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LUMBAR SPINE

PT and spinal stenosis

Spine J. 2014 Aug 1;14(8):1611-21. doi: 10.1016/j.spinee.2013.09.044. Epub 2013 Oct 23.

Associations between physical therapy and long-term outcomes for individuals with lumbar spinal stenosis in the SPORT study.

Fritz JM¹, Lurie JD², Zhao W³, Whitman JM⁴, Delitto A⁵, Brennan GP⁶, Weinstein JN⁷.

Abstract

BACKGROUND CONTEXT: A period of nonsurgical management is advocated before surgical treatment for most patients with lumbar spinal stenosis. Currently, little evidence is available to define optimal nonsurgical management. Physical therapy is often used, however its use and effectiveness relative to other nonsurgical strategies has not been adequately explored.

PURPOSE: Describe the use of physical therapy and other nonsurgical interventions by patients with lumbar spinal stenosis and examine the relationship between physical therapy and long-term prognosis.

STUDY DESIGN: Secondary analysis of the Spine Patient Outcomes Research Trial (SPORT) combining data from randomized and observational studies.

SETTING: Thirteen spine clinics in 11 states in the United States.

PATIENT SAMPLE: Patients with lumbar spinal stenosis receiving nonsurgical management including those who did or did not receive physical therapy within 6 weeks of enrollment.

OUTCOME MEASURES: Primary outcome measures included crossover to surgery, the bodily pain and physical function scales changes from the Survey Short Form 36 (SF-36), and the modified Oswestry Disability Index. Secondary outcome measures were patient satisfaction and the Sciatica Bothersomeness Index.

METHODS: Baseline characteristics and rates of crossover to surgery were compared between patients who did or did not receive physical therapy. Baseline factors predictive of receiving physical therapy were examined with logistic regression. Mixed effects models were used to compare outcomes between groups at 3 and 6 months and 1 year after enrollment adjusted for baseline severity and patient characteristics.

RESULTS: Physical therapy was used in the first 6 weeks by 90 of 244 patients (37%) and was predicted by the absence of radiating pain and being single instead of married. Physical therapy was associated with a reduced likelihood of crossover to surgery after 1 year (21% vs. 33%, $p=.045$), and greater reductions on the Short Form 36 physical functioning scale after 6 months (mean difference=6.0, 95% confidence interval: 0.2-11.7) and 1 year (mean difference=6.5, 95% confidence interval: 0.6-12.4). There were no differences in bodily pain or Oswestry scores across time.

CONCLUSIONS: Many patients with lumbar spinal stenosis pursuing conservative management receive physical therapy. Using physical therapy was associated with reduced likelihood of patients receiving surgery within 1 year. Results for other outcomes were mixed with no differences in several measures. Further research is needed to examine the effectiveness of physical therapy relative to other nonsurgical management strategies for patients with lumbar spinal stenosis.

KEYWORDS: Exercise; Lumbar spinal stenosis; Physical therapy; Prognosis; Rehabilitation; Surgery **PMID: 24373681**

Tactile acuity

Are tactile acuity and clinical symptoms related to differences in perceived body image in patients with chronic nonspecific lower back pain?

Manual Therapy, 08/04/2014 Clinical Article

Abstract

Purpose: Clinically, perceived image of the lower back and the two-point discrimination (TPD) test are used as markers for evaluating alterations of cortical reorganization. The purpose of the present study was to examine whether TPD and selected clinical findings are different in subgroups of individuals with chronic nonspecific lower back pain (CNLBP) based on body image drawings.

Methods: Forty-two patients with CNLBP and seventeen healthy individuals were recruited. Perceived body image, TPD and clinical profiles was measured.

Findings: Of the patients with CNLBP, 42.8% had a normal perceived body image, 28.5% an expanded image, and 28.5% a shrunken image. The TPD distance threshold was significantly larger for the expanded subgroup (13.3 ± 6.8 mm) compared with the control (5.5 ± 3.8 mm; Difference, 7.8; 95%CI, 1.83 to 13.66; $p < 0.05$) and normal subgroups (4.5 ± 5.5 mm; Difference, 8.8; 95%CI, 2.90 to 14.59; $p < 0.05$). No significant differences in pain intensity, duration of pain, Roland Morris Disability Questionnaire (RDQ), and Pain Catastrophizing Scale (PCS) scores were found between three body image subgroups.

Conclusions: Our results suggest that TPD is increased in patients who report an expanded perceived image of the lower back compared with healthy individuals and patients who report a normal image. The effectiveness of new rehabilitation techniques may be evaluated by assessing perceived image of the lower back and TPD values for patients with CNLBP before and after treatment.

Pressure sensitivity

Sensory characteristics of chronic non-specific low back pain: A subgroup investigation

Manual Therapy, 04/17/2014 Clinical Article

O'Sullivan P, et al.

Abstract

There was no evidence of lowered pressure pain threshold (PPT) at any site after adjustment for confounding factors. Those with an MP profile had similar pain thresholds to pain-free controls, whereas the non-mechanical pain (NMP) profile group demonstrated elevated CPT's consistent with central amplification of pain.

Methods

This study was a cross-sectional design investigating whether pressure pain threshold (PPT) and/or cold pain threshold (CPT) at three anatomical locations differed between patients with mechanical CNSLBP (n = 17) versus non-mechanical CNSLBP (n = 19) and healthy controls (n = 19) whilst controlling for confounders.

Results

The results of this study provide evidence of increased CPT at the wrist in the NMP profile group compared to both the MP profile and control subjects, when controlling for gender, sleep and depression (NMP versus MP group Odds Ratio (OR): 18.4, 95% confidence interval (CI): 2.5–133.1, p = 0.004)

Intermittent claudication evaluation

European Spine Journal August 2014 Date: 14 Aug 2014

Comparison between walking test and treadmill test for intermittent claudication associated with lumbar spinal canal stenosis

Shinji Tanishima, Satoru Fukada, Hiroyuki Ishii, Toshiyuki Dokai, Yasuo Morio, Hideki Nagashima

Abstract

Purpose

To clarify the priorities of the walking test and the treadmill test for intermittent claudication of lumbar canal stenosis.

Methods

The study population comprised 45 subjects, with a mean age of 72.6 years. An investigator walked with the subjects during the walking test or watched the subjects walking on the treadmill machine in the treadmill test.

Results

The pain scales became significantly worse after the walking test. Ten patients who were diagnosed as root symptom type or cauda equine symptoms were subsequently diagnosed as mixed type by the walking test. The numbers of patients who experienced muscle weakness that was not revealed at rest were eight with the walking test and seven with the treadmill test. The numbers of patients who experienced sensory disturbance that was not observed at rest were seven with the walking test and two with the treadmill test.

Conclusions

The walking test detected significantly more symptoms that were not detected at rest than the treadmill test.

LBP

Neuroscience education

Spine (Phila Pa 1976). 2014 Aug 15;39(18):1449-1457.

Preoperative Pain Neuroscience Education for Lumbar Radiculopathy: A Multicenter Randomized Controlled Trial With 1-Year Follow-up.

Louw A¹, Diener I, Landers MR, Puentedura EJ.

Abstract

STUDY DESIGN.:

Multicenter, randomized, controlled trial on preoperative pain neuroscience education (NE) for lumbar radiculopathy.

OBJECTIVE.:

To determine if the addition of NE to usual preoperative education would result in superior outcomes with regard to pain, function, surgical experience, and health care utilization postsurgery.

SUMMARY OF BACKGROUND DATA.:

One in 4 patients after lumbar surgery (LS) for radiculopathy experience persistent pain and disability, which is nonresponsive to perioperative treatments. NE focusing on the neurophysiology of pain has been shown to decrease pain and disability in populations with chronic low back pain.

METHODS.:

Eligible patients scheduled for LS for radiculopathy were randomized to receive either preoperative usual care (UC) or a combination of UC plus 1 session of NE delivered by a physical therapist (verbal one-on-one format) and a NE booklet. Sixty-seven patients completed the following outcomes prior to LS (baseline), and 1, 3, 6, and 12 months after LS: low back pain (numeric rating scale), leg pain (numeric rating scale), function (Oswestry Disability Index), various beliefs and experiences related to LS (10-item survey with Likert scale responses), and postoperative utilization of health care (utilization of health care questionnaire).

RESULTS.:

At 1-year follow-up, there were no statistical differences between the experimental and control groups with regard to primary outcome measure of low back pain ($P = 0.183$), leg pain ($P = 0.075$), and function ($P = 0.365$). In a majority of the categories regarding surgical experience, the NE group scored significantly better: better prepared for LS ($P = 0.001$); preoperative session preparing them for LS ($P < 0.001$) and LS meeting their expectations ($P = 0.021$). Health care utilization post-LS also favored the NE group ($P = 0.007$) resulting in 45% less health care expenditure compared with the control group in the 1-year follow-up period.

CONCLUSION.:

NE resulted in significant behavior change. Despite a similar pain and functional trajectory during the 1-year trial, patients with LS who received NE viewed their surgical experience more favorably and used less health care facility in the form of medical tests and treatments. Level of Evidence: 2.

PMID: 24875964

Steroid injections and LBP

The impact of cortical remapping interventions on pain and disability in chronic low back pain: a systematic review.

Physiotherapy, 08/11/2014 Evidence Based Medicine Review Article

Daffada PJ, et al.

Abstract

Background

Cortical change, in the manner of cortical remapping is a common feature of and potential driver for chronic low back pain (CLBP). Novel interventions such as graded motor imagery (GMI) and mirror visual feedback (MVF) have been shown to facilitate correction of cortical changes and improve symptoms in other chronic pain states. However, little is known regarding the effectiveness of these treatment approaches in CLBP.

Objective

To identify and assess the current evidence regarding the effectiveness of interventions which target cortical remapping in the management of CLBP.

Data Sources

The electronic databases Medline, Embase, CINAHL, AMED, OVID, PEDro, BNI, PsycINFO, HMIC, and Cochrane library were systematically searched.

Study Selection

Of 11 potential citations identified, 5 articles were identified for inclusion and critiqued. These comprised 3 randomised controlled trials (RCTs), 1 randomised cross-over study, and 1 multiple case study design.

Results

Visualisation of lumbar movement may significantly improve movement-related pain severity and duration. A combined sensorimotor retraining approach has been shown to produce short-term improvements in both pain and disability outcomes in CLBP. The relative effectiveness of individual interventions and their long-term efficacy have yet to be established.

Conclusions

There is a paucity of robust literature which has examined the application and efficacy of these novel treatments in the management of CLBP. Results from the few CLBP studies which are available are encouraging. Further, robust research is needed to optimise treatment protocols and establish their long-term effectiveness in CLBP.

Disc

Disc degeneration and impact on spinal muscles

J Back Musculoskelet Rehabil. 2014 Aug 5.

Quantitative MRI and X-ray analysis of disc degeneration and paraspinal muscle changes in degenerative spondylolisthesis.

Wang G, Karki SB, Xu S, Hu Z, Chen J, Zhou Z, Fan S.

Abstract

BACKGROUND AND OBJECTIVE:

The intervertebral disc degeneration changes and paraspinal muscles changes are believed to be risk factors for lumbar degenerative spondylolisthesis (LDS). But there is limited quantitative information about this progression. This study is to reveal their changes in the progression of LDS. **METHODS:** Data were gathered from 149 middle-aged degenerative spondylolisthesis patients and same amount of age- and sex-matched control group with both lumbar spine MRI and X-ray. Narrowed disc space were measured in percent as anterior inferior disc height (DHIA)/anterior superior disc height (DHSA), inferior disc height (DHI)/superior disc height (DHS), and posterior inferior disc height (DHIP)/posterior superior disc height (DHSP). Signal intensity ratio of multifidus muscle (RM) and erector spinae (RES) to psoas muscle, muscle atrophy ratio of lean CSA (LCSA) to gross CSA (GCSA) of paraspinal muscles were calculated.

RESULTS:

In the case group the most common slipped vertebra was L4 (75.84%). Disc height (DHIA/DHSA, DHI/DHS) and multifidus muscle atrophy ratio (M-LCSA/M-GCSA) tended to be lower than those in the control group, whereas the disc degeneration degree and T2 signal intensity ratio (RM,RES) of the paraspinal muscles and erector spinae muscle atrophy ratio were higher than control group. The difference between the two groups was statistically significant ($P < 0.05$). Using multivariate logistic regression analysis, it was confirmed that ES-LCSA/ES-GCSA, especially RM are independent predisposing factors to lumbar spondylolisthesis ($OR > 1$, $P < 0.05$) while DHIA/DHSA, M-LCSA/M-GCSA are independent protective factors ($OR < 1$, $P < 0.05$).

CONCLUSIONS:

Decreased anterior disc height and multifidus muscle atrophy are found in the LDS patients and could be the cause of LDS. The presence of erector spinae hypertrophy could be a compensatory mechanism to compensate for the instability.

KEYWORDS:

Degenerative spondylolisthesis; disc degeneration; erector spinae; multifidus muscle; predictive factor

PMID: 25096310

Disc factors

Arthritis Res Ther. 2014 Jul 28;16(4):R159

Increase of nerve growth factor levels in the human herniated intervertebral disc: can annular rupture trigger discogenic back pain?

Aoki Y, Nakajima A, Ohtori S, Takahashi H, Watanabe F, Sonobe M, Terajima F, Saito M, Takahashi K, Toyone T, Watanabe A, Nakajima T, Takazawa M, Nakagawa K.

Abstract

INTRODUCTION:

Nerve growth factor (NGF) has an important role in the generation of discogenic pain. We hypothesized that annular rupture is a trigger for discogenic pain through the action of NGF. In this study, the protein levels of NGF in discs from patients with disc herniation were examined and compared with those from discs of patients with other lumbar degenerative disc diseases.

METHODS:

Patients (n = 55) with lumbar degenerative disc disease treated by surgery were included. Nucleus pulposus tissue (or herniated disc tissue) was surgically removed and homogenized; protein levels were quantified using an enzyme-linked immunosorbent assay (ELISA) for NGF. Levels of NGF in the discs were compared between 1) patients with herniated discs (herniated group) and those with other lumbar degenerative disc diseases (non-herniated group), and 2) low-grade and high-grade degenerated discs. Patient's symptoms were assessed using a visual analogue scale (VAS) and the Oswestry disability index (ODI); the influence of NGF levels on pre- and post-operative symptoms was examined.

RESULTS:

Mean levels of NGF in discs of patients were significantly higher in herniated discs (83.4 pg/mg total protein) than those in non-herniated discs (68.4 pg/mg). No significant differences in levels of NGF were found between low-grade and high-grade degenerated discs. Multivariate analysis, adjusted for age and sex, also showed significant correlation between the presence of disc herniation and NGF levels, though no significant correlation was found between disc degeneration and NGF levels. In both herniated and non-herniated groups, pre-operative symptoms were not related to NGF levels. In the herniated group, post-operative lower extremity pain and low back pain (LBP) in motion were greater in patients with low levels of NGF; no significant differences were found in the non-herniated group.

CONCLUSIONS:

This study reports that NGF increased in herniated discs, and may play an important role in the generation of discogenic pain. Analysis of patient symptoms revealed that pre-operative NGF levels were related to post-operative residual lower extremity pain and LBP in motion. The results suggest that NGF in the disc is related to pain generation, however, the impact of NGF on generation of LBP varies in individual patients.

PMID: 25069717

Surgery/LBP

Fusions and levels above and below

Spine:

01 August 2014 - Volume 39 - Issue 17 - p 1373–1383 doi: 10.1097/BRS.0000000000000437
Clinical Case Series

ISSLS Prize Winner: Long-Term Follow-up Suggests Spinal Fusion Is Associated With Increased Adjacent Segment Disc Degeneration But Without Influence on Clinical Outcome: Results of a Combined Follow-up From 4 Randomized Controlled Trials

Mannion, Anne F. PhD^{*}; Leivseth, Gunnar MD, PhD[†]; Brox, Jens-Ivar MD, PhD[‡]; Fritzell, Peter MD, PhD[§]; Hägg, Olle MD, PhD[¶]; Fairbank, Jeremy C. T. MD, FRCS^{||}

Abstract

Study Design. Cross-sectional analysis of long-term follow-up (LTFU) data from 4 randomized controlled trials of operative versus nonoperative treatment for chronic low back pain.

Objective. To examine the influence of spinal fusion on adjacent segment disc space height as an indicator of disc degeneration at LTFU.

Summary of Background Data. There is ongoing debate as to whether adjacent segment disc degeneration results from the increased mechanical stress of fusion.

Methods. Plain standing lateral radiographs were obtained at LTFU (mean, 13 ± 4 yr postrandomization) in 229 of 464 (49%) patients randomized to surgery and 140 of 303 (46%), to nonoperative care. Disc space height and posteroanterior displacement were measured for each lumbar segment using a validated computer-assisted distortion compensated roentgen analysis technique. Values were reported in units of standard deviations above or below age and sex-adjusted normal values. Patient-rated outcomes included the Oswestry Disability Index and pain scales.

Results. Radiographs were usable in 355 of 369 (96%) patients (259 fusion and 96 nonoperative treatment). Both treatment groups showed significantly lower values for disc space height of the adjacent segment than norm values. There was a significant difference between treatment groups for the disc space height of the cranial adjacent segment (in both as-treated and intention-to-treat analyses). The mean treatment effect of fusion on adjacent segment disc space height was −0.44 SDs (95% CI, −0.77 to −0.11; P = 0.01; as-treated analysis); there was no group difference for posteroanterior displacement (0.18 SDs, 95% confidence interval, −0.28 to 0.64, P = 0.45). Adjacent level disc space height and posteroanterior displacement were not correlated with Oswestry Disability Index or pain scores at LTFU (r = 0.010–0.05; P > 0.33).

Conclusion. Fusion was associated with lower disc space height at the adjacent segment after an average of 13 years of FU. The reduced disc space height had no influence on patient self-rated outcomes (pain or disability).

Level of Evidence: 2

VISCERA

Abdominal pain and depression

Associations between abdominal pain symptom dimensions and depression among adolescents

Scandinavian Journal of Pain Volume 5, Issue 3, Pages 184–190, July 2014

Niklas Stabell , Trond Flægstad, Audun Stubhaug, Christopher Sivert Nielsen

Highlights

- Chronic abdominal pain (AP) was reported by 27% of adolescents.
- 8.2% met the Rome III Irritable Bowel Syndrome (IBS) criteria.
- Depression rate was more than doubled among AP and IBS cases.
- Depression was strongly associated with AP distribution and intensity, and co-morbid pain.
- Symptoms distinguishing IBS from other types of AP (e.g. diarrhea, constipation) were not independently related to depression.

Background and aims: The prevalence of depression is increased among patients with abdominal pain (AP) and Irritable Bowel Syndrome (IBS), but little is known about this association among adolescents in the general population. Furthermore, there is considerable uncertainty about exactly which dimensions of AP and IBS are associated with depression.

The aims of this study were therefore: (a) to describe the prevalence of AP, IBS and depression in a representative sample of adolescents, (b) to analyze the association of AP and IBS with depression and lastly, (c) to analyze the relationship between depression and specific AP and IBS symptom dimensions, i.e. pain intensity, frequency, duration, and distribution, the presence of co-morbid non-abdominal pain, and the specific bowel systems distinguishing IBS from AP in general.

Materials and methods: Self-reported symptoms of AP (monthly or more frequent), IBS (Rome III 2006 criteria), co-morbid chronic pain and depression (The Short Mood and Feeling Questionnaire sum-score ≥ 11) were recorded among 961 adolescents (mean age 16.1 y and 48.8% girls), participating in a population based study in 2010–2011. Multiple logistic regression carried out to analyze the association of AP and IBS with depression, adjusting for sex, parental level of education (<college or \geq college) and co-morbid chronic pain. Among the AP cases, the association of different AP dimensions and of the specific bowel symptoms in IBS with depression were analyzed in a stepwise multiple logistic regression model.

Results: Monthly or more frequent AP was reported by 27% of the participants ($n = 259$) and 8.2% ($n = 77$) met the Rome III IBS criteria. The prevalence of depression was 11.5% (girls 15.9% and boys 7.3%). The prevalence of depression was higher among both AP and IBS cases compared to in controls (20.5%, 24.7% and 8.1% respectively), but there was no evidence that depression rates differed between the two case groups (IBS: OR = 2.5, 95% CI = 1.6–3.9; AP: OR = 2.4 with 95% CI = 1.3–4.4, after adjusting for sex, parental level of education and co-morbid chronic pain).

In the regression analyses within the AP group, the following symptom dimensions were independently associated with depression: severe abdominal pain intensity (OR = 4.0; CI = 1.5–10.7), widespread abdominal pain (OR = 5.5; CI = 2.6–11.8) and presence of co-morbid chronic pain (OR = 3.3; CI = 1.6–6.8). Sex, parental education, and other abdominal pain symptom dimensions, including bowel symptoms that distinguish IBS from AP, were not independently associated with depression.

Conclusions and implications: The prevalence of depression is considerably increased among adolescents with AP and IBS in the general population, in particular among those reporting severe, widespread abdominal pain, and co-morbid chronic pain. Evaluating these symptom dimensions may be of value for

identifying subgroups adolescents with AP and IBS that have greater risk of depression.

CERVICAL SPINE

Racial complications with surgery

Spine (Phila Pa 1976). 2014 Aug 15;39(18):1506-1512.

Complications and Mortality in Cervical Spine Surgery: Racial Differences.

Skolasky RL¹, Thorpe RJ Jr, Wegener ST, Riley LH 3rd.

Abstract

STUDY DESIGN.:

Retrospective national database analysis.

OBJECTIVE.:

Our goal was to estimate racial and ethnic differences in in-hospital complication and mortality rates associated with cervical spine surgery.

SUMMARY OF BACKGROUND DATA.:

The impact of observed racial and ethnic disparities in orthopedic spine care use on morbidity and mortality is not well understood.

METHODS.:

On the basis of the Nationwide Inpatient Sample, there were 983,420 adult nontrauma hospital discharges from 2000 through 2009. In-hospital complications and mortality were the outcome variables. The primary independent variable was race/ethnicity (defined as non-Hispanic white [white], non-Hispanic black [black], and Hispanic). Covariates were age, sex, household income, insurance status, geographical location, hospital volume, and comorbidities. Multivariable regression models were used to determine the association between race/ethnicity and in-hospital complication and mortality. Significance was set at a P value less than 0.05.

RESULTS.:

The overall rates of an in-hospital complication or mortality were 4.09% and 0.42%, respectively. There were no differences in the rates of in-hospital complications or mortality between Hispanics and Caucasians. Compared with Caucasians, African Americans had higher odds of experiencing an in-hospital complication (odds ratio, 1.37; 95% confidence interval, 1.27-1.48) and higher odds of dying during hospitalization (odds ratio, 1.59; 95% confidence interval, 1.30-1.96).

CONCLUSION.:

Although there were no differences between Caucasians and Hispanics, African Americans had significantly higher rates of in-hospital complications and mortality associated with cervical spine surgery than did Caucasians. These differences persisted after adjusting for known risk factors for complications and mortality. Level of Evidence: 3.

PMID: 2485958

Herniated discs and sidebending

Research article

The shift of segmental contribution ratio in patients with herniated disc during cervical lateral bending

Haw-Chang H Lan, Han-Yu Chen, Li-Chieh Kuo, Jia-Yuan You, Wei-Chun Li and Shyi-Kuen Wu

BMC Musculoskeletal Disorders 2014, **15**:273 doi:10.1186/1471-2474-15-273

Published: 12 August 2014

Abstract

Background: Abnormal intervertebral movements of spine have been reported to be associated with trauma and pathological conditions. The importance of objective spinal motion imaging assessment in the frontal plane was frequently underestimated. The clinical evaluation of the segmental motion contribution could be useful for detecting the motion pattern of individual vertebrae. Therefore the purpose of this study was to investigate the shift of segmental contribution ratio in patients with herniated disc during cervical lateral bending to provide additional insights to cervical biomechanics.

Methods: A total of 92 subjects (46 healthy adult subjects and 46 disc-herniated patients) were enrolled in this case-control study. The motion images during cervical lateral bending movements were digitized using a precise image protocol to analyze the intervertebral motion and contribution.

Results: Our results showed that the intervertebral angulation during cervical lateral bending for the C2/3 to C6/7 segments were 7.66[degree sign] \pm 2.37[degree sign], 8.37[degree sign] \pm 2.11[degree sign], 8.91[degree sign] \pm 3.22[degree sign], 7.19[degree sign] \pm 2.29[degree sign], 6.31[degree sign] \pm 2.11[degree sign], respectively for the healthy subjects. For the patients with herniated disc, the intervertebral angulation for the C2/3 to C6/7 segments were 6.87[degree sign] \pm 1.67[degree sign], 7.83[degree sign] \pm 1.79[degree sign], 7.73[degree sign] \pm 2.71[degree sign], 5.13[degree sign] \pm 2.05[degree sign], 4.80[degree sign] \pm 1.93[degree sign], respectively. There were significant angulation and translational differences between healthy subjects and the patients with herniated disc in the C5/6 and C6/7 segments ($P=0.001-0.029$). The segmental contributions of the individual vertebral segments were further analyzed. There were a significant increase in segmental contribution ratio of C3/4 ($P=0.048$), while a significant decrease in contribution ratio of C5/6 ($P=0.037$) was observed in the patients with herniated disc. Our results indicated that the segmental contribution shifted toward the middle cervical spine in the patients with herniated disc.

Conclusions: The segmental contributions of cervical spine during lateral bending movement were first described based on the validated radiographic protocol. The detection of the shift of segmental contribution ratio could be helpful for the diagnosis the motion abnormality resulted from the disc or, facet pathologies, and arthritic changes of cervical spine.

UPPER C SPINE

Vertebral artery

Spine (Phila Pa 1976). 2014 Aug 15;39(18):E1053-E1057.

Vertebral Artery Anomalies at the Craniovertebral Junction in the US Population.

O'Donnell CM¹, Child ZA, Nguyen Q, Anderson PA, Lee MJ.

Abstract

STUDY DESIGN.:

Retrospective review.

OBJECTIVE.:

To evaluate the prevalence of anatomical variations of the vertebral artery at the craniovertebral junction and the posterior arch of the atlas in the US population.

SUMMARY OF BACKGROUND DATA.:

Recent studies from Asia have reported a 5% to 10% prevalence of a persistent first intersegmental vertebral artery and 1% to 2% prevalence of a fenestrated artery. These anomalous vertebral artery courses lie directly over the starting point for atlas lateral mass screw insertion. The relatively high reported prevalence of these anomalies suggests that routine preoperative computed tomographic angiogram be considered prior to upper cervical fixation. We have not observed this anomaly as commonly as reported.

METHODS.:

The authors analyzed the records of 975 patients from a level I trauma center and adjacent university hospital who underwent computed tomographic angiography to evaluate the incidence of anomalous variations in the third segment of the vertebral artery. These results were compared with similar studies performed in Korea and Japan.

RESULTS.:

The mean age of the patients was 52.9 years. The ethnic distribution of the patients was as follows: 69.3% of the patients were Caucasian, 11% Asian, 10.8% African American, and 6% Hispanic. The prevalence of a persistent intersegmental artery was 0.01% (1/975); a fenestrated vertebral artery was 0.01% (1/975); and origin of a posterior inferior cerebellar artery was 0.4% (4/975). The incidence of these anomalies was significantly lower than those previously published from Korea and Japan.

CONCLUSION.:

Vertebral artery course anomalies in the upper cervical spine were rare (0.42%) in our patient population. This finding contrasts with recent published reports from Asia, citing as high as a 10% rate of vertebral artery presence over the starting point for C1 lateral mass screw insertion. On the basis of the infrequent occurrence of this anomaly, we do not recommend routine computed tomographic angiography when planning upper cervical instrumentation.

PMID: 24979141

WHIPLASH

5 Year follow up

Scandinavian Journal of Pain DOI: <http://dx.doi.org/10.1016/j.sjpain.2014.06.001>

Symptoms, disabilities, and life satisfaction five years after whiplash injuries

[Johan Styrke](#), [Peter Sojka](#), [Ulf Björnstig](#), [Britt-Marie Stålnacke](#) 

Abstract

Background: Chronic whiplash-associated disorders (WADs) are often associated with social functioning problems and decreased ability to perform previous activities. This may lead to decreased life satisfaction, which is insufficiently studied in the context of whiplash injuries. Symptoms included in chronic WAD are similar to symptoms frequently reported by persons who have sustained mild traumatic brain injury (MTBI)/concussion. In cases of MTBI, the severity and number of symptoms have been suggested to have a diagnostic value. The corresponding importance of symptoms in chronic WAD has not been documented. Most studies of whiplash injuries have focused on neck pain because this is the dominant complaint, while other symptoms are less studied. The frequency of long-term symptoms after whiplash injuries seems to vary. It is difficult to compare the long-term outcome since the follow-up after whiplash injury in most studies has been rather short. Therefore, the primary aim of this investigation was to study neck pain and other symptoms, disability, and life satisfaction five years after whiplash injury in a defined population and geographical area.

Methods: The study was carried out at a public hospital in northern Sweden and was a cross-sectional survey of patients five years after the injury event in a cohort of whiplash-injured patients. Five years after the emergency department visit, 186 persons aged 18–64 answered questionnaires on symptoms (Rivermead Post-Concussion Symptoms Questionnaire, RPQ), disabilities (Rivermead Head Injury Follow Up Questionnaire, RHFUQ), and life satisfaction (LiSat-11). The answers were compared to those of a comparison cohort.

Results: The most common symptoms five years after whiplash injury were fatigue (41%), poor memory (39%), and headache (37%). Inability to sustain previous workload (44%) and fatigue at work (43%) were frequently reported disabilities. Only 39% were satisfied with their somatic health and 60% with their psychological health. Compared with healthy controls, the whiplash injured exhibited more symptoms and had lower life satisfaction. Women reported significantly higher pain intensity than men. Few significant differences between women and men regarding the other parameters were found.

Conclusions: This study shows that five years after a whiplash injury, patients reported symptoms that are typical of mild traumatic brain injury. Further, this study emphasizes the possibility of screening patients with chronic WAD for these symptoms as a complement to the assessment.

Implications: Untreated symptoms may negatively affect the outcome of pain rehabilitation. This implies that it might be clinically meaningful to quantify symptoms earlier in the rehabilitation process.

Keywords: [Whiplash injuries](#), [Post-Concussion Symptoms](#), [Disability](#), [Life satisfaction](#)

HEADACHES

Gene variants

Eur J Clin Pharmacol. 2014 Aug 7.

Combined effect of common gene variants on response to drug withdrawal therapy in medication overuse headache.

Cargnin S1, Viana M, Sances G, Bianchi M, Ghiotto N, Tassorelli C, Nappi G, Canonico PL, Genazzani AA, Terrazzino S.

Abstract

PURPOSE:

No information is currently available on genetic determinants of short-term response to drug withdrawal in medication overuse headache (MOH). In the present study, we aimed to evaluate the role of 14 polymorphisms in 8 candidate genes potentially relevant for drug addiction (OPRM1, DRD2, DBH, COMT, BDNF, SLC6A4, 5HT2A, and SLC1A2) as predictors for detoxification outcome of MOH patients at 2 months of follow-up.

METHODS:

Genotyping was conducted by PCR, PCR-RFLP analysis, or real-time PCR allelic discrimination assay on genomic DNA extracted from peripheral blood. The association between gene variants and risk of unsuccessful detoxification was evaluated by univariate and multivariate logistic regression analyses.

RESULTS:

One hundred and eight MOH patients with effective drug withdrawal therapy and 65 MOH patients with unsuccessful detoxification were available for the analysis. In the multivariable logistic regression analysis, triptan overuse (odds ratio (OR) 0.271, 95 % confidence interval (CI) 0.083-0.890, $P = 0.031$) and TT genotype carriage of DRD2 NcoI (OR 0.115, 95 % CI 0.014-0.982, $P = 0.048$) emerged as independent predictors for unsuccessful detoxification. In addition, carriers of at least four of the six top-ranked gene variants ($P < 0.10$) were found at higher odds for unsuccessful detoxification than patients with ≤ 3 high-risk genotypes (OR 3.40, 95 % CI 1.65-7.01, $P = 0.001$).

CONCLUSION:

This exploratory study suggests that DRD2 NcoI may be a genetic determinant of detoxification outcome in MOH patients. Our findings also show that an approach based on the combination of multiple genetic markers could be clinically useful for identification of MOH patients at higher risk for unsuccessful detoxification.

Stroke and HA

Curr Pain Headache Rep. 2014 Sep;18(9):444. doi: 10.1007/s11916-014-0444-1.

Headache and acute stroke.

Jamieson DG1, Cheng NT, Skliut M.

Abstract

Purpose and Conclusions:

Disorders associated with prominent headaches, such as migraine with aura and cerebral arterial and venous diseases, increase the risk of ischemic and hemorrhagic stroke. Central nervous system vasculitis, posterior reversible encephalopathy syndrome, reversible cerebral vasoconstriction syndrome, and cerebral venous thrombosis are all disorders associated with severe or persistent headache in which the risk for ischemic and hemorrhagic stroke is increased. Hemorrhagic strokes, more frequently than ischemic strokes, present with distinct headaches, usually accompanied by focal neurological symptoms. Pregnancy, and especially the postpartum period, is a time of overlap between new-onset headache and stroke risk.

CONCUSSIONS

Changes in gait

Med Sci Sports Exerc. 2014 Aug 5

Return to Activity after Concussion Affects Dual-Task Gait Balance Control Recovery.

Howell DR1, Osternig LR, Chou LS.

Abstract

BACKGROUND:

Recent work has identified deficits in dual-task gait balance control for up to 2 months following adolescent concussion, however how resumption of pre-injury physical activities affects recovery is unknown.

PURPOSE:

To examine how return to activity affects recovery from concussion on measures of symptom severity, cognition, and balance control during single-task and dual-task walking.

METHODS:

Nineteen adolescents with concussion who returned to pre-injury activity within 2 months following injury and 19 uninjured, matched controls completed symptom inventories, computerized cognitive testing, and single-task and dual-task gait analyses. Concussion participants were assessed at 5 time points: within 72 hours, one week, two weeks, one month, and two months post-injury. Control participants were assessed at the same time points as their matched concussion counterparts. Return-to-activity (RTA) day was documented as the post-injury day which physical activity participation was allowed. The effect of returning to physical activity was assessed by examining the percent change on each dependent variable across time prior to and directly after the RTA. Data were analyzed by two-way mixed effects ANOVAs.

RESULTS:

Following the RTA day, concussion participants significantly increased their total center-of-mass medial/lateral displacement ($p = .009$, $\eta^2 = .175$) and peak velocity ($p = .048$, $\eta^2 = .104$) during dual-task walking, when compared to pre RTA data, while no changes for the concussion group or between groups were detected on measures of single-task walking, forward movement, or cognition.

CONCLUSIONS:

Adolescents with concussion displayed increased center-of-mass medial/lateral displacement and velocity during dual-task walking following RTA, suggesting a regression of recovery in gait balance control. This study reinforces the need for a multi-faceted approach to concussion management and continued monitoring beyond the point of clinical recovery.

Football players

Impact locations and concussion outcomes in high school football player-to-player collisions

Pediatrics, 08/12/2014 Clinical Article Kerr ZY, et al.

BACKGROUND: Little research has examined concussion outcomes in terms of impact location (ie, the area on the head in which the impact occurred). This study describes the epidemiology of concussions resulting from player-to-player collision in high school football by impact location.

METHODS: National High School Sports-Related Injury Surveillance Study data (2008/2009–2012/2013) were analyzed to calculate rates and describe circumstances of football concussion (eg, symptomology, symptom resolution time, return to play) resulting from player-to-player collisions by impact location (ie, front-, back-, side-, and top-of-the-head).

RESULTS: Most concussions resulting from player-to-player collisions occurred from front-of-the-head (44.7%) and side-of-the-head (22.3%) impacts. Number of symptoms reported, prevalence of reported symptoms, symptom resolution time, and length of time to return to play were not associated with impact location. However, a larger proportion of football players sustaining concussions from top-of-the-head impacts experienced loss of consciousness (8.0%) than those sustaining concussions from impacts to other areas of the head (3.5%) (injury proportion ratio 2.3; 95% confidence interval 1.2–4.2; $P = .008$). Players had their head down at the time of impact in a higher proportion of concussions caused by top-of-the-head impacts (86.4%) than concussions from impacts to other areas of the head (24.0%) (injury proportion ratio 3.6; 95% confidence interval 3.2–4.0; $P < .001$).

CONCLUSIONS: Among high school football players who sustained concussions due to player-to-player collisions, concussion outcomes were generally independent of impact location. Recommended strategies for reducing the proportion of top-of-the-head impacts include improved education regarding tackling with proper “head-up” technique.

IMPINGEMENT

Scapula mobilization

J Sport Rehabil. 2014 Jul 23.

The Effects of Scapular Mobilization in Patients With Subacromial Impingement Syndrome: Randomized, Double-Blind, Placebo-Clinical Trial.

Aytar A¹, Baltaci G, Uhl T, Tuzun H, Oztop P, Karatas M.

Abstract

OBJECTIVE: To determine the effects of scapular mobilization on function, pain, range of motion and satisfaction in patients with subacromial impingement syndrome.

DESIGN: Randomized, double-blind, placebo- clinical trial.

SETTING: University hospital clinics in Turkey.

PARTICIPANTS: 66 participants (mean age= $\chi \pm SD = 52.06 \pm 3.71$ years) with subacromial impingement syndrome enrolled to this study.

INTERVENTIONS: Participants randomized into three groups, which include scapular mobilization, sham scapular mobilization and supervised exercise. Before the interventions transcutaneous electrical stimulation and hot pack were applied to all groups. Total intervention duration for all groups was three weeks with a total of nine treatment sessions.

MAIN OUTCOME MEASURES: Shoulder function and pain intensity were primary outcome measures; range of motion and participant satisfaction were secondary outcome measures. Shoulder function was assessed with short form of the disability of arm shoulder and hand questionnaire (DASH). Visual analog scale was used for evaluating pain severity. Active range of motion was measured with universal goniometer. 7-point likert scale was used to evaluate satisfaction. Outcome measurements were performed at baseline, prior to 5th visit, 10th visit, 4 weeks after 9th visit, and 8 weeks after 9th visit.

RESULTS: Our results showed that there was no group difference for DASH score ($p = .75$), pain at rest ($p = .41$), pain with activity ($p = .45$), pain at night ($p = .74$) and shoulder flexion ($p = .65$), external rotation ($p = .63$), internal rotation ($p = .19$). There was a significant increase in shoulder motions and function, a significant decrease in pain across time when all groups were combined ($p < .001$). The level of satisfaction was not significantly different for any of the questions about participant satisfaction between all groups ($p > .05$).

CONCLUSION: There was not a significant advantage of scapular mobilization for shoulder function, pain, range of motion and satisfaction compared with sham or supervised exercise groups in patients with subacromial impingement syndrome.

PMID: 25054347

Cortisone vs. manual therapy

Ann Intern Med. 2014 Aug 5;161(3):161-9. doi: 10.7326/M13-2199.

One-year outcome of subacromial corticosteroid injection compared with manual physical therapy for the management of the unilateral shoulder impingement syndrome: a pragmatic randomized trial.

Rhon DI, Boyles RB, Cleland JA.

Abstract

BACKGROUND: Corticosteroid injections (CSIs) and physical therapy are used to treat patients with the shoulder impingement syndrome (SIS) but have never been directly compared.

OBJECTIVE: To compare the effectiveness of 2 common nonsurgical treatments for SIS.

DESIGN: Randomized, single-blind, comparative-effectiveness, parallel-group trial. (ClinicalTrials.gov: NCT01190891).

SETTING: Military hospital-based outpatient clinic in the United States.

PATIENTS: 104 patients aged 18 to 65 years with unilateral SIS between June 2010 and March 2012.

INTERVENTION: Random assignment into 2 groups: 40-mg triamcinolone acetonide subacromial CSI versus 6 sessions of manual physical therapy.

MEASUREMENTS: The primary outcome was change in Shoulder Pain and Disability Index scores at 1 year. Secondary outcomes included the Global Rating of Change scores, the Numeric Pain Rating Scale scores, and 1-year health care use.

RESULTS: Both groups demonstrated approximately 50% improvement in Shoulder Pain and Disability Index scores maintained through 1 year; however, the mean difference between groups was not significant (1.5% [95% CI, -6.3% to 9.4%]). Both groups showed improvements in Global Rating of Change scale and pain rating scores, but between-group differences in scores for the Global Rating of Change scale (0 [CI, -2 to 1]) and pain rating (0.4 [CI, -0.5 to 1.2]) were not significant. During the 1-year follow-up, patients receiving CSI had more SIS-related visits to their primary care provider (60% vs. 37%) and required additional steroid injections (38% vs. 20%), and 19% needed physical therapy. Transient pain from the CSI was the only adverse event reported.

LIMITATION: The study occurred at 1 center with patients referred to physical therapy.

CONCLUSION: Both groups experienced significant improvement. The manual physical therapy group used less 1-year SIS-related health care resources than the CSI group.

PRIMARY FUNDING SOURCE: Cardon Rehabilitation Products through the American Academy of Orthopaedic Manual Physical Therapists.

PMID: 25089860

Scapula's position

Br J Sports Med doi:10.1136/bjsports-2013-092389 Original article

Is there a relationship between subacromial impingement syndrome and scapular orientation?

Abstract

Background Alterations in scapular orientation and dynamic control, specifically involving increased anterior tilt and downward rotation, are considered to play a substantial role in contributing to a subacromial impingement syndrome (SIS). Non-surgical intervention aims at restoring normal scapular posture. The research evidence supporting this practice is equivocal.

Objective The aim of this study was to systematically review the relevant literature to examine whether a difference exists in scapular orientation between people without shoulder symptoms and those with SIS.

Data sources MEDLINE, AMED, EMBASE, CINAHL, PEDro and SPORTDiscus databases were searched using relevant search terms up to August 2013. Additional studies were identified by hand-searching the reference lists of pertinent articles.

Review methods Of the 7445 abstracts identified, 18 were selected for further analysis. Two reviewers independently assessed the studies for inclusion, data extraction and quality, using a modified Downs and Black quality assessment tool.

Results 10 trials were included in the review. Scapular position was determined through two-dimensional radiological measurements, 360° inclinometers and three-dimensional motion and tracking devices. The findings were inconsistent. Some studies reported patterns of reduced upward rotation, increased anterior tilting and medial rotation of the scapula. In contrast, others reported the opposite, and some identified no difference in motion when compared to asymptomatic controls.

Conclusions The underlying aetiology of SIS is still debated. The results of this review demonstrated a lack of consistency of study methodologies and results. Currently, there is insufficient evidence to support a clinical belief that the scapula adopts a common and consistent posture in SIS. This may reflect the complex, multifactorial nature of the syndrome. Additionally, it may be due to the methodological variations and shortfalls in the available research. It also raises the possibility that deviation from a 'normal' scapular position may not be contributory to SIS but part of normal variations. Further research is required to establish whether a common pattern exists in scapular kinematics in SIS patients or whether subgroups of patients with common patterns can be identified to guide management options. Non-surgical treatment involving rehabilitation of the scapula to an idealised normal posture is currently not supported by the available literature.

Adhesive Capsulitis

Injections

PM R. 2014 Jul 1. pii: S1934-1482(14)00306-2. doi: 10.1016/j.pmrj.2014.06.015.

Glenohumeral corticosteroid injections in adhesive capsulitis: a systematic search and review.

Song A1, Higgins LD2, Newman J3, Jain NB4.

Abstract

OBJECTIVES:

To assess the literature on outcomes of corticosteroid injections for adhesive capsulitis, and in particular, image-guided corticosteroid injections. TYPE: Systematic search and review
LITERATURE SURVEY: The databases used were PubMed (1966-present), Embase (1947-present), Web of Science (1900-present), and the Cochrane Central Register of Controlled Trials. Upon reviewing full text articles of these studies, a total of 25 studies were identified for inclusion. The final yield included 7 prospective studies, 16 randomized trials, and 2 retrospective studies.

METHODOLOGY:

This systematic review was formatted using the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. Study criteria were limited to clinical trials, prospective studies, and retrospective studies that specifically evaluated intra-articular corticosteroid injections, both alone and in combination with other treatment modalities, for shoulder adhesive capsulitis. We included studies that were not randomized control trials because our review was not a meta-analysis. Data items extracted from each study included: study design, study population, mean patient age, duration of study, duration of symptoms, intervention, single or multiple injections, location of injections, control population, follow up duration, and outcome measurements. A percent change in outcome measures was calculated when corresponding data was available. Risk of bias in individual studies was assessed when appropriate.

SYNTHESIS:

All studies involved at least one corticosteroid injection intended for placement in the glenohumeral joint but only eight studies used image-guidance for all injections. Seven of these studies reported statistically significant improvements in ROM at 12 weeks of follow-up or earlier. Ninety-two percent of all studies documented a greater improvement in either visual analog pain scores or range of motion after corticosteroid injections in the first 1-6 weeks as compared with the control or comparison group.

CONCLUSIONS:

Corticosteroid injections offer rapid pain relief in the short-term (particularly in the first 6 weeks) for adhesive capsulitis. Long-term outcomes seem to be similar to other treatments including placebo. The added benefit of image-guided corticosteroid injections in improving shoulder outcomes needs further assessment.

PMID: 24998406

ELBOW

Central maps and elbow pain

Med Sci Sports Exerc. 2014 Aug 6.

Novel Adaptations in Motor Cortical Maps: The Relationship to Persistent Elbow Pain.

Schabrun SM1, Hodges PW, Vicenzino B, Jones E, Chipchase LS.

Abstract

INTRODUCTION:

Unilateral elbow pain results in sensori-motor dysfunction that is frequently bilateral, affects local and remote upper limb muscles and persists beyond resolution of local tendon symptoms. These characteristics suggest supraspinal involvement. Here we investigated i) the excitability and organisation of the M1 representation of the wrist extensor muscles and ii) the relationship between M1 changes and clinical outcomes in lateral epicondylalgia (LE; n=11) and healthy control subjects (n=11).

METHODS:

Transcranial magnetic stimulation was used to map the M1 representation of extensor carpi radialis brevis (ECRB) and extensor digitorum (ED).

RESULTS:

The cortical representations of ECRB and ED were more excitable and the centres of gravity (CoG) for the two muscles were located closer together in LE than healthy controls. Increased ECRB excitability and closer location of the CoG were associated with higher pain severity at rest and/or in the preceding 6 months. A novel finding was a reduced number of discrete peaks in the representations of ECRB and ED in LE compared with healthy controls.

CONCLUSION:

This finding may have broad implications for control of the wrist extensor muscles in LE. These data provide evidence that cortical organisation may be maladaptive in LE and suggest that reorganisation may be associated with persistence/recurrence of pain.

KNEE

RA stress on joints

Ann Rheum Dis. 2014 Sep;73(9):1683-8. doi: 10.1136/annrheumdis-2012-203143.
Epub 2013 Jul 9.

Does stress affect the joints? Daily stressors, stress vulnerability, immune and HPA axis activity, and short-term disease and symptom fluctuations in rheumatoid arthritis.

Evers AW¹, Verhoeven EW², van Middendorp H¹, Sweep FC³, Kraaimaat FW¹, Donders AR⁴, Eijsbouts AE⁵, van Laarhoven AI¹, de Brouwer SJ¹, Wirken L¹, Radstake TR⁶, van Riel PL⁷.

Abstract

OBJECTIVES:

Both stressors and stress vulnerability factors together with immune and hypothalamus-pituitary-adrenal (HPA) axis activity components have been considered to contribute to disease fluctuations of chronic inflammatory diseases, such as rheumatoid arthritis (RA). The aim of the present study was to investigate whether daily stressors and worrying as stress vulnerability factor as well as immune and HPA axis activity markers predict short-term disease activity and symptom fluctuations in patients with RA.

METHODS:

In a prospective design, daily stressors, worrying, HPA axis (cortisol) and immune system (interleukin (IL)-1 β , IL-6, IL-8, interferon (IFN)- γ , tumour necrosis factor α) markers, clinical and self-reported disease activity (disease activity score in 28 joints, RA disease activity index), and physical symptoms of pain and fatigue were monitored monthly during 6 months in 80 RA patients.

RESULTS:

Multilevel modelling indicated that daily stressors predicted increased fatigue in the next month and that worrying predicted increased self-reported disease activity, swollen joint count and pain in the next month. In addition, specific cytokines of IL-1 β and IFN- γ predicted increased fatigue 1 month later. Overall, relationships remained relatively unchanged after controlling for medication use, disease duration and demographic variables. No evidence was found for immune and HPA axis activity markers as mediators of the stress-disease relationship.

CONCLUSIONS:

Daily stressors and the stress-vulnerability factor worrying predict indicators of the short-term course of RA disease activity and fatigue and pain, while specific cytokines predict short-term fluctuations of fatigue. These stress-related variables and immune markers seem to affect different aspects of disease activity or symptom fluctuations independently in RA.

KEYWORDS: Disease Activity; Psychology; Rheumatoid Arthritis
PMID: 23838082

Ankle ROM and knee mechanics

The association of dorsiflexion flexibility on knee kinematics and kinetics during a drop vertical jump in healthy female athletes

Knee Surgery, Sports Traumatology, Arthroscopy, 08/12/2014 Evidence Based Medicine
Malloy P, et al.

Abstract

Purpose

While previous studies have examined the association between ankle dorsiflexion flexibility and deleterious landing postures, it is not currently known how landing kinetics are influenced by ankle dorsiflexion flexibility. The purpose of this study was to examine whether ankle dorsiflexion flexibility was associated with landing kinematics and kinetics that have been shown to increase the risk of anterior cruciate ligament (ACL) injury in female athletes.

Methods

Twenty-three female collegiate soccer players participated in a preseason screening that included the assessment of ankle dorsiflexion flexibility and lower-body kinematics and kinetics during a drop vertical jump task.

Results

The results demonstrated that females with less ankle dorsiflexion flexibility exhibited greater peak knee abduction moments ($r = -.442$), greater peak knee abduction angles ($r = .355$), and less peak knee flexion angles ($r = .385$) during landing. The range of dorsiflexion flexibility for the current study was between 9° and 23° (mean = 15.0° ; SD 3.9°).

Conclusion

Dorsiflexion flexibility may serve as a useful clinical measure to predict poor landing postures and external forces that have been associated with increased knee injury risk. Rehabilitation specialists can provide interventions aimed at improving dorsiflexion flexibility in order to ameliorate the impact of this modifiable factor on deleterious landing kinematics and kinetics in female athletes.

[Knee/ACL](#)

[Semitendinosus](#)

[PM R](#). 2014 Jul 17. pii: S1934-1482(14)00327-X. doi: 10.1016/j.pmrj.2014.07.003.

Biomechanical Deficiencies in Women with Semitendinosus-Gracilis Anterior Cruciate Ligament Reconstruction During Drop Jumps.

[Ortiz A1](#), [Capo-Lugo CE2](#), [Venegas-Rios HL3](#).

Abstract

OBJECTIVE:

To compare landing mechanics and neuromuscular recruitment strategies between women with semitendinosus-gracilis anterior cruciate ligament reconstruction (SG-ACLR) and noninjured women during double- and single-legged drop jumps.

DESIGN:

Cross-sectional biomechanical study.

SETTING:

Single university-based biomechanics laboratory.

PARTICIPANTS:

Fourteen women 1-5 years post-SG-ACLR and 16 noninjured women participated in this study.

METHODS:

After anthropometric measurements, warm-up, and familiarization procedures, participants performed 5 trials of a double- and single-legged drop jumps.

MAIN OUTCOME MEASUREMENTS:

Dynamic knee valgus was measured as the distance between knee joints during the landing phase of the double-leg drop jumps. Medial knee displacement was the outcome considered during the landing phase of the single-leg drop jumps. For both drop jump tasks, neuromuscular recruitment was evaluated through rectified normalized electromyographic activity of the quadriceps and hamstrings (amplitude and latency), and quadriceps/hamstrings electromyographic co-contraction ratio.

RESULTS:

Although the SG-ACLR group demonstrated a tendency toward a greater dynamic knee valgus during both drop jumps, these differences did not reach statistical significance. EMG data revealed different neuromuscular strategies for each group, depending on the specific jump.

CONCLUSIONS:

These findings suggest that women with SG-ACLR have a tendency toward greater dynamic knee valgus that could predispose to additional knee injuries. Rehabilitation specialists need to be aware of existing kinematic and neuromuscular deficiencies years after SG-ACLR. Taking this into consideration will aid in prescribing appropriate interventions designed to prevent re-injury.

PMID: 25043260

Patella

Exercise impact

Phys Ther. 2014 Jul 31.

Effectiveness of Exercise Therapy in Treatment of Patients With Patellofemoral Pain Syndrome: A Systematic Review and Meta-Analysis.

Clijisen R¹, Fuchs J², Taeymans J³.

Abstract

BACKGROUND AND PURPOSE:

This systematic review and meta-analysis was accomplished to determine whether exercise therapy is an effective intervention to reduce pain and patient-reported measures of activity limitations and participation restrictions (PRMALP) in patients with patellofemoral pain.

METHODS:

Randomized controlled trials in English and German language, published in Medline, PEDro and Cochrane databases were searched. Eligibility was assessed in two stages. The methodological quality of the studies was rated using the PEDro scale. Data were pooled using random-effects meta-analysis allowing for variability among studies. For clinical use, overall estimates were re-expressed in the original VAS scores. Significance was set at 5%.

RESULTS:

Fifteen studies with a total of 748 participants were included and pooled for a meta-analysis. Six studies compared the effect of exercise therapy with a control group neither receiving exercise therapy nor another intervention. Four studies compared the effect of exercise therapy versus additive therapy while five papers compared different exercise interventions. In both comparisons exercise therapy resulted in strong pain reduction and improvement of PRMALP effects. Significant short-term effects (≤ 12 weeks) of exercise therapy were found for pain and PRMALP while long-term effects (≥ 26 weeks) were observed for PRMALP only.

CONCLUSION:

This meta-analysis presents evidence that exercise therapy has a strong pain reducing effect and decreases PRMALP in patients with patellofemoral pain. However, the question, which exercise modality yields the strongest reducing effect on pain and PRMALP, remains unrevealed. The 15 studies included in this analysis were of variable quality. Large, high quality RCTs are needed to further the evaluation of the possible effects of different exercise therapy modalities on patellofemoral pain.

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PMID: 25082920

Management of Patella problems

Outcome Predictors for Conservative Patellofemoral Pain Management: A Systematic Review and Meta-Analysis.

Sports Med. 2014 Aug 7. [Lack S1](#), [Barton C](#), [Vicenzino B](#), [Morrissey D](#).

Abstract

BACKGROUND:

Patellofemoral pain (PFP) is highly prevalent within both sporting and recreationally active populations. Multiple treatment approaches have been advocated for the management of PFP, attempting to address both intrinsic and extrinsic factors thought to contribute to the development and persistence of pain. A number of predictors of treatment success have been proposed, and evaluated, for directing intervention choice.

OBJECTIVE:

Our aim was to systematically review the literature that identifies outcome predictors of specific conservative interventions in the management of PFP, including quality of the current evidence, to guide clinical practice and future studies investigating outcome predictors within this population.

DATA SOURCES: The AMED, CINAHL, EMBASE, MEDLINE and Web of Science databases were searched from inception to April 2013.

STUDY APPRAISAL AND SYNTHESIS METHODS: Following initial searching, all potential papers were assessed by two independent reviewers for inclusion using a checklist developed from the inclusion criteria. Cited, and citing, references were also searched in Google Scholar, but unpublished work was not sought. Methodological quality was assessed using a previously designed quality assessment scale. Definitions for levels of evidence were guided by recommendations made by van Tulder et al.

RESULTS:

Fifteen low-quality (LQ) cohort studies were included. No RCTs were found. This systematic review identified the evaluation of 205 conservative management outcome predictor variables. Of this large number of variables that have been assessed, 19 (9 %) were found to significantly predict a successful outcome. Where two or more outcome predictors and success determinants were consistent between studies, data were pooled. Within these studies, the low number of participants per output variable, and absence of controls, is likely to compromise the validity of the predictor's accuracy. Very limited evidence identified higher functional index questionnaire scores (mean 0.82, 95 % confidence interval [CI] 0.18-1.46), greater forefoot valgus (mean 0.67, 95 % CI 0.05-1.28) and greater rearfoot eversion magnitude peak (mean -0.93, 95 % CI -1.84 to -0.01) to significantly predict improved outcomes with orthoses interventions. Shorter symptom duration ($p = 0.019$), lower frequency of pain ($p = 0.012$), younger age, faster vastus medialis oblique reflex response time ($p = 0.026$), negative patella apprehension, absence of chondromalacia patella, tibial tubercle deviation of <14.6 mm and greater total quadriceps cross-sectional area on magnetic resonance imaging ($p = 0.01$), and reduced eccentric average quadriceps peak torque ($p = 0.015$) significantly predicted exercise intervention success following multivariate statistical analysis. Limited evidence identified increased Q-angle (mean 0.38, 95 % CI 0.05-0.72) and very limited evidence identified greater usual pain (mean 0.43, 95 % CI 0.01-0.85) to predict taping intervention success.

CONCLUSIONS:

This systematic review provides a comprehensive summary of current derivation level studies identifying indicators of prediction for conservative PFP management. The overall strength of evidence was low. With appropriate caution, clinicians should consider taping for those with greater usual pain, orthoses for older individuals and exercise for younger individuals, and orthoses intervention for patients with greater forefoot valgus and rearfoot eversion magnitude peak. RCTs with evaluation of outcome prediction as a primary aim are clearly warranted to provide clinicians with robust evidence and facilitate evidence-informed, tailored intervention to this heterogeneous patient population.

FOOT AND ANKLE

Subtalar joint axis

Foot Ankle Int. 2014 Aug 7. pii: 1071100714546549.

Subtalar Joint Axis in Patients With Symptomatic Peritalar Subluxation Compared to Normal Controls.

Apostle KL1, Coleman NW2, Sangeorzan BJ3.

Abstract

BACKGROUND:

The etiology of peritalar subluxation (PTS) is poorly understood and likely multifactorial. An anatomic predisposition for posterolateral subluxation of the hindfoot has not been previously described or investigated. The aim of the current study was to describe the morphology of the subtalar joint axis (STJA) in patients with symptomatic PTS compared to normal controls.

METHODS:

We identified patients with symptomatic PTS who had undergone operative correction from hospital records. The angle of the axis of the posterior facet of the subtalar joint was made on simulated weight-bearing CT (SWBCT) scans. A control group of patients who had no foot deformity on standing films was used for comparison. The STJA was defined as the angle between the superior talar dome and the posterior facet of the talus on coronal CT scan. The mean, maximum, and minimum STJAs were calculated for each cut from anterior to posterior across the posterior facet. The trend in progression across the posterior facet was also examined.

RESULTS:

After exclusions, 22 feet in 20 patients were included in the study group and compared to 20 control subjects. It was seen that patients with PTS had an increased valgus orientation of the subtalar joint. In patients with PTS the STJA began in valgus and progressed to even greater valgus from anterior to posterior across the posterior facet. The STJA in control subjects was seen instead to begin in slight varus and transition to valgus at the junction of the anterior and middle third and then increase in valgus as the joint progressed posteriorly.

CONCLUSIONS:

The valgus orientation of the coronal plane of the subtalar joint may represent an anatomic contribution to the etiology of PTS.

LEVEL OF EVIDENCE:

Level III, comparative series.

KEYWORDS:

adult acquired flat foot; hindfoot alignment; peritalar subluxation; subtalar joint axis; tibialis posterior insufficiency

PMID: 25104749

Taping

Phys Ther Sport. 2014 Aug;15(3):156-61. doi: 10.1016/j.pts.2013.09.001. Epub 2013 Sep 15.

Immediate effect of walking with talus-stabilizing taping on ankle kinematics in subjects with limited ankle dorsiflexion.

Kang MH¹, Kim JW², Choung SD³, Park KN⁴, Kwon OY⁵, Oh JS⁶.

Abstract

OBJECTIVE:

To determine the effects of walking with talus-stabilizing taping (TST) on ankle dorsiflexion (DF) and heel-off time in the stance phase of gait and ankle DF passive range of motion (PROM).

DESIGN:

Pre- and post-intervention study.

SETTING:

University motion analysis laboratory.

PARTICIPANTS:

Ten subjects participated in this study. Sixteen ankles with limited ankle DF PROM were tested.

MAIN OUTCOME MEASURES:

Ankle DF PROM was measured using a goniometer, and maximum ankle DF before heel-off and time to heel-off in the stance phase of gait were measured using a 3D motion analysis system before and after walking with TST. Data were analyzed using a paired t-test.

RESULTS:

Ankle maximum DF before heel-off ($p = 0.001$), time to heel-off during the stance phase of gait ($p = 0.005$), and ankle DF PROM ($p < 0.001$) were significantly increased post-intervention compared with pre-intervention.

CONCLUSIONS:

Walking with TST is an effective self-exercise for improving ankle kinematics during gait and increasing ankle DF PROM in individuals with limited ankle DF PROM.

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KEYWORDS:

Gait; Limited ankle dorsiflexion; Talus-stabilizing taping

PMID: 24239168

Development of the foot and ankle

Foot and Ankle Surgery

Volume 20, Issue 3, Pages 208–214, September 2014

Standard growth of the foot arch in childhood and adolescence—Derived from the measurement results of 10,155 children

Akeo Waseda, MD , Yasunori Suda, MD, Suguru Inokuchi, MD, Yuji Nishiwaki, MD, Yoshiaki Toyama, MD

Abstract

Background

The definition of flatfoot remains analytically vague. Toward the purpose of establishing the standard values of the foot length and arch height in childhood and adolescence, large-scale measurement and investigation of the foot arch were conducted using a three-dimensional foot-measuring device.

Methods

Measurements of foot structure were performed on 5311 boys and 4844 girls, for a total of 20,310 ft. of 10,155 children aged from 6 to 18 years during the 2006–2008 year period. The foot length (FL) and the navicular height (NH) were measured, and the arch height ratio (AHR (%)) = $NH \times 100/FL$ was calculated.

Results

The FL in boys showed an extension from the age of 6 to 14 and nearly reached a plateau at 14 years old. In girls, the extension was observed from the age of 6 to 13, and the FL came to a plateau at 13 years old. The NH in boys increased from the age of 6 to 13. In girls, the NH increased from the age of 8 to 13. The AHR, presented a normal distribution, and no differences were observed in the distribution for all ages in boys and girls. In boys, the AHR was almost flat until 11 years old, but elevated in the 11–13 year age period. In girls, the AHR was almost flat until 10 years old, but elevated in the 10–12 year age period.

Conclusions

We are certain that the data demonstrating the normal growth of the foot contribute to the diagnosis and treatment of the failure of the foot to thrive.

Keywords: Standard growth, Foot arch, Childhood, Adolescence

MANUAL THERAPY

Hawkins sign

The prognostic value of the hawkins sign and diagnostic value of MRI after talar neck fractures

Foot & Ankle International, 08/14/2014, Evidence Based Medicine, Chen H, et al.

Abstract

Background: The early diagnosis of avascular necrosis of the talus (AVN) and prediction of ankle function for talar fractures are important. The Hawkins sign, as a radiographic predictor, could exclude the possibility of developing ischemic bone necrosis after talar neck fractures, but its relationship with ankle function remains unclear. The purpose of this study was to illustrate the prognostic effect of the Hawkins sign on ankle function after talar neck fractures and to study the value of early MRI in detecting the AVN changes after talus fractures.

Methods: Cases of talar neck fractures between November 2008 and November 2013 were evaluated. The occurrences of the Hawkins sign and AVN were studied. X-ray imaging was performed at multiple time points from the 4th to the 12th week after the fractures, and MRI examinations were used in the Hawkins sign negative group, with the time span ranging from 1.5 to 12 months. AOFAS scores of the Hawkins sign positive and negative groups were compared during the follow-up. Forty-four cases (48 feet) were evaluated.

Results: The occurrence of positive Hawkins sign was 50%, 30%, and 33.3%, the incidence of AVN was 0%, 10%, and 50%, respectively, in type I, type II, and type III and IV talus fractures, respectively. The AOFAS scores showed no statistically significant difference between Hawkins sign positive group and negative group in type I and II fractures. The Hawkins sign positive group had better AOFAS scores than the negative group in type III and IV fractures. However, there was no statistically significant difference between Hawkins sign positive and negative groups when AVN cases were excluded in type III and IV fractures.

Conclusion: The Hawkins sign was a reliable predictor excluding the possibility of AVN. It did not have predictive value on the ankle function in low-energy fractures and may predict better ankle function in high-energy fractures. MRI can diagnose AVN during an earlier period, and we believe Hawkins sign negative patients should undergo MRI examinations 12 weeks after the fractures, especially in high-energy traumatic cases.

Level of Evidence: Level III, comparative case series

Manual therapy

Spine (Phila Pa 1976). 2014 Apr 1;39(7):E463-72. doi: 10.1097/BRS.0000000000000230.

Do manual therapies help low back pain? A comparative effectiveness meta-analysis.

Menke JM.

Abstract

STUDY DESIGN:

Meta-analysis methodology was extended to derive comparative effectiveness information on spinal manipulation for low back pain.

OBJECTIVE:

Determine relative effectiveness of spinal manipulation therapies (SMTs), medical management, physical therapies, and exercise for acute and chronic nonsurgical low back pain.

SUMMARY OF BACKGROUND DATA:

Results of spinal manipulation treatments of nonsurgical low back pain are equivocal. Nearly 40 years of SMT studies were not informative.

METHODS:

Studies were chosen on the basis of inclusion in prior evidence syntheses. Effect sizes were converted to standardized mean effect sizes and probabilities of recovery. Nested model comparisons isolated nonspecific from treatment effects. Aggregate data were tested for evidential support as compared with shams.

RESULTS:

Of 84% acute pain variance, 81% was from nonspecific factors and 3% from treatment. No treatment for acute pain exceeded sham's effectiveness. Most acute results were within 95% confidence bands of that predicted by natural history alone. For chronic pain, 66% of 98% was nonspecific, but treatments influenced 32% of outcomes. Chronic pain treatments also fit within 95% confidence bands as predicted by natural history. Though the evidential support for treating chronic back pain as compared with sham groups was weak, chronic pain seemed to respond to SMT, whereas whole systems of clinical management did not.

CONCLUSION:

Meta-analyses can extract comparative effectiveness information from existing literature. The relatively small portion of outcomes attributable to treatment explains why past research results fail to converge on stable estimates. The probability of treatment superiority matched a binomial random process. Treatments serve to motivate, reassure, and calibrate patient expectations--features that might reduce medicalization and augment self-care. Exercise with authoritative support is an effective strategy for acute and chronic low back pain.

PMID: 24480940

Effectiveness of myofascial release

Database of Abstracts of Reviews of Effects (DARE): Quality-assessed Reviews.

Review published: 2013.

Myofascial release as a treatment for orthopaedic conditions: a systematic review

Bibliographic details: McKenney K, Elder AS, Elder C, Hutchins A. Journal of Athletic Training 2013; 48(4): 522-527

Abstract

OBJECTIVE: To critically analyze published literature to determine the effectiveness of myofascial release therapy as a treatment for orthopaedic conditions.

DATA SOURCES: We searched the following electronic databases: MEDLINE, CINAHL, Academic Search Premier, Cochrane Library, and Physiotherapy Evidence Database (PEDro), with key words myofascial release, myofascial release therapy, myofascial release treatment, musculoskeletal, and orthopedic. No date limitations were applied to the searches.

STUDY SELECTION: Articles were selected based upon the use of the term myofascial release in the abstract or key words. Final selection was made by applying the inclusion and exclusion criteria to the full text. Studies were included if they were English-language, peer-reviewed studies on myofascial release for an orthopaedic condition in adult patients. Ten studies were eligible.

DATA EXTRACTION: Data collected were number of participants, condition being treated, treatment used, control group, outcome measures and results. Studies were analyzed using the PEDro scale and the Center for Evidence-Based Medicine's Levels of Evidence Scale.

DATA SYNTHESIS: Study scores on the PEDro scale ranged from 6 of 10 to 8 of 10. Based on the Levels of Evidence Scale, the case studies (n = 6) were of lower quality, with a rank of 4. Three of the 4 remaining studies were rated at 2b, and the final study was rated at 1b.

CONCLUSIONS: The quality of studies was mixed, ranging from higher-quality experimental to lower-quality case studies. Overall, the studies had positive outcomes with myofascial release, but because of the low quality, few conclusions could be drawn. The studies in this review may serve as a good foundation for future randomized controlled trials.

Manual therapy and the sympathetic nervous system

Man Ther. 2014 Aug;19(4):281-7. doi: 10.1016/j.math.2014.04.004. Epub 2014 Apr 13.

The effects of spinal mobilizations on the sympathetic nervous system: a systematic review.

Kingston L¹, Claydon L², Tumilty S².

Abstract

Purpose: The activity of the sympathetic nervous system is of importance to manual therapists, since the experience of pain is associated with sympathetic activity. There has been little exploration into the effects of mobilizing vertebral segments below the cervical spine. In addition to this, a synthesis of the evidence for changes in sympathetic outcome measures has not been completed. The primary aim of this review was to investigate the effects of spinal mobilizations compared to a control or placebo on sympathetic outcome measures. The secondary aim was to establish the level of change, either excitatory or inhibitory, in sympathetic outcome measures.

Method: Five electronic databases (Ovid Medline, Embase, AMED, PEDro, and the Cochrane library; from database inception to May 2012) were searched for randomized controlled trials. Two independent raters applied inclusion criteria and rated studies for methodological quality. Seven studies met the inclusion criteria.

Findings: All studies demonstrated a consistent increase in sympathetic outcome measures, indicative of sympathetic excitation, irrespective of the segments mobilized. Synthesis of the results established strong evidence (multiple high-quality randomised controlled trials (RCTs) for a positive change in skin conductance, respiratory rate, blood pressure, and heart rate among the healthy population. As only one study investigated changes in a symptomatic population, there was limited evidence (one RCT) for an increase in skin conductance and decrease in skin temperature.

Conclusions: Evidence from this systematic review supports a sympatho-excitatory response to spinal mobilizations irrespective of the segment mobilized.

KEYWORDS: Best evidence; Skin conductance; Spinal manipulation; Sympathetic nervous system; Sympathetic outcome measures

PMID: 24814903

T spine manips and c spine

Man Ther. 2014 Aug;19(4):331-7. doi: 10.1016/j.math.2014.03.002. Epub 2014 Mar 14.

Comparative short-term effects of two thoracic spinal manipulation techniques in subjects with chronic mechanical neck pain: a randomized controlled trial.

Casanova-Méndez A¹, Oliva-Pascual-Vaca A², Rodríguez-Blanco C², Heredia-Rizo AM³, Gogorza-Arroitaonandia K¹, Almazán-Campos G¹.

Abstract

Purpose: Spinal Manipulation (SM) has been purported to decrease pain and improve function in subjects with non-specific neck pain. Previous research has investigated which individuals with non-specific neck pain will be more likely to benefit from SM. It has not yet been proven whether or not the effectiveness of thoracic SM depends on the specific technique being used. This double-blind randomized trial has compared the short-term effects of two thoracic SM maneuvers in subjects with chronic non-specific neck pain.

Methods: Sixty participants were distributed randomly into two groups. One group received the Dog technique (n = 30), with the subject in supine position, and the other group underwent the Toggle-Recoil technique (n = 30), with the participant lying prone, T4 being the targeted area in both cases. Evaluations were made of self-reported neck pain (Visual Analogue Scale); neck mobility (Cervical Range of Motion); and pressure pain threshold at the cervical and thoracic levels (C4 and T4 spinous process) and over the site described for location of tense bands of the upper trapezius muscle. Measurements were taken before intervention, immediately afterward, and 20 min later.

Findings: Both maneuvers improved neck mobility and mechanosensitivity and reduced pain in the short term. No major or clinical differences were found between the groups. In the between-groups comparison slightly better results were observed in the Toggle-Recoil group only for cervical extension (p = 0.009), right lateral flexion (p = 0.004) and left rotation (p < 0.05).

KEYWORDS: Cervical spine; Neck pain; Randomized controlled trial; Spinal manipulation
PMID: 24679838

MT and post hip arthroscopy

J Orthop Sports Phys Ther. 2014 Aug 6:1-29.

The Use of Manual Therapy Post Hip Arthroscopy When an Exercise Based Therapy Approach Has Failed: A Case Report.

Le Beau RT¹, Nho SJ.

Abstract

Study Design Case report. Background Although there is a growing body of literature on both surgical intervention and post-surgical rehabilitation of acetabular labral repairs and femoroacetabular impingement (FAI), there is a paucity of information on how to manage individuals with lack of progress post-surgery.

Case Description A 30 year old female underwent surgical labral repair with FAI osteochondroplasty. Post-surgery, she was initially treated with an exercise-based approach, but experienced an increase in hip pain and further decline in function. Her primary functional deficits were difficulty standing and pain (6/10) with ambulation. A combination of soft tissue mobilization and trigger point dry needling were used to address perceived muscle dysfunction and non-thrust manipulation to address perceived hip joint hypomobility.

Outcomes Following 12 therapy sessions over 120 days, the patient returned to her demanding occupation with minimal residual symptoms. By the end of the period of care, the Harris Hip Score had improved from 56 to 96 and the lower extremity functional scale from 26 to 70.

Discussion This case describes a multimodal manual therapy approach used to improve outcomes of a patient post labral repair with FAI decompression who did not respond to an initial exercise-based post-surgical rehabilitation approach.

Level of Evidence Therapy, level 4. J Orthop Sports Phys Ther, Epub 6 August 2014.
doi:10.2519/jospt.2014.5047.

KEYWORDS: dry needling; femoral acetabular impingement (FAI); joint mobilization; labral repair
PMID: 25098193

Manipulations and intersegmental motion

Chiropr Man Therap. 2014 Jul 1;22:24. doi: 10.1186/s12998-014-0024-9. eCollection 2014.

Does inter-vertebral range of motion increase after spinal manipulation? A prospective cohort study.

Branney J¹, Breen AC².

Abstract

BACKGROUND:

Spinal manipulation for nonspecific neck pain is thought to work in part by improving inter-vertebral range of motion (IV-RoM), but it is difficult to measure this or determine whether it is related to clinical outcomes.

OBJECTIVES:

This study undertook to determine whether cervical spine flexion and extension IV-RoM increases after a course of spinal manipulation, to explore relationships between any IV-RoM increases and clinical outcomes and to compare palpation with objective measurement in the detection of hypo-mobile segments.

METHOD:

Thirty patients with nonspecific neck pain and 30 healthy controls matched for age and gender received quantitative fluoroscopy (QF) screenings to measure flexion and extension IV-RoM (C1-C6) at baseline and 4-week follow-up between September 2012-13. Patients received up to 12 neck manipulations and completed NRS, NDI and Euroqol 5D-5L at baseline, plus PGIC and satisfaction questionnaires at follow-up. IV-RoM accuracy, repeatability and hypo-mobility cut-offs were determined. Minimal detectable changes (MDC) over 4 weeks were calculated from controls. Patients and control IV-RoMs were compared at baseline as well as changes in patients over 4 weeks. Correlations between outcomes and the number of manipulations received and the agreement (Kappa) between palpated and QF-detected of hypo-mobile segments were calculated.

RESULTS:

QF had high accuracy (worst RMS error 0.5o) and repeatability (highest SEM 1.1o, lowest ICC 0.90) for IV-RoM measurement. Hypo-mobility cut offs ranged from 0.8o to 3.5o. No outcome was significantly correlated with increased IV-RoM above MDC and there was no significant difference between the number of hypo-mobile segments in patients and controls at baseline or significant increases in IV-RoMs in patients. However, there was a modest and significant correlation between the number of manipulations received and the number of levels and directions whose IV-RoM increased beyond MDC ($Rho=0.39$, $p=0.043$). There was also no agreement between palpation and QF in identifying hypo-mobile segments (Kappa 0.04-0.06).

CONCLUSIONS:

This study found no differences in cervical sagittal IV-RoM between patients with non-specific neck pain and matched controls. There was a modest dose-response relationship between the number of manipulations given and number of levels increasing IV-RoM - providing evidence that neck manipulation has a mechanical effect at segmental levels. However, patient-reported outcomes were not related to this.

KEYWORDS: Fluoroscopy; Manipulation; Neck pain; Patient-reported outcomes; Spine kinematics

Mulligan and sympathetic nervous system

Manual Therapy DOI: 10.1016/j.math.2014.07.002

The effects of a modified spinal mobilisation with leg movement (SMWLM) technique on sympathetic outflow to the lower limbs

Vasilis Tsirakis^a, Jo Perry^b

Abstract

Purpose: Physiotherapy management of lumbar disorders, based on Mulligan's mobilization techniques, is a treatment of choice by many physiotherapists, however, there is only limited evidence of any neurophysiological effects and much of this has focused on the cervical spine and upper limbs. This study aims to extend the knowledge base underpinning the use of a modified Mulligan's spinal mobilisation with leg movement technique (SMWLM) by exploring its effects on the peripheral sympathetic nervous system (SNS) of the lower limbs.

Methods: Using a single blind, placebo controlled, independent groups study design, 45 normal naive healthy males were randomly assigned to one of three experimental groups (control, placebo or treatment; SMWLM). SNS activity was determined by recording skin conductance (SC) obtained from lower limb electrodes connected to a BioPac unit. Validation of the placebo technique was performed by post- intervention questionnaire.

Findings: Results indicated that there was a significant change in SC from baseline levels (30%) that was specific to the side treated for the treatment group during the intervention period (compared to placebo and control conditions).

Conclusions: This study provides preliminary evidence that a modified SMWLM technique results in side-specific peripheral SNS changes in the lower limbs.

Mulligan foot and ankle

Foot Ankle Int. 2014 Aug 5. pii: 1071100714543797

Three-Dimensional Analysis of Foot Motion After Uphill Walking With Mobilization With Movement Using Tape Applied to the Talocrural Joint in Women With Limited Ankle Dorsiflexion.

Yoon JY1, Oh JS2, An DH3.

Abstract

BACKGROUND:

Previous studies that investigated mobilization with movement (MWM) treatment assessed only improvements in passive range of motion (ROM). No information is currently available regarding the efficacy of modified MWM by application of tape. Therefore, we investigated the effect of uphill walking with modified MWM using tape applied to the talocrural joint (uphill walking with MWM taping) in women with limited ankle dorsiflexion.

METHODS:

Twelve feet of 12 women with ankle dorsiflexion < 8 degrees were studied. Passive ROM measured using a goniometer was used to select participants. Participants walked on a level walkway under 3 conditions: before exercise, after uphill walking, and after uphill walking with MWM taping. The Oxford Foot Model using 3D motion analysis system was used to examine dynamic foot kinematics, and statistical significance was determined by 1-way repeated-measures analysis of variance.

RESULTS:

After uphill walking with MWM taping, peak hindfoot dorsiflexion relative to the tibia was significantly greater than that before exercise and after uphill walking. Furthermore, peak forefoot plantarflexion relative to the hindfoot, peak hindfoot plantarflexion relative to the tibia, and backward tilt of the tibia were greater than those before exercise.

CONCLUSIONS:

Uphill walking with MWM taping resulted in an immediate alteration in foot motion during walking, increasing hindfoot dorsiflexion in particular.

CLINICAL RELEVANCE:

Further studies are needed to investigate the long-term effects of uphill walking with MWM taping and its potential use in rehabilitation training.

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KEYWORDS:

ankle dorsiflexion; foot model; taping; uphill walking

PMID: 25097190

Mulligan and knee and hip biomechanics

Scand J Med Sci Sports. 2014 Aug 5. doi: 10.1111/sms.12302

Effect of Mulligan's and Kinesio knee taping on adolescent ballet dancers knee and hip biomechanics during landing.

Hendry D1, Campbell A, Ng L, Grisbrook TL, Hopper DM.

Abstract

Purpose: Taping is often used to manage the high rate of knee injuries in ballet dancers; however, little is known about the effect of taping on lower-limb biomechanics during ballet landings in the turnout position. This study investigated the effects of Kinesiotape (KT), Mulligan's tape (MT) and no tape (NT) on knee and hip kinetics during landing in three turnout positions. The effect of taping on the esthetic execution of ballet jumps was also assessed.

Methods: Eighteen pain-free 12-15-year-old female ballet dancers performed ballet jumps in three turnout positions, under the three knee taping conditions. A Vicon Motion Analysis system (Vicon Oxford, Oxford, UK) and Advanced Mechanical Technology, Inc. (Watertown, Massachusetts, USA) force plate collected lower-limb mechanics.

Findings: The results demonstrated that MT significantly reduced peak posterior knee shear forces ($P = 0.025$) and peak posterior ($P = 0.005$), medial ($P = 0.022$) and lateral ($P = 0.014$) hip shear forces compared with NT when landing in first position. KT had no effect on knee or hip forces. No significant differences existed between taping conditions in all landing positions for the esthetic measures.

Conclusions: MT was able to reduce knee and the hip forces without affecting the esthetic performance of ballet jumps, which may have implications for preventing and managing knee injuries in ballet dancers.

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KEYWORDS:

Knee force; hip force; kinematics; kinetics; turnout

PMID: 25091570

Muscles

Hamstrings

British journal of sports medicine : 2014 Jul 18 pg

Clinical findings just after return to play predict hamstring re-injury, but baseline MRI findings do not.

De Vos RJ, Reurink G, Goudswaard GJ, Moen MH, Weir A, Tol JL

Abstract

BACKGROUND

Acute hamstring re-injuries are common and hard to predict. The aim of this study was to investigate the association between clinical and imaging findings and the occurrence of hamstring re-injuries.

METHODS

We obtained baseline data (clinical and MRI findings) of athletes who sustained an acute hamstring injury within 5 days of initial injury. We also collected data of standardised clinical tests within 7 days after return to play (RTP). The number of re-injuries was recorded within 12 months. We analysed the association between the possible predictive variables and re-injuries with a multivariate Cox proportional-hazards regression model.

RESULTS

Eighty patients were included at baseline and 64 patients could be included in the final analysis because data after RTP were not available in 16 cases. There were 17 re-injuries (27%). None of the baseline MRI findings were univariately associated with re-injury. A higher number of previous hamstring injuries (adjusted OR (AOR) 1.33; 95% CI 1.11 to 1.61), more degrees of active knee extension deficit after RTP (AOR 1.13; 95% CI 1.03 to 1.25), isometric knee flexion force deficit at 15° after RTP (AOR 1.04; 95% CI 1.01 to 1.07) and presence of localised discomfort on hamstring palpation after RTP (AOR 3.95; 95% CI 1.38 to 11.37) were significant independent predictors of re-injury. Athletes with localised discomfort on hamstring palpation just after RTP were consequently almost four times more likely to sustain a re-injury.

CONCLUSIONS

The number of previous hamstring injuries, active knee extension deficit, isometric knee flexion force deficit at 15° and presence of localised discomfort on palpation just after RTP are associated with a higher hamstring re-injury rate. None of the baseline MRI parameters was a predictor of hamstring re-injury.

TRIAL REGISTRATION NUMBER

ClinicalTrial.gov number NCT01812564.

Validity of hand held dynamometer

J Back Musculoskelet Rehabil. 2014 Aug 5.

Reliability and validity of a custom-made instrument including a hand-held dynamometer for measuring trunk muscle strength.

Jubany J¹, Busquets A², Marina M², Cos F², Angulo-Barroso R².

Abstract

BACKGROUND:

Measuring isometric strength is necessary in many areas of health and sport. However, trunk muscles have some particular characteristics that make them difficult to evaluate with simple, inexpensive instruments.

OBJECTIVE:

To evaluate the reliability and validity of an instrument constructed with a hand-held dynamometer and a metallic structure (HHD+S) for measuring maximum isometric voluntary trunk muscle strength.

METHODS:

Maximum isometric voluntary trunk muscle strength (extension, flexion and lateral flexion) was measured in 20 healthy individuals using the custom-made instrument (HHD+S) and the gold standard Back-Check (BC).

RESULTS: The results showed that the two instruments had high and similar intra-subject reliability. The validity of the HHD+S was demonstrated by the high Pearson coefficient

correlation between the two instruments ($r \geq 0.78$).

CONCLUSIONS:

Given the good trial reliability and the close correlation between the two instruments, we believe that the use of a hand-held dynamometer together with the custom-made metallic structure (HHD+S) allows an evaluation of the maximum isometric voluntary trunk muscle strength to be made, that is very similar in quality, accuracy and reliability to the BC.

KEYWORDS:

Maximum voluntary contraction; back strength; custom-made instrument; dynamometer

PMID: 25096319

BET

Global postural reeducation

J Manipulative Physiol Ther. 2014 Aug 1. pii: S0161-4754(14)00114-6. doi: 10.1016/j.jmpt.2013.08.011.

Effectiveness of Global Postural Reeducation Compared to Segmental Exercises on Function, Pain, and Quality of Life of Patients With Scapular Dyskinesia Associated With Neck Pain: A Preliminary Clinical Trial.

Amorim CS¹, Gracitelli ME², Marques AP³, Alves VL⁴.

Abstract

OBJECTIVE:

The purpose of this study was to assess the effectiveness of global postural reeducation (GPR) relative to segmental exercises (SE) in the treatment of scapular dyskinesia (SD) associated with neck pain.

METHODS:

Participants with SD and neck pain (n = 30) aged 18 to 65 years were randomly assigned to one of two groups: GPR and SE (stretching exercises). The upper extremity was assessed using the Disabilities of the Arm, Shoulder, and Hand questionnaire; function of the neck was estimated using the Neck Disability Index; pain severity was measured using a visual analogical scale; and health-related quality of life was assessed using the Short Form-12. Assessments were conducted at baseline and after 10 weekly sessions (60 minutes each). The significance level adopted was $\alpha < .05$.

RESULTS:

For pre-post treatment comparisons, GPR was significantly associated with improvements in function of neck and upper extremities, pain, and physical and mental domains of quality of life ($P < .05$). Segmental exercises improved function of upper extremities and of the neck and severity of pain ($P < .05$). When contrasting groups, GPR was significantly superior to SE in improving pain and physical domains of the quality of life.

CONCLUSION:

This study showed that GPR and SE had similar effects on function of the neck and upper extremity in patients with SD associated with neck pain. When comparing groups, GPR was superior to SE in improving pain and quality of life.

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KEYWORDS:

Dyskinesias; Muscle Stretching Exercises; Neck pain; Physical Therapy Modalities; Posture
PMID: 25092553

Biomechanics of daily activities

J Back Musculoskelet Rehabil. 2014 Aug 5.

Three-dimensional lower extremity kinematics of Chinese during activities of daily living.

Han S1, Cheng G2, Xu P2.

Abstract

OBJECTIVE:

There were gender differences regarding lower extremity kinematics. The purpose of this study was to investigate three-dimensional kinematics of lower extremity for young Chinese during daily activities and to identify gender differences in lower extremity kinematics. **METHODS:** Lower extremity motions of 40 healthy volunteers (20 males and 20 females) were recorded while each subject was asked to perform each of three daily activities (walking, jogging, and squatting). The spatiotemporal parameters (speed, cadence and step length) and joint kinematics (peak angles and mean range of motions in each plane) were compared with previous results and within gender group. Independent t-tests were used for statistical significance ($p < 0.05$).

RESULTS:

Statistical analysis suggested that there was no gender difference in sagittal plane motions at the hip, knee and ankle joints, while females displayed greater non-sagittal plane joint motions compared to their male counterparts.

CONCLUSIONS:

The outcomes of this study added basic understanding of joint biomechanics during daily activities of Chinese and provided a basis for comparison to patients with various joint diseases.

KEYWORDS:

Daily activities; deep squatting; gender difference; kinematics

PMID: 25096318

Exercise

Predicting which exercise

Phys Ther. 2014 Jul 10.

Predicting Response to Motor Control Exercises and Graded Activity for Low Back Pain Patients: Preplanned Secondary Analysis of a Randomized Controlled Trial.

Macedo LG¹, Maher CG², Hancock M³, Kamper SJ⁴, McAuley J⁵, Stanton TR⁶, Stafford R⁷, Hodges PW⁸.

Abstract

BACKGROUND:

Current treatments for low back pain have small effects. A research priority is to identify patient characteristics associated with larger effects for specific interventions.

OBJECTIVE:

To identify simple clinical characteristics of patients with chronic low back pain who would benefit more from either motor control exercises or graded activity.

DESIGN:

Randomized controlled trial. **SETTING:** Australian physiotherapy clinics.

PARTICIPANTS:

172 patients presenting with chronic low back pain were enrolled in the trial.

INTERVENTIONS:

The treatment consisted of 12 initial exercise sessions over an 8-week period and booster sessions at 4 and 10 months following randomization.

MEASUREMENTS:

The putative effect modifiers (psychosocial features, physical activity level, walking tolerance and self-reported signs of clinical instability) were measured at baseline. Measures of pain and function (both measured on a 0-10 scale) were taken at baseline, 2, 6 and 12 months by a blinded assessor.

RESULTS:

We found self-reported clinical instability was a statistically significant and clinically important modifier of treatment response for 12 month function (interaction: 2.72; 95% CI 1.39 to 4.06). People with high scores on the clinical instability questionnaire (≥ 9) did 0.85 points better with motor control whereas people who had low scores (< 9) did 1.93 points better with graded activity. Most other effect modifiers investigated did not appear to be useful in identifying preferential response to exercise type.

LIMITATIONS:

The psychometric properties of the instability questionnaire have not been fully tested.

CONCLUSION:

A simple 15-item questionnaire of features considered indicative of clinical instability can identify patients who respond best to either motor control exercise or graded activity.

PMID: 25013000

High intensity exercise

BMC Public Health. 2014 Aug 3;14:789. doi: 10.1186/1471-2458-14-789.

High-intensity compared to moderate-intensity training for exercise initiation, enjoyment, adherence, and intentions: an intervention study.

Heinrich KM¹, Patel PM, O'Neal JL, Heinrich BS.

Abstract

BACKGROUND:

Understanding exercise participation for overweight and obese adults is critical for preventing comorbid conditions. Group-based high-intensity functional training (HIFT) provides time-efficient aerobic and resistance exercise at self-selected intensity levels which can increase adherence; behavioral responses to HIFT are unknown. This study examined effects of HIFT as compared to moderate-intensity aerobic and resistance training (ART) on exercise initiation, enjoyment, adherence, and intentions.

METHODS:

A stratified, randomized two-group pre-test posttest intervention was conducted for eight weeks in 2012 with analysis in 2013. Participants (n = 23) were stratified by median age (< or ≥ 28) and body mass index (BMI; < or ≥ 30.5). Participants were physically inactive with an average BMI of 31.1 ± 3.5 kg/m², body fat percentage of 42.0 ± 7.4%, weight of 89.5 ± 14.2 kg, and ages 26.8 ± 5.9 years. Most participants were white, college educated, female, and married/engaged. Both groups completed 3 training sessions per week. The ART group completed 50 minutes of moderate aerobic exercise each session and full-body resistance training on two sessions per week. The HIFT group completed 60-minute sessions of CrossFit™ with actual workouts ranging from 5-30 minutes. Participants completed baseline and posttest questionnaires indicating reasons for exercise initiation (baseline), exercise enjoyment, and exercise intentions (posttest). Adherence was defined as completing 90% of exercise sessions. Daily workout times were recorded.

RESULTS:

Participants provided mostly intrinsic reasons for exercise initiation. Eighteen participants adhered (ART = 9, 81.8%; HIFT = 9, 75%). HIFT dropouts (p = .012) and ART participants (p = .009) reported lower baseline exercise enjoyment than HIFT participants, although ART participants improved enjoyment at posttest (p = .005). More HIFT participants planned to continue the same exercise than ART participants (p = .002). No significant changes in BMI or body composition were found. Workouts were shorter for HIFT than ART (p < .001).

CONCLUSIONS:

HIFT participants spent significantly less time exercising per week, yet were able to maintain exercise enjoyment and were more likely to intend to continue. High-intensity exercise options should be included in public health interventions.

TRIAL REGISTRATION:

ClinicalTrials.gov Identifier: <http://NCT02185872>. Registered 9 July 2014.

PMID: 25086646

Breathing and TA activity

Journal of Bodywork and Movement Therapies

The Pilates breathing technique increases the electromyographic amplitude level of the deep abdominal muscles in untrained people

Alexandre Wesley Carvalho Barbosa, PT, MSc, PhD  , Michelle Cristina Sales Almeida Barbosa, PT, MSc

Summary

Objective

To evaluate the behaviour of the upper rectus abdominis, lower rectus abdominis and transverse abdominis/internal oblique (TrA/IO) by using surface electromyography during trunk flexion with and without the Pilates breathing technique.

Methods

Nineteen female subjects (without experience of the Pilates method) were recruited. The muscles were evaluated while trunk flexion was performed by using the Pilates breathing technique (POW) and Step Barrel device, followed by another contraction without the technique (NORM). Normality was accepted, and the paired t-test was used to determine data differences ($p < 0.05$).

Results

Significant differences were noted in the amplitude level of activation between TrA/IO-POW and TrA/IO-NORM. The activation amplitude level of TrA/IO-POW significantly increased compared with all the other muscles under the NORM condition.

Conclusion

The breathing technique of the Pilates method associated with trunk flexion increases TrA/IO electrical activity.

Keywords:

Exercise, Electromyography, Pilates, Breathing

Exercise and obesity

Osteoporos Int. 2014 Aug 8.

The effect of a 3-month moderate-intensity physical activity program on body composition in overweight and obese African American college females.

Joseph RP1, Casazza K, Durant NH.

Abstract

This study evaluated body composition outcomes following a 3-month exercise program for overweight/obese Black women. BMI decreased over the 3-month study despite an observed increase in body fat. Enhancements in bone marrow density and muscle density were also observed. Results show promising yet hypothesis-generating findings to explore in future research.

INTRODUCTION:

Few studies have evaluated the relationship between aerobic physical activity (PA) and body composition among young adult overweight/obese African American (AA) women.

PURPOSE:

The current study evaluated the effect of a 3-month moderate-intensity aerobic physical activity intervention for overweight and obese young adult women on bone, lean, and fat mass.

METHODS:

Participants (n = 15) were a randomly selected subset of AA female college students (M age = 21.7 years; M BMI = 33.3) enrolled in a larger PA promotion pilot study (n = 31). Study protocol required participants to engage in four 30-60-min moderate-intensity aerobic PA sessions each week. Whole body composition was measured by dual-energy X-ray absorptiometry (DXA), and peripheral quantitative computed tomography (pQCT) was used to assess additional quantitative and qualitative assessment of the radius.

RESULTS:

BMI decreased over the duration of the study (P = .034), reflected by a marginal decrease in body weight (P = .057). However, unexpectedly, increases in adipose tissue measures were observed, including total body fat (P = .041), percent body fat (P = .044), trunk fat (P = .031), and percent trunk fat (P = .041). No changes in DXA-measured bone outcomes were observed (i.e., bone mineral density, P = .069; bone mineral content, P = .211). Results from the pQCT assessment showed that bone marrow density increased (P = .011), but cortical density remained stable (P = .211). A marginally significant increase in muscle density (P = .053) and no changes in muscle area (P = .776) were observed.

CONCLUSIONS:

A 3-month moderate-intensity PA program was associated with several promising findings, including increased bone marrow and stabilization of body weight. However, the increase in adipose tissue and trend for decreased bone mineral density were unexpected and indicate the need for future studies with larger samples to further explore these outcomes.

PMID: 25103214

Scoliosis

Return to life

Spine (Phila Pa 1976). 2014 Aug 15;39(18):1471-1478.

Timing and Predictors of Return to Short-term Functional Activity in Adolescent Idiopathic Scoliosis After Posterior Spinal Fusion: A Prospective Study.

Tarrant RC¹, O'Loughlin PF, Lynch S, Queally JM, Sheeran P, Moore DP, Kiely PJ.

Abstract

STUDY DESIGN.: Prospective study.

OBJECTIVE.: To assess the timing and predictors of return to short-term functional activity in patients with adolescent idiopathic scoliosis (AIS) after posterior spinal fusion (PSF).

SUMMARY OF BACKGROUND DATA.: Few studies have examined the timing and rate of return to short-term functional activity in patients with AIS after PSF. No study has yet evaluated the timing and factors that predict a delayed return to school/college—a topic relevant to patients who have had or anticipate having spinal fusion, and their treating surgeons.

METHODS.: Seventy-seven eligible subjects with AIS who underwent PSF and correction (January 2010 to April 2012) were followed up until return to the functional outcomes under analysis. Timing of return to school/college and physical activity, as per the patients' preoperative level or better, was assessed. Binary logistic regression analysis was used to determine predictors of delayed return to school/college full-time (>16 wk) and unrestricted physical activity (>32 wk) relative to sociodemographic, anthropometric, radiographical, clinical, and surgical factors. In the present study, a "delayed" return to all the functional outcomes recorded was defined as "greater than the 75th percentile" of the continuous distribution.

RESULTS.: Mean follow-up was 12.8 months (SD, 5.7). Mean age was 15.04 years (SD, 1.89). The median time to return to school/college full-time (n = 75) was 10 weeks; the majority returned by 16 weeks (77.3%). Preoperative curves greater than 70° (relative risk, 3.38; P = 0.008), postoperative weight loss greater than 5 kg (relative risk, 3.02; P = 0.012), and minor perioperative respiratory complication incidence (relative risk, 2.89; P = 0.024) independently predicted delayed return to school/college full-time. By 24 and 52 weeks, 51.4% and 88.5% of subjects, respectively, returned to unrestricted physical activity. At final follow-up, nonreturn to unrestricted physical activity was identified in only 3 subjects (4.3%) because of chronic back pain.

CONCLUSION.: The majority of patients with AIS can expect to return to school/college full-time by 16 weeks and unrestricted physical activity by 52 weeks after PSF. Preoperative curves greater than 70°, postoperative weight loss greater than 5 kg, and minor perioperative respiratory complication incidence independently predicted a delayed return to school/college full-time. These findings add to the current knowledge base regarding actual versus anticipated timing of return to short-term functional outcomes in this population. Level of Evidence: 3.

PMID: 24875955

ATHLETICS

Hip impingement in athletes

Prevalence of femoro-acetabular impingement in international competitive track and field athletes

International Orthopaedics, 08/14/2014 Evidence Based Medicine, Lahner M, et al.

Abstract

Purpose

The aim of our study was to analyse the prevalence of femoro-acetabular impingement (FAI) in national elite track and field athletes compared to peers using magnetic resonance imaging (MRI) and clinical examination including impingement tests.

Methods

A total of 44 participants (22 national elite track and field athletes and 22 non-athletes) underwent an MRI for radiological findings associated with FAI, including alpha angle, lateral centre edge angle (CEA), findings of labral and cartilage lesions. The study group was furthermore investigated by the hip outcome score (HOS) and a clinical hip examination including range of motion (ROM) and impingement tests.

Results

Concerning the cam impingement, there was a significant difference measured by mean alpha angle between the athlete group ($52.2 \pm 7.29^\circ$) and the control group ($48.1 \pm 5.45^\circ$, $P = 0.004$). Eleven athletes showed a cam impingement, while two probands of the control group had a pincer impingement and one a mixed form ($P = 0.0217$). There was no statistically significant difference concerning the CEA upon evaluating pincer impingement. Seven track and field athletes had a positive impingement test, whereof three had an increased alpha angle $>55^\circ$. No participant of the control group showed pathological results in the impingement test ($P = 0.0121$).

Conclusions

MRI evidence and clinical examination suggest that cam impingement is more common in elite athletes in comparison to non-athletes. At a professional level, the intense practice of track and field athletics is susceptible for FAI.

Aging Olympic athletes

Med Sci Sports Exerc. 2014 Mar 4

Physiological Characteristics of an Aging Olympic Athlete.

Nybo L1, Schmidt JF, Fritzdorf S, Nordsborg NB.

Abstract

PURPOSE:

To investigate the physiological basis of continued world-class performance of a world-class rower who won medals (3 gold and 2 bronze) at five consecutive Olympic Games.

METHODS:

From the age of 19 to 40 years, maximal oxygen uptake (VO₂max), peak heart rate, blood lactate and rowing ergometer performance were assessed annually.

RESULTS:

During the first years of his elite career (from age 19 to 24) VO₂ max increased from 5.5 to ~5.9 l min (78 ml min kg) and his average power during 6 min maximal rowing increased from 420 to ~460 Watts. Although his maximal heart rate declined by ~20 bpm during the 20 year period, maximal aerobic power, evaluated both as VO₂ max and 6-min test performance, was maintained until the age of 40. Furthermore, peak lactate levels remained unchanged and average power output during 10 sec, 60 sec and 60 min ergometer test were all maintained at ~800 Watts, ~700 Watts and ~350 Watts, respectively, indicating that he was able to preserve both aerobic and anaerobic exercise performances. Echo cardiographic analyses revealed a left ventricular mass of 198 g and left ventricular end-diastolic diameter of 5.8 cm.

CONCLUSION:

This longitudinal case indicates that until the age of 40 years a steady increase in the oxygen pulse may have compensated for the significant decline in the maximal heart frequency. Furthermore, the maintenance of aerobic and anaerobic exercise capacities allowed this Olympic athlete to compete at the highest level for almost two decades.

Lower body strengthening positively impacts sprinting

Sports Med. 2014 Jul 25.

Increases in Lower-Body Strength Transfer Positively to Sprint Performance: A Systematic Review with Meta-Analysis.

Seitz LB¹, Reyes A, Tran TT, de Villarreal ES, Haff GG.

Abstract

BACKGROUND:

Although lower-body strength is correlated with sprint performance, whether increases in lower-body strength transfer positively to sprint performance remain unclear.

OBJECTIVES:

This meta-analysis determined whether increases in lower-body strength (measured with the free-weight back squat exercise) transfer positively to sprint performance, and identified the effects of various subject characteristics and resistance-training variables on the magnitude of sprint improvement.

METHODS:

A computerized search was conducted in ADONIS, ERIC, SPORTDiscus, EBSCOhost, Google Scholar, MEDLINE and PubMed databases, and references of original studies and reviews were searched for further relevant studies. The analysis comprised 510 subjects and 85 effect sizes (ESs), nested with 26 experimental and 11 control groups and 15 studies.

RESULTS:

There is a transfer between increases in lower-body strength and sprint performance as indicated by a very large significant correlation ($r = -0.77$; $p = 0.0001$) between squat strength ES and sprint ES. Additionally, the magnitude of sprint improvement is affected by the level of practice ($p = 0.03$) and body mass ($r = 0.35$; $p = 0.011$) of the subject, the frequency of resistance-training sessions per week ($r = 0.50$; $p = 0.001$) and the rest interval between sets of resistance-training exercises ($r = -0.47$; $p \leq 0.001$). Conversely, the magnitude of sprint improvement is not affected by the athlete's age ($p = 0.86$) and height ($p = 0.08$), the resistance-training methods used through the training intervention, ($p = 0.06$), average load intensity [% of 1 repetition maximum (RM)] used during the resistance-training sessions ($p = 0.34$), training program duration ($p = 0.16$), number of exercises per session ($p = 0.16$), number of sets per exercise ($p = 0.06$) and number of repetitions per set ($p = 0.48$).

CONCLUSIONS:

Increases in lower-body strength transfer positively to sprint performance. The magnitude of sprint improvement is affected by numerous subject characteristics and resistance-training variables, but the large difference in number of ESs available should be taken into consideration. Overall, the reported improvement in sprint performance (sprint ES = -0.87, mean sprint improvement = 3.11 %) resulting from resistance training is of practical relevance for coaches and athletes in sport activities requiring high levels of speed.

PMID: 25059334

Ankle taping and soccer kick

The effect of ankle taping to restrict plantar flexion on ball and foot velocity during an instep kick in soccer

Journal of Sport Rehabilitation, 08/14/2014 Evidence Based Medicine

Sasadai J, et al.

Abstract

Context: Posterior ankle impingement syndrome (PAIS) is a common disorder in soccer players and ballet dancers. In soccer players, it is caused by the repetitive stress of ankle plantar flexion due to instep kicking. Protective ankle dorsal flexion taping is recommended with the belief that it prevents posterior ankle impingement. However, the relationship between the ankle taping and ball kicking performance remains unclear.

Objective: To demonstrate the relationship between the restriction of ankle taping and performance of an instep kick in soccer.

Design: Laboratory-based repeated-measures study. **Setting:** University laboratory.

Participants: Eleven male university soccer players.

Intervention: The subjects' ankle plantar flexion was limited by taping. Four angles of plantar flexion (0°, 15°, 30°, and without taping) were formed by gradation limitation. The subjects performed maximal instep kicks at each angle.

Main Outcome Measures: The movements of the kicking legs and the ball were captured using 3 high-speed cameras at 200 Hz. The direct liner transformation method was used to obtain 3D coordinates using a digitizing system. Passive ankle plantar flexion angle, maximal plantar flexion angle at ball impact, ball velocity and foot velocity were measured. The data were compared among 4 conditions using repeated measures ANOVA and the correlations between ball velocity and foot velocity, and between ball velocity and toe velocity were calculated.

Results: Ankle dorsal flexion taping could gradually limit both passive plantar flexion and plantar flexion at the impact. Furthermore, limitation of 0° and 15° reduced the ball velocity generated by instep kicks.

Conclusion: Plantar flexion limiting taping at 30° has a potential to avoid posterior ankle impingement without decreasing the ball velocity generated by soccer instep kicks.

PAIN

Pain memory and exercise

Man Ther. 2014 Jul 18. pii: S1356-689X(14)00130-1. doi: 10.1016/j.math.2014.07.004.

Exercise therapy for chronic musculoskeletal pain: Innovation by altering pain memories.

Nijs J1, Lluch Girbés E2, Lundberg M3, Malfliet A4, Sterling M5.

Abstract

Purpose: Even though nociceptive pathology has often long subsided, the brain of patients with chronic musculoskeletal pain has typically acquired a protective (movement-related) pain memory. Exercise therapy for patients with chronic musculoskeletal pain is often hampered by such pain memories.

Methods: Here the authors explain how musculoskeletal therapists can alter pain memories in patients with chronic musculoskeletal pain, by integrating pain neuroscience education with exercise interventions. The latter includes applying graded exposure in vivo principles during exercise therapy, for targeting the brain circuitries orchestrated by the amygdala (the memory of fear centre in the brain).

Findings: Before initiating exercise therapy, a preparatory phase of intensive pain neuroscience education is required. Next, exercise therapy can address movement-related pain memories by applying the 'exposure without danger' principle.

Conclusions: By addressing patients' perceptions about exercises, therapists should try to decrease the anticipated danger (threat level) of the exercises by challenging the nature of, and reasoning behind their fears, assuring the safety of the exercises, and increasing confidence in a successful accomplishment of the exercise. This way, exercise therapy accounts for the current understanding of pain neuroscience, including the mechanisms of central sensitization.

KEYWORDS:

Chronic pain; Exercise therapy; Neuroscience; Sensitization

PMID: 25090974

Elderly and pain/psychology

Curr Opin Psychiatry. 2014 Sep;27(5):380-4. doi: 10.1097/YCO.0000000000000090.

The effectiveness of psychological treatments for chronic pain in older adults: cautious optimism and an agenda for research.

McGuire BE, Nicholas MK, Asghari A, Wood BM, Main CJ.

Abstract

PURPOSE OF REVIEW:

To explore the potential role of psychological treatments for older people who are affected by chronic pain.

RECENT FINDINGS:

It is now widely recognized that chronic pain is a highly prevalent health problem among older people, and guidelines have evolved to assist with the assessment and management of chronic pain. However, despite the fact that psychological treatments have been shown to be effective for a range of other conditions such as depression and anxiety, there is a relative paucity of studies focused on pain management. Although more evidence is needed, the trend from existing studies indicates that older people find psychological treatments for chronic pain to be relevant, acceptable in content, and beneficial in reducing distress and disability. Particular challenges arise for the delivery of psychological interventions to people with pain and cognitive impairment associated with dementia. There is a growing interest in this population and a good deal of research has focused on the assessment of pain, but with a small number of exceptions, almost no research activity as yet in developing psychological treatments for people with pain and dementia.

SUMMARY:

We conclude that there is sufficient evidence that psychological interventions are efficacious for older people with chronic pain. We propose a number of areas for research focus over the next 10 years that will help to consolidate our knowledge and to explore new avenues for the psychological management of chronic pain in older people.

PMID: 25010990

Physicians and pain

Clin J Pain. 2014 Sep;30(9):766-74. doi: 10.1097/AJP.0000000000000035.

Preferences, experience, and attitudes in the management of chronic pain and depression: a comparison of physicians and medical students.

Hirsh AT1, Hollingshead NA, Bair MJ, Matthias MS, Kroenke K.

Abstract

OBJECTIVES:

The current study investigated clinicians' treatment preferences for chronic pain and depression and the extent to which these preferences were related to clinicians' experience and attitudes.

METHODS:

Eighty-five participants (50 physicians, 35 medical students) made treatment recommendations for 8 virtual patients with chronic low back pain and depression. The 10 treatment options included pharmacological and nonpharmacological approaches. Participants also provided information about their clinical experience and completed measures assessing their attitudes toward patients with pain and depression.

RESULTS:

The highest recommended treatments were over-the-counter medications and topical modalities, whereas "no intervention," referral to a pain specialist, and opioid medication received the lowest ratings. Physicians gave higher ratings to physical therapy ($P<0.05$) and lifestyle activities ($P<0.05$) than did medical students. Students reported more negative attitudes about patients with depression ($P<0.05$) than did physicians. After controlling for participants' attitudes, the treatment preference \times training level interaction was no longer significant ($P>0.05$).

DISCUSSION:

Physicians and medical students shared a general preference for "low-risk," self-management approaches for chronic pain and depression; however, they differed in their recommendations for some specific treatments. Participants' attitudes toward patients with pain and depression were associated with their preferences and accounted for the differences in their treatment decisions. These results suggest a need for early and continuing education to reduce clinicians' negative attitudes toward and improve the management of patients with chronic pain and depression.

PMID: 24064934

PT and pain long term

Man Ther. 2014 Jul 15. pii: S1356-689X(14)00131-3. doi: 10.1016/j.math.2014.06.009.

Physiotherapy triage assessment of patients referred for orthopaedic consultation - Long-term follow-up of health-related quality of life, pain-related disability and sick leave.

Samsson KS1, Larsson ME2.

Abstract

INTRODUCTION:

The literature indicates that physiotherapy triage assessment can be efficient for patients referred for orthopaedic consultation, however long-term follow up of patient reported outcome measures are not available.

AIM:

To report a long-term evaluation of patient-reported health-related quality of life, pain-related disability, and sick leave after a physiotherapy triage assessment of patients referred for orthopaedic consultation compared with standard practice.

METHODS:

Patients referred for orthopaedic consultation (n = 208) were randomised to physiotherapy triage assessment or standard practice. The randomised cohort was analysed on an intention-to-treat (ITT) basis. The patient reported outcome measures EuroQol VAS (self-reported health-state), EuroQol 5D-3L (EQ-5D) and Pain Disability Index (PDI) were assessed at baseline and after 3, 6 and 12 months. EQ VAS was analysed using a repeated measure ANOVA. PDI and EQ-5D were analysed using a marginal logistic regression model. Sick leave was analysed for the 12 months following consultation using a Mann-Whitney U-test.

RESULTS:

The patients rated a significantly better health-state at 3 after physiotherapy triage assessment [mean difference -5.7 (95% CI -11.1; -0.2); p = 0.04]. There were no other statistically significant differences in perceived health-related quality of life or pain related disability between the groups at any of the follow-ups, or sick leave.

CONCLUSION:

This study reports that the long-term follow up of the patient related outcome measures health-related quality of life, pain-related disability and sick leave after physiotherapy triage assessment did not differ from standard practice, indicating the possible benefits of implementation of this model of care.

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KEYWORDS:

EQ-5D; PDI; Primary care; Randomised controlled trial

PMID: 25088308

Prognostic factors and course for successful clinical outcome quality of life and patients' perceived effect after a cognitive behavior therapy for chronic non-specific low back pain: A 12-months prospective study.

Verkerk K1, Luijsterburg PA2, Heymans MW3, Ronchetti I4, Miedema HS5, Koes BW2, Pool-Goudzwaard A6.

Abstract

Purpose: This study investigates the clinical course of and prognostic factors for quality of life (Short Form 36 items Health survey (SF-36)) and global perceived effect (GPE) in patients treated for chronic non-specific low back pain at 5 and 12-months follow-up.

Methods: Data from a prospective cohort (n = 1760) of a rehabilitation center were used, where patients followed a 2-months cognitive behavior treatment. The outcome 'improvement in quality of life (SF-36)' was defined as a 10% increase in score on the SF-36 at follow-up compared with baseline. On the GPE scale, patients who indicated to be 'much improved' were coded as 'clinically improved'. Multivariable logistic regression analysis included 23 baseline characteristics.

Findings: At 5-months follow-up, scores on the SF-36 Mental Component Scale (SF-36; MCS) and the Physical Component Scale (SF-36; PCS) had increased from 46.6 (SD 10.3) to 50.4 (SD 9.8) and from 31.9 (SD 7.1) to 46.6 (SD 10.3), respectively. At 5-months follow-up, 53.0% of the patients reported clinical improvement (GPE) which increased to 60.3% at 12-months follow-up. The 10% improvement in quality of life (SF-36 MCS) at 5-months follow-up was associated with patient characteristics and psychological factors. At 5-months follow-up, the 10% improvement in quality of life (SF-36 PCS) and GPE was associated with patient characteristics, physical examination, work-related factors and psychological factors; for GPE, an association was also found with clinical status. At 12-months follow-up GPE was associated with patient characteristics, clinical status, physical examination and work-related factors.

Conclusions: The next phase in this prognostic research is external validation of these results.

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KEYWORDS:

Chronic non-specific low back pain; Course; Prognosis; Psychological factors

PMID: 25107827

PT's response to pain

J Multidiscip Healthc. 2014 May 29;7:231-7. doi: 10.2147/JMDH.S58656. eCollection 2014.

Australian physiotherapists and their engagement with people with chronic pain: do their emotional responses affect practice?

Barlow S, Stevens J.

Abstract

Purpose: This study explores the experiences of Australian physiotherapists who see people with chronic pain as part of their daily practice. It has been established in the literature that Australian physiotherapists do not manage people with chronic pain well; however, the reasons for this are not well understood. This study aimed to explore this phenomenon through a qualitative approach that generated data about the perceptions of physiotherapists in regard to caring for people with chronic pain.

Methods: Fourteen physiotherapists were interviewed using a semi-structured interview approach.

Findings: The results indicate that the therapists experience emotional responses to people with chronic pain, which lead to difficulties in being able to successfully provide effective care.

Conclusions: These findings also provide the beginnings of a framework that may support physiotherapists in engaging more successfully with people with chronic pain.

KEYWORDS:

clinical practice; emotional engagement; physiotherapist perceptions

PMID: 24920918

Glutamate levels and chronic pain

Acad Radiol. 2014 Sep;21(9):1211-1217. doi: 10.1016/j.acra.2014.04.009. Epub 2014 Jun 26.

Higher Glutamate + Glutamine and Reduction of N-acetylaspartate in Posterior Cingulate According to Age Range in Patients with Cognitive Impairment and/or Pain.

Fayed N1, Andrés E2, Viguera L1, Modrego PJ3, Garcia-Campayo J4.

Abstract

RATIONALE AND OBJECTIVES:

The aim of the study was to analyze 1) whether the metabolite levels in the posterior cingulate cortex (PCC) are different in healthy individuals compared to a group of patients with cognitive impairment and/or pain and 2) whether there exists a correlation between brain metabolites and the age of a patient.

MATERIALS AND METHODS:

Two hundred seven patients with cognitive impairment and/or pain (66 mild cognitive impairment, 54 fibromyalgia, 36 Alzheimer disease, 33 interictal migraine, 10 somatization disorder, and 8 after trigeminal neuralgia, and 193 healthy participants adjusted for gender and age. Proton magnetic resonance spectroscopy (MRS) of the brain was performed with the voxel placed in the ventral PCC and postprocessed with LCModel (Stephen Provencher, Oakville, Ontario, Canada).

RESULTS:

Using linear regression and adjusting for gender and age, mean brain metabolite values for the pathological group, when compared to healthy controls, were significantly lower in N-acetylaspartate ($P = .003$) and N-acetylaspartate/creatine ($P = .015$) and significantly greater in glutamate + glutamine ($P < .001$) and glutamate + glutamine/creatine ($P < .000$). All metabolites were significantly correlated with age: glutamate, glutamate + glutamine, N-acetylaspartate, and their creatine ratios exhibited a negative correlation, whereas myoinositol and choline exhibited a positive correlation.

CONCLUSIONS:

Although the number of patients is relatively small with heterogeneous state of disease, MRS in PCC may serve as a useful noninvasive tool for diagnostic of patients with cognitive impairment and pain.

KEYWORDS:

Cognitive impairment; magnetic resonance spectroscopy; pain; posterior cingulate cortex voxel

PMID: 24981958

Phantom pain

PM R. 2014 Jan 9. pii: S1934-1482(14)00018-5. doi: 10.1016/j.pmrj.2014.01.005.

Mirror Visual Feedback for Phantom Pain: International Experience on Modalities and Adverse Effects Discussed by an Expert Panel: A Delphi Study.

Hagenberg A¹, Carpenter C².

Abstract

BACKGROUND:

Mirror visual feedback (mirror therapy) is practiced worldwide in very different ways to alleviate phantom pain; no study has compared these variations yet or researched the associated risk and harm.

OBJECTIVES:

To establish use and justification of a generally accepted mirror visual feedback treatment plan after amputation; to explore the occurrence and handling of adverse effects; and to increase knowledge about contributing factors.

METHODS:

Experiential knowledge of 13 experienced practitioners from 6 countries and 5 professions was explored with a 3-round Delphi technique.

RESULTS:

Experience with the use of 5 different treatment plans was described, of which 1 has never been mentioned in the literature: an intense 1-off plan in which the illusion was carefully set up before the patient was left to the experience with no interference, resolving pain as well as adverse effects. In the 4 known treatment plans, the expectations of response time varied, which influenced the definition of responders/nonresponders; the set-ups, control, and use of material reflected the professional background of the practitioners. Contraindications also were defined according to the professional confidence to deal with the adverse effects. Adverse effects were reported, including emotional reactions, pain increase, sensory changes, freezing of the phantom limb, dizziness, and sweating. The attitude toward, and the handling of, adverse effects varied in patients as in practitioners according to their professional background. A tool to fine tune the experience was reported with covering of the limb during therapy. Full consensus was reached on several treatment modalities.

CONCLUSION:

Analysis of the results suggests that the different treatment plans suit different patients and practitioners. Matching these could enhance effectiveness and compliance. Knowledge about adverse effects needs to inform treatment decisions. These findings triggered the development of a mirror visual feedback gateway to guide patients to the treatment plan for their needs, and to collect data from the practitioners to enhance neuroscientific understanding and inform practice.

PMID: 24412264

From acute to persistent LBP

J Back Musculoskelet Rehabil. 2014 Aug 5

What is the best time point to identify patients at risk of developing persistent low back pain?

Melloh M¹, Elfering A², Käser A², Rolli Salathé C², Barz T³, Zweig T⁴, Aghayev E⁴, Röder C⁴, Theis JC⁵.

Abstract

BACKGROUND:

Early identification of patients at risk of developing persistent low back pain (LBP) is crucial.

OBJECTIVE:

Aim of this study was to identify in patients with a new episode of LBP the time point at which those at risk of developing persistent LBP can be best identified. **METHODS:** Prospective cohort study of 315 patients presenting to a health practitioner with a first episode of acute LBP. Primary outcome measure was functional limitation. Patients were assessed at baseline, three, six, twelve weeks and six months looking at factors of maladaptive cognition as potential predictors. Multivariate logistic regression analysis was performed for all time points.

RESULTS:

The best time point to predict the development of persistent LBP at six months was the twelve-week follow-up (sensitivity 78%; overall predictive value 90%). Cognitions assessed at first visit to a health practitioner were not predictive.

CONCLUSIONS:

Maladaptive cognitions at twelve weeks appear to be suitable predictors for a transition from acute to persistent LBP. Already three weeks after patients present to a health practitioner with acute LBP cognitions might influence the development of persistent LBP. Therefore, cognitive-behavioral interventions should be considered as early adjuvant LBP treatment in patients at risk of developing persistent LBP.

KEYWORDS:

Prospective cohort study; maladaptive cognitions; persistent low back pain; predictors; prognosis; risk factors

PMID: 25096312

Is number sense impaired in chronic pain patients?

Wolrich J1, Poots AJ2, Kuehler BM3, Rice AS4, Rahman A1, Bantel C5.

Abstract

BACKGROUND:

Recent advances in imaging have improved our understanding of the role of the brain in painful conditions. Discoveries of morphological changes have been made in patients with chronic pain, with little known about the functional consequences when they occur in areas associated with 'number-sense'; thus, it can be hypothesized that chronic pain impairs this sense.

METHODS:

First, an audit of the use of numbers in gold-standard pain assessment tools in patients with acute and chronic pain was undertaken. Secondly, experiments were conducted with patients with acute and chronic pain and healthy controls. Participants marked positions of numbers on lines (number marking), before naming numbers on pre-marked lines (number naming). Finally, subjects bisected lines flanked with '2' and '9'. Deviations from expected responses were determined for each experiment.

RESULTS:

Four hundred and ninety-four patients were audited; numeric scores in the 'moderate' and 'severe' pain categories were significantly higher in chronic compared with acute pain patients. In experiments (n=150), more than one-third of chronic pain patients compared with 1/10th of controls showed greater deviations from the expected in number marking and naming indicating impaired number sense. Line bisection experiments suggest prefrontal and parietal cortical dysfunction as cause of this impairment.

CONCLUSIONS:

Audit data suggest patients with chronic pain interpret numbers differently from acute pain sufferers. Support is gained by experiments indicating impaired number sense in one-third of chronic pain patients. These results cast doubts on the appropriateness of the use of visual analogue and numeric rating scales in chronic pain in clinics and research.

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KEYWORDS: acute pain; chronic pain; hemi-spatial neglect; mild cognitive impairment

Chronic widespread pain

J Rehabil Med. 2014 Aug 6. doi: 10.2340/16501977-1878.

Factors influencing observed and self-reported functional ability in women with chronic widespread pain: A cross-sectional study.

Amris K1, Wæhrens EE, Stockmarr A, Bliddal H, Danneskiold-Samsøe B.

Abstract

OBJECTIVE:

To evaluate the relationships between key outcome variables, classified according to the International Classification of Functioning, Disability and Health (ICF), and observed and self-reported functional ability in patients with chronic widespread pain.

DESIGN:

Cross-sectional with systematic data collection in a clinical setting.

SUBJECTS:

A total of 257 consecutively enrolled women with chronic widespread pain.

METHODS:

Multidimensional assessment using self-report and observation-based assessment tools identified to cover ICF categories included in the brief ICF Core Set for chronic widespread pain.

RESULTS:

Relationships between ICF variables and observed functional ability measured with the Assessment of Motor and Process Skills (AMPS) were few. Out of 36 relationships analysed, only 4 ICF variables showed a moderate correlation with the AMPS motor ability measure. A moderate to strong correlation between numerous ICF variables and self-reported functioning was noted. Multivariate regression modeling supported significant contributions from pain and psychosocial variables to the variability in self-reported functional ability, but not to the variability in AMPS ability measures.

CONCLUSION:

Observation-based assessment of functional ability in patients with chronic widespread pain is less influenced by pain and psychosocial factors than are self-reported evaluations. Valid observation-based assessment tools, such as the AMPS, should be included in clinical evaluation and future research addressing functional outcomes in this patient population.

Unlearning chronic pain

Unlearning chronic pain: A randomized controlled trial to investigate changes in intrinsic brain connectivity following Cognitive Behavioral Therapy

08/13/2014 Clinical Article, Shpaner M, et al.

Abstract

Purpose: Chronic pain is a complex physiological and psychological phenomenon. Implicit learning mechanisms contribute to the development of chronic pain and to persistent changes in the central nervous system. We hypothesized that these central abnormalities can be remedied with Cognitive Behavioral Therapy (CBT). Specifically, since regions of the anterior Default Mode Network (DMN) are centrally involved in emotional regulation via connections with limbic regions, such as the amygdala, remediation of maladaptive behavioral and cognitive patterns as a result of CBT for chronic pain would manifest itself as a change in the intrinsic functional connectivity (iFC) between these prefrontal and limbic regions.

Methods: Resting-state functional neuroimaging was performed in patients with chronic pain before and after 11-week CBT (n = 19), as well as a matched (ages 19–59, both sexes) active control group of patients who received educational materials (n = 19). Participants were randomized prior to the intervention. To investigate the differential impact of treatment on intrinsic functional connectivity (iFC), we compared pre–post differences in iFC between groups. In addition, we performed exploratory whole brain analyses of changes in fractional amplitude of low frequency fluctuations (fALFF).

Findings: The course of CBT led to significant improvements in clinical measures of pain and self-efficacy for coping with chronic pain. Significant group differences in pre–post changes in both iFC and fALFF were correlated with clinical outcomes. Compared to control patients, iFC between the anterior DMN and the amygdala/periaqueductal gray decreased following CBT, whereas iFC between the basal ganglia network and the right secondary somatosensory cortex increased following CBT. CBT patients also had increased post-therapy fALFF in the bilateral posterior cingulate and the cerebellum.

Conclusions: By delineating neuroplasticity associated with CBT-related improvements, these results add to mounting evidence that CBT is a valuable treatment option for chronic pain.

Keywords: Chronic pain; CBT; Functional MRI; Default Mode Network; Functional connectivity

Bipolar disorder and pain

Acta Psychiatr Scand. 2014 Aug 6. doi: 10.1111/acps.12325.

The prevalence of pain in bipolar disorder: a systematic review and large-scale meta-analysis.

Stubbs B1, Eggermont L, Mitchell AJ, De Hert M, Correll CU, Soundy A, Rosenbaum S, Vancampfort D.

Abstract

OBJECTIVE:

To conduct a meta-analysis investigating the prevalence of pain in people with bipolar disorder (BD).

METHOD:

A systematic review and random effects meta-analysis searching major electronic databases from inception till 01/2014 in accordance with the PRISMA statement. We included articles reporting quantitative data on the prevalence of pain in people with BD with or without a healthy control group. Two independent authors conducted searches, extracted data, and completed methodological quality assessment.

RESULTS:

Twenty two cross-sectional studies were included, representing 12 375 644 individuals (BD n = 171 352, n controls = 12 204 292). The prevalence of pain in people with BD was 28.9% (95% CI = 16.4-43.4%, BD n = 171 352). The relative risk (RR) of pain in BD compared to controls was 2.14 (95% CI = 1.67-2.75%, n = 12 342 577). The prevalence of migraine was 14.2% (95% CI = 10.6-18.3%, BD n = 127 905), and the RR was 3.30 (95% CI = 2.27-4.80%, n = 6 732 220). About 23.7% (95% CI = 13.1-36.3%, n = 106 214) of people with BD experienced chronic pain. Age, percentage of males, methodological quality, and method of BD classification did not explain the observed heterogeneity.

CONCLUSION:

People with BD experience significantly increased levels of pain (particularly chronic pain and migraine). The assessment and treatment of pain should form an integral part of the management of BD.

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KEYWORDS:

bipolar disorder; chronic pain; migraine; pain; severe mental illness

PMID: 25098864

Pain thoughts/obesity

J Clin Rheumatol. 2014 Aug;20(5):244-50. doi: 10.1097/RHU.0000000000000124.

Pain, physical functioning, and overeating in obese rheumatoid arthritis patients: do thoughts about pain and eating matter?

Somers TJ1, Wren AA, Blumenthal JA, Caldwell D, Huffman KM, Keefe FJ.

Abstract

BACKGROUND:

Obese rheumatoid arthritis (RA) patients have higher levels of pain, disability, and disease activity than do nonobese patients with RA. Patients' health-related thoughts about arthritis and weight may be important to consider in obese patients with RA who face the dual challenge of managing RA and weight.

OBJECTIVES:

The objective of this study was to examine the relationships of pain catastrophizing, self-efficacy (ie, confidence) for arthritis management and self-efficacy for weight management to important outcomes in obese patients with RA. We expected that after controlling for demographic and medical variables, higher levels of pain catastrophizing and lower levels of confidence would account for significant and unique variance in pain, physical functioning, and overeating.

METHODS:

Participants had a diagnosis of RA and a body mass index of 28 kg/m or greater and completed self-report questionnaires assessing pain, physical functioning, overeating, pain catastrophizing, self-efficacy for arthritis management, self-efficacy for weight management, and a 6-minute walk test.

RESULTS:

Pain catastrophizing, self-efficacy for arthritis, and self-efficacy for weight management were significantly and uniquely related to RA-related outcomes. Pain catastrophizing was a significant independent predictor of pain severity ($\beta = 0.38$); self-efficacy for arthritis was a significant independent predictor of self-report physical functioning ($\beta = -0.37$) and the 6-minute walk performance ($\beta = 0.44$), and self-efficacy for weight management was a significant independent predictor of overeating ($\beta = -0.58$).

CONCLUSIONS:

Pain catastrophizing, self-efficacy for arthritis, and self-efficacy for weight management each contributed uniquely to relate to key outcomes in obese patients with RA. Clinicians should consider assessment of thought processes when assessing and intervening with patients who face dual health challenges; unique intervention approaches may be needed for addressing the challenges of arthritis and weight.

PMID: 25036564

CBT and chronic LBP

J Back Musculoskelet Rehabil. 2014 Aug 5.

Randomized controlled trial on the effectiveness of cognitive behavior group therapy in chronic back pain patients.

Linden M1, Scherbe S2, Cicholas B2.

Abstract

BACKGROUND:

It is empirically well documented that psychotherapy is vital in the treatment of chronic back pain.

OBJECTIVE:

To test in this randomized controlled clinical trial whether cognitive behavior group therapy is effective in respect to pain tolerance and disability apart from the effects on somatization in general and additional to the effects of a multimodal inpatient orthopedic rehabilitation programme.

METHODS:

Fifty-three patients were randomly assigned to an intervention group, receiving six sessions of "cognitive behavior group therapy for back pain" (CBT-BP), and 50 to a control group who got unspecific occupational therapy sessions instead. Patients were suffering from chronic back pain for at least six months. All patients were treated for 21 days in an orthopedic inpatient rehabilitation unit with a multimodal orthopedic treatment, including active physical therapy, patient education or motivation to exercise.

RESULTS:

In both groups there is a significant improvement over time in the Symptom Checklist (SCL-90), the Rating of Health Locus of Control Attributions, the Fear Avoidance Beliefs Questionnaire (FABQS) and a Visual Analogue Pain Scale (VAS-pain). There are significant interactions between treatment group and VAS-pain and the FABQS, showing a superior improvement in the intervention group, while no significant superiority is found for the SCL.

CONCLUSIONS:

The experience of pain can be altered directly and not only through improvement of depression or general somatoform complaints. The study replicates other research and increases the evidence base for this mode of treatment. The treatment effect can be called specific as it is found additional to a multimodal inpatient care programme.

KEYWORDS:

Cognitive behavior therapy; fear avoidance beliefs; locus of control; low back pain; pain; rehabilitation

NUTRITION/VITAMINS

Gluten free diet and plantar fasciitis

The Foot DOI: <http://dx.doi.org/10.1016/j.foot.2014.06.004>

Complete remission of plantar fasciitis with a gluten-free diet: Relationship or just coincidence?

Marco Paoloni , Emanuela Tavernese, Francesco Ioppolo, Massimo Fini, Valter Santilli

Abstract

Purpose and Conclusions:

We report the case of a 46-year-old woman with no known history for gluten sensitivity who presented severe heel pain, and was successfully managed with a gluten-free diet. Previously she had been unsuccessfully treated with several conservative remedies. The presence of musculoskeletal problems in patients with gluten sensitivity is not rare. To the best of our knowledge, however, this is the first case report mentioning the successful management of plantar fasciitis with a gluten-free diet. The case report highlights the importance of considering gluten sensitivity among other possible differential diagnosis for musculoskeletal pain insensitive to traditional therapies.

Keywords:

Plantar fasciitis, Gluten-free diet, Heel pain, Gluten sensitivity

Vit. D and fracture

Osteoporosis International, August 2014

Vitamin D insufficiency over 5 years is associated with increased fracture risk—an observational cohort study of elderly women

D. Buchebner, F. McGuigan, P. Gerdhem, J. Malm, M. Ridderstråle, K. Åkesson

Abstract

Summary

This study of elderly Swedish women investigated the association between chronic vitamin D insufficiency and osteoporotic fractures occurring between ages 80–90. The incidence and risk of hip and major osteoporotic fractures was significantly higher in elderly women with low vitamin D levels maintained over 5 years.

Introduction

Vitamin D insufficiency among the elderly is common; however, relatively little is known about the effects of long-term hypovitaminosis D on fracture. We investigated sequential assessment of serum 25(OH)D at age 75 and 80 to determine if continuously low 25(OH)D levels are associated with increased 10-year fracture incidence.

Methods

One thousand forty-four Swedish women from the population-based OPRA cohort, all 75 years old, attended at baseline (BL); 715 attended at 5 years. S-25(OH)D was available in 987 and 640, respectively and categorized as: <50 (Low), 50–75 (Intermediate), and >75 nmol/L (High). Incident fracture data was collected with maximum follow-up to 90 years of age.

Results

Hip fracture incidence between age 80–85 was higher in women who had low 25(OH)D at both baseline and 5 years (22.2 % (Low) vs. 6.6 % (High); $p = 0.003$). Between age 80–90, hip fracture incidence was more than double that of women in the high category (27.9 vs. 12.3 %; $p = 0.006$). Within 5-years, 50 % of women in the continuously low group compared to 34 % in the continuously high 25(OH)D group had an osteoporotic fracture ($p = 0.004$) while 10-year incidence was higher compared to the intermediate ($p = 0.020$) but not the high category ($p = 0.053$). The 10-year relative risk of hip fracture was almost three times higher and osteoporotic fracture risk almost doubled for women in the lowest 25(OH)D category compared to the high category (HR 2.7 and 1.7; $p = 0.003$ and 0.023, respectively).

Conclusion

In these elderly women, 25(OH)D insufficiency over 5-years was associated with increased 10-year risk of hip and major osteoporotic fractures.

Glucosamine and exercise of OA pain

J Back Musculoskelet Rehabil. 2014 Aug 5.

Comparison of the symptomatic and chondroprotective effects of glucosamine sulphate and exercise treatments in patients with knee osteoarthritis.

Armagan O¹, Yilmazer S², Calisir C³, Ozgen M¹, Tascioglu F¹, Oner S⁴, Akcar N³.

Abstract

OBJECTIVES:

The aim of the present study was to evaluate the symptomatic effects of glucosamine sulphate (GS) in comparison to the exercise therapy, as well effects on Magnetic Resonance Imaging (MRI) findings of cartilage loss in patients with knee osteoarthritis (OA).

MATERIALS AND METHODS:

Seventy patients with a diagnosis of knee OA were randomly divided into two groups. First group of patients (n=40) were treated with 1500 mg/day oral glucosamine sulphate and the second group (n=30) performed a home exercise program for a period of 6 months.

RESULTS:

Compared with baseline, significant improvements were observed in the visual analogue scale pain scores and the Western Ontario and McMaster Universities osteoarthritis index and 20-min walking time in both groups ($p < 0.001$); there were no significant differences between the two treatment groups. Upon the evaluation of joint cartilage thickness by MRI, an improvement was evident in only in the area of medial femoral condyle of patients who had performed a home exercise program ($p < 0.05$).

CONCLUSION:

The results of the present study suggest that both oral GS treatment and exercise therapy are efficient in the symptomatic treatment of patients with knee OA. However, exercise therapy found to have a better chondroprotective effect than oral GS treatment in this patient population.

KEYWORDS:

Oral glucosamine sulphate; exercise; knee osteoarthritis

PMID: 25096309

Breast feeding and bone health

Bone. 2014 Aug 10. pii: S8756-3282(14)00301-9. doi: 10.1016/j.bone.2014.08.001.

Duration Of Breastfeeding As A Risk Factor For Vertebral Fractures.

Bolzetta F¹, Veronese N², De Rui M², Berton L², Carraro S², Pizzato S², Girotti G², De Ronch I², Manzato E², Coin A², Sergi G².

Abstract

PURPOSE:

Among the risk factors for osteoporosis and fractures, gynecological history (fertile period, parity and breastfeeding) play an important part. Changes in calcium metabolism to enable an adequate mineral transfer to the milk have a prominent role in bone loss during breastfeeding. Data on the influence of breastfeeding in postmenopausal osteoporosis are inconsistent. The aim of the present study was to identify any association between duration of breastfeeding and vertebral fractures in postmenopausal women.

METHODS:

All patients underwent the following tests: bone mineral density measurements of the lumbar spine (L1-L4) and the total and femoral neck using dual-energy X-ray absorptiometry. Antero-posterior and lateral radiography of the thoracic and lumbar spine to identify vertebral fractures.

RESULTS:

The study involved 752 women with a mean age of 64.5±9.3; 23% of them reported vertebral osteoporotic fractures. The women with vertebral fractures had breastfed for longer periods (11.8±12.9 vs. 9.3±11.2 months, p=0.03) and had more pregnancies (2.6±2.2 vs. 2.2±1.3, p=0.002). Breastfeeding for more than 18 months was associated with a two-fold risk of developing vertebral fractures (OR 2.12, 95% CI 1.14-5.38, p=0.04), particularly in those without current or past use of drugs positively affecting bone.

CONCLUSIONS:

Our study showed an association between long periods of breastfeeding and vertebral fractures, supporting a role for lengthy lactation as a risk factor for osteoporotic fractures after menopause. Bearing in mind all the benefits of breastfeeding, this finding suggests the importance of an adequate calcium and vitamin D intake during pregnancy and breastfeeding, with the aid of dietary supplements if necessary.

KEYWORDS: breastfeeding; lactation; osteoporosis; postmenopausal; vertebral fractures

PMID: 25120256

Glucosamine and OA pain

Clin Rheumatol. 2014 Aug 3.

Combined glucosamine and chondroitin sulfate, once or three times daily, provides clinically relevant analgesia in knee osteoarthritis.

Provenza JR1, Shinjo SK, Silva JM, Peron CR, Rocha FA.

Abstract

Purpose: We compared the analgesic efficacy and safety of glucosamine sulfate (GS) and chondroitin sulfate (CS) capsules or sachet preparations with glucosamine hydrochloride (GH) and CS capsules in knee osteoarthritis (OA) patients.

Methods: 1,120 subjects with radiographic knee OA (Kellgren/Lawrence 2-3) were randomized (1:1:1) at 16 centers to receive GS 500 mg/CS 400 mg three times daily capsules (GI) or once daily sachet (GII) or GH 500 mg/CS 400 mg three times daily (GIII) for a 16-week trial. Primary outcome, intention-to-treat (ITT) was change from baseline of patient reported pain intensity (0-100 mm visual analogue scale) in the affected knee and variation of Lequesne's index (LI). Monthly secondary outcomes were changes from baseline in patient reported pain and LI, patient and physician global assessments of disease activity, acetaminophen consumption, and adherence. ITT population comprised 302, 301, and 306 patients in GI, GII, and GIII.

Findings: Pain significantly decreased (GI = -30.9 ± 1.5 ; GII = -28.7 ± 1.5 ; GIII = -29.7 ± 1.5 mm) in all groups ($P < 0.001$) as well as LI (GI = -3.8 ± 0.2 ; GII = -3.7 ± 0.2 ; GIII = -3.9 ± 0.2 ; $P < 0.001$). All secondary outcomes improved ($P < 0.005$) for all groups. Patients that did not complete the study were 77 (44.8 %) for lack of adherence, 16 (9.3 %) consent withdrawal, 11 (6.4 %) adverse events, eight (4.7 %) lost to follow-up, and 17 (9.9 %) for other causes. Non-inferiority analysis found no differences among groups.

Conclusions: This is a large study showing that GS/CS and GH/CS provide clinically meaningful and sustained analgesia in knee OA regardless of dose fractionation and capsule or sachet formulations.

PMID: 25085275

ELECTROTHERAPY/ULTRASOUND

Use on whiplash pain

Ultrasound Med Biol. 2014 Sep;40(9):2089-95. doi: 10.1016/j.ultrasmedbio.2014.04.016. Epub 2014 Jul 9.

Efficacy of therapeutic ultrasound in pain and joint mobility in whiplash traumatic acute and subacute phases.

Ruiz-Molinero C1, Jimenez-Rejano JJ2, Chillon-Martinez R2, Suarez-Serrano C2, Rebollo-Roldan J2, Perez-Cabezas V3.

Abstract

Purpose: To determine if ultrasound (US) is effective in reducing pain and mobility limitation in the treatment of traumatic cervical sprain, we performed an experimental study.

Methods: The sample comprised 54 diagnosed subjects with a mean age of 36.54 y (standard deviation = 12.245), assigned by simple random selection to an experimental group with ultrasound treatment and a control group with placebo ultrasound. Treatment consisted of 10 sessions of an ultrasound treatment protocol, followed by 15 sessions of a protocol identical for both groups without ultrasound. The variables assessed were pain and joint mobility.

Findings: There was no significant difference ($p > 0.05$) between groups in the first 10 sessions of treatment. However, there was a statistically significant difference ($p < 0.05$) between groups on the pain variable, 20 days after completion of the US.

Conclusions: High-active ultrasound treatment is more effective than placebo in reducing pain.

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KEYWORDS:

Mobility limitation; Pain; Ultrasonic therapy; Whiplash injuries

PMID: 25023094

NEUROLOGICAL CONDITIONS

Stroke and shoulder

PM R. 2014 Mar 2. pii: S1934-1482(14)00101-4. doi: 10.1016/j.pmrj.2014.02.015.

Poststroke Shoulder Pain and Its Association With Upper Extremity Sensorimotor Function, Daily Hand Activities, Perceived Participation, and Life Satisfaction.

Lindgren I1, Brogårdh C2.

Abstract

OBJECTIVE:

To assess the differences in upper extremity sensorimotor function, daily hand activities, and perceived participation and life satisfaction between individuals with and without poststroke shoulder pain (PSSP), and to determine how PSSP is associated with these variables.

DESIGN:

A cross-sectional study of a convenience sample.

PARTICIPANTS:

Forty-nine community-dwelling individuals (mean \pm standard deviation [SD] age, 64 ± 9 years), 24 with PSSP and 25 without (non-PSSP) were assessed, in mean \pm SD 15 ± 8 months after stroke.

METHODS:

Upper extremity sensorimotor function was assessed, and daily hand activities, perceived participation, and life satisfaction were reported. Demographics were described, and shoulder pain characteristics were recorded in the PSSP group. Between-group differences and regression analyses were conducted.

RESULTS:

The PSSP group had significantly decreased passive shoulder abduction ($P = .001$) and upper extremity motor function ($P = .03$) in comparison with the non-PSSP group, but there were no significant differences between the groups in daily hand activities, perceived participation, or life satisfaction. In the multivariate analyses, PSSP (odds ratio [OR] 4.42 [95% confidence interval (CI), 1.21-16.24]; $P = .03$) and proprioception (OR 10.28 [95% CI, 1.1-96.01]; $P = .04$) were associated with upper extremity motor function, whereas perceived participation was associated with life satisfaction (OR 1.08 [95% CI, 1.03-1.13]; $P = .002$). Passive shoulder abduction, resistance to passive movements, and proprioception explained 45% of variance of daily hand activities, whereas daily hand activities, vocational situation, and gender explained 40% of variance of perceived participation.

CONCLUSIONS:

This cross-sectional study indicated that there is an association between PSSP and upper extremity motor function, whereas the association between PSSP, daily hand activities, perceived participation, and life satisfaction is less clear. PSSP is commonly described as a severely disabling condition, but our results imply that, in individuals with mild-to-moderate upper extremity paresis, it may not have a great impact on their life situation.

PMID: 24594306