

ABSTRACTS

LUMBAR SPINE

PELVIC GIRDLE

VISCERA

THORACIC SPINE

CERVICAL SPINE

CRANIUM/TMJ

HEADACHES

CONCUSSIONS

SHOULDER GIRDLE

GLENOHUMERAL/SHOULDER

ELBOW

WRIST AND HAND

HIP

KNEE

FOOT AND ANKLE

MANUAL THERAPY

STM/STRETCHING/MUSCLES

BET

ATHLETICS

RUNNING GAIT

PAIN

COMPLEX REGIONAL PAIN

FIBROMYALGIA

NUTRITION/VITAMINS/MEDICATION/TOPICALS

NEUROLOGICAL CONDITIONS

LBP

Gray matter changes in CLBP

Clin J Pain. 2014 Oct;30.

Phenotype matters: the absence of a positive association between cortical thinning and chronic low back pain when controlling for salient clinical variables.

Dolman AJ¹, Loggia ML, Edwards RR, Gollub RL, Kong J, Napadow V, Wasan AD.

Abstract

AIMS/OBJECTIVES/BACKGROUND:

Studies have associated chronic low back pain (cLBP) with grey matter thinning. But these studies have not controlled for important clinical variables (such as a comorbid affective disorder, pain medication, age, or pain phenotype), which may reduce or eliminate these associations.

METHODS:

We conducted cortical thickness and voxel-based morphometry (VBM) analyses in 14 cLBP patients with a discogenic component to their pain, not taking opioids or benzodiazepines, and not depressed or anxious. They were age and gender matched to 14 pain-free controls (PFCs). An ROI-driven analysis (regions of interest) was conducted, using 18 clusters from a previous arterial spin labeling study demonstrating greater regional cerebral blood flow (rCBF) in these cLBP subjects than the PFCs. Cortical thickness and VBM-based gray matter volume measurements were obtained from a structural MRI scan and group contrasts were calculated.

RESULTS:

Multivariate analysis of variance showed a trend toward cortical thickening in the right paracentral lobule in cLBP subjects ($F_{1,17}=3.667$, $P<0.067$), and significant thickening in the right rostral middle frontal gyrus ($F_{1,17}=6.880$, $P<0.014$). These clusters were non-significant after including age as a covariate ($P<0.891$; $P<0.279$). A whole-brain cortical thickness and VBM analysis also did not identify significant clusters of thinning or thickening. Exploratory analyses identified group differences for correlations between age and cortical thickness of the right rostral middle frontal gyrus (cLBP: $R=-0.03$, $P=0.9$; PFCs: $R=-0.81$, $P<0.001$), that is, PFCs demonstrated age-related thinning while cLBP patients did not.

CONCLUSIONS:

Our pilot results suggest that controlling for affect, age, and concurrent medications may reduce or eliminate some of the previously reported structural brain alterations in cLBP.

PMID: 24135900

Oral analgesia and ROM

BMC Musculoskelet Disord. 2014 Sep 16

An experimental study investigating the effect of pain relief from oral analgesia on lumbar range of motion, velocity, acceleration and movement irregularity.

Williams JM, Haq I, Lee RY.

Abstract

BACKGROUND:

Movement alterations are often reported in individuals with back pain. However the mechanisms behind these movement alterations are not well understood. A commonly cited mechanism is pain. The aim of this study was to investigate the effect of pain reduction, from oral analgesia, on lumbar kinematics in individuals with acute and chronic low back pain.

METHODS:

A prospective, cross-sectional, experimental repeated-measures design was used. Twenty acute and 20 chronic individuals with low back pain were recruited from General Practitioner and self-referrals to therapy departments for low back pain. Participants complained of movement evoked low back pain. Inertial sensors were attached to the sacrum and lumbar spine and used to measure kinematics. Kinematic variables measured were range of motion, angular velocity and angular acceleration as well as a determining movement irregularity (a measure of deviation from smooth motion). Kinematics were investigated before and after administration of oral analgesia to instigate pain reduction.

RESULTS:

Pain was significantly reduced following oral analgesia. There were no significant effects on the kinematic variables before and after pain reduction from oral analgesia. There was no interaction between the variables group (acute and chronic) and time (pre and post pain reduction).

CONCLUSION:

The results demonstrate that pain reduction did not alter lumbar range of motion, angular velocity, angular acceleration or movement irregularity questioning the role of pain in lumbar kinematics.

PMID: 25228332

Sahrman system

Spine J. 2014 Mar 22.

Outcomes are not different for patient-matched versus nonmatched treatment in subjects with chronic recurrent low back pain: a randomized clinical trial.

Henry SM¹, Van Dillen LR², Ouellette-Morton RH³, Hitt JR³, Lomond KV³, DeSarno MJ⁴, Bunn JY⁴.

Abstract

BACKGROUND CONTEXT: Classification schemas for low back pain (LBP), such as the Treatment-Based Classification and the Movement System Impairment, use common clinical features to subgroup patients with LBP and are purported to improve treatment outcomes.

PURPOSE: To assess if providing matched treatments based on patient-specific clinical features led to superior treatment outcomes compared with an unmatched treatment for subjects with chronic recurrent LBP.

STUDY DESIGN: This study is a randomized controlled trial.

PATIENT SAMPLE: Subjects (n=124) with LBP (≥ 12 months) with or without recurrences underwent a standardized clinical examination to group them into one of two strata: ineligible or eligible for stabilization exercises based on the Treatment-Based Classification schema. Subjects underwent additional clinical tests to assign them to one of the five possible Movement System Impairment categories.

OUTCOME MEASURES: Questionnaires were collected electronically at Week 0 (before treatment), Week 7 (after the 6-week 1-hour treatment sessions), and 12 months. Using the Oswestry disability index (0-100) and the Numeric Pain Rating Scale (0-10), the primary analysis was performed using the intention-to-treat principle. Secondary outcomes included fear-avoidance beliefs and psychosocial work-related and general health status.

METHODS: After subjects were categorized based on their particular clinical features using both the Treatment-Based Classification and Movement System Impairment schemas, they were randomized into one of two treatments using a 3:1 ratio for matched or unmatched treatments. The treatments were trunk stabilization exercise or Movement System Impairment-directed exercises.

RESULTS: Of the patients allocated to treatment for this study, 76 received a matched treatment and 25 received an unmatched treatment. After treatment, both groups showed a statistically significant improvement in the primary outcome measures and almost all the secondary measures; however, the matched treatment group did not demonstrate superior outcomes at Week 7 or 12 months, except on one of the secondary measures (Graded Chronic Pain Scale [Disability Scale]) ($p=.01$).

CONCLUSIONS: Providing a matched treatment based on either the Treatment-Based Classification or the Movement System Impairment classification schema did not improve treatment outcomes compared with an unmatched treatment for patients with chronic LBP, except on one secondary disability measure.

PMID: 24662210

Neuroscience education

Spine: 15 August 2014 - Volume 39 - Issue 18 - p 1449–1457

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

Louw, Adriaan PhD, PT^{*,†}; Diener, Ina PhD, PT[†]; Landers, Merrill R. DPT, PhD, PT[‡];
Puentedura, Emilio J. DPT, PhD, PT^{*,‡}

**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.

Impact of whole body vibrations

Int Arch Occup Environ Health. 2014 Aug 21.

Whole-body vibration and the risk of low back pain and sciatica: a systematic review and meta-analysis.

Burström L¹, Nilsson T, Wahlström J.

Abstract

PURPOSE:

The aim of this systematic literature review was to evaluate the association between whole-body vibration (WBV) and low back pain (LBP) and sciatica with special attention given to exposure estimates. Moreover, the aim was to estimate the magnitude of such an association using meta-analysis and to compare our findings with previous reviews.

METHODS:

The authors systematically searched the PubMed (National Library of Medicine, Bethesda), Nioshtic2 (National Institute for Occupational Safety and Health (NIOSH, Morgantown), and ScienceDirect (Elsevier, Amsterdam) databases for records up to December 31, 2013. Two of the authors independently assessed studies to determine their eligibility, validity, and possible risk of bias.

RESULTS:

The literature search gave a total of 306 references out of which 28 studies were reviewed and 20 were included in the meta-analysis. Exposure to WBV was associated with increased prevalence of LBP and sciatica [pooled odds ratio (OR) = 2.17, 95 % confidence interval (CI) 1.61-2.91 and OR 1.92, 95 % CI 1.38-2.67, respectively]. Workers exposed to high vibration levels had a pooled risk estimate of 1.5 for both outcomes when compared with workers exposed to low levels of vibration. The results also indicate that some publication bias could have occurred especially for sciatica.

CONCLUSIONS:

This review shows that there is scientific evidence that exposure to WBV increases the risk of LBP and sciatica.

PMID: 25142739

History taking accuracy

Diagnostic accuracy of self-report and subjective history in the diagnosis of low back pain with non-specific lower extremity symptoms: A systematic review

Manual Therapy , 09/15/2014 Evidence Based Medicine Review Article
Shultz S, et al. –

Abstract

Purpose: Subjective history questions/self-report items are commonly used to triage the patient with low back pain and related leg symptoms. However the value of the history taking process for decision-making to identify common classifications/diagnosis for patients presenting with low back related leg pain (LBRLP) have not been considered. The purpose of this study was to investigate the diagnostic accuracy of self-report items/history-taking questions used to identify patients with LBRLP.

Methods: Eligible studies included: 1)subjects with low back pain AND related lower extremity pain, 2)details of subjective examination/self-report items, 3)cohort, prospective/longitudinal studies, and randomized control trials, 4)use of statistical reporting, 5)an acceptable reference standard. Quality was evaluated using the *Quality Assessment of Diagnostic Accuracy Studies* 2. A synthesis of history items that met the threshold for at least a small shift in the likelihood of the condition with a $+LR \geq 2$ or $-LR \leq 0.5$ were reported.

Results: Conditions commonly reported in the literature: lumbar spinal stenosis, lumbosacral nerve root compression/radiculopathy, disc herniation and neurophysiological low back pain \pm leg pain. Eleven studies met the inclusion criteria.

Conclusions: This is the first systematic review of diagnostic accuracy studies that examined only the history-taking items for their ability to identify LBRLP conditions. Clustering key items may provide a more precise clinical picture necessary to detect and treat a patient's presentation. History questions formed within the interview and their contributing value for decision-making remain understudied. There is a need for better designs to determine a more accurate diagnostic power to identify conditions with LBRLP

Discs

Height

Eur Spine J. 2014 Sep 12.

Intervertebral disc height loss demonstrates the threshold of major pathological changes during degeneration.

Jarman JP¹, Arpinar VE, Baruah D, Klein AP, Maiman DJ, Tugan Muftuler L.

Abstract

PURPOSE:

Quantitative MRI techniques were utilized to study intervertebral disc degeneration. Main focus was to develop a novel approach to quantify disc height loss associated with disc degeneration. Currently there is no universally accepted metric of degeneration based on measurement of disc height. Such quantitative imaging methods would complement qualitative visual assessment methods currently used and offer a valuable diagnostic tool.

METHODS:

51 adult participants took part in this MRI study. T2 weighted images were used to obtain disc height index (DHI) and also a semi-quantitative metric based on relative voxel intensities. For DHI, each disc was given a score based on standard deviations from the mean DHI of healthy discs. Diffusion Weighted MRI was used to assess morphological changes in the nucleus pulposus. Conventional Pfirrmann classification was used as the gold standard to assess these quantitative approaches.

RESULTS:

At deviations of up to 1.5σ below normative disc height, levels of apparent diffusion coefficient (ADC) and normalized T2 intensity were maintained. Once disc compression reached 1.5σ , there was a massive drop in ADC and normalized T2 intensity. Pfirrmann degeneration scores also increased after the 1.5σ mark.

CONCLUSIONS:

This study provides new, unbiased quantitative imaging tools to assess disc degeneration. We observed that these quantitative MRI measures indicate a threshold beyond which major pathological changes take place concurrently. Combined information from DHI, ADC and T2 images construct a set of novel biomarkers that could be used to identify degenerating discs that are approaching the threshold and possibly intervene before major pathologic changes occur.

PMID: 25212450

INJECTIONS

Facet injections

Eur Spine J. 2014 Sep 12.

The impact of sagittal balance on low back pain in patients treated with zygoapophysial facet joint injection.

Proietti L¹, Schirò GR, Sessa S, Scaramuzzo L.

Abstract

INTRODUCTION:

Aim of the study was to evaluate the effectiveness of facet joints injections in lumbar facet syndrome correlating clinical results to the sagittal contour of the spine.

METHODS:

Facet joints degree degeneration was evaluated using MRI according to Fujiwara classification. Sagittal contour of the spine was evaluated according to Roussouly classification. The clinical results were evaluated with visual analog scale (VAS) at regular intervals.

RESULTS:

Twenty-eight (70 %) of the 40 patients had clinical symptoms improvement, 12 (30 %) showed no benefit. There was a statistical significant correlation between postoperative VAS value improvement and Roussouly spine type 1 and 3 ($p = 0.003$). The benefit was more durable in patients with grade 2 or 3 degeneration.

CONCLUSIONS:

Facet joints injections have a more effective diagnostic than therapeutic value. The procedure could, however, give a temporary pain relief in cases with an overload of the facet joints due to lumbar hyperlordosis.

PMID: 25212449

SURGERY/LBP

Fusion vs. conservative care

J Spinal Disord Tech. 2014 Jul.

Lumbar fusion versus nonoperative management for treatment of discogenic low back pain: a systematic review and meta-analysis of randomized controlled trials.

Bydon M¹, De la Garza-Ramos R, Macki M, Baker A, Gokaslan AK, Bydon A.

Abstract

STUDY DESIGN:

Systematic review and meta-analysis of randomized controlled trials (RCTs).

OBJECTIVE:

To evaluate the current evidence comparing lumbar fusion to nonoperative management for the treatment of chronic discogenic low back pain.

BACKGROUND AND CONTEXT:

Discogenic low back pain is a common and sometimes disabling condition. When the condition becomes chronic and intractable, spinal fusion may play a role.

METHODS:

A systematic review of the literature was conducted using the PubMed and CENTRAL databases. We included RCTs that compared lumbar fusion to nonoperative management for the treatment of adult patients with chronic discogenic low back pain. A meta-analysis was conducted to assess the improvement in back pain based on the Oswestry Disability Index (ODI).

RESULTS:

Five RCTs met our inclusion criteria. A total of 707 patients were divided into lumbar fusion (n=523) and conservative management (n=134). Although inclusion/exclusion criteria were relatively similar across studies, surgical techniques and conservative management protocols varied. The pooled mean difference in ODI (final ODI-initial ODI) between the nonoperative and lumbar fusion groups across all studies was -7.39 points (95% confidence interval: -20.26, 5.47) in favor of lumbar fusion, but this difference was not statistically significant (P=0.26).

CONCLUSIONS:

Despite the significant improvement in ODI in the lumbar fusion groups in 3 studies, pooled data revealed no significant difference when compared with the nonoperative group. Although there was an overall improvement of 7.39 points in the ODI in favor of lumbar fusion, it is unclear that this change in ODI would lead to a clinically significant difference. Prospective randomized trials comparing a specific surgical technique versus a structured physical therapy program may improve evidence quality. Until then, either operative intervention by lumbar fusion or nonoperative management and physical therapy remain 2 acceptable treatment methods for intractable low back pain.

PMID: 24346052

Progressive exercise program

Clin Rehabil. 2014 Sep;28

Intensive, progressive exercise improves quality of life following lumbar microdiscectomy: a randomized controlled trial.

Beneck GJ¹, Popovich JM Jr², Selkowitz DM³, Azen S⁴, Kulig K⁵; Physical Therapy Clinical Research Network (PTClinResNet).

Abstract

OBJECTIVE:

The purpose of the study was to examine changes in quality of life measures in patients who have undergone an intensive exercise program following a single level microdiscectomy.

DESIGN:

Randomized controlled trial with blinded examiners.

SETTING:

The study was conducted in outpatient physical therapy clinics.

SUBJECTS:

Ninety-eight participants (53 male, 45 female) who had undergone a single-level lumbar microdiscectomy allocated to receive exercise and education or education only.

INTERVENTIONS:

A 12-week periodized exercise program of lumbar extensor strength and endurance training, and mat and upright therapeutic exercises was administered.

OUTCOME MEASURES:

Quality of life was tested with the Short Form 36 (SF-36). Measurements were taken 4-6 weeks postsurgery and following completion of the 12-week intervention program. Since some participants selected physical therapy apart from the study, analyses were performed for both an as-randomized (two-group) design and an as-treated (three-group) design.

RESULTS:

In the two-group analyses, exercise and education resulted in a greater increase in SF-36 scales, role physical (17.8 vs. 12.1) and bodily pain (13.4 vs. 8.4), and the physical component summary (13.2 vs. 8.9). In the three-group analyses, post-hoc comparisons showed exercise and education resulted in a greater increase in the SF-36 scales, physical function (10.4 vs. 5.6) and bodily pain (13.7 vs. 8.2), and the physical component summary (13.7 vs. 8.9) when compared with usual physical therapy.

CONCLUSIONS:

An intensive, progressive exercise program combined with education increases quality of life in patients who have recently undergone lumbar microdiscectomy.

KEYWORDS:

SF-36; intensive exercise; lumbar microdiscectomy

PMID: 24572139

VISCERA

Menstrual pain

Cancer Causes Control. 2014 Sep 5.

Menstrual pain and epithelial ovarian cancer risk.

Babic A¹, Cramer DW, Titus LJ, Tworoger SS, Terry KL.

Abstract

PURPOSE:

Menstrual pain is associated with increased production of inflammatory molecules, such as prostaglandins. Inflammation is involved in pathogenesis of several cancers, including ovarian cancer. In this study, we examined the association between menstrual pain and risk of ovarian cancer.

METHODS:

We conducted a case-control study with 2,028 cases of epithelial ovarian cancer and 2,091 age- and study center-matched controls. Women were asked to report the severity of menstrual pain during their twenties and thirties, when not using oral contraceptives or breastfeeding. We used an unconditional logistic regression to evaluate the association between menstrual pain and epithelial ovarian cancer risk overall, and polytomous logistic regression to evaluate whether the association differed across tumor subtypes.

RESULTS:

Risk of ovarian cancer was increased in women with moderate (OR 1.22, 95 % CI 1.05-1.42) and severe pain (OR 1.34, 95 % CI 1.09-1.65) compared to women with no or mild pain during menstrual period. The association differed by histologic subtypes, with significant associations for severe pain with endometrioid (OR 1.64, 95 % CI 1.15-2.34) and clear cell tumors (OR 1.91, 95 % CI 1.11-3.28).

CONCLUSIONS:

Our data suggest that moderate and severe pain during menstrual period are associated with increased risk of epithelial ovarian cancer. Due to high prevalence of menstrual pain in women of reproductive age, this observation warrants further studies.

PMID: 25189423

WHIPLASH

Exercise and chronic whiplash

Clin J Pain. 2014 Sep 5.

The Effect of Neck-specific Exercise with, or without a Behavioral Approach, on Pain, Disability and Self-efficacy in Chronic Whiplash-associated Disorders: A Randomized Clinical Trial.

Ludvigsson ML¹, Peterson G, O'Leary S, Dederig A, Peolsson A.

Abstract

OBJECTIVES::

The aim of this study was to compare the effect on self-rated pain, disability and self-efficacy of three interventions for the management of chronic Whiplash Associated Disorders (WAD): physiotherapist-led neck-specific exercise, physiotherapist-led neck-specific exercise with the addition of a behavioral approach, or prescription of physical activity.

METHODS::

Two hundred and sixteen volunteers with chronic WAD participated in this randomized, assessor blinded, clinical trial of three exercise interventions. Self-rated pain/pain bothersomeness (Visual Analogue Scale), disability (Neck Disability Index) and self-efficacy (Self-Efficacy Scale) were evaluated at baseline and at three and six months.

RESULTS::

The proportion of patients reaching substantial reduction in pain bothersomeness (at least 50% reduction) was more evident ($P<0.01$) in the two neck-specific exercise groups (29-48%) compared to the prescription of physical activity group (5%) at three months. At six months 39-44% of the patients in the two neck-specific groups and 28% in the prescription of physical activity group reported substantial pain reduction. Reduction of disability was also larger in the two neck-specific exercise groups at both three and six months ($P<0.02$). Self-efficacy was only improved in the neck-specific exercise group without a behavioral approach ($P=0.02$). However there were no significant differences in any outcomes between the two physiotherapist-led neck-specific exercise groups.

DISCUSSION::

Neck-specific exercise resulted in superior outcomes compared to prescription of physical activity in this study, but the observed benefits of adding a behavioral approach to the implementation of exercise in this study were inconclusive. This is an open-access article distributed under the terms of the Creative Commons Attribution-NonCommercial-NoDerivatives 3.0 License, where it is permissible to download and share the work provided it is properly cited. The work cannot be changed in any way or used commercially.
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PMID: 24918474

HEADACHES

Sleep apnea

Headache. 2014 Sep 18.

Association Between Tension-Type Headache and Migraine With Sleep Bruxism: A Systematic Review.

De Luca Canto G¹, Singh V, Bigal ME, Major PW, Flores-Mir C.

Abstract

AIM:

To evaluate the association between tension-type headache and migraine with sleep bruxism (SB).

BACKGROUND:

The association between SB and headaches has been discussed in both children and adults. Although several studies suggested a possible association, no systematic analysis of the available published studies exists to evaluate the quantity, quality, and risk of bias among those studies.

METHODS:

A systematic review was undertaken, including articles that classified the headaches according to the International Classification of Headache Disorders and SB according to the criteria of the American Association of Sleep Medicine. Only articles in which the objective was to investigate the association between primary headaches (tension-type and migraine) and SB were selected. Detailed individual search strategies for The Cochrane Library, MEDLINE, EMBASE, PubMed, and LILACS were developed. The reference lists from selected articles were also checked. A partial grey literature search was taken by using Google Scholar. The methodology of selected studies was evaluated using the quality in prognosis studies tool.

RESULTS:

Of 449 identified citations, only 2 studies, both studying adults, fulfilled the inclusion criteria. The presence of SB significantly increased the odds (study 1: odds ratio [OR] 3.12 [1.25-7.7] and study 2: OR 3.8; 1.83-7.84) for headaches, although studies reported different headache type.

CONCLUSION:

There is not enough scientific evidence to either support or refute the association between tension-type headache and migraine with SB in children. Adults with SB appear to be more likely to have headache.

KEYWORDS:

headache; migraine; review; sleep bruxism; tension-type headache

PMID: 25231339

GLENOHUMERAL/SHOULDER

Shoulder kinematics part 1

RESEARCH REPORT

Comparison of 3-Dimensional Shoulder Complex Kinematics in Individuals With and Without Shoulder Pain, Part 1: Sternoclavicular, Acromioclavicular, and Scapulothoracic Joints

Authors: [Rebekah L. Lawrence, PT, DPT, OCS¹](#), [Jonathan P. Braman, MD²](#), [Robert F. Laprade, MD, PhD³](#), [Paula M. Ludewig, PT, PhD^{1,4}](#)

Study Design: Cross-sectional.

Objectives: To compare sternoclavicular, acromioclavicular, and scapulothoracic joint motion between symptomatic and asymptomatic individuals during shoulder motion performed in 3 planes of humerothoracic elevation.

Background: Differences in scapulothoracic kinematics are associated with shoulder pain. Several studies have measured these differences using surface sensors, but the results of this technique may be affected by skin-motion artifact. Furthermore, previous studies have not included the simultaneous measurement of sternoclavicular and acromioclavicular joint motion.

Methods: Transcortical bone pins were inserted into the clavicle, scapula, and humerus of 12 asymptomatic and 10 symptomatic individuals for direct, bone-fixed tracking using electromagnetic sensors. Angular positions for the sternoclavicular, acromioclavicular, and scapulothoracic joints were measured during shoulder flexion, abduction, and scapular plane abduction.

Results: Differences between groups were found for sternoclavicular and scapulothoracic joint positions. Symptomatic individuals consistently demonstrated less sternoclavicular posterior rotation, regardless of angle, phase, or plane of shoulder motion. Symptomatic individuals also demonstrated less scapulothoracic upward rotation at 30° and 60° of humerothoracic elevation during shoulder abduction and scapular plane abduction.

Conclusion: The results of this study show that differences in shoulder complex kinematics exist between symptomatic and asymptomatic individuals. However, the magnitude of these differences was small, and the resulting clinical implications are not yet fully understood. The biomechanical coupling of the sternoclavicular and acromioclavicular joints requires further research to better understand scapulothoracic movement deviations and to improve manual therapy and exercise-based physical therapy interventions

Keyword: [biomechanics](#), [clavicle](#), [impingement syndrome](#), [scapula](#),

Shoulder kinematics part 2

RESEARCH REPORT

Comparison of 3-Dimensional Shoulder Complex Kinematics in Individuals With and Without Shoulder Pain, Part 2: Glenohumeral Joint

Authors: [Rebekah L. Lawrence](#), PT, DPT, OCS¹, [Jonathan P. Braman](#), MD², [Justin L. Staker](#), PT, MPT, OCS, SCS¹, [Robert F. LaPrade](#), MD, PhD³, [Paula M. Ludewig](#), PT, PhD^{1,4}

Objectives: To compare differences in glenohumeral joint angular motion and linear translations between symptomatic and asymptomatic individuals during shoulder motion performed in 3 planes of humerothoracic elevation.

Background: Numerous clinical theories have linked abnormal glenohumeral kinematics, including decreased glenohumeral external rotation and increased superior translation, to individuals with shoulder pain and impingement diagnoses. However, relatively few studies have investigated glenohumeral joint angular motion and linear translations in this population.

Methods: Transcortical bone pins were inserted into the scapula and humerus of 12 asymptomatic and 10 symptomatic participants for direct bone-fixed tracking using electromagnetic sensors. Glenohumeral joint angular positions and linear translations were calculated during active shoulder flexion, abduction, and scapular plane abduction.

Results: Differences between groups in angular positions were limited to glenohumeral elevation, coinciding with a reduction in scapulothoracic upward rotation. Symptomatic participants demonstrated 1.4 mm more anterior glenohumeral translation between 90° and 120° of shoulder flexion and an average of 1 mm more inferior glenohumeral translation throughout shoulder abduction.

Conclusion: Differences in glenohumeral kinematics exist between symptomatic and asymptomatic individuals. The clinical implications of these differences are not yet understood, and more research is needed to understand the relationship between abnormal kinematics, shoulder pain, and pathoanatomy.

Keyword: [biomechanics](#), [glenohumeral translations](#), [impingement syndrome](#)

ROTATOR CUFF

Tear and genetics

J Shoulder Elbow Surg. 2014 Sep 11.

Significant association of full-thickness rotator cuff tears and estrogen-related receptor- β (ESRRB).

Teerlink CC¹, Cannon-Albright LA², Tashjian RZ³.

Abstract

BACKGROUND:

The precise etiology of rotator cuff disease is unknown, but prior evidence suggests a role for genetic factors. Variants of estrogen-related receptor- β (ESRRB) have been previously associated with rotator cuff disease. The purpose of the present study was to confirm the association between multiple candidate genes, including ESRRB, and rotator cuff disease in an independent set of patients with rotator cuff tear.

MATERIALS AND METHODS:

The Illumina 5M (Illumina Inc, San Diego, CA, USA) single nucleotide polymorphism (SNP) platform was used to genotype 175 patients with rotator cuff tear. Genotypes were used to select a set of 2595 genetically matched Caucasian controls available from the Illumina iControls database. Tests of association were performed with Genome-wide Efficient Mixed Model Association (GEMMA) software at 69 SNPs that fell within 20 kb of 6 candidate genes (DEFB1, DENND2C, ESRRB, FGF3, FGF10, and FGFR1).

RESULTS:

Tests of association revealed 1 significantly associated SNP occurring in ESRRB (rs17583842; $P = 4.4E-4$). Another SNP within ESRRB (rs7157192) had a nominal P value of $7.8E-3$. FastPHASE software estimated 2 frequent haplotypes among 54 individuals who carried both risk alleles at these 2 SNPs. The first haplotype had a frequency of 13.9% ($n = 15$) in risk-allele carriers and only 2.2% in controls (odds ratio, 6.9; 95% confidence interval, 3.9-2.2). The second haplotype had a frequency of 12.9% in risk-allele carriers and only 2.7% in controls (odds ratio, 5.3; 95% confidence interval, 3.0-9.5).

CONCLUSIONS:

The significant association and the presence of high-risk haplotypes identified in the ESRRB gene confirm the association of variants in ESRRB and rotator cuff disease.

KEYWORDS: ESRRB; Rotator cuff disease; confirmation study; genetic association

PMID: 25219474

Instability

J Shoulder Elbow Surg. 2014 Sep 11

High frequency of posterior and combined shoulder instability in young active patients.

Song DJ¹, Cook JB², Krul KP², Bottoni CR², Rowles DJ², Shaha SH³, Tokish JM².

Abstract

OBJECTIVE:

The purpose of this study was to describe the epidemiology and demographics of surgically treated shoulder instability stratified by direction. We hypothesized that there would be an increased frequency of posterior and combined shoulder instability in our population compared with published literature. Secondly, we assessed preoperative magnetic resonance imaging (MRI) reports to determine how accurately they detected the pathology addressed at surgery.

MATERIALS AND METHODS:

A retrospective review was conducted at a single facility during a 46-month period. The study included all patients who underwent an operative intervention for shoulder instability. The instability in each case was characterized as isolated anterior, isolated posterior, or combined, according to pathologic findings confirmed at arthroscopy. The findings were retrospectively compared with official MRI reports to determine the accuracy of MRI in characterizing the clinically and operatively confirmed diagnosis.

RESULTS:

A consecutive series of 231 patients (221 men, 10 women) underwent stabilization for shoulder instability over 46 months. Patients were a mean age of 26.0 years. There were 132 patients (57.1%) with isolated anterior instability, 56 (24.2%) with isolated posterior instability, and 43 (18.6%) with combined instability. Overall, MRI findings completely characterized the clinical diagnosis and arthroscopic pathology in 149 of 219 patients (68.0%).

CONCLUSION:

The rate of posterior and combined instability in an active population is more common than has been previously reported, making up more than 40% of operatively treated instability, including a previously unreported incidence of 19% for combined instabilities. In addition, MRI was often incomplete or inaccurate in detecting the pathology eventually treated at surgery.

KEYWORDS: Shoulder instability; combined shoulder instability; posterior shoulder instability

PMID: 25219471

ADHESIVE CAPSULITIS

Stretching

Physiotherapy. 2014 Sep

Efficacy of a static progressive stretch device as an adjunct to physical therapy in treating adhesive capsulitis of the shoulder: a prospective, randomised study.

Ibrahim M¹, Donatelli R², Hellman M², Echternach J².

Abstract

BACKGROUND: Stress relaxation and static progressive stretch are techniques used for non-surgical restoration of shoulder range of motion for patients with adhesive capsulitis.

OBJECTIVES: To compare a static progressive stretch device plus traditional therapy with traditional therapy alone for the treatment of adhesive capsulitis of the shoulder.

DESIGN: Prospective, randomised controlled trial.

PARTICIPANTS: Sixty patients with adhesive capsulitis of the shoulder were assigned at random to an experimental group or a control group.

INTERVENTIONS: Both groups received three traditional therapy sessions per week for 4 weeks. In addition, the experimental group used a static progressive stretch device for 4 weeks.

MAIN OUTCOME MEASURES: The primary outcome measure was shoulder range of motion (active and passive shoulder abduction, and passive shoulder external rotation). The secondary outcome measures were function [measured by the Disabilities of the Arm, Shoulder and Hand (DASH) questionnaire] and pain [measured using a visual analogue scale (VAS)].

RESULTS: At baseline, there were no differences between the two groups. However, after the intervention, there were significant ($P < 0.05$) differences between the groups for all outcome parameters: 0.3 for mean VAS scores [95% confidence interval (CI) -0.6 to 1.1], -10.1 for DASH scores (95% CI -21.0 to 0.9), 21.2° for shoulder passive external rotation (95% CI 16.8 to 25.7), 26.4° for shoulder passive abduction (95% CI 17.4 to 35.3), and 27.7° for shoulder active abduction (95% CI 20.3 to 35.0). At 12-month follow-up, the differences between the groups were maintained and even increased for mean shoulder range of motion, VAS scores and DASH scores, with significant differences ($P < 0.001$) between the groups: -2.0 for VAS scores (95% CI -2.9 to -1.2), -53.8 for DASH scores (95% CI -64.7 to -42.9), 47.9° for shoulder passive external rotation (95% CI 43.5 to 52.3), 44.9° for shoulder passive abduction (95% CI 36.0 to 53.8), and 94.3° for shoulder active abduction (95% CI 87.0 to 101.7).

CONCLUSION: Use of a static progressive stretch device in combination with traditional therapy appears to have beneficial long-term effects on shoulder range of motion, pain and functional outcomes in patients with adhesive capsulitis of the shoulder. At 12-month follow-up, the experimental group had continued to improve, while the control group had relapsed.

KEYWORDS: Frozen shoulder; Mobilisation; SPS; Shoulder adhesive capsulitis; Static progressive stretch orthosis; Stiff shoulder

PMID: 24211154

KNEE/ACL

Results in function

Int Orthop. 2014 Sep 6

Anterior cruciate ligament reconstruction and return to sport activity: postural control as the key to success.

Papalia R¹, Franceschi F, Tecame A, D'Adamio S, Maffulli N, Denaro V.

Abstract

PURPOSE:

The risk for re-tear following anterior cruciate ligament (ACL) reconstruction is influenced by several hormonal, neuromuscular, biomechanical and anatomic factors. One of the most important negative prognostic factors that markedly increase the risk for ACL re-tear is the presence of high knee-abduction moment (KAM), which can be measured immediately by landing on both feet after a vertical jump. We evaluated the effect in postoperative values for KAM according to the type of graft used for ACL reconstruction (hamstring vs patellar tendon) and a specific rehabilitation protocol focusing on recovery of muscular strength, proprioception and joint stabilisation.

METHODS:

From November 2010 to September 2012, we enrolled 40 female recreational athletes with clinical and imaging evidence of ACL tear and randomised them in two groups. One group of patients underwent reconstruction with a hamstring-tendon graft and the second with a patellar-tendon graft. A custom rehabilitation programme focusing on proprioception was adopted. Clinical outcomes [International Knee Documentation Committee (IKDC) and Lysholm scores] and performance in functional test for stability (single-leg hop, timed hop, crossover triple hop, KAM test) were assessed preoperatively at three and six months postoperatively.

RESULTS:

All patients showed statistically significant clinical improvements postoperatively when compared with preoperative values ($P < 0.0001$). No significant intergroup difference was observed in all clinical scores and functional tests, with the exception of the value registered for the KAM test ($P < 0.0001$).

CONCLUSIONS:

ACL reconstruction using patellar-tendon graft followed by rehabilitation centred on strength, proprioception and stability restoration can produce satisfactory values for KAM within the physiological range. The surgical strategies should be adapted to the patient on the basis of a multidisciplinary approach.

PMID: 25192689

Strengthening

Am J Phys Med Rehabil. 2014 Aug 13.

Core Stability, Knee Muscle Strength, and Anterior Translation Are Correlated with Postural Stability in Anterior Cruciate Ligament-Reconstructed Patients.

Cinar-Medeni O¹, Baltaci G, Bayramlar K, Yanmis I.

Abstract

OBJECTIVE:

The purpose of this study was to investigate the relationship of postural stability and lower extremity performance with core stability, knee laxity, and muscle strength in patients with anterior cruciate ligament reconstruction.

DESIGN:

Twenty-eight anterior cruciate ligament-reconstructed subjects were included in the study. Anterior knee laxity tests, isokinetic knee muscle strength tests, and core stability tests were performed. Single-limb postural stability was assessed in both eyes-open and eyes-closed positions on a static surface and an eyes-open condition on a foam surface. A single-legged hop test was performed to assess lower extremity performance. To detect differences between the operated and healthy leg, a Mann-Whitney U test was performed, and a correlation analysis was performed using the Spearman correlation coefficient.

RESULTS:

Knee muscle strength and laxity were different between the operated and healthy legs ($P < 0.05$). Postural stability scores correlated with core stability tests ($P < 0.05$) in both the operated and healthy legs. In the operated leg, knee laxity and muscle strength correlated with the mediolateral sway index on a foam surface ($P < 0.05$). Knee flexor and extensor muscle strength correlated with the single-legged hop for both legs ($P < 0.05$).

CONCLUSIONS:

Decreased core stability, decreased knee muscle strength, and increased knee laxity correlated with single-limb postural stability. Better hop performance was demonstrated with better knee flexor and extensor muscle strength and was independent from core stability.

PMID: 25122103

MENISCUS

Surgery impact on cartilage

Knee Surg Sports Traumatol Arthrosc. 2014 Sep 6.

Cartilage failures. Systematic literature review, critical survey analysis, and definition.

Filardo G¹, Andriolo L, Balboni F, Marcacci M, Kon E.

Abstract

PURPOSE:

While midterm results of matrix-assisted autologous chondrocyte transplantation (MACT) are now available, less attention has been paid to the evaluation of failures of this surgical approach. Aim of this study was to analyse how "failures" are generally defined in cartilage surgery, in order to understand how the survival rate may change according to different definitions of failure.

METHODS:

A systematic review on MACT in the knee was conducted to report failure rates as well as different failure definitions in the available literature. Afterwards, we analysed the survival curve at 8.5-year follow-up of a survey of 193 patients treated with MACT. Using different definitions to identify failures, we compared how the survival rate changed according to the different definitions of failure.

RESULTS:

The systematic review on 93 papers showed that the average failure rate reported on 3,289 patients was 5.2 % at a mean 34 months of follow-up. However, 41 studies (44.1 %) did not even consider this aspect, and failures were variously defined, thus generating confusing data that make a meta-analysis or a study comparison meaningless. The failure analysis of the MACT survey showed that the survival curve changed significantly depending on the definition applied; in fact, the failure rate ranged from 3.6 to 33.7 %. According to a critical literature and survey analysis, we proposed a combined surgical- and improvement-based definition which led to a failure rate of 25.9 % at midterm/long-term follow-up.

CONCLUSION:

Nowadays, failure definitions of cartilage treatments differ in scientific articles, thus generating confusion and heterogeneous data even when applied to the same cohort of patients. While the literature analysis shows a low number of failures, this study demonstrated that if properly addressed with a comprehensive definition, the real failure rate of cartilage surgical procedures in the knee is higher than previously reported. Recognizing failures would give a better understanding and a more realistic prognosis to patients and physicians seeking treatment for cartilage lesions. LEVEL OF EVIDENCE: IV.

PMID: 25193571

INSTABILITY/ANKLE

Landing mechanics

Med Sci Sports Exerc. 2014 Sep 15.

Lower Limb Landing Biomechanics in Subjects with Chronic Ankle Instability.

De Ridder R¹, Willems T, Vanrenterghem J, Robinson MA, Roosen P.

Abstract

PURPOSE:

Literature on lower limb kinematic deviations in subjects with chronic ankle instability (CAI) during landing tasks is limited and not consistent. Several studies only report joint angles at defined events rather than considering the whole kinematic curve which might obscure possibly relevant information. Therefore, the main goal of this study was to evaluate landing kinematics of the lower limb in subjects with CAI using curve analysis.

METHODS:

Lower limb kinematics of 56 subjects (28 subjects with self-reported CAI and 28 matched healthy controls) were measured during a barefoot forward and side jump protocol. Kinematic data were collected in a laboratory setting using an eight-camera optoelectronic system. Ground reaction forces were registered by means of a force plate built into the landing zone. After completion of each task, difficulty level and subjective stability at the ankle joint were documented using a visual analogue scale. To compare between groups, Statistical Parametric Mapping was used to assess group differences between mean joint angles over the entire impact phase.

RESULTS:

SPM analysis of kinematical curves of the hip, knee, and ankle showed no significant differences between the subjects with CAI and the control group independent of jump direction. Subjects with CAI did report higher feelings of instability for both landing tasks and a higher difficulty level for the forward jump.

CONCLUSION:

Our results showed no altered lower limb kinematics in subjects with CAI compared to a healthy control group during a forward and side jump landing task. Therefore, these results question the hypothesis of kinematic deviations as part of an underlying mechanism of CAI.

PMID: 25225885

SHOES

Sandals

Int Orthop. 2014 Sep 12.

Comparison of plantar-pressure distribution and clinical impact of anatomically shaped sandals, off-the-shelf sandals and normal walking shoes in patients with central metatarsalgia.

Schuh R¹, Seegmueller J, Wanivenhaus AH, Windhager R, Sabeti-Aschraf M.

Abstract

PURPOSE:

Metatarsalgia is one of the most frequent pathological conditions of the foot and ankle. Numerous studies exist on plantar-pressure characteristics in various types of shoes. However, to the best of our knowledge, plantar-pressure distribution and clinical effects in sandals has not as yet been the the focus of any study.

METHODS:

Twenty-two patients (42 feet) with central metatarsalgia were assessed. Time and distance until symptom occurrence in terms of metatarsalgia were evaluated for normal walking shoes (WS), standard sandals (SS) and anatomically shaped, custom-made sandals with a metatarsal pad (AS). Pain intensity was measured with the visual analogue (VAS), and clinical assessment was performed with the American Orthopaedic Foot and Ankle Society (AOFAS) score for the respective shoes. Additionally, plantar-pressure distribution was assessed with the emed-at platform (Novel GmbH) and the F-scan insole system (Tekscan Inc.), respectively.

RESULTS:

The average walking distance until symptoms occurred was 1,894 m [standard deviation (SD) 1,196 m] for WS, 1,812 m (SD 1,079 m) for SS and 3,407 m (SD 1,817 m) for AS ($p < 0.01$). Mean duration until occurrence of symptoms was 22.3 min (SD 14.9 min) for the WS, 21.8 min (SD 13.4 min) for the SS and 42.0 min (SD 23.0 min) for the AS ($p < 0.01$). Plantar-pressure parameters were significantly reduced in the forefoot region for the AS compared with the other walking devices.

CONCLUSIONS:

The results of this study reveal that a modified standard sandal can significantly influence the onset of metatarsalgia, as increased walking time and distance in these patients was observed.

PMID: 25214318

ACHILLES TENDON

Tendon properties

RESEARCH REPORT

Altered Tendon Characteristics and Mechanical Properties Associated With Insertional Achilles Tendinopathy

Authors: Ruth L. Chimenti, PT, PhD, DPT¹, Adolph S. Flemister, MD², Joshua Tome, MS³, James M. McMahon, PhD⁴, Marie A. Flannery, PhD, RN, AOCN⁴, Ying Xue, DNSc, RN⁴, Jeff R. Houck, PT, PhD⁵

Study Design: Case-control laboratory study.

Objectives: To compare tendon characteristics (shape, composition) and mechanical properties (strain, stiffness) on the involved side of participants with insertional Achilles tendinopathy (IAT) to the uninvolved side and to controls, and to examine if severity of tendon pathology is associated with severity of symptoms during function.

Background: Despite the severity and chronicity of IAT, the quality of theoretical evidence available to guide the development of exercise interventions is low. While tendon pathology of midportion Achilles tendinopathy has been described, there are few studies specific to IAT.

Methods: Twenty individuals with unilateral IAT and 20 age- and sex-matched controls volunteered to participate. Ultrasound imaging was used to quantify changes in tendon shape (diameter) and composition (echogenicity). A combination of ultrasound and dynamometry was used to measure tendon mechanical properties (strain and stiffness) during passive ankle rotation toward dorsiflexion. Generalized estimating equations were used to examine the association between IAT, alterations in tendon properties, and participant demographics. Pearson correlation was used to examine the association between severity of tendon pathology and severity of symptoms (Victorian Institute of Sport Assessment-Achilles).

Results: The side with IAT had a larger tendon diameter ($P < .001$), lower echogenicity ($P < .001$), higher strain ($P = .011$), and lower stiffness ($P = .007$) compared to the side without IAT and the controls. On the involved side of participants with IAT, a lower echogenicity correlated with higher severity of symptoms ($r = 0.603$, $P = .010$).

Conclusion: Ultrasound imaging combined with dynamometry can discriminate alterations in tendon shape, composition, and mechanics in participants with IAT. Future clinical trials for IAT may consider strategies to alter tendon characteristics and restore tendon mechanics.

PLANTAR SURFACE

Gait

Foot Ankle Int. 2014 Sep 4.

Finite Element Analysis of Plantar Fascia During Walking: A Quasi-static Simulation.

Chen YN¹, Chang CW², Li CT³, Chang CH³, Lin CF⁴.

Abstract

BACKGROUND:

The plantar fascia is a primary arch supporting structure of the foot and is often stressed with high tension during ambulation. When the loading on the plantar fascia exceeds its capacity, the inflammatory reaction known as plantar fasciitis may occur. Mechanical overload has been identified as the primary causative factor of plantar fasciitis. However, a knowledge gap exists between how the internal mechanical responses of the plantar fascia react to simple daily activities. Therefore, this study investigated the biomechanical responses of the plantar fascia during loaded stance phase by use of the finite element (FE) modeling.

METHODS:

A 3-dimensional (3-D) FE foot model comprising bones, cartilage, ligaments, and a complex-shaped plantar fascia was constructed. During the stance phase, the kinematics of the foot movement was reproduced and Achilles tendon force was applied to the insertion site on the calcaneus. All the calculations were made on a single healthy subject.

RESULTS:

The results indicated that the plantar fascia underwent peak tension at preswing (83.3% of the stance phase) at approximately 493 N (0.7 body weight). Stress concentrated near the medial calcaneal tubercle. The peak von Mises stress of the fascia increased 2.3 times between the midstance and preswing. The fascia tension increased 66% because of the windlass mechanism.

CONCLUSION:

Because of the membrane element used in the ligament tissue, this FE model was able to simulate the mechanical structure of the foot. After prescribing kinematics of the distal tibia, the proposed model indicated the internal fascia was stressed in response to the loaded stance phase.

CLINICAL RELEVANCE:

Based on the findings of this study, adjustment of gait pattern to reduce heel rise and Achilles tendon force may lower the fascia loading and may further reduce pain in patients with plantar fasciitis.

KEYWORDS: DEfinite element (FE) model; foot arch; gait simulation; plantar fascia

PMID: 25189539

MANUAL THERAPY

McKenzie and LBP

J Back Musculoskelet Rehabil. 2014 Aug 26.

A comparison of mckenzie therapy with electrophysical agents for the treatment of work related low back pain: A randomized controlled trial.

Murtezani A¹, Govori V², Meka VS¹, Ibraimi Z³, Rrecaj S¹, Gashi S⁴.

Abstract

BACKGROUND AND OBJECTIVE:

Chronic low back pain (LBP) is a major public health problem in industrialized countries and is one of the most common reasons for seeking healthcare. Although the McKenzie therapy is widely used for the treatment of low back pain, there is evidence for no improvement with exercise in short-, intermediate-, or long-term outcomes of pain relief or function. The aim of this study was to compare the effect of the McKenzie therapy with electrophysical agents (EPAs) in patients with chronic LBP. MATERIAL AND METHOD: A randomized controlled comparative trial with a 3-month follow-up period was conducted between January 2009 and June 2012. 271 patients with chronic LBP, (more than three months duration of symptoms) were randomized into two groups: the McKenzie therapy group (n=134), and electrophysical agents group, (n=137). The treatment period of both groups was 4 weeks at an outpatient clinic. Clinical outcomes (pain intensity, trunk flexion range of motion, and disability) were obtained at follow-up appointments at the end of the treatment period, 2 and 3 months. RESULTS: Significant improvement of spinal motion, reduction of pain and disability were demonstrated in both groups but the results show the greater improvement in the McKenzie group (p< 0.05).

CONCLUSION:

McKenzie therapy reduces pain, and disability, among subjects with chronic LBP. This study revealed that the McKenzie therapy is more effective than EPAs group.

KEYWORDS:

Low back pain; McKenzie therapy; electrophysical agents; randomized controlled trial

PMID: 25159291

Perception of seniors regarding manual therapy

Perceived value of spinal manipulative therapy and exercise among seniors with chronic neck pain: A mixed methods study

Journal of Rehabilitation Medicine, 09/15/2014 Clinical Article, Maiers M, et al.

Purpose: The aim of this study is to explore perceptions of spinal manipulative therapy and exercise among adults aged 65 years and older with chronic neck pain. Relationship dynamics should be leveraged in clinical encounters to enhance patient satisfaction and perceived value of care.

Methods

- Semi-structured interviews were conducted at the completion of the 12 week intervention phase, during which participants received spinal manipulative therapy and exercise interventions.
- Interviews explored determinants of satisfaction with care, whether or not therapy was worthwhile, and what was liked and disliked about treatment.
- Interviews were recorded and transcribed; content analysis was used to identify themes within responses.

Results

- Participants placed high value on their relationships with health care team members, supervision, individualized care, and the exercises and information provided as treatment.
- Change in symptoms did not figure as prominently as social and process-related themes. Perceptions of age, activities, and co-morbidities influenced some seniors' expectations of treatment results, and comorbidities impacted perceptions of their ability to participate in active care.

Suboccipital muscle inhibition

Physiotherapy. 2014 Sep

Short-term changes in median nerve neural tension after a suboccipital muscle inhibition technique in subjects with cervical whiplash: a randomised controlled trial.

Antolinos-Campillo PJ¹, Oliva-Pascual-Vaca A², Rodríguez-Blanco C², Heredia-Rizo AM³, Espí-López GV⁴, Ricard F¹.

Abstract

OBJECTIVES:

To assess the immediate effect of a suboccipital muscle inhibition (SMI) technique on: (a) neck pain, (b) elbow extension range of motion during the upper limb neurodynamic test of the median nerve (ULNT-1), and (c) grip strength in subjects with cervical whiplash; and determine the relationships between key variables.

DESIGN:

Randomised, single-blind, controlled clinical trial.

SETTING:

Faculty of Nursing, Physiotherapy and Podiatry, University of Seville, Spain.

PARTICIPANTS:

Forty subjects {mean age 34 years [standard deviation (SD) 3.6]} with Grade I or II cervical whiplash and a positive response to the ULNT-1 were recruited and distributed into two study groups: intervention group (IG) (n=20) and control group (CG) (n=20).

INTERVENTIONS:

The IG underwent the SMI technique for 4minutes and the CG received a sham (placebo) intervention. Measures were collected immediately after the intervention.

MAIN OUTCOME MEASURES:

The primary outcome was elbow range of motion during the ULNT-1, measured with a goniometer. The secondary outcomes were self-perceived neck pain (visual analogue scale) and free-pain grip strength, measured with a digital dynamometer.

RESULTS:

The mean baseline elbow range of motion was 116.0° (SD 10.2) for the CG and 130.1° (SD 7.8) for the IG. The within-group comparison found a significant difference in elbow range of motion for the IG [mean difference -15.4°, 95% confidence interval (CI) -20.1 to -10.6; P=0.01], but not for the CG (mean difference -4.9°, 95% CI -11.8 to 2.0; P=0.15). In the between-group comparison, the difference in elbow range of motion was significant (mean difference -10.5°, 95% CI -18.6 to -2.3; P=0.013), but the differences in grip strength (P=0.06) and neck pain (P=0.38) were not significant.

CONCLUSION:

The SMI technique has an immediate positive effect on elbow extension in the ULNT-1. No immediate effects on self-perceived cervical pain or grip strength were observed.

KEYWORDS: Manipulation, Spinal; Median nerve; Pain; Whiplash injuries

PMID: 24405830

Feldenkrais and neck pain

Arch Phys Med Rehabil. 2014 Sep

Effects of Feldenkrais method on chronic neck/scapular pain in people with visual impairment: a randomized controlled trial with one-year follow-up.

Lundqvist LO¹, Zetterlund C², Richter HO³.

Abstract

OBJECTIVE:

To determine whether the Feldenkrais method is an effective intervention for chronic neck/scapular pain in patients with visual impairment.

DESIGN:

Randomized controlled trial with an untreated control group.

SETTING:

Low vision center.

PARTICIPANTS:

Patients (N=61) with visual impairment (mean, 53.3y) and nonspecific chronic (mean, 23.8y) neck/scapular pain.

INTERVENTIONS:

Participants were randomly assigned to the Feldenkrais method group (n=30) or untreated control group (n=31). Patients in the treatment group underwent one 2-hour Feldenkrais method session per week for 12 consecutive weeks.

MAIN OUTCOME MEASURES:

Blind assessment of perceived pain (visual analog scale [VAS]) during physical therapist palpation of the left and right occipital, upper trapezius, and levator scapulae muscle areas; self-assessed degree of pain on the Visual, Musculoskeletal, and Balance Complaints questionnaire; and the Medical Outcomes Study 36-Item Short-Form Health Survey bodily pain scale.

RESULTS:

Patients undergoing Feldenkrais method reported significantly less pain than the controls according to the VAS and Visual, Musculoskeletal, and Balance Complaints questionnaire ratings at posttreatment follow-up and 1-year follow-up. There were no significant differences regarding the Medical Outcomes Study 36-Item Short-Form Health Survey bodily pain scale ratings.

CONCLUSIONS:

Feldenkrais method is an effective intervention for chronic neck/scapular pain in patients with visual impairment.

KEYWORDS:

Neck pain; Randomized controlled trials; Rehabilitation; Treatment outcome; Visual impairment

PMID: 24907640

Manual therapy and Fibromyalgia

Clin J Pain, 2014 Jul.

Short-term effects of manual therapy protocol on pain, physical function, quality of sleep, depressive symptoms, and pressure sensitivity in women and men with fibromyalgia syndrome: a randomized controlled trial.

Castro-Sánchez AM¹, Aguilar-Ferrándiz ME, Matarán-Peñarrocha GA, Sánchez-Joya Mdel M, Arroyo-Morales M, Fernández-de-las-Peñas C.

Abstract

OBJECTIVE:

To investigate the therapeutic effects of a manual therapy protocol for improving pain, function, pressure pain thresholds (PPT), quality of sleep, and depressive symptoms in women and men with fibromyalgia syndrome (FMS).

MATERIALS AND METHODS:

Eighty-nine patients were randomly assigned to experimental or control group. The experimental group (24 female, 21 male) received 5 sessions of manual therapy and the control group (24 female, 21 male) did not receive any intervention. PPT, pain, impact of FMS symptoms, quality of sleep, and depressive symptoms were assessed in both groups at baseline and after 48 hours of the last intervention in the experimental group.

RESULTS:

The analysis of covariance found significant Group×Time×Sex interactions for McGill PPI and Center for Epidemiologic Studies Depressive Symptoms Scale ($P<0.01$) was also found: men exhibited a larger effect size for depressive symptoms than women, whereas women exhibited a greater effect size than men in the McGill PPI. A significant Group×Time×Sex interaction for PPT over suboccipital, upper trapezius, supraspinatus, second rib, gluteal region, and tibialis anterior muscle was also found: men included in the experimental group experienced significant greater improvements in PPT as compared with women with FMS in the experimental group.

CONCLUSIONS:

Manual therapy protocol was effective for improving pain intensity, widespread pressure pain sensitivity, impact of FMS symptoms, sleep quality, and depressive symptoms. In addition, sex differences were observed in response to treatment: women and men get similar improvements in quality of sleep and tender point count, whereas women showed a greater reduction in pain and impact of FMS symptoms than men, but men reported higher decreases in depressive symptoms and pressure hypersensitivity than women.

PMID: 24281285

Adhesive capsulitis

Cochrane Database Syst Rev. 2014 Aug 26

Manual therapy and exercise for adhesive capsulitis (frozen shoulder).

BACKGROUND: Adhesive capsulitis (also termed frozen shoulder) is commonly treated by manual therapy and exercise, usually delivered together as components of a physical therapy intervention.

OBJECTIVES: To synthesise available evidence regarding the benefits and harms of manual therapy and exercise, alone or in combination, for the treatment of patients with adhesive capsulitis.

SELECTION CRITERIA: We included randomised controlled trials (RCTs) and quasi-randomised trials, including adults with adhesive capsulitis, and comparing any manual therapy or exercise intervention versus placebo, no intervention, a different type of manual therapy or exercise or any other intervention. Interventions included mobilisation, manipulation and supervised or home exercise, delivered alone or in combination. Trials investigating the primary or adjunct effect of a combination of manual therapy and exercise were the main comparisons of interest. Main outcomes of interest were participant-reported pain relief of 30% or greater, overall pain (mean or mean change), function, global assessment of treatment success, active shoulder abduction, quality of life and the number of participants experiencing adverse events.

MAIN RESULTS: We included 32 trials (1836 participants). No trial compared a combination of manual therapy and exercise versus placebo or no intervention. Seven trials compared a combination of manual therapy and exercise versus other interventions but were clinically heterogeneous, so opportunities for meta-analysis were limited. The overall impression gained from these trials is that the few outcome differences between interventions that were clinically important were detected only up to seven weeks. Evidence of moderate quality shows that a combination of manual therapy and exercise for six weeks probably results in less improvement at seven weeks but a similar number of adverse events compared with glucocorticoid injection. Forty-six per cent (26/56) of participants reported treatment success with manual therapy and exercise compared with 77% (40/52) of participants receiving glucocorticoid injection with an absolute risk difference of 30% (13% to 48%). The number reporting adverse events did not differ between groups. Group differences in improvement in overall pain and function at six months and 12 months were not clinically important. We are uncertain of the effect of other combinations of manual therapy and exercise, as most evidence is of low quality. Meta-analysis of two trials (86 participants) suggested no clinically important differences between a combination of manual therapy, exercise, and electrotherapy for four weeks and placebo injection compared with glucocorticoid injection alone or placebo injection alone in terms of overall pain, function, active range of motion and quality of life at six weeks, six months and 12 months (though the 95% CI suggested function may be better with glucocorticoid injection at six weeks). The same two trials found that adding a combination of manual therapy, exercise and electrotherapy for four weeks to glucocorticoid injection did not confer clinically important benefits over glucocorticoid injection alone at each time point. Based on one high quality trial (148 participants), following arthrographic joint distension with glucocorticoid and saline, a combination of manual therapy and supervised exercise for six weeks conferred similar effects to those of sham ultrasound in terms of overall pain, function and quality of life at six weeks and at six months, but provided greater patient-reported treatment success and active shoulder abduction at six weeks. One trial (119 participants) found that a combination of manual therapy, exercise, electrotherapy and oral non-steroidal anti-inflammatory drug (NSAID) for three weeks did not confer clinically important benefits over oral NSAID alone in terms of function and patient-reported treatment success at three weeks. On the basis of 25 clinically heterogeneous trials, we are uncertain of the effect of manual therapy or exercise when not delivered together, or one type of manual therapy or exercise versus another, as most reported differences between groups were not clinically or statistically significant, and the evidence is mostly of low quality.

AUTHORS' CONCLUSIONS: The best available data show that a combination of manual therapy and exercise may not be as effective as glucocorticoid injection in the short-term. It is unclear whether a combination of manual therapy, exercise and electrotherapy is an effective adjunct to glucocorticoid injection or oral NSAID. Following arthrographic joint distension with glucocorticoid and saline, manual therapy and exercise may confer effects similar to those of sham ultrasound in terms of overall pain, function and quality of life, but may provide greater patient-reported treatment success and active range of motion. High-quality RCTs are needed to establish the benefits and harms of manual therapy and exercise interventions that reflect actual practice, compared with placebo, no intervention and active interventions with evidence of benefit (e.g. glucocorticoid injection).

LBP and MT

J Phys Ther Sci. 2014 Aug

The Effects of Manual Therapy Using Joint Mobilization and Flexion-distraction Techniques on Chronic Low Back Pain and Disc Heights.

Choi J¹, Hwangbo G², Park J³, Lee S³.

Abstract

[Purpose] The purpose of this study was to examine the effects of manual therapy using joint mobilization and flexion-distraction techniques on chronic low back pain and disc heights.

[Subjects] This study was conducted with 31 chronic low back pain patients who were divided into a manualtherapy group (MTG; n=16) and a spinal decompression therapy group (SDTG; n=15). **[Methods]** The MTG was treated using joint mobilization techniques and flexion-distraction techniques, and the SDTG was treated using spinal decompression therapeutic apparatuses. Conservative physicaltherapy was used in both groups, and the therapy was implemented three times per week for 6 weeks. The visual analog scale (VAS) was used to measure patient's low back pain scores, and a picture archiving and communication system was used to measure disc height by comparing and analyzing the images.

[Results] In comparisons of the VAS within each of the two groups, both the MTG and the SDTG showed significant decreases. In comparisons of disc height within each of the two groups, the MTG showed statistically significant increases.

[Conclusion] Manual therapy using joint mobilization techniques and flexion-distraction techniques is considered an effective intervention for addressing low back pain and disc heights in patients with chronic low back pain.

KEYWORDS:

Joint mobilization techniques; Manual therapy; Spinal decompression therapy

PMID: 25202191

C spine manual therapy

Arch Phys Med Rehabil. 2014 Sep

Effects of Cervical Spine Manual Therapy on Range of Motion, Head Repositioning, and Balance in Participants With Cervicogenic Dizziness: A Randomized Controlled Trial.

Reid SA¹, Callister R², Katekar MG², Rivett DA².

Abstract

OBJECTIVE:

To evaluate and compare the effects of 2 manual therapy interventions on cervical spine range of motion (ROM), head repositioning accuracy, and balance in patients with chronic cervicogenic dizziness.

DESIGN:

Randomized controlled trial with 12-week follow-up using blinded outcome assessment.

PARTICIPANTS:

Participants (N=86; mean age \pm SD, 62.0 \pm 12.7y; 50% women) with chronic cervicogenic dizziness.

INTERVENTIONS:

Participants were randomly assigned to 1 of 3 groups: sustained natural apophyseal glides (SNAGs) with self-SNAG exercises, passive joint mobilization (PJM) with ROM exercises, or a placebo. Participants each received 2 to 6 treatments over 6 weeks.

MAIN OUTCOME MEASURES:

Cervical ROM, head repositioning accuracy, and balance.

RESULTS:

SNAG therapy resulted in improved ($P \leq .05$) cervical spine ROM in all 6 physiological cervical spine movement directions immediately posttreatment and at 12 weeks. Treatment with PJM resulted in improvement in 1 of the 6 cervical movement directions posttreatment and 1 movement direction at 12 weeks. There was a greater improvement ($P < .01$) after SNAGs than PJM in extension (mean difference, -7.5° ; 95% confidence interval [CI], -13° to -2.0°) and right rotation (mean difference, -6.8° ; 95% CI, -11.5° to -2.1°) posttreatment. Manual therapy had no effect on balance or head repositioning accuracy.

CONCLUSIONS:

SNAG treatment improved cervical ROM, and the effects were maintained for 12 weeks after treatment. PJM had very limited impact on cervical ROM. There was no conclusive effect of SNAGs or PJMs on joint repositioning accuracy or balance in people with cervicogenic dizziness.

KEYWORDS: Cervical vertebrae; Musculoskeletal manipulations; Neck pain; Rehabilitation

PMID: 24792139

Exercise vs. manual therapy for shoulder impingement

J Rehabil Med. 2014 Sep 11.

Effectiveness of physiotherapy and costs in patients with clinical signs of shoulder impingement syndrome: One year follow-up of a randomized controlled trial.

Kromer TO¹, de Bie RA, Bastiaenen CH.

Abstract

Objectives: To investigate the effect of manual physiotherapy and exercises compared with exercises alone in patients with shoulder impingement syndrome one year after inclusion. Design: Randomized controlled trial.

Subjects: Patients with shoulder impingement of more than 4 weeks.

Methods: The intervention group received individualized manual physiotherapy plus individualized exercises; the control group received individualized exercises only. Both groups had 10 treatments over 5 weeks; afterwards all patients continued their exercises for another 7 weeks at home. Primary outcomes were the Shoulder Pain and Disability Index and Patients' Global Impression of Change. The Generic Patient-Specific Scale was used as secondary outcome. Costs were recorded in a log-book.

Results: Ninety patients were included in the study and 87 could be analyzed at 1-year follow-up. Both groups showed significant improvements in all outcome measures, but no difference was detected between the groups. Only costs differed significantly in favour of the control group ($p = 0.03$) after 5 weeks.

Conclusion: Individualized exercises resulted in lower costs than manual physiotherapy and showed a significant effect on pain and functioning within the whole group after one year. Exercises should therefore be considered as a basic treatment. Due to the progressive improvement that occurred during the follow-up period with individualized exercises further treatments should be delayed for 3 to 4 months.

PMID: 25211291

BET

Sitting and LBP

J Orthop Sci. 2014 Sep 8.

The prevalence and characteristics of low back pain among sitting workers in a Japanese manufacturing company.

Inoue G¹, Miyagi M, Uchida K, Ishikawa T, Kamoda H, Eguchi Y, Orita S, Yamauchi K, Takaso M, Tsuchiya KI, Takahashi K, Ohtori S.

Abstract

BACKGROUND:

Low back pain (LBP) is a major public health problem and the most common cause of workers' disability, resulting in substantial economic burden in terms of workers' compensation and medical costs. Sitting is a recognized potential risk factor for developing LBP. Therefore, eliminating risk factors associated with working conditions and individual work capacity may be beneficial in preventing LBP in sitting workers. The purpose of this prospective cross-sectional study is to investigate the prevalence of LBP and examine risk factors that contribute to the development of LBP in sitting workers at an electronics manufacturing company.

METHODS:

A cross-sectional survey was administered to all subjects to assess the prevalence of LBP persisting for at least 48 h during the recent week. Data on demographic characteristics and potential risk factors for LBP were collected at routine annual check-ups. Patients with LBP completed the Roland-Morris Disability Questionnaire (RDQ), which provided information on the attributes of LBP. Univariate and multivariate regression analyses examined the association between LBP and potential risk factors.

RESULTS:

Of the 1,329 sitting workers, 201 (15.1 %) acknowledged experiencing LBP during the recent week. In female workers, weight and body mass index were significantly correlated with the RDQ score. Univariate analyses identified male sex, prior history of LBP, height ≥ 170 cm, and weight ≥ 70 kg as significant risk factors of LBP. Multivariate logistic regression analyses identified prior history of LBP and past history of lumbar spine surgery as significant risk factors of LBP.

CONCLUSIONS:

This study characterized the prevalence and attributes of LBP in Japanese sitting workers and provided information about potential risk factors contributing to occurrence of LBP in the workplace.

PMID: 25196795

EXERCISE

Resistance exercises and LBP

Med Sci Sports Exerc. 2014 Sep

Resistance exercise, disability, and pain catastrophizing in obese adults with back pain.

Vincent HK¹, George SZ, Seay AN, Vincent KR, Hurley RW.

Abstract

PURPOSE:

The purpose of this study was to compare the effects of two different resistance exercise protocols on self-reported disability, fear avoidance beliefs, pain catastrophizing, and back pain symptoms in obese, older adults with low back pain (LBP).

METHODS:

Obese adults (n = 49, 60-85 yr) with chronic LBP were randomized into a total body resistance exercise intervention (TOTRX), lumbar extensor exercise intervention (LEXT), or a control group (CON). Main outcomes included perceived disability (Oswestry Disability Index, Roland Morris Disability Questionnaire). Psychosocial measures included the Fear Avoidance Beliefs survey, Tampa Scale of Kinesiophobia, and Pain Catastrophizing Scale. LBP severity was measured during three functional tasks: walking, stair climbing, and chair rise using an 11-point numerical pain rating scale.

RESULTS:

The TOTRX group had greater reductions in self-reported disability scores due to back pain (Oswestry Disability Index, Roland Morris Disability Questionnaire) compared with those in the LEXT (P < 0.05). The Pain Catastrophizing Scale scores decreased in the TOTRX group compared with that in the CON group by month 4 (64.3% vs 4.8%, P < 0.05). Pain severity during chair rise activity and walking was decreased in both the LEXT and TOTRX groups relative to the CON group.

CONCLUSIONS:

Greater reductions in perceived disability due to LBP can be achieved with TOTRX compared with those achieved with LEXT. Pain catastrophizing and pain severity decreased most with TOTRX. The positive change in psychological outlook may assist obese, older adults with chronic back pain in reconsidering the harmfulness of the pain and facilitate regular participation in other exercise programs.

PMID: 25133997

Exercise and body fat

Med Sci Sports Exerc. 2014 Sep 9.

Associations of Objectively Measured Physical Activity and Abdominal Fat Distribution.

Philipsen A¹, Hansen AL, Jørgensen ME, Brage S, Carstensen B, Sandbaek A, Almdal TP, Gram J, Pedersen EB, Lauritzen T, Witte DR.

Abstract**INTRODUCTION/PURPOSE:**

Visceral adipose tissue (VAT) and physical activity are both independent predictors of type 2 diabetes. Physical activity and overall obesity are inversely associated with each other. Yet the nature of the association between objectively measured dimensions of physical activity and abdominal fat distribution has not been well characterised. We aimed to do so in middle-aged to elderly population at high risk of diabetes.

METHODS:

A cross-sectional analysis of 1134 participants of the ADDITION-PRO study. VAT and subcutaneous adipose tissue (SAT) were assessed one-dimensionally by ultrasonography and physical activity with combined accelerometry and heart rate monitoring. Linear regression of physical activity energy expenditure (PAEE) and time spent in different physical activity intensity levels on VAT and SAT was performed.

RESULTS:

Median BMI was 26.6 kg/m and PAEE 28.1 kJ/kg/day, with 18.9 hours/day spent sedentary, 4.5 hours/day in light-intensity physical activity, and 0.4 hours/day in moderate-intensity physical activity. PAEE was significantly negatively associated with VAT and for women also SAT. The difference in VAT was -1.1mm (95%CI:-1.8;-0.3) per 10 kJ/kg/day increment, and the corresponding difference in SAT for women was -0.6mm (95%CI:-1.2;-0.04), in models adjusted for age, sex and waist circumference. Exchanging one hour of light physical activity with moderate physical activity was significantly associated with VAT (-4.5mm, 95%CI: -7.6;-1.5). Exchanging one sedentary hour with light physical activity was significantly associated with both VAT (-0.9mm, 95%CI: -0.1;-1.8) and SAT (-0.4mm, 95%CI: -0.0;-0.7).

CONCLUSIONS:

In this population with low physical activity levels, cross sectional findings indicate that increasing overall physical activity and decreasing time spent sedentary is important in order to avoid the accumulation of metabolically deleterious VAT.

PMID: 25207926

Motor control exercises vs graded activity

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 MJ³, Kamper SJ⁴, McAuley JH⁵, 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:

The aim of this study was 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:

This study was a secondary analysis of the results of a randomized controlled trial.

METHODS:

One hundred seventy-two patients with chronic low back pain were enrolled in the trial, which was conducted in Australian physical therapy clinics. The treatment consisted of 12 initial exercise sessions over an 8-week period and booster sessions at 4 and 10 months following randomization. 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 and at 2, 6, and 12 months by a blinded assessor.

RESULTS:

Self-reported clinical instability was a statistically significant and clinically important modifier of treatment response for 12-month function (interaction: 2.72; 95% confidence interval=1.39 to 4.06). Participants with high scores on the clinical instability questionnaire (≥ 9) did 0.76 points better with motor control exercises, whereas those 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.

CONCLUSIONS:

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

PMID: 25013000

Cardiovascular fitness and sleep

Med Sci Sports Exerc. 2014 Sep 9.

Decline in Cardiorespiratory Fitness and Odds of Incident Sleep Complaints.

Dishman RK¹, Sui X, Church TS, Kline CE, Youngstedt SD, Blair SN.

Abstract

PURPOSE:

To examine longitudinal change in cardiorespiratory fitness and odds of incident sleep problems.

METHODS:

A cohort of 7368 men and 1155 women, aged 20-85 years, from the Aerobics Center Longitudinal Study. The cohort did not complain of sleep problems, depression, or anxiety at their first clinic visit. Cardiorespiratory fitness assessed at 4 clinic visits between 1971-2006, each separated by an average of 2-3 years, was used as a proxy measure of cumulative physical activity exposure. Sleep complaints were made to a physician during follow-up.

RESULTS:

Across visits, there were 784 incident cases of sleep complaints in men and 207 cases in women. After adjustment for age, time between visits, body mass index, smoking, alcohol use, chronic medical conditions, complaints of depression or anxiety at each visit, and fitness at Visit 1, each minute decline in treadmill endurance (i.e., a decline in cardiorespiratory fitness of approximately one-half MET) between ages 51 to 56 increased the odds of incident sleep complaints by 1.7%

(1.0-2.4%) in men and 1.3% (0.0-2.8%) in women. Odds were ~8% higher per minute decline in

people with sleep complaints at 2 or 3 visits.

CONCLUSION:

The results indicate that maintenance of cardiorespiratory fitness during middle-age, when decline in fitness typically accelerates and risk of sleep problems is elevated, helps protect against the onset of sleep complaints made to a physician.

PMID: 25207930

Hypermobility and exercise

Physiotherapy. 2014 Sep

The effectiveness of therapeutic exercise for joint hypermobility syndrome: a systematic review.

Palmer S¹, Bailey S², Barker L³, Barney L², Elliott A⁴.

Abstract

BACKGROUND:

Joint hypermobility syndrome (JHS) is a heritable connective tissue disorder characterised by excessive range of movement at multiple joints accompanied by pain. Exercise is the mainstay of management yet its effectiveness is unclear.

OBJECTIVES:

To establish the effectiveness of therapeutic exercise for JHS.

DATA SOURCES:

A search of nine online databases, supplemented by a hand search and snowballing.

STUDY ELIGIBILITY CRITERIA (PARTICIPANTS AND INTERVENTIONS):

People diagnosed with JHS (rather than asymptomatic generalised joint laxity); therapeutic exercise (of any type) used as an intervention; primary data reported; English language; published research.

STUDY APPRAISAL AND SYNTHESIS METHODS:

Methodological quality was appraised by each reviewer using Critical Appraisal Skills Programme checklists. Articles were then discussed collectively and disagreements resolved through debate.

RESULTS:

2001 titles were identified. Four articles met the inclusion criteria, comprising one controlled trial, one comparative trial and two cohort studies. All studies found clinical improvements over time. However there was no convincing evidence that exercise was better than control or that joint-specific and generalised exercise differed in effectiveness.

LIMITATIONS:

The studies used heterogeneous outcome measures, preventing pooling of results. Only one study was a true controlled trial which failed to report between-group statistical analyses post-treatment.

CONCLUSIONS AND IMPLICATIONS OF KEY FINDINGS:

There is some evidence that people with JHS improve with exercise but there is no convincing evidence for specific types of exercise or that exercise is better than control. Further high quality research is required to establish the effectiveness of exercise for JHS.

KEYWORDS:

Benign hypermobility syndrome; Exercise; Exercise therapy; Joint hypermobility; Systematic review

PMID: 24238699

Walking steps to decrease pain

Eur Spine J. 2014 Sep 11.

The effect of daily walking steps on preventing neck and low back pain in sedentary workers: a 1-year prospective cohort study.

Sitthipornvorakul E¹, Janwantanakul P, Lohsoonthorn V.

Abstract

OBJECTIVE:

This study aimed to investigate the causal relationship between daily walking steps and the 1-year incidence of neck and low back pain in workers with sedentary jobs.

METHODS:

A 1-year prospective study was carried out among 387 workers who reported no spinal symptoms in the previous 3 months with pain intensity greater than 30 mm on a 100-mm visual analog scale. Data were gathered using a self-administered questionnaire, physical examination, and pedometer. Follow-up data were collected every month for the incidence of musculoskeletal disorders and every 3 months for daily walking steps. Two regression models were built to analyze the effect of daily walking steps on the 1-year incidence of neck and low back pain.

RESULTS:

Among 367 (95 %) participants followed for 1 year, 16 and 14 % reported incident neck and low back pain, respectively. After adjusting for confounders, a negative association between daily walking steps and onset of neck pain was found. Increasing daily walking steps by 1,000 reduced the risk of neck pain by 14 %. No significant association between daily walking steps and the onset of low back pain was found.

CONCLUSIONS:

Increasing daily walking steps is a protective factor for onset of neck pain in those with sedentary jobs. Interventions to reduce neck pain should include attempts to increase daily walking steps.

PMID: 25208502

CORE

Core and LBP

J Phys Ther Sci. 2014 Aug

Effects of the CORE Exercise Program on Pain and Active Range of Motion in Patients with Chronic Low Back Pain.

Cho HY¹, Kim EH², Kim J³.

Abstract

[Purpose] This study aimed to identify the effects of the CORE exercise program on pain and active range of motion (AROM) in patients with chronic low back pain.

[Subjects and Methods] Thirty subjects with chronic low back pain were randomly allocated to two groups: the CORE group (n = 15) and the control group (n = 15). The CORE group performed the CORE exercise program for 30 minutes a day, 3 times a week, for 4 weeks, while the control group did not perform any exercise. The visual analog scale (VAS) and an algometer were used to measure pain, and pain-free AROM in the trunk was measured before and after the intervention.

[Results] The CORE group showed significantly decreased VAS scores at rest and during movement and had a significantly increased pressure pain threshold in the quadratus lumborum and AROM in the trunk compared with those in the control group.

[Conclusion] This study demonstrated that the CORE exercise program is effective in decreasing pain and increasing AROM in patients with chronic low back pain. Thus, the CORE exercise program can be used to manage pain and AROM in patients with chronic low back pain.

KEYWORDS:

Active range of motion (AROM); CORE exercise program; Chronic low back pain (CLBP)

PMID: 25202188

POSTURE

Monitor and feedback

RESEARCH REPORT

The Effectiveness of a Lumbopelvic Monitor and Feedback Device to Change Postural Behavior: A Feasibility Randomized Controlled Trial

Authors: [Daniel Cury Ribeiro, PhD¹](#), [Gisela Sole, PhD¹](#), [J. Haxby Abbott, PhD²](#), [Stephan Milosavljevic, PhD³](#)

Study Design: Feasibility randomized controlled trial.

Objectives: To assess the feasibility of a trial to investigate the effectiveness of a lumbopelvic monitor as a feedback device for modifying postural behavior during daily work-related activities.

Background: Frequent or sustained flexed postures play a role in the development or maintenance of nonspecific low back pain. The provision of postural feedback could help individuals with or at risk of nonspecific low back pain improve their postural awareness and avoid hazardous or pain-provoking postures.

Methods: Sixty-two participants employed in a health care organization were randomly allocated into 1 of 3 groups: a control group, an intermittent feedback group, and a constant feedback group. Adherence and follow-up rates were assessed. Differences in postural pattern between baseline and follow-up measurements were used to assess the effectiveness of the lumbopelvic monitor as a postural feedback device.

Results: Adherence was approximately 75%. With the exception of 1 center, the follow-up overall rates exceeded the a priori desired threshold of 80%. Within-group comparisons revealed no significant differences in postural pattern for the control group and intermittent feedback group. The constant feedback group showed a significant reduction in flexed posture at the follow-up period compared with the baseline period. Differences between groups did not reach statistical significance; however, the constant feedback group, compared with the control group, demonstrated an effect size (*d*) of 0.60.

Conclusion: The provision of constant postural feedback seems promising for promoting changes in postural behavior. This feasibility trial identified adherence and follow-up rates and sample-size estimates important to the conduct of a fully powered efficacy trial.

Adolescent posture and LBP

Eur Spine J. 2014 Sep 12

Association between home posture habits and low back pain in high school adolescents.

Meziat Filho N¹, Coutinho ES, Azevedo E Silva G.

Abstract

PURPOSE:

To investigate the prevalence of low back pain (LBP) and the association with home posture habits while watching TV and using the computer in adolescents.

METHODS:

This is a cross-sectional study with high school adolescents in Rio de Janeiro, Brazil. Students answered questions regarding sociodemographic variables, lifestyle, posture (illustration), time watching TV, time using computer, time playing video game and the presence and impact of LBP. Multivariate logistic regression was used to investigate the association between home posture habits and LBP.

RESULTS:

The prevalence of LBP was 46.8 % (18.2 % chronic low back pain [CLBP] and 28.6 % acute low back pain [ALBP]). As LBP consequence, 23 % (n = 253) of the students took medication, 9.1 % (n = 100) missed classes and 8.2 % (n = 90) sought a physician. Slump postures while watching TV and using the desktop computer were associated with CLBP (OR 3.22, 95 % CI 1.38-7.5 and OR 1.7, 95 % CI 1.06-2.73, respectively). Participants who watched TV seated in bed yielded an OR of 2.14 (95 % CI 1.06-4.32) for ALBP and who used the notebook lying belly down in bed yielded an odds ratio (OR) of 2.26 (95 % CI 1.02-5.01) for ALBP. Among confounding factors, female sex was associated with CLBP and ALBP, work (no) was a protective factor associated with ALBP.

CONCLUSION:

Our findings support the high prevalence and the substantial impact of LBP in late adolescence and add the association with inappropriate home postural habits.

PMID: 25212451

GAIT

Anterior hip pain

Gait Posture. Oct 2010

Effect of Hip Angle on Anterior Hip Joint Force during Gait

Cara L. Lewis, PT, PhD, Assistant Professor,¹ Shirley A. Sahrman, PT, PhD, FAPTA, Professor,² and Daniel W. Moran, PhD, Associate Professor³

Abstract

Purpose: Anterior hip pain is common in young, active adults. Clinically, we have noted that patients with anterior hip pain often walk in a swayback posture, and that their pain is reduced when the posture is corrected. The purpose of this study was to investigate a potential mechanism for the reduction in pain by testing the effect of posture on movement patterns and internal moments during gait in healthy subjects.

Methods: Fifteen subjects were instructed to walk while maintaining three postures: 1) natural, 2) swayback, and 3) forward flexed. Kinematic and force data were collected using a motion capture system and a force plate.

Results: Walking in the swayback posture resulted in a higher peak hip extension angle, hip flexor moment and hip flexion angular impulse compared to natural posture. In contrast, walking in a forward flexed posture resulted in a decreased hip extension angle and decreased hip flexion angular impulse.

Conclusions: Based on these results, walking in a swayback posture may result in increased forces required of the anterior hip structures, potentially contributing to anterior hip pain. This study provides a potential biomechanical mechanism for clinical observations that posture correction in patients with hip pain is beneficial.

RUNNING

Posture and running

J Orthop Sports Phys Ther. 2014 Aug 25:1-31

Sagittal Plane Trunk Posture Influences Patellofemoral Joint Stress During Running.

Teng HL¹, Powers CM.

Abstract

Study Design Cross-sectional, repeated-measures.

Objectives To examine the association between sagittal plane trunk posture and patellofemoral joint (PFJ) stress and determine whether modifying sagittal plane trunk posture influences PFJ stress during running.

Background Patellofemoral pain is the most common injury among runners and is thought to be the result of elevated PFJ stress. While sagittal plane trunk posture has been shown to influence tibiofemoral joint mechanics, no study has examined the influence of trunk posture on PFJ kinetics. Methods Twenty-four asymptomatic recreational runners (12 female, 12 male) ran overground at a speed of 3.4 m/s under 3 trunk posture conditions: self-selected (SELF), flexed (FLEX), and extended (EXT). Trunk and knee kinematics, ground reaction forces, and electromyographic signals from selected lower extremity muscles were obtained. A previously described PFJ biomechanical model was used to quantify PFJ stress.

Results The mean \pm SD trunk flexion angles under the SELF, FLEX, and EXT running conditions were $7.3^\circ \pm 3.6^\circ$, $14.1^\circ \pm 4.8^\circ$, and $4.0^\circ \pm 3.9^\circ$, respectively. A significant inverse relationship was observed between mean trunk flexion angle and peak PFJ stress during the SELF condition ($r=-0.60$, $p=0.002$). Peak PFJ stress was significantly lower in the FLEX condition (mean \pm SD, 20.2 ± 3.4 MPa, $p<0.001$) and significantly higher in the EXT condition (23.1 ± 3.4 MPa, $p<0.001$) compared to the SELF condition (21.5 ± 3.2 MPa).

Conclusion Sagittal plane trunk posture has a significant influence on PFJ kinetics during running. Incorporation of a forward trunk lean may be an effective strategy to reduce PFJ stress during running.

KEYWORDS:

patellofemoral joint; running; stress; trunk posture

PMID: 2515565

Tibial stress

J Biomech. 2014 Aug 22

Effect of step width manipulation on tibial stress during running.

Meardon SA¹, Derrick TR².

Abstract

Purpose: Narrow step width has been linked to variables associated with tibial stress fracture. The purpose of this study was to evaluate the effect of step width on bone stresses using a standardized model of the tibia.

Methods: 15 runners ran at their preferred 5k running velocity in three running conditions, preferred step width (PSW) and $PSW \pm 5\%$ of leg length. 10 successful trials of force and 3-D motion data were collected. A combination of inverse dynamics, musculoskeletal modeling and beam theory was used to estimate stresses applied to the tibia using subject-specific anthropometrics and motion data. The tibia was modeled as a hollow ellipse.

Results: Multivariate analysis revealed that tibial stresses at the distal 1/3 of the tibia differed with step width manipulation ($p=0.002$). Compression on the posterior and medial aspect of the tibia was inversely related to step width such that as step width increased, compression on the surface of tibia decreased (linear trend $p=0.036$ and 0.003). Similarly, tension on the anterior surface of the tibia decreased as step width increased (linear trend $p=0.029$). Widening step width linearly reduced shear stress at all 4 sites ($p<0.001$ for all).

Conclusions: The data from this study suggests that stresses experienced by the tibia during running were influenced by step width when using a standardized model of the tibia. Wider step widths were generally associated with reduced loading of the tibia and may benefit runners at risk of or experiencing stress injury at the tibia, especially if they present with a crossover running style.

KEYWORDS:

Injury; Locomotion; Medial tibial stress syndrome; Running technique; Stress fracture

PMID: 24935171

PAIN**Pressure thresholds**

Pain Med. 2014 Sep 15

Vibration and Rotation During Biaxial Pressure Algometry Is Related with Decreased and Increased Pain Sensations.

Adnadjevic D¹, Graven-Nielsen T.

Abstract**OBJECTIVE:**

During palpation, the pressure intensity and direction include minor deviations suggesting that standardized variations of the pressure intensity during pressure algometry may optimize the stimulus efficacy. This study examined the perceived pain outcome and reliability of a biaxial (bidirectional) algometer exerting rotational and vibratory stimulation on top of the basic pressure.

METHODS:

In 24 healthy subjects, pressure pain thresholds (PPTs) were recorded with a linear pressure gradient (30 kPa/s) applied by a 1-cm² probe bilaterally on the tibialis anterior muscle via biaxial and handheld algometers. During constant pressure stimulation (5 seconds, 75%, 100%, 125% PPT), rotational (45°, 90°, and 180°), linear vibrational (15, 25, and 50 Hz), and radial vibrational stimulations (5, 15, and 25 Hz) were applied randomly via regular and fanning rounded probes (1 cm²). Subjects rated perceived pain on a 10-cm visual analogue scale on two occasions separated by 1 week period.

RESULTS:

Repeated measures analysis of variance revealed enhanced effect of rotation angle ($P < 0.001$), probe ($P < 0.001$), and radial vibration frequency ($P < 0.02$), and suppressing effect of axial vibration frequency ($P < 0.03$) on pain perception, relative to basic pressure alone. PPT reliability of biaxial and handheld algometers showed averaged intraclass correlation coefficient of 0.94 and 0.945, and coefficient of variations of 15.4 and 13.5%, respectively.

CONCLUSIONS:

PPT assessment and multidirectional stimulations can be exerted reliably via biaxial algometer. Linear vibrational stimulation effect on pressure pain perception verified the inhibitory interaction between simultaneous pressure stimulation of low-threshold mechanoreceptors and nociceptors, while radial vibration and rotational stimulation showed facilitatory effects.

KEYWORDS:

Muscle Stimulation; Pain Perception; Pressure Algometry

PMID: 25220654

Childhood abuse and pain

Psychosomatics, 2013 Oct 23

Childhood Abuse and the Experience of Pain in Adulthood: The Mediating Effects of PTSD and Emotion Dysregulation on Pain Levels and Pain-Related Functional Impairment.

Powers A¹, Fani N², Pallos A², Stevens J², Ressler KJ³, Bradley B⁴.

Abstract

BACKGROUND:

Previous findings suggest a relationship between childhood abuse and pain-related conditions. It is yet to be determined whether adult posttraumatic stress disorder (PTSD) symptoms may mediate the association between the experience of childhood abuse and reported pain in adulthood.

OBJECTIVE:

We sought to determine if emotion dysregulation may also play a role in mediating PTSD and pain levels.

METHODS:

We examined subjects (N = 814) recruited from the primary care clinics of an urban public hospital as part of an National Institute of Mental Health-funded study of trauma-related risk and resilience. We evaluated childhood abuse with the Childhood Trauma Questionnaire, PTSD symptoms with the PTSD Symptom Severity scale, and emotional dysregulation with the Emotion Dysregulation Scale. Pain and functional limitations of pain were assessed through self-report.

RESULTS:

We found that both childhood abuse and current PTSD symptoms predicted higher levels of reported pain. Childhood abuse, PTSD symptoms, and emotion dysregulation all predicted higher levels of functional impairment related to pain. Using the Sobel method and bootstrapping techniques and controlling for current level of negative affect, we found that PTSD fully mediated the effect of childhood abuse on pain level and pain-related limitations; emotion dysregulation partially mediated the effect of PTSD symptoms in predicting higher levels of pain-related limitations.

CONCLUSIONS:

Although causality cannot be determined in the present study, these findings suggest that PTSD may serve as the pathway between exposure to childhood abuse and the development of pain-related conditions in adulthood, and that emotion dysregulation is a significant factor in understanding how PTSD relates to specific pain-related functional impairment.

PMID: 24360527