

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

LUMBAR SPINE

Impact of musculoskeletal pain compared to neuro disability

[Arch Phys Med Rehabil.](#) 2014 Jan 21. pii: S0003-9993(14)00031-8. doi: 10.1016/j.apmr.2013.10.032.

The Incidence, Prevalence, Costs and Impact on Disability of Common Conditions Requiring Rehabilitation in the US: Stroke, Spinal Cord Injury, Traumatic Brain Injury, Multiple Sclerosis, Osteoarthritis, Rheumatoid Arthritis, Limb Loss, and Back Pain.

[Ma VY1](#), [Chan L2](#), [Carruthers KJ1](#).

Author information

Abstract

OBJECTIVE:

To determine the relative incidence, prevalence, costs and impact on disability of 8 common conditions treated by rehabilitation professionals.

DESIGN:

Structured review of the literature SETTING: United States PARTICIPANTS: N/A INTERVENTIONS: N/A MAIN OUTCOME MEASURES: disease associated incidence, prevalence, direct and indirect costs and impact on activity and work limitations.

RESULTS:

Back pain and arthritis (osteoarthritis and rheumatoid arthritis) are the most common and costly conditions that we examined, affecting over 100 million individuals and costing over \$200 billion per year. Traumatic brain injury, while less common than arthritis and back pain, carries enormous per capita direct and indirect costs, mostly due to the young age of those involved and the severe disability that it may cause. Finally, stroke, which is often listed as the most common cause of disability, is likely second to both arthritis and back pain in its impact on functional limitations.

CONCLUSIONS:

Of the common rehabilitation diagnoses we studied, musculoskeletal conditions such as back pain and arthritis likely have the most impact on the health care system due to their high prevalence and impact on disability.

Cost of medical rx of sciatica

Pain. 2014 Apr 9. pii: S0304-3959(14)00176-6. doi: 10.1016/j.pain.2014.04.008

Cost-effectiveness of different strategies to manage patients with sciatica.

Fitzsimmons D¹, Phillips CJ², Bennett H¹, Jones M¹, Williams N³, Lewis R³, Sutton A⁴, Matar HE⁵, Din N³, Burton K⁶, Nafees S³, Hendry M³, Rickard I⁷, Wilkinson C³.

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Abstract

The aim of this paper is to estimate the relative cost-effectiveness of treatment regimens for managing patients with sciatica.

A deterministic model structure was constructed, based on information from the findings from a systematic review of clinical and cost-effectiveness, published sources of unit costs and expert opinion. The assumption was patients presenting with sciatica would be managed through one of three pathways (primary care, stepped approach, immediate referral to surgery). Results were expressed as incremental cost per patient with symptoms successfully resolved. Analysis also included incremental cost per utility gained over a 12 month period. One-way sensitivity analyses were used to address uncertainty. The model demonstrated that none of the strategies resulted in 100% success. For initial treatments, the most successful regime in the first pathway was non-opioids, with a probability of success of 0.613. In the second pathway, the most successful strategy was non-opioids, followed by biological agents, followed by epidural/nerve block and disc surgery, with a probability of success of 0.996. Pathway 3 (immediate surgery) was not cost-effective. Sensitivity analyses identified that the use of the highest cost estimates results in a similar overall picture.

While the estimates of cost per QALY are higher, the economic model demonstrated that stepped approaches based on initial treatment with non-opioids are likely to represent the most cost-effective regimens for the treatment of sciatica. However, development of alternative economic modelling approaches is required.

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KEYWORDS: *Cost-effectiveness, Economic model, Sciatica PMID: 24726924*

Orthotics and effectiveness in helping LBP

BMC Musculoskelet Disord. 2014 Apr 29;15(1):140.

The effectiveness of shoe insoles for the prevention and treatment of low back pain: a systematic review and meta-analysis of randomised controlled trials.

Chuter V, Spink M, Searle A, Ho A.

Abstract

BACKGROUND:

Low back pain (LBP) is a significant public health problem in Western industrialised countries and has been reported to affect up to 80% of adults at some stage in their lives. It is associated with high health care utilisation costs, disability, work loss and restriction of social activities. An intervention of foot orthoses or insoles has been suggested to reduce the risk of developing LBP and be an effective treatment strategy for people suffering from LBP. However, despite the common usage of orthoses and insoles, there is a lack of clear guidelines for their use in relation to LBP. The aim of this review is to investigate the effectiveness of foot orthoses and insoles in the prevention and treatment of non specific LBP.

METHODS:

A systematic search of MEDLINE, CINAHL, EMBASE and The Cochrane Library was conducted in May 2013. Two authors independently reviewed and selected relevant randomised controlled trials. Quality was evaluated using the Cochrane Collaboration Risk of Bias Tool and the Downs and Black Checklist. Meta-analysis of study data were conducted where possible.

RESULTS:

Eleven trials were included: five trials investigated the treatment of LBP (n = 293) and six trials examined the prevention of LBP (n = 2379) through the use of foot orthoses or insoles. Meta-analysis showed no significant effect in favour of the foot orthoses or insoles for either the treatment trials (standardised mean difference (SMD) -0.74, CI 95%: -1.5 to 0.03) or the prevention trials (relative risk (RR) 0.78, CI 95%: 0.50 to 1.23).

CONCLUSIONS:

There is insufficient evidence to support the use of insoles or foot orthoses as either a treatment for LBP or in the prevention of LBP. The small number, moderate methodological quality and the high heterogeneity of the available trials reduce the strength of current findings. Future research should concentrate on identification of LBP patients most suited to foot orthoses or insole treatment, as there is some evidence that trials structured along these lines have a greater effect on reducing LBP.

PMID: 24775807

Global burden of LBP

Ann Rheum Dis. 2014 Mar 24. doi: 10.1136/annrheumdis-2013-204631.

The global burden of occupationally related low back pain: estimates from the Global Burden of Disease 2010 study.

Driscoll T¹, Jacklyn G, Orchard J, Passmore E, Vos T, Freedman G, Lim S, Punnett L.

Author information

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Abstract

OBJECTIVES:

The study was part of the Global Burden of Disease 2010 study and aimed to quantify the burden arising from low back pain (LBP) due to occupational exposure to ergonomic risk factors.

METHODS:

Exposure prevalence was based on occupation distribution; estimates of relative risk came from a meta-analysis of relevant published literature. The work-related burden was estimated as disability-adjusted life years (DALYs). Estimates were made for each of 21 world regions and 187 countries, separately for 1990 and 2010 using consistent methods.

RESULTS:

Worldwide, LBP arising from ergonomic exposures at work was estimated to cause 21.7 million DALYs in 2010. The overall population attributable fraction was 26%, varying considerably with age, sex and region. 62% of LBP DALYs were in males-the largest numbers were in persons aged 35-55 years. The highest relative risk (3.7) was in the agricultural sector. The largest number of DALYs occurred in East Asia and South Asia, but on a per capita basis the biggest burden was in Oceania. There was a 22% increase in overall LBP DALYs arising from occupational exposures between 1990 and 2010 due to population growth; rates dropped by 14% over the same period.

CONCLUSIONS:

LBP arising from ergonomic exposures at work is an important cause of disability. There is a need for improved information on exposure distributions and relative risks, particularly in developing countries.

KEYWORDS: nLBP, burden, ergonomic, occupation PMID:24665117

Treatment models for CLBP

[BMC Musculoskelet Disord.](#) 2014 Apr 16;15(1):131.

Effectiveness of three treatment strategies on occupational limitations and quality of life for patients with non-specific chronic low back pain: Is a multidisciplinary approach the key feature to success: study protocol for a randomized controlled trial.

[Petit A](#), [Roche-Leboucher G](#), [Bontoux L](#), [Dubus V](#), [Ronzi Y](#), [Roquelaure Y](#), [Richard I](#).

Abstract

BACKGROUND:

Chronic low back pain (cLBP) is a significant public health problem, being the primary cause of work absenteeism, as well as affecting sufferers' quality of life, in industrialized society. International guidelines recommend intensive multidisciplinary approaches for patients with cLBP. However, these costly and time-consuming programs can only be offered to a minority of the most heavily affected patients and therefore do not seem likely to respond to public health requirements. Lighter programs may be an alternative to full time hospital-based programs with valuable results in terms of disability and occupational activity for cLBP patients. It is therefore important to define both what the determining components of management to improve activity restriction are and how to treat a larger number of patients more effectively at a lower cost. The aim of this study is to compare three programs with various levels of intensity and multidisciplinary.

Methods/design: This paper describes the protocol for a prospective, randomized, controlled, clinical trial in working aged patients with cLBP.

Three treatment strategies are compared: (1) intensive and multidisciplinary program conducted in a rehabilitation center; (2) less intensive outpatient program conducted by a private physiotherapist; (3) mixed strategy combining the same out program with a multidisciplinary intervention.

The primary outcome of the trial is the impact of the mixed strategy on being able to work compared to hospital centered-program and out program. The secondary outcome is the impact of the mixed strategy on quality of life and social ability compared to the two others programs. The intervention part of the trial programs will take 5 weeks and observational follow-up will take 12 months. The sample size will be 180 participants (60 for each arm). The project has been approved by the Ethical Committee of Angers Hospital, France.

DISCUSSION:

On the hypothesis that a multidisciplinary approach is the key feature to programs success in reducing social and occupational impairment in cLBP patients, we suggest that it is possible to achieve the same results with less intensive strategies if a multidisciplinary approach is maintained. Trial registration: Current Controlled Trials NCT02030171.

PMID: 24739659

Fear avoidance and LBP

Spine J. 2014 May 1;14(5):816-836.e4. doi: 10.1016/j.spinee.2013.09.036. Epub 2013 Oct 18.

The role of fear avoidance beliefs as a prognostic factor for outcome in patients with nonspecific low back pain: a systematic review.

Wertli MM¹, Rasmussen-Barr E², Weiser S³, Bachmann LM⁴, Brunner F⁵.

Abstract

BACKGROUND CONTEXT:

Psychological factors including fear avoidance beliefs are believed to influence the development of chronic low back pain (LBP).

PURPOSE: The purpose of this study was to determine the prognostic importance of fear avoidance beliefs as assessed by the Fear Avoidance Beliefs Questionnaire (FABQ) and the Tampa Scale of Kinesiophobia for clinically relevant outcomes in patients with nonspecific LBP.

DESIGN/SETTING: The design of this study was a systematic review.

METHODS: In October 2011, the following databases were searched: BIOSIS, CINAHL, Cochrane Library, Embase, OTSeeker, PeDRO, PsycInfo, PubMed/Medline, Scopus, and Web of Science. To ensure the completeness of the search, a hand search and a search of bibliographies was conducted and all relevant references included. A total of 2,031 references were retrieved, leaving 566 references after the removal of duplicates. For 53 references, the full-text was assessed and, finally, 21 studies were included in the analysis.

RESULTS: The most convincing evidence was found supporting fear avoidance beliefs to be a prognostic factor for work-related outcomes in patients with subacute LBP (ie, 4 weeks-3 months of LBP). Four cohort studies, conducted by disability insurance companies in the United States, Canada, and Belgium, included 258 to 1,068 patients mostly with nonspecific LBP. These researchers found an increased risk for work-related outcomes (not returning to work, sick days) with elevated FABQ scores. The odds ratio (OR) ranged from 1.05 (95% confidence interval [CI] 1.02-1.09) to 4.64 (95% CI, 1.57-13.71). The highest OR was found when applying a high cutoff for FABQ Work subscale scores. This may indicate that the use of cutoff values increases the likelihood of positive findings. This issue requires further study. Fear avoidance beliefs in very acute LBP (<2 weeks) and chronic LBP (>3 months) was mostly not predictive.

CONCLUSIONS: Evidence suggests that fear avoidance beliefs are prognostic for poor outcome in subacute LBP, and thus early treatment, including interventions to reduce fear avoidance beliefs, may avoid delayed recovery and chronicity.

Copyright © 2014 Elsevier Inc. All rights reserved. **KEYWORDS:** Back pain, Fear avoidance, Fear avoidance beliefs, Fear avoidance model, Low back pain, Nonspecific low back pain, Prognosis, Prognostic factors PMID:24412032

Spinal stenosis anatomical variation

Spine J. 2014 May 1;14(5):808-15. doi: 10.1016/j.spinee.2013.09.012. Epub 2013 Oct 9.

Anatomic radiological variations in developmental lumbar spinal stenosis: a prospective, control-matched comparative analysis.

Kitab SA¹, Alsulaiman AM¹, Benzel EC².

Abstract

BACKGROUND CONTEXT:

Developmental lumbar spinal stenosis is a maldevelopment of the dorsal spinal elements involving short pedicles and a trefoil bony spinal canal that increases the likelihood of neural compression at an earlier age.

PURPOSE: To identify radiographically the anatomic variations caused by the maldevelopment of the infrequently characterized dorsal spinal elements.

STUDY DESIGN: A prospective, control-matched comparative analysis.

METHODS: Magnetic resonance imaging (MRI) and anteroposterior (AP) plain radiographs of 66 patients (mean age, 40.7 years) selected and randomized prospectively and compared with images of 45, age- and gender-matched control subjects. Variables assessed included spinal canal cross-sectional area (CSA), thecal sac AP and transverse canal diameters (CSA), and interpedicular distance. All were expressed in ratios with vertebral body diameter (VBD), interlaminar angle, stenosis grade, and MRI evidence of disc degeneration.

RESULTS: In the stenosis cohort, global pathology and multilevel involvement with L3, L4, and L5 segments were involved more commonly and severely. Severe stenosis, at L1, L2, and S1 occurs infrequently. Multivariate analysis demonstrated a statistically significant reduction in spinal canal CSA-to-vertebral body CSA ratio, AP spinal canal diameter-to-VBD ratio on axial and sagittal magnetic resonance images, and plain radiograph interpedicular distance-to-VBD ratio at all levels. Interlaminar angle and the transverse spinal canal diameter-to-VBD ratio were reduced significantly in the stenosed cohort at all levels, except L1. No statistically significant difference regarding the incidence of disc degeneration on MRI between the two cohorts, as well as thecal sac CSA-to-spinal canal CSA ratios across all levels were observed, except for L3 and S1 ($p < .05$).

CONCLUSIONS: Three spinal canal morphologies were identified: (1) "flattened" canal with predominantly reduced spinal canal AP diameter, (2) spinal canal with predominantly reduced interlaminar angle, and (3) global reduction of all canal parameters. Early age at presentation and subtle spondylosis, although typical, should not be considered the identifying, differentiating factors.

Copyright © 2014 Elsevier Inc. All rights reserved. **KEYWORDS:** Canal, Congenital, Developmental, Lumbar, MRI, Spine, Stenosis PMID: 24314904

LBP in seniors

BMC Musculoskelet Disord. 2014 Apr 23;15(1):134

Back pain in seniors: the back pain outcomes using longitudinal data (BOLD) cohort baseline data.

Jarvik JG, Comstock BA, Heagerty PJ, Turner JA, Sullivan SD, Shi X, Nerenz DR, Nedeljkovic SS, Kessler L, James K, Friedly JL, Bresnahan BW, Bauer Z, Avins AL, Deyo RA.

Abstract

BACKGROUND:

Back pain represents a substantial burden globally, ranking first in a recent assessment among causes of years lived with disability. Though back pain is widely studied among working age adults, there are gaps with respect to basic descriptive epidemiology among seniors, especially in the United States. Our goal was to describe how pain, function and health-related quality of life vary by demographic and geographic factors among seniors presenting to primary care providers with new episodes of care for back pain.

METHODS:

We examined baseline data from the Back pain Outcomes using Longitudinal Data (BOLD) registry, the largest inception cohort to date of seniors presenting to a primary care provider for back pain. The sample included 5,239 patients ≥ 65 years old with a new primary care visit for back pain at three integrated health systems (Northern California Kaiser-Permanente, Henry Ford Health System [Detroit], and Harvard Vanguard Medical Associates [Boston]). We examined differences in patient characteristics across healthcare sites and associations of patient sociodemographic and clinical characteristics with baseline patient-reported measures of pain, function, and health-related quality of life.

RESULTS:

Patients differed across sites in demographic and other characteristics. The Detroit site had more African-American patients (50%) compared with the other sites (7-8%). The Boston site had more college graduates (68%) compared with Detroit (20%). Female sex, lower educational status, African-American race, and older age were associated with worse functional disability as measured by the Roland-Morris Disability Questionnaire. Except for age, these factors were also associated with worse pain.

CONCLUSIONS:

Baseline pain and functional impairment varied substantially with a number of factors in the BOLD cohort. Healthcare site was an important factor. After controlling for healthcare site, lower education, female sex, African-American race, and older age were associated with worse physical disability and all of these factors except age were associated with worse pain. Trial registration: ClinicalTrials.gov NCT01776242; Registration date: June 13, 2012.

PMID: 24755158

Obesity and LBP

Am J Epidemiol. 2014 Apr 15;179(8):929-37. doi: 10.1093/aje/kwu007. Epub 2014 Feb 24.

Obesity as a risk factor for sciatica: a meta-analysis.

Shiri R, Lallukka T, Karppinen J, Viikari-Juntura E.

Abstract

The aim of this study was to assess the associations of overweight and obesity with lumbar radicular pain and sciatica using a meta-analysis.

We searched the PubMed, Embase, Scopus, and Web of Science databases from 1966 to July 2013. We performed a random-effects meta-analysis and assessed publication bias. We included 26 (8 cross-sectional, 7 case-control, and 11 cohort) studies. Both overweight (pooled odds ratio (OR) = 1.23, 95% confidence interval (CI): 1.14, 1.33; n = 19,165) and obesity (OR = 1.40, 95% CI: 1.27, 1.55; n = 19,165) were associated with lumbar radicular pain. The pooled odds ratio for physician-diagnosed sciatica was 1.12 (95% CI: 1.04, 1.20; n = 109,724) for overweight and 1.31 (95% CI: 1.07, 1.62; n = 115,661) for obesity. Overweight (OR = 1.16, 95% CI: 1.09, 1.24; n = 358,328) and obesity (OR = 1.38, 95% CI: 1.23, 1.54; n = 358,328) were associated with increased risk of hospitalization for sciatica, and overweight/obesity was associated with increased risk of surgery for lumbar disc herniation (OR = 1.89, 95% CI: 1.25, 2.86; n = 73,982). Associations were similar for men and **women** and were independent of the design and quality of included studies.

There was no evidence of publication bias. Our findings consistently showed that both overweight and obesity are risk factors for lumbar radicular pain and sciatica in men and **women**, with a dose-response relationship.

Multidisciplinary approach

[BMC Musculoskelet Disord.](#) 2014 Apr 16;15(1):131.

Effectiveness of three treatment strategies on occupational limitations and quality of life for patients with non-specific chronic low back pain: Is a multidisciplinary approach the key feature to success: study protocol for a randomized controlled trial.

[Petit A](#), [Roche-Leboucher G](#), [Bontoux L](#), [Dubus V](#), [Ronzi Y](#), [Roquelaure Y](#), [Richard I](#).

Abstract

BACKGROUND:

Chronic low back pain (cLBP) is a significant public health problem, being the primary cause of work absenteeism, as well as affecting sufferers' quality of life, in industrialized society. International guidelines recommend intensive multidisciplinary approaches for patients with cLBP. However, these costly and time-consuming programs can only be offered to a minority of the most heavily affected patients and therefore do not seem likely to respond to public health requirements. Lighter programs may be an alternative to full time hospital-based programs with valuable results in terms of disability and occupational activity for cLBP patients. It is therefore important to define both what the determining components of management to improve activity restriction are and how to treat a larger number of patients more effectively at a lower cost. The aim of this study is to compare three programs with various levels of intensity and multidisciplinary. **Methods/design:** This paper describes the protocol for a prospective, randomized, controlled, clinical trial in working aged patients with cLBP. Three treatment strategies are compared: (1) intensive and multidisciplinary program conducted in a rehabilitation center; (2) less intensive outpatient program conducted by a private physiotherapist; (3) mixed strategy combining the same out program with a multidisciplinary intervention. The primary outcome of the trial is the impact of the mixed strategy on being able to work compared to hospital centered-program and out program. The secondary outcome is the impact of the mixed strategy on quality of life and social ability compared to the two others programs. The intervention part of the trial programs will take 5 weeks and observational follow-up will take 12 months. The sample size will be 180 participants (60 for each arm). The project has been approved by the Ethical Committee of Angers Hospital, France.

DISCUSSION:

On the hypothesis that a multidisciplinary approach is the key feature to programs success in reducing social and occupational impairment in cLBP patients, we suggest that it is possible to achieve the same results with less intensive strategies if a multidisciplinary approach is maintained. Trial registration: Current Controlled Trials NCT02030171.

Spondylo and pelvis position

Comparison and correlation of pelvic parameters between low-grade and high-grade spondylolisthesis

Journal of Spinal Disorders & Techniques, 05/02/2014 Evidence Based Medicine

Min WK, et al

Abstract

Study Design:

This study was retrospectively conducted on 51 patients with L5–S1 spondylolisthesis.

Objective:

This study was conducted to compare a total of 11 pelvic parameters, such as the level of displacement by Meyerding method, lumbar lordosis, sacral inclination, lumbosacral angle, slip angle, S2 inclination, pelvic incidence (PI), L5 inclination, L5 slope, pelvic tilt (PT), and sacral slope (SS) between low-grade and high-grade spondylolisthesis, and to investigate a correlation of the level of displacement by Meyerding method with other pelvic parameters.

Methods:

Pelvic parameters were measured using preoperational erect lateral spinal simple radiographs. The patients were divided into 39 patients with low-grade spondylolisthesis and 12 patients with high-grade spondylolisthesis before analysis. In all patients of both groups, 11 radiographic measurements including the level of displacement by Meyerding method, lumbar lordosis, sacral inclination, lumbosacral angle, slip angle, S2 inclination, PI, L5 inclination, L5 slope, PT, and SS were performed. *T* test and Pearson correlation analysis were conducted to compare and analyze each measurement.

Results:

As for the comparison between the 2 groups, a statistically great significance in the level of displacement by Meyerding method, lumbosacral angle, slip angle, L5 incidence, PI, and L5 slope ($P \leq 0.001$) was shown. Meanwhile, a statistical significance in the sacral inclination and PT ($P < 0.05$) was also shown. However, no statistical significance in the S2 incidence and SS was shown. A correlation of the level of displacement by Meyerding method with each parameter was analyzed in the both the groups. A high correlation was observed in the lumbar lordosis, lumbosacral angle, slip angle, L5 incidence, and L5 slope (Pearson correlation coefficient, $P = 0.01$), as well as the sacral inclination, PI, and PT (Pearson correlation coefficient, $P = 0.05$). Meanwhile, no correlation was shown in the S2 incidence and SS.

Conclusions:

A significant difference in the lumbosacral angle, slip angle, L5 incidence, PI, L5 slope, sacral inclination, and PT was shown between the patients with high-grade spondylolisthesis and patients with low-grade spondylolisthesis. Among the aforementioned measurements, the PI showed a significant difference between the 2 groups and also had a significant correlation with the dislocation level in all the patients

Fusion/adjacent segments

Eur J Orthop Surg Traumatol. 2014 Apr 12.

Adjacent segment degeneration and disease after lumbar fusion compared with motion-preserving procedures: a meta-analysis.

Ren C¹, Song Y, Liu L, Xue Y.

Author information

Abstract

PURPOSE:

The purpose of our study was to compare lumbar fusion and motion-preserving procedures to determine whether lumbar fusion may be associated with a higher prevalence of adjacent segment degeneration (ASDeg) or adjacent segment disease (ASDis).

METHODS:

We performed a systematic review and meta-analysis for articles published up to July 2013. We included randomized controlled trials and cohort studies that reported ASDeg or ASDis after lumbar fusion compared with motion-preserving devices. Two authors independently extracted the articles and the predefined data.

RESULTS:

A total of 13 studies with 1,270 patients met our inclusion criteria and were included in the final analysis. Our analysis showed that the prevalence of ASDeg and ASDis, and adjacent segment reoperation rate in the fusion group were higher than those in the motion-preserving devices group ($P < 0.0001$, $P = 0.0008$, and $P < 0.0001$, respectively). The prevalence of ASDeg and reoperation rate in the motion-preserving devices group were significantly lower than that in the fusion group for both short- and long-term follow-up ($P = 0.0008$ and $P = 0.001$ at <5 years of follow-up; $P = 0.003$ and $P = 0.001$ at >5 years of follow-up).

CONCLUSIONS:

The current evidence suggests that lumbar fusion may result in a higher prevalence of adjacent segment degeneration or disease than motion-preserving procedures.

PMID: 24728779

Impact on mechanics

Spine J. 2013 Oct 4. pii: S1529-9430(13)01491-5. doi: 10.1016/j.spinee.2013.08.043

Characterization and prediction of rate-dependent flexibility in lumbar spine biomechanics at room and body temperature.

Stolworthy DK¹, Zirbel SA, Howell LL, Samuels M, Bowden AE.

Abstract

BACKGROUND CONTEXT:

The soft tissues of the spine exhibit sensitivity to strain-rate and temperature, yet current knowledge of spine biomechanics is derived from cadaveric testing conducted at room temperature at very slow, quasi-static rates.

PURPOSE:

The primary objective of this study was to characterize the change in segmental flexibility of cadaveric lumbar spine segments with respect to multiple loading rates within the range of physiologic motion by using specimens at body or room temperature. The secondary objective was to develop a predictive model of spine flexibility across the voluntary range of loading rates.

STUDY DESIGN:

This in vitro study examines rate- and temperature-dependent viscoelasticity of the human lumbar cadaveric spine.

METHODS:

Repeated flexibility tests were performed on 21 lumbar function spinal units (FSUs) in flexion-extension with the use of 11 distinct voluntary loading rates at body or room temperature. Furthermore, six lumbar FSUs were loaded in axial rotation, flexion-extension, and lateral bending at both body and room temperature via a stepwise, quasi-static loading protocol. All FSUs were also loaded using a control loading test with a continuous-speed loading-rate of 1-deg/sec. The viscoelastic torque-rotation response for each spinal segment was recorded. A predictive model was developed to accurately estimate spine segment flexibility at any voluntary loading rate based on measured flexibility at a single loading rate.

RESULTS:

Stepwise loading exhibited the greatest segmental range of motion (ROM) in all loading directions. As loading rate increased, segmental ROM decreased, whereas segmental stiffness and hysteresis both increased; however, the neutral zone remained constant. Continuous-speed tests showed that segmental stiffness and hysteresis are dependent variables to ROM at voluntary loading rates in flexion-extension. To predict the torque-rotation response at different loading rates, the model requires knowledge of the segmental flexibility at a single rate and specified temperature, and a scaling parameter. A Bland-Altman analysis showed high coefficients of determination for the predictive model.

CONCLUSIONS: The present work demonstrates significant changes in spine segment flexibility as a result of loading rate and testing temperature. Loading rate effects can be accounted for using the predictive model, which accurately estimated ROM, neutral zone, stiffness, and hysteresis within the range of voluntary motion.

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Twins and LBP

Eur J Pain. 2014 Apr 15. doi: 10.1002/ejp.506.

Heritability and lifestyle factors in chronic low back pain: Results of the Australian Twin Low Back Pain Study (The AUTBACK study).

Junqueira DR¹, Ferreira ML, Refshauge K, Maher CG, Hopper JL, Hancock M, Carvalho MG, Ferreira PH.

Author information

Abstract

BACKGROUND:

Heritability and population-specific lifestyle factors are considered to significantly contribute to chronic low back pain (LBP), but traditional population studies fail to (1) adjust for genetics; and (2) use standard and validated definitions for LBP and for lifestyle factors.

METHODS:

Using a classical and a co-twin control study design and validated definitions for chronic LBP and lifestyle variables, we explored the relative contribution of genetics and environment on the prevalence of chronic LBP in a sample of adult Australian twins.

RESULTS:

Data from 105 twin pairs showed that the prevalence of chronic LBP is significantly determined by genetic factors (heritability = 32%). Additionally, monozygotic twins were five times more likely to have chronic LBP than dizygotic twins when one of the siblings of the pair was affected. In a case-control analysis (n = 38 twin pairs), an exploratory analysis showed higher prevalence of chronic LBP associated with light walking exercises and vigorous gardening or heavy work around the house. Daily time spent in sitting was also positively associated with chronic LBP, but not moderate physical activities such as jogging, cycling and gentle swimming. In the final multivariate model, only time spent in vigorous gardening or heavy work around the house remained associated with chronic LBP (odds ratio 6.5; 95% confidence interval 1.47-28.8).

CONCLUSIONS:

The type, frequency and duration of physical activity may be important to understand risk factors for chronic LBP. The causation path between chronic LBP and people's engagement in activities involving frequent bending and twisting such as gardening and housework should be further investigated.

Fear of movement post fusion

Spine J. 2013 Nov 6. pii: S1529-9430(13)01209-6. doi: 10.1016/j.spinee.2013.06.087.

Early postoperative fear of movement predicts pain, disability, and physical health 6 months after spinal surgery for degenerative conditions.

Archer KR¹, Seebach CL, Mathis SL, Riley LH 3rd, Wegener ST.

Author information

Abstract

BACKGROUND CONTEXT:

The fear-avoidance model offers a promising framework for understanding the development of chronic postoperative pain and disability. However, limited research has examined this model in patients undergoing spinal surgery.

PURPOSE:

To determine whether preoperative and early postoperative fear of movement predicts pain, disability, and physical health at 6 months following spinal surgery for degenerative conditions, after controlling for depressive symptoms and other potential confounding variables.

STUDY DESIGN/SETTING:

A prospective cohort study conducted at an academic outpatient clinic.

PATIENT SAMPLE:

One hundred forty-one patients undergoing surgery for lumbar or cervical degenerative conditions.

OUTCOME MEASURES:

Self-reported pain and disability were measured with the Brief Pain Inventory and the Oswestry Disability Index/Neck Disability Index, respectively. The physical composite scale of the 12-Item Short-Form Health Survey (SF-12) measured physical health.

METHODS:

Data collection occurred preoperatively and at 6 weeks and 6 months following surgery. Fear of movement was measured with the Tampa Scale for Kinesiophobia and depression with the Prime-MD PHQ-9.

RESULTS:

One hundred and twenty patients (85% follow-up) completed the 6-month postoperative assessment. Multivariable mixed-method linear regression analyses found that early postoperative fear of movement (6 weeks) predicted pain intensity, pain interference, disability, and physical health at 6-month follow-up ($p < .05$). Preoperative and early postoperative depression predicted pain interference, disability, and physical health.

CONCLUSION:

Results provide support for the fear-avoidance model in a postsurgical spine population. Early postoperative screening for fear of movement and depressive symptoms that do not acutely improve following surgical intervention appears warranted. Cognitive and behavioral strategies may be beneficial for postsurgical patients with high fear of movement and/or depressive symptoms.

Copyright © 2013 Elsevier Inc. All rights reserved. **KEYWORDS:** Depression, Fear of movement, Postoperative pain, Rehabilitation, Spine surgery PMID: 2421109

Impact of anti-inflammatory medications on LBP

Drug therapy for the treatment of chronic nonspecific low back pain: Systematic review and meta-analysis

Pain Physician, 11/26/2013 Evidence Based Medicine Review Article Clinical Article

Joanne WY Chung, PhD, Yingchun Zeng, MPhil, and Thomas KS Wong, PhD

BACKGROUND: Low back pain (LBP) is one of the most common health problems in adults. The impact of LBP on the individual can cause loss of health status in the form of symptoms and loss of function related to pain in the back; limitation of daily, leisure, and/or strenuous activities, and disability. LBP also poses an economic burden to society, mainly in terms of one of the most common reasons for seeking medical care (direct treatment costs), and accounts for the large number of work days lost (indirect costs). To reduce the impact of LBP on adults, drug therapy is the most frequently recommended intervention. Over the last decade, a substantial number of randomized clinical trials of drug therapy for LBP have been published.

OBJECTIVE: To determine the effectiveness of drug therapy for the treatment of chronic nonspecific low back pain (CNLBP). **STUDY DESIGN:** Systematic review

METHODS: A systematic review and meta-analysis of randomized controlled trials was conducted. Five databases (Medline, CINAHL, Science Direct, CAJ Full-text Database, and Cochrane databases) were searched for articles published from 2002 to 2012. The eligibility criteria were randomized trials and double-blind controlled trials of oral or injection drug therapy for CNLBP in subjects who were aged at least 18 years old, published in English or Chinese. Two independent reviewers extracted the data.

RESULTS: A total of 25 drug therapy trials were included. cyclo-oxygenase-2 (COX-2) nonsteroidal anti-inflammatory drugs (NSAIDs), tramadol, and opioids were commonly used. Only 5 trials studied the efficacy of adjuvant analgesics of antiepileptics (n = 1) and antidepressants (n = 4) for CNLBP. The standardized mean difference (SMD) for COX-2 NSAIDs in pain relief was -12.03 (95% confidence interval [CI]: -15.00 to -9.06). The SMD for tramadol in pain relief was -1.72 (95% CI: -3.45 to 0.01). As the 95% CI crossed 0, this effect size was not considered statistically significant. The SMD for the overall effects of opioids in pain relief was -5.18 (95% CI: -8.30 to -2.05). The SMD for the partial opioid agonist drug in pain relief was -7.46 (95% CI: -11.87 to -3.04).

LIMITATIONS: The follow-up periods of these included trials in the meta-analysis ranged from 4 to 24 weeks. The difference of follow-up periods influenced how study outcomes were recorded. These included trials also had significant differences in patient selections. Some trials may actually include CNLBP patients with neuropathic pain, as not having focal neurological findings or signs does not mean that the pain is not neuropathic. Consequently, different pain conditions may influence patients who responded to the same drug and then influence pooled estimates of treatment effect size.

CONCLUSION: This review endorses the use of COX-2 NSAIDs as the first-line drugs for CNLBP. Tramadol shows no statistically significant effect on pain relief, but has small effect sizes in improving functioning. Among included opioid therapy studies, the overall effects of opioids and the partial opioids agonist drug had statistically significant treatment effects in pain relief for CNLBP patients.

LBP and predicting longevity

Spine (Phila Pa 1976). 2014 Apr 20;39(9):E581-6. doi: 10.1097/BRS.0000000000000248.

Testing a New 10-Item Scale (Pind's LBP Test) for Prediction of Sick Leave Lasting More Than Three Days or More Than Two Weeks After a General Practitioner Visit for Acute Low Back Pain.

Pind R.

Abstract

STUDY DESIGN:

A study on acute low back pain (LBP) in consecutive working patients in a multicenter study in general practice.

OBJECTIVE:

LBP costs are enormous in all countries. New guidelines are difficult to introduce. On the basis of a new, specially developed LBP scale, the aims were to predict the duration of sick leave (SL), and to examine if the guidelines concerning bed rest (BR) and referral to radiographical examination were followed.

SUMMARY OF BACKGROUND DATA:

Pain intensity and heavy work influence the course of SL. A finger-to-floor distance test assesses the mobility of the spine, and both the finger-to-floor distance test and the straight leg raising test (SLRT) can be used to predict the course of LBP. BR or waiting time for treatment or referral will prolong SL. The expectations of patients and general practitioners are strong outcome predictors as is information about the prognosis.

METHODS:

A user-friendly 10-item questionnaire was specifically developed. The scale included the background date. From a predefined scale the patients were subgrouped into 3 categories in relation to SL: (1) "no SL" or "a few days of SL," (2) "1 week of SL," and (3) "more than 2 weeks of SL." The Fisher exact test was used to compare categorical variables.

RESULTS:

Twenty-three doctors examined 207 working patients. A total of 114 patients (56%) completed the follow-up questionnaire. The 10-item scale showed a good correlation between the total score at the first general practitioner visit and predictable time of SL according to the 3 periods. The frequency of BR and referral to radiographical examination was low, and perhaps this was a consequence of using the scale.

CONCLUSION:

The specially developed short and user-friendly 10-item LBP scale was a good predictor of the duration of SL. A low rate of BR and radiographical examination may even be the result of using the scale. Level of Evidence: N/A.

PMID 24480937

Balancing reactions

Chinese Medical Journal 2014;127(7):1229-1234:10.3760/cma.j.issn.0366-6999.20121430

Comparison of postural control between healthy subjects and individuals with nonspecific low back pain during exposure to visual stimulus

Li Rui, Wang Ninghua, Yan Xiang and Wei Kunlin

Abstract

Background Low back pain (LBP) is a common clinical problem. Many researchers have demonstrated that LBP disorders have difference in sensory strategies for postural control. Optokinetic stimulation (OKS) of optic flow has been widely applied to study its effect on vision, but has not been applied to LBP. Here we used OKS on different surfaces to investigate the characteristics of chronic nonspecific LBP (CNLBP) posture control, so as to provide new theoretical and experimental data for further recognizing CNLBP and enriching its treatment.

Methods Fifteen individuals with CNLBP (age range 25–40 years) and 15 age and gender-matched control subjects were recruited. Each subject, while standing on a stable or soft surface, was exposed to random-dot patterns projected on a large screen, with the dots displaying expansion (+) and contraction (–) and velocities including 80°, 40°, and 20° per second. The visual stimulus used a “stimuli-interval” pattern. The peak velocity, different phases’ standard deviation (SD) of the anterior-posterior centre of pressure (COP) displacements and the total length of the medial-lateral COP sway (LML) for stable surface and soft surface were recorded by force platform.

Results The main effect of surface on all parameters was significant, while the main effect of group and OKS showed no significance with the exception of peak velocity ($F(3,95)=3.6$, $P=0.01$) and A2 ($F(5,140)=9.34$, $P<0.01$) for which the effect of OKS was significant. The interactions of group by OKS of A2 ($F(5,140)=3.65$, $P<0.01$) and group by surface by OKS ($F(5,140)=2.83$, $P=0.02$), and surface by OKS of A1 and A3 ($P<0.05$) were significant. It was reported that significantly more SD in amplitude in the T2 phase was seen in persons with CNLBP when confronting the + 40 stimuli on the soft surface ($P<0.05$) compared to healthy individuals.

Conclusions There was no significance between persons with CNLBP and healthy people when using the stable surface. Subjects with LBP showed decreased efficiency of postural adjustment when exposed to more complicated tasks and environments, especially OKS in the expansion direction, and displayed a visual-dependent phenomenon. This result suggested that the treatment of abnormal motor patterns in people with LBP should take the properties of task and environment into account.

LBP/Disc

Lumbar disc resorption

Spine (Phila Pa 1976). 2014 Apr 20;39(9):736-44. doi: 10.1097/BRS.0000000000000259.

Spontaneous resorption of lumbar disc herniation is less likely when modic changes are present.

Shan Z¹, Fan S, Xie Q, Suyou L, Liu J, Wang C, Zhao F.

Author information

Abstract

STUDY DESIGN:

A retrospective survey on 85 consecutive patients with primary single-level lumbar disc herniation (LDH).

OBJECTIVE:

To investigate associations between Modic changes (MCs) and the likelihood of resorption of herniated lumbar intervertebral discs.

SUMMARY OF BACKGROUND DATA:

Spontaneous resorption of LDH has been demonstrated, whereas the mechanisms are unclear. MCs are closely associated with disc degeneration, but research focusing on their association with spontaneous resorption of LDH has not been specifically investigated.

METHODS:

Eighty-five consecutive patients with LDH (52 males, 33 females, aged 20-66 yr) were included. Patients' diagnosis was based on clinical presentation, magnetic resonance imaging, and computed tomography. Patients were divided into surgical and conservative groups and further divided into MC and non-MC subgroups. Spontaneous resorption and clinical success in the conservative group were assessed by reduction in the herniated volume and Oswestry Disability Index. Disc tissues collected from the surgical group were examined histologically, and immunohistochemistry was used to identify endothelial cells and macrophages.

RESULTS:

In total, 35 of 85 patients showed MC, mostly type II. Herniated tissue in MC group contained relatively more hyaline cartilage endplate than that in non-MC group (on average, 50% vs. 8%, $P < 0.05$) but less nucleus pulposus (18% vs. 55%, $P < 0.05$). Conservative treatment reduced Oswestry Disability Index scores in non-MC group from 29.4 to 23.5 on average ($P < 0.05$), but reductions in MC group (30.1-29.0) were nonsignificant. Herniated volumes reduced after conservative treatment in non-MC group (0.44-0.21 cm, $P < 0.05$) but not in MC group (0.52-0.45 cm, $P > 0.05$). More neovascularization and macrophage infiltration was observed in herniated tissue from non-MC group than from MC group ($P < 0.001$).

CONCLUSION:

MCs in patients with LDH are associated with cartilaginous herniations that resorb poorly, so that patients respond less well to conservative treatments. Loss of cartilaginous endplate may explain the origins of MCs and their association with disc infection. Level of Evidence: 3.

PMID:24503683

LBP/INJECTIONS

Epidurals and diabetics

Am J Phys Med Rehabil. 2014 May;93(5):372-8. doi: 10.1097/PHM.0000000000000001.

Changes in Blood Glucose and Cortisol Levels After Epidural or Shoulder Intra-articular Glucocorticoid Injections in Diabetic or Nondiabetic Patients.

Moon HJ¹, Choi KH, Lee SI, Lee OJ, Shin JW, Kim TW.

Author information

Abstract

OBJECTIVE:

The aim of this study was to investigate the changes in blood glucose and cortisol levels after glucocorticoid injections into the epidural space or the glenohumeral joint in patients with or without diabetes.

DESIGN:

Twenty-nine patients with sciatic or shoulder pain were included. Fasting plasma glucose and cortisol levels were measured at baseline. After glucocorticoid injection, the levels were measured again after 1, 7, and 21 days. The patients were divided into four subgroups according to the presence of diabetes and site of injection.

RESULTS:

In all subgroups, fasting plasma glucose levels were significantly higher 1 day after injection but returned to baseline 7 days after the injection. Compared with baseline, cortisol levels were markedly reduced 1 and 7 days after the injection. For both the diabetic and nondiabetic subjects, this drop was significantly larger in the epidural injection than the glenohumeral joint injection. At 21 days after injection, cortisol levels returned to baseline in all subgroups except in the diabetic patients treated with epidural injections.

CONCLUSIONS:

These findings indicate a need for caution when using local glucocorticoid injection therapy in diabetic patients, most notably when an epidural injection is given. It is also recommended that diabetic patients take more time off before receiving a succeeding epidural glucocorticoid injection.

PMID:24508924

Surgery/LBP

Obesity and outcomes of surgery

Spine (Phila Pa 1976). 2014 May 1;39(10):798-804. doi: 10.1097/BRS.0000000000000232.

Body mass index as a predictor of complications and mortality after lumbar spine surgery.

Marquez-Lara A¹, Nandyala SV, Sankaranarayanan S, Noureldin M, Singh K.

Author information

Abstract

STUDY DESIGN:

Retrospective analysis.

OBJECTIVE:

A national population-based database was analyzed to characterize the risks of postoperative complications and mortality associated with the patient's body mass index (BMI) after lumbar spinal surgery.

SUMMARY OF BACKGROUND DATA:

Obesity has been associated with greater perioperative complications and worsened surgical outcomes after lumbar spinal surgery. However, the stratified BMI risks of postoperative complications relative to normal weight patients have not been well characterized.

METHODS:

The American College of Surgeons National Surgical Quality Improvement Program database was queried to identify patients who underwent lumbar spinal surgery between 2006 and 2011. Patients were stratified into BMI cohorts: normal (18.5-24.99 kg/m), overweight (25.00-29.99 kg/m), class 1 (30.00-34.99 kg/m), class 2 (35.00-39.99 kg/m), and class 3 (≥ 40 kg/m) obesity. Preoperative patient characteristics and perioperative outcomes were assessed. The relative risks of 30-day postoperative complications and mortality for each BMI cohort were calculated in reference to the normal weight cohort using a 95% confidence interval.

RESULTS:

A total of 24,196 patients underwent lumbar spine surgery between 2006 and 2011 of which 19,195 (79.3%) were overweight or obese. The risk for deep vein thrombosis increased beginning with overweight patients and compounded for the subsequent obesity classes. The risk for superficial wound infection and pulmonary embolism increased beginning with the class 1 obesity cohort. Furthermore, the relative risk increase for urinary tract infection, acute renal failure, and sepsis was significantly increased only among class 3 obesity patients. Lastly, there was no relative risk increase in 30-day mortality in any cohort after lumbar spine surgery.

CONCLUSION:

Overweight and obese patients demonstrated an increased risk of postoperative complications relative to normal weight patients. Despite these findings, a BMI 25 kg/m or more was not associated with a greater risk of mortality. Further studies are warranted to characterize the impact of postoperative complications associated with overweight and obese patients on hospital resource utilization and costs after lumbar spine surgery. Level of Evidence: 4.

PMID: 24480950

VISCERA

Vestibulodynia

Clin J Pain. 2014 May;30(5):428-35. doi: 10.1097/AJP.0b013e31829ea118.

A comparison of demographic and psychosexual characteristics of women with primary versus secondary provoked vestibulodynia.

Brotto LA¹, Sadownik LA, Thomson S, Dayan M, Smith KB, Seal BN, Moses M, Zhang A.

Author information

Abstract

OBJECTIVES:

Provoked vestibulodynia (PVD) is a distressing genital pain condition affecting approximately 12% of premenopausal women. It has been speculated that primary (ie, lifelong) and secondary (ie, acquired) PVD may represent 2 distinct conditions with different etiologies. There is also evidence that primary and secondary PVD subtypes may respond differently to conventional treatments. The goal of this study was to compare the demographic, clinical, and psychosexual characteristics of a large sample of premenopausal women with primary and secondary PVD.

METHODS:

A total of 132 premenopausal women (n=42 primary; n=90 secondary) with PVD who sought treatment in a Multidisciplinary Vulvodynia Program completed demographic questions and a battery of validated self-report measures before treatment.

RESULTS:

Women with primary PVD had a longer duration of PVD as well as more time before diagnosis. Women with secondary PVD reported significantly more clitoral hood pain, higher overall vestibular pain levels, more overall sexual dysfunction and sex-related distress, and proportionately more intercourse occasions that were painful. Women with primary pain stated they had significantly more dysmenorrhea and were more likely to report that their partners were unaware of their PVD symptoms. There were no significant subtype differences on any psychological measure but a trend towards higher magnification of symptoms in women with secondary PVD.

DISCUSSION:

Overall the findings suggest some important differences in the characteristics of women with primary versus secondary PVD which may have management-related implications.

PMID: 23887337

Pelvic pain

Reg Anesth Pain Med. 2014 May-Jun;39(3):181-4. doi: 10.1097/AAP.000000000000068.

Correlation between altered central pain processing and concentration of peritoneal fluid inflammatory cytokines in endometriosis patients with chronic pelvic pain.

Neziri AY¹, Bersinger NA, Andersen OK, Arendt-Nielsen L, Mueller MD, Curatolo M.

Abstract

Translational research has not yet elucidated whether alterations in central pain processes are related to peripheral inflammatory processes in chronic pain patients. We tested the hypothesis that the concentration of cytokines in the peritoneal fluid of endometriosis patients with chronic pain correlate with parameters of hyperexcitability of the nociceptive system. The concentrations of 15 peritoneal fluid cytokines were measured in 11 patients with chronic pelvic pain and a diagnosis of endometriosis. Six parameters assessing central pain processes were recorded. Positive correlations between concentration of some cytokines in the peritoneal fluid and amplification of central pain processing were found. The results suggest that inflammatory mechanisms may be important in the pathophysiology of altered central pain processes and that cytokines produced in the environment of endometriosis could act as mediators between the peripheral lesion and changes in central nociceptive processes.

PMID: 24694998

Pelvic congestion syndrome

J Vasc Interv Radiol. 2014 May;25(5):725-733. doi: 10.1016/j.jvir.2014.01.030

Pelvic Congestion Syndrome: Etiology of Pain, Diagnosis, and Clinical Management.

Phillips D¹, Deipolyi AR², Hesketh RL³, Midia M⁴, Oklu R⁵.

Author information

Abstract

Pelvic congestion syndrome is associated with pelvic varicosities that result in chronic pelvic pain, especially in the setting of prolonged standing, coitus, menstruation, and pregnancy.

Although the underlying pathophysiology of pelvic congestion syndrome is unclear, it probably results from a combination of dysfunctional venous valves, retrograde blood flow, venous hypertension, and dilatation. Asymptomatic women may also have pelvic varicosities, making pelvic congestion syndrome difficult to diagnose.

This article explores the etiologies of pain, use of imaging techniques, and clinical management of pelvic congestion syndrome. Possible explanations for the spectrum of pain among women with pelvic varicosities are also discussed.

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PMID: 24745902

Abdominal pain in females

World J Gastroenterol. 2014 Apr 14;20(14):4043-9. doi: 10.3748/wjg.v20.i14.4043.

Acute right lower abdominal pain in women of reproductive age: Clinical clues.

Hatipoglu S, Hatipoglu F, Abdullayev R.

Author information

Abstract

AIM:

To study possible gynecological organ pathologies in the differential diagnosis of acute right lower abdominal pain in patients of reproductive age.

METHODS:

Following Clinical Trials Ethical Committee approval, the retrospective data consisting of physical examination and laboratory findings in 290 patients with sudden onset right lower abdominal pain who used the emergency surgery service between April 2009 and September 2013, and underwent surgery and general anesthesia with a diagnosis of acute appendicitis were collated.

RESULTS:

Total data on 290 patients were obtained. Two hundred and twenty-four (77.2%) patients had acute appendicitis, whereas 29 (10%) had perforated appendicitis and 37 (12.8%) had gynecological organ pathologies. Of the latter, 21 (7.2%) had ovarian cyst rupture, 12 (4.2%) had corpus hemorrhagicum cyst rupture and 4 (1.4%) had adnexal torsion. Defense, Rovsing's sign, increased body temperature and increased leukocyte count were found to be statistically significant in the differential diagnosis of acute appendicitis and gynecological organ pathologies.

CONCLUSION:

Gynecological pathologies in women of reproductive age are misleading in the diagnosis of acute appendicitis.

KEYWORDS:

Anamnesis, Appendicitis, Differential diagnosis, Gynecological pathologies, Physical examination

PMID: 24744594

Arousal and pelvic pain

Persistent genital arousal in women with pelvic and genital pain

Journal of Obstetrics and Gynaecology Canada, 04/22/2014 Clinical Article

Pink L, et al

Abstract

Objective: Persistent genital arousal disorder (PGAD) has been identified as a condition of often unprovoked genital arousal associated with a significant level of distress. PGAD is not well understood, and no definitive cause has been determined. The aim of this study was to gain a better understanding of the disorder and to seek commonalities between cases of PGAD encountered in a chronic pain management clinic.

Method: We reviewed a cohort of 15 women with PGAD who presented to a chronic non-cancer pain clinic in a large urban tertiary teaching hospital that provides pelvic and genital pain management. We conducted a series of interviews to examine medical history, history of presenting illness, and management. Descriptive statistics were used to examine the data.

Results: Findings were largely consistent with previous research on PGAD regarding symptomatology and aggravating and alleviating factors. Symptoms of genital pain, depression, and interstitial cystitis were found in over one half of the patients in this cohort. Previous antidepressant use, restless legs syndrome, and pudendal neuralgia were found in a number of cases. Pelvic varices and Tarlov cysts have been previously identified as possible contributors to PGAD, but these were not a common finding in our cohort.

Conclusion: Further research is needed to build on the current understanding of PGAD. Patients should be asked about persistent arousal as part of a sexual and reproductive history, especially in the case of common comorbidities.

Endometriosis and pain

Eur J Pain. 2014 Apr 14. doi: 10.1002/ejp.514

Pain threshold and sleep quality in women with endometriosis.

Nunes FR¹, Ferreira JM, Bahamondes L.

Abstract

BACKGROUND:

Pain is a common complaint in women with endometriosis and can be influenced by many variables, including sleep disorders; however, no data are available on the sleep quality of women with endometriosis or on the correlation between sleep quality and pain.

METHODS:

The 510 volunteers included in this study were divided into two groups: 257 women with a laparoscopic and histopathological diagnosis of endometriosis and 253 women with no history of endometriosis and no endometriosis-related symptoms. The volunteers answered two questionnaires: the Post-Sleep Inventory to evaluate sleep quality and the International Physical Activity Questionnaire to assess their level of physical activity. Pain was evaluated using a visual analogue scale (VAS) and women were also submitted to a physical examination, during which their pain threshold was assessed at 20 different body sites.

RESULTS:

Sleep quality was significantly poorer in women with endometriosis compared to women without the disease. The pain threshold was significantly lower in the greater trochanter and abdomen in women with endometriosis when compared to women without the disease; however, there was no difference in VAS pain score between the groups. The higher the VAS pain score, the lower the Post-Sleep Inventory score. Additionally, there was a significant positive correlation between the pain threshold at some body sites and sleep quality.

CONCLUSIONS:

Sleep quality was poorer and the pain threshold at certain body sites was lower in the group of women with endometriosis.

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PMID: 24733758

CERVICAL SPINE

C spine capsules

Spine (Phila Pa 1976). 2014 Jan 29.

In Vivo Cervical Facet Joint Capsule Deformation During Flexion-Extension.

Anderst WJ1, Donaldson WF 3rd, Lee JY, Kang JD.

Author information

Abstract

Study Design. Non-randomized controlled cohort. **Objective.** To characterize subaxial cervical facet joint kinematics and facet joint capsule (FJC) deformation during in vivo, dynamic flexion-extension. To assess the effect of single-level anterior arthrodesis on adjacent segment FJC deformation.

Summary of Background Data. The cervical facet joint has been identified as the most common source of neck pain and it is thought to play a role in chronic neck pain related to whiplash injury. Our current knowledge of cervical facet joint kinematics is based on cadaveric mechanical testing.

Methods. 14 asymptomatic controls and 9 C5-C6 arthrodesis patients performed full range of motion (ROM) flexion-extension while biplane radiographs were collected at 30 Hz. A volumetric model-based tracking process determined 3D vertebral position with sub-millimeter accuracy. FJC fibers were modeled and grouped into anterior, lateral, posterior-lateral, posterior, and posterior-medial regions. FJC fiber deformations (total, shear and compression-distraction) relative to the static position were determined for each cervical motion segment (C2-C3 through C6-C7) during flexion-extension.

Results. No significant differences in the rate of fiber deformation in flexion were identified among motion segments ($p = .159$), however, significant differences were observed among fiber regions ($p < .001$). Significant differences in the rate of fiber deformation in extension were identified among motion segments ($p < .001$) and among fiber regions ($p = .001$). The rate of FJC deformation in extension adjacent to the arthrodesis was 45% less than in corresponding motion segments in control subjects ($p = .001$).

Conclusion. In control subjects, facet joint capsule deformations are significantly different among vertebral levels and capsule regions when vertebrae are in an extended orientation. In a flexed orientation, FJC deformations are only different among capsule regions. Single-level anterior arthrodesis is associated with significantly less FJC deformation adjacent to the arthrodesis when the spine is in an extended orientation.

Impact on employment of C spine symptoms

Experiences of employees with arm, neck and shoulder complaints: a focus group study

BMC Musculoskeletal Disorders, 04/30/2014 Evidence Based Medicine Clinical Article

Hutting N, et al. –

CANS causes significant work problems, including absenteeism (sickness absence), presenteeism (decreased work productivity) and, ultimately, job loss so the experts realised the need for intervention programs for people suffering from CANS so the management of symptoms and workload, and improving the workstyle, could be important factors in the strategy to deal with CANS. They reveal several recurring problems and the results endorse the multi-factorial origin of CANS which participants generally experience that are similar to those of employees with other types of complaints or chronic diseases, e.g. related to their illness, insufficient communication, working together with healthcare professionals, colleagues and management, and workplace adaptations. They addressed the topics in the adaptation of an existing self-management program to the characteristics of employees suffering from CANS.

Methods

- A qualitative study comprising three focus group meetings with 15 employees suffering from CANS.
- Based on a question guide, participants were asked about experiences in relation to continuing work despite their complaints.
- Data were analysed using content analysis with an open-coding system.
- During selective coding, general themes and patterns were identified and relationships between the codes were examined.

Results

- Participants suffering from CANS often have to deal with pain, disability, fatigue, misunderstanding and stress at work.
- Some needs of the participants were identified, i.e. disease-specific information, exercises, muscle relaxation, working with pain, influence of the work and/or social environment, and personal factors (including workstyle).

Whiplash and sensory changes

Clin J Pain. 2014 May;30(5):436-42. doi: 10.1097/AJP.0b013e3182a03940.

Less Efficacious Conditioned Pain Modulation and Sensory Hypersensitivity in Chronic Whiplash-associated Disorders in Singapore.

Ng TS¹, Pedler A, Vicenzino B, Sterling M.

Author information

Abstract

OBJECTIVES:

Cultural differences in pain perception exist. Although chronic whiplash-associated disorder (WAD) is well investigated in western countries, little is known about its presentation in Singapore. We studied the neck motion and pain sensitivity in people with chronic WAD in Singapore.

MATERIALS AND METHODS:

Thirty chronic WAD participants (>3 mo, Neck Disability Index: 40% [SD 17%]) were age, sex, and ethnicity matched with 30 pain-free controls. All 60 participants underwent the following tests: active neck motion, pain thresholds (pressure, brachial plexus provocation test [BPPT], cold), cold pain tolerance, and conditioned pain modulation (CPM). The test stimulus of contact heat and conditioning stimulus of cold water immersion was used to assess CPM. Data were evaluated to determine differences between WAD and control groups.

RESULTS:

Active neck motion ($F_{1,29}=80.02$), pain thresholds of blunt pressure ($F_{1,29}=20.84$), BPPT ($F_{1,29}=54.56$), and cold ($Z=-4.31$) were significantly lower in participants with WAD ($P<0.0001$). Cold pressor pain tolerance was significantly lower in participants with WAD ($Z=-2.89$, $P=0.02$). A less efficacious CPM was also demonstrated in participants with WAD ($F_{1,29}=9.20$, $P=0.03$). A combination of BPPT and cold hyperalgesia best predicted the WAD group (sensitivity=96.7%, specificity=96.7%).

DISCUSSION:

These findings of sensory hypersensitivity and decreased neck motion in Singaporeans with chronic WAD are consistent with physical impairments reported in western populations.

PMID: 23887342

Recovery from whiplash

BMC Musculoskelet Disord. 2014 Apr 16;15(1):130. [Epub ahead of print]

Multidimensional associative factors for improvement in pain, function, and working capacity after rehabilitation of whiplash associated disorder: a prognostic, prospective outcome study.

Angst F, Gantenbein AR, Lehmann S, Gysi-Klaus F, Aeschlimann A, Michel BA, Hegemann F.

Abstract

BACKGROUND:

Whiplash associated disorders (WAD) have dramatic consequences for individual and public health. Risk factors for better and worse outcomes are important to optimize management. This study aimed to determine short- and mid-term associative co-factors of neck pain relief, improved physical functioning, and improved working capacity (dependent variables) in patients suffering from whiplash associated disorder who participated in a standardized, inpatient pain management program.

METHODS:

Naturalistic, observational, prospective cohort study. Outcome was measured by standardized assessment instruments. Co-factors covered sociodemographics, comorbidities, social participation, affective health, and coping abilities. Stepwise, multivariate linear regression analysis was performed at discharge and at the 6-month follow-up.

RESULTS:

All regression models explained high proportions of variance (53.3% - 72.1%). The corresponding baseline level was significantly associated with a change in every dependent variable (explained variances: 11.4%-56.7%). Pain relief significantly depended on improved function and vice-versa (3.4%-14.8%). Improved ability to decrease pain was associated with pain relief at discharge (9.6%). Functional improvement was associated with decreased catastrophizing (19.4%) at discharge and decreased depression (20.5%) at the 6 month follow-up.

CONCLUSIONS:

Pain relief, improved physical function and working capacity were associated with each other. Improved coping (catastrophizing and ability to decrease pain) and reduced depression may act as important predictors for pain relief and improved function. These findings offer toe-holds for optimized therapy of chronic WAD

Adolescent neck and shoulder pain/activity

J Adolesc Health. 2014 Apr 16. pii: S1054-139X(14)00105-0. doi: 10.1016/j.jadohealth.2014.02.016.

Adolescent Neck and Shoulder Pain-The Association With Depression, Physical Activity, Screen-Based Activities, and Use of Health Care Services.

Myrtveit SM¹, Sivertsen B², Skogen JC³, Frostholt L⁴, Stormark KM⁵, Hysing M⁵.

Abstract

PURPOSE:

Neck and shoulder pain is frequent in adolescents, and multiple factors seem to affect the risk of such symptoms. We aimed to investigate the prevalence of neck and shoulder pain in Norwegian adolescence and to examine whether behavioral and emotional factors were associated with the risk of neck and shoulder pain. Finally we aimed to investigate whether neck and shoulder pain was related to the use of health services.

METHOD:

Data from the population-based study ung@hordaland were used. Participants were asked how often during the last 6 months they had experienced neck and shoulder pain. The association between frequent neck and shoulder pain and physical activity, symptoms of depression, and screen-based activities was evaluated using logistic regression analyses stratified by gender. The relative risk of visiting health services when reporting neck and shoulder pain was calculated using multiple logistic regression analyses.

RESULTS:

Frequent neck and shoulder pain was reported by 20.0% (1,797 of the total 8,990) and more often by girls than boys ($p < .001$). A high score of depressive symptoms was the strongest risk factor for neck and shoulder pain in both boys and girls (odds ratio = 6.14 [95% confidence interval 4.48-8.42] and odds ratio = 3.10 [95% confidence interval 2.63-3.67], respectively). Frequent screen-based activities slightly increased the risk while physical activity was protective. Individuals reporting neck and shoulder pain more often visited their general practitioner (47.1% vs. 31.8%) and school health services (24.6% vs. 13.5%).

CONCLUSION:

Frequent neck and shoulder pain was reported in 20% of Norwegian adolescents. Symptoms of depression and screen-based activities increased the risk of neck and shoulder pain while physical activity was protective. Individuals reporting neck and shoulder pain visited health services more frequently than others.

Copyright © 2014 Society for Adolescent Health and Medicine. Published by Elsevier Inc. All rights reserved. **KEYWORDS:** Adolescent health, Depression, Health services, Neck and shoulder pain, Physical activity, Risk factors, Screen-based activities PMID:24746679

Emotions and chronic neck pain

Clin J Pain. 2013 Dec;29(12):1029-35. doi: 10.1097/AJP.0b013e31828027a2.

The determinants of function and disability in neck patients referred to a specialized outpatient clinic.

Johansen JB, Røe C, Bakke ES, Mengshoel AM, Storheim K, Andelic N.

Source *Department of Physical Medicine and Rehabilitation §Communication and research unit for musculoskeletal disorders, FORMI ||Department of Orthopaedics, Oslo University Hospital, Ullevål †Faculty of Medicine ‡Department of Health Sciences, Institute of Health and Society, University of Oslo, Oslo, Norway.

AIM/OBJECTIVES/BACKGROUND: Considerable attention has been paid to assessing the risk factors for the development of disability following neck pain (NP) in the general population, but we still lack knowledge regarding disability in NP patients referred to a specialist level of care. This study investigated the associations among the socio-demographic characteristics, work ability, self-reported pain, emotional distress, fear of movement and disability of NP patients referred to a specialised neck and back outpatient clinic. In total, 221 patients participated in this cross-sectional study, which was conducted from December 2007 to December 2009.

METHODS: The associations between demographics, pain reports, emotional distress, fear of movement and the self-reported disability of NP were investigated by correlation and regression analyses. The pain intensity was assessed using the numeric rating scale (NRS), the pain distribution was assessed by the number of pain areas drawn, emotional distress was assessed by the Hopkins Symptom Checklist version 25 (HSCL-25), and the fear of movement was assessed by the Tampa Scale for Kinesiophobia (TSK). The self-rated disability was assessed using the Neck Disability Index (NDI).

RESULTS: The mean NDI score was 41.9 (SD, 16). According to the multiple regression analysis, emotional distress explained 37% of the variance in the NDI, the pain intensity 12%, and the pain distribution and the fear of movement accounted for 4%. The pain intensity and emotional distress were the strongest individual explanatory variables (β -values: 0.36 [95% CI, 1.96-3.56] and 0.33 [95% CI, 0.24-0.51], respectively).

CONCLUSIONS: These results suggest that emotion should be considered in any assessment of patients with chronic NP and targeting emotional factors should be an integral part of treatment strategies.

PMID: 23370090

HEADACHES

Headache/mindfulness

Complement Ther Med. 14 Apr;22(2):278-85. doi: 10.1016/j.ctim.2013.12.018. Epub 2014 Jan 9.

Mindfulness-based cognitive therapy for the treatment of headache pain: A mixed-methods analysis comparing treatment responders and treatment non-responders.

Day MA¹, Thorn BE², Rubin NJ³.

OBJECTIVES:

Our recent pilot study demonstrated mindfulness-based cognitive therapy (MBCT) is a potentially efficacious headache pain treatment; however, it was not universally effective for all participants. This study sought to explore patient characteristics associated with MBCT treatment response and the potential processes of change that allowed treatment responders to improve and that were potentially lacking in the non-responders.

DESIGN:

We implemented a mixed-methods analysis of quantitative and qualitative data. The sample consisted of 21 participants, 14 of whom were classified as treatment responders ($\geq 50\%$ improvement in pain intensity and/or pain interference) and seven as non-responders ($< 50\%$ improvement).

SETTING:

The study was conducted at the Kilgo Headache Clinic and the University of Alabama Psychology Clinic.

INTERVENTION:

Participants completed an 8-week MBCT treatment for headache pain management.

MEASURES:

Standardized measures of pain, psychosocial outcomes, and non-specific therapy factors were obtained; all participants completed a post-treatment semi-structured interview.

RESULTS:

Quantitative data indicated a large effect size difference between responders and non-responders for pre- to post-treatment change in standardized measures of pain acceptance and catastrophizing, and a small to medium effect size differences on treatment dose indicators. Both groups showed improved psychosocial outcomes. Qualitatively, change in cognitive processes was a more salient qualitative theme within treatment responders; both groups commented on the importance of non-specific therapeutic factors. Barriers to mindfulness meditation were also commented on by participants across groups.

CONCLUSIONS:

Results indicated that change in pain related cognitions during an MBCT intervention for headache pain is a key factor underlying treatment response.

Copyright © 2014 Elsevier Ltd. All rights reserved. **KEYWORDS:** Headache pain, Mindfulness-based cognitive therapy, Mixed-methods analysis, Responder analysis
PMID: 24731899

Impact of depression and allodynia on HA

Cephalalgia. 2014 Apr 25. [Epub ahead of print]

Allodynia is associated with a higher prevalence of depression in migraine patients.

Louter M¹, Wardenaar K, Veen G, Oosterhout WV, Zitman F, Ferrari M, Terwindt G.

Author information

- ¹Department of Neurology, Leiden University Medical Centre, the Netherlands.

Abstract

INTRODUCTION:

There is a strong association between migraine and depression. The aim of this study is to identify migraine-specific factors involved in this association.

METHODS:

We conducted a cross-sectional study in a large, well-defined cohort of migraine patients (N = 2533). We assessed lifetime depression using validated questionnaires, and diagnosed migraine based on the International Classification of Headache Disorders III-beta criteria. Multivariate regression analyses were conducted.

RESULTS:

Of the 2533 migraineurs that were eligible, 1137 (45%) suffered from lifetime depression. The following independent factors were associated with an increased depression prevalence: i) migraine-specific risk factors: high migraine attack frequency and the presence of allodynia, ii) general factors: being a bad sleeper, female gender, high BMI, being single, smoking, and a low alcohol consumption.

CONCLUSION:

This study identified allodynia, in addition to high migraine attack frequency, as a new migraine-specific factor associated with depression.

KEYWORDS: LUMINA, Migraine, allodynia, comorbidity, depression PMID:24770422

Headaches arterial control

Curr Pain Headache Rep. 2014 May;18(5):417. doi: 10.1007/s11916-014-0417-4.

Role of Angiotensin modulation in primary headaches.

Tronvik E¹, Stovner LJ.

Author information

Abstract

The renin-angiotensin system (RAS) is a major regulatory system controlling many different homeostatic mechanisms both within the brain and in the periphery.

While it is primarily associated with blood pressure and salt/water regulation, increasing evidence points to the involvement of the RAS in both headache disorders specifically and pain regulation in general. Several publications have indicated that drugs blocking various elements of the renin-angiotensin system lead to a reduction in migraine. Additionally, interventions on different angiotensin peptides or their receptors have been shown to both reduce and increase pain in animal models.

As such, modulation of the renin-angiotensin system is a promising approach to the treatment of headaches and other pain conditions.

PMID: 24729173

HA and dementia

Cephalalgia. 2013 Nov 21.

Headache as a risk factor for dementia: A prospective population-based study.

Hagen K, Stordal E, Linde M, Steiner TJ, Zwart JA, Stovner LJ.

Source

Department of Neuroscience, Norwegian University of Science and Technology, Norway.

Abstract

BACKGROUND:

Headache has not been established as a risk factor for dementia. The aim of this study was to determine whether any headache was associated with subsequent development of vascular dementia (VaD), Alzheimer's disease (AD) or other types of dementia.

METHODS:

This prospective population-based cohort study used baseline data from the Nord-Trøndelag Health Study (HUNT 2) performed during 1995-1997 and, from the same Norwegian county, a register of cases diagnosed with dementia during 1997-2010. Participants aged ≥ 20 years who responded to headache questions in HUNT 2 were categorized (headache free; with any headache; with migraine; with nonmigrainous headache). Hazard ratios (HRs) for later inclusion in the dementia register were estimated using Cox regression analysis.

RESULTS:

Of 51,383 participants providing headache data in HUNT 2, 378 appeared in the dementia register during the follow-up period. Compared to those who were headache free, participants with any headache had increased risk of VaD (N = 63) (multivariate-adjusted HR = 2.3, 95% CI 1.4-3.8, P = 0.002) and of mixed dementia (VaD and AD (N = 52)) (adjusted HR = 2.0, 95% CI 1.1-3.5, P = 0.018). There was no association between any headache and later development of AD (N = 180).

CONCLUSION: In this prospective population-based cohort study, any headache was a risk factor for development of VaD.

KEYWORDS: Alzheimer's disease, headache, migraine, vascular dementia PMID:24265286

SHOULDER GIRDLE

Scapula dyskinesia

Revisit to scapular dyskinesia: three-dimensional wing computed tomography in prone position

Journal of Shoulder and Elbow Surgery, 11/26/2013 Evidence Based Medicine

Park JY, et al.

Background

Three-dimensional (3D) wing computed tomography (CT) showed a high inter-rater reliability in assessing scapular dyskinesia.

Methods

The 330 scapular movements of 165 patients were classified into 4 types by 7 blinded observers. Then, 3D wing CT was performed with patients prone, and 4 blinded observers measured 5 angles, consisting of upward rotation (UR) superior translation (ST), anterior tilting (AT), protraction (PRO), and internal rotation (IR). The inter-rater reliability (IRR) of 2 methods was calculated, and cutoff values were determined for the 5 angles on the 3D wing CT images.

Results

The IRR was 0.783 for the observational method of scapular dyskinesia and 0.981 for 3D wing CT in the prone position. UR and ST angles were significantly larger in type 3 more than in the other types ($P < .001$, $P < .001$), and the AT angle showed a similar pattern in type 1 ($P < .001$). The PRO angle was significantly larger in types 1, 2, and 3 more than in type 4 ($P < .001$, $P < .001$, $P = .013$), and the IR angle was significantly larger in type 2 more than in the other types ($P < .001$). The cutoff values of the 5 angles were UR, 117°; ST, 90°; AT, 8°; PRO, 99°; and IR, 51°. The UR angle showed a significant correlation with glenohumeral internal rotation deficit (odds ratio, 0.436; $P = .029$) and the IR angle with MDI (odds ratio, 8.947; $P = .048$).

Conclusion

The patients with a high UR angle showed a low rate of glenohumeral internal rotation deficit and those with a high IR angle had a high rate of the MDI in affected shoulder by the determinant of the cutoff value of the 5 angles.

Level of evidence: Level III, Development of Diagnostic Criteria with Nonconsecutive Patients, Diagnostic Study

Dominant side variation in posture

Dominance effect on scapula 3-dimensional posture and kinematics in healthy male and female populations

Journal of Shoulder and Elbow Surgery, 11/26/2013 Review Article

Schwartz C, et al.

Background

The contralateral shoulder is often used as a reference when evaluating a pathologic shoulder. However, the literature provides contradictory results regarding the symmetry of the scapular pattern in a healthy population. We assume that several factors including gender and type of motion may influence the bilateral symmetry of the scapulae.

Materials and methods

The dominant and nondominant shoulders of 2 populations of men and women comprising 11 subjects each were evaluated for 3 distinct motions: flexion in the sagittal plane, abduction in the frontal plane, and glenohumeral internal/external rotation with the arm abducted at 90°. Posture, kinematics, and range of motion were studied separately.

Results

Asymmetries are observed for motions performed in the frontal and sagittal plane but not for internal/external rotation with the arm abducted at 90°. For both male and female populations, multiplanar asymmetries are observed and the dominant scapula has a larger upward rotation. The asymmetries mainly originate in the scapula's kinematics and not in its original posture.

Conclusion

Small but significant asymmetries exist between the dominant and nondominant shoulders in terms of kinematics. One should be aware of these differences when using the contralateral shoulder as a reference.

Level of evidence: Basic Science Study, Kinematics

GLENOHUMERAL/SHOULDER

Subscapularis/coracohumeral ligament

J Shoulder Elbow Surg. 2014 Apr 21. pii: S1058-2746(14)00119-0. doi: 10.1016/j.jse.2014.02.009.

The anatomy of the coracohumeral ligament and its relation to the subscapularis muscle.

Arai R¹, Nimura A², Yamaguchi K², Yoshimura H³, Sugaya H⁴, Saji T¹, Matsuda S¹, Akita K⁵.

Abstract

BACKGROUND:

Only a few reports describe the extension of the coracohumeral ligament to the subscapularis muscle. The purposes of this study were to histo-anatomically examine the structure between the ligament and subscapularis and to discuss the function of the ligament.

METHODS:

Nineteen intact embalmed shoulders were used. In 9 shoulders, the expansion of the ligament was anatomically observed, and in 6 of these 9, the muscular tissue of the supraspinatus and subscapularis was removed to carefully examine the attachments to the tendons of these muscles. Five shoulders were frozen and sagittally sectioned into 3-mm-thick slices. After observation, histologic analysis was performed on 3 of these shoulders. In the remaining 5 shoulders, the coracoid process was harvested to investigate the ligament origin.

RESULTS:

The coracohumeral ligament originated from the horizontal limb and base of the coracoid process and enveloped the cranial part of the subscapularis muscle. The superficial layer of the ligament covered a broad area of the anterior surface of the muscle. Laterally, it protruded between the long head of the biceps tendon and subscapularis and attached to the tendinous floor, which extended from the subscapularis insertion. Histologically, the ligament consisted of irregular and sparse fibers abundant in type III collagen.

CONCLUSION:

The coracohumeral ligament envelops the whole subscapularis muscle and insertion and seems to function as a kind of holder for the subscapularis and supraspinatus muscles. The ligament is composed of irregular and sparse fibers and contains relatively rich type III collagen, which would suggest flexibility.

Copyright © 2014 Journal of Shoulder and Elbow Surgery Board of Trustees. Published by Mosby, Inc. All rights reserved. **KEYWORDS:** Anatomy, collagen, coracohumeral ligament, histology, shoulder joint, subscapularis muscle PMID: 24766789

Shoulder impingement scapula orientation

J Orthop Sports Phys Ther. 2014 Mar 27.

Reliability and Minimal Detectable Change of 3D Scapular Orientation in Subjects With and Without Shoulder Impingement.

Haik MN¹, Albuquerque-Sendín F, Camargo PR.

Author information

Abstract

Study Design Clinical measurement.

Objective To establish trial to trial within-day and between-day reliability, standard error of measurement (SEM), and minimum detectable change (MDC) of scapular orientations during elevation and lowering of the arm and with the arm relaxed at the side in subjects with and without shoulder impingement. **Background** Electromagnetic devices are commonly used to measure 3-D scapular kinematics during arm elevation in different conditions and for intervention studies. However, there is lack of studies that evaluate within and between-day reliability of these measurements.

Methods Subjects were divided in 2 groups: control and impingement. Kinematic data were collected using Flock of Birds® electromagnetic device during elevation and lowering of the arm in the sagittal plane on 2 different occasions separated by 3 to 5 days. Forty-nine subjects were tested for within-day reliability. Forty-three subjects were reassessed for between-day reliability.

Results Intraclass correlation coefficients (ICCs) for within- and between-day assessment of scapular orientation during elevation and lowering of the arm in both groups ranged from 0.92 to 0.99 and 0.54 to 0.88 respectively. ICCs for assessment of scapular orientation with the arms relaxed at the side in both groups ranged from 0.66 to 0.95. Standard Error of Measurements (SEMs) for between-day measurements ranged from 3.37° to 7.44° for both groups. The minimum detectable change (MDC₉₀) for between-day measurements increased from 7.81° at the lower to 17.27° at the higher humerothoracic elevation angles.

Conclusion These results support the use of Flock of Birds® to measure scapular orientations with excellent within-day reliability, but the measurements are not highly reliable over time in subjects with and without impingement symptoms. *J Orthop Sports Phys Ther*, Epub 27 March 2014. doi:10.2519/jospt.2014.4705.

PMID: 24673448

Shoulder ROM changes with sitting posture

J Bodyw Mov Ther. 2014 Apr;18(2):239-43. doi: 10.1016/j.jbmt.2013.09.008. Epub 2013 Sep 25.

Changes in sitting posture affect shoulder range of motion.

Kanlayanaphotporn R.

Author information

Abstract

OBJECTIVE:

To assess the effect of slouched sitting on shoulder range of motion (ROM).

METHOD:

30 asymptomatic males aged between 18 and 35 years with no history of shoulder problems within the last 6 months. Shoulder ROMs in flexion and abduction as well as external rotation and internal rotation in 90° of shoulder abduction were measured while the subjects sat in 3 different sitting postures.

RESULTS:

There were statistically significant mean differences among the 3 sitting postures regarding thoracic kyphosis and shoulder ROMs ($p < 0.001$). Post hoc analyzes demonstrated significant differences in all comparisons ($p < 0.001$).

CONCLUSION:

Changes in sitting posture affect shoulder ROMs in all directions tested. Greater changes in shoulder ROMs were associated with greater increase in thoracic kyphosis. These findings suggest that even subtle changes in thoracic kyphosis need to be considered during shoulder evaluation.

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KEYWORDS Shoulder range of motion, Slouched posture, Thoracic kyphosis

PMID: 24725793

Measuring ROM

J Shoulder Elbow Surg. 2014 Apr 10. pii: S1058-2746(14)00037-8. doi: 10.1016/j.jse.2014.01.006.

Measuring shoulder external and internal rotation strength and range of motion: comprehensive intra-rater and inter-rater reliability study of several testing protocols.

Cools AM¹, De Wilde L², Van Tongel A², Ceyssens C³, Ryckewaert R³, Cambier DC³.

BACKGROUND:

Shoulder range of motion (ROM) and strength measurements are imperative in the clinical assessment of the patient's status and progression over time. The method and type of assessment varies among clinicians and institutions. No comprehensive study to date has examined the reliability of a variety of procedures based on different testing equipment and specific patient or shoulder position. The purpose of this study was to establish absolute and relative reliability for several procedures measuring the rotational shoulder ROM and strength into internal (IR) and external (ER) rotation strength.

METHODS:

Thirty healthy individuals (15 male, 15 female), with a mean age of 22.1 ± 1.4 years, were examined by 2 examiners who measured ROM with a goniometer and inclinometer and isometric strength with a hand-held dynamometer (HHD) in different patient and shoulder positions. Relative reliability was determined by intraclass correlation coefficients (ICC). Absolute reliability was quantified by standard error of measurement (SEM) and minimal detectable change (MDC). Systematic differences across trials or between testers, as well as differences among similar measurements under different testing circumstances, were analyzed with dependent t tests or repeated-measures analysis of variance in case of 2 or more than 2 conditions, respectively.

RESULTS:

Reliability was good to excellent for IR and ER ROM and isometric strength measurements, regardless of patient or shoulder position or equipment used (ICC, 0.85-0.99). For some of the measurements, systematic differences were found across trials or between testers. The patient's position and the equipment used resulted in different outcome measures.

CONCLUSIONS:

All procedures examined showed acceptable reliability for clinical use. However, patient position and equipment might influence the results.

Copyright © 2014 Journal of Shoulder and Elbow Surgery Board of Trustees. Published by Mosby, Inc. All rights reserved. **KEYWORDS:** Shoulder rotation, goniometer, hand-held dynamometer, inclinometer, range of motion measurement, reliability, strength measurement
PMID:n 24726484

Adhesive Capsulitis

Initial indicators

Physiotherapy. 2014 Mar 12. pii: S0031-9406(14)00026-1. doi: 10.1016/j.physio.2014.02.001.

Movement and pain patterns in early stage primary/idiopathic adhesive capsulitis: a factor analysis.

Walmsley S1, Osmotherly PG2, Rivett DA3.

Abstract

OBJECTIVES:

To evaluate patients clinically diagnosed with early stage primary/idiopathic adhesive capsulitis to determine the existence of any pattern of movement loss and associated pain that may facilitate early recognition.

DESIGN:

Cross-sectional study.

SETTING:

Private upper limb specialty clinic, Newcastle, Australia.

PARTICIPANTS:

Fifty-two patients clinically diagnosed with early stage adhesive capsulitis by a medical practitioner or physiotherapist.

MAIN OUTCOME MEASURES:

Percentage loss of active and passive ranges of eight shoulder movements and the pain level at the end of each movement. The reason for limitation of movement was also recorded.

RESULTS:

Factor analysis clearly identified two groups for percentage loss of active range of movement. Notably external rotation movements grouped separately from other movements. A single group emerged for percentage loss of passive range of movement suggesting a non-specific global loss. For both pain at the end of active range of movement and passive range of movement two groups emerged, however the delineation between the groups was less clear than for percentage loss of active range of movement suggesting a pattern of end range pain may be less useful in identifying patients in this stage.

CONCLUSIONS:

External rotation movements in neutral and abduction generally group together and behave differently to other shoulder movements in patients clinically diagnosed with early stage primary/idiopathic adhesive capsulitis. In particular external rotation in abduction has emerged as the most painfully limited movement in this sample. This study provides preliminary evidence of patterns of range of movement and end range pain that require testing in a population of mixed shoulder diagnoses to determine their diagnostic utility for early stage adhesive capsulitis.

WRIST AND HAND

Carpal tunnel syndrome

Cortisone injections and outcomes

Acta Orthop. 2014 Feb;85(1):102-6. doi: 10.3109/17453674.2013.867781. Epub 2013 Nov 29.

Preoperative corticosteroid injections are associated with worse long-term outcome of surgical carpal tunnel release.

Vahi PS1, Kals M, Kõiv L, Braschinsky M.

Abstract

BACKGROUND AND PURPOSE:

Failed closed treatment of carpal tunnel syndrome (CTS) is often followed by surgery. We investigated whether preoperative steroid injections could have a negative effect on the long-term outcome of the operation.

PATIENTS AND METHODS:

174 hands (164 patients) were operated on by a single surgeon at Tartu University Hospital in 2005. The patients were interviewed by telephone 5-6 years after the operation. Self-reported data were gathered retrospectively concerning the number of steroid injections received before the surgery and the perceived regression of symptoms (on a 100-point numeric rating scale) at the time of interview. The patients were also asked about the presence of specific symptoms of CTS if regression of their symptoms had not been complete.

RESULTS:

93 of the 174 hands had complete regression of symptoms. Each additional injection was associated with an increased risk of occurrence of pain (RR = 1.1, 95% CI: 1.02-1.2), paresthesiae (RR = 1.1, CI: 1.1-1.2), and nocturnal awakenings (RR = 1.2, CI: 1.1-1.3). There was a weak association between the number of injections and the score given to regression of symptoms.

INTERPRETATION:

This is the first study to indicate that patients who received a greater number of local steroid injections preoperatively were more likely to have postoperative complaints associated with CTS.

Computer work and CTS

J Occup Environ Med. 2014 Feb;56(2):204-8. doi: 10.1097/JOM.0000000000000080.

Is carpal tunnel syndrome related to computer exposure at work? A review and meta-analysis.

Mediouni Z¹, de Roquemaurel A, Dumontier C, Becour B, Garrabe H, Roquelaure Y, Descatha A.

Author information

Abstract

OBJECTIVE:

A meta-analysis on epidemiological studies was undertaken to assess association between carpal tunnel syndrome (CTS) and computer work.

METHODS:

Four databases (PubMed, Embase, Web of Science, and Base de Donnees de Sante Publique) were searched with cross-references from published reviews. We included recent studies, original epidemiological studies for which the association was assessed with blind reviewing with control group. Relevant associations were extracted, and a metarisk was calculated using the generic variance approach (meta-odds ratio [meta-OR]).

RESULTS:

Six studies met the criteria for inclusion. Results are contradictory because of heterogeneous work exposure. The meta-OR for computer use was 1.67 (95% confidence interval [CI], 0.79 to 3.55). The meta-OR for keyboarding was 1.11 (95% CI, 0.62 to 1.98) and for mouse 1.94 (95% CI, 0.90 to 4.21).

CONCLUSION:

It was not possible to show an association between computer use and CTS, although some particular work circumstances may be associated with CTS.

Median nerve mobility

Acad Radiol. 2014 Apr;21(4):472-80. doi: 10.1016/j.acra.2013.12.012.

Altered Median Nerve Deformation and Transverse Displacement during Wrist Movement in Patients with Carpal Tunnel Syndrome.

Wang Y1, Filius A1, Zhao C1, Passe SM1, Thoreson AR1, An KN1, Amadio PC2.

Abstract

RATIONALE AND OBJECTIVES:

Carpal tunnel syndrome (CTS) is the most common peripheral nerve entrapment syndrome. Strong pinch or grip with wrist flexion has been considered a risk factor for CTS. Studying median nerve displacement during wrist movements may provide useful information about median nerve kinematic changes in patients with CTS. The purpose of this study was to evaluate the deformability and mobility of the median nerve in patients with CTS compared to healthy subjects.

MATERIALS AND METHODS:

Dynamic ultrasound images were obtained in 20 affected wrists of 13 patients with CTS. Results were compared to complementary data obtained from both wrists of 10 healthy subjects reported in a previous study. Shape and position of initial and final median nerve were measured and analyzed for six defined wrist movements. The deformation ratios for each movement were defined as the median nerve area, perimeter, and circularity of the final position normalized by respective values assessed in the initial position. The median nerve displacement vector and magnitude were also calculated.

RESULTS:

The deformation ratio for circularity was significantly less in patients with CTS compared to healthy subjects during wrist flexion ($P < .05$). The mean vector of median nerve displacement during wrist flexion was significantly different between patients with CTS and healthy subjects ($P < .05$). The displacement magnitude of the median nerve was found to be less in patients with CTS compared to healthy subjects during most movements, with the exception of wrist extension with fingers extended.

CONCLUSIONS:

Patients with CTS differ from normal subjects with regard to mobility and deformability of the median nerve.

KNEE

Squatting exercise

J Orthop Sports Phys Ther. 2014 Mar 27.

Patellofemoral Joint Stress During Weight Bearing and Non-Weight Bearing Quadriceps Exercises.

Powers CM¹, Ho KY, Chen YJ, Souza RB, Farrokhi S.

Abstract

Study Design Single-group, repeated-measures design.

Objective To compare patellofemoral joint (PFJ) stress among weight bearing and non-weight bearing quadriceps exercises. **Background** An important consideration in prescribing exercises to strengthen the quadriceps in persons with patellofemoral pain is to minimize PFJ loading. Currently there is disagreement in the literature as to which exercises and ranges of motion best accomplish this goal.

Methods Ten healthy subjects participated. Lower extremity kinematics, kinetics, and electromyography of the knee musculature were obtained during a weight bearing squatting exercise (SQUAT) and 2 non-weight bearing knee extension exercises: 1) knee extension with variable resistance (EXT-VR), and 2) knee extension with constant resistance (EXT-CR). A previously described biomechanical model was used to estimate PFJ stress at 0°, 15°, 30°, 45°, 60°, 75°, and 90° of knee flexion. PFJ stress was compared among the 3 exercises using a 2-way ANOVA with repeated measures.

Results When compared to the 2 non-weight bearing exercises, the SQUAT exercise produced significantly higher PFJ stress at 90°, 75°, and 60° of knee flexion. Conversely, the 2 non-weight bearing exercises produced significantly higher PFJ stress at 30°, 15°, and 0° of knee flexion when compared to the SQUAT exercise. The EXT-VR exercise produced significantly lower PFJ stress than the EXT-CR exercises at 90°, 75°, and 60° of knee flexion.

Conclusion To minimize patellofemoral joint stress while performing quadriceps exercises, our data suggest that the SQUAT exercise should be performed from 45° to 0° of knee flexion and the EXT-VR exercise should be performed from 90° to 45° of knee flexion.

J Orthop Sports Phys Ther, Epub 27 March 2014. doi:10.2519/jospt.2014.4936.

PMID: 24673446

Impact of cortisone injections

Arthroscopy. 2014 May;30(5):607-12. doi: 10.1016/j.arthro.2014.02.002.

Effect of Intra-articular Local Anesthesia on Articular Cartilage in the Knee.

Ravnihar K¹, Barlič A², Drobnič M³.

PURPOSE:

To evaluate the hypothetical toxic effect of local anesthetics on the articular cartilage using patient data from autologous chondrocyte cultivation with different anesthesia types used for arthroscopic cartilage biopsy specimen procurement.

METHODS:

A retrospective analysis of patient data from the national autologous chondrocyte implantation registry and the corresponding hospital records was approved by the National Medical Ethics Committee. Articular cartilage biopsy specimens from the knees of 49 consecutive patients assigned for autologous chondrocyte implantation (aged 14 to 44 years) were procured from the non-weight-bearing articular surface during arthroscopy under general anesthesia (12 patients), spinal anesthesia (18 patients), or local anesthesia (intra-articular injection of 15 to 20 mL of 2% lidocaine hydrochloride) (19 patients). All the biopsy specimens were further manipulated following the same chondrocyte cultivation protocol. General patient data and surgery-related parameters, together with chondrocyte viability, population doublings, and chondrocyte morphology in biopsy specimens and primary cell cultures, were analyzed and compared across different types of anesthesia.

RESULTS:

Patients in the general, spinal, and local anesthesia groups showed no statistical differences in age (27 years, 29 years, and 32 years, respectively), duration of surgery (36 minutes, 37 minutes, and 39 minutes, respectively), weight of biopsy specimens (110 mg, 178 mg, and 130 mg, respectively), cell viability in cartilage biopsy specimens (67%, 69%, and 78%, respectively) or primary cultures (95%, 95%, and 95%, respectively), and population doublings (5.2, 5.2, and 5.2, respectively). Similar chondrocyte morphology in primary cell cultures was observed among the 3 groups.

CONCLUSIONS:

This retrospective study showed that a single intra-articular injection of lidocaine hydrochloride used for knee arthroscopy did not influence the viability, morphology, and cultivation potential of chondrocytes in articular cartilage biopsy specimens assigned for autologous chondrocyte implantation.

Anterior knee pain neurodynamics

J Orthop Sports Phys Ther. 2014 Apr 14.

Neurodynamic Responses of the Femoral Slump Test in Patients With Anterior Knee Pain Syndrome.

Lin PL¹, Shih YF, Chen WY, Ma HL.

Author information

Abstract

Study Design Matched control, cross-sectional study.

Objectives The purpose of this study was to compare the responses to the femoral slump test (FST) including the change in hip range of motion and level of discomfort between subjects with and without anterior knee pain.

Background Anterior knee pain syndrome is a common problem among adults. The FST is the neurodynamic test used to assess the mechanosensitivity of the femoral component of the nervous system. However, as of now there is no literature discussing the use of the FST in patients with anterior knee pain.

Methods Thirty patients with anterior knee pain and 30 gender-, age- and dominant leg-matched control participants were recruited. The subjects received the FST during which the hip extension angle, and the location and intensity of pain/discomfort were recorded. Reproduction of symptoms, which were alleviated by neck extension, was interpreted as a positive test. Differences in hip extension angle and pain intensity between groups were examined using two-way repeated measures analysis of variance (ANOVA) and Kruskal-Wallis analysis. The level of significance was set at $\alpha = 0.05$.

Results Subjects with anterior knee pain had a smaller hip extension angle than the controls ($-3.6^\circ \pm 5.3^\circ$ vs. $0.6^\circ \pm 6.1^\circ$, mean difference (95% CI) = 4.2 (1.24, 7.15), $P = 0.006$). Eight patients with anterior knee pain showed positive FST, and those with positive FST had a smaller hip extension angle ($-5.7^\circ \pm 4.5^\circ$) than the controls (mean difference (95% CI) = 6.3 (0.8, 11.8), $P = 0.007$). But there was no difference in the hip extension angle between the positive and negative FST groups (mean difference (95% CI) = 2.9 (-8.5, 2.0)), or between the negative FST and the control groups (mean difference (95% CI) = 3.4 (-0.4, 7.3)).

Conclusion Results of this study suggest altered mechanosensitivity of the femoral nerve in the patients with anterior knee pain who presented with positive FST. The role of the increased mechanosensitivity in the development and management of anterior knee pain should be investigated in the future.

J Orthop Sports Phys Ther, Epub 14 April 2014. doi:10.2519/jospt.2014.4781. PMID: 24730437

Ground reaction forces

J Biomech. 2014 Jan 22;47(2):512-7. doi: 10.1016/j.jbiomech.2013.10.038. Epub 2013 Nov 7.

Control of dynamic foot-ground interactions in male and female soccer athletes: females exhibit reduced dexterity and higher limb stiffness during landing.

Lyle MA¹, Valero-Cuevas FJ², Gregor RJ³, Powers CM⁴.

Abstract

Controlling **dynamic interactions** between the lower **limb** and ground is important for skilled locomotion and may influence injury risk in **athletes**.

It is well known that **female athletes** sustain anterior cruciate ligament (ACL) tears at **higher** rates than male **athletes**, and **exhibit** lower extremity biomechanics thought to increase injury risk during sport maneuvers. The purpose of this study was to examine whether lower extremity **dexterity** (LED)--the ability to dynamically **control** endpoint force magnitude and direction as quantified by compressing an unstable spring with the lower **limb** at submaximal forces--is a potential contributing factor to the "at-risk" movement behavior exhibited by **female athletes**. We tested this hypothesis by comparing LED-test performance and single-**limb** drop jump biomechanics between 14 **female** and 14 male high school **soccer** players. We found that **female athletes** exhibited **reduced** LED-test performance ($p=0.001$) and **higher limb stiffness** during **landing** ($p=0.008$) calculated on average within 51 ms of foot contact. **Females** also exhibited **higher** coactivation at the ankle ($p=0.001$) and knee ($p=0.02$) before **landing**. No sex differences in sagittal plane joint angles and center of mass velocity at foot contact were observed.

Collectively, our results raise the possibility that the **higher** leg **stiffness** observed in **females** during **landing** is an anticipatory behavior due in part to **reduced** lower extremity **dexterity**. The **reduced** lower extremity **dexterity** and compensatory stiffening strategy may contribute to the heightened risk of ACL injury in this population.

Prior knee surgery

Am J Sports Med. 2014 Apr;42(4):959-64. doi: 10.1177/0363546513519951. Epub 2014 Feb 11.

Effects of Prior Knee Surgery on Subsequent Injury, Imaging, and Surgery in NCAA Collegiate Athletes.

Rugg CM1, Wang D, Sulzicki P, Hame SL.

Abstract

BACKGROUND:

High school and professional athletes with a history of orthopaedic surgery have decreased career lengths and are at a greater risk for reinjury compared with their peers. It is unknown whether the same risk applies to intercollegiate athletes.

PURPOSE:

To determine the effect of prior knee surgery in National Collegiate Athletic Association (NCAA) Division I athletes in the United States.

STUDY DESIGN:

Cohort study; Level of evidence, 3.

METHODS:

Division I athletes who began participation in collegiate athletics at a single institution from fall 2003 to spring 2008 were identified. Athletes with a history of orthopaedic surgery were identified through preparticipation evaluation forms. Data on the number of seasons and games played, number of days missed, diagnostic imaging, athletic injuries sustained, and surgical operations during college were collected through medical records and the Sports Injury Monitoring System (SIMS).

RESULTS:

During the 5-year study period, 456 athletes completed preparticipation evaluation forms. Of these, 104 athletes (22.8%) had a history of orthopaedic surgery (Ortho group). Forty-eight (10.5% of all athletes) had a history of knee surgery (Knee group), 16 (3.5%) had a history of anterior cruciate ligament reconstruction (ACL group), and 28 (6.1%) had a history of multiple surgeries (Multiple group). Days missed per season due to any injury and due to knee injury were increased for all surgical groups compared with controls ($P < .016$). The rate of knee injury and knee surgery while in college was significantly increased for all surgery groups. Athletes in the Knee and ACL groups were 6.8- and 19.6-fold more likely to sustain a knee injury and 14.4- and 892.9-fold more likely to undergo a knee surgery during their collegiate careers compared with controls ($P < .001$). The number of MRIs per season were 0.83 for the Knee group ($P < .001$), 1.29 for the ACL ($P = .009$), and 0.97 for the Multiple group ($P < .001$), compared with 0.37 for controls. Average career length and percentage of games played were not significantly different between any of the surgery groups compared with controls.

CONCLUSION:

Athletes who had a history of knee surgery before participation in collegiate athletics miss more days due to injury, have increased rates of knee injury and knee surgery, and require more MRIs during their collegiate careers than their peers.

KEYWORDS: anterior cruciate ligament, athlete, collegiate, imaging, knee, prior injury, return, sports, surgery

PMID: 24519183

[Knee/ACL](#)

Soccer female injury

Am J Sports Med. 2014 Apr;42(4):940-8. doi: 10.1177/0363546513518741. Epub 2014 Feb 5.

Risk factors for lower extremity injuries in elite female soccer players.

Nilstad A1, Andersen TE, Bahr R, Holme I, Steffen K.

BACKGROUND: The incidence of lower extremity injuries in female soccer players is high, but the risk factors for injuries are unknown.

PURPOSE: To investigate risk factors for lower extremity injuries in elite female soccer players.

STUDY DESIGN: Cohort study; Level of evidence, 3.

METHODS:

Players in the Norwegian elite female soccer league (N = 12 teams) participated in baseline screening tests before the 2009 competitive soccer season. The screening included tests assessing maximal lower extremity strength, dynamic balance, knee valgus angles in a drop-jump landing, knee joint laxity, generalized joint laxity, and foot pronation. Also included was a questionnaire to collect information on demographic data, elite-level experience, and injury history. Time-loss injuries and exposure in training and matches were recorded prospectively in the subsequent soccer season using weekly text messaging. Players reporting an injury were contacted to collect data regarding injury circumstances. Univariate and multivariate regression analyses were used to calculate odds ratios (ORs) and 95% confidence intervals (CIs) for ± 1 standard deviation of change.

RESULTS:

In total, 173 players underwent complete screening tests and registration of injuries and exposure throughout the season. A total of 171 injuries in 107 players (62%) were recorded; ligament and muscle injuries were the most frequent. Multivariate analyses showed that a greater body mass index (BMI) (OR, 1.51; 95% CI, 1.21-1.90; P = .001) was the only factor significantly associated with new lower extremity injuries. A greater BMI was associated with new thigh injuries (OR, 1.51; 95% CI, 1.08-2.11; P = .01), a lower knee valgus angle in a drop-jump landing was associated with new ankle injuries (OR, 0.64; 95% CI, 0.41-1.00; P = .04), and a previous knee injury was associated with new lower leg and foot injuries (OR, 3.57; 95% CI, 1.27-9.99; P = .02), whereas none of the factors investigated influenced the risk of new knee injuries.

CONCLUSION:

A greater BMI was associated with lower extremity injuries in elite female soccer players.

CLINICAL RELEVANCE:

Increased knowledge on risk factors for lower extremity injuries enables more targeted prevention strategies with the aim of reducing injury rates in female soccer players.

ACL replacements comparisons

Arthroscopy. 2005 Jul;21(7):791-803.

Reconstruction of the anterior cruciate ligament: meta-analysis of patellar tendon versus hamstring tendon autograft.

Goldblatt JP¹, Fitzsimmons SE, Balk E, Richmond JC.

Abstract

PURPOSE: No graft tissue has consistently shown superiority over others for reconstruction of the anterior cruciate ligament (ACL). Bone-patellar tendon-bone (BPTB) and doubled hamstring tendon (semitendinosus and gracilis) (HT) are the most commonly used autologous grafts. We performed a meta-analysis to compare the effectiveness of ACL reconstruction using either BPTB or HT grafts.

TYPE OF STUDY: Systematic review and meta-analysis.

METHODS:

We searched the MEDLINE database (1966 to April 2003) for English-language randomized or prospective studies comparing BPTB and 3- or 4-strand HT grafts used for ACL reconstruction. For inclusion, studies were required to follow identical rehabilitation protocols within each study, and provide subjective or objective outcome data after a minimum average 2-year follow-up. Comparison data between BPTB and HT for each identified outcome measure were combined using a random-effects model meta-analysis.

RESULTS:

Eleven reports fulfilled the criteria for inclusion. Outcomes favoring BPTB were found in the following outcome measures: normal Lachman examination (relative risk [RR], 0.91; 95% confidence interval [CI], 0.83-0.99; $P = .025$), normal pivot-shift (RR, 0.94; 95% CI, 0.88-1.0; $P = .067$), KT-1000 manual-maximum side-to-side difference of ≤ 3 mm (RR, 0.75; 95% CI, 0.55-1.01; $P = .057$), and fewer reconstructions resulting in flexion loss > 5 degrees (RR, 1.41; 95% CI, 1.01-1.96; $P = .04$). Intermediate level laxity was more common with the HT graft, as shown by higher rates of abnormal Lachman > 0 (RR, 1.22; 95% CI, 0.99-1.5; $P = .06$), pivot-shift > 0 (RR, 1.3; 95% CI, 0.96-1.75; $P = .09$), and KT-1000 manual-maximum side-to-side differences > 3 mm (RR, 1.64; 95% CI, 1.13-2.39; $P = .01$). Outcome measures that favored HT were absence of patellofemoral crepitation (RR, 1.08; 95% CI, 1.01-1.15; $P = .03$), fewer results with extension loss > 5 degrees (RR, 0.56; 95% CI, 0.3-1.03; $P = .06$), and kneeling pain. The incidence of instability, as defined by Lachman grade 2, pivot-shift grade 2, or KT-1000 manual-maximum side-to-side difference > 5 mm, was not significantly different between the 2 grafts. All other outcome measures were not significantly different.

CONCLUSIONS:

The data presented in this meta-analysis show that the incidence of instability is not significantly different between the BPTB and HT grafts. However, BPTB was more likely to result in reconstructions with normal Lachman, normal pivot-shift, KT-1000 manual-maximum side-to-side difference < 3 mm, and fewer results with significant flexion loss. In contrast, HT grafts had a reduced incidence of patellofemoral crepitation, kneeling pain, and extension loss. The choice of graft by the patient and surgeon must be individualized, and the results of this meta-analysis can aid in the decision by clarifying the risks and benefits of each surgical approach.

LEVEL OF EVIDENCE: Level I.PMID: 16012491

ACL comparison

Knee. 2005 Jan;12(1):41-50.

Anterior cruciate ligament reconstruction, hamstring versus bone-patella tendon-bone grafts: a systematic literature review of outcome from surgery.

Herrington L¹, Wrapson C, Matthews M, Matthews H.

Author information

Abstract

The Anterior Cruciate Ligament (ACL) is regarded as critical to the normal functioning of the knee, its disruption causing functional impairment.

In recent years central third of the patellar tendon (PT) and combined Semitendinosus and gracilis tendons (HT) have become the most frequently used graft types for anterior cruciate knee ligament reconstruction. For the past two decades, the gold standard in ACL reconstructions has been the PT, but increasingly the HT graft has been used. This shift in popularity has occurred for several reasons, including concerns about damaging the knee extensor apparatus using the PT procedure, but potential complications also exist with HT techniques. Despite the vast amount of literature on ACL reconstruction and its outcome, there are very few controlled randomised studies directly comparing the two most commonly used tissue grafts. This review aimed to examine the data available from randomised trials, in order to combine and evaluate the best available evidence for choice between these two popular tissue grafts for use in ACL reconstruction. A literature search revealed 13 studies, which met the inclusion criteria of the review.

The results of the 13 studies included in this review suggest that there is no significant evidence to indicate that one graft is superior. Both the PT and HT grafts appear to improve patients' performance, and therefore both would be good choices for ACL reconstruction.

PMID: 15664877

Hamstring weakness post ACL

Knee Surg Sports Traumatol Arthrosc. 2014 May;22(5):1024-9. doi: 10.1007/s00167-013-2696-4. Epub 2013 Sep 26.

Medial hamstring muscle activation patterns are affected 1-6 years after ACL reconstruction using hamstring autograft.

Arnason SM¹, Birnir B, Guðmundsson TE, Guðnason G, Briem K. Abstract

PURPOSE:

Although changes in hamstring muscle morphology after anterior cruciate ligament reconstruction (ACLR) using a semitendinosus autograft hamstrings-gracilis (HG) of the ipsilateral limb are recognized, alterations in muscle activation patterns have not been extensively studied. The purpose of this controlled laboratory trial was therefore to monitor muscle activation levels of the medial (MH) and lateral (LH) hamstring muscles in athletes who had undergone ACLR using a HG autograft and to contrast these to activation levels demonstrated by healthy controls.

METHODS:

Surface electromyography (EMG) was sampled from bilateral hamstring muscles of 18 athletes 1-6 years after ACLR and 18 matched controls (CTRL) during the performance of two dissimilar exercises, both involving eccentric knee flexor activity. Peak normalized muscle activation levels were identified for MH and LH of both limbs during the performance of the Nordic Hamstring (NH) exercise and TRX(®) hamstring curl (TRX) exercise.

RESULTS:

A statistically significant limb by exercise interaction was found for peak activation levels of LH, due to significant interlimb differences in activation during the performance of the TRX exercise compared to more symmetrical activation during the NH ($p < 0.001$). A three-way interaction was found for peak activation levels of MH, due to group differences in peak muscle activation between limbs and exercise type ($p = 0.025$). Whereas CTRL group participants consistently favoured one limb over the other during the performance of both exercises, ACLR participants demonstrated dissimilar peak MH activation patterns between limbs during the performance of the NH exercise compared to the TRX.

CONCLUSIONS:

In light of these results and considering the surgical procedure, patients who undergo ACLR using a HG autograft from the ipsilateral limb may benefit from post-operative rehabilitation that involves muscle activation and strengthening specifically targeting the MH component.

PMID: 24067994

MRI efficiency ACL

Efficacy of Magnetic Resonance Imaging Evaluation for Meniscal Tear in Acute Anterior Cruciate Ligament Injuries

Arthroscopy. Volume 30, Issue 4, Pages 475–482, April 2014

Tae-Seok Nam, M.D., Min Kyu Kim, M.D, Ji Hyun Ahn, M.D.email

PURPOSE

The objective of this study was to compare the preoperative magnetic resonance imaging (MRI) diagnostic rates of meniscal injuries combined with acute anterior cruciate ligament (ACL) injuries, as well as traumatic meniscal injuries without ACL injuries.

METHODS

From January 2005 through April 2013, 208 patients who underwent ACL reconstruction and 1,334 patients with traumatic meniscal tear injuries were examined by MRI and arthroscopy. Patients with chronic ACL injuries, revisions, fracture histories, or multiple-ligament injuries and patients with Outerbridge degenerative changes of grade 3 or greater were excluded, yielding 159 patients and 621 patients in the 2 groups, respectively. The medial meniscus (MM) and lateral meniscus (LM) examined by MRI and arthroscopy for findings of tears were compared in each group. The sensitivity, specificity, positive predictive value, and negative predictive value for MM and LM tears by MRI were compared and analyzed statistically.

RESULTS

The diagnostic sensitivity of MRI in the group with ACL injury was significantly lower than that in the ACL-intact group for the MM ($P < .001$) and LM ($P = .040$). The negative predictive value was also lower in the group with ACL injury for both the MM ($P = .008$) and LM ($P < .001$). There was no statistical difference in specificity and positive predictive value between the 2 groups.

CONCLUSIONS

This study showed that if a patient had an acute ACL tear, the sensitivity and negative predictive value of MRI for a meniscal tear were less than if there was no ACL tear, which led to the low diagnostic accuracy of MRI.

LEVEL OF EVIDENCE Level

Tibial slope

Posterior tibial slope influences static anterior tibial translation in anterior cruciate ligament reconstruction: A minimum 2-year follow-up study

The American Journal of Sports Medicine, 04/11/2014 Clinical Article

Objective

Li Y, et al. – Posterior tibial slope (PTS) has recently been identified as a risk factor for anterior cruciate ligament (ACL) injuries because of an associated increase in anterior tibial translation (ATT) and ACL loading. However, few studies concerning the correlation between PTS and postoperative ATT have been published. Researchers found a significant correlation between PTS and postoperative anterior knee static stability in this study. Patients with a steeper medial or lateral PTS showed a higher risk of ATT greater than or equal to 5 mm at thresholds of 5.6° and 3.8° , respectively.

Methods

Included in this retrospective study were 40 consecutive patients who underwent ACLR (28 male, 12 female; median age, 22 years; range, 14–44 years) from October 2010 to June 2011.

The patients were divided into 3 groups based on medial and lateral PTS values as measured on MRI.

Demographic data and results of the manual maximum side-to-side difference with a KT-1000 arthrometer at 30° of knee flexion before ACLR and at final follow-up were collected; results were divided into ATT less than or equal to 2 mm, $2\text{ mm} < \text{ATT} < 5\text{ mm}$, and ATT greater than or equal to 5 mm.

First, the distribution of ATT in the 3 groups was compared, and then correlation analysis and logistic regression were conducted to determine the correlation between PTS and ATT.

Finally, the thresholds of medial and lateral PTS were calculated.

Results

Results of the ATT measurements were collected at a mean of 27.5 months (range, 24.0–37.0 months) after ACLR.

group with a PTS greater than or equal to 5° had significantly more cases of ATT greater than or equal to 5 mm than the group with a PTS $<3^\circ$ (medial PTS: $P = 0.005$; lateral PTS: $P = 0.016$).

There were statistically significant correlations with ATT for both medial ($r = 0.43$, $P = 0.005$) and lateral ($r = 0.36$, $P = 0.02$) PTS.

Medial or lateral PTS resulted in the increased probability of ATT $\geq 5\text{ mm}$, with an odds ratio of 1.76 ($P = 0.011$) and 1.68 ($P = 0.008$), respectively.

The threshold of an increased risk of ATT greater than or equal to 5 mm was a medial PTS $>5.6^\circ$ ($P = 0.003$) or a lateral PTS $>3.8^\circ$ ($P = 0.002$).

Balance impact of ACL injury

Physiotherapy. 2013 Dec 4. pii: S0031-9406(13)00117-X. doi: 10.1016/j.physio.2013.11.002.

The effects of ACL injury on knee proprioception: a meta-analysis.

Relph N1, Herrington L2, Tyson S3.

Abstract

BACKGROUND:

It is suggested the anterior cruciate ligament (ACL) plays a significant role in knee proprioception, however, the effect of ACL injury on knee proprioception is unclear. Studies utilising the two most common measurement techniques, joint position sense and threshold to detect passive motion, have provided evidence both for and against a proprioceptive deficient following ACL injury.

OBJECTIVE:

The objective of the study was to undertake a meta-analysis investigating the effects of ACL injury, treated conservatively or by reconstruction, on proprioception of the knee, measured using joint position sense and/or threshold to detect passive movement techniques.

DATA SOURCES:

Seven databases were searched from their inception to September 2013 using the subject headings 'anterior cruciate ligament, proprioception, postural sway, joint position sense, balance, equilibrium or posture' to identify relevant studies.

ELIGIBILITY CRITERIA:

PRISMA guidelines were followed as much as possible. Studies that investigated the effect of ACL injury on either knee joint kinaesthesia or position sense were included in this review.

DATA EXTRACTION AND SYNTHESIS:

Two reviewers independently extracted data using a standardised assessment form. Comparisons were made using a fixed effect model with an inverse variance method using Review Manager Software (V5.1).

RESULTS:

Patients with ACL injury have poorer proprioception than people without such injuries (SMD=0.35°; P=0.001 and SMD=0.38°; P=0.03) when measured using joint position sense and threshold to detect passive motion techniques respectively. Patients had poorer proprioception in the injured than uninjured leg (SMD=0.52°; P<0.001) and the proprioception of people whose ACL was repaired was better than those whose ligament was left unrepaired (SMD=-0.62°; P<0.001).

LIMITATIONS:

Heterogeneity of measurement techniques and lack of psychometric details.

CONCLUSION:

ACL injuries may cause knee proprioception deficits compared to uninjured knees and control groups. Although differences were statistically significant, the clinical significance of findings can be questioned. Clinical practitioners using joint position sense or threshold to detect passive motion techniques need to consider the reliability and validity of data provided.

Meniscus

Replacement results

[Am J Sports Med.](#) 2014 Apr;42(4):892-7. doi: 10.1177/0363546513520115. Epub 2014 Feb 14.

Survival and Reoperation Rates After Meniscal Allograft Transplantation: Analysis of Failures for 172 Consecutive Transplants at a Minimum 2-Year Follow-up.

[McCormick F1](#), [Harris JD](#), [Abrams GD](#), [Hussey KE](#), [Wilson H](#), [Frank R](#), [Gupta AK](#), [Bach BR Jr](#), [Cole BJ](#).

BACKGROUND: Meniscal allograft transplantation (MAT) is a treatment option for knee pain in young patients with meniscal deficiency in the setting of intact articular surfaces, ligamentous stability, and normal alignment. It is being performed with increasing frequency, and the need for reoperations is not uncommon. A mean survival rate of allografts and indications for reoperations would be helpful information when counseling patients regarding the procedure.
Purpose/

HYPOTHESIS: The purpose of this study was to quantify survival for MAT and report findings at reoperation. The hypothesis was that the reoperation rate would be frequent and that the most common secondary surgery would be arthroscopic debridement.

STUDY DESIGN: Case series; Level of evidence, 4.

METHODS: A retrospective review of a prospectively collected database of patients who underwent MAT from 2003 to 2011 was conducted; all surgeries were performed by a single surgeon. The reoperation rate, timing of reoperation, procedure performed at reoperation, and findings at surgery, including the status of the meniscal and articular cartilage, were reviewed. Survival was defined as a lack of revision MAT or knee arthroplasty. Descriptive statistics, log-rank testing, cross-tabulation, and χ^2 testing were analyzed, with an α value of .05 set as significant.

RESULTS:

Of 200 patients who underwent MAT during the study period, 172 patients (86%; mean age, 34.3 \pm 10.3 years) were evaluated at a mean of 59 months (range, 24-118 months) with a minimum 2-year follow-up. Forty-one percent of MATs were isolated, while 60% were performed with concomitant procedures. Sixty-four patients (32%) returned to the operating room after their index procedure. Arthroscopic debridement was performed in 59% (38/64) of these patients. The mean time to subsequent surgery was 21 months (range, 2-107 months), with 73% occurring within 2 years. Eight of 172 patients (4.7%) went on to require revision MAT or total knee replacement. Patients requiring secondary surgery within 2 years had an odds ratio of 8.4 (95% CI, 1.6-43.4) for future arthroplasty or MAT revision ($P = .007$).

CONCLUSION:

In this series, there was a 32% reoperation rate for MAT, with simple arthroscopic debridement being the most common surgical treatment (59%), and a 95% allograft survival rate at a mean of 5 years. Those requiring additional surgery still benefited, having an 88% allograft survival rate, but were at an increased risk of failure. Patients requiring secondary surgery within 2 years had an odds ratio of 8.4 for future arthroplasty or MAT revision.

Reoperation rates

Am J Sports Med. 2014 Apr;42(4):892-7. doi: 10.1177/0363546513520115. Epub 2014 Feb 14.

Survival and Reoperation Rates After Meniscal Allograft Transplantation: Analysis of Failures for 172 Consecutive Transplants at a Minimum 2-Year Follow-up.

McCormick F1, Harris JD, Abrams GD, Hussey KE, Wilson H, Frank R, Gupta AK, Bach BR Jr, Cole BJ.

BACKGROUND:

Meniscal allograft transplantation (MAT) is a treatment option for knee pain in young patients with meniscal deficiency in the setting of intact articular surfaces, ligamentous stability, and normal alignment. It is being performed with increasing frequency, and the need for reoperations is not uncommon. A mean survival rate of allografts and indications for reoperations would be helpful information when counseling patients regarding the procedure. Purpose/

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KEYWORDS: knee, meniscal allograft transplantation, reoperation rates, survival analysis
PMID: 24532597 [PubMed - in process]

Bucket handle tears repairs

Outcomes After Repair of Chronic Bucket-Handle Tears of Medial Meniscus

Arthroscopy. Volume 30, Issue 4, Pages 492–496, April 2014.

Alejandro Espejo-Reina, M.D., José Miguel Serrano-Fernández, M.D., Belén Martín-Castilla, M.D., Francisco Javier Estades-Rubio, M.D., Karen K. Briggs, M.P.H., Alejandro Espejo-Baena, M.D.

PURPOSE

The purpose of this study was to determine the outcomes after repair of chronic bucket-handle medial meniscal tears by use of magnetic resonance imaging, clinical examination, and patient-reported outcomes.

METHODS

A retrospective review of patients with chronic bucket-handle medial meniscal tears that had been repaired with meniscal sutures was undertaken. The following criteria for inclusion were adopted: minimum tear length of 2 cm and chronic medial meniscal tear identified at the time of arthroscopy. The tears were susceptible to dislocation with probing. Data collected included demographic, clinical, radiologic, and surgical data. Postoperative healing was assessed with the clinical criteria of Barrett et al. The International Knee Documentation Committee rating, Lysholm score, and Tegner activity level were determined, and postoperative magnetic resonance imaging was used to evaluate healing in accordance with the criteria of Henning et al.

RESULTS

Twenty-four patients fulfilled the inclusion criteria. The mean time from injury to surgery was 10 months (range, 2 to 60 months). Sixteen patients underwent anterior cruciate ligament reconstruction, 1 patient underwent posterior cruciate ligament reconstruction, and 6 patients underwent meniscus repair only. A median of 5 sutures (range, 3 to 6 sutures) were used for repair. Four cases (all of which had undergone meniscus repair only) required revision. Complete healing was achieved in 83% of cases according to the criteria of Barrett et al. The mean follow-up time was 48 months (range, 24 to 112 months). An International Knee Documentation Committee rating of A or B was achieved in the 20 patients who did not require revision. The median Lysholm score was 95 (range, 92 to 100). The median Tegner activity level before injury was 7, and it remained unchanged after surgery in all cases.

CONCLUSIONS

This study showed that repair of chronic bucket-handle meniscal tears can lead to good clinical outcomes and a relatively low (17%) failure rate. In addition, repairs of isolated meniscal tears had a significantly higher risk of failure than repairs performed in conjunction with anterior cruciate ligament reconstruction.

Level of Evidence Level IV, therapeutic case series.

Meniscus/Ultrasound evaluation

J Knee Surg. 2014 Jan 28.

MRI versus Ultrasonography to Assess Meniscal Abnormalities in Acute Knees.

Cook JL1, Cook CR1, Stannard JP2, Vaughn G3, Wilson N2, Roller BL4, Stoker AM1, Jayabalan P5, Hdeib M6, Kuroki K1.

ABSTRACT While magnetic resonance imaging (MRI) is often considered the "gold standard" diagnostic imaging modality for detection of meniscal abnormalities, it is associated with misdiagnosis in as high as 47% of cases, is costly, and is not readily available to a large number of patients. Ultrasonographic examination of the knee has been reported to be an effective diagnostic tool for this purpose with the potential to overcome many of the shortcomings of MRI.

PURPOSE

The purpose of this study is to determine the clinical usefulness of ultrasonography for diagnosis of meniscal pathology in patients with acute knee pain and compare its diagnostic accuracy to MRI in a clinical setting.

METHODS

With Institutional Review Board approval, patients (n = 71) with acute knee pain were prospectively enrolled with informed consent. Preoperative MRI (1.5 T) was performed on each affected knee using the hospital's standard equipment and protocols and read by faculty radiologists trained in musculoskeletal MRI. Ultrasonographic assessments of each affected knee were performed by one of two faculty members trained in musculoskeletal ultrasonography using a 10 to 14 MHz linear transducer. Arthroscopic evaluation of affected knees was performed by one of three faculty orthopedic surgeons to assess and record all joint pathology, which served as the reference standard for determining presence, type, and severity of meniscal pathology. All evaluators for each diagnostic modality were blinded to all other data. Data were collected and compared by a separate investigator to determine sensitivity (Sn), specificity (Sp), positive predictive value (PPV), negative predictive value (NPV), correct classification rate (CCR), likelihood ratios (LR[+] and LR[-]), and odds ratios.

RESULTS

Preoperative ultrasonographic assessment of meniscal pathology was associated with Sn = 91.2%, Sp = 84.2%, PPV = 94.5%, NPV = 76.2%, CCR = 89.5%, LR(+) = 5.78, and LR(-) = 0.10. Preoperative MRI assessment of meniscal pathology was associated with Sn = 91.7%, Sp = 66.7%, PPV = 84.6%, NPV = 80.0%, CCR = 81.1%, LR(+) = 2.75, and LR(-) = 0.13. Ultrasonography was two times more likely than MRI to correctly determine presence or absence of meniscal pathology seen arthroscopically in this study.

CONCLUSIONS

Ultrasonography is a useful tool for diagnosis of meniscal pathology with potential advantages over MRI. Based on these data and available portable equipment, ultrasonography could be considered for use as a point-of-injury diagnostic modality for meniscal injuries

Repairs of bucket handle tears results

Arthroscopy. 2014 Apr;30(4):492-6. doi: 10.1016/j.arthro.2013.12.020.

Outcomes After Repair of Chronic Bucket-Handle Tears of Medial Meniscus.

Espejo-Reina A¹, Serrano-Fernández JM², Martín-Castilla B³, Estades-Rubio FJ², Briggs KK⁴, Espejo-Baena A³.

Abstract

PURPOSE:

The purpose of this study was to determine the outcomes after repair of chronic bucket-handle medial meniscal tears by use of magnetic resonance imaging, clinical examination, and patient-reported outcomes.

METHODS:

A retrospective review of patients with chronic bucket-handle medial meniscal tears that had been repaired with meniscal sutures was undertaken. The following criteria for inclusion were adopted: minimum tear length of 2 cm and chronic medial meniscal tear identified at the time of arthroscopy. The tears were susceptible to dislocation with probing. Data collected included demographic, clinical, radiologic, and surgical data. Postoperative healing was assessed with the clinical criteria of Barrett et al. The International Knee Documentation Committee rating, Lysholm score, and Tegner activity level were determined, and postoperative magnetic resonance imaging was used to evaluate healing in accordance with the criteria of Henning et al.

RESULTS:

Twenty-four patients fulfilled the inclusion criteria. The mean time from injury to surgery was 10 months (range, 2 to 60 months). Sixteen patients underwent anterior cruciate ligament reconstruction, 1 patient underwent posterior cruciate ligament reconstruction, and 6 patients underwent meniscus repair only. A median of 5 sutures (range, 3 to 6 sutures) were used for repair. Four cases (all of which had undergone meniscus repair only) required revision. Complete healing was achieved in 83% of cases according to the criteria of Barrett et al. The mean follow-up time was 48 months (range, 24 to 112 months). An International Knee Documentation Committee rating of A or B was achieved in the 20 patients who did not require revision. The median Lysholm score was 95 (range, 92 to 100). The median Tegner activity level before injury was 7, and it remained unchanged after surgery in all cases.

CONCLUSIONS: This study showed that repair of chronic bucket-handle meniscal tears can lead to good clinical outcomes and a relatively low (17%) failure rate. In addition, repairs of isolated meniscal tears had a significantly higher risk of failure than repairs performed in conjunction with anterior cruciate ligament reconstruction.

LEVEL OF EVIDENCE: Level IV, therapeutic case series. Copyright © 2014 Arthroscopy Association of North America. Published by Elsevier Inc. All rights reserved. PMID: 24680309

Patella

Plasma rich injections

Am J Sports Med. 2014 Apr;42(4):906-11. doi: 10.1177/0363546513519964. Epub 2014 Feb 11.

Are multiple platelet-rich plasma injections useful for treatment of chronic patellar tendinopathy in athletes?: a prospective study.

Charousset C1, Zaoui A, Bellaiche L, Bouyer B.

BACKGROUND: Chronic patellar tendinopathy (PT) is one of the most common overuse knee disorders. Platelet-rich plasma (PRP) appears to be a reliable nonoperative therapy for chronic PT.

PURPOSE: To evaluate clinical and radiological outcomes of 3 consecutive ultrasound (US)-guided PRP injections for the treatment of chronic PT in athletes.

STUDY DESIGN: Case series; Level of evidence, 4.

METHODS:

A total of 28 athletes (17 professional, 11 semiprofessional) with chronic PT refractory to nonoperative management were prospectively included for US-guided pure PRP injections into the site of the tendinopathy. The same treating physician at a single institution performed 3 consecutive injections 1 week apart, with the same PRP preparation used. All patients underwent clinical evaluation, including the Victorian Institute of Sport Assessment-Patella (VISA-P) score, visual analog scales (VAS) for pain, and Lysholm knee scale before surgery and after return to practice sports. Tendon healing was assessed with MRI at 1 and 3 months after the procedure.

RESULTS:

The VISA-P, VAS, and Lysholm scores all significantly improved at the 2-year follow-up. The average preprocedure VISA-P, VAS, and Lysholm scores improved from 39 to 94 ($P < .001$), 7 to 0.8 ($P < .0001$), and 60 to 96 ($P < .001$), respectively, at the 2-year follow-up. Twenty-one of the 28 athletes returned to their presymptom sporting level at 3 months (range, 2-6 months) after the procedure. Follow-up MRI assessment showed improved structural integrity of the tendon at 3 months after the procedure and complete return to normal structural integrity of the tendon in 16 patients (57%). Seven patients did not recover their presymptom sporting level (among them, 6 were considered treatment failures): 3 patients returned to sport at a lesser level, 1 patient changed his sport activity (for other reasons), and 3 needed surgical intervention.

CONCLUSION:

In this study, application of 3 consecutive US-guided PRP injections significantly improved symptoms and function in athletes with chronic PT and allowed fast recovery to their presymptom sporting level. The PRP treatment permitted a return to a normal architecture of the tendon as assessed by MRI.

Patella instability

Return to activity after medial patellofemoral ligament repair or reconstruction

Arthroscopy, 04/25/2014 Evidence Based Medicine

Matic GT, et al.

Purpose

This study aimed to determine the ability of patients to return to activity after medial patellofemoral ligament (MPFL) reconstruction or repair for patellar instability.

Methods

A systematic review was performed using multiple databases. Studies reporting outcomes with Tegner scores after repair or reconstruction of the MPFL were included. Surgical technique, Tegner scores, and episodes of recurrent patellar instability were recorded.

Results

Ten articles with a total of 402 patients were included. The mean preoperative Tegner score was 4.7 (2.9 to 7.5). The mean postoperative Tegner score was 5.8 (4.0 to 7.7). Forty-nine patients (12.2%) had a recurrent episode of instability, 11 of whom required additional corrective procedures. There was a statistically significant larger failure rate among those who underwent MPFL repair (26.9%) than those who underwent reconstruction (6.6%) or medial retinacular repair/plication (16.5%).

Conclusions

Recurrent dislocation was higher in patients who underwent MPFL repair rather than reconstruction. However, repair and reconstruction had similar Tegner scores. Repair or reconstruction of the soft tissue structures contributing to patellofemoral instability is successful in returning patients to preinjury activity levels.

Level of Evidence **Level IV, systematic review of Level II, III, and IV studies.**

Core strengthening impact

Research Report

Effects of Functional Stabilization Training on Pain, Function, and Lower Extremity Biomechanics in Women With Patellofemoral Pain: A Randomized Clinical Trial

Authors: Rodrigo De Marche Baldon, PT, MS¹, Fábio Viadanna Serrão, PT, PhD¹, Rodrigo Scatone Silva, PT, MS¹, Sara Regina Piva, PT, PhD²

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Published: *Journal of Orthopaedic & Sports Physical Therapy*, 2014, **Volume:** 44 **Issue:** 4
Pages: 240-A8 doi:10.2519/jospt.2014.4940

Objectives To compare the effects of functional stabilization training (FST) versus standard training on knee pain and function, lower-limb and trunk kinematics, trunk muscle endurance, and eccentric hip and knee muscle strength in women with patellofemoral pain.

Background A combination of hip- and knee-strengthening exercise may be more beneficial than quadriceps strengthening alone to improve pain and function in individuals with patellofemoral pain. However, there is limited evidence of the effectiveness of these exercise programs on the biomechanics of the lower extremity.

Methods Thirty-one women were randomized to either the FST group or standard-training group. Patients attended a baseline assessment session, followed by an 8-week intervention, and were reassessed at the end of the intervention and at 3 months after the intervention. Assessment measures were a 10-cm visual analog scale for pain, the Lower Extremity Functional Scale, and the single-leg triple-hop test. A global rating of change scale was used to measure perceived improvement. Kinematics were assessed during the single-leg squat. Outcome measures also included trunk endurance and eccentric hip and knee muscle strength assessment.

Results The patients in the FST group had less pain at the 3-month follow-up and greater global improvement and physical function at the end of the intervention compared to those in the standard-training group. Lesser ipsilateral trunk inclination, pelvis contralateral depression, hip adduction, and knee abduction, along with greater pelvis anteversion and hip flexion movement excursions during the single-leg squat, were only observed in the FST group after the intervention. Only those in the FST group had greater eccentric hip abductor and knee flexor strength, as well as greater endurance of the anterior, posterior, and lateral trunk muscles, after training.

Conclusion An intervention program consisting of hip muscle strengthening and lower-limb and trunk movement control exercises was more beneficial in improving pain, physical function, kinematics, and muscle strength compared to a program of quadriceps-strengthening exercises alone. Level of Evidence Therapy, level 2b

Hip strengthening

Arch Phys Med Rehabil. 2014 Jan 16. pii: S0003-9993(14)00007-0. doi: 10.1016/j.apmr.2013.12.022.

Posterolateral Hip Muscle Strengthening Versus Quadriceps Strengthening for Patellofemoral Pain: A Comparative Control Trial.

Khayambashi K1, Fallah A1, Movahedi A1, Bagwell J2, Powers C3.

OBJECTIVE: To compare the efficacy of posterolateral hip muscle strengthening versus quadriceps strengthening in reducing pain and improving health status in persons with patellofemoral pain (PFP).

DESIGN: Comparative control trial.

SETTING: Rehabilitation facility.

PARTICIPANTS: Persons with a diagnosis of PFP (N=36; 18 men, 18 women).

INTERVENTIONS:

Patients were alternately assigned to a posterolateral hip muscle strengthening group (9 men and 9 women) or a quadriceps strengthening group (9 men and 9 women). The posterolateral hip muscle strengthening group performed hip abductor and external rotator strengthening exercises, whereas the quadriceps strengthening group performed quadriceps strengthening exercises (3 times a week for 8wk).

MAIN OUTCOME MEASURES:

Pain (visual analog scale [VAS]) and health status (Western Ontario McMaster Universities Osteoarthritis Index [WOMAC]) were assessed at baseline, postintervention, and 6-month follow-up.

RESULTS:

Significant improvements in VAS and WOMAC scores were observed in both groups from baseline to postintervention and baseline to 6-month follow-up ($P < .001$). Improvements in VAS and WOMAC scores in the posterolateral hip exercise group were superior to those in the quadriceps exercise group postintervention and at 6-month follow-up ($P < .05$).

CONCLUSIONS:

Although both intervention programs resulted in decreased pain and improved function in persons with PFP, outcomes in the posterolateral hip exercise group were superior to the quadriceps exercise group. The superior outcomes obtained in the posterolateral hip exercise group were maintained 6 months postintervention.

Knee/total

Impact of weight gain

Weight gain and the risk of knee replacement due to primary osteoarthritis: A population based, prospective cohort study of 225,908 individuals.

Apold H1, Meyer HE2, Nordsletten L3, Furnes O4, Baste V5, Flugsrud GB6.

OBJECTIVE:

To study the association between weight gain and the risk of knee replacement (KR) due to primary osteoarthritis (OA), and to evaluate whether the association differs by age.

DESIGN:

225,908 individuals from national health screenings with repeated measurements of height and weight were followed prospectively with respect to KR identified by linkage to the Norwegian Arthroplasty Register. Cox proportional hazard regression was used to calculate sex-specific relative risks (RR) of KR according to change in Body Mass Index (BMI) and weight, corresponding analyses were done for age categories at first screening.

RESULTS:

During 12 years of follow up, 1591 participants received a KR due to primary OA. Men in the highest quarter of yearly change in BMI had a RR of 1.5 (95% confidence interval (CI) 1.1-1.9) of having a KR compared to those in the lowest quarter. For women the corresponding RR was 2.4 (95% CI 2.1-2.7). Men under the age of 20 at the first screening had a 26% increased risk for KR per 5 kg weight gain, for women the corresponding increase was 43%. At older age the association became weaker, and in the oldest it was lost.

CONCLUSIONS:

Weight gain increases the risk for later KR both in men and women. The impact of weight gain is strongest in the young, at older age the association is weak or absent. Our study suggests that future OA may be prevented by weight control and that preventive measures should start at an early age.

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Knee flexion indicator

Arch Phys Med Rehabil. 2014 Mar 3. pii: S0003-9993(14)00142-7. doi: 10.1016/j.apmr.2014.02.015.

Guidelines for the Early Restoration of Active Knee Flexion following Total Knee Arthroplasty: Implications for Rehabilitation and Early Intervention.

Ebert JR, Munsie C, Joss B.

OBJECTIVE(S): To investigate the association between active knee flexion at initial (1-2 weeks) and final (7-weeks) out-patient visits after Total Knee Arthroplasty (TKA), and develop a guide for the expected progression of knee flexion in the sub-acute post-operative phase. Design: Prospective Case Series.

SETTING: Private Functional Rehabilitation Clinic.

PARTICIPANTS: A consecutive sample of 108 patients who underwent TKA between December 2007 and August 2012.

INTERVENTION(S): TKA, followed by a standardized, 5-week out-patient rehabilitation program (two sessions per week) immediately after hospital discharge.

MAIN OUTCOME MEASURES(S):

Active knee flexion was recorded upon the patient's first out-patient visit (1-2 weeks), and then bi-weekly throughout the patient's 5-week out-patient rehabilitation program.

RESULTS:

Active knee flexion at initial (1-2 weeks) and final (7 weeks) out-patient visits were significantly correlated ($r=0.86$, $p<0.0001$). Mean active knee flexion significantly improved ($p<0.0001$) across all patients from 90.4° at initial to 110.0° at final out-patient visit. At 7-weeks post-surgery, a value of 100° was determined as the cut-off point for an acceptable active knee flexion, which corresponded with 80° of active knee flexion at initial out-patient presentation at 1-2 weeks.

CONCLUSION:

Active knee flexion at initial out-patient visit exhibits a strong correlation with knee flexion at 7-weeks after TKA. These knee flexion guidelines may allow for the provision of individualized rehabilitation, allow practitioners to provide patients with realistic goals of progression throughout the sub-acute phase, and allow the early identification of patients at risk of poor long term outcome who may benefit from further intensive care or other early intervention.

OSTEOARTHRITIS/KNEE

Injections

Knee. 2014 Feb 24. pii: S0968-0160(14)00035-0. doi: 10.1016/j.knee.2014.02.010.

A randomized double-blind clinical trial on the treatment of knee osteoarthritis: The efficacy of polynucleotides compared to standard hyaluronian viscosupplementation.

Giarratana LS1, Marelli BM2, Crapanzano C3, De Martinis SE4, Gala L5, Ferraro M6, Marelli N7, Albisetti W8.

Abstract

BACKGROUND:

This randomized, double-blind, parallel-group clinical trial aims to assess the equivalence of intra-articular polynucleotides compared to standard hyaluronic acid (HA) viscosupplementation in the treatment of knee osteoarthritis (OA).

METHODS:

75 patients affected by knee OA were assessed for eligibility and 72 were enrolled and randomized to receive either intra-articular polynucleotides (Candrotide-36 patients) or hyaluronic acid (Hyalubrix-36 patients) at the Orthopedic Institute "Gaetano Pini" (Milan). All patients underwent three intra-articular injections of Candrotide or Hyalubrix with an interval of 1 week. Participants, care givers, and investigators responsible for outcome assessment were all blinded to group assignment. Primary outcome measurements (KOOS and pain level (1) at rest, (2) at weight-bearing and (3) during physical activity) were evaluated at baseline (T0) and after one (T1), two (T2), six (T6), ten (T10), and 26 (T26) weeks. Secondary measurements included the determination of COMP serum levels at T0, T6 and T26.

RESULTS:

The reduction of pain and the increase of KOOS values from baseline were statistically significant for both treatments; nevertheless, for parameter KOOS "symptoms" the treatment with Candrotide showed significant results already after two weeks (at T2 $p=0.003$) while the results obtained with Hyalubrix became significant only after 18 weeks (at T18 $p=0.01$). No significant adverse events were reported.

CONCLUSIONS:

Candrotide is as effective as Hyalubrix in reducing knee OA symptoms but showed an earlier response on pain reduction and can therefore be considered a valid alternative to the use of HA in the treatment of OA, avoiding the adverse events of NSAIDs and of intra-articular corticosteroids.

Knee/OA/Gait alignment

Knee. 2014 Mar 20. pii: S0968-0160(14)00059-3. doi: 10.1016/j.knee.2014.03.004.

Effect of lower limb malalignment in the frontal plane on transverse plane mechanics during gait in young individuals with varus knee alignment.

Stief F1, Böhm H2, Dussa CU2, Multerer C2, Schwirtz A3, Imhoff AB4, Döderlein L2.

Abstract

BACKGROUND:

Varus knee alignment has been identified as a risk factor for the progression of medial knee osteoarthritis (OA). This study tested the hypothesis that not only frontal plane kinematics and kinetics but also transverse plane lower extremity mechanics during gait are affected by varus malalignment of the knee.

METHODS:

Eighteen, otherwise healthy children and adolescents with varus malalignment of the knee were studied to examine the association between static varus malalignment and functional gait parameters. Kinematic data were collected using a Vicon motion capture system (Vicon Motion Systems, Oxford, UK). Two AMTI force plates (Advanced Mechanical Technology, Inc., Watertown, MA, USA) were used to collect kinetic data.

RESULTS:

The results indicated that changes in transverse plane mechanics occur concomitantly with changes in knee malalignment in the frontal plane. A mechanical consequence of varus knee malalignment is obviously an increased endorotation of the foot (internal foot placement) and an increased internal knee rotation (tibia rotation) during stance phase. The linear correlation between the maximum external knee adduction moment in terminal stance and the internal knee rotation in terminal stance ($r=0.823$, $p<0.001$) shows that this transverse plane gait mechanics is directly in conjunction with intrinsic compressive load on the medial compartment during gait.

CONCLUSIONS:

Understanding factors that influence dynamic knee joint loading in healthy, varus malaligned knees may help us to identify risk factors that lead to OA. Thus, three-dimensional gait analysis could be used for clinical prognoses regarding the onset or progression of medial knee OA.

Copyright © 2014 Elsevier B.V. All rights reserved. **KEYWORDS:** Gait analysis, Internal tibia rotation, Knee adduction moment, Knee osteoarthritis, Varus malalignment

Knee biomechanics/elderly/activity

Knee. 2014 Mar 19. pii: S0968-0160(14)00057-X. doi: 10.1016/j.knee.2014.02.025.

Knee biomechanics during popular recreational and daily activities in older men.

Pfeiffer JL1, Zhang S1, Milner CE2.

Abstract

BACKGROUND:

Physical activity is recommended for older adults, including those with knee pathology. However, demands on the knee during popular recreational activities are unclear. The study purpose was to determine knee biomechanics in healthy older men during golf and bowling and compare them to activities of daily living.

METHODS:

Three-dimensional motion analysis was used to determine knee biomechanics in 19 healthy males (45-73years): 11 golfers and eight bowlers. Subjects performed walking, stair ascent, stair descent, and either golf or bowling. Comparisons were made between the recreational activity and activities of daily living.

RESULTS:

During bowling, flexion angle at peak extensor moment was as high as during stair descent, and peak extensor moment was as high as during stair ascent. For the golf lead knee, flexion angle at peak extensor moment and peak extensor moment were as high as during stair ascent, and peak abduction moment, internal and external rotation angles were larger than during all activities of daily living. Peak external rotation angle for the golf trail knee was larger than all activities of daily living.

CONCLUSION:

The greatest challenge for the knee of healthy older males during bowling is eccentric control of knee flexion. Golf poses challenges in all three planes of motion for the lead knee and in the transverse plane for the trail knee.

CLINICAL RELEVANCE:

Comparing mechanical demands on the knee during bowling and golf to those of stair negotiation provides a reference for clinicians when recommending recreational activities for older adults with knee pathology.

Copyright © 2014 Elsevier B.V. All rights reserved. **KEYWORDS:** Bowling, Gait, Golf, Kinematics, Stair negotiation

OA limited extension

Knee. 2014 Mar 27. pii: S0968-0160(14)00056-8. doi: 10.1016/j.knee.2014.03.003.

Efficacy of passive extension mobilization in addition to exercise in the osteoarthritic knee: An observational parallel-group study.

Kappetijn O¹, van Trijffel E², Lucas C³.

STUDY DESIGN:

Pretest post-test observational parallel-group design.

OBJECTIVES:

To evaluate the efficacy of passive knee extension mobilization in addition to exercise therapy on extension range of motion (ROM) in patients with osteoarthritis (OA) of the knee. Secondary objectives were to determine changes in pain and functional abilities.

BACKGROUND:

Patients with knee OA complain of pain, limited range of motion, and impaired activities. Efficacy of mobilization as a treatment option next to exercises has not been studied rigorously.

METHODS AND MEASURES:

Thirty-four participants with persistent knee pain, a positive radiography for knee OA, and a passive extension deficit were included. Seventeen participants (mean age \pm SD, 59.8 \pm 6.1years) were treated with an exercise protocol and were additionally given manual mobilizations to improve passive extension ROM. The other group (mean age \pm SD, 61.5 \pm 7.3years) with equal characteristics was treated with an identical exercise therapy protocol only. Prior to participation, detailed ROM measurements were recorded next to muscle function tests, pain (VAS), six-minute walking tests (6MWTs), a condition-specific questionnaire, and the patient-specific function scale (PSFS). Participants in both groups completed 16 treatment sessions each.

RESULTS:

Passive mobilization significantly improved extension ROM in the intervention group (5.2 versus 8.6°, $p=.017$). The manually mobilized group also had better physical capacities as assessed by 6MWT, less pain, and a lower PSFS score.

CONCLUSION:

A combined protocol including exercise therapy and passive mobilization was beneficial for patients with OA of the knee complaining of pain, decreased extension ROM and decreased limited abilities.

LEVEL OF EVIDENCE:

Therapy, 2b.

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KEYWORDS: Knee osteoarthritis, Passive movement, Physical therapy, Training PMID: 24746916

Central sensitization and OA

Eur J Pain. 2014 Apr 3. doi: 10.1002/j.1532-2149.2014.499.x.

Evidence for central sensitization in patients with osteoarthritis pain: A systematic literature review.

Lluch E1, Torres R, Nijs J, Van Oosterwijck J.

Author information

Abstract

Hyperexcitability of the central nervous system (CNS) has been suggested to play an important role in the chronic pain experienced by osteoarthritis (OA) patients.

A systematic review following PRISMA guidelines was performed to evaluate the existing evidence from the literature related to the presence of central sensitization (CS) in patients with OA.

Electronic databases PubMed and Web of Science were searched to identify relevant articles using pre-defined keywords regarding CS and OA. Full-text clinical reports addressing studies of CS in human adults with chronic complaints due to osteoarthritis were included and screened for methodological quality by two independent reviewers. From the 40 articles that were initially eligible for methodological quality assessment, 36 articles achieved sufficient scores and therefore were discussed. The majority of these studies were case-control studies and addressed OA of the knee joint. Different subjective and objective parameters considered manifestations of CS, which have been previously reported in other chronic pain conditions such as whiplash or rheumatoid arthritis, were established in subjects with OA pain.

Overall results suggest that, although peripheral mechanisms are involved in OA pain, hypersensitivity of the CNS plays a significant role in a subgroup of subjects within this population. Although the majority of the literature provides evidence for the presence of CS in chronic OA pain, clinical identification and treatment of CS in OA is still in its infancy, and future studies with good methodological quality are necessary.

Weight and OA

Osteoarthritis Cartilage. 2014 Mar 12. pii: S1063-4584(14)00994-7. doi: 10.1016/j.joca.2014.03.002.

Weight gain and the risk of knee replacement due to primary osteoarthritis: A population based, prospective cohort study of 225,908 individuals.

Apold H1, Meyer HE2, Nordsletten L3, Furnes O4, Baste V5, Flugsrud GB6.

OBJECTIVE:

To study the association between weight gain and the risk of knee replacement (KR) due to primary osteoarthritis (OA), and to evaluate whether the association differs by age.

DESIGN:

225,908 individuals from national health screenings with repeated measurements of height and weight were followed prospectively with respect to KR identified by linkage to the Norwegian Arthroplasty Register. Cox proportional hazard regression was used to calculate sex-specific relative risks (RR) of KR according to change in Body Mass Index (BMI) and weight, corresponding analyses were done for age categories at first screening.

RESULTS:

During 12 years of follow up, 1591 participants received a KR due to primary OA. Men in the highest quarter of yearly change in BMI had a RR of 1.5 (95% confidence interval (CI) 1.1-1.9) of having a KR compared to those in the lowest quarter. For women the corresponding RR was 2.4 (95% CI 2.1-2.7). Men under the age of 20 at the first screening had a 26% increased risk for KR per 5 kg weight gain, for women the corresponding increase was 43%. At older age the association became weaker, and in the oldest it was lost.

CONCLUSIONS:

Weight gain increases the risk for later KR both in men and women. The impact of weight gain is strongest in the young, at older age the association is weak or absent. Our study suggests that future OA may be prevented by weight control and that preventive measures should start at an early age.

FOOT AND ANKLE

Deltoid ligament

J Bone Joint Surg Am. 2014 Apr 16;96(8):e62. doi: 10.2106/JBJS.M.00870.

The ligament anatomy of the deltoid complex of the ankle: a qualitative and quantitative anatomical study.

Campbell KJ¹, Michalski MP¹, Wilson KJ¹, Goldsmith MT¹, Wijdicks CA¹, Laprade RF², Clanton TO².

Author information

Abstract

BACKGROUND:

The deltoid ligament has both superficial and deep layers and consists of up to six ligamentous bands. The prevalence of the individual bands is variable, and no consensus as to which bands are constant or variable exists. Although other studies have looked at the variance in the deltoid anatomy, none have quantified the distance to relevant osseous landmarks.

METHODS:

The deltoid ligaments from fourteen non-paired, fresh-frozen cadaveric specimens were isolated and the ligamentous bands were identified. The lengths, footprint areas, orientations, and distances from relevant osseous landmarks were measured with a three-dimensional coordinate measurement device.

RESULTS:

In all specimens, the tibionavicular, tibiospring, and deep posterior tibiotalar ligaments were identified. Three additional bands were variable in our specimen cohort: the tibiocalcaneal, superficial posterior tibiotalar, and deep anterior tibiotalar ligaments. The deep posterior tibiotalar ligament was the largest band of the deltoid ligament. The origins from the distal center of the intercollicular groove were 16.1 mm (95% confidence interval, 14.7 to 17.5 mm) for the tibionavicular ligament, 13.1 mm (95% confidence interval, 11.1 to 15.1 mm) for the tibiospring ligament, and 7.6 mm (95% confidence interval, 6.7 to 8.5 mm) for the deep posterior tibiotalar ligament. Relevant to other pertinent osseous landmarks, the tibionavicular ligament inserted at 9.7 mm (95% confidence interval, 8.4 to 11.0 mm) from the tuberosity of the navicular, the tibiospring inserted at 35% (95% confidence interval, 33.4% to 36.6%) of the spring ligament's posteroanterior distance, and the deep posterior tibiotalar ligament inserted at 17.8 mm (95% confidence interval, 16.3 to 19.3 mm) from the posteromedial talar tubercle.

CONCLUSIONS:

The tibionavicular, tibiospring, and deep posterior tibiotalar ligament bands were constant components of the deltoid ligament. The deep posterior tibiotalar ligament was the largest band of the deltoid ligament.

CLINICAL RELEVANCE:

The anatomical data regarding the deltoid ligament bands in this study will help to guide anatomical placement of repairs and reconstructions for deltoid ligament injury or instability.

PMID: 24740670

Foot intrinsic

Br J Sports Med. 2014 Mar 21. doi: 10.1136/bjsports-2013-092690.

The foot core system: a new paradigm for understanding intrinsic foot muscle function.

McKeon PO1, Hertel J, Bramble D, Davis I.

Author information

Abstract

The foot is a complex structure with many articulations and multiple degrees of freedom that play an important role in static posture and dynamic activities. The evolutionary development of the arch of the foot was coincident with the greater demands placed on the foot as humans began to run. The movement and stability of the arch is controlled by intrinsic and extrinsic muscles.

However, the intrinsic muscles are largely ignored by clinicians and researchers. As such, these muscles are seldom addressed in rehabilitation programmes. Interventions for foot-related problems are more often directed at externally supporting the foot rather than training these muscles to function as they are designed. In this paper, we propose a novel paradigm for understanding the function of the foot. We begin with an overview of the evolution of the human foot with a focus on the development of the arch. This is followed by a description of the foot intrinsic muscles and their relationship to the extrinsic muscles.

We draw the parallels between the small muscles of the trunk region that make up the lumbopelvic core and the intrinsic foot muscles, introducing the concept of the foot core. We then integrate the concept of the foot core into the assessment and treatment of the foot. Finally, we call for an increased awareness of the importance of the foot core stability to normal foot and lower extremity function

Ankle dorsi flexion lunge test

Man Ther. 2014 Apr 2. pii: S1356-689X(14)00042-3. doi: 10.1016/j.math.2014.03.008.

A simplified version of the weight-bearing ankle lunge test: Description and test-retest reliability.

Cejudo A¹, Sainz de Baranda P², Ayala F³, Santonja F⁴.

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Abstract

The purpose of this study was twofold: (1) to describe a new version of the weight-bearing ankle lunge test (WBLT) that is simple to administer, that allows clinicians and sports medicine practitioners to directly assess (in degrees) the ankle dorsiflexion range of motion in a very short period of time while adopting a comfortable testing position; as well as (2) to determine the test-retest reliability of the ankle dorsiflexion range of motion measure obtained from the new version of the WBLT.

A total of 50 active adults completed this study. All participants performed the new version of the WBLT on three different occasions, with a two-week interval between testing sessions. Reliability was examined through the change in the mean between consecutive pairs of testing sessions (ChM), standard error of measurement (SEM), minimal detectable change at 95% confidence interval (MDC₉₅), and intraclass correlation coefficient (ICC_{2,k}). The findings showed negligible or trivial ChM values for all the flexibility measures analysed (<1°). Furthermore, the SEM and MDC₉₅ scores for the ankle dorsiflexion measure were 1.3 and 3.8 respectively, and the ICC_{2k} was 0.95. Therefore, this study demonstrated that the ankle dorsiflexion measure obtained from the new version of the WBLT has excellent test-retest reliability scores.

Thus, an observed change larger than 3.8° from baseline scores after performing a treatment would indicate that a real change in ankle dorsiflexion range of motion was likely.

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KEYWORDS: Dorsiflexion, Range of motion, Reproducibility, Sports therapy PMID:24746162

MRI and sprains

J Foot Ankle Surg. 2014 Apr 6. pii: S1067-2516(14)00096-9. doi: 10.1053/j.jfas.2014.02.018.

Associations between MRI Findings and Symptoms in Patients with Chronic Ankle Sprain.

Kwon DG¹, Sung KH², Chung CY², Park MS², Kim TW², Lee SH³, Lee KM⁴.

Author information

Abstract

Magnetic resonance imaging (MRI) provides an accurate method of observing and diagnosing injuries of the ligament complex of the ankle. However, the association between ankle symptoms and MRI findings has been unclear. The purpose of the present study was to evaluate the relationship between ankle pain and MRI findings. This prospective study included 40 patients with ankle pain after inversion injury and 10 healthy volunteers. Correlations among the ankle symptoms (tenderness on the anterior talofibular ligament, pain during varus stress in a neutral and plantarflexed ankle), and MRI findings were analyzed. A complete tear of the anterior talofibular ligament correlated with ankle pain during varus stress in the neutral position ($r = 0.365$, $p = .031$) and tenderness at the anterior talofibular ligament ($r = 0.362$, $p = .032$). The results of our study suggest that a complete tear of the anterior talofibular ligament will correlate with lateral ankle pain.

Foot pain and mental health

Arthritis Care Res (Hoboken). 2014 Jan 27. doi: 10.1002/acr.22292.

The relationship between mental health and foot pain.

Butterworth PA1, Urquhart DM, Cicuttini FM, Menz HB, Strauss BJ, Proietto J, Dixon JB, Jones G, Wluka AE.

Author information

Abstract

Objectives Although mental health is related to the persistence of musculoskeletal pain, our understanding of the relationship between mental health and foot pain is limited. Subsequently, we conducted a three year longitudinal study to examine the relationship between mental health and foot pain in a community based population.

Methods Eighty-three community dwelling participants (mean body mass index $35.3 \text{ kg/m}^2 \pm 9.0$) **who** had foot pain at study inception in 2008, and for whom measures of mental health (Mental Component Summary of the Short Form-36) were available, were invited to take part in this follow-up study in 2011. Change in foot pain was determined by the difference between the Manchester Foot Pain and Disability Index score at baseline and follow up; therefore, a decrease in the score indicates improved foot pain and an increase indicates deterioration in foot pain. Linear regression was used to determine the factors affecting change in foot pain

Results Of the 62 respondents (75% response rate, 49 females and 13 males), there were 27 (44%) whose foot pain deteriorated. A higher Mental Component Summary score of the Short Form-36 at baseline was associated with a slower progression of foot pain (beta coefficient -0.29, 95% confidence interval -0.42 to -0.01); adjusted for age, sex, body mass index and physical health.

Conclusion Mental health is associated with changes in foot pain. Clinicians dealing with this population should consider the contribution of mental health in their management and treatment of foot pain. © 2014 American College of Rheumatology.

Mental health and foot pain

Arthritis Care Res (Hoboken). 2014 Jan 27. doi: 10.1002/acr.22292.

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Conclusion Mental health is associated with changes in foot pain. Clinicians dealing with this population should consider the contribution of mental health in their management and treatment of foot pain

Flatfeet – Pronated

Research Report

Adult-Acquired Flatfoot Deformity and Age-Related Differences in Foot and Ankle Kinematics During the Single-Limb Heel-Rise Test

Authors: Ruth L. Chimenti, PT, DPT^{1,2}, Joshua Tome, MS², Cody D. Hillin, MS, MD³, Adolph S. Flemister, MD⁴, Jeff Houck, PT, PhD⁵

Published: *Journal of Orthopaedic & Sports Physical Therapy*, 2014, **Volume:** 44 **Issue:** 4
Pages: 283-290 doi:10.2519/jospt.2014.4939

Study Design Cross-sectional laboratory study.

Objective To compare single-limb heel-rise performance and foot-ankle kinematics between persons with stage 2 adult-acquired flat foot deformity (AAFD) and healthy controls.

Background The inability to perform a single-limb heel rise is considered a positive functional diagnostic test for AAFD. However, which foot motions contribute to poor performance of this task are not known.

Methods Fifty individuals participated in this study, 20 with stage 2 AAFD (mean \pm SD age, 57.6 \pm 11.3 years), and 15 older participants (age, 56.8 \pm 5.3 years) and 15 younger participants (age, 22.2 \pm 2.4 years) without AAFD as control groups. Forefoot (sagittal plane) and rear foot (sagittal and frontal planes) kinematics were collected using a 3-D motion analysis system. Heel-rise performance (heel height) and kinematics (joint angles, excursions) were evaluated. One-way and 2-way analyses of variance were used to examine differences in heel-rise performance and kinematics between groups.

Results Individuals with AAFD and older controls demonstrated lower heel-rise height than those in the younger control group ($P < .001$). Persons with AAFD demonstrated higher degrees of first metatarsal dorsiflexion ($P < .001$), lower ankle plantar flexion ($P < .001$), and higher subtalar eversion ($P = .027$) than those in the older control group. Persons with AAFD demonstrated lower ankle excursion ($P < .001$) and first metatarsal excursion ($P < .001$) than those in the older control group, but no difference in subtalar excursion ($P = .771$).

Conclusion Persons with stage 2 AAFD did not achieve sufficient heel height during a single-leg heel rise. Both forefoot and rear foot kinematics in the sagittal plane, as opposed to the frontal plane, contributed to the lower heel height in participants with stage 2 AAFD. Older controls demonstrated lower heel-rise height than younger controls, indicating that clinical expectations of heel-rise performance may need to be adjusted for age

MANUAL THERAPY

Manual Therapy/MFR/LBP

J Bodyw Mov Ther. 2014 Apr;18(2):273-81. doi: 10.1016/j.jbmt.2013.05.007. Epub 2013 Jun 5.

Effectiveness of Myofascial release in the management of chronic low back pain in nursing professionals.

Ajimsha MS1, Daniel B2, Chithra S2.

Abstract

OBJECTIVE: To investigate whether Myofascial release (MFR) when used as an adjunct to specific back exercises (SBE) reduces pain and disability in chronic low back pain (CLBP) in comparison with a control group receiving a sham Myofascial release (SMFR) and specific back exercises (SBE) among nursing professionals.

DESIGN: Randomized, controlled, single blinded trial.

SETTING: Nonprofit research foundation clinic in Kerala, India.

PARTICIPANTS: Nursing professionals (N = 80) with chronic low back pain (CLBP).

INTERVENTIONS: MFR group or control group. The techniques were administered by physiotherapists certified in MFR and consisted of 24 sessions per client over 8 weeks.

MAIN OUTCOME MEASURE: The McGill Pain Questionnaire (MPQ) was used to assess subjective pain experience and Quebec Back Pain Disability Scale (QBPDS) was used to assess the disability associated with CLBP. The primary outcome measure was the difference in MPQ and QBPDS scores between week 1 (pretest score), week 8 (posttest score), and follow-up at week 12 after randomization.

RESULTS:

The simple main effects analysis showed that the MFR group performed better than the control group in weeks 8 and 12 ($P < 0.005$). The patients in the MFR group reported a 53.3% reduction in their pain and 29.7% reduction in functional disability as shown in the MPQ and QBPDS scores in week 8, whereas patients in the control group reported a 26.1% and 9.8% reduction in their MPQ and QBPDS scores in week 8, which persisted as a 43.6% reduction of pain and 22.7% reduction of functional disability in the follow-up at week 12 in the MFR group compared to the baseline. The proportion of responders, defined as participants who had at least a 50% reduction in pain between weeks 1 and 8, was 73% in the MFR group and 0% in the control group, which was 0% for functional disability in the MFR and control group.

CONCLUSIONS:

This study provides evidence that MFR when used as an adjunct to SBE is more effective than a control intervention for CLBP in nursing professionals.

Copyright © 2013 Elsevier Ltd. All rights reserved. **KEYWORDS:** Chronic low back pain, Myofascial release, Specific back exercises

Force application in mobilization

Man Ther. 2014 Apr;19(2):90-96. doi: 10.1016/j.math.2013.12.003. Epub 2013 Dec 24.

Inter-clinician and intra-clinician reliability of force application during joint mobilization: A systematic review.

Gorgos KS1, Wasylyk NT1, Van Lunen BL2, Hoch MC3.

Abstract

Joint mobilizations are commonly used by clinicians to decrease pain and restore joint arthrokinematics following musculoskeletal injury.

The force applied during a joint mobilization treatment is subjective to the individual clinician but may have an effect on patient outcomes. The purpose of this systematic review was to critically appraise and synthesize the studies which examined the reliability of clinicians' force application during joint mobilization. A systematic search of PubMed and EBSCO Host databases from inception to March 1, 2013 was conducted to identify studies assessing the reliability of force application during joint mobilizations. Two reviewers utilized the Quality Appraisal of Reliability Studies (QAREL) assessment tool to determine the quality of included studies. The relative reliability of the included studies was examined through intraclass correlation coefficients (ICC) to synthesize study findings. All results were collated qualitatively with a level of evidence approach. A total of seven studies met the eligibility and were included. Five studies were included that assessed inter-clinician reliability, and six studies were included that assessed intra-clinician reliability. The overall level of evidence for inter-clinician reliability was strong for poor-to-moderate reliability (ICC = -0.04 to 0.70). The overall level of evidence for intra-clinician reliability was strong for good reliability (ICC = 0.75-0.99).

This systematic review indicates there is variability in force application between clinicians but individual clinicians apply forces consistently. The results of this systematic review suggest innovative instructional methods are needed to improve consistency and validate the forces applied during of joint mobilization treatments. This is particularly evident for improving the consistency of force application across clinicians.

Copyright © 2014 Elsevier Ltd. All rights reserved. **KEYWORDS:** Force, Joint mobilization, Manual therapy, Reliability PMID: 24405786

Lumbar side bending

Man Ther. 2014 Apr;19(2):114-8. doi: 10.1016/j.math.2013.08.004. Epub 2013 Sep 4.

Lumbar spine side bending is reduced in end range extension compared to neutral and end range flexion postures.

Ebert R1, Campbell A2, Kemp-Smith K3, O'Sullivan P4.

Abstract

Lumbar side bending movements coupled with extension or flexion is a known low back pain (LBP) risk factor in certain groups, for example, athletes participating in sports such as hockey, tennis, gymnastics, rowing and cricket.

Previous research has shown that sagittal spinal postures influence the degree of spinal rotation, with less rotation demonstrated at end of range extension and flexion. To date it is unknown whether sagittal spinal postures influence side bending. The aim of this study was to determine whether side bend range of motion (ROM) of the lumbar spine is decreased in end-range flexion and extension postures compared to a neutral spine. Twenty subjects between 18 and 55 years of age [mean age = 22.8 yrs (6.8)] with no history of LBP were recruited for this study. Upper (L1-L3) and lower (L3-L5) lumbar side bend, were measured utilising a 14 camera system (Vicon, Oxford metrics, inc.) in end-range flexion, extension and neutral postures, in both sitting and standing positions. The results revealed no statistically significant difference in upper and lower lumbar side bend ROM in an end-range flexion posture compared to a neutral spinal posture. A reduction was found in the range of upper and lower lumbar side bend ROM in an end-range extended posture ($p < 0.05$), compared to neutral and end range flexion postures. This ROM reduction was found in sitting and standing.

These findings allow clinicians to better interpret combined movements involving side bending of the lumbar spine in clinical and real life settings.

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KEYWORDS: Lumbar spine, Neutral zone, Sagittal posture, Side bend range of motion PMID: 24315299

Mulligan's impact with C spine

Effects of cervical spine manual therapy on range of motion, head repositioning and balance in participants with cervicogenic dizziness: a randomized controlled trial

Archives of Physical Medicine and Rehabilitation, 05/02/2014 Clinical Article

Reid SA, et al

Abstract

Objective

To evaluate and compare the effects of two 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.

Setting

University in New South Wales, Australia.

Participants

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

Interventions

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

Main Outcome Measures

Cervical ROM, head repositioning accuracy, and balance.

Results

SNAG therapy resulted in improved ($p \leq 0.05$) cervical spine ROM in all six physiological cervical spine movement directions immediately post-treatment and at 12 weeks. Treatment with PJM resulted in improvement in one of the six cervical movement directions post-treatment, and one movement direction at 12 weeks. There was a greater improvement ($p < 0.01$) after SNAGs than PJM in extension (mean difference -7.5 degrees, 95% CI -13, -2.0) and right rotation (-6.8, -11.5, -2.1) post treatment. 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.

Key Words: Neck pain, Musculoskeletal manipulation, Rehabilitation, Cervical vertebrae

Manipulation impact

Research Report

Changes in Biochemical Markers of Pain Perception and Stress Response After Spinal Manipulation

Authors: Gustavo Plaza-Manzano, PT¹, Francisco Molina, PT, PhD², Rafael Lomas-Vega, PT, PhD², Antonio Martínez-Amat, PhD², Alexander Achalandabaso, PT¹, Fidel Hita-Contreras, MD, PhD²

Published: *Journal of Orthopaedic & Sports Physical Therapy*, 2014, **Volume:** 44 **Issue:** 4
Pages: 231-239

Study Design Controlled, repeated-measures, single-blind randomized study.

Objectives To determine the effect of cervical or thoracic manipulation on neurotensin, oxytocin, orexin A, and cortisol levels.

Background Previous studies have researched the effect of spinal manipulation on pain modulation and/or range of movement. However, there is little knowledge of the biochemical process that supports the antinociceptive effect of spinal manipulation.

Methods Thirty asymptomatic subjects were randomly divided into 3 groups: cervical manipulation (n = 10), thoracic manipulation (n = 10), and nonmanipulation (control) (n = 10). Blood samples were extracted before, immediately after, and 2 hours after each intervention. Neurotensin, oxytocin, and orexin A were determined in plasma using enzyme-linked immuno assay. Cortisol was measured by microparticulate enzyme immuno assay in serum samples.

Results Immediately after the intervention, significantly higher values of neurotensin ($P < .05$) and oxytocin ($P < .001$) levels were observed with both cervical and thoracic manipulation, whereas cortisol concentration was increased only in the cervical manipulation group ($P < .05$). No changes were detected for orexin A levels. Two hours after the intervention, no significant differences were observed in between-group analysis.

Conclusion The mechanical stimulus provided by spinal manipulation triggers an increase in neurotensin, oxytocin, and cortisol blood levels. Data suggest that the initial capability of the tissues to tolerate mechanical deformation affects the capacity of these tissues to produce an induction of neuropeptide expression.

STM

Massage and neck pain

Ann Fam Med. 2014 Mar-Apr;12(2):112-20. doi: 10.1370/afm.1602.

Five-week outcomes from a dosing trial of therapeutic massage for chronic neck pain.

Sherman KJ1, Cook AJ, Wellman RD, Hawkes RJ, Kahn JR, Deyo RA, Cherkin DC.

Abstract

PURPOSE This trial was designed to evaluate the optimal dose of massage for individuals with chronic neck pain.

METHODS We recruited 228 individuals with chronic nonspecific neck pain from an integrated health care system and the general population, and randomized them to 5 groups receiving various doses of massage (a 4-week course consisting of 30-minute visits 2 or 3 times weekly or 60-minute visits 1, 2, or 3 times weekly) or to a single control group (a 4-week period on a wait list). We assessed neck-related dysfunction with the Neck Disability Index (range, 0-50 points) and pain intensity with a numerical rating scale (range, 0-10 points) at baseline and 5 weeks. We used log-linear regression to assess the likelihood of clinically meaningful improvement in neck-related dysfunction (≥ 5 points on Neck Disability Index) or pain intensity ($\geq 30\%$ improvement) by treatment group.

RESULTS After adjustment for baseline age, outcome measures, and imbalanced covariates, 30-minute treatments were not significantly better than the wait list control condition in terms of achieving a clinically meaningful improvement in neck dysfunction or pain, regardless of the frequency of treatments. In contrast, 60-minute treatments 2 and 3 times weekly significantly increased the likelihood of such improvement compared with the control condition in terms of both neck dysfunction (relative risk = 3.41 and 4.98, $P = .04$ and $.005$, respectively) and pain intensity (relative risk = 2.30 and 2.73; $P = .007$ and $.001$, respectively).

CONCLUSIONS After 4 weeks of treatment, we found multiple 60-minute massages per week more effective than fewer or shorter sessions for individuals with chronic neck pain. Clinicians recommending massage and researchers studying this therapy should ensure that patients receive a likely effective dose of treatment.

Dry needling heel pain

Phys Ther. 2014 Apr 3.

Effectiveness of Trigger Point Dry Needling for Plantar Heel Pain: A Randomized Controlled Trial.

Cotchett MP1, Munteanu SE, Landorf KB.

Abstract

Background Plantar heel pain can be managed with dry needling of myofascial trigger points, however there is only poor quality evidence supporting its use.

Objective To evaluate the effectiveness of dry needling for plantar heel pain. **Design** Parallel group, participant blinded, randomized controlled trial. **Setting** A university health sciences clinic.

Patients Study participants were 84 patients with plantar heel pain of at least one month's duration. **Intervention** Participants were randomised to real or sham trigger point dry needling. The intervention consisted of one treatment per week for six weeks. Participants were followed for 12 weeks.

Measurements Primary outcome measures included 'first-step pain' measured with a Visual Analogue Scale and foot pain measured with the pain subscale of the Foot Health Status Questionnaire. The primary end-point for predicting the effectiveness of dry needling for plantar heel pain was six weeks.

Results At the primary end-point, significant effects favored real dry needling over sham dry needling for pain (adjusted mean difference: VAS first-step pain -14.4 mm, 95% CI -23.5 to - 5.2, $p=0.002$; FHSQ foot pain 10.0 points, 95% CI 1.0 to 19.1, $p=0.029$), although the between-group difference was lower than the minimal important difference. The number needed to treat at six weeks was 4 (95% CI 2 to 12). The frequency of minor transitory adverse events was significantly greater in the real dry needling group (70 real dry needling appointments [32%] compared with only 1 sham dry needling appointment [$<1\%$]).

Limitations It was not possible to blind the therapist.

Conclusion Dry needling provided statistically significant improvements in plantar heel pain, but the magnitude of this effect should be considered against the frequency of minor transitory adverse events.

Electro vs manual acupuncture

Acupunct Med. 2014 Feb 24. doi: 10.1136/acupmed-2013-010489.

Immediate effects of electroacupuncture and manual acupuncture on pain, mobility and muscle strength in patients with knee osteoarthritis: a randomised controlled trial.

Plaster R1, Vieira WB, Alencar FA, Nakano EY, Liebano RE.

Author information

Abstract

OBJECTIVE:

To compare the immediate effects of electroacupuncture and manual acupuncture on pain, mobility and muscle strength in patients with knee osteoarthritis.

METHODS:

Sixty patients with knee osteoarthritis, with a pain intensity of ≥ 2 on the pain Numerical Rating Scale, were included. The patients were randomised into two groups: manual acupuncture and electroacupuncture. Pain intensity, degree of dysfunction (Timed Up and Go (TUG) test), maximal voluntary isometric contraction and pressure pain threshold were assessed before and after a single session of manual acupuncture or electroacupuncture treatments.

RESULTS:

Both groups showed a significant reduction in pain intensity ($p < 0.001$) and time to run the TUG test after the acupuncture treatment ($p = 0.005$ for the manual acupuncture group and $p = 0.002$ for the electroacupuncture group). There were no differences between the groups regarding pain intensity ($p = 0.25$), TUG test ($p = 0.70$), maximum voluntary isometric contraction ($p = 0.43$) or pressure pain threshold ($p = 0.27$).

CONCLUSIONS:

This study found no difference between the immediate effects of a single session of manual acupuncture and electroacupuncture on pain, muscle strength and mobility in patients with knee osteoarthritis.

Strain counterstrain impact

Journal of Bodywork and Movement Therapies

Volume 18, Issue 2 , Pages 165-173, April 2014

Strain counterstrain technique to decrease tender point palpation pain compared to control conditions: A systematic review with meta-analysis

- Christopher Kevin Wong, PT, PhD, OCS  Tim Abraham, BS Parisa Karimi, BS Carly Ow-Wing, BS

Background Strain counterstrain (SCS) is an indirect osteopathic manipulative technique that uses passive positioning to relieve tender point (TP) palpation pain and associated dysfunction.

Objective The purposes of this systematic review with meta-analysis were to 1) determine the pooled effect of SCS on TP palpation pain compared to a control condition and 2) assess the quality of the overall evidence.

Data source A search conducted using the MEDLINE with AMED, PUBMED, CINAHL, and SCOPUS databases for publications from January 2002 and April 2012 yielded 29 articles for eligibility screening.

Study selection Included studies were limited to randomized control trials comparing TP palpation pain after isolated SCS treatment compared to control conditions assessed with a visual analog scale. Other study designs or manipulative treatments were excluded.

Data extraction

Two reviewers adhered to a predetermined study protocol following current Cochrane Collaboration recommendations to independently extract the data with standardized extraction forms and assess studies for methodological quality and determine risks of bias.

Results

Five randomized control trials were included for qualitative and quantitative analysis. The pooled effect of SCS was a reduction of TP palpation pain ($p < 0.001$, 95% CI -0.291 to -0.825). The overall evidence quality was low: while all studies met at least 8 of 12 methodological quality criteria, most were low quality.

Conclusions

This systematic review and meta-analysis found low quality evidence suggesting that SCS may reduce TP palpation pain. Future studies with larger samples of better quality studies with patient populations that assess long-term pain, impairment, and dysfunction outcomes could enrich the literature.

BET

Sitting adaptations with LBP

Spine (Phila Pa 1976). 2014 May 1;39(10):785-90. doi: 10.1097/BRS.000000000000296.

Dynamic stability of the trunk during unstable sitting in people with low back pain.

Freddolini M¹, Strike S, Lee R.

Author information

- ¹From the Department of Life Sciences, University of Roehampton, London, United Kingdom.

Abstract

STUDY DESIGN: Cross-sectional study.

OBJECTIVE: To evaluate the dynamic stability and kinematics of the trunk during unstable sitting, and to determine the differences in these biomechanical parameters between healthy participants and participants with low back pain (LBP).

SUMMARY OF BACKGROUND DATA: Patients with LBP exhibited alterations in trunk kinematics while performing different dynamic tasks and in static posture as a result of pain. It is not clear if changing in trunk motion may reduce postural control and the ability to perform a balancing task.

METHODS: Twenty-three participants with LBP and 31 healthy participants were requested to sit on a custom-made swinging chair and to regain the balance after tilting the chair backward for 10° and 20°. Lumbar spine, pelvis, and chair motions were recorded using FASTRAK sensors. The thoracolumbar curvature of all participants was also evaluated in the standing position. The angular displacement of the chair was fitted in an equation describing the underdamped second-order response to a step input.

RESULTS: Kinematic analysis showed that the hip range of motion increased whereas spine range of motion angle decreased in participants with LBP for both tilt angles ($P < 0.05$). There were no significant differences between the 2 subject groups in the time required to regain balance, and the natural frequency and damping ratio of the kinematic equation. Lumbar lordosis significantly decreased in LBP group.

CONCLUSION: Participants with LBP showed trunk postural and movement adaptations that seems to be compensatory strategies to decrease the risk of further injuries and aggravation of the symptoms, but their ability to regain the balance was not affected by LBP. Clinicians should encourage patients with LBP to remain active while they are experiencing pain.

Level of Evidence: N/A.

PMID:24583732

Exercise

Impact of exercise

Scand J Med Sci Sports 2014:

Muscle conduction velocity, strength, neural activity, and morphological changes after eccentric and concentric training

E. L. Cadore¹, M. González-Izal¹, J. G. Pallarés², J. Rodríguez-Falces³, K. Häkkinen⁴, W. J. Kraemer⁵, R. S. Pinto⁶, M. Izquierdo

ABSTRACT

This study compared the effects of concentric and eccentric training on neuromuscular adaptations in young subjects.

Twenty-two men and women were assigned to one of two groups: concentric (CON, n=11) and eccentric (ECC, n=11) training. Training consisted of 6 weeks of isokinetic exercise, performed twice weekly, starting with two sets of eight repetitions, and progressing to five sets of 10 repetitions. Subjects were tested in strength variables [concentric, eccentric, and isometric peak torque (PT), and rate of force development (RFD)], muscle conduction velocity (CV), neuromuscular activity, vastus lateralis (VL) muscle thickness, and echo intensity as determined by ultrasonography. There were similar increases in the concentric and eccentric PTs in both the CON and ECC groups ($P < 0.01$), but only the ECC group showed an increase in isometric PT ($P < 0.001$). Similarly, both groups exhibited increased VL muscle thickness, CV, and RFD, and reduced VL echo intensity ($P < 0.05$). Significant correlations were observed among the relative changes in the neuromuscular outcomes and training variables (e.g., total work, average PT) ($r = 0.68-0.75$, $P < 0.05$).

The results showed that both training types similarly improved dynamic PT, CV, RFD, and muscle thickness and quality during the early weeks of training.

Exercise – ROM

Clin Interv Aging. 2014 Apr 11;9:653-60. doi: 10.2147/CIA.S59548. eCollection 2014.

Changes in spinal range of motion after a flexibility-training program in elderly women.

Battaglia G¹, Bellafiore M¹, Caramazza G², Paoli A³, Bianco A¹, Palma A¹.

Author information

Abstract

BACKGROUND:

Aging-related reduced spinal mobility can interfere with the execution of important functional skills and activities in elderly women. Although several studies have shown positive outcomes in response to spinal flexibility training programs, little is known about the management of sets and repetitions in training protocols. The purpose of this study was to investigate the effects of an 8-week specific and standardized flexibility training program on the range of spinal motion in elderly women.

METHODS:

PARTICIPANTS WERE RECRUITED IN A SENIOR CENTER OF PALERMO AND RANDOMLY ASSIGNED IN TWO GROUPS: trained group (TG) and control group (CG), which included 19 and 18 women, respectively. TG was trained for 8 weeks at two sessions/week. In particular, every session included three phases: warm up (~10 minutes), central period (~50 minutes), and cool down (~10 minutes). CG did not perform any physical activity during the experimental period. Spinal ranges of motion (ROM) were measured from neutral standing position to maximum bending position and from neutral standing position to maximum extension position before and after the experimental period, using a SpinalMouse® device (Idiag, Volkerswill, Switzerland).

RESULTS:

After the training period, TG showed an increase in spinal inclination by 16.4% ($P<0.05$), in sacral/hip ROM by 29.2% ($P<0.05$), and in thoracic ROM by 22.5% ($P>0.05$) compared with CG from maximum extension position to maximum bending position. We did not observe any significant difference in TG's lumbar ROM compared with CG after the training period ($P>0.05$).

CONCLUSION:

We found that an 8-week flexibility training program improved ROMs of the spine in elderly women. The training protocol appeared to be practicable for active elderly people with autonomy and the capability for self-care.

KEYWORDS: ROM, elderly, exercise, physical activity, spinal mouse, stretching PMID: 24748783

Testing hamstring strength with theraband

J Sport Rehabil. 2014 Apr 3.

Validity and Reliability of Maximal Strength Assessment of Knee Flexors and Extensors Using Elastic Bands.

Guex K¹, Daucourt C, Borloz S.

Author information

Abstract

CONTEXT:

In the field of sport rehabilitation, an easy, valid and reliable assessment of maximal strength is crucial for an efficient muscular rehabilitation. Classically, it is performed on fitness equipments, which are not necessary available in the field. Thera-Band® has developed elastic bands with different resistances depending on the color of the band and on the percentage of stretch of this last. This may allow testing maximal strength.

OBJECTIVE:

To determine validity and reliability of maximal strength assessment of knee flexors and extensors using elastic bands.

DESIGN:

Reliability and validity study.

PARTICIPANTS:

22 healthy participants (31.3 ± 7.0 yrs, 175.5 ± 8.5 cm, 70.7 ± 12.9 kg).

INTERVENTION:

Participants performed two maximal strength assessments, separated by seven days, of knee flexors and extensors using elastic bands. After the second trial, a maximal concentric isokinetic test at 60°·s⁻¹ was performed.

MAIN OUTCOME MEASURES:

Correlations between one repetition maximum (1-RM) using elastic bands and peak torque (PT) on isokinetic dynamometer were used to determine the validity of the proposed method, while ICC, CV and SEM were used to determine the reliability between first and second trials.

RESULTS:

The validity of the proposed method was found to be very high ($r = .93$ for both knee flexors and extensors). The relative reliability was found to be very high (ICC = .98 and .99 for knee flexors and extensors, respectively), while absolute reliability was also very satisfying (CV = 3.44% and 2.33%; SEM = 1.70 kg and 2.16 kg for knee flexors and extensors, respectively).

CONCLUSIONS:

Thera-Band® is a valid and reliable alternative to the use of fitness equipments to test maximal strength of knee flexors and extensors in healthy subjects. The ease of use, accessibility and low cost of elastic bands should allow regular assessment during the rehabilitation process.

PMID: 24700494

Pilates indications

Phys Ther. 2014 Apr 3.

Indications, Benefits, and Risks of Pilates Exercise for People With Chronic Low Back Pain: A Delphi Survey of Pilates-Trained Physical Therapists.

Wells C1, Kolt GS, Marshall P, Bialocerkowski A.

Author information

Abstract

Background The effectiveness of Pilates exercise for treating people with chronic low back pain (CLBP) is yet to be established. Understanding how to identify people with CLBP who may benefit, or not benefit from Pilates exercise, and the benefits and risks of Pilates exercise will assist trial design.

Objectives To establish a consensus regarding the indications, contraindications, and precautions of Pilates exercise, and the potential benefits and risks of Pilates exercise for people with CLBP.

Methods A panel of 30 Australian physical therapists experienced in the use of Pilates exercise were surveyed using the Delphi technique. Three electronic questionnaires were used to collect participant opinions. Answers to open-ended questions were analyzed thematically, combined with research findings, and translated into statements about Pilates exercise. Participants then rated their level of agreement with statements using a 6 point Likert scale. Consensus was achieved when 70% of panel members agreed or disagreed with an item.

Results Thirty physical therapists completed the 3 questionnaires. Consensus was reached on 100% of items related to the benefits, indications, and precautions of Pilates exercise, 50% of risks, and 56% of contraindications. Participants agreed that people who have poor body awareness and maladaptive movement patterns may benefit from Pilates exercise, while those with pre-eclampsia, unstable spondylolisthesis, or a fracture may not. Participants also agreed that Pilates exercise may improve functional ability, movement confidence, body awareness, posture, and movement control.

Conclusions These findings contribute to a better understanding of the indications, contraindications, and precautions of Pilates exercise, and the benefits and risks of Pilates exercise for people with CLBP. This can assist in future trial design examining the effectiveness of Pilates exercise.

Core

Adding dorsi flexion

Clin Rehabil. 2013 Nov 18.

The effect of a novel core stabilization technique on managing patients with chronic low back pain: a randomized, controlled, experimenter-blinded study.

You JH, Kim SY, Oh DW, Chon SC.

Source 1Yonsei University, Wonju City, Republic of South Korea.

Abstract

Objective:To identify the effect of a novel augmented core stabilization exercise technique on physical function, pain and core stability in patients with chronic low back pain.

Design:A block randomized controlled trial with two groups.

Setting:A sports rehabilitation clinic.**Participants:**Forty patients with low back pain (20 experimental, mean (SD) age 50.35 (9.26) years and 20 control, 51.30 (7.01)), 19 men and 21 women.

Interventions:In the experimental group ankle dorsiflexion was used in addition to drawing in the abdominal wall; the control group involved drawing in the abdominal wall alone. Both groups received the same conventional physical therapy training three days a week for eight weeks.

Main outcome measures :Physical disability instruments; Oswestry Disability Index and Roland Morris Disability Questionnaire; pain intensity assessments; visual analogue scale, Pain Disability Index, and a pain rating scale; and core stability measures, such as the active straight leg raise, were determined at pretest, posttest and two-month follow-up.

Results: After the intervention, the experimental group showed significant greater improvement at two months compared with the control group. Physical disability results included Oswestry Disability Index (P = 0.001, from 24.25 (7.08) to 13.35 (4.17)) and Roland Morris Disability Questionnaire (P = 0.001, from 15.55 (1.99) to 8.15 (1.69)), pain intensity including visual analogue scale (P = 0.001, from 6.30 (1.03) to 3.35 (0.59)), Pain Disability Index (P = 0.001, 31.25 (5.44) to 19.00 (3.58)) and pain rating scale (P = 0.001, from 72.25 (18.73) to 50.10 (15.47)), and the core stability test such as active straight leg raise (P = 0.001, from 7.40 (0.75) to 2.15 (0.49)).

Conclusions: This study provides the clinical evidence that adding ankle dorsiflexion to drawing in the abdominal wall gave increased benefit in terms of physical disability, pain and core stability in patients with chronic low back pain. **KEYWORDS:** Augmented core stabilization, ankle dorsiflexion, low back pain, randomized trial MID:24249843

Posture

Postural aberrant movements

Research Report

Clinical Observation of Standing Trunk Movements: What Do the Aberrant Movement Patterns Tell Us?

Authors: Scott A. Biely, PT, PhD¹, Sheri P. Silfies, PT, PhD², Susan S. Smith, PT, PhD^{2,3}, Gregory E. Hicks, PT, PhD⁴

Published: *Journal of Orthopaedic & Sports Physical Therapy*, 2014, **Volume:** 44 **Issue:** 4
Pages: 262-272 doi:10.2519/jospt.2014.4988

Study Design Clinical measurement, cross-sectional study.

Objective To investigate the reliability of observation of aberrant movement patterns (altered lumbopelvic rhythm, deviation from sagittal plane, instability catch or judder, and painful arc of motion) and to determine whether each pattern is associated with current low back pain (LBP).

Background Identification of aberrant movement patterns during trunk motion is an important component of subclassifying patients with LBP and prescribing evidence-based interventions. However, reported reliability for observation of specific aberrant patterns is low, and observation of any aberrant pattern (clinical definition of positive test) has ranged from poor to moderate. In addition, the validity of the association of clinical observations of aberrant movements during forward bending with LBP or dysfunction has yet to be determined.

Methods Experienced physical therapists simultaneously observed trunk movements of 102 subjects with no LBP, current LBP, or history of LBP. Kappa statistics were used to evaluate interrater agreement in identifying different types of aberrant patterns. Associations were used to determine the validity of the hypothesized relationship between aberrant patterns and LBP.

Results Interrater reliability of identifying the different types of aberrant patterns in subjects with LBP ranged from fair ($\kappa = 0.35$; 95% confidence interval: 0.00, 0.71) to excellent ($\kappa = 0.89$; 95% confidence interval: 0.69, 1.00). Using the clinical definition of 1 observation of any aberrant motion, interrater agreement was substantial ($\kappa = 0.65$; 95% confidence interval: 0.00, 1.00). Significant association was found between judder, deviation, and LBP. The frequency of observed aberrant patterns was significantly associated with LBP.

Conclusion Simultaneous observation for specific aberrant movement patterns suggests that identification can be performed with at least fair interrater agreement, and observation of any pattern with substantial agreement. Aberrant patterns are more frequently observed in patients with current complaints of LBP; however, they also appear in individuals with a history of LBP and no LBP

Keyword: aberrant movement pattern, classification, instability, low back pain

Scoliosis

Bracing and scoliosis

J Bone Joint Surg Am. 2014 Apr 16;96(8):649-53. doi: 10.2106/JBJS.M.00290.

Bracing for idiopathic scoliosis: how many patients require treatment to prevent one surgery?

Sanders JO¹, Newton PO², Browne RH³, Katz DE³, Birch JG³, Herring JA³.

Author information

Abstract

BACKGROUND:

Although the efficacy of bracing for adolescent idiopathic scoliosis has been debated, recent evidence indicates a strong dose-response effect with respect to preventing curve progression of $\geq 6^\circ$. The purpose of this study was to investigate whether bracing, prescribed with use of current criteria, prevents surgery and how many patients must be treated with bracing to prevent one surgery.

METHODS:

Of 126 patients with adolescent idiopathic scoliosis measuring between 25° and 45° and with a Risser sign of ≤ 2 , 100 completed a prospective study in which they were managed with a Boston brace fitted with a heat sensor that measured brace wear. Noncompliant patients were compared both with highly compliant patients and with the entire cohort, with the end point of progression to surgery. The absolute risk reduction (ARR) was calculated and used to calculate the number needed to treat (NNT) to prevent one surgery.

RESULTS:

Bracing was not effective in preventing surgery unless the patient was highly compliant with brace wear. For patients who were considered to be highly compliant, based on the hours per day that they wore the brace, the NNT was 3 (95% confidence interval [CI], 2 to 7).

CONCLUSIONS:

Within the limitations of a nonrandomized prospective study design, bracing for adolescent idiopathic scoliosis was found to substantially decrease the risk of curve progression to a range requiring surgery when patients were highly compliant with brace wear. Since many patients avoid surgery without wearing a brace, current indications appear to lead to marked overtreatment. Bracing appears to decrease the risk of curve progression to a magnitude requiring surgery, but current bracing indications include many curves that would not have progressed to a magnitude requiring surgery even if the patient had not worn the brace, and overall compliance with brace wear is low. Identifying these lower-risk patients and improving the compliance of those likely to have curve progression could substantially improve bracing results.

ATHLETICS

Previous knee surgery and impact of future injury

Am J Sports Med. 2014 Apr;42(4):959-64. doi: 10.1177/0363546513519951. Epub 2014 Feb 11.

Effects of Prior Knee Surgery on Subsequent Injury, Imaging, and Surgery in NCAA Collegiate Athletes.

Rugg CM1, Wang D, Sulzicki P, Hame SL.

BACKGROUND: High school and professional athletes with a history of orthopaedic surgery have decreased career lengths and are at a greater risk for reinjury compared with their peers. It is unknown whether the same risk applies to intercollegiate athletes.

PURPOSE: To determine the effect of prior knee surgery in National Collegiate Athletic Association (NCAA) Division I athletes in the United States.

STUDY DESIGN: Cohort study; Level of evidence, 3.

METHODS:

Division I athletes who began participation in collegiate athletics at a single institution from fall 2003 to spring 2008 were identified. Athletes with a history of orthopaedic surgery were identified through preparticipation evaluation forms. Data on the number of seasons and games played, number of days missed, diagnostic imaging, athletic injuries sustained, and surgical operations during college were collected through medical records and the Sports Injury Monitoring System (SIMS).

RESULTS:

During the 5-year study period, 456 athletes completed preparticipation evaluation forms. Of these, 104 athletes (22.8%) had a history of orthopaedic surgery (Ortho group). Forty-eight (10.5% of all athletes) had a history of knee surgery (Knee group), 16 (3.5%) had a history of anterior cruciate ligament reconstruction (ACL group), and 28 (6.1%) had a history of multiple surgeries (Multiple group). Days missed per season due to any injury and due to knee injury were increased for all surgical groups compared with controls ($P < .016$). The rate of knee injury and knee surgery while in college was significantly increased for all surgery groups. Athletes in the Knee and ACL groups were 6.8- and 19.6-fold more likely to sustain a knee injury and 14.4- and 892.9-fold more likely to undergo a knee surgery during their collegiate careers compared with controls ($P < .001$). The number of MRIs per season were 0.83 for the Knee group ($P < .001$), 1.29 for the ACL ($P = .009$), and 0.97 for the Multiple group ($P < .001$), compared with 0.37 for controls. Average career length and percentage of games played were not significantly different between any of the surgery groups compared with controls.

CONCLUSION:

Athletes who had a history of knee surgery before participation in collegiate athletics miss more days due to injury, have increased rates of knee injury and knee surgery, and require more MRIs during their collegiate careers than their peers.

Knee testing

Sports Med. 2014 Mar 29.

What is Normal? Female Lower Limb Kinematic Profiles During Athletic Tasks Used to Examine Anterior Cruciate Ligament Injury Risk: A Systematic Review.

Fox AS¹, Bonacci J, McLean SG, Spittle M, Saunders N.

Author information

Abstract

BACKGROUND: It has been proposed that the performance of athletic tasks where normal motion is exceeded has the potential to damage the anterior cruciate ligament (ACL). Determining the expected or 'normal' kinematic profile of athletic tasks commonly used to assess ACL injury risk can provide an evidence base for the identification of abnormal or anomalous task performances in a laboratory setting.

OBJECTIVE: The objective was to conduct a systematic review of studies examining lower limb kinematics of females during drop landing, drop vertical jump, and side-step cutting tasks, to determine 'normal' ranges for hip and knee joint kinematic variables.

DATA SOURCES: An electronic database search was conducted on the SPORTDiscus™, MEDLINE, AMED and CINAHL (January 1980-August 2013) databases using a combination of relevant keywords.

STUDY SELECTION: Studies identified as potentially relevant were independently examined by two reviewers for inclusion. Where consensus could not be reached, a third reviewer was consulted. Original research articles that examined three-dimensional hip and knee kinematics of female subjects during the athletic tasks of interest were included for review. Articles were excluded if subjects had a history of lower back or lower limb joint injury or isolated data from the female cohort could not be extracted.

STUDY APPRAISAL AND SYNTHESIS METHODS: Two reviewers independently assessed the quality of included studies. Data on subject characteristics, the athletic task performed, and kinematic data were extracted from included studies. Studies were categorised according to the athletic task being examined and each study allocated a weight within categories based on the number of subjects assessed. Extracted data were used to calculate the weighted means and standard deviations for hip and knee kinematics (initial contact and peak values). 'Normal' motion was classified as the weighted mean plus/minus one standard deviation.

RESULTS: Of 2,920 citations, a total of 159 articles were identified as potentially relevant, with 29 meeting all inclusion/exclusion criteria. Due to the limited number of studies available examining double-leg drop landings and single-leg drop vertical jumps, insufficient data was available to include these tasks in the review. Therefore, a total of 25 articles were included. From the included studies, 'normal' ranges were calculated for the kinematic variables of interest across the athletic tasks examined.

LIMITATIONS: Joint forces and other additional elements play a role in ACL injuries, therefore, focusing solely on lower limb kinematics in classifying injury risk may not encapsulate all relevant factors. Insufficient data resulted in no normal ranges being calculated for double-leg drop land and single-leg drop vertical jump tasks. No included study examined hip internal/external rotation during single-leg drop landings, therefore ranges for this kinematic variable could not be determined. Variation in data between studies resulted in wide normal ranges being observed across certain kinematic variables.

CONCLUSIONS: The ranges calculated in this review provide evidence-based values that can be used to identify abnormal or anomalous athletic task performances on a multi-planar scale. This may be useful in identifying neuromuscular factors or specific muscular recruitment strategies that contribute to ACL injury risk.

Adolescent football progression

Sports Med. 2014 Apr 9.

The Relationship Between Workloads, Physical Performance, Injury and Illness in Adolescent Male Football Players.

Gabbett TJ¹, Whyte DG, Hartwig TB, Wescombe H, Naughton GA.

BACKGROUND:

The expectation that training enhances performance is well explored in professional sport. However, the additional challenges of physical and cognitive maturation may require careful consideration when determining workloads to enhance performance in adolescents.

OBJECTIVE:

The objective of this study was to determine the state of knowledge on the relationship between workloads, physical performance, injury and/or illness in adolescent male football players.

METHODS:

A systematic review of workloads, physical performance, injury and illness in male adolescent football players was conducted. Studies for this review were identified through a systematic search of six electronic databases (Academic Search Complete, CINAHL, PsycINFO, PubMed, SPORTDiscus, and Web of Science). For the purpose of this review, load was defined as the cumulative amount of stress placed on an individual from multiple training sessions and games over a period of time, expressed in terms of either the external workloads performed (e.g., resistance lifted, kilometres run) or the internal response (e.g., heart rate, rating of perceived exertion) to that workload.

RESULTS:

A total of 2,081 studies were initially retrieved from the six databases, of which 892 were duplicates. After screening the titles, abstracts and full texts, we identified 23 articles meeting our criteria around adolescent football players, workloads, physical performance, injury and/or illness. Seventeen articles addressed the relationship between load and physical performance, four articles addressed the relationship between load and injury and two articles addressed both. A wide range of training modalities were employed to improve the physical performance of adolescent football players, with strength training, high-intensity interval training, dribbling and small-sided games training, and a combination of these modalities in addition to normal football training, resulting in improved performances on a wide range of physiological and skill assessments. Furthermore, there was some (limited) evidence that higher workloads may be associated with the development of better physical qualities, with one study demonstrating enhanced submaximal interval shuttle run performance with each additional hour of training or game play. Of the few studies examining negative consequences associated with workloads, increases in training load led to increases in injury rates, while longer training duration was associated with a greater incidence of illness.

CONCLUSION:

The combined capacity for adolescent males to grow, train and improve physical performance highlights and underscores an exciting responsiveness to training in the football environment. However, the capacity to train has some established barriers for adolescents experiencing high workloads, which could also result in negative consequences. Additional research on stage-appropriate training for adolescent male footballers is required in order to address the knowledge gaps and enhance safe and efficient training practices.

Myocardial function

J Nucl Cardiol. 2014 Mar 14. [Epub ahead of print]

Differential effects of variation in athletes training on myocardial morphophysiological adaptation in men: Focus on ¹²³I-MIBG assessed myocardial sympathetic activity.

Miranda DP¹, Dos Santos MJ, Salemi VM, de Oliveira EP, Verberne HJ, da Rocha ET.

Author information

- ¹Post Graduation Program in Research and Development - Medical Biotechnology, Faculdade de Medicina de Botucatu, Universidade Estadual Paulista, Botucatu, São Paulo, Brazil, douglas@pinheirimiranda.com.

Abstract

PURPOSE:

High intensity systematic physical training leads to myocardial morphophysiological adaptations. The goal of this study was to investigate if differences in training were correlated with differences in cardiac sympathetic activity.

METHODS:

58 males (19-47 years), were divided into three groups: strength group (SG), (20 bodybuilders), endurance group (EG), (20 endurance athletes), and a control group (CG) comprising 18 healthy non-athletes. Cardiac sympathetic innervation was assessed by planar myocardial ¹²³I-metaiodobenzylguanidine scintigraphy using the early and late heart to mediastinal (H/M) ratio, and washout rate (WR).

RESULTS:

Left ventricular mass index was significantly higher both in SG ($P < .001$) and EG ($P = .001$) compared to CG without a statistical significant difference between SG and EG ($P = .417$). The relative wall thickness was significantly higher in SG compared to CG ($P < .001$). Both left ventricular ejection fraction and the peak filling rate showed no significant difference between the groups. Resting heart rate was significantly lower in EG compared to CG ($P = .006$) and SG ($P = .002$). The late H/M ratio in CG was significantly higher compared to the late H/M for SG ($P = .003$) and EG ($P = .004$). However, WR showed no difference between the groups. There was no significant correlation between the parameters of myocardial sympathetic innervation and parameters of left ventricular function.

CONCLUSIONS:

Strength training resulted in a significant increase in cardiac dimensions. Both strength and endurance training seem to cause a reduction in myocardial sympathetic drive. However, myocardial morphological and functional adaptations to training were not correlated with myocardial sympathetic activity. PMID: 24627344

Construction workers working in musculoskeletal pain and engaging in leisure-time physical activity: Findings from a mixed-methods pilot study

American Journal of Industrial Medicine, 04/24/2014 Clinical Article

Caban–Martinez AJ, et al.

Abstract

Background

While exercise has been shown to be beneficial for some musculoskeletal pain conditions, construction workers who are regularly burdened with musculoskeletal pain may engage less in leisure-time physical activity (LTPA) due to pain. In a small pilot study, we investigate how musculoskeletal pain may influence participation in LTPA among construction workers.

Methods

A sequential explanatory mixed-methods design was employed using a jobsite-based survey (n = 43) among workers at two commercial construction sites and one focus group (n = 5).

Results

Over 93% of these construction workers reported engaging in LTPA and 70% reported musculoskeletal pain. Fifty-seven percent of workers who met either moderate or vigorous LTPA guidelines reported lower extremity pain (i.e., ankle, knee) compared with 21% of those who did not engage in either LTPA ($P = 0.04$). Focus group analyses indicate that workers felt they already get significant physical activity out of their job because they are “moving all the time and not sitting behind a desk.” Workers also felt they “have no choice but to work through pain and discomfort [as the worker] needs to do anything to get the job done.”

Conclusion

Pilot study findings suggest that construction workers not only engage in either moderate or vigorous LTPA despite musculoskeletal pain but workers in pain engage in more LTPA than construction workers without pain. Am. J. Ind. Med. 9999:1–7, 2014. © 2014 Wiley Periodicals, Inc

Variability in the Relationship Between Sleep and Pain in Patients Undergoing Interdisciplinary Rehabilitation for Chronic Pain.

Davin S¹, Wilt J, Covington E, Scheman J.

Author information

- ¹Neurological Center for Pain, Neurological Institute, Cleveland Clinic, Cleveland, Ohio, USA.

Abstract

OBJECTIVE:

Chronic pain and sleep disturbance frequently coexist and often complicate the course of treatment. Despite the well-established comorbidity, there are no studies that have investigated concurrent changes in sleep and pain among patients participating in an interdisciplinary chronic pain rehabilitation program (ICPRP). The goal of this study was to investigate the daily changes in sleep and pain among patients participating in an ICPRP.

METHODS:

Multilevel modeling techniques were used to evaluate the daily changes in total sleep time (TST) and pain among a sample of 50 patients with chronic noncancer pain participating in the ICPRP.

RESULTS:

Increases in TST were predictive of less pain the following treatment day, although daily pain ratings were not predictive of that night's TST. Time in treatment was a significant predictor of both TST and pain reduction, even while controlling for age, gender, anxiety, and depression. Additional analyses revealed significant individual variability in the relationship between TST and next day pain. Individuals with stronger associations between previous night's TST and next day pain were found to experience the greatest treatment benefits overall, in terms of pain reduction and TST.

CONCLUSIONS:

Our results provide compelling support for individual variability of the pain-sleep relationship in patients with intractable pain conditions participating in an ICPRP. Importantly, these findings suggest that when pain and sleep are comorbid, both must be addressed to reap the maximum response to treatment programs such as an ICPRP.

PERSPECTIVE STATEMENT:

This study demonstrates the utility of treating sleep problems in patients participating in an interdisciplinary chronic pain rehabilitation program. Results highlight the benefits of accounting for individual variability in the pain-sleep relationship in a clinical setting and targeting sleep interventions for those individuals whose pain and sleep problems are comorbid.

Wiley Periodicals, Inc.

KEYWORDS: Chronic Pain, Interdisciplinary Rehabilitation, Sleep, Treatment PMID: 24716856

Impact of a nap

J Sports Sci. 2007 Dec;25(14):1557-66.

The role of a short post-lunch nap in improving cognitive, motor, and sprint performance in participants with partial sleep deprivation.

Waterhouse J1, Atkinson G, Edwards B, Reilly T.

Abstract

The aim of this study was to determine the effects of a post-lunch nap on subjective alertness and performance following partial sleep loss.

Ten healthy males (mean age 23.3 years, $s = 3.4$) either napped or sat quietly from 13:00 to 13:30 h after a night of shortened sleep (sleep 23:00-03:00 h only). Thirty minutes after the afternoon nap or control (no-nap) condition, alertness, short-term memory, intra-aural temperature, heart rate, choice reaction time, grip strength, and times for 2-m and 20-m sprints were recorded. The afternoon nap lowered heart rate and intra-aural temperature. Alertness, sleepiness, short-term memory, and accuracy at the 8-choice reaction time test were improved by napping ($P < 0.05$), but mean reaction times and grip strength were not affected ($P > 0.05$). Sprint times were improved. Mean time for the 2-m sprints fell from 1.060 s ($s(x) = 0.018$) to 1.019 s ($s(x) = 0.019$) ($P = 0.031$ paired t-test); mean time for the 20-m sprints fell from 3.971 s ($s(x) = 0.054$) to 3.878 s ($s(x) = 0.047$) ($P = 0.013$).

These results indicate that a post-lunch nap improves alertness and aspects of mental and physical performance following partial sleep loss, and have implications for athletes with restricted sleep during training or before competition.

J Orthop Sci. 2014 Apr 16.

Investigation of chronic musculoskeletal pain (third report): with special reference to the importance of neuropathic pain and psychogenic pain.

Nakamura M¹, Nishiwaki Y, Sumitani M, Ushida T, Yamashita T, Konno S, Taguchi T, Toyama Y.

Author information

- ¹Department of Orthopaedic Surgery, School of Medicine, Keio University, 35 Shinanomachi, Shinjuku, Tokyo, 160-8582, Japan, masa@a8.keio.jp.

Abstract

BACKGROUND:

The previous epidemiological surveys conducted in Japan revealed that once the vicious cycle of chronic musculoskeletal pain begins, it is difficult to disrupt the cycle. This finding suggests the existence of problems with the conventional approaches to treatment of chronic musculoskeletal pain. The purpose of this study was to investigate the characteristics of patients with chronic musculoskeletal pain focusing on neuropathic and psychogenic pain.

METHODS:

The questionnaire was sent again to the 660 subjects found to have persistent chronic pain in the epidemiological surveys conducted in 2011. Responses were collected from 588 subjects (response rate 90 %).

RESULTS:

Of the 588 responders, 365 (62 %) complained of persistent chronic pain. Among them, 128 (35 %) were still receiving treatment and 193 (53 %) had discontinued treatment. The degree of satisfaction with the treatment was low, and 66 % of the patients had switched the medical facility that they visited to receive treatment. The cited reasons for the change in the medical facility visited and discontinuation of treatment were "treatment was ineffective," "I did not have sufficient time," "I thought I could take care of it myself," and "Treatment seemed to be unnecessary". Involvement of neuropathic pain was suggested in 20 % of all the patients with chronic pain. As the PainDETECT Score rose, the Visual Analog Scale (VAS) score became higher and the change of medical facility for treatment also increased. The Pain Catastrophizing Scale score was correlated positively with the VAS score. The Hospital Anxiety and Depression Scale score was significantly correlated with the VAS score and the duration of pain.

DISCUSSION:

The results of this survey indicated that the chronic course of musculoskeletal pain may be attributable to the following factors: (1) lack of appropriate treatment of neuropathic pain and psychogenic pain, and (2) insufficient awareness/knowledge among patients about chronic musculoskeletal pain. PMID: 24737064

Inflammation impact of sleep cycle disruption

Diabetes. 2014 Jan 23.

Circadian misalignment augments markers of insulin resistance and inflammation, independently of sleep loss.

Leproult R1, Holmbäck U, Van Cauter E.

Abstract

Shift workers, who are exposed to irregular sleep schedules resulting in sleep deprivation and misalignment of circadian rhythms, have an increased risk of diabetes relative to day workers.

In healthy adults, sleep restriction without circadian misalignment promotes insulin resistance. To determine whether the misalignment of circadian rhythms that typically occurs in shift work involves intrinsic adverse metabolic effects independently of sleep loss, twenty-six healthy adults were studied using a parallel group design. Both interventions involved 3 inpatient days with 10-h bedtimes followed by 8 inpatient days of sleep restriction to 5 hours, either with fixed nocturnal bedtimes (circadian alignment) or with bedtimes delayed by 8.5 hours on 4 of the 8 days (circadian misalignment). Daily total sleep time during the intervention was nearly identical in the aligned and misaligned conditions (4h48min[5min] vs. 4h45min[6min]).

In both groups, insulin sensitivity significantly decreased after sleep restriction, without compensatory increase in insulin secretion, and inflammation increased. In male participants exposed to circadian misalignment, both the reduction in insulin sensitivity and the increase in inflammation doubled, compared to those who maintained regular nocturnal bedtimes.

Circadian misalignment as occurs in shift work may increase diabetes risk and inflammation, independently of sleep loss.

Basketball sleep and performance

Sleep. 2011 Jul 1;34(7):943-50. doi: 10.5665/SLEEP.1132.

The effects of sleep extension on the athletic performance of collegiate basketball players.

Mah CD1, Mah KE, Kezirian EJ, Dement WC.

Abstract

STUDY OBJECTIVES: To investigate the effects of sleep extension over multiple weeks on specific measures of athletic performance as well as reaction time, mood, and daytime sleepiness.

SETTING: Stanford Sleep Disorders Clinic and Research Laboratory and Maples Pavilion, Stanford University, Stanford, CA.

PARTICIPANTS: Eleven healthy students on the Stanford University men's varsity basketball team (mean age 19.4 ± 1.4 years).

INTERVENTIONS: Subjects maintained their habitual sleep-wake schedule for a 2-4 week baseline followed by a 5-7 week sleep extension period. Subjects obtained as much nocturnal sleep as possible during sleep extension with a minimum goal of 10 h in bed each night.

Measures of athletic performance specific to basketball were recorded after every practice including a timed sprint and shooting accuracy. Reaction time, levels of daytime sleepiness, and mood were monitored via the Psychomotor Vigilance Task (PVT), Epworth Sleepiness Scale (ESS), and Profile of Mood States (POMS), respectively.

RESULTS: Total objective nightly sleep time increased during sleep extension compared to baseline by 110.9 ± 79.7 min ($P < 0.001$). Subjects demonstrated a faster timed sprint following sleep extension (16.2 ± 0.61 sec at baseline vs. 15.5 ± 0.54 sec at end of sleep extension, $P < 0.001$). Shooting accuracy improved, with free throw percentage increasing by 9% and 3-point field goal percentage increasing by 9.2% ($P < 0.001$). Mean PVT reaction time and Epworth Sleepiness Scale scores decreased following sleep extension ($P < 0.01$). POMS scores improved with increased vigor and decreased fatigue subscales ($P < 0.001$). Subjects also reported improved overall ratings of physical and mental well-being during practices and games.

CONCLUSIONS: Improvements in specific measures of basketball performance after sleep extension indicate that optimal sleep is likely beneficial in reaching peak athletic performance.

KEYWORDS: Sleep extension, athletes, athletic performance, basketball, collegiate, extra sleep, fatigue, mood, reaction time, sports

GAIT

Stair decent

Knee. 2014 Apr 3. pii: S0968-0160(14)00061-1. doi: 10.1016/j.knee.2014.03.006.

Effects of increased step width on frontal plane knee biomechanics in healthy older adults during stair descent.

Paquette MR¹, Zhang S², Milner CE³, Fairbrother JT², Reinbolt JA⁴.

Abstract

BACKGROUND:

Peak internal knee abduction moment is a common surrogate variable associated with medial compartment knee loading. Stair descent has been shown to yield a greater peak knee abduction moment compared to level-walking. Changes in step width (SW) may lead to changes in frontal plane lower extremity limb alignment in the frontal plane and alter peak knee abduction moment. The purpose of this study was to investigate the effects of increased SW on frontal plane knee biomechanics during stair descent in healthy older adults.

METHODS:

Twenty healthy adults were recruited for the study. A motion analysis system was used to obtain three-dimensional lower limb kinematics during testing. An instrumented 3-step staircase with two additional customized wooden steps was used to collect ground reaction forces (GRF) data during stair descent trials. Participants performed five stair descent trials at their self-selected speed using preferred, wide (26% leg length), and wider (39% leg length) SW.

RESULTS:

The preferred normalized SW in older adults during stair descent was 20% of leg length. Wide and wider SW during stair descent reduced both first and second peak knee adduction angles and abduction moments compared to preferred SW in healthy adults.

CONCLUSIONS:

Increased SW reduced peak knee adduction angles and abduction moments. The reductions in knee abduction moments may have implications in reducing medial compartment knee loads during stair descent.

Copyright © 2014 Elsevier B.V. All rights reserved. KEYWORDS Abduction moment, Force, Knee, Stair descent, Step width PMID 24767736

OA of the hip changes

Research Report

Spatial-Temporal Gait Characteristics in Individuals With Hip Osteoarthritis: A Systematic Literature Review and Meta-analysis

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Study Design Systematic literature review and meta-analysis.

Objective To systematically review and critically evaluate the literature to determine how basic gait characteristics are altered in individuals with hip osteoarthritis (OA).

Background Hip OA is a progressive musculoskeletal condition that leads to pain, stiffness, and functional limitation in activities such as walking. Understanding gait dysfunction in people with hip OA may contribute to more effective management of the disease.

Methods Eleven electronic research databases were searched. Studies comparing basic gait parameters in individuals with hip OA to healthy controls and the affected to the contralateral limb of individuals with hip OA were included. The studies were critically appraised for methodological quality. Available data were extracted, and meta-analysis was performed, with standardized effect sizes (Cohen *d*) and corresponding 95% confidence intervals computed for gait speed, cadence, step and stride length, stance, swing and double-stance duration, and step width.

Results The final analysis included 30 articles. Self-selected gait speed was 26% slower in individuals with hip OA relative to controls, which was explained by shorter stride length. Consistent evidence was found for greater asymmetry in individuals with hip OA than controls, with shorter step length and stance duration in the affected compared to the contralateral limb.

Conclusion Individuals with hip OA walk at a slower speed and exhibit greater gait asymmetry than controls. Gait speed and asymmetry can be readily assessed clinically and represent a simple way of objectively evaluating gait dysfunction and monitoring treatment progress in individuals with hip OA

PAIN

Central sensitization

[Pain Med.](#) 2014 Apr 16. doi: 10.1111/pme.12424.

Evidence for Acute Central Sensitization to Prolonged Experimental Pain in Posttraumatic Stress Disorder.

Moeller-Bertram T¹, Strigo IA, Simmons AN, Schilling JM, Patel P, Baker DG.

Author information

Abstract

BACKGROUND:

Post-traumatic stress disorder (PTSD) and pain have a well-documented high comorbidity; however, the underlying mechanisms of this comorbidity are currently poorly understood. The aim of this psychophysical study was to investigate the behavioral response to a prolonged suprathreshold pain stimulus in subjects with combat-related PTSD and combat controls (CC) for clinical evidence of central sensitization.

METHODS:

Ten male subjects with current PTSD related to combat and 11 CC male subjects underwent baseline quantitative sensory testing (QST), temporal pain summation, and psychological profiling followed by an intramuscular injection of capsaicin into the quadriceps muscle.

RESULTS:

There was no significant between-group difference for the initial maximal pain response or an initial pain reduction for the first 15 minutes postinjection on QST or pain ratings. However, we observed significantly higher scores in the PTSD group for the second 15 minutes postinjection on both pain intensity and pain unpleasantness ratings. Assessment of temporal summation to repetitive pressure stimuli showed significantly higher subjective pain in the PTSD group.

CONCLUSION:

These findings are consistent with a significantly higher degree of acute central sensitization in individuals with PTSD. Increased acute central sensitization may underlie increased vulnerability for developing pain-related conditions following combat trauma.

Wiley Periodicals, Inc.

KEYWORDS: Capsaicin, Central Sensitization, Experimental Pain, PTSD, Quantitative Sensory Testing PMID: 2473856

Internet behavioral therapy for chronic pain

Eur J Pain. 2014 Apr 29. doi: 10.1002/ejp.509.

A randomized controlled trial of an Internet-based cognitive-behavioural intervention for non-specific chronic pain: An effectiveness and cost-effectiveness study.

de Boer MJ¹, Versteegen GJ, Vermeulen KM, Sanderman R, Struys MM.

Author information

Abstract

BACKGROUND:

Cognitive-behavioural treatment can nowadays be delivered through the Internet. This form of treatment can have various advantages with regard to availability and accessibility. Previous studies showed that Internet-based treatment for chronic pain is effective compared to waiting-list control groups.

METHODS:

We conducted a randomized controlled trial comparing an Internet-based cognitive-behavioural intervention with e-mail therapist contact to a face-to-face cognitive-behavioural group intervention. Of the 72 participants who were randomly assigned to an Internet or a group course, 50 participants completed the intervention. Participants were assessed at baseline (T0), immediately after the 7-week course (T1) and at the booster session 2 months later (T2). Pain-related catastrophizing was the primary outcome measure. Pain intensity, fatigue, pain-related interference, locus of control, pain coping, global health-related quality of life and medical expenses were secondary outcome variables.

RESULTS:

Significant improvement was found on catastrophizing, pain coping, locus of control and aspects of global health-related quality of life in both the Internet and the group courses directly after the course and at the booster session. Pain intensity was improved in both courses at the booster session. At T2, improvement in catastrophizing, pain intensity, pain coping and some quality of life dimensions was significantly greater in completers of the Internet course than in the group course. Furthermore, the Internet course was cost-effective compared to the group course.

CONCLUSIONS:

We conclude that the Internet-based cognitive-behavioural intervention was at least as effective as the face-to-face group intervention and, on some outcome measures appeared to be even more effective.

Measuring the Intensity of Chronic Pain: Are the Visual Analogue Scale and the Verbal Rating Scale Interchangeable?

Kliger M¹, Stahl S, Haddad M, Suzan E, Adler R, Eisenberg E.

Author information

Abstract

OBJECTIVES:

The 0 to 100 mm visual analogue scale (VAS) and the five-category verbal rating scale (VRS) are commonly used for measuring pain intensity. An open question remains as to whether these scales can be used interchangeably to allow comparisons between intensities of pain in the clinical setting or increased statistical power in pain research.

METHODS:

Seven hundred and ninety-six patients were requested to rate the present intensity of their chronic pain on the two scales. Spearman's rank correlation coefficients between VAS and VRS were calculated. For testing interchangeability, VAS was transformed into a discrete ordinal scale by dividing the entire VAS into five categories, either equidistantly (biased) or using frequency distributions of VAS (unbiased). We used Goodman-Kruskal's gamma and Wilson's e measures of ordinal association quantified the relationships between the transformed VAS and VRS scores and Svensson method to evaluate agreement between biased and unbiased discrete VAS and VRS scales.

RESULTS:

Average VAS and VRS scores were 76 ± 18 mm and "severe," respectively. Spearman's rank correlation coefficient values between continuous VAS and VRS were 0.77 to 0.85. Goodman-Kruskal's gamma ordinal associations between discrete VAS and VRS were 0.82 to 0.92 and 0.90 to 0.98 for the biased and unbiased VAS, respectively. Wilson's e measures were 0.51 to 0.61 and 0.54 to 0.65, accordingly. Svensson analysis showed low probability of agreement between both biased (0.66 to 0.76) and unbiased (0.75 to 0.82) VAS and VRS.

DISCUSSION:

Regardless of the relatively high Spearman correlations between original VAS and VRS, the low ordinal association and low probability of agreement between discrete VAS and VRS suggest that they are not interchangeable. Therefore, VAS and VRS should not be used interchangeably in the clinical setting or for increased statistical power in pain research.

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KEYWORDS:

Verbal Rating Scale, Visual Analogue Pain Scale, pain intensity, pain measurement

PMID:24735056

Factors in MS pain

J Orthop Sci. 2014 Apr 16.

Investigation of chronic musculoskeletal pain (third report): with special reference to the importance of neuropathic pain and psychogenic pain.

Nakamura M¹, Nishiwaki Y, Sumitani M, Ushida T, Yamashita T, Konno S, Taguchi T, Toyama Y.

BACKGROUND:

The previous epidemiological surveys conducted in Japan revealed that once the vicious cycle of chronic musculoskeletal pain begins, it is difficult to disrupt the cycle. This finding suggests the existence of problems with the conventional approaches to treatment of chronic musculoskeletal pain. The purpose of this study was to investigate the characteristics of patients with chronic musculoskeletal pain focusing on neuropathic and psychogenic pain.

METHODS:

The questionnaire was sent again to the 660 subjects found to have persistent chronic pain in the epidemiological surveys conducted in 2011. Responses were collected from 588 subjects (response rate 90 %).

RESULTS:

Of the 588 responders, 365 (62 %) complained of persistent chronic pain. Among them, 128 (35 %) were still receiving treatment and 193 (53 %) had discontinued treatment. The degree of satisfaction with the treatment was low, and 66 % of the patients had switched the medical facility that they visited to receive treatment. The cited reasons for the change in the medical facility visited and discontinuation of treatment were "treatment was ineffective," "I did not have sufficient time," "I thought I could take care of it myself," and "Treatment seemed to be unnecessary". Involvement of neuropathic pain was suggested in 20 % of all the patients with chronic pain. As the PainDETECT Score rose, the Visual Analog Scale (VAS) score became higher and the change of medical facility for treatment also increased. The Pain Catastrophizing Scale score was correlated positively with the VAS score. The Hospital Anxiety and Depression Scale score was significantly correlated with the VAS score and the duration of pain.

DISCUSSION:

The results of this survey indicated that the chronic course of musculoskeletal pain may be attributable to the following factors: (1) lack of appropriate treatment of neuropathic pain and psychogenic pain, and (2) insufficient awareness/knowledge among patients about chronic musculoskeletal pain.

PMID: 24737064

Pressure pain thresholds

Phys Ther. 2014 Apr 17.

Clinical Pressure Pain Threshold Testing in Neck Pain: Comparing Protocols, Responsiveness, and Association With Psychological Variables.

Walton DM¹, Levesque L, Payne M, Schick J.

Author information

Abstract

Background Quantitative sensory testing, including pressure pain threshold (PPT), is seeing increased use in clinical practice. In order to facilitate clinical utility, knowledge of the properties of the tool and interpretation of results are required.

Objectives This observational study used a clinical sample of people with mechanical neck pain to determine: (1) the influence of number of testing repetitions on measurement properties, (2) reliability and minimum clinically important difference, and (3) associations between PPT and key psychological constructs

.Design This study was observational with both cross-sectional and prospective elements

.Methods Experienced clinicians measured PPT in patients with mechanical neck pain following a standardized protocol. Subcohorts also provided repeated measures and completed scales of key psychological constructs.

Results The total sample was 206 participants, but not all participants provided data for all analyses. Interrater and 1-week test-retest reliability were excellent (intraclass correlation coefficients [2,1]=.75-.95). Potentially important differences in reliability and PPT scores were found when using only 1 or 2 repeated measures compared with all 3. The PPT over a distal location (tibialis anterior muscle) was not adequately responsive in this sample, but the local site (upper trapezius muscle) was responsive and may be useful as part of a protocol to evaluate clinical change. Sensitivity values (range = 0.08-0.50) and specificity values (range = 0.82-0.97) for a range of change scores are presented. Depression, catastrophizing, and kinesiophobia were able to explain small but statistically significant variance in local PPT (3.9%-5.9%), but only catastrophizing and kinesiophobia explained significant variance in the distal PPT (3.6% and 2.9%, respectively)

.Limitations Limitations of the study include multiple raters, unknown recruitment rates, and unknown measurement properties at sites other than those tested here.

Conclusions The results suggest that PPT is adequately reliable and that 3 measurements should be taken to maximize measurement properties. The variance explained by the psychological variables was small but significant for 3 constructs related to catastrophizing, depression, and fear of movement. Clinical implications for application and interpretation of PPT are discussed.

PMID: 24557645

Global impact of pain

Ann Rheum Dis. 2014 Mar 3. doi: 10.1136/annrheumdis-2013-204680.

The global burden of other musculoskeletal disorders: estimates from the Global Burden of Disease 2010 study.

Smith E¹, Hoy DG, Cross M, Vos T, Naghavi M, Buchbinder R, Woolf AD, March L.

Author information

- ¹Northern Clinical School, Institute of Bone and Joint Research, University of Sydney, St Leonards, New South Wales, Australia.

Abstract

OBJECTIVE: To estimate disability from the remainder of musculoskeletal (MSK) disorders (categorised as other MSK) not covered by the estimates made specifically for osteoarthritis (OA), rheumatoid arthritis (RA), gout, low back pain and neck pain, as part of the Global Burden of Disease (GBD) 2010 study.

METHODS: Systematic reviews were conducted to gather the age-sex-specific epidemiological data for other MSK. The focus was on finding health surveys and published studies that measured the overall amount of MSK disorders and complaints, and classified the remainder of MSK disorders that was not RA, OA, gout, low back or neck pain. Six levels of severity were defined to derive disability weights (DWs) and severity distribution. The data, DWs and severity distribution were used to calculate years of life lived with disability (YLDs). Mortality was estimated for MSK-related deaths classified under other MSK. YLDs were added to years of life lost (YLLs) from the mortality estimates to derive overall burden in disability-adjusted life years (DALYs).

RESULTS: Global prevalence of other MSK was 8.4% (95% uncertainty interval (UI) 8.1% to 8.6%). DALYs increased from 20.6 million (95% UI 17.0 to 23.3 million) in 1990 to 30.9 million (95% UI 25.8 to 34.6 million) in 2010. The burden of other MSK increased with age. Globally, other MSK disability burden (YLD) ranked sixth.

CONCLUSIONS:

Ageing of the global population will further increase the burden of other MSK. Specific MSK conditions within this large category should be considered separately to enable more explicit estimates of their burden in future iterations of GBD.

KEYWORDS:

Arthritis, Autoimmune Diseases, Epidemiology, Health Services Research, Outcomes Research

PMID: 24590181

Descending inhibitory pathways

Pain Pract. 2013 Nov 20. doi: 10.1111/papr.12145.

The Role of Descending Inhibitory Pathways on Chronic Pain Modulation and Clinical Implications.

Kwon M, Altin M, Duenas H, Alev L.

Source

Eli Lilly Medical, Quality and Regulatory Affairs Department, Eli Lilly Korea Ltd., Seoul, Korea.

Abstract

The treatment and management of chronic pain is a major challenge for clinicians. Chronic pain is often underdiagnosed and undertreated, and there is a lack of awareness of the pathophysiological mechanisms that contribute to chronic pain. Chronic pain involves peripheral and central sensitization, as well as the alteration of the pain modulatory pathways. Imbalance between the descending facilitatory systems and the descending inhibitory systems is believed to be involved in chronic pain in pathological conditions. A pharmacological treatment that could restore the balance between these 2 pathways by diminishing the descending facilitatory pain pathways and enhancing the descending inhibitory pain pathways would be a valuable therapeutic option for patients with chronic pain. Due to the lack of evidence for pharmacological options that act on descending facilitation pathways, in this review we summarize the role of the descending inhibitory pain pathways in pain perception. This review will focus primarily on monoaminergic descending inhibitory pain pathways and their contribution to the mechanism of chronic pain and several pharmacological treatment options that enhance these pathways to reduce chronic pain.

We describe anatomical structures and neurotransmitters of the descending inhibitory pain pathways that are activated in response to nociceptive pain and altered in response to sustained and persistent pain which leads to chronic pain in various pathological conditions.

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KEYWORDS: central nervous system, chronic pain, descending inhibition, inhibitory pathways, pain modulation, review PMID: 24256177

Fibromyalgia

Restless leg syndrome

Eur J Pain. 2014 Apr 3. doi: 10.1002/ejp.504.

High prevalence of restless legs syndrome among women with multi-site pain: A population-based study in Dalarna, Sweden.

Stehlik R1, Ulfberg J, Hedner J, Grote L.

Author information

Abstract

BACKGROUND:

The chronic pain (CP) and chronic multi-site pain (CMP) condition is a highly prevalent health problem. Several studies have reported a high (31-64%) prevalence of co-morbid restless legs syndrome (RLS) in patients with fibromyalgia, one specifically defined form of chronic widespread pain. The current study explored the association between CMP and RLS.

METHOD:

The study included 4040 respondents to a postal questionnaire sent to 10,000 women in the age range of 18-64 years and randomly selected from the general population. Complete questionnaire data on type (acute/chronic), degree (mild to severe) and spreading (0-5 body zones) of pain, as well as RLS symptoms (validated questionnaire), were obtained from 3060 subjects. Information on lifestyle, anthropometrics, co-morbidities and medication was collected.

RESULTS:

RLS prevalence increased from 9.6% in subjects with no report of pain to 23.9%, 26.4%, 39.2%, 44.9% and 54.8% in those reporting one, two, three, four and five pain areas, respectively ($p < 0.001$). Further, RLS prevalence increased from 9.6% (no pain) to 27.9%, 37.9% and 42.4% in subjects with mild, moderate and severe chronic pain ($p < 0.001$). Multi-site pain, pain localized in the leg, extended pain duration and co-morbid psychiatric disorder were all independently associated with a RLS diagnosis in a multiple regression analysis.

CONCLUSION:

The prevalence of RLS increased progressively with pain severity and even more sharply with the degree of pain spreading in women recruited from the general population. Both acute and chronic pain was associated with RLS-related symptoms.

NUTRITION/VITAMINS/SMOKING

Smoking and fracture healing

J Bone Joint Surg Am. 2014 Apr 16;96(8):674-81. doi: 10.2106/JBJS.M.00081.

Cigarette smoking increases complications following fracture: a systematic review.

[Scolaro JA](#)¹, [Schenker ML](#)², [Yannascoli S](#)², [Baldwin K](#)², [Mehta S](#)², [Ahn J](#)².

Author information

Abstract

BACKGROUND:

Smoking has been suggested to increase the rate of perioperative complications including soft-tissue complications, to decrease the rate of fracture union, and to prolong healing time. The purpose of our study was to systematically evaluate and analyze the literature regarding the relationship between smoking and healing following operative treatment of long-bone fractures.

METHODS:

We searched the MEDLINE, Embase, and Cochrane databases by pairing the search terms "smoking," "tobacco," and "nicotine" with the terms "fracture," "nonunion," "delayed union," and "healing." Articles and citations were evaluated for relevance. Inclusion and exclusion criteria were established to maintain data quality for analysis. Relevant information was independently extracted and compared to ensure agreement. The methodological quality of the studies was determined. A random-effects model was used. The adjusted odds ratios (ORs) and frequency-weighted means for the primary and secondary outcome measures were calculated.

RESULTS:

Our initial search identified 7110 articles. Of the 237 articles that underwent further evaluation of the abstract, nineteen (seven prospective and twelve retrospective cohort studies) were included. The adjusted OR of nonunion in the smoking group compared with the nonsmoking group was 2.32 (95% confidence interval [CI], 1.76 to 3.06; $p < 0.001$). An increased nonunion rate was observed in smokers with a tibial fracture (OR, 2.16; 95% CI, 1.55 to 3.01; $p < 0.001$) and those with an open fracture (OR, 1.95; 95% CI, 1.3 to 2.9; $p < 0.001$). For all fractures, the mean healing time was longer for smokers (30.2 weeks; 95% CI, 22.7 to 37.7 weeks) than for nonsmokers (24.1 weeks; 95% CI, 17.3 to 30.9 weeks) ($p = 0.18$). Trends toward more superficial and deep infections of postoperative or traumatic wounds in smokers were noted; however, the differences in superficial and deep infection rates were not significant ($p = 0.13$ and $p = 0.33$, respectively).

CONCLUSIONS:

Smoking significantly increased the risk of nonunion of fractures overall, tibial fractures, and open fractures. Nonsignificant trends toward increased time to union in all fractures and toward increased postoperative rates of superficial and deep infections were noted in smokers compared with nonsmokers.

LEVEL OF EVIDENCE:

Prognostic Level III. See Instructions for Authors for a complete description of levels of evidence. N PMID: 2474066

PHARMACOLOGY

Nsaid's and MS trauma

Curr Med Res Opin. 2014 May;30(5):953-9. doi: 10.1185/03007995.2014.913412. Epub 2014 Apr 15.

Challenges of pain masking in the management of soft tissue disorders: optimizing patient outcomes with a multi-targeted approach.

Speed C¹, Wolfarth B.

Author information

- ¹Rheumatology, Sport & Exercise Medicine, Cambridge Centre for Health and Performance , Cambridge , UK.

Abstract

Abstract Current approaches to managing soft tissue injuries often rely upon the use of non-steroidal anti-inflammatory drugs (NSAIDs). The use of NSAIDs in this manner is contentious, and some believe that the risks of using NSAIDs can outweigh any potential benefit. In this article the issues of toxicity, pain masking and return to full activity are reviewed, and an alternative strategy for the management of inflammation in soft tissue injuries is proposed. We consider that a multi-targeted approach has the potential to improve healing, reduce additional injury from premature return to full activity as a consequence of pain masking, and improve prognosis for many patients with soft tissue injuries.

PMID: 24730542

Pain medication

Clin J Pain. 2014 May;30(5):453-62. doi: 10.1097/AJP.0b013e31829f57df.

Oxytocin and pain: a systematic review and synthesis of findings.

Rash JA¹, Aguirre-Camacho A, Campbell TS.

Author information

Abstract

OBJECTIVES:

A review of the literature was conducted to assess the association between oxytocin (OT) and pain.

METHODS:

PsychInfo, PubMed, and Medline (EBSCO) research databases were searched for peer-reviewed articles written between 1950 and 2012. Of a total of 1166 articles returned, 50 (9 human, 33 animal, and 8 spinal cord samples) met full inclusion criteria and were included in the review.

RESULTS:

OT had a reliable effect as defined by increasing pain tolerance in 29 of 33 animal studies reviewed. This effect persisted across central and peripheral modes of administration and type of noxious stimulus used (eg, heat, electric). The results suggest that OT acts as an analgesic for acute pain in animals. Preliminary research with humans offers consistent evidence to suggest that OT decreases pain sensitivity, though the reliability and stability of such effects cannot yet be determined. Although the findings are encouraging, there is a need for methodologically rigorous work in humans where OT is administered centrally.

DISCUSSION:

Further research seems to be warranted as the existence of biologically and psychologically plausible mechanisms linking OT and pain have been well supported using animal models with limited but encouraging human research. Implications and recommendations are discussed. Findings from this research may inform therapeutic methods for the management of pain.

PMID: 23887343