KEYWORDS: China; Gluten; India; anti-endomysial; screening; tissue transglutaminase
PMID: 26678020
**Probiotics and infections**

**Probiotics and prebiotics in infectious gastroenteritis**


There is evidence that selected strains of probiotics decrease the duration of AGE with 24 hours, both in ambulatory care and in hospitalized children, resulting also in a decrease of the duration of hospitalization. Synbiotics are equally effective as probiotics alone, but prebiotics are not effective. Both pro- and prebiotics have limited to no efficacy in the prevention of AGE. The administration of pre- and probiotics is considered to be safe, even in newborns. Only these pre-, pro and synbiotics that have been clinically tested can be recommended.
Probiotics


Comparison of the effect of daily consumption of probiotic compared with low-fat conventional yogurt on weight loss in healthy obese women following an energy-restricted diet: a randomized controlled trial.

Madjd A1, Taylor MA2, Mousavi N3, Delavari A4, Malekzadeh R4, Macdonald IA2, Farshchi HR5.

Abstract

BACKGROUND: Despite evidence for the beneficial effects of probiotics and low-fat dairy products, to our knowledge, no study has compared the beneficial effect on weight loss of consuming a probiotic yogurt (PY) compared with a standard low-fat yogurt (LF) during a hypoenergetic program.

OBJECTIVE: We compared the effect of the PY with LF yogurt consumption on body weight and cardiometabolic risk factors in women during a weight-loss program.

DESIGN: Overweight and obese women [body mass index (in kg/m2): 27-40; age: 18-50 y] who usually consumed standard LFs were asked to consume either PY or LF every day with their main meals for 12 wk while following a weight-loss program.

RESULTS: A total of 89 participants were randomly assigned to one of the 2 intervention groups. Baseline variables were not significantly different between groups. A statistically significant reduction in anthropometric measurements and significant improvements in cardiometabolic risk characteristics were observed over the 12 wk in both groups. However, no significant differences in weight loss and anthropometric measurements were seen between groups after the intervention. Compared with the LF group, the PY group had a greater (mean ± SD) decrease in total cholesterol (PY = -0.36 ± 0.10 mmol/L, LF = -0.31 ± 0.10 mmol/L; P = 0.024), low-density lipoprotein cholesterol (PY = -0.35 ± 0.10 mmol/L, LF = -0.31 ± 0.11 mmol/L; P = 0.018), homeostasis model assessment of insulin resistance (PY = -0.55 ± 0.32, LF = -0.42 ± 0.20; P = 0.002), 2-h postprandial glucose (PY = -0.61 ± 0.24 mmol/L, LF = -0.44 ± 0.19 mmol/L; P < 0.001), and fasting insulin concentration (PY = -1.76 ± 1.01 mU/mL, LF = -1.32 ± 0.62 mU/mL; P = 0.002), as secondary endpoints after the study. No significant differences were found for fasting plasma glucose, high-density lipoprotein cholesterol, or triglycerides within both groups after the 12 wk.

CONCLUSION: Consumption of PY compared with LF with main meals showed no significant effects on weight loss. However, it may have positive effects on lipid profiles and insulin sensitivity during a weight-loss program. This trial was registered at http://www.irct.ir/ as IRCT201402177754N8.

KEYWORDS: insulin resistance; lipid; probiotic; weight loss; yogurt

PMID:26702123
Proprioceptive deficits in Chronic C spine pain


Stanton TR¹, Leake HB², Chalmers KJ³, Moseley GL¹.

Abstract

BACKGROUND: Despite common use of proprioceptive retraining interventions in people with chronic, idiopathic neck pain, evidence that proprioceptive dysfunction exists in this population is lacking. Determining whether proprioceptive dysfunction exists in people with chronic neck pain has clear implications for treatment prescription.

PURPOSE: The aim of this study was to synthesize and critically appraise all evidence evaluating proprioceptive dysfunction in people with chronic, idiopathic neck pain by completing a systematic review and meta-analysis.

DATA SOURCES: MEDLINE, CINAHL, PubMed, Allied and Complementary Medicine, EMBASE, Academic Search Premier, Scopus, Physiotherapy Evidence Database (PEDro), and Cochrane Collaboration databases were searched.

STUDY SELECTION: All published studies that compared neck proprioception (joint position sense) between a chronic, idiopathic neck pain sample and asymptomatic controls were included.

DATA EXTRACTION: Two independent reviewers extracted relevant population and proprioception data and assessed methodological quality using a modified Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) statement.

DATA SYNTHESIS: Thirteen studies were included in the present review. Meta-analysis on 10 studies demonstrated that people with chronic neck pain perform significantly worse on head-to-neutral repositioning tests, with a moderate standardized mean difference of 0.44 (95% confidence interval=0.25, 0.63). Two studies evaluated head repositioning using trunk movement (no active head movement thus hypothesized to remove vestibular input) and showed conflicting results. Three studies evaluated complex or postural repositioning tests; postural repositioning was no different between groups, and complex movement tests were impaired only in participants with chronic neck pain if error was continuously evaluated throughout the movement.

LIMITATIONS: A paucity of studies evaluating complex or postural repositioning tests does not permit any solid conclusions about them.

CONCLUSIONS: People with chronic, idiopathic neck pain are worse than asymptomatic controls at head-to-neutral repositioning tests.

PMID:26472296
Chronic neck pain and impact on muscles

Does muscle morphology change in chronic neck pain patients? – A systematic review

R. De Pauw I. Coppieters J. Kregel K. De Meulemeester L. Danneels B. Cagnie

Highlights
• A systematic review including 14 articles of moderate quality.
• Moderate evidence is available for changes of the neck musculature in neck pain.
• Fatty infiltration is only a feature of patients with whiplash associated disorder.
• Patients with chronic idiopathic neck pain show signs of general disuse.

Abstract
Background
Neck pain is a common disabling worldwide health problem with a high socio-economic burden. Changes underlying the transition to, or the maintenance of a chronic state are still barely understood. Increasing evidence suggests that morphological muscle changes, including changes in cross-sectional area (CSA) or fatty infiltration, play a role in chronic neck pain. However, a structured overview of the current evidence of morphological changes is lacking.

Objective
To systematically review the morphological muscle changes in patients with chronic neck pain, including those with whiplash-associated disorders (WAD) and chronic idiopathic neck pain.

Study design & Methods
A systematic review using the PRISMA-guidelines.

Results
Fourteen of 395 papers were included after extensive screening. Most studies were of moderate methodological quality. A higher CSA was found in all flexor muscles in both patients with WAD and patients with chronic idiopathic neck pain, except for the deeper flexor muscles in patients with chronic idiopathic neck pain. The cervical extensor muscles show an increased CSA at the highest cervical segments in patients with WAD, while most studies in patients with chronic idiopathic neck pain report a decreased CSA in all extensor muscles. Fatty infiltration, which could be accountable for an increased CSA, of both cervical extensors and flexors seems to occur only in patients with WAD.

Conclusion
Some evidence is available for changes in muscle morphology, however more high quality prospective and cross-sectional research is needed to confirm these changes and to identify potential underlying causes that need yet to be discovered.

Keywords: Neck pain, Muscle morphology, Whiplash, Fatty infiltration, Cross-sectional area
10 B. CERVICAL EXERCISES

Irradiation from shoulder to neck

Ultrasonographic analysis of dorsal neck muscles thickness changes induced by isometric contraction of shoulder muscles: a comparison between patients with chronic neck pain and healthy controls

Noureddin Karimi (Assistant Professor) Asghar Rezasoltani (Professor) Leila Rahnama, PT, PhD Farhang Noori-Kochi Shapour Jaberzadeh

Highlights
• Isometric abduction of shoulder muscles activates dorsal neck muscles more than other movement directions.
• In patients with non-specific CNP, more activity in Semispinalis muscle is seen compared to Multifidus.
• Among dorsal neck muscles, Splenius Capitis showed the most thickness changes during isometric contraction of shoulder muscles.

Abstract

Background
Altered pattern of muscle activity is commonly seen with chronic neck pain (CNP). However, limited investigations have been done on dorsal neck muscles’ activity pattern while performing upper limb tasks in patients with CNP.

Objectives
To investigate dorsal neck muscles’ thickness changes during isometric contraction of shoulder muscles.

Design
Case-control study.

Methods
This study investigated dorsal neck muscles’ thickness changes during isometric contraction of shoulder muscles in 20 healthy participants (mean age 27± 4.37) and 17 patients with CNP (mean age 29± 5.50). Effects of isometric force of shoulder muscles on dorsal neck muscles’ thickness changes were also evaluated.

Results
Significant muscle × group interaction was observed for the dorsal neck muscles thickness changes (p=0.008) indicating different pattern of muscle activity in terms of changes in muscle thickness of two groups. Significant main effects of direction was observed (P=0.003), with the abduction had the greatest impact on changing the dorsal neck muscles thickness.

Conclusions
Patients with CNP showed altered pattern of muscle thickness changes in comparison to healthy participants. Isometric abduction of shoulder muscles induced the greatest changes of dorsal neck muscles thickness among other force directions.

Keywords: Neck pain, neck muscles, ultrasonography, shoulder, isometric contraction
12 A. WHIPLASH

Kinesthesia impact

The long-term course of deficient cervical kinaesthesia following a whiplash injury has a tendency to seek a physiological homeostasis. A prospective study

Eythor Kristjansson, PT, PhD (Researcher at the Movement Science Lab) Sigrun Vala Björnsdottir, PT, MSc (Researcher and assistant professor at the Movement Science Lab) Gudny Lilja Oddsdottir, PT, PhD (Researcher and lecturer at the Movement Science Lab) Department of Physiotherapy, University of Iceland, Reykjavik, Iceland

Highlights
• In the long-term, deficient cervical kinaesthesia seeks physiological homeostasis
• Both kinaesthetic tests showed the same trend, unaffected by kinesiophobia
• The Fly test is a more stable measure of cervical kinaesthesia than the HNR test
• Secondary to the remaining kinaesthetic deficits, adaptive patterns may develop
• Unrelenting stiffness in the superficial neck muscles may be one adaptive pattern

Abstract

Background
No research exists for the long-term course of deficient cervical kinaesthesia following a whiplash injury. Prior results depicted two divergent courses of deficient cervical kinaesthesia at 1 year.

Objectives
First, to determine the actual course(s) of untreated deficient cervical kinaesthesia from 1 year to 6–8 years post-collision and second, to investigate the association between the test results versus self-reported disability.

Design
A follow-up study was conducted to measure persons who had experienced whiplash from January 2007–September 2009.

Method
The two clinical tests for cervical kinaesthesia, the Head-Neck Relocation (HNR) test and the Fly test are conceptualised to measure two distinct “percepts” of neck proprioception: position sense and movement sense, respectively. In both tests, the mean error of three trials was calculated for each individual and represented the kinaesthetic accuracy. These values were used for analysis.

Results
Forty-one participants out of an initial forty-seven (response rate = 87.2%) were able to participate at the 6-8 years follow-up. The two divergent courses at 12 months had a tendency to seek a physiological homeostasis at the 6–8 years follow-up. Overall, very slight improvements were revealed in disability levels between the 2 assessment points.

Conclusions
Untreated deficient cervical kinaesthesia has a tendency to seek a physiological homeostasis somewhere from 1 year to 6–8 years post-collision. We therefore recommend that cervical kinaesthesia be monitored and treated early, as deficient cervical kinaesthesia may lead to adaptive compensatory patterns secondary to the remaining functional kinaesthetic deficits.

Keywords: Whiplash, Cervical, Kinaesthesia, Tests, Prospective study
Balance disorders

Balance, dizziness and proprioception in patients with chronic whiplash associated disorders complaining of dizziness: A prospective randomized study comparing three exercise programs

Julia Treleaven Gunnel Peterson Maria Landén Ludvigsson Ann-Sofi Kammerlind Anneli Peolsson

DOI: http://dx.doi.org/10.1016/j.math.2015.10.017

Highlights

• Dizziness and unsteadiness are common symptoms following a whiplash injury.
• We compared 3 exercise programs in patients with chronic whiplash with dizziness.
• Specific neck exercise, in combination with a behavioural approach, was superior.
• Symptoms persisted in many, thus management directed towards this is important.

Abstract

Background
Dizziness and unsteadiness are common symptoms following a whiplash injury.

Objective
To compare the effect of 3 exercise programs on balance, dizziness, proprioception and pain in patients with chronic whiplash complaining of dizziness.

Design
A sub-analysis of a randomized study.

Methods
One hundred and forty subjects were randomized to either a physiotherapist-guided neck-specific exercise (NSE), physiotherapist-guided neck-specific exercise, with a behavioural approach (NSEB) or prescription of general physical activity (PPA) group. Pre intervention, 3, 6 and 12 months post baseline they completed the University of California Los Angeles Dizziness Questionnaire (UCLA-DQ), Visual Analogue Scales (VAS) for, dizziness at rest and during activity and physical measures (static and dynamic clinical balance tests and head repositioning accuracy (HRA)).

Results
There were significant time by group differences with respect to dizziness during activity and UCLA-Q favouring the physiotherapy led neck specific exercise group with a behavioural approach. Within group analysis of changes over time also revealed significant changes in most variables apart from static balance.

Conclusion:
Between and within group comparisons suggest that physiotherapist led neck exercise groups including a behavioural approach had advantages in improving measures of dizziness compared with the general physical activity group, although many still complained of dizziness and balance impairment. Future studies should consider exercises specifically designed to address balance, dizziness and cervical proprioception in those with persistent whiplash.

Keywords: Dizziness, Balance, Proprioception, Whiplash
Kinaesthesia deficits

The long-term course of deficient cervical kinaesthesia following a whiplash injury has a tendency to seek a physiological homeostasis. A prospective study

Eythor Kristjansson, PT, PhD  Sigrun Vala Björnsdottir, PT, MSc  Gudny Lilja Oddsdottir, PT, PhD (Researcher and lecturer at the Movement Science Lab)

Highlights

• In the long-term, deficient cervical kinaesthesia seeks physiological homeostasis
• Both kinaesthetic tests showed the same trend, unaffected by kinesiophobia
• The Fly test is a more stable measure of cervical kinaesthesia than the HNR test
• Secondary to the remaining kinaesthetic deficits, adaptive patterns may develop
• Unrelenting stiffness in the superficial neck muscles may be one adaptive pattern

Abstract

Background

No research exists for the long-term course of deficient cervical kinaesthesia following a whiplash injury. Prior results depicted two divergent courses of deficient cervical kinaesthesia at 1 year.

Objectives

First, to determine the actual course(s) of untreated deficient cervical kinaesthesia from 1 year to 6–8 years post-collision and second, to investigate the association between the test results versus self-reported disability.

Design

A follow-up study was conducted to measure persons who had experienced whiplash from January 2007–September 2009.

Method

The two clinical tests for cervical kinaesthesia, the Head-Neck Relocation (HNR) test and the Fly test are conceptualised to measure two distinct “percepts” of neck proprioception: position sense and movement sense, respectively. In both tests, the mean error of three trials was calculated for each individual and represented the kinaesthetic accuracy. These values were used for analysis.

Results

Forty-one participants out of an initial forty-seven (response rate = 87.2%) were able to participate at the 6-8 years follow-up. The two divergent courses at 12 months had a tendency to seek a physiological homeostasis at the 6–8 years follow-up. Overall, very slight improvements were revealed in disability levels between the 2 assessment points.

Conclusions

Untreated deficient cervical kinaesthesia has a tendency to seek a physiological homeostasis somewhere from 1 year to 6–8 years post-collision. We therefore recommend that cervical kinaesthesia be monitored and treated early, as deficient cervical kinaesthesia may lead to adaptive compensatory patterns secondary to the remaining functional kinaesthetic deficits.

Keywords: Whiplash, Cervical, Kinaesthesia, Tests, Prospective study
13. CRANIUM/TMJ

Hamstring stretching and TMJ

Immediate effects of hamstring stretching alone or combined with ischemic compression of the masseter muscle on hamstrings extensibility, active mouth opening and pain in athletes with temporomandibular dysfunction

Luis Espejo-Antúnez, PT, MSc, PhD Elisa Castro-Valenzuela, PT, MSc Fernando Ribeiro, PT, MSc, PhD Manuel Albornoz-Cabello, PT, MSc, PhD Anabela Silva, PT, MSc, PhD Juan Rodríguez-Mansilla, PT, MSc, PhD

Objective
To assess the immediate effects of hamstrings stretching alone or combined with ischemic compression of the masseter muscle on hamstrings extensibility, active mouth opening and pain in athletes with temporomandibular dysfunction and hamstrings shortening.

Methods
Forty-two participants were randomized to receive the stretching technique (n=21) or the stretching plus the ischemic compression (n=21). Outcome measures were: hamstrings extensibility, active mouth opening, pressure pain thresholds and pain intensity.

Results
Both interventions improved significantly active mouth opening (group 1: 35.7±6.7 to 39.1±7.6mm, p<0.001; group 2: 34.0±6.2 to 37.6±5.6mm, p<0.001), active knee extension (group 1: 33.1±8.5 to 40.8±8.2º, p<0.001; group 2: 28.9±6.5 to 35.5±6.4º, p<0.001) and pain. No significant differences were found between interventions.

Conclusion
Hamstrings stretching induced an acute improvement in hamstrings extensibility, active mouth opening and pain. Moreover, the addition of ischemic compression did not induce further improvements on the assessed parameters.

Keywords:
Active Mouth Opening, Hamstrings, Masseter, Stretching, Temporomandibular Joint
Cervicogenic tinnitus


Rob A.B. Oostendorp Iem Bakker Hans Elvers Emilia Mikolajewska Sarah Michiels Willem De Hertogh Han Samwel

Highlights
• Understanding of neural mechanisms underlying somatosensory tinnitus is the basics for application of manual therapy.
• Chronic subjective tinnitus combined with secondary central tinnitus is comparable with chronic pain with central sensitization.
• Manual therapy is a potential treatment in patients with cervicogenic somatosensory tinnitus.

Abstract
Tinnitus can be evoked or modulated by input from the somatosensory and somatomotor systems. This means that the loudness or intensity of tinnitus can be changed by sensory or motor stimuli such as muscle contractions, mechanical pressure on myofascial trigger points, transcutaneous electrical stimulation or joint movements. The neural connections and integration of the auditory and somatosensory systems of the upper cervical region and head have been confirmed by many studies. These connections can give rise to a form of tinnitus known as somatosensory tinnitus. To date only a handful of publications have focussed on (cervicogenic) somatosensory tinnitus and manual therapy. Broadening the current understanding of somatosensory tinnitus would represent a first step towards providing therapeutic approaches relevant to manual therapists. Treatment modalities involving the somatosensory systems, and particularly manual therapy, should now be re-assessed in the subgroup of patients with cervicogenic somatosensory tinnitus. The conceptual phase of this study aims to uncover underlying mechanisms linking the auditory and somatosensory systems in relation to subjective tinnitus through (i) review of the literature (part 1) and (ii) through design of a that will explore characteristics of the study population and identify relevant components and outcomes of manual therapy in patients with cervicogenic somatosensory tinnitus (part 2). This manuscript focusses the theoretical concept of (cervicogenic) somatosensory tinnitus, either with or without secondary central tinnitus or tinnitus sensitization.

Keywords: Auditory–somatosensory interactions, Somatosensory tinnitus, Tinnitus sensitization, Cervical spine, Somatosensory stimulation, Manual therapy
17. SHOULDER GIRDLE

Serratus and Pect minor

**Serratus anterior or pectoralis minor: Which muscle has the upper hand during protraction exercises?**

Birgit Castelein Barbara Cagnie Thierry Parlevliet Ann Cools

DOI: http://dx.doi.org/10.1016/j.math.2015.12.002

**Highlights**
- All exercises activated the Pm between 15 and 29% MVIC.
- The Modified Push-Up Plus (Wall and Floor) activated SA and Pm to a similar degree.
- The Serratus punch seems optimal in healthy subjects when maximum SA with minimal Pm activation is desired.

**Abstract**

**Background**

The Serratus Anterior (SA) has a critical role in stabilizing the scapula against the thorax. Research has linked shoulder and neck disorders to impairments in the SA activation. Exercises that target the SA are included in the rehabilitation of shoulder or neck pain and mostly include a protraction component. The Pectoralis Minor (PM) functions as a synergist of the SA. From the literature it is unclear to what extent PM is activated during SA exercises.

**Objectives**

To determine the activity of SA and PM during different protraction exercises.

**Design**

Controlled laboratory study.

**Method**

26 subjects performed 3 exercises: Modified Push-Up Plus (Wall Version), Modified Knee Push-Up Plus (Floor version) and Serratus Punch. Electromyographic (EMG) data was collected from the SA (surface) and PM (fine-wire EMG).

**Results**

During the Serratus Punch the SA activity was significantly higher than the PM activity. During the Modified Push-Up Plus exercises (both Wall and Floor version), the SA and PM activity were comparable. The PM showed the highest activity during the Serratus Punch and the Modified Push-Up Plus (Floor), which was significantly higher than during the Modified Push-Up Plus (Wall). The SA showed the highest activity during the Serratus Punch, which was significantly higher than during the Modified Push-Up Plus (Floor) which was in turn significantly higher than the activity during the Modified Push-Up Plus (Wall).

**Conclusions**

All exercises activated the PM between 15 and 29% Maximum Voluntary Isometric Contraction and the SA between 15 and 43%. The Modified Push-Up Plus exercise against the wall and the floor activated the SA and PM to a similar degree. When maximum activation of the SA with minimal activation of the PM is desired in healthy subjects, the “Serratus punch” seems to be the optimal exercise.

**Keywords:**

EMG, Serratus anterior, Pectoralis minor, Scapular muscles, Exercises
OBJECTIVE: This study examines the association between strength measurements and supraspinatus tear in patients with shoulder pain. This study characterized determinants of abduction strength among patients with tears.

DESIGN: A total of 208 patients with shoulder pain were recruited. Strength was tested using a handheld dynamometer. Supraspinatus tears were diagnosed by combination of clinical assessment and blinded magnetic resonance imaging review. Associations of supraspinatus tear with patient characteristics and strength measurements (abduction, internal rotation and external rotation) were assessed using multivariable logistic regression models.

RESULTS: Patients with supraspinatus tear had decreased abduction strength (P = 0.02) and decreased external rotation strength (P < 0.01). When adjusted for age, sex, tear laterality, and body mass index, decreased abduction strength (odds ratio, 1.18/kg; 95% confidence interval, 1.06-1.32) and decreased external rotation strength (odds ratio, 1.29/kg; 95% confidence interval, 1.14-1.48) were associated with supraspinatus tear. In patients with tear, age 60 yrs or older, female sex, and visual analog scale pain score were significantly associated with decreased abduction strength but tear size, fatty infiltration, and atrophy were not.

CONCLUSIONS: Decreased abduction and external rotation strength were associated with supraspinatus tear in patients with shoulder pain. In this cohort, the abduction strength of patients with tears was influenced by demographic factors but not tear characteristics.

PMID:26098921
26. CARPAL TUNNEL SYNDROME

Factors of pain


Pain is Associated to Clinical, Psychological, Physical, and Neurophysiological Variables in Women With Carpal Tunnel Syndrome.

Fernández-Muñoz JJ¹, Palacios-Ceña M, Cigarán-Méndez M, Ortega-Santiago R, de-la-Llave-Rincón AI, Salom-Moreno J, Fernández-de-Las-Peñas C.

Author information

Abstract

OBJECTIVES:
To investigate potential relationships of clinical (age, function, side of pain, years with pain), physical (cervical range of motion, pinch grip force), psychological (depression), and neurophysiological (pressure and thermal pain thresholds) outcomes and hand pain intensity in carpal tunnel syndrome (CTS).

METHODS:
Two hundred and forty-four (n=224) women with CTS were recruited. Demographic data, duration of the symptoms, function and severity of the disease, pain intensity, depression, cervical range of motion, pinch tip grip force, heat/cold pain thresholds (HPT/CPT), and pressure pain thresholds (PPT) were collected. Correlation and regression analysis were performed to determine the association among those variables and to determine the proportions of explained variance in hand pain intensity.

RESULTS:
Significant negative correlations existed between the intensity of pain and PPTs over the radial nerve, C5/C6 zygapophyseal joint, carpal tunnel and tibialis anterior muscle, HPT over the carpal tunnel, cervical extension and lateral-flexion, and thumb-middle, fourth, and little finger pinch tip forces. Significant positive correlations between the intensity of hand pain with function and depression were also observed. Stepwise regression analyses revealed that function, thumb-middle finger pinch, thumb-little finger pinch, depression, PPT radial nerve, PPT carpal tunnel, and HPT carpal tunnel were significant predictors of intensity of hand pain (R=0.364; R adjusted=0.343; F=16.87; P<0.001).

CONCLUSION:
This study showed that 36.5% of the variance of pain intensity was associated to clinical (function), neurophysiological (localized PPT and HPT), psychological (depression), and physical (finger pinch tip force) outcomes in women with chronic CTS.

PMID:25882866
Impact on nerves


Effect of Carpal Tunnel Syndrome on the Ulnar Nerve at the Wrist: Sonographic and Electrophysiologic Studies.

Kang S1, Yang SN2, Yoon JS1, Kang HJ1, Won SJ1.

Author information

Abstract

OBJECTIVES:
The aim of this study was to compare the ulnar nerve at the wrist by sonographic and electrophysiologic studies between patients with carpal tunnel syndrome and control participants and to verify the effect of carpal tunnel syndrome of the ulnar nerve at the wrist.

METHODS:
Forty-two hands of patients with carpal tunnel syndrome and 37 hands of control participants were examined. Electrophysiologic studies of the ulnar nerve were done in all participants. The cross-sectional areas of the median and ulnar nerves at the wrist were evaluated by sonography. Fifteen hands of patients with carpal tunnel syndrome who underwent carpal tunnel release were also evaluated by sonography after the operation.

RESULTS:
The ulnar nerve cross-sectional area of the patients with carpal tunnel syndrome (mean ± SD, 5.16 ± 1.04 mm(2)) was significantly larger than that of the controls (3.56 ± 0.52 mm(2); P < .0001). After release of the transverse carpal ligament, the cross-sectional area of the ulnar nerve was significantly smaller than the size measured prior to surgery (P < .0001). The cross-sectional area of the median nerve was significantly correlated with that of the ulnar nerve (P < .05). However, no statistically significant difference was found between the patients with carpal tunnel syndrome and controls in ulnar nerve conduction. There were no statistically significant differences in nerve conduction study results or cross-sectional area of the ulnar nerve between patients with carpal tunnel syndrome with and without extramedian symptoms.

CONCLUSIONS:
The cross-sectional areas of the ulnar and median nerves at the wrist are increased in patients with carpal tunnel syndrome. Also, the cross-sectional area of the ulnar nerve is decreased after carpal tunnel release.

KEYWORDS: Guyon canal; carpal tunnel syndrome; neurosonology; sonography; ulnar nerve
PMID: 26589645
29. OA

Changes in function with PT

Phys Ther. 2015 Dec 17.

**Long-Term Effect of Exercise Therapy and Patient Education on Impairments and Activity Limitations in Patients With Hip Osteoarthritis: Secondary Outcome Analysis of a Randomized Clinical Trial.**

Svege I¹, Fernandes L², Nordsletten L³, Holm I⁴, Risberg MA⁵.

Abstract

**BACKGROUND:**
The effect of exercise on specific impairments and activity limitations in patients with hip osteoarthritis (OA) is limited.

**OBJECTIVES:**
To evaluate long-term results of exercise therapy and patient education on range of motion (ROM), muscle strength, physical fitness, walking capacity and pain during walking in patients with hip OA.

**DESIGN:**
Randomized clinical trial

**SETTING:** University Hospital

**PATIENTS:** One hundred and nine patients with clinical and radiographic hip OA, included at a university hospital, were randomly allocated to exercise therapy and patient education (exercise group) or patient education only (control group).

**INTERVENTIONS:**
All patients participated in a patient education program consisting of three group meetings led by two physical therapists. Two other physical therapists were responsible for providing the exercise therapy program, consisting of 2-3 weekly sessions of strengthening, functional and stretching exercises over 12-weeks. Both interventions were conducted at a sports medicine clinic.

**OUTCOME MEASURES:**
Outcome measures included ROM, isokinetic muscle strength, predicted maximal oxygen consumption determined by the Astrand bike test, the six minute walk test (6MWT) for distance and pain during the 6MWT. Follow-ups were conducted four, ten and 29 months after inclusion by five physical therapists blinded to group allocation.

**RESULTS:**
No significant group differences were found for ROM, muscle strength, predicted maximal oxygen consumption, or 6MWT for distance over the follow-up period, but the exercise group had less pain during the 6MWT compared to the control group at 10 months [mean difference (95% confidence interval) -8.5 mm (-16.1, -0.9)] and 29 months [-9.3 mm (-18.1, -0.6)].

**LIMITATIONS:**
Reduced statistical power and 53% compliance rate with the exercise program.

**CONCLUSIONS:**
The previously reported effect of exercise on self-reported function was not reflected by beneficial results in ROM, muscle strength, physical fitness and walking capacity, but exercise in addition to patient education resulted in less pain during walking in the long-term.
ABSTRACTS

30 A. IMPINGEMENT

In young hockey players


Prevalence and Functional Consequences of Femoroacetabular Impingement in Young Male Ice Hockey Players.

Brunner R¹, Maffiuletti NA², Casartelli NC³, Bizzini M³, Sutter R⁴, Pfirrmann CW⁵, Leunig M⁵.

Author information

Abstract

BACKGROUND:
Femoroacetabular impingement (FAI), which is highly prevalent in adult ice hockey players, is often associated with negative clinical and functional outcomes. It is unclear, however, whether FAI-related bony deformities and symptoms may lead to functional alterations as reflected in hip muscle strength, range of motion (ROM), and on-ice physical performance in youth ice hockey players.

HYPOTHESIS:
Compared with players with neither structural signs nor symptoms related to FAI, players with symptomatic FAI would show hip muscle weakness and reduced hip ROM, which would in turn affect ice hockey physical performance.

STUDY DESIGN:
Controlled laboratory study.

METHODS:
A total of 74 young male ice hockey players were evaluated bilaterally for passive hip internal rotation ROM by use of a hip examination chair. Only the side with less internal rotation ROM was further investigated. FAI-related bony deformities were evaluated with magnetic resonance imaging (MRI). The involved hip was classified as symptomatic or asymptomatic based on the presence of hip pain during exercise and results from the flexion/adduction/internal rotation (FADIR) provocation test. Hip muscle strength, passive hip ROM, and on-ice physical performance were compared between players with no FAI, players with asymptomatic MRI-positive FAI, and players with symptomatic FAI.

RESULTS:
Fifty of 74 players (68%) had FAI-related bony deformities, of whom 16 (22%) were symptomatic. Hip muscle strength, hip ROM, and on-ice physical performance did not differ significantly between players with no FAI and those with asymptomatic or symptomatic FAI.

CONCLUSION:
Despite a high prevalence of FAI-related bony deformities, youth ice hockey players with asymptomatic or symptomatic FAI did not show functional impairments in terms of hip muscle strength, hip ROM, or on-ice physical performance.

CLINICAL RELEVANCE:
Hip muscle strength, passive hip ROM, and on-ice physical performance do not seem to discriminate for FAI-related signs and symptoms in young male ice hockey players.
Impact of surgery


Sex Differences in Self-Reported Hip Function Up to 2 Years After Arthroscopic Surgery for Femoroacetabular Impingement.

Joseph R¹, Pan X², Cenkus K³, Brown L⁴, Ellis T⁵, Di Stasi S⁶.

Author information

Abstract

BACKGROUND:
Femoroacetabular impingement (FAI) is a significant cause of disability in young adults. Hip arthroscopic surgery restores bony congruence and improves function in the majority of patients, but recent evidence indicates that women may experience worse pre- and postoperative function than men.

PURPOSE/HYPOTHESIS:
The purpose of this study was to identify whether self-reported hip function differed between men and women with symptomatic FAI. The hypothesis was that mean self-reported hip function scores would improve after arthroscopic surgery but that women would report poorer function than men both before and up to 2 years after arthroscopic surgery.

STUDY DESIGN:
Cohort study; Level of evidence, 2.

METHODS:
A total of 229 patients (68.4% women; mean [±SD] age, 31.6 ± 10.8 years; mean [±SD] body mass index, 26.8 ± 11.9 kg/m(2)) underwent hip arthroscopic surgery for unilateral symptomatic FAI. All eligible and consenting patients with radiologically and clinically confirmed FAI completed the International Hip Outcome Tool (iHOT-33) and the Hip Outcome Score activities of daily living subscale (HOS-ADL) before hip arthroscopic surgery and at 3, 6, 12, and 24 months after arthroscopic surgery. A linear mixed model for repeated measures was used to test for differences in self-reported hip function between men and women over the study period (P ≤ .05).

RESULTS:
There were no significant time × sex interactions for either the HOS-ADL (P = .12) or iHOT-33 (P = .64), but both measures showed significant improvements between the preoperative time point and each of the 4 follow-up points (P < .0001); however, self-reported hip function did not improve between 6 and 24 months after arthroscopic surgery (P ≥ .11). Post hoc independent t tests indicated that women reported poorer hip function than did men before surgery (P ≤ .003) both on the HOS-ADL (mean ± standard error of the mean [SEM], 67.4 ± 1.9 [men] vs 60.5 ± 1.3 [women]) and iHOT-33 (mean ± SEM, 38.0 ± 1.9 [men] vs 30.9 ± 1.3 [women]); scores were not different between sexes at any other time point.

CONCLUSION:
These findings indicate improvements in self-reported hip function in patients with FAI, regardless of sex, until 6 months after hip arthroscopic surgery. Although women reported poorer preoperative function than did men, the differences were not significant 2 years after surgery.

KEYWORDS: femoroacetabular impingement; hip arthroscopic surgery; hip function

PMID: 26546302
Prevalence in elite ballet dancers


Radiographic Prevalence of Dysplasia, Cam, and Pincer Deformities in Elite Ballet.

Harris JD¹, Gerrie BJ², Varner KE², Lintner DM², McCulloch PC².

Author information

Abstract

BACKGROUND:
The demands of hip strength and motion in ballet are high. Hip disorders, such as cam and pincer deformities or dysplasia, may affect dance performance. However, the prevalence of these radiographic findings is unknown.

PURPOSE:
To determine the prevalence of radiographic cam and pincer deformities, borderline dysplasia, and dysplasia in a professional ballet company.

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

METHODS:
An institutional review board-approved cross-sectional investigation of a professional ballet company was undertaken. Male and female adult dancers were eligible for inclusion. Four plain radiographs were obtained (standing anteroposterior pelvis, bilateral false profile, and supine Dunn 45°) and verified for adequacy. Cam and pincer deformities, dysplasia, borderline dysplasia, and osteoarthritis were defined. All plain radiographic parameters were measured and analyzed on available radiographs. Student t test, chi-square test (and Fisher exact test), and Spearman correlation analyses were performed to compare sexes, groups, and the effect of select radiographic criteria.

RESULTS:
A total of 47 dancers were analyzed (21 males, 26 females; mean age (±SD), 23.8 ± 5.4 years). Cam deformity was identified in 25.5% (24/94) of hips and 31.9% (15/47) of subjects, with a significantly greater prevalence in male dancers than females (48% hips and 57% subjects vs 8% hips and 12% subjects; P < .001 and P = .001, respectively). Seventy-four percent of subjects had at least 2 of 6 radiographic signs of pincer deformity. Male dancers had a significantly greater prevalence of both prominent ischial spine and posterior wall signs (P = .001 and P < .001, respectively), while female dancers had a significantly greater prevalence of coxa profunda (85% female hips vs 26% male hips; P < .001). Eighty-nine percent of subjects had dysplasia or borderline dysplasia in at least 1 hip (37% dysplastic), with a significantly greater prevalence of dysplasia or borderline dysplasia in female versus male dancers (92% female hips vs 74% male hips; P < .022). Further, in those with dysplasia or borderline dysplasia, 92% of female and 82% of male dancers had bilateral findings.

CONCLUSION:
In this professional ballet company, a high prevalence of radiographic abnormalities was found, including cam and pincer deformity and dysplasia. The results also revealed several sex-related differences of these abnormalities in this unique population. The long-term implications of these findings in this group of elite athletes remain unknown, and this issue warrants future investigation.
Voluntary activation of quadriceps femoris in patients with unilateral anterior cruciate ligament rupture within 6 months of injury: A cross-sectional observational study

Highlights
- Voluntary activation was lower in the injured limb than the uninjured limb.
- Peak torque was lower in the injured limb than the uninjured limb.
- Strength and muscle inhibition should be targeted in rehabilitation.

Abstract

Background
Deficits in quadriceps femoris strength and voluntary activation have been well documented in chronic anterior cruciate ligament (ACL) injuries, but less is known about the acute or early phase after injury.

Objectives
The aim of this study was to evaluate and compare the levels of quadriceps voluntary activation (VA) and strength in both limbs of participants with unilateral ACL ruptures (complete tears) within 6 months of injury.

Design
Cross-sectional observational study.

Method
Seventeen participants, 12 male, mean age 30 (17–45) years, performed maximal voluntary isometric contractions with the interpolated twitch technique.

Results
Mean (SD) peak VA was significantly lower in the injured limb 76.5 (15.0) % than the uninjured limb 85.9 (6.7) % (p = 0.02). Mean (SD) peak torque in the injured limb was significantly lower 162.7 (74.1) Nm than the uninjured limb 240.5 (81.0) Nm (p < 0.01).

Conclusions
This between-limb difference in VA has not previously been observed in patients within 6 months of ACL rupture. Our findings suggest that early rehabilitation programs for adults with ACL rupture should focus on reducing VA deficits to facilitate improvement of the quadriceps femoris muscle strength in the injured limb to comparable values of the uninjured limb.

Keywords: Voluntary muscle activation, Quadriceps strength, Anterior cruciate ligament
Degeneration of


Abstract

OBJECTIVE: Meniscus injury is one of the causes of secondary osteoarthritis (OA). However, the role of meniscus is still unclear. Human meniscal distribution of cells and cartilage oligomeric matrix protein (COMP) and their changes in advanced OA were analyzed.

PATIENTS AND METHODS: Thirty-one medial menisci from patients with knee OA that underwent a total knee arthroplasty were studied. Normal meniscal tissue was obtained from partial arthroscopic meniscectomy. Meniscal samples were processed for histology, immunohistochemistry and in situ hybridization, for cell assessment including density, active divisions, apoptosis, COMP distribution and proteoglycan content.

RESULTS: Osteoarthritic menisci demonstrated areas of cell depletion and significant decrease in COMP immunostaining. Actively dividing cells were only found in the meniscectomy group, but not in the osteoarthritic group. Proteoglycan staining was less prominent in menisci from the osteoarthritic group.

CONCLUSIONS: Our results show a decreased cell population, with low COMP and altered matrix organization in osteoarthritic menisci that suggest an altered meniscal scaffold and potential impairment of meniscal function. These meniscal changes may be associated with the development of knee osteoarthritis.

KEYWORDS: COMP; Immunohistochemistry; In situ hybridization; Knee osteoarthritis; Meniscus

PMID:26667622
34. PATELLA

Decreased H reflex

Smaller amplitude of H-reflex in females with patellofemoral pain: Thinking outside proximal, local and distal factors

Archives of Physical Medicine and Rehabilitation, 01/07/2016 De Oliveira Silva D, et al.

The aim of this study is to investigate whether vastus medialis (VM) H–reflexes differ based on the presence or absence of patellofemoral pain (PFP). An additional objective was to assess the capability of VM H–reflex measurements in discriminating accurately between females with and without PFP. This study is the first to show that VM H–reflexes are lower in females with PFP as compared to asymptomatic controls. Moreover, the discriminatory capability of VM Hmax/Mmax measurements indicates that a considerable amount of subjects with PFP shows impaired H–reflex excitability.

Methods

- Cross–sectional study.
- Laboratory of biomechanics and motor control.
- Fifteen females with PFP and 15 asymptomatic controls aged 18 to 35 years.
- Maximum evoked responses were obtained by electrical stimulation applied to the femoral nerve and peak–to–peak amplitudes of normalized maximal H–reflexes (Hmax/Mmax ratios) were calculated.
- Independent t tests were performed to identify differences between groups and a Receiver Operating Characteristic (ROC) curve was performed to evaluate the discriminatory capability of VM H–reflex measurements.

Results

- VM Hmax/Mmax ratios were significantly lower in subjects with PFP as compared to pain–free subjects (p =0.007).
- In addition, the VM Hmax/Mmax ratio presented high and balanced discriminatory capability values (73% sensitivity and 67% specificity).
Knee brace ok


The Effect of Knee Braces on Quadriceps Strength and Inhibition in Subjects With Patellofemoral Osteoarthritis.

Callaghan MJ, Parkes MJ, Felson DT.

Abstract
Study Design Secondary analysis of a randomized controlled trial. Background The use of external supports has been questioned because they may lead to weakness in the surrounding muscles. To our knowledge, there is no investigation into the effect of knee supports or braces on quadriceps muscle strength and quadriceps inhibition in individuals with patellofemoral joint (PFJ) osteoarthritis (OA).

Objectives To investigate the effects of a flexible knee support on quadriceps maximum voluntary contraction (MVC) and arthrogenous muscle inhibition (AMI) in patients with PFJ OA.

Methods The study included 108 participants who had at least 3 months of patellofemoral pain and a Kellgren-Lawrence score of 2 or 3 for PFJ OA. The participants were randomized to a group that wore a flexible knee support (brace) or a group that did not wear a support (no brace) in a 6-week randomized controlled trial, followed by an open-label trial, in which all participants wore the brace for a total of 12 weeks. Quadriceps MVC, measured isometrically, and quadriceps AMI, measured by twitch interpolation, were assessed at the 6-week and 12-week time points.

Results After 6 weeks, MVC did not differ between the brace and no-brace groups (9.09 Nm; 95% confidence interval [CI]: -4.89, 23.07; P = .20). Arthrogenous muscle inhibition significantly decreased in the brace group (-8.62%; 95% CI: -13.90%, -3.33%; P = .002). After 12 weeks, in all of the participants who wore a flexible knee support, MVC increased by 7.98 Nm (95% CI: 2.52, 13.45; P = .004) and AMI decreased (-8.42%; 95% CI: -11.48%, -5.36%; P<.001). Although statistically significant, these results have doubtful clinical significance.

Conclusion A patellofemoral flexible knee support in participants with PFJ OA does not have an adverse effect on quadriceps MVC or AMI. Using a knee support should not be discouraged because of concerns about deleterious effects on quadriceps strength and inhibition. Level of Evidence Therapy, level 1b. J Orthop Sports Phys Ther 2016;46(1):19-25. Epub 10 Nov 2015. doi:10.2519/jospt.2016.5093.

KEYWORDS: MI; MVC; arthrogenous muscle inhibition; isometric strength
PMID:26556391
Stretching

Effects of static stretching of knee musculature on patellar alignment and knee functional disability in male patients diagnosed with knee extension syndrome: A single-group, pretest–posttest trial

Mohammad Reza Pourahmadi Ismail Ebrahimi Takamjani Kazem Hesampour Gholam Reza h-Hosseini Ali Ashraf Jamshidi Mohammad Bagher Shamsi

Highlights
• Patellar tilt angle was increased in male Kext syndrome patients.
• Rectus femoris shortness had a significant effect on patellar tilt angle.
• Patella alta does not seem to be severe in male Kext syndrome patients.
• Stretching was effective in improving Kujala scores in male Kext syndrome patients.

Abstract
Background
Knee extension (Kext) syndrome is based on movement system impairments and is described as knee pain associated with quadriceps stiffness.

Objective
To investigate the effects of 3 times per week for 4 weeks static stretching of knee musculature on patellar alignment and knee functional disability in male Kext syndrome patients.

Design
A single-group, pretest–posttest clinical trial.

Setting
Hazrat-e-Rasoul Akram Hospital.

Participants
Forty-six male Kext syndrome patients aged 18–35 years.

Methods
Knee functional disability was assessed by the Kujala questionnaire. Patellar tilt was assessed using the skyline view X-ray. In addition, patella alta was assessed by X-ray using the Insall–Salvati ratio. After intervention, changes in knee flexion–extension range of motion (ROM) and hip adduction were assessed by goniometer and inclinometer. Changes in patellar tilt and patella alta were evaluated. Correlations between muscles length, patellar tilt and knee functional disability were also evaluated.

Results
The mean of patellar tilt in male Kext syndrome patients was 15.19°. Only the correlation between rectus femoris shortness and patellar tilt (P = 0.002) and the correlation between rectus femoris shortness and knee functional disability (P = 0.037) were significant. Patella alta was not severe in male Kext syndrome patients (1.28 ± 0.10). Knee flexion–extension ROM and femoral adduction increased significantly after a 12-session stretching programme (P < 0.0001).

Conclusion
The results demonstrated that rectus femoris shortness had higher correlation with patellar tilt and knee functional disability than iliotibial band and hamstring shortness. Stretching was effective in reducing patellar tilt, patella alta, knee functional disability, increasing knee ROM and hip adduction in these patients.

Keywords: Patellar tilt, Patella alta, Knee extension syndrome, Knee functional disability
Abstract

OBJECTIVE:
To investigate the efficacy of 4 weeks of pre-operative and 4-week post-operative progressive resistance training (PRT) compared to 4 weeks of post-operative PRT only on functional performance, muscle strength and patient-reported outcomes in patients undergoing total knee arthroplasty (TKA).

METHODS:
In total 59 patients were randomized to 4 weeks of pre-operative PRT (intervention group) or to a group who "lived as usual" (control group). Both groups performed 4 weeks of PRT after TKA. At 6 and 1 weeks before TKA, and at 1, 6 and 12 weeks after TKA performance-based measures (30s chair stand test (30sCST), timed-up-and-go (TUG) and walking tests), knee extensor and flexor muscle strength (dynamometry), patient-reported functional performance, health-related quality of life, and pain scores were evaluated.

RESULTS:
When comparing the changes from baseline to the primary test point 6 weeks after TKA, a significant group difference in favor of the intervention group was found for the 30sCST (2.5 rep. (0.9;4.1) vs. -1.1 rep. (-2.8;0.7), p<0.004), the TUG (-0.7 sec (-1.6;0.1) vs. 0.8 sec (-0.1;1.7), p=0.015), normalized knee extensor muscle strength (-0.2 Nm/kg (-0.3;-0.1) vs. -0.4 Nm/kg (-0.5;-0.3), p=0.002) and normalized knee flexor muscle strength (0.1 Nm/kg (0.0;0.2) vs. 0.0 Nm/kg (-0.1;0.1), p=0.016). No differences were found between groups on patient-reported outcomes.

CONCLUSION:
Supervised pre-operative PRT is an efficacious and safe intervention for improving post-operative functional performance and muscle strength, but improvements in patient-reported outcomes were not detected. This article is protected by copyright. All rights reserved.

KEYWORDS: Knee replacement; knee osteoarthritis; rehabilitation; strength training
PMID:26713665
Knee manipulation under anaesthetic following total knee arthroplasty: a matched cohort design.

Dzaja I1, Vasarhelyi EM2, Lanting BA2, Naudie DD2, Howard JL2, Somerville L3, McCalden RW2, MacDonald SJ4.

Abstract

The purpose of this study was to compare clinical outcomes of total knee arthroplasty (TKA) after manipulation under anaesthesia (MUA) for post-operative stiffness with a matched cohort of TKA patients who did not require MUA. In total 72 patients (mean age 59.8 years, 42 to 83) who underwent MUA following TKA were identified from our prospective database and compared with a matched cohort of patients who had undergone TKA without subsequent MUA. Patients were evaluated for range of movement (ROM) and clinical outcome scores (西方麦吉尔大学关节炎指数, Short-Form Health Survey, and Knee Society Clinical Rating System) at a mean follow-up of 36.4 months (12 to 120). MUA took place at a mean of nine weeks (5 to 18) after TKA. In patients who required MUA, mean flexion deformity improved from 10° (0° to 25°) to 4.4° (0° to 15°) (p < 0.001), and mean range of flexion improved from 79.8° (65° to 95°) to 116° (80° to 130°) (p < 0.001). There were no statistically significant differences in ROM or functional outcome scores at three months, one year, or two years between those who required MUA and those who did not.

There were no complications associated with manipulation. At most recent follow-up, patients requiring MUA achieved equivalent ROM and clinical outcome scores when compared with a matched control group. While other studies have focused on ROM after manipulation, the current study adds to current literature by supplementing this with functional outcome scores. Cite this article: Bone Joint J 2015;97-B:1640-4.

KEYWORDS: Total knee arthroplasty; clinical outcomes; manipulation; stiffness

PMID: 26637678
37. OSTEOARTHRITIS/KNEE

Mobilization of OA knee

Joint Mobilization Enhances Mechanisms of Conditioned Pain Modulation in Individuals With Osteoarthritis of the Knee

Authors: Carol A. Courtney, PT, PhD¹, Alana D. Steffen, PhD¹, César Fernández-de-las-Peñas, PT, PhD²,³, John Kim, PT, DPT⁴, Samuel J. Chmell, MD¹


Study Design
Experimental laboratory study with repeated measures crossover design.

Background
Treatment effects of joint mobilization may occur in part by decreasing excitability of central nociceptive pathways. Impaired conditioned pain modulation (CPM) has been found experimentally in persons with knee and hip osteoarthritis (OA), indicating impaired inhibition of central nociceptive pathways. We hypothesized increased effectiveness of CPM following application of joint mobilization, determined via measures of deep tissue hyperalgesia.

Objectives
To examine the effect of joint mobilization on impaired CPM.

Methods
Examination of 40 individuals with moderate/severe knee OA identified 29 (73%) with impaired CPM. Subjects were randomized to receive 6 minutes of knee joint mobilization (intervention) or light manual cutaneous input only, one week apart. Deep tissue hyperalgesia was examined via pressure pain thresholds (PPT) bilaterally at knee medial joint line and the hand, at baseline, post-intervention and post-CPM testing. Further, vibration perception threshold (VPT) was measured at medial knee epicondyle at baseline and post-CPM testing.

Results
Joint mobilization, but not cutaneous input intervention, resulted in a global increase in PPT, indicated by diminished hyperalgesic responses to pressure stimulus. Further, CPM was significantly enhanced following joint mobilization. Diminished baseline VPT acuity was enhanced following joint mobilization at the knee that received intervention, but not the contralateral knee. Resting pain was also significantly lower following the joint intervention.

Conclusion
CPM was enhanced following joint mobilization, demonstrated by global decrease in deep tissue pressure sensitivity. Joint mobilization may act via enhancement of descending pain mechanisms, in patients with painful knee OA.

Level of Evidence

Keyword: arthralgia, diffuse noxious inhibitory control, manual therapy, physical therapy techniques
Normative data for the American Orthopedic Foot and Ankle Society ankle-hindfoot, midfoot, hallux and lesser toes clinical rating system.

Schneider W¹, Jurenitsch S².

Abstract

PURPOSE:
Despite some theoretical reservations, the AOFAS clinical rating system with its scales for ankle-hindfoot, midfoot, hallux and lesser toes is one of the most widely used assessment tools in foot and ankle surgery. This study was designed to generate age- and gender-related norm values for all four subscales.

METHODS:
Despite not being used in a self-administered manner, the AOFAS score underwent cross cultural adaptation to guarantee unrestricted comparability of data. A data pool was generated using the results of personal interviews and clinical examination of 625 individuals, including staff and visitors to our hospital, and excluding people scheduled for foot surgery or in after-treatment. These data served as a basis to calculate all four parts of the AOFAS clinical rating system.

RESULTS:
Mean value for the ankle-hindfoot scale was calculated as 91.6 points (±0.9 confidence interval), and 89.3 points for the midfoot scale (±1.0 CI), 88.3 for the hallux metatarsophalangeal-interphalangeal scale (± 0.9 CI) and 91.0 for the lesser metatarsophalangeal-interphalangeal scale (± 0.8 CI). Results showed a decrease with age in all four scales. Males showed better results than females. Individuals with previous surgery showed lower results in the respective score.

CONCLUSIONS:
While lowered scoring results prior to surgery reflect the degree of restrictions due to pain, function and alignment problems, post-operative increases in clinical scoring should indicate return to age-related norm values. Our data calculated these norm values for the first time for all four AOFAS scales, giving a basis for better interpretation of published results in foot and ankle surgery. Our data showed and quantified the decrease of norm values with age, especially for hallux and lesser toes scores, as well as lower norm values for females and for individuals that had had surgery of the foot.

KEYWORDS: AOFAS clinical rating system; Ankle-hindfoot; Hallux; Lesser toe; Midfoot; Normative data
PMID:26669697
39 A. ORTHOTICS

And LBP

Foot orthotics for low back pain: The state of our understanding and recommendations for future research

The Foot, 01/06/2016

Papuga MO, et al. – Based upon the critical evaluation of the current research on foot orthotics related to biomechanical mechanisms and clinical outcomes, recommendations for future research to address the evidence–practice gaps on the use of foot orthotics for low back pain are presented.

Methods

• Database searches were conducted using PubMed, EBSCO, GALE, Google Scholar, and clinicaltrials.gov.

• The biomedical literature was reviewed to determine the current state of knowledge on the benefits of foot orthotics for low back pain related to biomechanical mechanisms and clinical outcomes.

Results

• It may be argued that foot orthotics are experimental, investigational, or unproven for low back pain due to lack of sufficient evidence for their clinical effectiveness.

• This conclusion is based upon lack of high quality randomized controlled trials (RCTs).

• However, there is extensive research on biomechanical mechanisms underlying the benefits of orthotics that may be used to address this gap.

• Additionally, promising pilot studies are beginning to emerge in the literature and ongoing large–scale RCTs are addressing effects of foot orthotics on chronic low back pain.
42. PLANTAR SURFACE

Pressures during gait


Are Pressure Time Integral and Cumulative Plantar Stress Related to 1st Metatarsophalangeal Joint Pain: The Multicenter Osteoarthritis Study.


Abstract

OBJECTIVE: To examine the relationship between plantar stress over a step, cumulative plantar stress over a day and 1st metatarsophalangeal (MTP) joint pain among older adults.

METHODS: Plantar stress and 1st MTP pain were assessed within the Multicenter Osteoarthritis Study (MOST). All included participants were asked if they had pain, aching or stiffness at the 1st MTP joint on most days for the past 30 days. Pressure time integral (PTI) was quantified as participants walked on a pedobarograph, and mean steps per day were obtained using an accelerometer. Cumulative plantar stress was calculated as the product of regional PTI and mean steps per day. Quintiles of hallucal and 2nd metatarsal PTI and cumulative plantar stress were generated. The relationship between predictors and the odds ratio of 1st MTP pain was assessed using a logistic regression model.

RESULTS: Feet in the quintile with the lowest hallux PTI had 2.14 times increased odds of 1st MTP pain (95% confidence interval [95% CI]:1.42-3.25, p<0.01). Feet in the quintile with the lowest 2nd metatarsal PTI had 1.50 times increased odds of 1st MTP pain (95% CI:1.01-2.23, p=0.042). Cumulative plantar stress was unassociated with 1st MTP pain.

CONCLUSION: Lower PTI was modestly associated with increased prevalence of frequent 1st MTP pain at both the hallucal and 2nd metatarsal. Lower plantar loading may indicate the presence of an antalgic gait strategy and may reflect an attempt at pain avoidance. The lack of association with cumulative plantar stress may suggest that they do not limit their walking as a pain-avoidance mechanism. This article is protected by copyright. All rights reserved.

KEYWORDS: Foot pain; cumulative stress; gait; metatarsophalangeal; plantar pressure; walking

PMID: 26713755
**Abstract**

Arthritis causes disability due to pain and inflammation in joints. There are many forms of arthritis, one of which is osteoarthritis whose prevalence increases with age. It occurs in various joints including hip, knee and hand with knee osteoarthritis being more prevalent. There is no cure for it. The management strategies include exercise, glucosamine plus chondroitin sulfate and NSAIDs. In vitro and animal studies provide a rationale for the use of antioxidant supplements for its management. This review assesses the reality of the benefits of antioxidant supplements in the management of knee osteoarthritis. Several difficulties were encountered in examining this issue: poorly conducted studies, a lack of uniformity in disease definition and diagnosis, and muddling of conclusions from attempts to isolate the efficacious molecules. The antioxidant supplements with most evidence for benefit for pain relief and function in knee osteoarthritis were based on curcumin and avocado-soya bean unsaponifiables. Boswellia and some herbs used in Ayurvedic and Chinese medicine may also be useful. The benefits of cuisines with the appropriate antioxidants should be assessed because they may be more economical and easier to incorporate into the lifestyle.

PMID: 26728196
OBJECTIVE: To evaluate the additional effect provided by physical therapy in migraine treatment.

DESIGN: Randomized clinical trial.

SETTING: Tertiary university-based hospital.

PARTICIPANTS: Among 300 patients approached, 50 women, aged 18-55 years old, diagnosed with migraine were randomized into two groups: a control group (CG) and a physiotherapy plus medication group (PG).

INTERVENTIONS: Both groups received medication for migraine treatment. Additionally, PG patients received 8 sessions of physical therapy over four weeks; comprised mainly of manual therapy and stretching maneuvers lasting 50 min.

MAIN OUTCOME MEASURES: A blinded examiner assessed the clinical outcomes of headache frequency, intensity, and self-perception of global change, as well as physical outcomes of pressure pain threshold and cervical range of motion. Data were recorded at baseline, post-treatment, and follow-up after one-month.

RESULTS: Twenty-three patients experienced side effects from the medication. Both groups reported a significantly reduced frequency of headaches, although no differences were observed between groups (PG patients showed an additional 18% improvement at post-treatment and 12% improvement at follow-up compared to CG patients, p>0.05). The reduction observed in PG patients was clinically relevant at post-treatment, whereas clinical relevance for CG patients was demonstrated only at the follow-up. For pain intensity, PG patients showed statistical evidence and clinical relevance with reduction post-treatment (p<0.05). In addition, they showed better self-perception of global change than CG patients (p<0.05). Cervical muscle pressure pain threshold increased significantly in PG patients and decreased in CG patients, but statistical differences between groups were observed only in the temporal area (p<0.05). No differences were observed between groups regarding the cervical range of motion.

CONCLUSION: We cannot assume that physical therapy promotes additional improvement in migraine treatment; however, it can increase cervical pressure pain threshold, anticipate clinically relevant changes, and enhance patient satisfaction.

CLINICAL TRIALS REGISTER: REBEC nº RBR-6kvx74.

KEYWORDS: headache; manual therapy; migraine; physical therapy

PMID:26718237
Cervicogenic tinnitus


Rob A.B. Oostendorp Iem Bakker Hans Elvers Emilia Mikolajewska Sarah Michiels Willem De Hertogh Han Samwel

Highlights
• Understanding of neural mechanisms underlying somatosensory tinnitus is the basics for application of manual therapy.
• Chronic subjective tinnitus combined with secondary central tinnitus is comparable with chronic pain with central sensitization.
• Manual therapy is a potential treatment in patients with cervicogenic somatosensory tinnitus.

Abstract
Tinnitus can be evoked or modulated by input from the somatosensory and somatomotor systems. This means that the loudness or intensity of tinnitus can be changed by sensory or motor stimuli such as muscle contractions, mechanical pressure on myofascial trigger points, transcutaneous electrical stimulation or joint movements. The neural connections and integration of the auditory and somatosensory systems of the upper cervical region and head have been confirmed by many studies. These connections can give rise to a form of tinnitus known as somatosensory tinnitus. To date only a handful of publications have focussed on (cervicogenic) somatosensory tinnitus and manual therapy. Broadening the current understanding of somatosensory tinnitus would represent a first step towards providing therapeutic approaches relevant to manual therapists.

Treatment modalities involving the somatosensory systems, and particularly manual therapy, should now be re-assessed in the subgroup of patients with cervicogenic somatosensory tinnitus. The conceptual phase of this study aims to uncover underlying mechanisms linking the auditory and somatosensory systems in relation to subjective tinnitus through (i) review of the literature (part 1) and (ii) through design of a that will explore characteristics of the study population and identify relevant components and outcomes of manual therapy in patients with cervicogenic somatosensory tinnitus (part 2). This manuscript focusses the theoretical concept of (cervicogenic) somatosensory tinnitus, either with or without secondary central tinnitus or tinnitus sensitization.

Keywords: Auditory–somatosensory interactions, Somatosensory tinnitus, Tinnitus sensitization, Cervical spine, Somatosensory stimulation, Manual therapy
ABSTRACTS

45 D. MANUAL THERAPY EXTREMITIES

MT and CTS


Fernández-de-Las Peñas C, Ortega-Santiago R, de la Llave-Rincón A, Martínez-Perez A, Fahandezh-Saddi Díaz H, Martínez-Martín J, Pareja JA, Cuadrado-Pérez ML.

Author information

Abstract

This randomized clinical trial investigated the effectiveness of surgery compared with physical therapy consisting of manual therapies including desensitization maneuvers in carpal tunnel syndrome (CTS). The setting was a public hospital and 2 physical therapy practices in Madrid, Spain. One hundred twenty women with CTS were enrolled between February 2013 and January 2014, with 1-year follow-up completed in January 2015. Interventions consisted of 3 sessions of manual therapies including desensitization maneuvers of the central nervous system (physical therapy group, n = 60) or decompression/release of the carpal tunnel (surgical group, n = 60). The primary outcome was pain intensity (mean pain and the worst pain), and secondary outcomes included functional status and symptoms severity subscales of the Boston Carpal Tunnel Questionnaire and the self-perceived improvement. They were assessed at baseline and 1, 3, 6, and 12 months by a blinded assessor. Analysis was by intention to treat. At 12 months, 111 (92%) women completed the follow-up (55/60 physical therapy, 56/60 surgery). Adjusted analyses showed an advantage (all, P < .01) for physical therapy at 1 and 3 months in mean pain (Δ -2.0 [95% confidence interval (CI) -2.8 to -1.2]/-1.3 [95% CI -2.1 to -.6]), the worst pain (Δ -2.9 [-4.0 to -2.0]/-2.0 [-3.0 to -.9]), and function (Δ -8 [-1.0 to -.6]/-.3 [-.5 to -.1]), respectively. Changes in pain and function were similar between the groups at 6 and 12 months. The 2 groups had similar improvements in the symptoms severity subscale of the Boston Carpal Tunnel Questionnaire at all follow-ups. In women with CTS, physical therapy may result in similar outcomes on pain and function to surgery.


PERSPECTIVE: This study found that surgery and physical manual therapies including desensitization maneuvers of the central nervous system were similarly effective at medium-term and long-term follow-ups for improving pain and function but that physical therapy led to better outcomes in the short term.

KEYWORDS: Carpal tunnel syndrome; manual therapy; pain; physical therapy; surgery
PMID:26281946
MT and Ex for OA of hip


The effects of manual therapy or exercise therapy or both in people with hip osteoarthritis: A systematic review and meta-analysis.

Sampath KK, Mani R, Miyamori T, Tumilty S.

Author information

Abstract

OBJECTIVE:
To determine whether manual therapy or exercise therapy or both is beneficial for people with hip osteoarthritis in terms of reduced pain, improved physical function and improved quality of life.

METHODS:
Databases such as Medline, AMED, EMBASE, CINAHL, SPORTSDiscus, PubMed, Cochrane Library, Web of Science, Physiotherapy Evidence Database, and SCOPUS were searched from their inception till September 2015. Two authors independently extracted and assessed the risk of bias in included studies. Standardised mean differences for outcome measures (pain, physical function and quality of life) were used to calculate effect sizes. The Grading of Recommendations, Assessment, Development and Evaluation (GRADE) approach was used for assessing the quality of the body of evidence for each outcome of interest.

RESULTS:
Seven trials (886 participants) that met the inclusion criteria were included in the meta-analysis. There was high quality evidence that exercise therapy was beneficial at post-treatment (pain-SMD-0.27,95%CI-0.5to-0.04; physical function-SMD-0.29,95%CI-0.47to-0.11) and follow-up (pain-SMD-0.24,95%CI-0.41to-0.06; physical function-SMD-0.33,95%CI-0.5to-0.15). There was low quality evidence that manual therapy was beneficial at post-treatment (pain-SMD-0.71,95%CI-1.08to-0.33; physical function-SMD-0.71,95%CI-1.08to-0.33) and follow-up (pain-SMD-0.43,95%CI-0.8to-0.06; physical function-SMD-0.47,95%CI-0.84to-0.1). Low quality evidence indicated that combined treatment was beneficial at post-treatment (pain-SMD-0.43,95%CI-0.78to-0.08; physical function-SMD-0.38,95%CI-0.73to-0.04) but not at follow-up (pain-SMD0.25,95%CI-0.35to0.84; physical function-SMD0.09,95%CI-0.5to0.68). There was no effect of any interventions on quality of life.

CONCLUSION:
An Exercise therapy intervention provides short-term as well as long-term benefits in terms of reduction in pain, and improvement in physical function among people with hip osteoarthritis. The observed magnitude of the treatment effect would be considered small to moderate.

KEYWORDS: Exercise; Hip pain; Physiotherapy; manipulation; meta-analysis

PMID: 26701903
Mobilization of OA knee

Joint Mobilization Enhances Mechanisms of Conditioned Pain Modulation in Individuals With Osteoarthritis of the Knee

Authors: Carol A. Courtney, PT, PhD1, Alana D. Steffen, PhD1, César Fernández-de-las-Peñas, PT, PhD2,3, John Kim, PT, DPT4, Samuel J. Chmell, MD1


Study Design
Experimental laboratory study with repeated measures crossover design.

Background
Treatment effects of joint mobilization may occur in part by decreasing excitability of central nociceptive pathways. Impaired conditioned pain modulation (CPM) has been found experimentally in persons with knee and hip osteoarthritis (OA), indicating impaired inhibition of central nociceptive pathways. We hypothesized increased effectiveness of CPM following application of joint mobilization, determined via measures of deep tissue hyperalgesia.

Objectives
To examine the effect of joint mobilization on impaired CPM.

Methods
Examination of 40 individuals with moderate/severe knee OA identified 29 (73%) with impaired CPM. Subjects were randomized to receive 6 minutes of knee joint mobilization (intervention) or light manual cutaneous input only, one week apart. Deep tissue hyperalgesia was examined via pressure pain thresholds (PPT) bilaterally at knee medial joint line and the hand, at baseline, post-intervention and post-CPM testing. Further, vibration perception threshold (VPT) was measured at medial knee epicondyle at baseline and post-CPM testing.

Results
Joint mobilization, but not cutaneous input intervention, resulted in a global increase in PPT, indicated by diminished hyperalgesic responses to pressure stimulus. Further, CPM was significantly enhanced following joint mobilization. Diminished baseline VPT acuity was enhanced following joint mobilization at the knee that received intervention, but not the contralateral knee. Resting pain was also significantly lower following the joint intervention.

Conclusion
CPM was enhanced following joint mobilization, demonstrated by global decrease in deep tissue pressure sensitivity. Joint mobilization may act via enhancement of descending pain mechanisms, in patients with painful knee OA.

Level of Evidence

Keyword: arthralgia, diffuse noxious inhibitory control, manual therapy, physical therapy techniques
46 A. UPPER LIMB NEUROMOBILIZATION

Validity of the Upper Limb Neurodynamic Test 1 for the diagnosis of Carpal Tunnel Syndrome. The role of structural differentiation

Elena Bueno-Gracia., PT, PhD José Miguel Tricás-Moreno, PT, PhD Pablo Fanlo-Mazas, PT, PhD Miguel Malo-Urriés, PT, PhD María Haddad-Garay, MD Elena Estébanez-de-Miguel, PT, PhD César Hidalgo-García, PT, PhD John R. Krauss, PT, PhD, OCS, FAAOMPT

Highlights
• Individuals with suspected CTS were invited to voluntarily participate in the study.
• NCS were considered the Gold Standard for the diagnosis of CTS in this study.
• ULNT1 was positive when patient’s symptoms were reproduced and changed during SD.
• The LRs suggested that the ULNT1 generates small shifts in post-test probability.
• Due to imprecision in the CIs ULNT1 alone shouldn’t be used to diagnose CTS.

Abstract
Background
Several studies have analysed the use of the Upper Limb Neurodynamic Test 1 (ULNT1) for diagnosing Carpal Tunnel Syndrome (CTS) obtaining weak diagnostic accuracy, which could be related to the lack of consensus in the selected diagnostic criteria of ULNT1.

Objective
To determine the concurrent validity of ULNT1 in comparison to Nerve Conduction Studies (NCS) for the diagnosis of CTS, considering the structural differentiation (SD) as an essential part of the diagnosis.

Design
Prospective diagnostic test study.

Methods
Individuals with suspected CTS referred for NCS were invited to voluntarily participate in the study. Each participant was tested with NCS and ULNT1. ULNT1 result was considered positive when the patient’s clinical symptoms were reproduced during the test and symptoms changed during contralateral neck side bending (SD).

Results
58 participants (17 men, 44 women) with suspected CTS and a total of 95 limbs were examined using the NCS and ULNT1. Sensitivity of the ULNT1 was 57.9%, specificity was 84.2%, and the positive and negative likelihood ratios were 3.67 and 0.50 respectively.

Conclusion
Results obtained in the study may indicate the ability of the ULNT1 to generate small shifts from pre-test to post-test probability. However, imprecision in the CIs limits interpretation from the data.

Keywords: Neurological evaluation, Carpal tunnel syndrome, Manual therapy, Diagnosis
Validity of test position #1

Validity of the Upper Limb Neurodynamic Test 1 for the diagnosis of Carpal Tunnel Syndrome. The role of structural differentiation

Elena Bueno-Gracia., PT, PhD José Miguel Tricás-Moreno, PT, PhD Pablo Fanlo-Mazas, PT, Miguel Malo-Urríés, PT, PhD María Haddad-Garay, MD Elena Estébanez-de-Miguel, PT, PhD, César Hidalgo-García, PT, PhD John R. Krauss, PT, PhD, OCS, FAAOMPT

Highlights
• Individuals with suspected CTS were invited to voluntarily participate in the study.
• NCS were considered the Gold Standard for the diagnosis of CTS in this study.
• ULNT1 was positive when patient’s symptoms were reproduced and changed during SD.
• The LRs suggested that the ULNT1 generates small shifts in post-test probability.
• Due to imprecision in the CIs ULNT1 alone shouldn’t be used to diagnose CTS.

Abstract
Background
Several studies have analysed the use of the Upper Limb Neurodynamic Test 1 (ULNT1) for diagnosing Carpal Tunnel Syndrome (CTS) obtaining weak diagnostic accuracy, which could be related to the lack of consensus in the selected diagnostic criteria of ULNT1.

Objective
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Results
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Conclusion
Results obtained in the study may indicate the ability of the ULNT1 to generate small shifts from pre-test to post-test probability. However, imprecision in the CIs limits interpretation from the data.

Keywords: Neurological evaluation, Carpal tunnel syndrome, Manual therapy, Diagnosis
49. STRETCHING

Hamstring knee or hip


**Effects of hamstring stretching on passive muscle stiffness vary between hip flexion and knee extension maneuvers.**

Miyamoto N¹, Hirata K¹, Kanehisa H¹.

Author information

Abstract
The purpose of this study was to examine whether the effects of hamstring stretching on the passive stiffness of each of the long head of the biceps femoris (BFl), semitendinosus (ST), and semimembranosus (SM) vary between passive knee extension and hip flexion stretching maneuvers. In 12 male subjects, before and after five sets of 90 s static stretching, passive lengthening measurements where knee or hip joint was passively rotated to the maximal range of motion (ROM) were performed. During the passive lengthening, shear modulus of each muscle was measured by ultrasound shear wave elastography. Both stretching maneuvers significantly increased maximal ROM and decreased passive torque at a given joint angle. Passive knee extension stretching maneuver significantly reduced shear modulus at a given knee joint angle in all of BFl, ST, and SM. In contrast, the stretching effect by passive hip flexion maneuver was significant only in ST and SM.

The present findings indicate that the effects of hamstring stretching on individual passive muscles' stiffness vary between passive knee extension and hip flexion stretching maneuvers. In terms of reducing the muscle stiffness of BFl, stretching of the hamstring should be performed by passive knee extension rather than hip flexion.

**KEYWORDS:** Ultrasound shear wave elastography; bi-articular muscle; biceps femoris; joint flexibility; range of motion; shear modulus

PMID: 26669626
Brain function


**The restless brain: how intrinsic activity organizes brain function.**

Raichle ME¹

Author information

**Abstract**

Traditionally studies of brain function have focused on task-evoked responses. By their very nature such experiments tacitly encourage a reflexive view of brain function. While such an approach has been remarkably productive at all levels of neuroscience, it ignores the alternative possibility that brain functions are mainly intrinsic and ongoing, involving information processing for interpreting, responding to and predicting environmental demands. I suggest that the latter view best captures the essence of brain function, a position that accords well with the allocation of the brain's energy resources, its limited access to sensory information and a dynamic, intrinsic functional organization. The nature of this intrinsic activity, which exhibits a surprising level of organization with dimensions of both space and time, is revealed in the ongoing activity of the brain and its metabolism. As we look to the future, understanding the nature of this intrinsic activity will require integrating knowledge from cognitive and systems neuroscience with cellular and molecular neuroscience where ion channels, receptors, components of signal transduction and metabolic pathways are all in a constant state of flux. The reward for doing so will be a much better understanding of human behaviour in health and disease.

**KEYWORDS:** aerobic glycolysis; functional connectivity; local field potentials; neoteny; resting state; slow cortical potentials
PT’s lifting beliefs


Influence of Physical Therapists' Kinesiophobic Beliefs on Lifting Capacity in Healthy Adults.

Lakke SE¹, Soer R², Krijnen WP³, van der Schans CP⁴, Reneman MF⁵, Geertzen JH⁶.

Abstract

BACKGROUND:
Physical therapists' recommendations to patients to avoid daily physical activity can be influenced by the therapists' kinesiophobic beliefs. Little is known about the amount of influence of a physical therapist's kinesiophobic beliefs on a patient's actual lifting capacity during a lifting test.

OBJECTIVE:
The objective of this study was to determine the influence of physical therapists' kinesiophobic beliefs on lifting capacity in healthy people.

DESIGN:
A blinded, cluster-randomized cross-sectional study was performed.

METHODS:
The participants (n=256; 105 male, 151 female) were physical therapist students who performed a lifting capacity test. Examiners (n=24) were selected from second-year physical therapist students. Participants in group A (n=124) were tested in the presence of an examiner with high scores on the Tampa Scale of Kinesiophobia for health care providers (TSK-HC), and those in group B (n=132) were tested in the presence of an examiner with low scores on the TSK-HC. Mixed-model analyses were performed on lifting capacity to test for possible (interacting) effects.

RESULTS:
Mean lifting capacity was 32.1 kg (SD=13.6) in group A and 39.6 kg (SD=16.4) in group B. Mixed-model analyses revealed that after controlling for sex, body weight, self-efficacy, and the interaction between the examiners' and participants' kinesiophobic beliefs, the influence of examiners' kinesiophobic beliefs significantly reduced lifting capacity by 14.4 kg in participants with kinesiophobic beliefs and 8.0 kg in those without kinesiophobic beliefs.

LIMITATIONS:
Generalizability to physical therapists and patients with pain should be studied.

CONCLUSIONS:
Physical therapists' kinesiophobic beliefs negatively influence lifting capacity of healthy adults. During everyday clinical practice, physical therapists should be aware of the influence of their kinesiophobic beliefs on patients' functional ability.

PMID: 25838337

52. EXERCISE
Modifying the hip abduction angle during bridging exercise can facilitate gluteus maximus activity

Sun-Young Kang  Sung-Dae Choung Hye-Seon Jeon

Highlights
• Gluteus maximus activity was greatest at 30° hip abduction during bridging exercise.
• The erector spinae EMG amplitude at 30° was lower than at 0° and 15° hip abduction.
• The anterior pelvic tilt angle was lower at 30° than at 0° or 15° hip abduction.

Abstract
Purpose
The current study aimed to investigate how the erector spinae (ES) and gluteus maximus (GM) muscle activity and the anterior pelvic tilt angle change with different hip abduction angles during a bridging exercise.

Methods
Twenty healthy participants (10 males and 10 females, aged 21.6±1.6) voluntarily participated in this study. Surface electromyography (EMG) signals were recorded from the ES and GM during bridging at three hip abduction angles: 0°, 15°, and 30°. Simultaneously, the anterior pelvic tilt angle was measured using Image J software.

Results
The EMG amplitude of the GM muscle and the GM/ES EMG ratio were greatest at 30° hip abduction, followed by 15° and then 0° hip abduction during the bridging exercise. In contrast, the ES EMG amplitude at 30° hip abduction was significantly lower than that at 0° and 15° abduction. Additionally, the anterior pelvic tilt angle was significantly lower at 30° hip abduction than at 0° or 15°.

Conclusions
These results indicated that bridging with 30° hip abduction can be recommended as an effective method to selectively facilitate GM muscle activity, minimize compensatory ES muscle activity, and decrease the anterior pelvic tilt angle.

Keywords: Bridging exercise, Electromyography, Gluteus maximus, Hip abduction
Impact of core training on adolescent badminton players

**Effect of core strength training on dynamic balance and agility in adolescent badminton players**

Tarik Ozmen, PT, PhD Mert Aydogmus, PhD

**Summary**

The aim of the present study was to investigate effect of core strength training (CST) on core endurance, dynamic balance and agility in adolescent badminton players. Twenty adolescent (age = 10.8 ± 0.3 years; height = 140.6 ± 4.4 cm, weight = 33.9 ± 5.8 kg) badminton players were randomly divided into two groups as training group (TG) and control (CG) group. All subjects were evaluated with Star Excursion Balance Test (SEBT), Illinois Agility Test, and the core endurance tests. The TG completed CST twice a week, for 6 weeks. There were significant increases in (p < 0.05) directions of SEBT and core endurance tests (p < 0.05). However, no significant change was observed for agility (p > 0.05). The CST resulted in significant gains in directions of the SEBT and core endurances in adolescent badminton players, but not in agility. Keywords: Core strength, Core exercise, Balance, Agility

**Abdominal bracing for landing in LBP**
Effects of Volitional Spine Stabilization and Lower Extremity Fatigue on Trunk Control During Landing in a Recurrent Low Back Pain Population

Authors: Ram Haddas, PhD¹, Steven F. Sawyer, PT, PhD², Phillip S. Sizer, PT, PhD², Toby Brooks, PhD, ATC², Ming-Chien Chyu, PhD³, C. Roger James, PhD³

AFFILIATIONS:

Study Design
Controlled laboratory study.

Background
LBP and neuromuscular fatigue are independently thought to increase the risk of spine injury. Volitional preemptive abdominal contraction is thought to improve lumbar spine and pelvis control in individuals with rLBP. The effects of VPAC on fatigued landing performance in individuals with rLBP are unknown.

Objectives
To determine the effects of volitional preemptive abdominal contraction (VPAC) and lower extremity (LE) fatigue on trunk control during landing in a recurrent low back pain (rLBP) population.

Methods
Thirty-two rLBP (age 21.2±2.7 yr) and 33 healthy (age 20.9±2.3 yr) subjects performed 0.30 m drop-jump landings with and without VPAC and fatigue. Trunk, pelvis and hip biomechanical and electromyographic variables were obtained using 3D motion capture. Hypotheses were tested using ANOVA.

Results
Volitional preemptive abdominal contraction resulted in significantly earlier muscle onsets across all muscles with and without fatigue in both groups (M±SD, 0.058±0.019 s earlier; p≤0.001) and altered lumbar lateral flexion (1.4±14.8 deg greater right lateral flexion; p=0.002). Fatigue significantly delayed muscle onsets (0.040±0.014 s later; p≤0.001) and altered pelvic obliquity (1.4±11.0 deg greater; p≤0.001) and trunk side flexion (2.0±14.8 deg less; p≤0.001). The rLBP group exhibited delayed muscle onsets (0.039±0.031 s later; p≤0.004) and 4.2 deg less hip abduction at initial contact (p≤0.008) in comparison to healthy controls.

Conclusion
Volitional preemptive abdominal contraction decreases some of the detrimental effects of fatigue on landing biomechanics and thus may reduce spine injury risk in a rLBP population. J Orthop Sports Phys Ther, Epub 1 Jan 2016. doi:10.2519/jospt.2016.6048

Keyword: abdominal contraction, clinical biomechanics, fatigue, neuromuscular, spine injury, spine stability, trunk kinematics

Multifidus in LBP
Corticomotor control of lumbar multifidus muscles is impaired in chronic low back pain: concurrent evidence from ultrasound imaging and double-pulse transcranial magnetic stimulation.

Massé-Alarie H, Beaulieu LD, Preuss R, Schneider C. 

Author information

Abstract

Chronic low back pain (CLBP) is often associated with impaired control of deep trunk muscles and reorganization of the primary motor areas (M1). Precisely, functional changes of the lumbar multifidus muscles (MF) involved in spine stability may be of special interest in rehabilitation. Therefore, we tested MF corticomotor control using double transcranial magnetic stimulation (TMS) paradigms for the first time in this muscle and examined its link with MF volitional activation. Eleven individuals with lateralized CLBP and 13 pain-free participants were recruited. Ultrasound imaging enabled measurement of MF volitional isometric contraction in prone lying. TMS of MF M1 area was used to test hemispheric excitability and mechanisms in relation to motor programming, i.e., active motor threshold (AMT), amplitude of motor-evoked potentials and short-interval intracortical inhibition (SICI) and facilitation (SICF).

In CLBP, SICI level was lower in the left hemisphere and MF volitional contraction was not related to AMT (M1 excitability), conversely to what was observed in the pain-free group. No other between-group difference was detected. These original findings support a plasticity of cortical maps controlling paravertebral muscles and likely including a different motor strategy for the control of MF. Changes of M1 function may thus underline impaired motor control of lumbopelvic spine and pain persistence in CLBP.

KEYWORDS: Chronic low back pain; Intracortical inhibition and facilitation; Multifidus motor control; Primary motor cortex; Transcranial magnetic stimulation; Ultrasound imaging

PMID: 26708518
Disproportionate growth


Disproportionate growth between the spine and pelvis in patients with thoracic adolescent scoliosis: a new look into the pattern's growth.

Bao H1, Liu Z1, Yan P1, Qiu Y1, Zhu F1.

Author information

Abstract

A self-control ratio, the spine-pelvis index (SPI), was proposed for the assessment of patients with adolescent idiopathic scoliosis (AIS) in this study. The aim was to evaluate the disproportionate growth between the spine and pelvis in these patients using SPI. A total of 64 female patients with thoracic AIS were randomly enrolled between December 2010 and October 2012 (mean age 13 years, standard deviation (sd) 2.17; 9 to 18) and a further 73 healthy female patients with a mean age of 12.4 years (mean age 12.4 years, sd 2.24; 9 to 18), were randomly selected from a normal control database at our centre. The radiographic parameters measured included length of spine (LOS), height of spine (HOS), length of thoracic vertebrae (LOT), height of thoracic vertebrae (HOT), width of pelvis (WOP), height of pelvis (HOP) and width of thorax (WOT). SPI was defined as the ratio LOS/HOP. The SPI and LOT/HOP in patients with AIS showed a significant increase when compared with normal girls (p < 0.001 and p < 0.001 respectively), implying an abnormal pattern of growth of the spine relative to the pelvis in patients with AIS.

No significant difference in SPI was found in different age groups in the control group, making the SPI an age-independent parameter with a mean value of 2.219 (2.164 to 2.239). We also found that the SPI was not related to maturity in the control group. This study, for the first time, used a self-control ratio to confirm the disproportionate patterns of growth of the spine and pelvis in patients with thoracic AIS, highlighting that the SPI is not affected by age or maturity. Cite this article: Bone Joint J 2015;97-B:1668-74.

KEYWORDS: adolescent idiopathic scoliosis; growth; pelvis; maturity; peak height velocity

PMID:26637683
Poor fitness and obesity evidence of early death


Aerobic fitness in late adolescence and the risk of early death: a prospective cohort study of 1.3 million Swedish men.

Högström G1, Nordström A1, Nordström P2.

Abstract

BACKGROUND: Fitness level and obesity have been associated with death in older populations. We investigated the relationship between aerobic fitness in late adolescence and early death, and whether a high fitness level can compensate the risk of being obese.

METHODS: The cohort comprised 1,317,713 Swedish men (mean age, 18 years) that conscripted between 1969 and 1996. Aerobic fitness was assessed by an electrically braked cycle test. All-cause and specific causes of death were tracked using national registers. Multivariable adjusted associations were tested using Cox regression models.

RESULTS: During a mean follow-up period of 29 years, 44,301 subjects died. Individuals in the highest fifth of aerobic fitness were at lower risk of death from any cause [hazard ratio (HR), 0.49; 95% confidence interval (CI), 0.47-0.51] in comparison with individuals in the lowest fifth, with the strongest association seen for death related to alcohol and narcotics abuse (HR, 0.20; 95% CI, 0.15-0.26). Similar risks were found for weight-adjusted aerobic fitness. Aerobic fitness was associated with a reduced risk of death from any cause in normal-weight and overweight individuals, whereas the benefits were reduced in obese individuals (P < 0.001 for interaction). Furthermore, unfit normal-weight individuals had 30% lower risk of death from any cause (HR, 0.70; 95% CI, 0.53-0.92) than did fit obese individuals.

CONCLUSIONS: Low aerobic fitness in late adolescence is associated with an increased risk of early death. Furthermore, the risk of early death was higher in fit obese individuals than in unfit normal-weight individuals.

KEYWORDS: Fitness; death; obesity

PMID: 26686843

Swimming and bone density
Swimming and bone: Is low bone mass due to hypogravity alone or does other physical activity influence it?

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Author information

Abstract
Swimming during adolescence has shown neutral or even negative effects on bone mass. Nevertheless, it is still unknown if these effects are due to swimming or to other factors, such as sedentary behaviors.

\textbf{INTRODUCTION:} Three objectives were described (1) to measure objective physical activity (PA) additional to swimming performed by adolescent swimmers (SWI) and compare it to that performed by normo-active controls (CG), (2) to describe the relationship between objectively measured PA and bone mass, and (3) to compare bone mass of swimmers that meet the World Health Organization PA guidelines (active) WHO and those that do not (inactive).

\textbf{METHODS:} A total of 71 SWI (33 females) and 41 CG (17 females) wore an accelerometer for at least 4 days. PA was expressed as the amount of time (minutes/day) in each intensity [sedentary/light/moderate or vigorous (VPA), and the sum of moderate and vigorous (MVPA)]. Using the cutoff points proposed by Vanhelst et al. SWI were classified as active or inactive according to whether they reached 60 min of weight-bearing MVPA per day or not. Bone mineral density (BMD) was measured by dual energy X-ray absorptiometry, and bone strength values were calculated with peripheral quantitative computed tomography. Differences in PA intensities were calculated between SWI and CG. The relation of VPA to bone mass was studied in the SWI.

\textbf{RESULTS:} Male-SWI spend less time in VPA and MVPA than male-GC, which partly explains the lower BMD values in SWI than CG.

\textbf{CONCLUSION:} Swimming may displace weight-bearing VPA with serious implications on bone health.

\textbf{KEYWORDS:} Accelerometry; Bone mass; DXA; Swimming; pQCT
PMID:26694592
OA of knee adoptions


A Comparison of Gait Characteristics between Patients with Non-traumatic and Post-traumatic Medial Knee Osteoarthritis.

Robbins SM¹, Birmingham TB², Jones IC³, Sischek EL⁴, Dietzsch M⁴, Giffin JR⁵.

Author information

Abstract

OBJECTIVE: To compare knee kinematics and kinetics during walking in patients with post-traumatic versus non-traumatic medial compartment knee osteoarthritis (OA).

METHODS: Participants with medial compartment knee OA were classified as non-traumatic (n=122) or post-traumatic (n=93) based on evidence of previous anterior cruciate ligament (ACL) tear confirmed arthroscopically. Kellgren-Lawrence severity scores and mechanical axis angle (MAA) were determined from radiographs. Knee flexion and adduction angles and external moments were calculated from gait analysis using a 3-dimensional optical motion capture system and force plate. Peak values were identified and principal component analysis determined waveform characteristics (PC-scores). Linear regression models examined if OA group (post-traumatic or non-traumatic) predicted peak values and PC-scores after controlling for age, gait speed, and severity. Models were repeated with and without controlling for MAA.

RESULTS: Knee OA group was a significant predictor of peak knee adduction angles (p=0.04) and moments (p=0.05). Similarly, it was a significant predictor for some knee adduction angle (p=0.02 to 0.64) and moment (p=0.02 to 0.25) PC-scores. The non-traumatic OA group had higher adduction angles and moments. There were no significant relationships between OA group and knee flexion angles and moments. After controlling for MAA, only one significant relationship remained between a knee adduction moment shape characteristics and OA group.

CONCLUSIONS: Frontal plane knee kinematics and kinetics during walking differ between patients with post-traumatic versus non-traumatic medial compartment knee OA, with post-traumatic OA showing relatively decreased adduction. This article is protected by copyright. All rights reserved.

PMID: 26714257
Tactile acuity diminished in CP


Is tactile acuity altered in people with chronic pain? a systematic review and meta-analysis.

Catley MJ¹, O'Connell NE², Berryman C¹, Ayhan FF³, Moseley GL⁴.
Author information

Abstract
Impaired tactile acuity in people with chronic pain conditions has been suggested to reflect altered cortical representation of the painful body part, and treatments that aim to improve tactile acuity in these conditions have shown clinical benefit. Whether abnormalities in tactile acuity are a consistent feature of chronic pain remains largely unknown. The aim of this review was to systematically evaluate the literature and use meta-analysis to establish whether tactile acuity is altered in people with chronic non-neuropathic pain. We systematically searched the literature for studies that investigated tactile acuity in people with chronic non-neuropathic pain and compared it to an appropriate control group. Sixteen studies, reporting data from 5 chronic pain conditions, were included. Data were available for 18 chronic pain populations (n = 484) and 15 control populations (n = 378). Our results suggest that tactile acuity is diminished in arthritis, complex regional pain syndrome, and chronic low back pain but not in burning mouth syndrome. The strength of the available evidence is weakened by somewhat inconsistent results and the high risk of bias observed in all of the included studies.

PERSPECTIVE:
This systematic review synthesizes the evidence for tactile acuity deficits in people with chronic non-neuropathic pain. The findings suggest that tactile acuity deficits may be characteristic of chronic pain. That tactile acuity training may benefit those with chronic pain disorders suggests that clinical trials may be warranted.

KEYWORDS: 2-point discrimination; Tactile acuity; chronic pain; reorganization; sensory training

PMID: 24983492

61. FIBROMYALGIA
Activity and FM


Association of sedentary time and physical activity with pain, fatigue, and impact of fibromyalgia: the al-Ándalus study.


Abstract
We examined the association of objectively measured sedentary time (ST) and physical activity (PA) levels with pain, fatigue, and the impact of the disease in women with fibromyalgia. Four hundred and nineteen (mean age ± SD = 51.7 ± 7.6 years old) women with fibromyalgia participated. ST and PA levels (light, moderate, and moderate-to-vigorous [MVPA]) were measured with triaxial accelerometry. We assessed experimental pain with algometry and clinical pain, fatigue, and impact of fibromyalgia with a number of questionnaires. The association of ST and light PA with most of the pain- and fatigue-related outcomes and impact of fibromyalgia (all, P ≤ 0.019) was independent of moderate and vigorous PA. Furthermore, the association of vigorous PA with general and physical fatigue was independent of ST and light and moderate PA (all, P < 0.001). In conclusion, lower levels of ST or higher levels of light PA are associated with lower pain, fatigue, and the overall impact of the disease independent of moderate and vigorous PA in women with fibromyalgia. Interestingly, higher vigorous PA is independently associated with lower general and physical fatigue. These results are significant for future ST and PA intervention studies in this population.

KEYWORDS: GT3X+; accelerometry; fibromyalgia severity; physical activity intensity levels; sedentary behavior; symptomatology

PMID: 26644186
Effectiveness of food labeling


Impact of food labelling systems on food choices and eating behaviours: a systematic review and meta-analysis of randomized studies.

Cecchini M¹, Warin L¹.

Author information

Abstract
Food labels are considered a crucial component of strategies tackling unhealthy diets and obesity. This study aims at assessing the effectiveness of food labelling in increasing the selection of healthier products and in reducing calorie intake. In addition, this study compares the relative effectiveness of traffic light schemes, Guideline Daily Amount and other food labelling schemes. A comprehensive set of databases were searched to identify randomized studies. Studies reporting homogeneous outcomes were pooled together and analysed through meta-analyses. Publication bias was evaluated with a funnel plot. Food labelling would increase the amount of people selecting a healthier food product by about 17.95% (confidence interval: +11.24% to +24.66%). Food labelling would also decrease calorie intake/choice by about 3.59% (confidence interval: -8.90% to +1.72%), but results are not statistically significant. Traffic light schemes are marginally more effective in increasing the selection of healthier options. Other food labels and Guideline Daily Amount follow. The available evidence did not allow studying the effects of single labelling schemes on calorie intake/choice.

Findings of this study suggest that nutrition labelling may be an effective approach to empowering consumers in choosing healthier products. Interpretive labels, as traffic light labels, may be more effective.

KEYWORDS: Calorie intake; food choice; food labelling; meta-analysis; obesity
PMID: 26693944
Resisted Breathing in SCI

Resistive Respiratory Training Improves Blood Pressure Regulation in Individuals with Chronic Spinal Cord Injury

Sevda C. Aslan, PhD  David C. Randall, PhD Andrei V. Krassioukov, MD, PhD Aaron Phillips, PhD Alexander V. Ovechkin, MD, PhD

Objective
To investigate the effects of resistive Respiratory Motor Training (RMT) on pulmonary function and orthostatic stress-mediated cardiovascular and autonomic responses in individuals with chronic Spinal Cord Injury (SCI).

Design
Before-after intervention case-controlled clinical study.

Setting:
Participants
Individuals with chronic C3-T2 SCI diagnosed with orthostatic hypotension (OH) (n=11) and healthy, non-injured (NI) controls (n=10).

Intervention
21 ± 2 (mean ± SD) sessions of resistive inspiratory-expiratory RMT performed 5 days a week during a one-month period.

Main Outcome Measures
Standard Pulmonary Function Test (PFT): Forced Vital Capacity (FVC), Forced Expiratory Volume in one second (FEV1), Maximal Inspiratory Pressure (PImax), and Maximal Expiratory Pressure (PEmax) and beat-to-beat arterial blood pressure (BP), heart rate (HR), and respiratory rate during orthostatic sit-up stress test acquired before and after RMT program.

Results
Completion of RMT intervention abolished OH in 7 out of 11 individuals. FVC, low-frequency component of power spectral density (LF PSD) of BP and HR oscillations, baroreflex effectiveness and cross correlations between BP, HR, and respiratory rate during orthostatic challenge were significantly improved, approaching levels observed in NI individuals. These findings indicate increased sympathetic activation and baroreflex effectiveness in association with improved respiratory-cardiovascular interactions in response to the sudden decrease in BP.

Conclusion
Resistive respiratory training increases respiratory capacity and improves orthostatically mediated respiratory, cardiovascular, and autonomic responses suggesting that this intervention can be an efficacious therapy for managing OH after SCI.

Key Words:
Spinal cord injury, Respiratory training, Respiratory function, Autonomic regulation, Blood pressure, Orthostatic hypotension