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LUMBAR SPINE

Location of lumbar plexus in relationship to psoas


A MRI study of lumbar plexus with respect to the lateral transpsoas approach to the lumbar spine.

He L¹, Kang Z, Tang WJ, Rong LM.

Author information

Abstract

PURPOSE:
To evaluate the relative position between lumbar plexus and access corridor of minimally invasive lateral transpsoas lumbar approach, as well as the approach safety.

METHODS:
Three-dimensional fast imaging employing steady-state acquisition (3D FIESTA) sequence images of lumbar spine were obtained from 58 patients with lumbar degenerative diseases for reconstruction to analyze the distribution of lumbar plexus from L1-L2 to L4-L5 level with respect to the transpsoas lumbar approach. The axial image distance (AID) between the anterior edge of lumbar plexus and the sagittal central perpendicular line (SCPL) of disc was measured. SCPL was drawn perpendicularly to the sagittal plane of intervertebral disc and it passed through its central point, which is initial dilator trajectory for transpsoas approach. As related to the SCPL of disc, the distance with a positive value was set to indicate neural tissue posterior to it, while anterior to it was represented by a negative value.

RESULTS:
In relation to SCPL of disc, the AID of lumbar plexus was measured 13.01 ± 1.70, 8.61 ± 2.26, 1.12 ± 2.37 and -5.42 ± 3.26 mm from L1-L2 to L4-L5 level, respectively, while the AID of genitofemoral nerve was recorded -1.13 ± 2.87, -5.78 ± 2.33 and -10.53 ± 3.30 mm from L2-L3 to L4-L5 level accordingly.

CONCLUSION:
With respect to the SCPL of disc, a trajectory of guide wire or a radiographic reference landmark to place working channel, lumbar plexus lies posteriorly to it from L1-L2 to L3-L4 level and shifts anteriorly to it at L4-L5 level, while genitofemoral nerve locates anteriorly to the SCPL from L2-L3 to L4-L5 level. Neural retraction may take place during sequential dilation of access corridor especially at L4-L5 level.

PMID: 25749688
Correlation analysis of demographic and anthropometric factors, hip flexion angle and conus medullaris displacement with unilateral and bilateral straight leg raise.

Rade M1, Könönen M, Marttila J, Vanninen R, Shacklock M, Kankaanpää M, Airaksinen O.

Abstract

PURPOSE:
It has been shown that the conus medullaris displaces significantly and consistently in response to both unilateral and bilateral SLRs. Point of interest is represented by whether the magnitude of this displacement can be predicted in asymptomatic subjects. The purpose was to investigate whether any correlations existed between demographic and anthropometric factors and hip flexion angle with magnitude of conus medullaris displacement with the unilateral and bilateral SLR. This was done following the notion that there is the possibility that cord movement may contain aspects of predictability in asymptomatic subjects.

METHODS:
Using the same methods as in our previous MRI studies, we further investigated whether any correlations existed between age, height, weight, BMI or hip flexion angle and magnitude of conus medullaris displacement with the unilateral and bilateral SLR.

RESULTS:
Moderate to strong positive correlation was found between degree of hip flexion and magnitude of conus medullaris caudal displacement with unilateral and bilateral SLRs and CuMeD. A negligible inverse correlation between subjects’ height and magnitude of conus medullaris displacement in response to unilateral SLR was found, while no correlation (r < 0.1) emerged with bilateral SLR and CuMeD. No correlation was found for other values such as age, weight or BMI.

CONCLUSIONS:
The data show that in in vivo and structurally intact asymptomatic volunteers, the degree of hip flexion may have strong predictive values for magnitude of neural displacement in response to unilateral and bilateral SLRs. This provides further justification to its quantification in clinical settings. Magnitude of conus medullaris displacement in response to unilateral and bilateral SLRs is not likely to be predicted from easily clinically collectable measures such as age, height, weight and BMI. This study offers information relevant to investigation of prediction of neuromechanical responses in neurodynamic tests.

PMID: 25763871
The effect of an acupressure backrest on pain and disability in office workers with chronic low back pain: A randomized, controlled study

Complementary Therapies in Medicine, 03/31/2015
Purepong N, et al.

This study investigated the effects of an acupoint–stimulating lumbar backrest on pain and disability in office workers who suffering from low back pain (LBP) as well as the preference influence on pain and disability. The findings suggested 1–month of acupressure backrest use could improve LBP conditions. Preference was not a powerful moderator to the significant treatment effect.

Methods

- Sixty-four participants were randomly assigned to two groups; one with no intervention (n = 32) and another with 1 month of backrest use (n = 32).
- An additional group (n = 37) who wished to try 1 month of acupressure backrest were recruited to indicate the preference effect.
- Pain and disability were two key outcomes.

Results

- Significant differences between control and randomized acupressure backrest groups were found at 2 week period for disability and at 4 weeks for pain after the backrest use.
- Also, significant differences were found in both groups for 3 month period with an increase of the treatment effect on pain and disability.
- Both control and randomized acupressure backrest groups showed greater improvement in pain and disability scores which were more than the minimal clinically important change (30% improvement for both outcomes).
- No significant difference was found for pain and disability between the randomized and preferred backrest groups.
Value of imaging in early LBP


Association of early imaging for back pain with clinical outcomes in older adults.
Jarvik JG1, Gold LS2, Comstock BA3, Heagerty PJ3, Rundell SD4, Turner JA5, Avins AL6, Bauer Z7, Bresnahan BW7, Friedly JL4, James K8, Kessler L9, Nedeljkovic SS10, Nerenz DR11, Shi X12, Sullivan SD13, Chan L14, Schwalb JM15, Deyo RA16.

Author information
Abstract

IMPORTANCE:
In contrast to the recommendations for younger adults, many guidelines allow for older adults with back pain to undergo imaging without waiting 4 to 6 weeks. However, early imaging may precipitate interventions that do not improve outcomes.

OBJECTIVE:
To compare function and pain at the 12-month follow-up visit among older adults who received early imaging with those who did not receive early imaging after a new primary care visit for back pain without radiculopathy.

DESIGN, SETTING, AND PARTICIPANTS:
Prospective cohort of 5239 patients 65 years or older with a new primary care visit for back pain (2011-2013) in 3 US health care systems. We matched controls 1:1 using propensity score matching of demographic and clinical characteristics, including diagnosis, pain severity, pain duration, functional status, and prior resource use.

EXPOSURES:
Diagnostic imaging (plain films, computed tomography [CT], magnetic resonance imaging [MRI]) of the lumbar or thoracic spine within 6 weeks of the index visit.

MAIN OUTCOME AND MEASURES:
PRIMARY OUTCOME:
back or leg pain-related disability measured by the modified Roland-Morris Disability Questionnaire (score range, 0-24; higher scores indicate greater disability) 12 months after enrollment.

RESULTS:
Among the 5239 patients, 1174 had early radiographs and 349 had early MRI/CT. At 12 months, neither the early radiograph group nor the early MRI/CT group differed significantly from controls on the disability questionnaire. The mean score for patients who underwent early radiography was 8.54 vs 8.74 among the control group (difference, -0.10 [95% CI, -0.71 to 0.50]; mixed model, P = .36). The mean score for the early MRI/CT group was 9.81 vs 10.50 for the control group (difference, -0.51 [-1.62 to 0.60]; mixed model, P = .18).

CONCLUSIONS AND RELEVANCE:
Among older adults with a new primary care visit for back pain, early imaging was not associated with better 1-year outcomes. The value of early diagnostic imaging in older adults for back pain without radiculopathy is uncertain.

PMID: 25781443
Fluoroscopic Assessment of Lumbar Total Disc Replacement Kinematics During Walking.
Barrett RS¹, Lichtwark GA, Armstrong C, Barber L, Scott-Young M, Hall RM.

Abstract

STUDY DESIGN:
Descriptive.

OBJECTIVE:
The purpose of this study was to determine the in vivo kinematics of functional spinal units, during gait, in individuals with a single-level lumbar total disc replacement (TDR).

SUMMARY OF BACKGROUND DATA:
TDR is a motion preservation technology that offers an alternative to spinal fusion for treatment of degenerative disc disease. The aim of TDRs is to replicate motion of the functional spinal units, which may protect adjacent intervertebral discs against accelerated degeneration. At present, there is limited understanding of the in vivo motion of TDRs, particularly during dynamic activities such as gait. Such information is important for understanding the wear characteristics of TDRs and furthering design rationale of future implants.

METHODS:
TDR motions were obtained from 24 participants who underwent implantation with single-level L4-L5 or L5-S1 CHARITÉ or In Motion TDRs. Video fluoroscopy was used to obtain measurements in the frontal and sagittal planes during fixed speed treadmill walking.

RESULTS:
The mean range of motion between the upper and lower lumbar TDR endplates during walking was 1.6° and 2.4° in the frontal and sagittal planes, respectively. These values were significantly different from zero and corresponded to 19% of the maximum static range of motion in each plane.

CONCLUSION:
Lumbar TDRs provide a degree of motion preservation at the operative level during moderate speed walking. The distribution of lumbar TDR motions during walking presented here will inform relevant standards for conducting standardized tests of lumbar TDRs, particularly wear assessments, and, hence, enable more realistic mechanical and computer-based wear simulations to be performed.

LEVEL OF EVIDENCE: N/A.

PMID: 25599285
**ABSTRACTS**

**VISCERA**

**IBS and hospitalizations**


**Disproportionate Rise in Clostridium difficile-Associated Hospitalizations Among US Youth With Inflammatory Bowel Disease, 1997-2011.**

Sandberg KC, Davis MM, Gebremariam A, Adler J.

Author information

Abstract

**OBJECTIVES:**
Our aim was to characterize the temporal changes in burden that Clostridium difficile infection (CDI) added to the hospital care of children and young adults with inflammatory bowel disease (IBD) in the United States.

**METHODS:**
Retrospective analysis of annual, nationally representative samples of children and young adults with IBD.

**RESULTS:**
There was a 5-fold increase in IBD hospitalizations with CDI from 1997 to 2011 (P for trend <0.01). During the same period, IBD hospitalizations without CDI increased 2-fold (P for trend <0.01). Mean length of stay for IBD hospitalizations with CDI was consistently longer than that for hospitalizations without CDI and did not significantly change over time (P for trend=0.47). CDI-related total hospital days in the United States rose from 1702 to 10,194 days per million individuals per year from 1997 to 2011 (P for trend <0.01). Children and young adults hospitalized with CDI had a significantly lower odds of colectomy (0.31) compared with those without CDI. Total charges for CDI-related hospitalizations among children and young adults in the United States rose from $8.7 million in 1997 to $68.2 million in 2011.

**CONCLUSIONS:**
A widening gap in burden has opened between IBD hospitalizations with and without CDI during the last decade and a half. CDI-related hospitalizations are associated with disproportionately longer lengths of stay, more hospital days, and more charges than hospitalizations without CDI over time. Further work within health systems, hospitals, and practices can help us better understand this enlarging gap to improve clinical care for this vulnerable population.

PMID: 25419679
Cost effectiveness of gluten free diet

Cost and affordability of a nutritionally balanced gluten-free diet: Is following a gluten-free diet affordable?

Nutrition & Dietetics,

04/03/2015

Lambert K, et al. – The study aimed to determine the cost and affordability of a gluten–free healthy food basket for four reference families in Australia. Findings suggest that compliance to a gluten–free diet may be more difficult for some families due to the significant price discrepancy of gluten–free items. Families on welfare with people who require a gluten–free diet are particularly vulnerable to food insecurity. Consideration should be given to the creation of a national subsidised medical foods program to enable equitable access to affordable gluten-free staple foods via prescription.

Methods

- Exploratory study using an amalgamation of two commonly used food basket costing methods.
- Two food basket types were constructed for four common Australian family types.
- These were designated the Healthy Food Basket and modified (gluten-free) Healthy Food Basket.
- Baskets were priced at five locations and costs as a proportion of the Equivalised Household Disposable Income and average weekly earnings for welfare recipients were calculated.
- The price differential for four common bread and cereal staples were also calculated per 100 g.

Results

- The gluten-free healthy food basket was significantly more expensive compared to a gluten-containing healthy food basket for all family types.
- The gluten-free basket was considered unaffordable for three of the four common family types.
- Gluten-free staples are significantly more expensive than their gluten-containing counterparts.
ABSTRACTS

IBS and culture


A cross-cultural investigation of attachment style, catastrophizing, negative pain beliefs, and symptom severity in irritable bowel syndrome.

Gerson CD¹, Gerson MJ, Chang L, Corazziari ES, Dumitrascu D, Ghoshal UC, Porcelli P, Schmulson M, Wang WA, Zali M.

Author information
Abstract

BACKGROUND:
Little information exists regarding whether psychosocial variables in irritable bowel syndrome (IBS) vary by geographic location. Adult attachment is an important psychological concept rooted in childhood relationship experience that has not been previously studied in IBS. Catastrophizing and negative pain beliefs have been described in IBS and may be affected by attachment.

AIMS:
In this cross-cultural study, we determined: (i) whether attachment differs between IBS patients and controls, (ii) whether geographic location has a significant effect on attachment style, catastrophizing and negative pain beliefs, and (iii) how all three variables correlate with IBS symptom severity.

METHODS:
463 IBS patients, with moderate to severe symptom scores, and 192 healthy controls completed validated questionnaires about attachment, catastrophizing, negative pain beliefs and IBS-SSS in nine locations, USA (New York, Los Angeles), Mexico, Italy (Rome, Bari), Romania, Iran, India, and China.

KEY RESULTS:
Attachment anxiety and avoidance scores were significantly higher in IBS patients than in controls (p < 0.001). This was particularly true for the fearful-avoidant attachment category, especially in China and Romania. Path analysis showed that attachment anxiety and avoidance had indirect effects on IBS-SSS through catastrophizing (p < 0.0001) and negative pain beliefs (p = 0.005). All three psychosocial measures varied significantly depending on location.

CONCLUSIONS & INFERENCES:
In the IBS population studied, attachment style was significantly different in IBS compared to a control population. Geographic differences in attachment, catastrophizing and negative pain beliefs were documented and their correlation with symptom severity and thus, research of psychosocial variables in IBS should take into account the location of the population studied.

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KEYWORDS:
attachment; catastrophizing; cross-cultural; irritable bowel syndrome; negative pain beliefs

PMID: 25817055
ABSTRACTS

IBS and obesity

Obesity in Inflammatory Bowel Disease: A Marker of Less Severe Disease.
Flores A1, Burstein E, Cipher DJ, Feagins LA.

Author information

Abstract

BACKGROUND:
Both obesity and inflammatory bowel disease (IBD) are highly prevalent in Western societies. IBD, including Crohn's disease (CD) and ulcerative colitis (UC), has been historically associated with cachexia and malnutrition. It is uncertain how obesity, a chronic pro-inflammatory state, may impact the course of IBD.

AIM:
The aim of this study was to report the prevalence of obesity in patients with IBD in a metropolitan US population and to assess the impact of obesity on disease phenotypes, treatment, and surgical outcomes in IBD patients.

METHODS:
We reviewed the medical records of patients identified from the IBD registries of the Dallas Veterans Affairs Medical Center and Parkland Health and Hospital Systems who were seen from January 1, 2000, to December 31, 2012.

RESULTS:
Of 581 identified IBD patients, 32.7 % were obese (BMI ≥ 30) and 67.6 % were non-obese (BMI < 30). There were 297 (51.1 %) patients with CD and 284 (48.9 %) patients with UC. The rate of obesity was 30.3 % among CD patients and 35.2 % among UC patients. Overall, obese patients were significantly less likely to receive anti-TNF treatment, undergo surgery, or experience a hospitalization for their IBD than their non-obese counterparts (55.8 vs. 72.1 %, p = .0001).

CONCLUSION:
Obesity is highly prevalent in our IBD patients, paralleling the obesity rates in the US population. Clinical outcomes were significantly different in obese versus non-obese patients with IBD. Despite the plausible mechanisms whereby obesity might exacerbate IBD, we have found that obesity (as defined by BMI) is a marker of a less severe disease course in IBD.

PMID: 25799938
Early life body fat and cancer

Cancer Epidemiol Biomarkers Prev. 2015 Mar 16.

Early Life Body Fatness and Risk of Colorectal Cancer in U.S. Women and Men-Results from Two Large Cohort Studies.

Zhang X1, Wu K2, Giovannucci EL3, Ma J4, Colditz GA5, Fuchs CS6, Willett WC3, Stampfer MJ3, Nimptsch K7, Ogino S8, Wei EK9.

Author information

Abstract

BACKGROUND:
The association between body fatness before adulthood and later risk of colorectal cancer remains unclear. We hypothesized that, independent of adult body fatness, early life body fatness would be associated with a higher risk of developing colorectal cancer.

METHODS:
We assessed body fatness during childhood and adolescence using a validated 9-level somatotype and inquired body weight in young adulthood in the Nurses' Health Study and Health Professionals Follow-up Study. We used the Cox proportional hazard regression modeling to estimate relative risks [RR, 95% confidence intervals (CI)] adjusting for adult body mass index (BMI) and other known colorectal cancer risk factors.

RESULTS:
We identified 2,100 incident colorectal cancer cases (1,292 in women and 808 in men) during 22 years of follow-up. Among women, the RR (95% CI) for childhood body fatness of level 5 or higher versus level 1 was 1.28 (1.04-1.58; \( P_{\text{trend}} = 0.08 \)) and for adolescent body fatness, it was 1.27 (1.01-1.60; \( P_{\text{trend}} = 0.23 \)). The corresponding RRs for men were 1.04 (0.82-1.31; \( P_{\text{trend}} = 0.48 \)) and 0.98 (0.75-1.27; \( P_{\text{trend}} = 0.20 \)), respectively. Results were generally similar across anatomic subsites within the colorectum. In addition, the RRs comparing BMI categories \( \geq 27.5 \) to <19 kg/m² were 1.44 (1.06-1.95, at age 18; \( P_{\text{trend}} = 0.009 \)) for women and 1.18 (0.84-1.65, at age 21; \( P_{\text{trend}} = 0.57 \)) for men.

CONCLUSION:
Increased body fatness in early life, independent of adult obesity, might be a risk factor for colorectal cancer in women, but we observed a weaker association in men.

IMPACT:
Our findings support the growing evidence that early life body fatness affects the risk of colorectal cancer many decades later. Cancer Epidemiol Biomarkers Prev; 24(4); 1-8. ©2015 AACR.

©2015 American Association for Cancer Research. PMID: 2577780
WHIPLASH

Fatty infiltrates

RESEARCH REPORT

The Geography of Fatty Infiltrates Within the Cervical Multifidus and Semispinalis Cervicis in Individuals With Chronic Whiplash-Associated Disorders

Authors: Rebecca Abbott, BS12, Ashley Pedler, PT, PhD3, Michele Sterling, PT, PhD3, Julie Hides, PT, PhD4, Todd Murphey, PhD5, Mark Hoggarth, MS15, James Elliott, PT, PhD1


Study Design Cross-sectional. Objectives To quantify the magnitude and distribution of muscle fat infiltration (MFI) within the cervical multifidus and semispinalis cervicis muscles in participants with chronic whiplash-associated disorders (WADs) compared to those who have fully recovered from a whiplash injury and healthy controls.

Background Previous research has established the presence of increased MFI throughout the cervical extensor muscles of individuals with WAD when compared to healthy controls. These changes appear to be greater in the deepest muscles (eg, multifidus and semispinalis cervicis) than in the more superficial muscles. A detailed analysis of the distribution of MFI within these deep extensor muscles in chronic WAD, recovered, and control groups would provide a foundation for further investigation of specific mechanisms, etiologies, and targets for treatments.

Methods Fifteen participants (WAD, n = 5; recovered, n = 5; and control, n = 5) were studied using a 3-D fat-water separation magnetic resonance imaging sequence. Bilateral measures of cervical multifidus and semispinalis cervicis MFI in 4 quartiles (1 [medial] to 4 [lateral]) at cervical levels C3 through C7 were included in the analysis. Intrarater and interrater reliability were established. A mixed-model analysis was performed to control for covariates, identify interaction effects, and compare MFI distribution between groups.

Results The limits of agreement confirmed strong intrarater and interrater agreement at all levels (C3–C7). Sex, age, and body mass index were identified as significant covariates for MFI. Significant interactions were found between group and muscle quartile (P<.001) and between muscle quartile and cervical level (P<.001). Pairwise comparisons for intraquartile MFI between groups revealed significantly greater MFI in the WAD group when compared to the recovered group in the first quartile (P<.001), second quartile (P<.001), and third quartile (P = .03). When compared to the control group, the WAD group had significantly greater MFI in the first quartile (P = .002) and the second quartile (P = .045). The control group had significantly higher MFI in comparison to the recovered group in the first quartile (P = .048).

Conclusion This study provides preliminary data mapping the spatial distribution of MFI in the cervical multifidus and semispinalis cervicis muscles in individuals with chronic WAD, those who have recovered from a whiplash injury, and healthy controls. Muscle fat infiltration is more concentrated in the medial portion of the muscles in all participants. However, the magnitude of MFI in the medial quartiles (1 and 2) is greatest in the chronic WAD group. J Orthop Sports Phys Ther 2015;45(4):281–288. Epub 4 Mar 2015. doi:10.2519/jospt.2015.571

Keyword: imaging, MRI, muscle, neck, spine
RESEARCH REPORT
External Validation of a Clinical Prediction Rule to Predict Full Recovery and Ongoing Moderate/Severe Disability Following Acute Whiplash Injury

Authors: Carrie Ritchie, PhD¹, Joan Hendrikz, PGradStats², Gwendolen Jull, PhD³, James Elliott, PhD⁴, Michele Sterling, PhD¹


Study Design Retrospective secondary analysis of data.

Objectives To investigate the external validity of the whiplash clinical prediction rule (CPR).

Background We recently derived a whiplash CPR to consolidate previously established prognostic factors for poor recovery from a whiplash injury and predicted 2 recovery pathways. Prognostic factors for full recovery were being less than 35 years of age and having an initial Neck Disability Index (NDI) score of 32% or less. Prognostic factors for ongoing moderate/severe pain and disability were being 35 years of age or older, having an initial NDI score of 40% or more, and the presence of hyperarousal symptoms. Validation is required to confirm the reproducibility and accuracy of this CPR. Clinician feedback on the usefulness of the CPR is also important to gauge acceptability.

Methods A secondary analysis of data from 101 individuals with acute whiplash-associated disorder who had previously participated in either a randomized controlled clinical trial or prospective cohort study was performed using accuracy statistics. Full recovery was defined as NDI score at 6 months of 10% or less, and ongoing moderate/severe pain and disability were defined as an NDI score at 6 months of 30% or greater. In addition, a small sample of physical therapists completed an anonymous survey on the clinical acceptability and usability of the tool.

Results The positive predictive value of ongoing moderate/severe pain and disability was 90.9% in the validation cohort, and the positive predictive value of full recovery was 80.0%. Surveyed physical therapists reported that the whiplash CPR was simple, understandable, would be easy to use, and was an acceptable prognostic tool.

Conclusion External validation of the whiplash CPR confirmed the reproducibility and accuracy of this dual-pathway tool for individuals with acute whiplash-associated disorder. Further research is needed to assess prospective validation, the impact of inclusion on practice, and to examine the efficacy of linking treatment strategies with predicted prognosis.


Keyword: Neck Disability Index, prediction, prognosis, whiplash-associated disorder
HEADACHES

Neck and shoulder strength

Cephalalgia. 2015 Apr 1. pii: 0333102415576726.

Neck and shoulder muscle strength in patients with tension-type headache: A case-control study.
Madsen BK¹, Søgaard K², Andersen LL³, Skotte JH³, Jensen RH⁴.

Author information

Abstract

INTRODUCTION:
Tension-type headache (TTH) is highly prevalent in the general population, and it is characterized by increased muscle tenderness with increasing headache frequency and intensity.

AIM:
The aim of this case-control study was to compare muscle strength in neck and shoulder muscles in TTH patients and healthy controls by examining maximal voluntary isometric contraction (MVC) during shoulder abduction, neck flexion and extension as well as the extension/flexion strength ratio of the neck.

METHODS:
Sixty TTH patients and 30 sex- and age-matched healthy controls were included. Patients were included if they had TTH ≥8 days per month. The MVC neck extensor and flexor muscles were tested with the participant seated upright. MVC shoulder abduction was tested with the individual lying supine.

RESULTS:
Compared to controls TTH patients had significantly weaker muscle strength in neck extension (p = 0.02), resulting in a significantly lower extension/flexion moment ratio (p = 0.03). TTH patients also showed a tendency toward significantly lower muscle strength in shoulder abduction (p = 0.05). Among the 60 TTH patients, 25 had frequent episodic TTH (FETTH), and 35 had chronic TTH (CTTH).

CONCLUSION:
Patients with TTH exhibited decreased muscle strength in the neck extensor muscles, inducing a reduced cervical extension/flexion ratio compared to healthy people.

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KEYWORDS:
Tension-type headache; extension; extension/flexion ratio; flexion; maximal voluntary contraction (MVC); neck and shoulder muscles

PMID:25834271
Migraines and cardiovascular disease


Migraine and risk of ischaemic heart disease: a systematic review and meta-analysis of observational studies.

Sacco S1, Ornello R, Ripa P, Tiseo C, Degan D, Pistoia F, Carolei A.

Author information

Abstract

BACKGROUND AND PURPOSE:
Several studies have assessed the risk of ischaemic heart diseases in migraineurs, drawing different conclusions. To define and update the issue, a systematic review and meta-analysis of the available observational studies was performed.

METHODS:
PubMed and EMBASE were systematically searched up to April 2014 for observational studies dealing with the risk of any form of ischaemic heart disease in migraineurs. Studies assessing migraine as exposure and several types of ischaemic heart disease as outcomes were included in the analysis. A random effects model was used to pool the effect sizes.

RESULTS:
Out of 3348 records, 15 studies (one case-control, one cross-sectional and 13 cohort studies) were identified and were included in the meta-analysis. The pooled analysis indicated an increased risk of myocardial infarction (pooled adjusted effect estimate 1.33, 95% confidence interval 1.08-1.64; P = 0.007) and of angina (pooled adjusted effect estimate 1.29, 95% confidence interval 1.17-1.43; P < 0.0001) in migraineurs compared to non-migraineurs.

CONCLUSIONS:
Based on our data indicating an association of migraine with myocardial infarction and angina and on previous data showing an association of migraine, and particularly migraine with aura, with an increased risk for stroke, migraine can be appropriately considered an overall risk factor for cardiovascular diseases.

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KEYWORDS:
cardiovascular disease; headache disorders; ischaemic heart disease; meta-analysis; migraine

PMID: 25808832
Depression and Migraine’s


**Migraine features in migraineurs with and without anxiety-depression symptoms: A hospital-based study.**

Baldacci F¹, Lucchesi C², Cafalli M³, Poletti M³, Ulivi M⁴, Giuntini M², Mazzucchi S², Del Prete E², Vergallo A², Nuti A⁵, Gori S².

**Author information**

Abstract

**BACKGROUND:** Migraine, anxiety and depression often coexist. A "neurolimbic" model of migraine has been recently proposed accounting for a dynamic influence of pain, mood and anxiety on the migraine disease. However, very few data exist concerning clinical migraine features in patients reporting anxiety-depression symptoms.

**OBJECTIVE:** Aim of our study was to test differences in clinical migraine features between migraineurs with anxiety-depression symptoms and migraineurs without ones.

**MATERIALS AND METHODS:** We recruited 200 consecutive migraineurs. Other primary headaches comorbidity and migraine prophylaxis were exclusion criteria. Each patient was interviewed following a structured questionnaire including general features about migraine, triggers, allodynia. Anxiety and depression symptoms were evaluated in each patient by two brief self-reported scales: the generalized anxiety disorder 7-item scale (GAD-7) and the Patient Health Questionnaire 9-item scale (PHQ-9). A cut-off of 5 in both the GAD-7 and the PHQ-9 was considered positive for the presence of anxiety-depressive symptoms.

**RESULTS:** One hundred and one patients (51.5%) had anxiety-depression symptoms (GAD-7 and PHQ-9 ≥ 5). They reported a more headaches/month (p=0.004), higher number of triggers (p<0.001), and were more allodynic (p=0.005). In a binary logistic regression model triggers and allodynia made a unique statistical contribution on reporting anxiety-depressive symptoms.

**CONCLUSION:** Our results showed that the presence of anxiety-depression symptoms affects migraine clinical presentation. They are associated with enhanced migraine triggers susceptibility, more ictal alldynic symptoms as well as more headaches/month. An altered sensation in migraineurs with anxiety-depression symptoms could be a result of a lower pain threshold and an increased cortical excitability in a broader context of a neurolimbic dysfunction.

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**KEYWORDS:**

Alldynia; Anxiety; Depression; Migraine; Triggers

PMID: 25804622
Pressure Pain and Isometric Strength of Neck Flexors Are Related in Chronic Tension-Type Headache

Pain Physician, 03/31/2015 Castien R, et al.

Research Article

Rene Castien, PhD, Annette Blankenstein, PhD, and Willem DeHertogh, PhD

BACKGROUND: In patients with chronic tension-type headache (CTTH) changes in pressure pain in the cervical region are associated with peripheral or central sensitization. It is hypothesized that an increase of isometric strength of neck flexors would lead to a decrease of pressure pain in CTTH, as an expression of reduced peripheral or central sensitization.

OBJECTIVE: In this study we aimed to analyze the correlation between change in isometric strength of the neck flexors and change in pressure pain scores (PPS) in patients with CTTH.

STUDY DESIGN: Comparative analysis of data from previous study.

SETTING: Primary healthcare center.

METHODS: Data from 145 patients with CTTH who underwent a manual therapy program including isometric strength training of the neck flexors were analyzed at 8 and 26 weeks post-treatment. PPS were measured as a total of pain scores on a numeric rating scale (score 0 to 10) on application of a pressure stimulus of 3kg/cm at 8 cervical- and suboccipital muscles. Isometric strength of the neck flexors was measured in seconds. Correlations were computed between changes in PPS and isometric neck flexor strength.

RESULTS: Isometric strength of neck flexors scored significantly different compared to baseline measurement (mean 30.0 seconds, sd:25.2), and increased with a mean difference of 17.33 seconds (95%CI: 20.61 to 14.05) at 8 weeks and 19.18 seconds (95%CI: 23.48 to 14.87) at 26 weeks. Similarly, compared to PPS baseline measurement (31.6 points, sd:18.6), mean difference in PPS was significantly decreased at 8 and 26 weeks: -11.3 points (95%CI: -8.77 to -13.83) and -11.15 points (95%CI: -8.31 to -13.99). There is a negative correlation between changes in PPS and changes in isometric strength of neck flexors which is weak at 8 weeks (r = -0.243, P = 0.004) and moderate at 26 weeks (r = -0.318, P < 0.000).

LIMITATIONS: Correlational analysis.

CONCLUSION: Decrease in PPS correlates with increases in isometric strength of neck flexors in patients with CTTH in short- and long-term.
Migraine


Migraine features in migraineurs with and without anxiety-depression symptoms: A hospital-based study.


Author information

Abstract

BACKGROUND:
Migraine, anxiety and depression often coexist. A "neurolimbic" model of migraine has been recently proposed accounting for a dynamic influence of pain, mood and anxiety on the migraine disease. However, very few data exist concerning clinical migraine features in patients reporting anxiety-depression symptoms.

OBJECTIVE:
Aim of our study was to test differences in clinical migraine features between migraineurs with anxiety-depression symptoms and migraineurs without ones.

MATERIALS AND METHODS:
We recruited 200 consecutive migraineurs. Other primary headaches comorbidity and migraine prophylaxis were exclusion criteria. Each patient was interviewed following a structured questionnaire including general features about migraine, triggers, allodynia. Anxiety and depression symptoms were evaluated in each patient by two brief self-reported scales: the generalized anxiety disorder 7-item scale (GAD-7) and the Patient Health Questionnaire 9-item scale (PHQ-9). A cut-off of 5 in both the GAD-7 and the PHQ-9 was considered positive for the presence of anxiety-depressive symptoms.

RESULTS:
One hundred and one patients (51.5%) had anxiety-depression symptoms (GAD-7 and PHQ-9 ≥ 5). They reported a more headaches/month (p=0.004), higher number of triggers (p=0.001), and were more alldynic (p=0.005). In a binary logistic regression model triggers and alldynia made a unique statistical contribution on reporting anxiety-depression symptoms.

CONCLUSION:
Our results showed that the presence of anxiety-depression symptoms affects migraine clinical presentation. They are associated with enhanced migraine triggers susceptibility, more ictal allodynic symptoms as well as more headaches/month. An altered sensation in migraineurs with anxiety-depression symptoms could be a result of a lower pain threshold and an increased cortical excitability in a broader context of a neurolimbic dysfunction.

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KEYWORDS:
Allodynia; Anxiety; Depression; Migraine; Triggers

PMID: 25804622
CONCUSSIONS

Recovery


Williams RM¹, Puetz TW, Giza CC, Broglio SP.

Author information
Abstract

BACKGROUND:
Concussion diagnosis and management is made through the clinical exam using assessment tools that include self-report symptomatology, postural control, and cognitive evaluations. The specific timing of concussion resolution varies between individuals. However, despite a lack of research in concussion recovery, it is widely accepted that the majority of young adults will recover in 7-10 days, with youth athletes taking longer.

OBJECTIVES:
The purpose of this review is to directly compare the recovery duration among high school and collegiate athletes on symptom reports and cognitive assessments following concussion.

DATA SOURCES:
Data were collected from a literature search comprising high school or college athletes only. This included studies (n = 6) that reported symptom or cognitive performance recovery to the exact day.

RESULTS:
High school athletes self-reported symptom recovery at 15 days compared with 6 days in collegiate athletes. Both college and high school athletes showed cognitive recovery at similar rates of 5 and 7 days.

LIMITATIONS:
This review only included articles that were directly related to concussed high school or college athletes. Additionally, athletes in the high school and college setting typically receive a battery of neurocognitive tests that may not be as sensitive or as comprehensive as a full neuropsychological exam.

CONCLUSION:
The review finds that neurocognitive recovery rates are similar among high school and college athletes, while symptom reporting shows longer recovery time points in high school than in college.

IMPLICATIONS OF KEY FINDINGS:
An individualized and stepwise concussion management plan is important for proper concussion recovery regardless of age.

PMID: 25820456
Reduced levels of mesenchymal stem cells at the tendon-bone interface tuberosity in patients with symptomatic rotator cuff tear.

Hernigou P¹, Merouse G, Duffiet P, Chevalier N, Rouard H.

Abstract

PURPOSE: While the use of bone marrow concentrate (BMC) has been described in the treatment of rotator cuff tears, the impact of a rotator cuff injury on the mesenchymal stem cells (MSCs) content present in the human shoulder has not been determined, especially with regard to changes in the levels of MSCs at the tendon-bone interface. With the hypothesis that there was a decreased level of MSCs at the tendon-bone interface tuberosity in patients with rotator cuff tear, we assessed the level of MSCs in the tuberosity of the shoulder of patients undergoing a rotator cuff repair.

METHODS: We analysed the data of 125 patients with symptomatic rotator cuff tears and of 75 control patients without rotator cuff injury. We recorded the following data: size of tear, number of torn tendons, aetiology of the tear, lag time between onset of shoulder symptoms/injury and repair, and also fatty infiltration of muscles. Mesenchymal stem cell content at the tendon-bone interface tuberosity was evaluated by bone marrow aspiration collected in the humeral tuberosities of patients at the beginning of surgery.

RESULTS: A significant reduction in MSC content (from moderate, 30-50 %, to severe >70 %) at the tendon-bone interface tuberosity relative to the MSC content of the control was observed in all rotator cuff repair study patients. Severity of the decrease was statistically correlated to a number of factors, including the delay between onset of symptoms and surgery, number of involved tendons, fatty infiltration stage and increasing patient age.

CONCLUSION: This study demonstrates that the level of MSCs present in the greater tuberosity of patients with a rotator cuff tear decreases as a function of a number of clinical factors, including lag time from tear onset to treatment, tear size, number of tears and stage of fatty infiltration, among others. This information may help the practices in using biologic augmentation of a rotator cuff repair.

PMID: 25757411
ABSTRACTS

IMPINGEMENT
Exercise for impingement

Is exercise effective for the management of subacromial impingement syndrome and other soft tissue injuries of the shoulder? A systematic review by the Ontario Protocol for Traffic Injury Management (OPTIMa) Collaboration

Manual Therapy, 04/02/2015 Abdulla SY, et al.

Abstract
Background
Exercise is a key component of rehabilitation for soft tissue injuries of the shoulder, however its effectiveness remains unclear.

Objective
Determine the effectiveness of exercise for shoulder pain.

Methods
We searched seven databases from 1990 to 2015 for randomized controlled trials (RCTs), cohort or case control studies comparing exercise to other interventions for shoulder pain. We critically appraised eligible studies using the Scottish Intercollegiate Guidelines Network (SIGN) criteria. We synthesized findings from scientifically admissible studies using best-evidence synthesis methodology.

Results
We retrieved 4853 articles. Eleven RCTs were appraised and five had a low risk of bias. Four studies addressed subacromial impingement syndrome. One study addressed nonspecific shoulder pain. For variable duration subacromial impingement syndrome: 1) supervised strengthening leads to greater short-term improvement in pain and disability over wait listing; and 2) supervised and home-based strengthening and stretching leads to greater short-term improvements in pain and disability compared to no treatment. For persistent subacromial impingement syndrome: 1) supervised and home-based strengthening leads to similar outcomes as surgery; and 2) home-based heavy load eccentric training does not add benefits to home-based rotator cuff strengthening and physiotherapy. For low-grade nonspecific shoulder pain, supervised strengthening and stretching leads to similar short-term outcomes as corticosteroid injections or multimodal care.

Conclusion
The evidence suggests that supervised and home-based progressive shoulder strengthening and stretching are effective for the management of subacromial impingement syndrome. For low-grade nonspecific shoulder pain, supervised strengthening and stretching are equally effective to corticosteroid injections or multimodal care.
CARPAL TUNNEL SYNDROME

How to judge time of resolution of surgery


Pre-operative electrodiagnostic testing predicts time to resolution of symptoms after carpal tunnel release.

Fowler JR¹, Munsch M², Huang Y², Hagberg WC², Imbriglia JE².

Author information

Abstract
The purpose of this study was to determine if nerve conduction studies predict time to resolution of symptoms after carpal tunnel release.

A total of 56 patients undergoing open carpal tunnel release were prospectively enrolled. Pre-operative presence of nocturnal symptoms and daytime numbness/tingling were documented. Pre-operative nerve conduction studies were reviewed and classified as mild, moderate, or severe. After open carpal tunnel release, patients were contacted by phone within 48 hours, at 1 week, and then at 2-week intervals for up to 9 months or until both nocturnal and daytime symptoms had resolved. This study found that patients with mild or moderate carpal tunnel syndrome experience a faster time to resolution of daytime numbness and tingling when compared with patients with severe carpal tunnel syndrome. Nocturnal symptoms resolved quickly in both groups.

The results of this study are in contrast to previous studies that found little to no value of nerve conduction studies in predicting post-operative functional and subjective outcomes.

LEVEL OF EVIDENCE:
IV.

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KEYWORDS: Carpal tunnel syndrome; electrodiagnostic testing; nerve conduction testing
PMID: 25770901
Do lifestyle restrictions and precautions prevent dislocation after total hip arthroplasty? A systematic review and meta-analysis of the literature

Clinical Rehabilitation, 04/02/2015Van der Weegen W, et al.

Objective: A systematic literature review and meta-analysis on the effectiveness of lifestyle restrictions and precautions to prevent dislocation after total hip arthroplasty.

Data sources: MEDLINE and the Cochrane Library were searched in February 2015, with additional hand searching of systematic reviews and reference lists.

Review methods: This review was conducted in accordance with the PRISMA statement for reporting systematic reviews and meta-analysis. PubMed and the Cochrane Library were searched from their start date through to February 2015. Randomized controlled trials and comparative case series in English, Dutch or German language were included. Only primary total hip arthroplasty procedures managed with different postoperative restrictions and precautions protocols were included. Primary outcome was the total hip arthroplasty dislocation rate, secondary outcomes were patient functioning, return to activities of daily living and patient satisfaction.

Results: A total of 119 eligible articles were identified, six were included: three randomized controlled trials, one retrospective matched cohort study, one retrospective and one prospective cohort study, describing 1122 procedures (restrictions group: n = 528; no restrictions group: n = 594). Both the standard posterior and anterolateral surgical approaches were included. There were eight dislocations (1.5%) in the restricted group, vs. six dislocations (1.0%) in the unrestricted group. Patients in the unrestricted group resumed activities significantly faster and were more satisfied with their pace of recovery.

Conclusion: A more liberal lifestyle restrictions and precautions protocol will not lead to worse dislocation rates after total hip arthroplasty, but will lead to earlier and better resumption of activities and higher patient satisfaction. These results appear to hold up for various surgical approaches.
**IMPINGEMENT**

**Pubic symphysectomy and hip impingement**

**Multicenter outcomes of endoscopic pubic symphysectomy for osteitis pubis associated with femoroacetabular impingement**

Arthroscopy, 03/31/2015 Matsuda DK, et al.

**Purpose**
To investigate outcomes of athletic patients treated with concurrent femoroacetabular impingement (FAI) and osteitis pubis (OP) surgery including endoscopic pubic symphysectomy.

**Methods**
We performed a multicenter retrospective case series of 7 consecutive adult patients (4 men) with a mean age of 33 years with symptomatic FAI and OP who underwent arthroscopic surgery for the former and endoscopic pubic symphysectomy for the latter with a mean follow-up period of 2.9 years (range, 2.0 to 5.0 years). The visual analog scale (VAS) score, the Non-Arthritic Hip Score (NAHS), and patient satisfaction were measured. Complications and revision surgical procedures were reported, and preoperative and postoperative radiographs were assessed.

**Results**
The mean preoperative VAS score of 6.7 (range, 4 to 8) improved to a mean postoperative VAS score of 1.5 (range, 0 to 7) \( P = .03 \). The mean preoperative NAHS of 50.2 points (range, 21 to 78 points) improved to a mean postoperative NAHS of 84.7 points (range, 41 to 99 points) \( P = .03 \). The mean patient satisfaction rating was 8.3 (range, 3 to 10). Two male patients had postoperative scrotal swelling that resolved spontaneously. There were no other complications. Preoperative and postoperative radiographs showed no anterior or posterior pelvic ring instability. One patient underwent pubic symphyseal arthrodesis because of continued pain.

**Conclusions**
Endoscopic pubic symphysectomy is a minimally invasive treatment for athletic OP with encouraging early outcomes that may be performed concurrently with surgery for FAI in co-afflicted patients.

**Level of Evidence**
Level IV, therapeutic case series.
Hamstring and Quad function in landing

Changes in Quadriceps and Hamstring Cocontraction Following Landing Instruction in Patients With Anterior Cruciate Ligament Reconstruction


**Study Design** Pretest/posttest controlled laboratory study. **Objectives** To determine changes in the neuromuscular activation of the quadriceps and hamstrings following instructions aimed at improving knee flexion during a single-limb landing task in persons who have undergone anterior cruciate ligament reconstruction (ACLR).

**Background** Clinicians advise patients who have undergone ACLR to increase knee flexion during landing tasks to improve impact attenuation. Another long-standing construct underlying such instruction involves increasing cocontraction of the hamstrings with the quadriceps to limit anterior shear of the tibia on the femur. The current study examined whether cocontraction of the knee musculature changes following instruction to increase knee flexion during landing.

**Methods** Thirty-four physically active subjects with unilateral ACLR participated in a 1-time testing session. The kinetics and kinematics of single-leg landing on the surgical limb were analyzed before and after instruction to increase knee flexion and reduce the impact of landing. Vastus lateralis and biceps femoris activities were analyzed using surface electromyography and normalized to a maximal voluntary isometric contraction (MVIC). Cocontraction indices were integrated over the weight-acceptance phase of landing.

**Results** Following instruction, peak knee flexion increased (preinstruction mean ± SD, 56° ± 11°; postinstruction, 77° ± 12°; \(P<.001\)) and peak vertical ground reaction forces decreased (preinstruction, 3.50 ± 0.42 body mass; postinstruction, 3.06 ± 0.44 body mass; \(P<.001\)). Cocontraction also decreased following instruction (preinstruction, 30.88% ± 17.68% MVIC; postinstruction, 23.74% ± 15.39% MVIC; \(P<.001\)). The change in cocontraction was correlated with a decrease in hamstring activity (preinstruction, 23.79% ± 12.88% MVIC; postinstruction, 19.72% ± 13.92% MVIC; \(r = 0.80; P<.001\)).

**Conclusion** Landing instruction produced both a statistically and clinically significant change in landing mechanics in persons post-ACLR. Conscious improvement of the absorptive power of the surgical limb was marked by decreased hamstring activity and cocontraction during single-limb landing.


**Keyword:** biomechanics, EMG, knee, lower extremity, motor control/learning
Cytokines and ACL


Improvement in muscle strength after an anterior cruciate ligament injury corresponds with a decrease in serum cytokines.

Barker T1, Henriksen VT2, Rogers VE2, Trawick RH3.

Author information

Abstract

The purpose of this communication was to identify if a decrease in serum cytokine concentrations associates with an improvement in muscle strength after an anterior cruciate ligament (ACL) injury. To establish groups with contrasting serum cytokine concentrations, subjects scheduled for ACL reconstructive surgery were separated into one of two groups (gender matched) based on their time from injury occurrence: (1) Early (<21-d from injury occurrence; n=22) or (2) Late (≥21-d from injury occurrence; n=22). Before surgery, each subject provided a fasting blood sample and performed single-leg peak isometric force testing on the injured (INJ) and non-injured (NI) limbs. Compared to the NI limb, peak isometric force in the INJ limb was decreased (p<0.05) in both groups (Early, ∼35%; Late, ∼18%). The deficit in peak isometric force, however, was increased (p<0.05) in the Early compared to Late group. Similarly, serum granulocyte macrophage colony-stimulating factor (GM-CSF), interleukin (IL)-6, and IL-13 were increased (all p<0.05) in the Early group. These unique findings show a concurrent increase in muscular weakness and serum cytokine concentrations shortly after (<21-d) an ACL injury. Importantly, muscular weakness persisted thereafter (>21-d) but at an attenuated level and parallel to a decrease in circulating cytokine concentrations. We conclude that a decrease in serum cytokines associates with a reduction in muscular weakness after an ACL injury.

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KEYWORDS:
Anterior cruciate ligament; Cytokines; Injury; Muscle weakness; Surgery

PMID: 25748529
The risk of manipulation under anesthesia due to unsatisfactory knee flexion after fast-track total knee arthroplasty.

Wied C¹, Thomsen MG², Kallemose T², Myhrmann L², Jensen LS², Husted H¹, Troelsen A².

BACKGROUND:
Fast-track TKA has significantly shortened the time available for physiotherapists to optimize knee ROM before discharge. Safety aspects concerning knee stiffness and the need for manipulation in a fast-track setting need to be illuminated. The study aims were to analyze if fast-track TKA can be considered safe considering rates of knee manipulation and if there is an association between knee ROM at time of discharge and the need for later manipulation.

METHODS:
Primary TKAs operated in 2011 at our institution were eligible for inclusion. The study group consisted of 359 TKAs.

RESULTS:
Manipulation of the knee was performed in 21 of 359 TKAs (5.8%). Seventy-one percent were discharged with a flexion $\geq 70^\circ$ combined with an extension deficit of $\leq 10^\circ$. The occurrence of MUA for these patients was 4.3%. The prevalence of knee manipulation showed a statistically significant association with the achieved knee flexion at discharge ($p=0.02$). Median length of stay was two days.

CONCLUSION:
Compared with literature findings fast-track TKA surgery may be considered safe based on the acceptable rate of knee manipulations after TKA (5.8%). We suggest ROM of $\geq 70^\circ$ flexion combined with an extension deficit of $\leq 10^\circ$ as an "optimal-zone" for ROM at discharge. The reason for this is the low occurrence of MUA (4.3%) in relation to the large amount of TKAs it represents (71%). The indication for MUA is multifactorial and ROM at discharge serves only as an indicator of later MUA risk.

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KEYWORDS:
MUA; Optimal-zone; ROM; TKA

PMID: 25766466
Does patellofemoral geometry in TKA affect patellar position in mid-flexion?
Saffarini M¹, Zaffagnini S, Bignozzi S, Colle F, Marcacci M, Dejour D.

Author information
Abstract

PURPOSE:
This study aimed to compare the position of the patella at 90° of flexion before and after implantation of two TKA models with identical tibiofemoral geometry but different trochlear and patellar designs. The hypothesis was that the design with the deeper 'anatomic' trochlea could produce more natural patellar positions.

METHODS:
Intra-operative navigation data were collected from 22 consecutive cases that received two TKA designs (9 HLS Noetos® and 13 HLS KneeTec®). Both implants were cemented postero-stabilised TKAs with mobile tibial inserts and patellar resurfacing. Operations were guided by a non-image-based system that recorded relative femoral, tibial and patellar positions pre- and post-operatively.

RESULTS:
The two groups exhibited little difference in femoral internal-external rotation and anterior-posterior translation during knee flexion. The two groups exhibited significant differences in patellar position at 90° of flexion. Post-operatively, the patella was similarly shifted medially relative to the femur (Noetos 6.9 mm, KneeTec 6.0 mm, n.s.). Patellar flexion was equivalent in native knees (Noetos 18.3°, KneeTec 20.5°, n.s.), but in implanted knees, it was considerably different (Noetos 6.3°, KneeTec 23.5°, p = 0.031).

CONCLUSIONS:
The present study compared intra-operative navigation data from two patient series that received TKA implants with identical tibiofemoral articular geometry but different patellofemoral designs. The results confirm that tibiofemoral kinematics are unchanged, but that patellar positions at 90° of flexion offer greater mechanical advantage to the quadriceps using the KneeTec than using the Noetos. The findings raise awareness of influence of patellofemoral geometry on mid-flexion kinematics and help surgeons select the most suitable implant for patients with weak quadriceps muscles or with history of patellar instability.

LEVEL OF EVIDENCE:
Comparative study, Level III.

PMID: 25763848
Therapeutic effects of whole body vibration training in knee osteoarthritis: a systematic review and meta-analysis.
Zafar H1, Alghadir A2, Anwer S3, Al-Eisa E2.

Abstract
OBJECTIVES: This systematic review was conducted to examine the current evidence regarding the effects of whole body vibration (WBV) training in individuals with knee osteoarthritis (OA).

DATA SOURCES: We searched Pubmed, CINAHL, Embase, Scopus, PEDro, and Science citation index for research articles published prior to January 2015 using the keywords whole body vibration, vibration training, and vibratory exercise in combination with Medical Subject Headings "Osteoarthritis knee".

STUDY SELECTION: This meta-analysis was restricted to randomized controlled trials published in English language. The quality of the selected studies was assessed by the PEDro Scale. The risk of bias was assessed using the Cochrane collaboration's tool in the domain based evaluation. We also evaluated the quality of each study based on the criteria given by the International Society of Musculoskeletal and Neuronal Interactions (ISMNI) for reporting WBV intervention studies, consisting of 13 factors.

DATA EXTRACTION: Descriptive data regarding subjects, design, intervention, WBV parameters, outcomes, and conclusions were collected from each study by two independent evaluators. The mean and standard deviation of the baseline and final end point scores for pain, stiffness, and function were extracted from included studies.

DATA SYNTHESIS: A total of 83 studies were found in the search. Of these, 5 studies met the inclusion criteria and were further analyzed. Four of these 5 studies reached high methodological quality on the PEDro scale. Overall, studies demonstrated mixed results in favor of additive effects of WBV for reducing pain and improving function in knee OA. There was considerable variation in the parameters of the WBV included in this systematic review.

CONCLUSIONS: Whole body vibration training reduces pain and improves function in individuals with knee OA.

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KEYWORDS: Function; Osteoarthritis; Pain; Squat; Strength; Whole body vibration PMID: 25827655
FOOT AND ANKLE
ORTHOTICS/SHOES

High heels and LBP


High-heeled-related alterations in the static sagittal profile of the spino-pelvic structure in young women.

Dai M\textsuperscript{1}, Li X, Zhou X, Hu Y, Luo Q, Zhou S.

Author information

Abstract

**PURPOSE:**
Women wearing high-heeled shoes have been considered to be more characterizing beauty, self-assurance and elegance. However, while maintaining the body on this type of support base, women with increased heel height often complain that wearing high-heeled shoes causes them to experience low back pain. The aim of the present study was to morphologically assess the effect of high-heel use on the static sagittal profile of the spino-pelvic structure.

**METHODS:**
A total of 21 Chinese girls were recruited in this study, with informed written consent. For each participant, standing left lateral radiographs, including that of the spine and pelvis, were obtained in a standardized standing position under barefoot and high-heel use conditions. The radiographic assessments were performed to detect the changes in the spino-pelvic profile under barefoot and high-heel use conditions.

**RESULTS:**
The average lumbar lordosis (LL) was $54.3 \pm 6.4^\circ$ under the barefoot condition and increased to $65.2 \pm 5.1^\circ$ after high-heel use ($P < 0.001$), with a significant increase in the disc L5/S1 and disc L4/L5 tilt angles. Of the 21 participants, 15 (71.43 %) had an increased kyphosis value for thoracic kyphosis, and 6 (28.57 %) had a decreased value after high-heel use, with a significant increased mean kyphosis value of $3.4 \pm 1.5^\circ$ overall ($P < 0.001$). The sagittal vertical axis (SVA) was always positive and was worse after high-heel use ($P = 0.012$): $11.5 \pm 8.7$ mm under the barefoot condition and $29.8 \pm 8.5$ mm under the high-heel use condition. Bivariate correlation analysis showed that both $\Delta$LL and $\Delta$SVA were positively associated with the heel height of the shoes and were inversely associated with the age of the participants. Receiver operator characteristic analysis showed that a heel height $>45.5$ mm was strongly predictive of the loss of static sagittal balance of the spine during high-heel use (sensitivity 87.5 %, specificity 62.5 %, area under the curve: 0.773; $P = 0.026$).

**CONCLUSIONS:**
The present study revealed that wearing high-heeled shoes can lead to increased LL and an uneconomic body position. This finding may help explain why some women complain that wearing high-heeled shoes causes them to experience low back pain.

PMID: 25753007
Exercise and sprain

The effectiveness of exercise on recovery and clinical outcomes of soft tissue injuries of the leg, ankle, and foot: A systematic review by the Ontario Protocol for Traffic Injury Management (OPTIMA) Collaboration

Woitzik E, et al.

Abstract

Introduction
Soft tissue injuries of the leg, ankle, or foot are common and often treated by exercise. The purpose of this study was to determine the effectiveness of exercise for the management of soft tissue injuries of the leg, ankle, or foot.

Methods
A systematic review of the literature was conducted. We searched five databases from 1990 to 2015. Relevant articles were critically appraised using Scottish Intercollegiate Guidelines Network (SIGN) criteria. The evidence from studies with low risk of bias was synthesized using the best-evidence synthesis methodology.

Results
We screened 7946 articles. We critically appraised ten randomized trials and six had a low risk of bias. The evidence suggests that for recent lateral ankle sprain: 1) rehabilitation exercises initiated immediately post-injury are as effective as a similar program initiated one week post-injury; and 2) supervised progressive exercise plus education/advice and home exercise lead to similar outcomes as education/advice and home exercise. Eccentric exercises may be more effective than an AirHeel brace but less effective than acupuncture for Achilles tendinopathy of more than two months duration. Finally, for plantar heel pain, static stretching of the calf muscles and sham ultrasound lead to similar outcomes, while static plantar fascia stretching may provide short-term benefits compared to shockwave therapy.

Conclusions
We found little evidence to support the use of early or supervised exercise interventions for lateral ankle sprains. Eccentric exercises may provide short-term benefits over a brace for persistent Achilles tendinopathy and plantar fascia stretching may provide short-term benefits for plantar heel pain.
ACHILLES TENDON

Achilles surgery weight bearing


Weight bearing the same day versus non-weight bearing for 4 weeks in Achilles tendon rupture.

Korkmaz M, Erkoc MF, Yolcu S, Balbaloglu O, Öztemur Z, Karaaslan F.

Author information

Abstract

INTRODUCTION:
Achilles tendon rupture (ATR) often occurs in 40- to 50-year-old men. Multiple studies discuss the correct treatment strategy based on surgical or nonsurgical intervention, including early mobilization. We aimed to compare the outcomes of bearing weight on the same day with non-weight bearing over a 4-week period of ATR patients.

MATERIALS AND METHOD:
Forty-seven ATR patients were conservatively treated and entered into our study. Group 1 consisted of 23 patients treated with partial weight bearing beginning the same day of conservative treatment; Group 2 consisted of 24 patients treated with non-weight bearing after a 4-week period. Patients were at least 18 years old and were followed for 12 months. Evaluation criteria were mechanism of injury, admission time to our clinic, complication rate, and time to return to work. Symptoms and physical activity levels of all patients were assessed on 6 and 12 months after treatment began, according to the Achilles Tendon Total Rupture Score (ATRS), Physical Activity Scale (PAS), and American Orthopedic Foot and Ankle Society (AOFAS) ankle-hindfoot score.

RESULTS:
Rerupture rates were rate 17.4 % (4 patients) in Group 1 and 12.5 % (3 patients) in Group 2 (p = 0.81). Time to return to work was shorter in Group 1 compared with Group 2, but it was not statistically significant (p = 0.86). AOFAS, ATRS, and PAS scores at 6 and 12 months showed no significant differences between groups (p = 0.69, p = 0.59, p = 0.89, p = 0.77, p = 0.94, p = 0.66, respectively).

CONCLUSION:
This study showed that a well-conducted early-weight-bearing treatment has good clinical outcomes, with a complication rate no higher than non-weight-bearing treatment.

PMID: 25773309
Foot mobilizations of plantar fasciitis

**RESEARCH REPORT**
The Effect of Additional Ankle and Midfoot Mobilizations on Plantar Fasciitis: A Randomized Controlled Trial

**Authors:** Anat Shashua, MPT\(^1\), Shlomo Flechter, MD, PhD\(^2\), Liat Avidan, BPT\(^1\), Dani Ofir, BPT\(^1\), Alex Melayev, BPT\(^1\), Leonid Kalichman, PT, PhD\(^3\)


**Study Design** A single-blind randomized controlled trial.

**Objective** To evaluate the efficacy of ankle and midfoot mobilization on pain and function of patients with plantar fasciitis (PF).

**Background** Plantar fasciitis is a degenerative process of the plantar fascia, with a lifetime prevalence of approximately 10%. Limited ankle dorsiflexion is a common finding and apparently acts as a contributing factor to the development of PF.

**Methods** Fifty patients with PF, aged 23 to 73 years, were randomly assigned to either the intervention or control group. Both groups received 8 treatments, twice a week, consisting of stretching exercises and ultrasound. In addition, the intervention group received mobilization of the ankle and midfoot joints. Dorsiflexion range of motion was measured at the beginning and at the end of treatment. The results were evaluated by 3 outcomes: the numeric pain-rating scale, Lower Extremity Functional Scale, and algometry.

**Results** No significant difference was found between groups in any of the outcomes. Both groups showed a significant difference in the numeric pain-rating scale and Lower Extremity Functional Scale. Both groups significantly improved in dorsiflexion range of motion, with no difference between groups.

**Conclusion** The addition of ankle and foot joint mobilization aimed at improving dorsiflexion range of motion is not more effective than stretching and ultrasound alone in treating PF. The association between limited ankle dorsiflexion and PF is most probably due to soft tissue limitations, not the joints. Trial registered at ClinicalTrials.gov (registration number NCT01439932).


**Keyword:** ankle joint, dorsiflexion, joint mobilizations, plantar fascia
McKenzie vs manipulation for LBP

Predicting a clinically important outcome in patients with low back pain following McKenzie therapy or spinal manipulation: a stratified analysis in a randomized controlled trial

BMC Musculoskeletal Disorders, 04/03/2015 Petersen T, et al.

Background Reports vary considerably concerning characteristics of patients who will respond to mobilizing exercises or manipulation. The objective of this prospective cohort study was to identify characteristics of patients with a changeable lumbar condition, i.e. presenting with centralization or peripheralization, that were likely to benefit the most from either the McKenzie method or spinal manipulation.

Methods 350 patients with chronic low back pain were randomized to either the McKenzie method or manipulation. The possible effect modifiers were age, severity of leg pain, pain-distribution, nerve root involvement, duration of symptoms, and centralization of symptoms. The primary outcome was the number of patients reporting success at two months follow-up. The values of the dichotomized predictors were tested according to the prespecified analysis plan.

Results No predictors were found to produce a statistically significant interaction effect. The McKenzie method was superior to manipulation across all subgroups, thus the probability of success was consistently in favor of this treatment independent of predictor observed. When the two strongest predictors, nerve root involvement and peripheralization, were combined, the chance of success was relative risk 10.5 (95% CI 0.71-155.43) for the McKenzie method and 1.23 (95% CI 1.03-1.46) for manipulation (P = 0.11 for interaction effect).

Conclusions We did not find any baseline variables which were statistically significant effect modifiers in predicting different response to either McKenzie treatment or spinal manipulation when compared to each other. However, we did identify nerve root involvement and peripheralization to produce differences in response to McKenzie treatment compared to manipulation that appear to be clinically important. These findings need testing in larger studies. Trial registration Clinicaltrials.gov: NCT0093910
Alexander Technique and neck pain

Efficacy of the alexander technique in treating chronic non-specific neck pain: a randomized controlled trial

Clinical Rehabilitation, 04/02/2015

Lauche R, et al.

The aim of this study is to test the efficacy of the Alexander Technique, local heat and guided imagery on pain and quality of life in patients with chronic non–specific neck pain. The Alexander Technique was not superior to local heat application in treating chronic non–specific neck pain. It cannot be recommended as routine intervention at this time. Further trials are warranted for conclusive judgment.

Methods

• The primary outcome measure at week 5 was neck pain intensity on a 100-mm visual analogue scale; secondary outcomes included neck disability, quality of life, satisfaction and safety.

• The primary outcome measure at week 5 was neck pain intensity on a 100-mm visual analogue scale; secondary outcomes included neck disability, quality of life, satisfaction and safety.

Results

• No group difference was found for pain intensity for the Alexander Technique compared to local heat (difference 4.5mm; 95%CI:-8.1;17.1;p=0.48), but exploratory analysis revealed the superiority of the Alexander Technique over guided imagery (difference -12.9mm; 95%CI:-22.6;-3.1,p=0.01).

• Significant group differences in favor of the Alexander Technique were also found for physical quality of life (P<0.05).

• Adverse events mainly included slightly increased pain and muscle soreness.
Cervical manipulations


Coronado RA\(^1\), Bialosky JE, Bishop MD, Riley Iii JL, Robinson ME, Michener LA, George SZ.

Author information

Abstract

Study Design Single-blind, randomized trial.

Objectives 1) To compare the effects of cervical and shoulder thrust manipulation (TM) and exercise on pain sensitivity, and 2) to explore associations with clinical outcomes in patients with shoulder pain.

Background Experimental studies indicate spinal TM has an influence on central pain processes, supporting its application for treatment of extremity conditions. Direct comparison of spinal and peripheral TM on pain sensitivity has not been widely examined.

Methods Seventy-eight participants with shoulder pain (36 female, mean age ± SD = 39.0 ± 14.5 years) were randomized to receive 3 treatments of cervical TM (n = 26) or shoulder TM (n = 27) or shoulder exercise (n = 25) over 2 weeks. Twenty-five healthy participants (13 female, mean age ± SD = 35.2 ± 11.1 years) were assessed to determine altered pain sensitivity in the clinical participants at baseline. Primary outcomes were changes in local (e.g., shoulder) and remote (e.g., tibialis anterior) pressure pain threshold (PPT) and heat pain threshold (HPT) occurring over 2 weeks. Secondary outcomes were shoulder pain intensity and patient-rated function at 4, 8, and 12 weeks. ANOVA models and partial correlation analyses were conducted for examining comparative effects and the relationship between measures.

Results Clinical participants demonstrated lower local (mean difference (kg) = -1.63 [95% CI: -2.40; -0.86]) and remote PPT (mean difference (kg) = -1.96 [95% CI: -3.09; -0.82]) and HPT (mean difference (°C) = -1.15 [95% CI: -2.06; -0.24]) compared to controls suggesting enhanced pain sensitivity. Following intervention, there were no between-group differences in pain sensitivity or clinical outcome (p > 0.05). However, improvements were noted, regardless of intervention, for PPT (range of mean difference (kg) = 0.22 to 0.32 [95% CI: 0.03; 0.43]) and HPT (range of mean difference (°C) = 0.30 to 0.58 [95% CI: 0.06; 0.96]), and pain intensity (range of mean difference (x/10) = -1.79 to -1.45 [95% CI: 2.34; -0.94]) and function (range of mean difference (x/60) = 3.15 to 3.82 [95% CI: 0.69; 6.20]) at all time points. We did not find an association between pain sensitivity changes and clinical outcome (p > 0.05).

Conclusion Clinical participants showed enhanced pain sensitivity, but did not respond differentially to cervical or peripheral TM. In fact in this sample, cervical TM, shoulder TM, and shoulder exercise had similar pain sensitivity and clinical effects. The lack of association between pain sensitivity and clinical pain and function outcomes suggests different (e.g. non-specific) pain pathways for clinical benefit following TM or exercise.


KEYWORDS: manual therapy; pain mechanism; quantitative sensory testing; shoulder

PMID:25739842
POSTURE

Sitting posture and neck pain computing

The relationship between sitting posture and seated-related upper quadrant musculoskeletal pain in computing South African adolescents: A prospective study

Manual Therapy, 04/02/2015 Brink Y, et al.

Abstract

Background

There is evidence that consistent sitting for prolonged periods is associated with upper quadrant musculoskeletal pain (UQMP). It is unclear whether postural alignment is a significant risk factor.

Objective and design

The aim of the prospective study (2010 – 2011) was to ascertain if three-dimensional sitting postural angles, measured in a real-life school computer classroom setting, predict seated-related UQMP.

Method

Asymptomatic Grade 10 high-school students, aged 15 - 17 years, undertaking Computer Application Technology, were eligible to participate. Using the 3D Posture Analysis Tool, sitting posture was measured while students used desk-top computers. Posture was reported as five upper quadrant angles (Head flexion, Neck flexion; Craniocervical angle, Trunk flexion and Head lateral bending). The Computer Usage Questionnaire measured seated-related UQMP and hours of computer use. The Beck Depression Inventory and the Multidimensional Anxiety Scale for Children assessed psychosocial factors. Sitting posture, computer use and psychosocial factors were measured at baseline. UQMP was measured at six months and one-year follow-up.

Results

211, 190 and 153 students participated at baseline, six months and one-year follow-up respectively. 34.2% students complained of seated-related UQMP during the follow-up period. Increased head flexion (HF) predicted seated-related UQMP developing over time for a small group of students with pain scores greater than the 90th pain percentile, adjusted for age, gender, BMI, computer use and psychosocial factors (p=0.003). The pain score increased 0.22 points per 1° increase in HF.

Conclusions

Classroom ergonomics and postural hygiene should therefore focus on reducing large HF angles among computing adolescents.

Keywords: posture, three-dimensional, adolescent, pain
ABSTRACTS

ATHLETICS

Psychological determinates


Psychological Determinants of Whole-Body Endurance Performance.
McCormick A¹, Meijen C, Marcora S.

Author information
Abstract

BACKGROUND:
No literature reviews have systematically identified and evaluated research on the psychological determinants of endurance performance, and sport psychology performance enhancement guidelines for endurance sports are not founded on a systematic appraisal of endurance-specific research.

OBJECTIVE:
A systematic literature review was conducted to identify practical psychological interventions that improve endurance performance and to identify additional psychological factors that affect endurance performance. Additional objectives were to evaluate the research practices of the included studies, to suggest theoretical and applied implications, and to guide future research.

METHODS:
Electronic databases, forward-citation searches and manual searches of reference lists were used to locate relevant studies. Peer-reviewed studies were included when they chose an experimental or quasi-experimental research design; a psychological manipulation; endurance performance as the dependent variable; and athletes or physically active, healthy adults as participants.

RESULTS:
Consistent support was found for using imagery, self-talk and goal setting to improve endurance performance, but it is unclear whether learning multiple psychological skills is more beneficial than learning one psychological skill. The results also demonstrated that mental fatigue undermines endurance performance, and verbal encouragement and head-to-head competition can have a beneficial effect. Interventions that influenced perception of effort consistently affected endurance performance.

CONCLUSIONS:
Psychological skills training could benefit an endurance athlete. Researchers are encouraged to compare different practical psychological interventions, to examine the effects of these interventions for athletes in competition and to include a placebo control condition or an alternative control treatment. Researchers are also encouraged to explore additional psychological factors that could have a negative effect on endurance performance. Future research should include psychological mediating variables and moderating variables. Implications for theoretical explanations for endurance performance and evidence-based practice are described.

PMID:25771784
Sprinting and conditioning


The Effects of Repeated-Sprint Training on Field-Based Fitness Measures: A Meta-Analysis of Controlled and Non-Controlled Trials.

Taylor J^1, Macpherson T, Spears I, Weston M.

Abstract

BACKGROUND: Repeated-sprint training appears to be an efficient and practical means for the simultaneous development of different components of fitness relevant to team sports.

OBJECTIVE: Our objective was to systematically review the literature and meta-analyse the effect of repeated-sprint training on a selection of field-based measures of athletic performance, i.e. counter-movement jump, 10 m sprint, 20 m sprint, 30 m sprint, repeated-sprint ability and high-intensity intermittent running performance.

DATA SOURCES: The SPORTDiscus, PubMed, MEDLINE and Web of Science databases were searched for original research articles. Search terms included 'repeated-sprint training', 'sprint training', 'aerobic endurance', 'repeated-sprint ability', 'counter-movement jump' and 'sprint performance'.

STUDY SELECTION: Inclusion criteria included intervention consisting of a series of ≤10 s sprints with ≤60 s recovery; trained participants; intervention duration of 2-12 weeks; field-based fitness measures; running- or cycling-based intervention; published up to, and including, February 2014.

DATA EXTRACTION: Our final dataset included six trials for counter-movement jump (two controlled trials), eight trials for 10 m sprint, four trials for 20 m sprint (three controlled trials), two trials for 30 m sprint, eight trials for repeated-sprint ability and three trials for high-intensity intermittent running performance. Analyses were conducted using comprehensive meta-analysis software. Uncertainty in the meta-analysed effect of repeated-sprint training was expressed as 95 % confidence limits (CL), along with the probability that the true value of the effect was trivial, beneficial or harmful. Magnitude-based inferences were based on standardised thresholds for small, moderate and large changes of 0.2, 0.6 and 1.2 standard deviations, respectively.

RESULTS: Repeated-sprint training had a likely small beneficial effect in non-controlled counter-movement jump trials (effect size 0.33; 95 % CL ±0.30), with a possibly moderate beneficial effect in controlled trials (0.63; 95 % CL ±0.44). There was a very likely small beneficial effect on 10 m sprint time in non-controlled trials (-0.42; 95 % CL ±0.24), with a possibly moderate beneficial effect on 20 m sprint time in non-controlled (-0.49; 95 % CL ±0.61) and controlled (-0.65; 95 % CL ±0.61) trials. Repeated-sprint training had a possibly large beneficial effect on 30 m sprint performance in non-controlled trials (-1.01; 95 % CL ±0.93), with possibly moderate beneficial effects on repeated-sprint ability (-0.62; 95 % CL ±0.25) and high-intensity intermittent running performance (-0.61; 95 % CL ±0.54).

CONCLUSIONS: Repeated-sprint training can induce small to large improvements in power, speed, repeated-sprint ability and endurance, and may have relevance for training in team sports. PMID: 25790793
Knee loading

RESEARCH REPORT
Cumulative Loads Increase at the Knee Joint With Slow-Speed Running Compared to Faster Running: A Biomechanical Study

Authors: Jesper Petersen, PT, MSc1, Henrik Sørensen, PhD1, Rasmus Østergaard Nielsen, PT, PhD1


Study Design Biomechanical cross-sectional study.

Objective To investigate the hypothesis that the cumulative load at the knee during running increases as running speed decreases.

Background The knee joint load per stride decreases as running speed decreases. However, by decreasing running speed, the number of strides per given distance is increased. Running a given distance at a slower speed may increase the cumulative load at the knee joint compared with running the same distance at a higher speed, hence increasing the risk of running-related injuries in the knee.

Methods Kinematic and ground reaction force data were collected from 16 recreational runners, during steady-state running with a rearfoot strike pattern at 3 different speeds (mean ± SD): 8.02 ± 0.17 km/h, 11.79 ± 0.21 km/h, and 15.78 ± 0.22 km/h. The cumulative load (cumulative impulse) over a 1000-m distance was calculated at the knee joint on the basis of a standard 3-D inverse-dynamics approach.

Results Based on a 1000-m running distance, the cumulative load at the knee was significantly higher at a slow running speed than at a high running speed (relative difference, 80%). The mean load per stride at the knee increased significantly across all biomechanical parameters, except impulse, following an increase in running speed.

Conclusion Slow-speed running decreases knee joint loads per stride and increases the cumulative load at the knee joint for a given running distance compared to faster running. The primary reason for the increase in cumulative load at slower speeds is an increase in number of strides needed to cover the same distance.


Keyword: anterior knee pain, patellofemoral, run, tibiofemoral
Ancestry and pain


Relationship of pain and ancestry in African American women.
Robbins JA¹, Qi L, Garcia L, Younger JW, Seldin MF.

Abstract

BACKGROUND:
African Americans are reported to be more sensitive to pain than European Americans. Pain sensitivity has been shown to be genetically linked in animal models and is likely to be in humans.

METHODS:
Exactly, 11,239 self-identified African American post-menopausal women enrolled in the Women's Health Initiative had percentage African ancestry determined by ancestry informative markers, "Pain Construct" measurements and covariate information. They answered five questions about specific types and location of pain, such as joint, neck, low back, headache and urinary. They also answered two questions which were used to derive a "Pain Construct", a measure of general pain scored on a scale of 1-100. Associations were tested in linear regression models adjusting for age, self-reported medical conditions, neighbourhood socio-economic status, education and depression.

RESULTS:
In the unadjusted model of the five specific types of pain measures, greater pain perception was associated with a higher proportion of African ancestry. However, some of the specific types of pain measures were no longer associated with African ancestry after adjustment for other study covariates. The Pain Construct was statistically significantly associated with African ancestry in both the unadjusted [β = -0.132, 95% confidence interval (CI) = -0.099 to -0.164; r = -0.075, 95% CI -0.056 to -0.093] and the adjusted models (β = -0.069 95% CI = -0.04 to -0.10).

CONCLUSIONS:
Greater African ancestry was associated with higher levels of self-reported pain, although this accounted for only a minor fraction of the overall variation in the Pain Construct.

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PMID: 25752262
Environment and chronic pain

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Alleviation of chronic neuropathic pain by environmental enrichment in mice well after the establishment of chronic pain

Pascal Vachon, Magali Millecamps, Lucie Low, Scott J Thompson, Floriane Pailleux, Francis Beaudry, Catherine M Bushnell, and Laura S Stone

Background In animal models, the impact of social and environmental manipulations on chronic pain have been investigated in short term studies where enrichment was implemented prior to or concurrently with the injury. The focus of this study was to evaluate the impact of environmental enrichment or impoverishment in mice three months after induction of chronic neuropathic pain.

Methods Thirty-four CD-1 seven to eight week-old male mice were used. Mice underwent surgery on the left leg under isoflurane anesthesia to induce the spared nerve injury model of neuropathic pain or sham condition. Mice were then randomly assigned to one of four groups: nerve injury with enriched environment (n = 9), nerve injury with impoverished environment (n = 8), sham surgery with enriched environment (n = 9), or sham surgery with impoverished environment (n = 8). The effects of environmental manipulations on mechanical (von Frey filaments) heat (hot plate) and cold (acetone test) cutaneous hypersensitivities, motor impairment (Rotarod), spontaneous exploratory behavior (open field test), anxiety-like behavior (elevated plus maze) and depression-like phenotype (tail suspension test) were assessed in neuropathic and control mice 1 and 2 months post-environmental change. Finally, the effect of the environment on spinal expression of the pro-nociceptive neuropeptides substance P and CGRP form the lumbar spinal cord collected at the end of the study was evaluated by tandem liquid chromatography mass spectrometry.

Results Environmental enrichment attenuated nerve injury-induced hypersensitivity to mechanical and cold stimuli. In contrast, an impoverished environment exacerbated mechanical hypersensitivity. No antidepressant effects of enrichment were observed in animals with chronic neuropathic pain. Finally, environmental enrichment resulted lower SP and CGRP concentrations in neuropathic animals compared to impoverishment. These effects were all observed in animals that had been neuropathic for several months prior to intervention.

Conclusions These results suggest that environmental factors could play an important role in the rehabilitation of chronic pain patients well after the establishment of chronic pain. Enrichment is a potentially inexpensive, safe and easily implemented non-pharmacological intervention for the treatment of chronic pain.

Keywords: Chronic neuropathic pain, Environmental enrichment, Environmental impoverishment, Animal model, Spared nerve injury
Postoperative pain


Clinically derived early postoperative pain trajectories differ by age, sex, and type of surgery.

Tighe PJ¹, Le-Wendling LT, Patel A, Zou B, Fillingim RB.

Author information

Abstract

The objective of this study was to determine the effects of age, sex, and type of surgery on postoperative pain trajectories derived in a clinical setting from pain assessments in the first 24 hours after surgery. This study is a retrospective cohort study using a large electronic medical records system to collect and analyze surgical case data. The sample population included adult patients undergoing nonambulatory nonobstetric surgery in a single institution over a 1-year period. Analyses of postoperative pain trajectories were performed using a linear mixed-effects model. Pain score observations (91,708) from 7293 patients were included in the statistical analysis. On average, the pain score decreased about 0.042 (95% confidence interval [CI]: -0.044 to -0.040) points on the numerical rating scale (NRS) per hour after surgery for the first 24 postoperative hours. The pain score reported by male patients was approximately 0.27 (95% CI: -0.380 to -0.168) NRS points lower than that reported by females. Pain scores significantly decreased over time in all age groups, with a slightly more rapid decrease for younger patients. Pain trajectories differed by anatomic location of surgery, ranging from -0.054 (95% CI: -0.062 to -0.046) NRS units per hour for integumentary and nervous surgery to -0.104 (95% CI: -0.110 to -0.098) NRS units per hour for digestive surgery, and a positive trajectory (0.02 [95% CI: 0.016 to 0.024] NRS units per hour) for musculoskeletal surgery. Our data support the important role of time after surgery in considering the influence of biopsychosocial and clinical factors on acute postoperative pain.

PMID: 25790453
Pain and disability


**How does pain lead to disability? A systematic review and meta-analysis of mediation studies in people with back and neck pain.**

Lee H¹, Hübscher M, Moseley GL, Kamper SJ, Traeger AC, Mansell G, McAuley JH.

Author information

Abstract

Disability is an important outcome from a clinical and public health perspective. However, it is unclear how disability develops in people with low back pain or neck pain. More specifically, the mechanisms by which pain leads to disability are not well understood. Mediation analysis is a way of investigating these mechanisms by examining the extent to which an intermediate variable explains the effect of an exposure on an outcome. This systematic review and meta-analysis was aimed to identify and examine the extent to which putative mediators explain the effect of pain on disability in people with low back pain or neck pain. Five electronic databases were searched. We found 12 studies (N=2,961) that examined how pain leads to disability with mediation analysis. Standardized regression coefficients (á) of the indirect and total paths were pooled. We found evidence to show that self-efficacy (á = 0.23, 95% CI = 0.10-0.34), psychological distress (á = 0.10, 95% CI = 0.01-0.18), and fear (á = 0.08, 95% CI = 0.01-0.14) mediated the relationship between pain and disability, but catastrophizing did not (á = 0.07, 95% CI = -0.06-0.19).

The methodological quality of these studies was low and we highlight potential areas for development. Nonetheless, the results suggest that there are significant mediating effects of self-efficacy, psychological distress, and fear, which underpins the direct targeting of these constructs in treatment.

PMID: 25760473
Brain alterations and neurocognitive dysfunction in patients with complex regional pain syndrome

The Journal of Pain, 04/03/2015

Abstract
Few studies have examined the involvement of specific sub-regions of the prefrontal cortex in complex regional pain syndrome (CRPS). We analyzed cortical thickness to identify morphological differences in local brain structures between patients with CRPS and healthy control subjects (HCs). Furthermore, we evaluated the correlation between cortical thickness and neurocognitive function. Cortical thickness was measured in 25 patients with CRPS and 25 HCs using the FreeSurfer method. Pain severity and psychiatric symptoms were assessed using the Short Form McGill Pain Questionnaire and the Beck Depression and Anxiety Inventories (BDI and BAI), respectively. Neurocognitive function was assessed via the Wisconsin Card Sorting Test (WCST) and the stop-signal task (SST). The right dorsolateral prefrontal cortex (DLPFC) and left ventromedial prefrontal cortex (VMPFC) were significantly thinner in CRPS patients than in HCs. CRPS patients made more perseveration errors on the WCST and had longer SST reaction times compared with HCs. Although BDI and BAI differ significantly between the groups, they were not correlated with cortical thickness. Our study suggests that the pathophysiology of CRPS may be related to reduced cortical thickness in the DLPFC and VMPFC. The structural alterations in DLPFC may explain executive dysfunction and disinhibited pain perception in CRPS.

Perspective
The present study reports decreased cortical thickness in the prefrontal cortex and neurocognitive dysfunctions in patients with complex regional pain syndrome. These findings may contribute to the understanding of pain-related impairments in cognitive function and could help explain the symptoms or progression of complex regional pain syndrome.
Complex regional pain syndrome—significant progress in understanding.

Birklein F¹, Schlereth T.

Author information

Abstract

Research into complex regional pain syndrome (CRPS) has made significant progress. First, there was the implementation of the official IASP "Budapest" diagnostic criteria. It would be desirable to also define exclusion and outcome criteria that should be reported in studies. The next step was to recognize the complex pathophysiology. After trauma, some inflammation is physiological; in acute CRPS, this inflammation persists for months. There is an abundance of inflammatory and a lack of anti-inflammatory mediators. This proinflammatory network (cytokines and probably also other mediators) sensitizes the peripheral and spinal nociceptive system, it facilitates the release of neuropeptides from nociceptors inducing the visible signs of inflammation, and it stimulates bone cell or fibroblast proliferation, and endothelial dysfunction leading to vascular changes. Trauma may also expose nervous system structures to the immune system and triggers autoantibodies binding to adreno- and acetylcholine receptors. In an individual time frame, the pain in this inflammatory phase pushes the transition into "centralized" CRPS, which is dominated by neuronal plasticity and reorganization. Sensory-motor integration becomes disturbed, leading to a loss of motor function; the body representation is distorted leading to numbness and autonomic disturbances. In an attempt to avoid pain, patients neglect their limb and learn maladaptive nonuse.

The final step will be to assess large cohorts and to analyze these data together with data from public resources using a bioinformatics approach. We could then develop diagnostic toolboxes for individual pathophysiology and select focused treatments or develop new ones.

PMID: 25789441
Caffeine and spontaneous abortions


Caffeine and caffeinated beverage consumption and risk of spontaneous abortion.
Hahn KA¹, Wise LA², Rothman KJ³, Mikkelsen EM⁴, Brogly SB⁵, Sørensen HT⁶, Riis AH⁴, Hatch EE⁵.

Abstract
STUDY QUESTION: Is caffeine and caffeinated beverage consumption associated with the risk of spontaneous abortion (SAB)?
SUMMARY ANSWER: While preconceptional caffeine consumption was not materially associated with an increased risk of SAB, consumption during early pregnancy was associated with a small increased risk of SAB, although the relation was not linear.
WHAT IS KNOWN ALREADY: Caffeine has been hypothesized as a risk factor for SAB since the 1980s; however, results from previous studies have been conflicting.
STUDY DESIGN, SIZE, DURATION: This prospective cohort study included 5132 Danish women planning pregnancy and enrolled from 2007 to 2010.
PARTICIPANTS/MATERIALS, SETTING, METHODS: Participants were women who conceived after entry into the Snart-Gravid cohort and who were aged 18-40, in a stable relationship with a male partner, and did not use fertility treatments to conceive. Women reported their daily caffeine and caffeinated beverage consumption on questionnaires before conception and during early pregnancy. All exposure measurements were prospective with respect to outcome ascertainment. We estimated hazard ratios (HRs) of SAB for categories of caffeine consumption in milligrams (mg) per day and the corresponding 95% confidence intervals (CIs) using Cox proportional hazards regression models with gestational weeks as the time scale.
MAIN RESULTS AND THE ROLE OF CHANCE: There were 732 women (14.3%) who were identified as having a SAB. In the preconceptional period, caffeine consumption was not materially associated with SAB risk (HR comparing ≥300 with <100 mg/day: 1.09; 95% CI: 0.89, 1.33). In early pregnancy, the HRs for 100-199, 200-299 and ≥300 mg/day of caffeine consumption were 1.62 (95% CI: 1.19, 2.22), 1.48 (95% CI: 1.03, 2.13) and 1.23 (95% CI: 0.61, 2.46), respectively, compared with that for <100 mg/day.
LIMITATIONS, REASONS FOR CAUTION: The observed results may be affected by non-differential exposure misclassification, reverse causation and residual confounding.
WIDER IMPLICATIONS OF THE FINDINGS:
This is the largest study to date of prospectively measured, preconception caffeine consumption and risk of SAB. We were able to reduce the likelihood of differential left truncation bias and recall bias present in other analyses.
STUDY FUNDING/COMPETING INTERESTS:
Snart-Gravid was funded by the NICHD (R21-050264). Dr. Hahn's work was funded in part by the BU Reproductive, Perinatal, and Pediatric Epidemiology Training Grant NIH #T32HD052458. There are no competing interests.

© The Author 2015. Published by Oxford University Press on behalf of the European Society of Human Reproduction and Embryology. All rights reserved. For Permissions, please email: journals.permissions@oup.com. KEYWORDS: caffeine; coffee; cohort study; spontaneous abortion PMID: 25788567
NEUROLOGICAL CONDITIONS

Spinal cord injury recovery


**The effect of vertebral fracture on the early neurologic recovery in patients with central cord syndrome.**

Schroeder GD, Kepler CK, Hjelm N, Vaccaro AR, Weinstein MS.

**PURPOSE:**
To compare early changes in the ASIA Motor Score (AMS) between patients with central cord syndrome (CCS) from an acute fracture to patients without a fracture.

**METHODS:**
Patients with CCS were identified and stratified based on the presence of a fracture. The AMS through the first week of the patients' hospitalization was obtained. Initial injury severity as well as early neurologic recovery was measured using the AMS. Analysis of variance was performed to determine if age, gender, rectal tone at presentation, congenital stenosis, or surgery within 24 h significantly effected the change in AMS.

**RESULTS:**
A strong trend (p = 0.0504) towards a more severe initial neurologic injury in patients with a fracture (AMS 59.7) than in patients without a fracture (AMS 70.2) was identified. However, in the week after injury, patients with a fracture had an improvement in their neurologic function (ΔAMS +4.8) while patients without a fracture demonstrated neurologic decline (ΔAMS -5.9). The change in AMS between patients with and without a fracture was nearly significant (p = 0.06).

**CONCLUSION:**
Patients with central cord syndrome present with similar symptoms, but injuries with and without a fracture may be associated with a different early neurologic recovery. Patients with a fracture have a more severe injury at initial presentation, but tend to have neurologic improvement in the first week; conversely patients without a fracture have a less severe initial neurologic injury, but tend to have a slight decline in neurologic function over the first week.

PMID: 25749728