

ABSTRACTS

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LUMBAR SPINE

Chronic LBP/PT/ NSAIDs

J Clin Epidemiol. 2013 Sep 7. pii: S0895-4356(13)00262-X. doi: 10.1016/j.jclinepi.2013.02.018.

The smallest worthwhile effect of nonsteroidal anti-inflammatory drugs and physiotherapy for chronic low back pain: a benefit-harm trade-off study.

Ferreira ML, Herbert RD, Ferreira PH, Latimer J, Ostelo RW, Grotle M, Barrett B.

Source

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Abstract

OBJECTIVE:

The aim of this study was to determine the smallest worthwhile effects of two treatments for nonspecific low back pain (LBP).

STUDY DESIGN AND SETTING:

The benefit-harm trade-off method was used to estimate the smallest worthwhile effect of nonsteroidal anti-inflammatory drugs (NSAIDs) and physiotherapy for LBP. Patients seeking care for chronic LBP were interviewed by telephone before treatment commenced and 4 weeks later.

RESULTS:

Patients need to see a median of 30% (interquartile range [IQR]: 10-40) more improvement in pain and 20% (IQR: 10-40) more improvement in disability than would occur without intervention to perceive the effect of NSAIDs are worthwhile. They would need to see 20% (IQR: 0-30) more improvement on pain and disability over natural recovery to perceive that the effect of physiotherapy was worthwhile. There was no difference in estimates of the smallest worthwhile effect elicited at baseline and 4 weeks later.

CONCLUSIONS:

People with chronic back pain need to see larger effects on pain of NSAIDs than physiotherapy to consider the effects of these interventions worthwhile. These estimates of the smallest worthwhile effect can be used to interpret the findings of clinical trials and to design adequately powered clinical trials.

Fusion

Spine J. 2013 Nov;13(11):1438-48. doi: 10.1016/j.spinee.2013.06.101. Epub 2013 Nov 5.

Comparison of spinal fusion and nonoperative treatment in patients with chronic low back pain: long-term follow-up of three randomized controlled trials.

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Abstract

BACKGROUND CONTEXT: Chronic low back pain (cLBP) represents a major challenge to our health care systems. The relative efficacy of surgery over nonoperative treatment for the treatment of cLBP remains controversial, and little is known of the long-term comparative outcomes.

PURPOSE: To compare the clinical outcome at long-term follow-up (LTFU) of patients who were randomized with either spinal fusion or multidisciplinary cognitive-behavioral and exercise rehabilitation for cLBP.

STUDY DESIGN/SETTING: Long-term clinical follow-up of three multicenter randomized controlled trials (RCTs) of surgery (instrumented or noninstrumented fusion, stabilization) versus nonoperative treatment (multidisciplinary cognitive-behavioral and exercise rehabilitation) in Norway and the United Kingdom.

PATIENT SAMPLE: A total of 473 patients with cLBP of at least 1 year's duration who were all considered candidates for spinal fusion.

OUTCOME MEASURES: The primary outcome was the Oswestry Disability Index (ODIv2.1a for the United Kingdom and ODIv1 for Norway) score measured at LTFU. Secondary outcomes included visual analog scale (VAS) pain intensity, pain frequency, pain medication use, work status, EuroQol VAS for health-related quality of life, satisfaction with care, and global treatment outcome at LTFU. **METHODS:**

Patients who consented to LTFU (average 11.4 [range 8-15] years after the initial treatment) completed the outcome questionnaires.

RESULTS: Of 473 enrolled patients, 261 (55%) completed LTFU, 140/242 patients randomized to receive surgery and 121/231 randomized to receive multidisciplinary cognitive-behavioral and exercise rehabilitation. The intention-to-treat analysis showed no statistically or clinically significant differences between treatment groups for ODI scores at LTFU (adjusted for baseline ODI, previous surgery, duration of LBP, sex, age, and smoking habit): the mean adjusted treatment effect of fusion was -0.7 points on the 0-100 ODI scale (95% confidence interval [CI], -5.5 to 4.2). An as-treated analysis similarly demonstrated no advantage of surgery (treatment effect, -0.8 points on the ODI (95% CI, -5.9 to 4.3). The results for the secondary outcomes were largely consistent with those of the ODI, showing no relevant group differences.

CONCLUSIONS: After an average of 11 years follow-up, there was no difference in patient self-rated outcomes between fusion and multidisciplinary cognitive-behavioral and exercise rehabilitation for cLBP. The results suggest that, given the increased risks of surgery and the lack of deterioration in nonoperative outcomes over time, the use of lumbar fusion in cLBP patients should not be favored in health care systems where multidisciplinary cognitive-behavioral and exercise rehabilitation programmes are available.

Copyright © 2013 Elsevier Inc. All rights reserved. **KEYWORDS:** Chronic low back pain, Fusion, Multidisciplinary cognitive-behavioral and exercise rehabilitation, Randomized trial, Self-rated disability PMID: 24200413

Surgery/conservative care

Spine J. 2013 Nov;13(11):1421-33. doi: 10.1016/j.spinee.2013.05.047. Epub 2013 Jul 23.

One-year outcomes of surgical versus nonsurgical treatments for discogenic back pain: a community-based prospective cohort study.

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Source department of Orthopaedic Surgery and The Dartmouth Institute for Health Policy and Clinical Practice, Geisel School of Medicine at Dartmouth, Hanover, NH 03755, USA. Electronic address: sohail.k.mirza@dartmouth.edu.

Abstract

BACKGROUND CONTEXT: The clinical entity "discogenic back pain" remains controversial at fundamental levels, including its pathophysiology, diagnostic criteria, and optimal treatment. This is true despite availability of four randomized trials comparing the efficacy of surgical and nonsurgical treatments. One trial showed benefit for lumbar fusion compared with unstructured nonoperative care, and three others showed roughly similar results for lumbar surgery and structured rehabilitation.

PURPOSE: To compare outcomes of community-based surgical and nonsurgical treatments for patients with chronic back pain attributed to degeneration at one or two lumbar disc levels.

DESIGN: Prospective observational cohort study.

PATIENT SAMPLE: Patients presenting with axial back pain to academic and private practice orthopedic surgeons and neurosurgeons in a large metropolitan area.

OUTCOME MEASURES: Roland-Morris back disability score (primary outcome), current rating of overall pain severity on a numerical scale, back and leg pain bothersomeness measures, the physical function scale of the short-form 36 version 2 questionnaire, use of medications for pain, work status, emergency department visits, hospitalizations, and further surgery.

METHODS: Patients receiving spine surgery within 6 months of enrollment were designated as the "surgical treatment" group and the remainder as "nonsurgical treatment." Outcomes were assessed at 3, 6, 9, and 12 months after enrollment.

RESULTS: We enrolled 495 patients with discogenic back pain presenting for initial surgical consultation in offices of 16 surgeons. Eighty-six patients (17%) had surgery within 6 months of enrollment. Surgery consisted of instrumented fusion (79%), disc replacement (12%), laminectomy, or discectomy (9%). Surgical patients reported more severe pain and physical disability at baseline and were more likely to have had prior surgery. Adjusting for baseline differences among groups, surgery showed a limited benefit over nonsurgical treatment of 5.4 points on the modified (23-point) Roland disability questionnaire (primary outcome) 1 year after enrollment. Using a composite definition of success incorporating 30% improvement in the Roland score, 30% improvement in pain, no opioid pain medication use, and working (if relevant), the 1-year success rate was 33% for surgery and 15% for nonsurgical treatment. The rate of reoperation was 11% in the surgical group; the rate of surgery after treatment designation in the nonsurgical group was 6% at 12 months after enrollment.

CONCLUSIONS: The surgical group showed greater improvement at 1 year compared with the nonsurgical group, although the composite success rate for both treatment groups was only fair. The results should be interpreted cautiously because outcomes are short term, and treatment was not randomly assigned. Only 5% of nonsurgical patients received cognitive behavior therapy. Nonsurgical treatment that patients received was variable and mostly not compliant with major guidelines.

Copyright © 2013 Elsevier Inc. All rights reserved. **KEYWORDS:** Discogenic back pain, Fusion, Nonsurgical treatment, Outcome, Surgery PMID: 23890947

LBP/fibromyalgia

Arthritis Rheum. 2013 Sep 10. doi: 10.1002/art.38178.

Prevalence of the fibromyalgia phenotype in spine pain patients presenting to a tertiary care pain clinic and the potential treatment implications.

Brummett CM, Goesling J, Tsodikov A, Meraj TS, Wasserman RA, Clauw DJ, Hassett AL.

Source

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Abstract

Objective: Injections for spinal pain have high failure rates, emphasizing the importance of patient selection. It is possible that detecting the presence of a fibromyalgia-like phenotype could aid in prediction, because in these individuals a peripheral injection would not address pain due to alterations in central neurotransmission. We hypothesized that spine pain patients meeting survey criteria for fibromyalgia would be phenotypically distinct from those who do not meet criteria.

Methods: 548 patients with a primary spine pain diagnosis were studied. All patients completed validated self-report questionnaires, including the Brief Pain Inventory, PainDETECT, Hospital Anxiety and Depression Scale, measures of physical function, and the American College of Rheumatology survey criteria for fibromyalgia.

Results: 42% met survey criteria for fibromyalgia (FM+). When compared with criteria negative patients, FM+ patients were more likely to be younger, unemployed, receiving compensation, have greater pain severity, pain interference and neuropathic pain descriptors, as well as higher levels of depression and anxiety, and lower level of physical function ($p < 0.0001$ for each comparison). Gender, neuropathic pain, pain interference, physical function, and anxiety were independently predictive of fibromyalgia status in a multivariate analysis ($p < 0.01$, all variables). ROC analysis showed the strength of association of 0.80 as measured by the cross-validated C-statistic.

Conclusion: Using the survey criteria for fibromyalgia, we demonstrated profound phenotypic differences in a spine pain population. Although centralized pain cannot be confirmed with a survey alone, the pathophysiology of fibromyalgia may help explain a portion of the variability of responses to spine interventions. © 2013 American College of Rheumatology.

Stability limits

J Manipulative Physiol Ther. 2013 Nov-Dec;36(9):612-8. doi: 10.1016/j.jmpt.2013.08.005.

The effect of chronic pain intensity on the stability limits in patients with low back pain.

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Abstract

OBJECTIVE:

The purpose of this study was to evaluate if the intensity of recurrent chronic pain would modify postural performance in reaching the functional limits of stability (LOS) in chronic low back pain (CLBP) patients.

METHODS:

Three groups of subjects were investigated. Healthy persons comprised the asymptomatic group ($n = 32$) while CLBP patients ($n = 36$) were divided into 2 subgroups, according to the reported intensity of resting pain on a numerical rating scale: patients with low (LP) and high pain (HP) levels. The maximal displacement of the center of pressure (COP) indexing the LOS magnitude and the COP mean velocity indexing the performance in reaching LOS were calculated on a Kistler force plate during forward and backward voluntary body lean with eyes open (EO) or closed (EC).

RESULTS:

The forward LOS was lower in both the LP ($P < .01$) and HP ($P < .01$) subgroups than in the asymptomatic under EO and EC conditions, while no differences between the LP and HP groups were found. The backward LOS was lower in the HP group than in asymptomatic but only with EC ($P = .01$). Eye closure caused an increase in forward ($P = .02$) and backward ($P = .001$) COP velocity in the LP group and forward COP velocity in the asymptomatic ($P = .04$) only. With EC, the only intergroup difference was lower forward COP velocity in the HP than LP group ($P = .04$).

CONCLUSION:

Subjects with CLBP had reduced forward LOS regardless the pain level. However, the higher level of pain was associated with slower execution of voluntary leaning tasks, with EC only.

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KEYWORDS: Articular, Balance, Postural Equilibrium, Posture, Range of Motion PMID: 24229576

Spondylo

The Journal of Bone & Joint Surgery, Volume 95, Issue 21 November 06, 2013

Complications, Reoperation Rates, and Health-Care Cost Following Surgical Treatment of Lumbar Spondylolisthesis

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Background:

Surgery remains the mainstay for management of lumbar spondylolisthesis and is considered an effective therapeutic modality following unsuccessful nonoperative treatment. Surgical procedures include decompression, decompression with instrumented arthrodesis, and decompression with noninstrumented arthrodesis. The purpose of this study was to examine the complications, reoperation rates, and health-care costs associated with each of these procedures.

Methods:

The MarketScan database was utilized to identify 16,556 patients with a primary diagnosis of lumbar spondylolisthesis who underwent surgical treatment from 2000 to 2009. Outcomes were evaluated in propensity score-matched cohorts, with complication rates analyzed with the chi-square test, reoperation rates analyzed using the Mantel-Haenszel test, and health-care resource use analyzed using the Wilcoxon signed-rank test.

Results:

Complication rates were significantly higher in patients who underwent arthrodesis compared with those who had decompression alone during the initial hospitalization (8.3% versus 4.8%; $p < 0.0001$) and at the time of the ninety-day follow-up (9.6% versus 5.5%; $p < 0.0001$). Complication rates were similar for those who received instrumented and noninstrumented arthrodesis. Patients who underwent decompression alone had higher reoperation rates at two years or more than those who received arthrodesis (15.7% versus 11.9%; $p = 0.034$). Patients with instrumented arthrodesis trended to have higher reoperation rates than those without instrumentation at five years or more (18.4% versus 10.6%; $p = 0.063$). Initial hospital costs and two-year and five-year overall costs (in 2009 U.S. dollars) were higher for patients managed with arthrodesis than for those who had decompression only (\$102,906 versus \$89,337; $p = 0.0018$). Also, patients who received instrumentation had higher hospitalization costs than those without instrumentation (\$39,997 versus \$27,309; $p = 0.023$) and higher overall costs at two years (\$73,482 versus \$60,394; $p < 0.0001$), although the difference was not significant at five years ($p = 0.29$).

Conclusions:

Patients with lumbar spondylolisthesis who underwent decompressive laminectomy and spinal arthrodesis had lower reoperation rates but higher overall costs than patients treated with laminectomy alone. Noninstrumented arthrodesis was also associated with lower long-term reoperation rates and health-care costs compared with instrumented arthrodesis. The long-term outcomes and costs of these procedures should be evaluated in conjunction with clinical efficacy to ensure the most cost-effective treatment is utilized.

Level of Evidence: Therapeutic Level III. See Instructions for Authors for a complete description of levels of evidence.

Urgent care LBP

Physiotherapy. 2013 Nov 14. pii: S0031-9406(13)00077-1. doi: 10.1016/j.physio.2013.08.001.

Why do patients with Simple Mechanical Back Pain seek Urgent Care?

Stafford V, Greenhalgh S, Davidson I.

Source

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Abstract

OBJECTIVE:

To explore why patients with simple mechanical back pain seek urgent care.

DESIGN:

Qualitative Exploratory Inquiry based on the principles of Grounded Theory.

SETTING:

Urgent Care.

METHODS:

Data collection by semi-structured interview.

RESULTS:

The study identified eight key motivators of patients with mechanical back pain seeking urgent care: (1) GP access, (2) Pain, (3) Function, (4) Something being different, (5) Something being wrong, (6) Desire for investigation, (7) Third Party Influence and (8) Repeat visits.

CONCLUSION:

This study provides some evidence to support the notion that patients are willing to use primary care services for the treatment of Simple Mechanical Back Pain but that access is frequently limited and untimely. The study concludes that inappropriate attendances at urgent care facilities are frequently a human response to perception of pain severity which is reinforced by functional loss, uncertainty, the need to provide care for others and the encouragement of others. While it is asserted that there is a clear need for mass education in this area, it is also speculated that attendance at urgent care may occur to overtly escalate the need for assistance and illustrate to sceptical significant others the severity of the condition.

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KEYWORDS: Back pain, Care-seeking, Primary care, Qualitative design, Urgent-care PMID: 24239190

Obesity

Spine J. 2013 Nov;13(11):1521-6. doi: 10.1016/j.spinee.2013.06.049. Epub 2013 Aug 23.
Associations among low back pain, income, and body mass index in Taiwan.

Hu HY, Chen L, Wu CY, Chou YJ, Chen RC, Huang N.

Source

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Abstract

BACKGROUND CONTEXT:

There is a lack of literature on the association of obesity with low back pain (LBP) in oriental countries. Furthermore, no research has explored whether higher socioeconomic status cushions obesity-related risk of LBP.

PURPOSE:

This study aims to investigate the association between obesity and LBP and to investigate the effects of socioeconomic status on this association.

STUDY DESIGN:

This was a retrospective cohort study using data from Taiwan's 2001 National Health Interview Survey and 2002 to 2004 National Health Insurance claim records.

PATIENT SAMPLE:

The sample consisted of 12,862 adults who were aged 18 or older in 2001.

OUTCOME MEASURES:

Persons with at least one outpatient or inpatient claim record including 724 as a diagnosis code were defined as LBP patients.

RESULTS:

The estimated risk levels of being overweight ($23.0 \leq \text{body mass index [BMI]} < 25.0$) and of being in Class I of obesity ($25.0 \leq \text{BMI} < 30.0$) were the same (hazard ratio [HR]=1.31), and no statistically significant difference in risk level was detected among persons with different economic levels. Among people in Class II of obesity ($\text{BMI} \geq 30.0$), the LBP risk levels were different for persons with an economic level in the bottom quintile (defined as the poor) and their better-off counterparts (HR=1.77 vs. 1.24, $p < .05$).

CONCLUSIONS:

Obesity-related risk of LBP is substantially higher for poor people than for those with higher socioeconomic status. Weight reduction should be promoted as a way to reduce LBP. Because income may serve as a proxy for other variables, the mechanisms underlying the empirical observed associations need to be further explored.

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KEYWORDS:

Economic disparity, Low back pain, Obesity, Overweight, Taiwan

PMID: 23978625

LBP/Depression

Eur J Pain. 2013 Oct 28. doi: 10.1002/j.1532-2149.2013.00407.x.

Neuronal differences between chronic low back pain and depression regarding long-term habituation to pain.

Rodriguez-Raecke R, Ihle K, Ritter C, Muhtz C, Otte C, May A.

Source

Department of Systems Neuroscience, University Medical Center Hamburg-Eppendorf, Germany.

Abstract

BACKGROUND:

Longitudinal studies of experimental pain are rare and little is known about the differences regarding sensitization and habituation over longer periods in patients with chronic pain or depression compared with controls.

METHODS:

We used a standardized longitudinal painful heat paradigm that was designed to induce long-term habituation in 19 patients with chronic low back pain (CLBP), 21 patients with depression (DEP) and 21 healthy participants (controls) over a time course of eight consecutive days. We applied functional magnetic resonance imaging on the first and last day of this period and after 3 months.

RESULTS:

Although the pain paradigm was standardized, patients with DEP exhibited significantly higher pain thresholds and a trend to higher pain ratings and, in functional imaging, showed less activation of the operculum and the secondary somatosensory cortex (S2) as compared to patients with CLBP and controls. Conversely, patients with CLBP showed increased activation in the anterior insula and parietal operculum as compared to patients with DEP and controls. Within session, all participants sensitized to pain, which was associated with higher activation levels in the thalamus, amygdala, midcingulate cortex, and sensory and motor areas. However, patients with depression showed significantly less activation in midbrain and brainstem areas.

CONCLUSION:

Given that pain and depression potentiate each other clinically, our data suggest that this may involve different cortical pain areas.

LBP/Disc

Disc/Pain

Neuroradiology November 2013

Disc degeneration and chronic low back pain: an association which becomes nonsignificant when endplate changes and disc contour are taken into account

- Francisco M. Kovacs, Estanislao Arana, Ana Royuela, Ana Estremera, Guillermo Amengual, Beatriz Asenjo, Helena Sarasfbar, Isabel Galarraga, Ana Alonso, Carlos Casillas, ... [show all 13](#)

Abstract

Introduction

The objective of this study was to assess the association between severe disc degeneration (DD) and low back pain (LBP).

Methods

A case-control study was conducted with 304 subjects, aged 35–50, recruited in routine clinical practice across six hospitals; 240 cases (chronic LBP patients with a median pain duration of 46 months) and 64 controls (asymptomatic subjects without any lifetime history of significant LBP). The following variables were assessed once, using previously validated methods: gender, age, body mass index (BMI), lifetime smoking exposure, degree of physical activity, severity of LBP, disability, and findings on magnetic resonance (MRI) (disc degeneration, Modic changes (MC), disc protrusion/hernia, annular tears, spinal stenosis, and spondylolisthesis). Radiologists who interpreted MRI were blinded to the subjects' characteristics. A multivariate logistic regression model assessed the association between severe DD and chronic LBP, adjusting for gender, age, BMI, physical activity, MC, disc protrusion/hernia, and spinal stenosis.

Results

Severe DD at ≥ 1 level was found in 46.9 % of the controls and 65.8 % of the cases. Crude odds ratio (95 % CI), for suffering chronic LBP when having severe DD, was 2.06 (1.05; 4.06). After adjusting for “MC” and “disc protrusion/hernia,” it was 1.81 (0.81; 4.05).

Conclusions

The association between severe DD and LBP ceases to be significant when adjusted for MC and disc protrusion/hernia. These results do not support that DD as a major cause of chronic LBP.

Spondylothesis/Adolescent athletes

Am J Phys Med Rehabil. 2013 Dec;92(12):1070-1074.

Effect of Sports Modification on Clinical Outcome in Children and Adolescent Athletes with Symptomatic Lumbar Spondylolysis.

El Rassi G, Takemitsu M, Glutting J, Shah SA.

Source

From the Department of Orthopedic Surgery, Balamand University, Beirut, Lebanon (GE, MT, SAS); Division of Orthopedics, National Center of Neurology and Psychiatry, Tokyo, Japan (MT); University of Delaware, Newark (JG); and Department of Orthopedic Surgery, Jefferson Medical College, Philadelphia, Pennsylvania (SAS).

Abstract

OBJECTIVE:

This cohort study aimed to report the compliance of young athletes with nonoperative treatment and to clarify the role of sports modification on clinical outcome of symptomatic spondylolysis.

DESIGN:

This study included patients with a chief complaint of low back pain participating in regular sports activity, having spondylolysis, and being treated and followed up between 1990 and 2002 in the authors' hospital.

RESULTS:

One hundred thirty-two athletes were included in this study: 78 males and 54 females. The mean age of the patients was 13 yrs (range, 7-18 yrs). Only 56 patients (42.4%) were compliant to nonoperative treatment. Eighty-six patients (65%) stopped all sports activities for at least 3 mos, and 46 patients (35%) stopped exercising for a variable period of less than 3 mos. The grading of clinical outcome after nonoperative treatment was as follows: excellent in 48 patients (36.4%), good in 74 patients (56.1), fair in 6 patients (4.5%), and poor in 4 patients (3%). The patients who stopped sports for at least 3 mos were 16.39 times more likely to have an excellent result than those who did not stop sports. Bony healing on radiographs did not correlate with clinical outcome.

CONCLUSIONS:

Timely cessation of sports activity for 3 mos is considered an effective method of nonoperative treatment for young athletes with symptomatic lumbar spondylolysis.

PMID: 24141103

Medial professionals communications

Ann Fam Med. 2013 Nov-Dec;11(6):527-34. doi: 10.1370/afm.1518.

The enduring impact of what clinicians say to people with low back pain.

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Source Department of Primary Health Care and General Practice, University of Otago, Wellington, New Zealand.

Abstract

PURPOSE

The purpose of this study was to explore the formation and impact of attitudes and beliefs among people experiencing acute and chronic low back pain.

METHODS

Semistructured qualitative interviews were conducted with 12 participants with acute low back pain (less than 6 weeks' duration) and 11 participants with chronic low back pain (more than 3 months' duration) from 1 geographical region within New Zealand. Data were analyzed using an Interpretive Description framework.

RESULTS

Participants' underlying beliefs about low back pain were influenced by a range of sources. Participants experiencing acute low back pain faced considerable uncertainty and consequently sought more information and understanding. Although participants searched the Internet and looked to family and friends, health care professionals had the strongest influence upon their attitudes and beliefs. Clinicians influenced their patients' understanding of the source and meaning of symptoms, as well as their prognostic expectations. Such information and advice could continue to influence the beliefs of patients for many years. Many messages from clinicians were interpreted as meaning the back needed to be protected. These messages could result in increased vigilance, worry, guilt when adherence was inadequate, or frustration when protection strategies failed. Clinicians could also provide reassurance, which increased confidence, and advice, which positively influenced the approach to movement and activity.

CONCLUSIONS

Health care professionals have a considerable and enduring influence upon the attitudes and beliefs of people with low back pain. It is important that this opportunity is used to positively influence attitudes and beliefs.

KEYWORDS: attitude, attitudes, health knowledge, health personnel, low back pain, patients, physician-patient relations, practice

Return to work

Occup Environ Med. 2013 Nov 1. doi: 10.1136/oemed-2013-101571.

Absence from work and return to work in people with back pain: a systematic review and meta-analysis.

Wynne-Jones G, Cowen J, Jordan JL, Uthman O, Main CJ, Glozier N, van der Windt D.
Source

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Keele University, , Keele, UK.

Abstract

BACKGROUND:

A considerable proportion of work absence is attributed to back pain, however prospective studies in working populations with back pain are variable in setting and design, and a quantitative summary of current evidence is lacking.

OBJECTIVE:

To investigate the extent to which differences in setting, country, sampling procedures and methods for data collection are responsible for variation in estimates of work absence and return to work.

METHODS:

Systematic searches of seven bibliographic databases. Inclusion criteria were: adults in paid employment, with back pain, work absence or return to work during follow-up had been reported. Random effects meta-analysis and meta-regression analysis was carried out to provide summary estimates of work absence and return to work rates.

RESULTS:

45 studies were identified for inclusion in the review; 34 were included in the meta-analysis. The pooled estimate for the occurrence of work absence in workers with back pain was 15.5% (95% CI 9.8% to 23.6%, n=17 studies, I² 98.1%) in studies with follow-up periods of ≤6 months. The pooled estimate for the proportion of people with back pain returning to work was 68.2% (95% CI 54.8% to 79.1%, n=13, I² 99.2%), 85.6% (95% CI 78.2% to 90.7%, n=13, I² 98.7%) and 93.3% (95% CI 84.0% to 94.7%, n=10, I² 99%), at 1 month, 1-6 months and ≥6 months, respectively. Differences in setting, risk of participation bias and method of assessing work absence explained some of the heterogeneity.

CONCLUSIONS:

Pooled estimates suggest high return to work rates, with wide variation in estimates of return to work only partly explained by a priori defined study-level variables. The estimated 32% not back at work at 1 month are at a crucial point for intervention to prevent long term work absence.

Pressure pain threshold/LBP

Spine (Phila Pa 1976). 2013 Sep 10.

Changes in Pressure Pain Threshold in Patients With Chronic Nonspecific Low Back Pain.

Imamura M, Chen J, Matsubayashi SR, Targino RA, Alfieri FM, Bueno DK, Hsing WT.

Source

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Abstract

Study Design. Cross-sectional study

Objective. The purpose of this study is to compare Pressure Pain Threshold (PPT) values between patients with chronic nonspecific low back pain (CLBP) and healthy individuals and correlate PPT values of the structures investigated with demographic and clinical data from patients with CLBP.

Summary of Background Data. Chronic pain may decrease pain tolerance of almost the entire spinal cord segment, while previous studies on PPT in patients with low back pain have limited their focus to evaluating only patient complaints.

Methods. Forty subjects participated in the study, 20 with a clinical diagnosis of CLBP and 20 healthy individuals. Outcome measures were: PPT values of myotomes, sclerotomes and dermatomes corresponding to segments L1 to S3; demographic, clinic and social data; Visual Analog Scale (VAS) and Roland and Morris (RM) Questionnaire.

Results. Most analyzed structures had lower PPT values in patients with CLBP than in healthy individuals on both sides(bilaterally). PPT correlated positively with height and pain duration ($p < 0.05$) and negatively with body mass index (BMI) in the supra-interspinous ligament between L2 and L3 and dermatomes L5 to S2 ($p < 0.05$).

Conclusions. Our results showed that individuals with CLBP have lower PPT values than healthy individuals in almost all assessed structures. We propose a simple approach that can differentiate patients with CLBP whose hyperalgesia in the painful area may be the result of several mechanisms that should be further investigated, such as sensitization of the central nervous system.

PMID: 24026153

LBP/movement control

Spine J. 2013 Oct;13(10):1263-72. doi: 10.1016/j.spinee.2013.07.452. Epub 2013 Oct 3.

Effects of noxious stimulation and pain expectations on neuromuscular control of the spine in patients with chronic low back pain.

Henchoz Y, Tétreau C, Abboud J, Piché M, Descarreaux M.

Source

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Abstract

BACKGROUND CONTEXT: Alterations of the neuromuscular control of the lumbar spine have been reported in patients with chronic low back pain (LBP). During trunk flexion and extension tasks, the reduced myoelectric activity of the low back extensor musculature observed during full trunk flexion is typically absent in patients with chronic LBP.

PURPOSE:

To determine whether pain expectations could modulate neuromuscular responses to experimental LBP to a higher extent in patients with chronic LBP compared with controls.

STUDY DESIGN: A cross-sectional, case-control study.

PATIENT SAMPLE: Twenty-two patients with nonspecific chronic LBP and 22 age- and sex-matched control participants.

METHODS: Trunk flexion-extension tasks were performed under three experimental conditions: innocuous heat, noxious stimulation with low pain expectation, and noxious stimulation with high pain expectation. Noxious stimulations were delivered using a contact heat thermode applied on the skin of the lumbar region (L4-L5), whereas low or high pain expectations were induced by verbal and visual instructions.

OUTCOME MEASURES:

Surface electromyography of erector spinae at L2-L3 and L4-L5, as well as lumbopelvic kinematic variables were collected during the tasks. Pain was evaluated using a numerical rating scale. Pain catastrophizing, disability, anxiety, and fear-avoidance beliefs were measured using validated questionnaires.

RESULTS: Two-way mixed analysis of variance revealed that pain was significantly different among the three experimental conditions ($F_{2,84}=317.5$; $p<.001$). Increased myoelectric activity of the low back extensor musculature during full trunk flexion was observed in the high compared with low pain expectations condition at the L2-L3 level ($F_{2,84}=9.5$; $p<.001$) and at the L4-L5 level ($F_{2,84}=3.7$; $p=.030$). At the L4-L5 level, this effect was significantly more pronounced for the control participants compared with patients with chronic LBP ($F_{2,84}=3.4$; $p=.045$). Pearson correlation analysis revealed that increased lumbar muscle activity in full flexion induced by expectations was associated with higher pain catastrophizing in patients with chronic LBP ($r=0.54$; $p=.012$).

CONCLUSIONS: Repeated exposure to pain appears to generate rigid and less variable patterns of muscle activation in patients with chronic LBP, which attenuate their response to pain expectations. Patients with high levels of pain catastrophizing show higher myoelectric activity of lumbar muscles in full flexion and exhibit greater neuromechanical changes when expecting strong pain.

Copyright © 2013 Elsevier Inc. All rights reserved. **KEYWORDS:** Biopsychosocial outcomes, Chronic low back pain, Electromyography, Neuromuscular control, Pain expectations PMID: 24090825

MRI/Future

Eur J Pain. 2013 Nov 26. doi: 10.1002/j.1532-2149.2013.00427.x.

Does magnetic resonance imaging predict future low back pain? A systematic review.

Steffens D, Hancock MJ, Maher CG, Williams C, Jensen TS, Latimer J.

Source

The George Institute for Global Health, Sydney Medical School, The University of Sydney, Australia.

Abstract

BACKGROUND AND OBJECTIVE:

Magnetic resonance imaging (MRI) has the potential to identify pathology responsible for low back pain (LBP). However, the importance of findings on MRI remains controversial. We aimed to systematically review whether MRI findings of the lumbar spine predict future LBP in different samples with and without LBP.

DATABASES AND DATA TREATMENT:

MEDLINE, CINAHL and EMBASE databases were searched. Included were prospective cohort studies investigating the relationship between baseline MRI abnormalities of the lumbar spine and clinically important LBP outcome at follow-up. We excluded cohorts with specific diseases as the cause of their LBP. Associations between MRI findings and LBP pain outcomes were extracted from eligible studies.

RESULTS:

A total of 12 studies met the inclusion criteria. Six studies presented data on participants with current LBP; one included a sample with no current LBP, three included a sample with no history of LBP and two included mixed samples. Due to small sample size, poor overall quality and the heterogeneity between studies in terms of participants, MRI findings and clinical outcomes investigated, it was not possible to pool findings. No consistent associations between MRI findings and outcomes were identified. Single studies reported significant associations for Modic changes type 1 with pain, disc degeneration with disability in samples with current LBP and disc herniation with pain in a mixed sample.

CONCLUSIONS:

The limited number, heterogeneity and overall quality of the studies do not permit definite conclusions on the association of MRI findings of the lumbar spine with future LBP (PROSPERO: CRD42012002342).

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PMID: 24276945

Neural input

Impaired neural drive in patients with low back pain □

European Journal of Pain, 12/02/2013 Clinical Article

Chiou SY, et al.

Abstract

Background

Control of trunk movement relies on the integration between central neuronal circuits and peripheral skeletomuscular activities and it can be altered by pain. There is increasing evidence that there are deficits within the central nervous system controlling the trunk muscles in people with low back pain (LBP). However, it is unclear how LBP impacts upon neural drive to back muscles at different levels of voluntary contraction. Therefore, the purpose of this study was to investigate if neural drive is impaired in these patients.

Methods

Seventeen patients with LBP and 11 healthy controls were recruited. Bilateral electromyographic (EMG) recordings were obtained from the erector spinae (ES) muscles at two vertebral levels (T12 and L4). Participants performed a series of brief isometric back extensions (50–100% maximum voluntary contraction – MVC), during which transcranial magnetic stimulation was delivered. The size of the evoked (superimposed) twitch was measured using dynamometry.

Results

The size of the superimposed twitch decreased linearly with increasing contraction strength in the controls; however, this linear relationship was not observed in the patients. Additionally, patients had larger superimposed twitches and longer time-to-peak amplitudes during MVCs than those observed in controls. Furthermore, patients had lower MVC and root-mean-square EMG activity of ES muscles during MVCs.

Conclusions

A decline of central neural drive to the back muscles at high level of voluntary contraction was observed in patients with LBP. These results suggest that it might be pertinent to include neuromuscular facilitation programmes and therapeutic exercise utilizing high voluntary contractions for patients with LBP.

Disc and lumbar flexibility

Spine (Phila Pa 1976). 2013 Aug 16.

Joint Laxity Negatively Correlates With Lumbar Disc Degeneration in Young Adults.

Kim TH, Lee HM, Moon SH, Kwak DK, Oh JK, Kim YC, Park MS, Alday FB 3rd, Kim SW.

Source

From the 1Spine Center, Hallym University Sacred Heart Hospital, Hallym University College of Medicine, Anyang, Korea 2Department of Orthopedic Surgery, Yonsei University College of Medicine, Seoul, Korea.

Abstract

ABSTRACTS:

Study Design. Cross-sectional study of preselected cohort of patients with neck pain

Objective. To determine the association between joint laxity and lumbar disc degeneration in young adults

Summary of Background Data. Joint laxity is known to be closely related with orthopedic injuries and disease, however, studies about the relationship between spinal disorder and joint laxity are lacking.

Method. Patients aged 30 to 40 years, seen at the outpatient clinic of our hospital for the evaluation of neck pain, who had MRI of cervical spine with routine inclusion of T2-weighted sagittal plane of whole spine were included in the study. Beighton and Horan criteria was used for the assessment of joint laxity. Logistic regression analysis was performed to estimate the odds ratio for lumbar disc degeneration in patients with joint laxity, and other variables including age, gender, body mass index, physical workload, neck pain (VAS score) and related disability (NDI score), and sagittal alignment.

Results. A total of 101 patients were enrolled in the study: 34 patients with joint laxity; and 67 patients without joint laxity. There were no differences in age, BMI, physical workload, neck pain (VAS score), and NDI score between the two groups but there was a significant difference in gender ratio ($p < 0.001$). Patients with joint laxity showed increased lumbar lordosis ($p = 0.004$) and increased sacral slope ($p = 0.003$) but without significant difference in pelvic incidence ($p = 0.084$). In univariate analysis, presence of joint laxity (Beighton score ≥ 4) as well as positive results of thumb ($p = 0.016$) and elbow ($p = 0.047$) tests were significantly associated with decreased risk for lumbar disc degeneration. Presence of joint laxity remained significant after multivariate adjustment for gender and lumbar lordosis (odds ratio = 0.373, $p = 0.040$).

Conclusion. Increased joint laxity was closely associated with lower prevalence of lumbar disc degeneration in young adults, and the increased lumbar lordosis associated with joint laxity might explain the decreased risk of lumbar disc degeneration.

PMID: 23921324

Fear/LBP

Fear--avoidance beliefs associated with perceived psychological and social factors at work among patients with neck and back pain: a cross-sectional multicentre study

Kjersti Myhre, Cecilie Røe, Gunn Hege Marchand, Anne Keller, Erik Bautz-Holter, Gunnar Leivseth, Leiv Sandvik and Bjørn Lau

BMC Musculoskeletal Disorders 2013, **14**:329 doi:10.1186/1471-2474-14-329

Abstract (provisional)

Background

Neck and back pain are common and often account for absenteeism at work. Factors at work as well as fear--avoidance beliefs may influence sick-leave in these patients. The aims of this study were to assess: (1) how sick-listed patients in specialised care perceive demand, control, support, effort, reward, and overcommitment at work compared to a general reference group of workers; (2) if women and men report demand, control, support, effort, reward, and overcommitment differently; and (3) the association between psychological and social factors at work and fear--avoidance beliefs about work.

Methods

A cross-sectional multicentre study was carried out in 373 patients on sick leave due to neck and back pain. Psychosocial work factors were measured by demand, control, and support, (Nordic Questionnaire for Psychological and Social Factors at Work), and effort, reward and overcommitment (Effort Reward Imbalance Questionnaire). Fear avoidance beliefs about work were measured by the Fear--Avoidance Belief Questionnaire Work subscale (FABQ-W).

Results

Although the patients differed significantly from a reference working group regarding several subscales of demand, control, support, effort, reward, and overcommitment, the magnitude of these differences were small. The study population also reported significantly higher scores for 'demand for physical endurance' than the reference population, and Cohen's $d = 0.55$ here indicated a medium degree of difference. Female patients reported significantly higher on support, whereas male patients reported significantly higher demand for physical endurance, quantitative demand, effort, and overcommitment. Demand for physical endurance, job control, job support, high reward, and overcommitment were significantly associated with FABQ-W.

Conclusions

Perceived psychological and social factors at work were strongly associated with fear--avoidance beliefs about work in sick-listed neck and back patients. The demand for physical endurance, control, support, high reward, as well as overcommitment at work outweighed pain and added to the burden of emotional distress and disability regarding fear--avoidance beliefs

Facet orientation

Spine J. 2013 Oct;13(10):1301-8. doi: 10.1016/j.spinee.2013.06.025. Epub 2013 Sep 12.

The biomechanical influence of the facet joint orientation and the facet tropism in the lumbar spine.

Kim HJ, Chun HJ, Lee HM, Kang KT, Lee CK, Chang BS, Yeom JS.

Source

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Abstract

BACKGROUND CONTEXT:

Facet joint orientation and facet tropism (FT) are presented as the potential anatomical predisposing factors for lumbar degenerative changes that may lead in turn to early degeneration and herniation of the corresponding disc or degenerative spondylolisthesis. However, no biomechanical study of this concept has been reported.

PURPOSE:

To investigate the biomechanical influence of the facet orientation and FT on stress on the corresponding segment.

STUDY DESIGN:

Finite element analysis.

METHODS:

Three models, F50, F55, and F60 were simulated with different facet joint orientations (50°, 55°, and 60° relative to coronal plane) at both L2-L3 facet joints. A FT model was also simulated to represent a 50° facet joint angle at the right side and a 60° facet joint angle at the left side in the L2-L3 segment. In each model, the intradiscal pressures were investigated under four pure moments and anterior shear force. Facet contact forces at the L2-L3 segment were also analyzed under extension and torsion moments and anterior shear force. This study was supported by 5000 CHF grant of 2011 AO Spine Research Korea fund. The authors of this study have no topic-specific potential conflicts of interest related to this study.

RESULTS:

The F50, F55, and F60 models did not differ in the intradiscal pressures generated under four pure moments: but under anterior shear force, the F60 and FT models showed increases of intradiscal pressure. The F50 model under extension and the F60 model under torsion each generated an increase in facet contact force. In all conditions tested, the FT model yielded the greatest increase of intradiscal pressure and facet contact force of all the models.

CONCLUSIONS:

The facet orientation per se did not increase disc stress or facet joint stress prominently at the corresponding level under four pure moments, but FT could make the corresponding segment more vulnerable to external moments or anterior shear force.

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KEYWORDS: Facet joint orientation, Facet tropism, Finite element model, Spondylolisthesis
PMID: 24035730

Submaximal exercise and LBP

Spine (Phila Pa 1976). 2013 Dec 1;38(25):E1608-15. doi: 10.1097/01.brs.0000435028.50317.33.

Which instruments can detect submaximal physical and functional capacity in patients with chronic nonspecific back pain? A systematic review.

van der Meer S, Trippolini MA, van der Palen J, Verhoeven J, Reneman MF.

Source

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Abstract

STUDY DESIGN:

Systematic review.

OBJECTIVE:

To evaluate the validity of instruments that claim to detect submaximal capacity when maximal capacity is requested in patients with chronic nonspecific musculoskeletal pain.

SUMMARY OF BACKGROUND DATA:

Several instruments have been developed to measure capacity in patients with chronic pain. The detection of submaximal capacity can have major implications for patients. The validity of these instruments has never been systematically reviewed.

METHODS:

A systematic literature search was performed including the following databases: Web of Knowledge (including PubMed and Cinahl), Scopus, and Cochrane. Two reviewers independently selected the articles based on the title and abstract according to the study selection criteria. Studies were included when they contained original data and when they objectified submaximal physical or functional capacity when maximal physical or functional capacity was requested. Two authors independently extracted data and rated the quality of the articles. The included studies were scored according to the subscales "Criterion Validity" and "Hypothesis Testing" of the COSMIN checklist. A Best Evidence Synthesis was performed.

RESULTS:

Seven studies were included, 5 of which used a reference standard for submaximal capacity. Three studies were of good methodological quality and validly detected submaximal capacity with specificity rates between 75% and 100%.

CONCLUSION:

There is strong evidence that submaximal capacity can be detected in patients with chronic low back pain with a lumbar motion monitor or visual observations accompanying a functional capacity evaluation lifting test. Level of Evidence: N/A.

PMID: 24026154

Vertebral body referred pain

Spine (Phila Pa 1976). 2013 Dec 1;38(25):E1571-4. doi: 10.1097/BRS.0b013e3182a879cd.

Dichotomizing sensory nerve fibers innervating both the lumbar vertebral body and the area surrounding the iliac crest: a possible mechanism of referred lateral back pain from lumbar vertebral body.

Fujii T, Sakuma Y, Orita S, Inoue G, Ochiai N, Kuniyoshi K, Aoki Y, Ishikawa T, Miyagi M, Kamoda H, Suzuki M, Kubota G, Inage K, Sainoh T, Sato J, Yamauchi K, Toyone T, Nakamura J, Kishida S, Takahashi K, Koshi T, Ohtori S.

Source

From the Department of Orthopaedic Surgery, Graduate School of Medicine, Chiba University, Chiba, Japan.

Abstract

STUDY DESIGN:

Animal study.

OBJECTIVE:

To determine the existence of dichotomizing sensory nerve fibers innervating both the lumbar vertebral body and the area surrounding the iliac crest (ASIC).

SUMMARY OF BACKGROUND DATA:

Elderly patients with osteoporosis sometimes experience lumbar vertebral fracture and may feel diffuse nonlocalized pain in the back, the lateral portion of the trunk, and the ASIC. The pattern of sensory innervation of vertebral bodies remains unclear. DRG neurons with dichotomizing axons have been reported and are thought to be related to referred pain. The purpose of this study was to investigate the existence of dichotomizing axons to the lumbar vertebral bodies and the ASIC in rats.

METHODS:

Two kinds of neurotracers (1,1'-dioctadecyl-3,3',3'-tetramethylindocarbocyanine perchlorate [DiI] and Fluoro-Gold [FG]) were used. DiI crystals were placed in the left ASIC, and FG was applied into the L2 vertebral body in 10 rats. Four weeks later, left DRGs from L1 to L6 were resected, sectioned, and observed under a fluorescence microscope.

RESULTS:

DiI-labeled DRG neurons innervating the ASIC and FG-labeled DRG neurons innervating the vertebral L2 body were distributed from L1 to L6. The ratio of total double-labeled per total DiI-labeled DRG neurons was 10.2%, and that of total double-labeled per total FG-labeled DRG neurons was 14.7%. These double-labeled DRG neurons innervating the L2 vertebral body had other axons that extended to the ASIC.

CONCLUSION:

This finding provides a possible neuroanatomical explanation for referred pain in the ASIC from vertebral bodies.

PMID: 23970105

Automatic activation/RTU

Reliability of ultrasound measurement of automatic activity of the abdominal muscle in participants with and without chronic low back pain

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Department of Physical Therapy, Shahid Beheshti University of Medical Sciences, Tehran, *Chiropractic & Manual Therapies* 2013, **21**:37 doi:10.1186/2045-709X-21-37

Background

Ultrasound (US) imaging has been considered as a non-invasive technique to measure thickness and estimate relative abdominal muscle activity. Although some studies have assessed the reliability of US imaging, no study has assessed the reliability of US measurement of automatic activity of abdominal muscles in positions with different levels of stability in participants with chronic low back pain (cLBP). The purpose of this study was to investigate within-day and between-days reliability of US thickness measurements of automatic activity of the abdominal muscles in asymptomatic participants and within-day reliability in those with cLBP.

Methods

A total of 20 participants (10 with cLBP, 10 healthy) participated in the study. The reliability of US thickness measurements at supine lying and sitting positions (sitting on a chair, sitting on a gym ball with both feet on the ground or lifting one foot off the floor) were assessed. We evaluated within-day reliability in all participants and between-days reliability in asymptomatic participants.

Results

We found high ICC scores (0.85-0.95) and also small SEM and MDC scores in both groups. The reliability of the measurements was comparable between participants with and without LBP in each position but the SEMs and MDCs was slightly higher in patient group compared with healthy group. It indicates high intra-tester reliability for the US measurement of the thickness of abdominal muscles in all positions.

Conclusion

US imaging can be used as a reliable method for assessment of automatic activity of abdominal muscles in positions with low levels of stability in participants with and without LBP.

Keywords: Ultrasound; Reliability; Abdominal muscles; Low back pain

Clinical prediction rules

Man Ther. 2013 Oct 3. pii: S1356-689X(13)00158-6. doi: 10.1016/j.math.2013.09.005.

Physiotherapists' knowledge, attitudes and practices regarding clinical prediction rules for low back pain.

Haskins R, Osmotherly PG, Southgate E, Rivett DA.

Source

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Abstract

Clinical Prediction Rules (CPRs) have been developed to assist in the physiotherapy management of low back pain (LBP) although little is known about the factors that may influence their implementation in clinical practice.

This study used qualitative research methodology to explore the knowledge, attitudes and practices/behaviours of physiotherapists in relation to these tools. Four semi-structured focus groups involving 26 musculoskeletal physiotherapists were conducted across three Australian geographic regions. A fictitious LBP case scenario was developed and used to facilitate group discussion. Participant knowledge of CPRs was found to be mixed, with some clinicians never having previously encountered the term or concept. LBP CPRs were often conceptualised as a formalisation of pattern recognition. Attitudes towards CPRs expressed by study participants were wide-ranging with several facilitating and inhibiting views identified. It was felt that more experienced clinicians had limited need of such tools. Only a small number of participants expressed that they had ever used LBP CPRs in clinical practice.

To optimise the successful adoption of an LBP CPR, researchers should consider avoiding the use of the term 'rule' and ensure that the tool and its interface are uncomplicated and easy to use. Understanding potential barriers, the needs of clinicians and the context in which CPRs will be implemented will help facilitate the development of tools with the highest potential to positively influence physiotherapy practice.

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Acupuncture

Br J Sports Med. 2013 Nov;47(17):1085-9. doi: 10.1136/bjsports-2013-092949. Epub 2013 Sep 10.

Acupuncture applied as a sensory discrimination training tool decreases movement-related pain in patients with chronic low back pain more than acupuncture alone: a randomised cross-over experiment.

Wand BM, Abbaszadeh S, Smith AJ, Catley MJ, Moseley GL.

Source

School of Physiotherapy, The University of Notre Dame Australia, , Fremantle, Western Australia, Australia.

Abstract

BACKGROUND:

High-quality clinical evidence suggests that although acupuncture appears superior to usual care in the management of chronic low back pain, there is little meaningful difference between true and sham acupuncture. This suggests that the benefits of acupuncture are mediated by the placebo response. An alternative explanation is that sham acupuncture is an active treatment and shares a mechanism of action with traditionally applied acupuncture. One plausible candidate for this mechanism is improvement in self-perception mediated through the sensory discrimination-like qualities of acupuncture. We aimed to compare the effects of acupuncture with a sensory discrimination training component to acupuncture without.

METHODS:

25 people with chronic low back pain were enrolled in a randomised cross-over experiment. We compared the effect of acupuncture delivered when sensory discrimination is optimised to acupuncture delivered when it is not, on movement-related back pain immediately after each intervention.

RESULTS:

We found that the average pain intensity after participants had received acupuncture with sensory discrimination training (2.8 ± 2.5) was less than when they received acupuncture without sensory discrimination training (3.6 ± 2.0). This difference was statistically significant (after adjustment; mean difference = -0.8, 95% CI -1.4 to -0.3; $p = 0.011$).

CONCLUSIONS:

Our findings are consistent with the idea that acupuncture may offer specific benefit that is not dependent on precisely where the needles are inserted so much as that the patient attends to where they are inserted. If so, the location of the needles might be better focused on the painful area and the need for penetration of the skin may be mitigated.

KEYWORDS: Back injuries, Physiotherapy PMID: 24021562

LBP/INJECTIONS

Facet/Muscle

Spine (Phila Pa 1976). 2013 Nov 1;38(23):1995-2002. doi: 10.1097/BRS.0b013e3182a76df1.

Effect of facet joint injection versus systemic steroids in low back pain: a randomized controlled trial.

Ribeiro LH, Furtado RN, Konai MS, Andreo AB, Rosenfeld A, Natour J.

Source

From the Division of Rheumatology, Universidade Federal de São Paulo (UNIFESP), São Paulo, Brazil.

Abstract

STUDY DESIGN:

Randomized clinical trial.

OBJECTIVE:

To compare the effectiveness of facet joint injection versus systemic steroid in patients with a diagnosis of facet joint syndrome.

SUMMARY OF BACKGROUND DATA:

The term facet joint syndrome has been used to define back pain originating from the facet joints. Treatment is mainly conservative, although interventions, including intra-articular injections and medial branch nerve blocks are used to manage facet-mediated pain. Several studies have evaluated the effectiveness of these interventions. Results of facet joint injection, however, are conflicting.

METHODS:

Sixty subjects with a diagnosis of facet joint syndrome were enrolled in the study. They were randomized into experimental and control groups. The experimental group was administered with intra-articular injection of 6 lumbar facet joints with triamcinolone hexacetonide; the control group was administered with triamcinolone acetone intramuscular injection of 6 lumbar paravertebral points. Visits were taken at baseline and at 1, 4, 12, and 24 weeks after interventions. Outcome measures were used: pain visual analogue scale, pain visual analogue scale during extension of the spine, Likert scale, improvement percentage scale, Roland-Morris, 36-Item Short Form Health Survey, and accountability of medications taken. Homogeneity was tested using the Student t, Pearson χ , and Mann-Whitney tests. Analysis of variance was used to analyze differences in the groups over time and the Student t test to analyze differences between groups at each time evaluation.

RESULTS:

The groups were similar at baseline. Comparisons between the groups showed, in analysis of variance analysis, an improvement in the experimental group regarding diclofenac intake and quality of life, in the "role physical" profile, assessed by 36-Item Short Form Health Survey. In the analysis at each time point, an improvement in the experimental group was also found in the Roland-Morris questionnaire, in the improvement percentage scale and in the response to treatment, assessed by the Likert scale.

CONCLUSION:

Both treatments were effective, with a slight superiority of the intra-articular injection of steroids over intramuscular injection. Level of Evidence: 2.

Platelet plasma/cartilage

Sports Med Arthrosc. 2013 Dec;21(4):213-9. doi: 10.1097/JSA.0b013e3182999740.

Platelet-rich Plasma for Articular Cartilage Repair.

Abrams GD, Frank RM, Fortier LA, Cole BJ.

Source

*Department of Orthopedic Surgery, Rush University Medical Center, Chicago, IL †College of Veterinary Medicine, Cornell University, Ithaca, NY.

Abstract

Platelet concentrates have been gaining popularity for a number of applications in orthopedic surgery as a way to enhance both healing of various tissues and reduce pain.

One major area of focus has been the effect of platelet-rich plasma (PRP) on stem cells and chondrocytes and the potential for PRP to enhance cartilage regeneration as well as reduce catabolic factors that lead to cartilage degradation. This article provides an up-to-date review of the current literature regarding the effect of PRP on articular cartilage and its use in the treatment of osteoarthritis. Basic science, animal, and human clinical investigations are presented. In general, PRP has been shown to promote chondrogenic differentiation in vitro and lead to enhanced cartilage repair during animal investigations.

Human trials, mostly conducted in the form of injection into knees with osteoarthritis, have shown promise in a number of investigations for achieving symptomatic relief of pain and improving function.

PMID: 24212369

Plasma/basic science

Sports Med Arthrosc. 2013 Dec;21(4):180-5. doi: 10.1097/JSA.0b013e3182999712.

The Basic Science of Platelet-rich Plasma (PRP): What Clinicians Need to Know.

Arnoczky SP, Shebani-Rad S.

Source

*Laboratory for Comparative Orthopaedic Research, College of Veterinary Medicine, Michigan State University, East Lansing †Department of Orthopaedic Surgery, McLaren-Flint/Michigan State University, Flint, MI.

Abstract

Platelet-rich plasma (PRP) has been advocated for the biological augmentation of tissue healing and regeneration through the local introduction of increased levels (above baseline) of platelets and their associated bioactive molecules.

In theory, the increased levels of autologous growth factors and secretory proteins provided by the concentrated platelets may enhance the wound healing process, especially in degenerative tissues or biologically compromised individuals. Although PRP has been increasingly utilized in the treatment of a variety of sports-related injuries, improvements in healing and clinical outcomes have not been universally reported. One reason for this may be the fact that all PRP preparations are not the same. Variations in the volume of whole blood taken, the platelet recovery efficacy, the final volume of plasma in which the platelets are suspended, and the presence or absence of white blood cells, and the addition of exogenous thrombin to activate the platelets or calcium chloride to induce fibrin formation, can all affect the character and potential efficacy of the final PRP product.

This article will review the basic principles involved in creating PRP and examine the potential basic scientific significance of the individual blood components contained in the various forms of PRP currently used in sports medicine.

PMID: 24212364

Epidural

Anesthesiology. 2013 Oct;119(4):907-31. doi: 10.1097/ALN.0b013e31829c2ddd.

Epidural Injections for Spinal Pain: A Systematic Review and Meta-analysis Evaluating the "Control" Injections in Randomized Controlled Trials.

Bicket MC, Gupta A, Brown CH 4th, Cohen SP.

Source

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Abstract

BACKGROUND:

Epidural steroid injection is the most frequently performed pain procedure. This study of epidural steroid "control" injections aimed to determine whether epidural nonsteroid injections constitute a treatment or true placebo in comparison with nonepidural injections for back and neck pain treatment.

METHODS:

This systematic review with direct and indirect meta-analyses used PubMed and EMBASE searches from inception through October 2012 without language restrictions. Study selection included randomized controlled trials with a treatment group receiving epidural injections of corticosteroids or another analgesic and study control groups receiving either an epidural injection devoid of treatment drug or a nonepidural injection. Two reviewers independently extracted data including short-term (up to 12 weeks) pain scores and pain outcomes. All reviewers evaluated studies for eligibility and quality.

RESULTS:

A total of 3,641 patients from 43 studies were included in this systematic review and meta-analysis. Indirect comparisons suggested epidural nonsteroid were more likely than nonepidural injections to achieve positive outcomes (risk ratio, 2.17; 95% CI, 1.87-2.53) and provide greater pain score reduction (mean difference, -0.15; 95% CI, -0.55 to 0.25). In the very limited direct comparisons, no significant differences were noted between epidural nonsteroid and nonepidural injections for either outcome (risk ratio [95% CI], 1.05 [0.88-1.25]; mean difference [95% CI], 0.22 [-0.50 to 0.94]).

CONCLUSION:

Epidural nonsteroid injections may provide improved benefit compared with nonepidural injections on some measures, though few, low-quality studies directly compared controlled treatments, and only short-term outcomes (≤ 12 weeks) were examined.

VISCERA

Obstet Gynecol. 2013 Nov;122(5):1047-55. doi: 10.1097/AOG.0b013e3182a7e1f5.

Increased pressure pain sensitivity in women with chronic pelvic pain.

As-Sanie S, Harris RE, Harte SE, Tu FF, Neshewat G, Clauw DJ.

Source

Departments of Obstetrics and Gynecology, Anesthesiology, and Internal Medicine (Rheumatology), University of Michigan Health Center, Ann Arbor, Michigan; and the Department of Obstetrics and Gynecology, Northshore University Health System, Chicago, Illinois.

Abstract

OBJECTIVE:

To determine whether women with chronic pelvic pain and variable degrees of endometriosis demonstrate altered pain sensitivity relative to pain-free healthy women in a control group and whether such differences are related to the presence or severity of endometriosis or comorbid pain syndromes.

METHODS:

Four patient subgroups (endometriosis with chronic pelvic pain [n=42], endometriosis with dysmenorrhea [n=15], pain-free endometriosis [n=35], and chronic pelvic pain without endometriosis [n=22]) were each compared with 30 healthy women in a control group in this cross-sectional study. All patients completed validated questionnaires regarding pain symptoms and underwent screening for comorbid pain disorders. Pain sensitivity was assessed by applying discrete pressure stimuli to the thumbnail using a previously validated protocol.

RESULTS:

While adjusting for age and education, pain thresholds were lower in all subgroups of women with pelvic pain relative to healthy women in the control group (all P values <.01). There was no difference in pain thresholds when comparing patients with endometriosis without pelvic pain with healthy women in the control group (mean difference 0.02 kg/m, 95% confidence interval -0.43 to 0.47). The presence and severity of endometriosis and number of comorbid pain syndromes were not associated with a difference in pain thresholds.

CONCLUSION:

Women with chronic pelvic pain demonstrate increased pain sensitivity at a nonpelvic site compared with healthy women in a control group, which is independent of the presence or severity of endometriosis or comorbid pain syndromes. These findings support the notion that central pain amplification may play a role in the development of pelvic pain and may explain why some women with pelvic pain do not respond to therapies aimed at eliminating endometriosis lesions.

LEVEL OF EVIDENCE: : II. PMID: 24104772

Child birth/chronic pain

Int J Gynaecol Obstet. 2013 Oct 17. pii: S0020-7292(13)00518-3. doi: 10.1016/j.ijgo.2013.07.029.

The effects of mode of delivery and time since birth on chronic pelvic pain and health-related quality of life.

Li WY, Liabsuetrakul T, Stray-Pedersen B, Li YJ, Guo LJ, Qin WZ.

Source

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Abstract

OBJECTIVE:

To assess the effects of mode of delivery and time since birth on chronic pelvic pain (CPP) and health-related quality of life (HRQoL) among primiparous Chinese women.

METHODS:

Primiparous women of childbearing age who had given birth at least 6 months previously were invited to participate in the present cross-sectional study, which was conducted from October 2011 to April 2012 in the Chaoyang District of Beijing. Time since birth was divided into the following 4 periods: less than 1 year, 1-5 years, 6-10 years, and more than 10 years. The factors associated with CPP status were analyzed using logistic regression.

RESULTS:

Among the 1456 participants, CPP was more common following cesarean delivery (11.2% versus 6.9% among women with a vaginal delivery; $P=0.007$), and the rate of CPP increased with time since birth (2.3%, 9.3%, 10.7%, and 13.1% for the 4 specified time periods, respectively ($P<0.001$)). Cesarean delivery, longer time since birth, and CPP were all associated with a lower HRQoL utility score.

CONCLUSION:

Although the absolute risks were small, cesarean delivery and time since birth were significant risk factors for CPP, which had a negative impact on the participants' HRQoL.

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KEYWORDS: Cesarean delivery, Chronic pelvic pain, Health-related quality of life, Mode of delivery, Time since birth PMID: 24225262

PELVIC GIRDLE

Obturator externus

Clinical effectiveness of the obturator externus muscle injection in chronic pain patients

Shin Hyung Kim MD, Do Hyeong Kim MD, Duck Mi Yoon MD, PhD, Kyung Bong Yoon MD, PhD*

Article first published online: 5 NOV 2013

DOI: 10.1111/papr.12138

Because of its anatomical location and function, the obturator externus (OE) muscle can be a source of pain; however, this muscle is understudied as a possible target for therapeutic intervention in pain practice. In this retrospective observational study, we evaluated the clinical effectiveness of the OE muscle injection with a local anesthetic in chronic pelvic pain patients with suspected OE muscle problems.

Methods

Twenty-three patients with localized tenderness on the inferolateral side of the pubic tubercle accompanied by pain in the groin, anteromedial thigh, or hip were studied. After identifying the OE with contrast dye under fluoroscopic guidance, 5 to 8 mL of 0.3% lidocaine was injected. Pain scores were assessed before and after injection; patient satisfaction was also assessed.

Results

Mean pain score decreased by 44.7% (6.6 ± 1.8 to 3.5 ± 0.9 , $P < 0.001$) 2 weeks after OE muscle injection as compared with pain score before injection. In addition, 82% of patients (19 of 23 patients) reported excellent or good satisfaction during 2 weeks after injection. No patients reported complications from OE muscle injection.

Conclusions

Fluoroscopy-guided injection of the OE muscle with local anesthetic reduced pain scores and led to a high level of satisfaction at short-term follow-up in patients with suspected OE muscle problem. The results of this study suggest that OE muscle injection may be a valuable therapeutic option for a select group of chronic pelvic pain patients who present with localized tenderness in the OE muscle that is accompanied by groin, anteromedial thigh, or hip pain.

Morphology with aging

Spine J. 2013 Nov;13(11):1500-9. doi: 10.1016/j.spinee.2013.06.034. Epub 2013 Oct 4.

Evaluation of pelvic morphology in the sagittal plane.

Vrtovec T, Janssen MM, Likar B, Castelein RM, Viergever MA, Pernuš F.

Source University of Ljubljana, Faculty of Electrical Engineering, Laboratory of Imaging Technologies, Tržaška cesta 25, SI-1000 Ljubljana, Slovenia. Electronic address: tomaz.vrtovec@fe.uni-lj.si.

Abstract

BACKGROUND CONTEXT: It is generally accepted that for normal subjects the angle of pelvic incidence (PI) increases during childhood and then remains unchanged throughout adolescence and adulthood. However, recent findings show that PI increases linearly throughout the lifespan due to morphological changes of the pelvis.

PURPOSE: A retrospective study aiming to determine the extent of morphological changes of the pelvis related to the age of the subjects.

STUDY DESIGN: Pelvic morphology was evaluated in a normal adult population by measuring the anatomical parameters of sagittal pelvic alignment.

PATIENT SAMPLE: The final study cohort consisted of 330 subjects (mean age, 45.3 years; standard deviation, 18.1 years; range, 18-87 years; 164 male and 166 female subjects).

OUTCOME MEASURES:

Physiologic measures, obtained as measurements of PI, sacral end plate width (S1W), and pelvic thickness (PTH).

METHODS:

Parameters of PI, S1W, and PTH were evaluated from computed tomography images of the subjects. The measured PTH was normalized according to S1W and age of the subjects, allowing the comparison among anatomies of different sizes. The normalized components of PTH in anteroposterior and cephalocaudal directions were computed to determine the configuration and extent of changes in pelvic morphology related to subject age.

RESULTS:

Statistically significant correlation with both age and PI was obtained for all normalized parameters (except for the anteroposterior component of PTH for male subjects), and no statistically significant differences were observed between the sexes. With increasing PI that occurs due to the aging process, a decrease of PTH can be observed that is manifested not only as an increase of the distance between the sacrum and the hip axis in the anterior direction but considerably more as a decrease of the distance between the sacrum and the hip axis in the cephalic direction. By considering these morphological changes in the pelvis simultaneously, the hip axis can move only within a narrow area.

CONCLUSIONS:

The changes in pelvic morphology due to the aging process occur in the anterior direction, which may be due to the remodeling process affecting the coxal bone that results in an anterior drift of the acetabulum relative to the sacrum. More importantly, the changes are considerably more evident in the cephalic direction, which may be the result of the weight-bearing loads and consequent wear of acetabular cartilage.

Copyright © 2013 Elsevier Inc. All rights reserved. **KEYWORDS:** Pelvic incidence, Pelvic morphology, Pelvic thickness, Sagittal alignment PMID: 24094715

THORACIC SPINE

ROM

European Spine Journal
November 2013

Range of motion of thoracic spine in sagittal plane

Daigo Morita, Yasutsugu Yukawa, Hiroaki Nakashima, Keigo Ito, Go Yoshida, Masaaki Machino, Syunsuke Kanbara, Toshiki Iwase, Fumihiko Kato
Purchase on Springer.com

Abstract

Study design

Imaging study of thoracic spine.

Objective

The purpose of this study was to investigate dynamic alignment and range of motion (ROM) at all segmental levels of thoracic spine.

Summary of background data

Thoracic spine is considered to have restricted ROM because of restriction by the rib cage. However, angular movements of thoracic spine can induce thoracic compressive myelopathy in some patients. Although few previous studies have reported segmental ROM with regard to sagittal plane, these were based on cadaver specimens. No study has reported normal functional ROM of thoracic spine.

Methods

Fifty patients with cervical or lumbar spinal disease but neither thoracic spinal disease nor compression fracture were enrolled prospectively in this study (34 males, 16 females; mean age 55.4 ± 14.7 years; range 27–81 years). After preoperative myelography, multidetector-row computed tomography scanning was performed at passive maximum flexion and extension position. Total and segmental thoracic kyphotic angles were measured and ROM calculated.

Results

Total kyphotic angle (T1/L1) was $40.2^\circ \pm 11.4^\circ$ and $8.5^\circ \pm 12.8^\circ$ in flexion and extension, respectively ($P < 0.0001$). The apex of the kyphotic angle was at T6/7 in flexion. Total ROM (T1/L1) was $31.7^\circ \pm 11.3^\circ$. Segmental ROM decreased from T1/2 to T4/5 but increased gradually from T4/5 to T12/L1. Maximum ROM was at T12/L1 ($4.2^\circ \pm 2.1^\circ$) and minimum at T4/5 ($0.9^\circ \pm 3.0^\circ$).

Conclusions

Thoracic spine showed ROM in sagittal plane, despite being considered a stable region. These findings offer useful information in the diagnosis and selection of surgical intervention in thoracic spinal disease.

T spine measurements

Reliability and validity of non-radiographic methods of thoracic kyphosis measurement: A systematic review □

Manual Therapy , 11/19/2013 Evidence Based Medicine Review Article

Barrett E, et al.

Abstract

Background

A wide array of instruments are available for non-invasive thoracic kyphosis measurement. Guidelines for selecting outcome measures for use in clinical and research practice recommend that properties such as validity and reliability are considered. This systematic review reports on the reliability and validity of non-invasive methods for measuring thoracic kyphosis.

Methods

A systematic search of 11 electronic databases located studies assessing reliability and/or validity of non-invasive thoracic kyphosis measurement techniques. Two independent reviewers used a critical appraisal tool to assess the quality of retrieved studies. Data was extracted by the primary reviewer. The results were synthesized qualitatively using a level of evidence approach.

Results

27 studies satisfied the eligibility criteria and were included in the review. The reliability, validity and both reliability and validity were investigated by sixteen, two and nine studies respectively. 17/27 studies were deemed to be of high quality. In total, 15 methods of thoracic kyphosis were evaluated in retrieved studies. All investigated methods showed high ($ICC \geq .7$) to very high ($ICC \geq .9$) levels of reliability. The validity of the methods ranged from low to very high.

Conclusion

The strongest levels of evidence for reliability exists in support of the Debrunner kyphometer, Spinal Mouse and Flexicurve index, and for validity supports the arcometer and Flexicurve index. Further reliability and validity studies are required to strengthen the level of evidence for the remaining methods of measurement. This should be addressed by future research.

Keywords: [Reliability](#), [Validity](#), [Thoracic kyphosis](#), [Measurement](#)

T spine discs

Eur Spine J. 2013 Nov 17.

The relationship of symptomatic thoracolumbar disc herniation and Scheuermann's disease.

Liu N, Chen Z, Qi Q, Shi Z.

Source

Department of Orthopaedics, Peking University Third Hospital, No.49 North Garden Road, Beijing, 100191, China.

Abstract

PURPOSE:

Symptomatic disc herniations in the thoracolumbar spine between T10/11 and L1/2 can be collectively called thoracolumbar disc herniation (TLDH). The etiology of this disorder is unclear. However, it is interesting that we have noted numerous TLDH patients have radiographic features of another spinal disorder which is Scheuermann's disease (SD). The purpose of this study is to investigate the relationship between symptomatic TLDH and SD in a symptomatic TLDH cohort.

METHODS:

A cohort of 63 patients with symptomatic TLDH, who had surgery was investigated. Incidences of associated SD and four radiographic signs of SD that were Schmorl's node, irregular vertebral end plate, posterior bony avulsion of the vertebra and wedge-shaped vertebra, average thoracolumbar kyphotic angle and incidences of disc herniation at segments with and without radiographic signs of SD were examined. Data from the TLDH group were compared with 57 patients undergoing surgery for lower lumbar disc herniation (LDH, L3/4-L5/S1) in the same period.

RESULTS:

The incidences of the four radiographic signs of SD and the incidence of associated SD were all significantly higher in the TLDH group than in the LDH group. 95.2 % of the patients in the TLDH group were diagnosed with SD (either classical SD or its atypical form). The average thoracolumbar kyphotic angle of the TLDH group was 16.9°, while that of the LDH group was 7.6° (P = 0.000). In the TLDH group, the incidences of disc herniation at segments with radiographic signs of SD were all significantly higher than at segments where no sign of SD was found.

CONCLUSIONS:

The high proportion of associated SD and the tendency of SD's signs to promote disc herniation in symptomatic TLDH patients suggest a close relationship between these two disorders. Symptomatic TLDH should be seen as a truly different surgical entity, that is, a special form of SD rather than just an indicator of a failing back.

PMID: 24241014

CERVICAL SPINE

Exercise and C spine/office workers

Occup Environ Med. 2013 Oct 18. doi: 10.1136/oemed-2013-101561.

Effects of an exercise programme on preventing neck pain among office workers: a 12-month cluster-randomised controlled trial.

Sihawong R, Janwantanakul P, Jiamjarasrangsi W.

Source

Department of Physical Therapy, Faculty of Allied Health Sciences, Chulalongkorn University, , Bangkok, Thailand.

Abstract

OBJECTIVES:

This study aimed to evaluate the effects of an exercise programme focusing on muscle stretching and endurance training on the 12-month incidence of neck pain in office workers.

METHODS:

A 12-month prospective cluster-randomised controlled trial was conducted in healthy office workers with lower-than-normal neck flexion movement or neck flexor endurance. Participants were recruited from 12 large-scale enterprises. A total of 567 healthy office workers were randomly assigned at the cluster level into either intervention (n=285) or control (n=282) groups. Participants in the intervention group received an exercise programme that included daily stretching exercise and twice-a-week muscle endurance training. Those in the control group received no intervention. The primary outcome measure was the 12-month incidence of neck pain, and the secondary outcome measures were pain intensity, disability level, and quality of life and health status. Analyses were performed using the Cox proportional hazard models.

RESULTS:

Over the 12-month follow-up, 12.1% of participants in the intervention group and 26.7% in the control group developed incident neck pain. Hazard rate ratios showed a protective effect of the exercise programme for neck pain (HR=0.45, 95% CI 0.28 to 0.71) after adjusting for biopsychosocial factors. There was no significant difference in pain intensity, disability and quality of life and health status between those who reported incident neck pain in the intervention and control groups.

CONCLUSIONS:

The exercise programme reduced incident neck pain and increased neck flexion movement for office workers with lower-than-normal neck flexion movement. PMID: 24142988

Kinematics

Man Ther. 2013 Nov 9. pii: S1356-689X(13)00186-0. doi: 10.1016/j.math.2013.10.006.

Do neck kinematics correlate with pain intensity, neck disability or with fear of motion?

Sarig Bahat H, Weiss PL, Sprecher E, Krasovsky A, Laufer Y.

Source

Department of Physical Therapy, Faculty of Social Welfare and Health Sciences, University of Haifa, Mount Carmel, Haifa 31905, Israel. Electronic address: hbahat@research.haifa.ac.il.

Abstract

PURPOSE:

This study aimed to investigate the relationship between cervical kinematics and subjective measures, including pain intensity, disability, and fear of motion.

METHODS:

Twenty-five patients (19 females, 6 males; mean age 39 ± 12.7 years) with chronic neck pain participated in this cross-sectional study. A customized virtual reality system was employed to evaluate cervical range of motion (ROM) and kinematics, using an interactive game controlled by cervical motion via electromagnetic tracking. Self-reported outcome measures included pain intensity (visual analogue scale); disability (Neck Disability Index); and fear of motion (TAMPA scale of kinesiophobia). Kinematic measures included cervical ROM, mean and peak velocity, and number of velocity peaks (NVP) reflecting smoothness of motion.

RESULTS:

Results showed significant correlations of approximately 0.4-0.6 between ROM and fear of motion, pain intensity, and disability. All 12 kinematic measures were correlated with fear of motion, but only a few were correlated with pain intensity, and with disability.

CONCLUSIONS:

The results emphasise fear of motion as a subjective measure primarily correlated with neck kinematics, including range, velocity, and smoothness of cervical motion. The level of neck disability was found to be partly related to ROM or to other kinematic impairments. However, ROM by itself remains a valid measure related to pain intensity and to fear of motion in patients with chronic neck pain. All correlations demonstrated were moderate, indicating that these measures involve other factors in need of further research.

Copyright © 2013 Elsevier Ltd. All rights reserved. **KEYWORDS:** Fear of motion, Kinematics, Neck pain, Velocity PMID: 24291364

C spine radiculopathy/conservative care

Clin J Pain. 2013 Dec;29(12):1073-86. doi: 10.1097/AJP.0b013e31828441fb.

The effectiveness of conservative treatment for patients with cervical radiculopathy: a systematic review.

Thoomes EJ, Scholten-Peeters W, Koes B, Falla D, Verhagen AP.

Source

*Department of General Practice, Erasmus Medical Centre, Rotterdam †Research Group Diagnostics, University of Applied Sciences AVANS, Breda, The Netherlands ‡Pain Clinic, Center for Anesthesiology, Emergency and Intensive Care Medicine, University Hospital Göttingen §Department of Neurorehabilitation Engineering, Bernstein Focus Neurotechnology (BFNT) Göttingen, Bernstein Center for Computational Neuroscience, University Medical Center Göttingen, Georg-August University, Göttingen, Germany.

Abstract

OBJECTIVES:

The aim of this systematic review is to assess the effectiveness of conservative treatments for patients with cervical radiculopathy, a term used to describe neck pain associated with pain radiating into the arm. Little is known about the effectiveness of conservative treatment for patients with cervical radiculopathy.

METHODS:

We electronically searched the Cochrane Controlled Trials Register, MEDLINE, EMBASE, and CINAHL for randomized clinical trials. Conservative therapies consisted of physiotherapy, collar, traction etc. Two authors independently assessed the risk of bias using the criteria recommended by the Cochrane Back Review Group and extracted the data. If studies were clinically homogenous, a meta-analysis was performed. The overall quality of the body of evidence was evaluated using the GRADE method.

RESULTS:

Fifteen articles were included that corresponded to 11 studies. Two studies scored low risk of bias. There is low-level evidence that a collar is no more effective than physiotherapy at short-term follow-up and very low-level evidence that a collar is no more effective than traction. There is low-level evidence that traction is no more effective than placebo traction and very low level-evidence that intermittent traction is no more effective than continuous traction.

DISCUSSION:

On the basis of low-level to very low-level evidence, no 1 intervention seems to be superior or consistently more effective than other interventions. Regardless of the intervention assignment, patients seem to improve over time, indicating a favorable natural course. Use of a collar and physiotherapy show promising results at short-term follow-up.

PMID: 23446070

Upper limb neural tension

J Manipulative Physiol Ther. 2013 Nov-Dec;36(9):626-32. doi: 10.1016/j.jmpt.2013.07.007.
Epub 2013 Oct 23.

Concordance of upper limb neurodynamic tests with medical examination and magnetic resonance imaging in patients with cervical radiculopathy: a diagnostic cohort study.

Apelby-Albrecht M, Andersson L, Kleiva IW, Kvåle K, Skillgate E, Josephson A.

Source

Doctor of Naprapathy, Scandinavian College of Naprapathic Manual Medicine Kräftriket, Stockholm, Sweden.

Abstract

OBJECTIVE:

The purpose of this study was to investigate the concordance of the upper limb neurodynamic tests (ULNTs) with a chosen reference standard, consisting of medical examination and magnetic resonance imaging (MRI), in patients with cervical radiculopathy.

METHODS:

This diagnostic cohort study included 51 consecutive patients referred to a center for spinal surgery for clinical investigation of cervical and/or arm pain in Sweden during the period of November 2007 to February 2008. The patients were exposed to the 4 different tests of ULNT. One diagnosis based on each of the tests separately and one based on the tests combined were compared with a chosen reference standard consisting of MRI, anamnestic features, and clinical examination.

RESULTS:

The ULNT (1-3 used combined) had a sensitivity of 0.97 and a specificity of 0.69. The results of ULNT (1-3 used combined) corresponded in 88.2% with the reference standard. Individually, the ULNT 1 (median) showed the highest validity, and ULNT 2b (radial), the lowest.

CONCLUSION:

Upper limb neurodynamic test (combined) showed a substantial agreement with findings from medical examination including MRI. These results indicate the importance of ULNT (combined) to complement the clinical examination of patients with radiculopathy.

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KEYWORDS:

Brachial Plexus, Cervical Radiculopathy, Magnetic Resonance Imaging, Neurological Examination PMID: 24161389

Bladder red flag

Journal of Orthopaedic Science

November 2013

Overactive bladder in cervical spondylotic myelopathy

Zhuo Wang, Toshihiko Sakakibara, Yuichi Kasai

Abstract

Background

Overactive bladder (OAB) is a new disease concept defined by the International Continence Society in 2002. There have been no reports of OAB among patients with cervical spondylotic myelopathy assessed on the basis of symptom questionnaires.

Methods

One-hundred-and-six patients diagnosed with cervical spondylotic myelopathy and treated by use of laminoplasty were examined. The patients were classified into two groups, those identified as having OAB (OAB group) and those identified as not having OAB (non-OAB group), by use of the Overactive Bladder Symptom Score collected before and 1 year after surgery. The clinical results for the two groups were assessed. OAB symptom prevalence and post-operative symptom improvement were investigated 1 year postoperatively.

Results

Of the 106 patients, 50 were identified as having OAB (symptom prevalence 47.2 %). Of these 50 patients, symptom improvement was observed for only 14 (28 %) 1 year after surgery. For both groups good improvement on the basis of the Japanese Orthopedic Association score was observed 1 year postoperatively, but there were no significant differences between them.

Conclusions

Post-operative improvement of OAB symptoms in cervical spondylotic myelopathy patients was low, which indicated that OAB was most frequently attributable to non-neurogenic and idiopathic, but not neurogenic, causes. It is considered necessary to tell patients with cervical spondylotic myelopathy that the possibility of post-operative OAB symptom improvement is not high when the explanation for informed

Obesity

World Neurosurg. 2013 Oct 18. pii: S1878-8750(13)01369-7. doi: 10.1016/j.wneu.2013.09.053.

The impact of obesity on surgeon ratings and patient-reported outcome measures after degenerative cervical spine disease surgery.

Auffinger B, Lam S, Kraninger J, Shen J, Roitberg BZ.

Source The University of Chicago, Section of Neurosurgery, 5841 South Maryland Ave, MC3026, J341, Chicago, IL 60637. Electronic address: bauffinger@surgery.bsd.uchicago.edu.

Abstract

OBJECTIVE: Obesity is a growing public health problem. A considerable number of patients undergoing cervical spine surgery are obese, but the correlation between obesity and surgical outcome is still unclear. In this study, we investigate the impact of body mass index (BMI) on patients' and surgeons' perception of spine surgery outcomes.

METHODS: We analyzed a prospectively collected spine surgery registry with patient-reported outcome (PRO) measures and surgeon ratings. Mixed-effects linear models and linear regression models were applied to investigate the relationship between different WHO obesity classifications and surgical outcome.

RESULTS:

88 patients had surgery for degenerative cervical spine disease with 97.72% follow-up at 3 months and 94.31% at 6 months postoperatively. Mean BMI was $27.92 \text{ kg/m}^2 \pm 7.9$. 28.57% were overweight (BMI 25-29.9) and 31.57% were obese (Class I obesity, BMI 30-34.9). We found a positive correlation between BMI and VAS at 6 months ($R^2: 0.298, p < 0.05$) and between BMI and change in NDI ($R^2: 0.385, p < 0.01$) suggesting that obese patients had less improvement and more pain 6 months postoperatively than non-obese patients. Overweight patients had worse MCS values ($R^2: -0.275, p < 0.05$) and obese patients had worse VAS values 6 months after surgery ($R^2: 0.284, p < 0.03$). Interestingly, surgeon ratings matched the above results. Patients with higher BMI had worse surgeon ratings 3 and 6 months postoperatively ($R^2: 0.555, p < 0.05$), while normal weight patients had better outcomes when rated from the surgeon's perspective ($R^2: -0.536, p < 0.05$).

CONCLUSION:

Obese patients had worse postoperative PRO scores and less overall patient-rated improvement when compared to non-obese patients. Patients with BMI > 25 reported less improvement after surgery both in the patients' and in the surgeons' perspectives.

KEYWORDS: BMI, Body Mass Index, Body mass index, MCS, Mental Component Summary of the Short Form of the SF-36, NDI, Neck Disability Index, PCS, PROs, Patient-Reported Outcomes, Physical Component Summary of the Short Form of the SF-36, VAS, Visual Analog Scale, degenerative cervical spine disease, patient-reported outcomes, spine surgery outcomes, surgeon ratings PMID:24145235

Algorithms

Man Ther. 2013 Oct 14. pii: S1356-689X(13)00160-4. doi: 10.1016/j.math.2013.09.007.

Articular dysfunction patterns in patients with mechanical neck pain: A clinical algorithm to guide specific mobilization and manipulation techniques.

Dewitte V, Beernaert A, Vanthillo B, Barbe T, Danneels L, Cagnie B.

Source

Ghent University, Department of Rehabilitation Sciences and Physiotherapy, De Pintelaan 185 3B3, 9000 Ghent, Belgium. Electronic address: vincent.dewitte@ugent.be.

Abstract

In view of a didactical approach for teaching cervical mobilization and manipulation techniques to students as well as their use in daily practice, it is mandatory to acquire sound clinical reasoning to optimally apply advanced technical skills.

The aim of this Masterclass is to present a clinical algorithm to guide (novice) therapists in their clinical reasoning to identify patients who are likely to respond to mobilization and/or manipulation. The presented clinical reasoning process is situated within the context of pain mechanisms and is narrowed to and applicable in patients with a dominant input pain mechanism. Based on key features in subjective and clinical examination, patients with mechanical nociceptive pain probably arising from articular structures can be categorized into specific articular dysfunction patterns. Pending on these patterns, specific mobilization and manipulation techniques are warranted. The proposed patterns are illustrated in 3 case studies. This clinical algorithm is the corollary of empirical expertise and is complemented by in-depth discussions and knowledge exchange with international colleagues.

Consequently, it is intended that a carefully targeted approach contributes to an increase in specificity and safety in the use of cervical mobilizations and manipulation techniques as valuable adjuncts to other manual therapy modalities.

Copyright © 2013 Elsevier Ltd. All rights reserved. **KEYWORDS:** Articular dysfunction patterns, Cervical spine, Clinical reasoning, Spinal manipulation PMID: 24176917

Whiplash

Scandinavian Journal of Pain

[Volume 4, Issue 4](#), Pages 173-179, October 2013

New objective findings after whiplash injuries: High blood flow in painful cervical soft tissue: An ultrasound pilot study

[Hatem Kalawy](#), [Britt-Marie Stålnacke](#), [Martin Fahlström](#), [Lars Öhberg](#), [Felix Linetsky](#),
[Håkan Alfredson](#)

Abstract

Background

The presence of high blood flow in the structurally abnormal and painful regions of tendinosis, but not in the normal pain-free tendons, was recently confirmed by colour Doppler (CD) ultrasound (US). Biopsies from the regions with high blood flow demonstrated the presence of sympathetic and sensitive nerve fibres juxtapositioned to neovessels. Grey-scale US and CD are reliable methods used to evaluate structural homogeneity, thickness, and blood flow in the peripheral tendons. The aim of this study was to utilize CD to qualitatively evaluate for the presence of abnormal high blood flow in paravertebral tissues after whiplash injuries in patients with chronic neck pain.

Methods

Twenty patients with chronic neck pain after whiplash-associated disorder (WAD) and 20 pain-free control subjects were included in the study. The same experienced radiologist performed all grey-scale US and CD examinations.

Results

More regions with high blood flow were observed in the patient group than in the control group. At all levels, the high blood flow pattern was detected at the enthesis of the spinous processes and bilaterally juxtapositioned to the facet joints.

Conclusion

All regions identified by the patients as painful and tender corresponded to the positive high blood flow found during the CD examination.

Implications

These findings document increased blood-flow/neovascularisation at insertions of neck muscles which may indicate that there are pathological neovascularisation with accompanying pain- and sympathetic nerves, similar to what has been found in Achilles-tendinosis. These findings promise that similar treatments that now is successful with Achilles tendinosis, may be effective in the WAD-painful muscle insertions of the neck.

Whiplash

BMC Musculoskelet Disord. 2013 Nov 4;14(1):314.

Muscle activity and head kinematics in unconstrained movements in subjects with chronic neck pain; cervical motor dysfunction or low exertion motor output?

Vikne H, Bakke ES, Liestøl K, Engen SR, Vøllestad N.

Abstract

BACKGROUND:

Chronic neck pain after whiplash associated disorders (WAD) may lead to reduced displacement and peak velocity of neck movements. Dynamic neck movements in people with chronic WAD are also reported to display altered movement patterns such as increased irregularity, which is suggested to signify impaired motor control. As movement irregularity is strongly related to the velocity and displacement of movement, we wanted to examine whether the increased irregularity in chronic WAD could be accounted for by these factors.

METHODS:

Head movements were completed in four directions in the sagittal plane at three speeds; slow (S), preferred (P) and maximum (M) in 15 men and women with chronic WAD and 15 healthy, sex and age-matched control participants. Head kinematics and measures of movement smoothness and symmetry were calculated from position data. Surface electromyography (EMG) was recorded bilaterally from the sternocleidomastoid and splenius muscles and the root mean square (rms) EMG amplitude for the accelerative and decelerative phases of movement were analyzed.

RESULTS:

The groups differed significantly with regard to movement velocity, acceleration, displacement, smoothness and rmsEMG amplitude in agonist and antagonist muscles for a series of comparisons across the test conditions (range 17 -- 121%, all p-values < 0.05). The group differences in peak movement velocity and acceleration persisted after controlling for movement displacement. Controlling for differences between the groups in displacement and velocity abolished the difference in measures of movement smoothness and rmsEMG amplitude.

CONCLUSIONS:

Simple, unconstrained head movements in participants with chronic WAD are accomplished with reduced velocity and displacement, but with normal muscle activation levels and movement patterns for a given velocity and displacement. We suggest that while reductions in movement velocity and displacement are robust changes and may be of clinical importance in chronic WAD, movement smoothness of unconstrained head movements is not.

Whiplash/facet injections

BMC Musculoskelet Disord. 2013 Nov 4;14(1):313.

A comparison of physical and psychological features of responders and non-responders to cervical facet blocks in chronic whiplash.

Smith AD, Jull G, Schneider G, Frizzell B, Hooper RA, Sterling M.

Abstract

BACKGROUND:

Cervical facet block (FB) procedures are often used as a diagnostic precursor to radiofrequency neurotomies (RFN) in the management of chronic whiplash associated disorders (WAD). Some individuals will respond to the FB procedures and others will not respond. Such responders and non-responders provided a sample of convenience to question whether there were differences in their physical and psychological features. This information may inform future predictive studies and ultimately the clinical selection of patients for FB procedures.

METHODS:

This cross-sectional study involved 58 individuals with chronic WAD who responded to cervical FB procedures (WAD_R); 32 who did not respond (WAD_NR) and 30 Healthy Controls (HC)s. Measures included: quantitative sensory tests (pressure; thermal pain thresholds; brachial plexus provocation test); nociceptive flexion reflex (NFR); motor function (cervical range of movement (ROM); activity of the superficial neck flexors during the cranio-cervical flexion test (CCFT). Self-reported measures were gained from the following questionnaires: neuropathic pain (s-LANSS); psychological distress (General Health Questionnaire-28), post-traumatic stress (PDS) and pain catastrophization (PCS). Individuals with chronic whiplash attended the laboratory once the effects of the blocks had abated and symptoms had returned.

RESULTS:

Following FB procedures, both WAD groups demonstrated generalized hypersensitivity to all sensory tests, decreased neck ROM and increased superficial muscle activity with the CCFT compared to controls ($p < 0.05$). There were no significant differences between WAD groups (all $p > 0.05$). Both WAD groups demonstrated psychological distress (GHQ-28; $p < 0.05$), moderate post-traumatic stress symptoms and pain catastrophization. The WAD_NR group also demonstrated increased medication intake and elevated PCS scores compared to the WAD_R group ($p < 0.05$).

CONCLUSIONS:

Chronic WAD responders and non-responders to FB procedures demonstrate a similar presentation of sensory disturbance, motor dysfunction and psychological distress. Higher levels of pain catastrophization and greater medication intake were the only factors found to differentiate these groups.

CRANIUM/TMJ

Cog. Beh. Therapy/TMJ

Clin J Pain. 2013 Dec;29(12):1057-65. doi: 10.1097/AJP.0b013e3182850559.

Biofeedback-based Cognitive-Behavioral Treatment Compared With Occlusal Splint for Temporomandibular Disorder: A Randomized Controlled Trial.

Shedden Mora MC, Weber D, Neff A, Rief W.

Source

Departments of *Clinical Psychology and Psychotherapy †Prosthetic Dentistry ‡Oral and Maxillofacial Surgery, Philipps University of Marburg, Marburg, Germany.

Abstract

OBJECTIVES:

Cognitive-behavioral treatment has proven efficacy for chronic temporomandibular disorder (TMD). However, most patients receive dental treatment that may not address psychological comorbidities often present in TMD. The aim of the present study was to evaluate the efficacy of biofeedback-based cognitive-behavioral treatment (BFB-CBT) versus dental treatment with occlusal splint (OS). Moreover, changes in nocturnal masseter muscle activity (NMMA) were investigated.

METHODS:

Fifty-eight patients with chronic TMD were randomly assigned to receive either 8 weekly sessions of BFB-CBT or 8 weeks of OS treatment. Diagnoses were established using Research Diagnostic Criteria for TMD. Pain intensity and disability were defined as primary outcomes. Secondary outcomes included emotional functioning, pain coping, somatoform symptoms, treatment satisfaction, and adverse events. NMMA was assessed during 3 nights pretreatment and posttreatment with portable devices. Follow-up assessment took place 6 months after the treatment.

RESULTS:

Both treatments resulted in significant reductions in pain intensity and disability, with similar amounts of clinically meaningful improvement (45% for BFB-CBT and 48% for OS). Patients receiving BFB-CBT showed significantly larger improvements in pain coping skills. Satisfaction with treatment and ratings of improvement were higher for BFB-CBT. Effects were stable over 6 months, and tended to be larger in the BFB-CBT group for all outcomes. No significant changes were observed in NMMA.

DISCUSSION:

The fact that BFB-CBT resulted in larger improvements in pain coping skills, and was well accepted by the patients, underlines the importance and feasibility of psychological treatments in the clinical management of TMD.

PMID: 23446073

HEADACHES

Sexual pain/HA

Headache. 2013 Nov 21. doi: 10.1111/head.12271.

Evaluation of the Frequency and the Association of Sexual Pain and Chronic Headaches.

Gordon A, Paneduro D, Pink L, Lawler V, Lay C.

Source

Wasser Pain Management Centre, Mount Sinai Hospital, Toronto, ON, Canada.

Abstract

BACKGROUND:

Sexual pain and chronic headaches are both complex conditions with associated high disability. Little research has examined whether there is a relationship between the 2. The aim of this survey-based study was to explore the frequency of sexual pain in a population of women being treated for chronic headache. Peripheral aims included exploring the number of patients receiving treatment for sexual pain and the association between sexual pain and libido, and history of abuse.

METHODS:

Patients presenting to an ambulatory chronic headache clinic were administered a short 10-item survey.

RESULTS:

Forty-four percent of patients reported that they had pelvic region or genital pain brought on by sexual activity. Only half of these patients had ever discussed their pelvic pain with a health care provider, and 31% of these patients had not received treatment. Almost all patients would be interested in treatment if available. Seventy-five percent of patients indicated a change in libido.

CONCLUSION:

Chronic headaches and sexual pain are both conditions that have a significant impact on patients and the health care system, and they do coexist. More research is needed to look at the relationship between these conditions in addition to epidemiology, symptomatology, evaluation, and treatments.

© 2013 American Headache Society.

KEYWORDS chronic headache, chronic pain, pelvic pain, sexual pain PMID: 24261411

CONCUSSIONS

Young athletes

World Neurosurg. 2013 Oct 10. pii: S1878-8750(13)01306-5. doi: 10.1016/j.wneu.2013.10.020. [

Neuroimaging Changes in the Brain in Contact versus Noncontact Sport Athletes Using Diffusion Tensor Imaging.

Gajawelli N, Lao Y, Apuzzo ML, Romano R, Liu C, Tsao S, Hwang D, Wilkins B, Lepore N, Law M.

Source

Department of Biomedical Engineering, University of Southern California, Los Angeles, California, USA. Electronic address: gajawell@usc.edu.

Abstract

OBJECTIVE:

Traumatic brain injury in contact sports has significant impact on short-term neurologic and neurosurgical function as well as longer-term cognitive disability. In this study, we aim to demonstrate that contact sport participants exhibit differences in diffusion tensor imaging (DTI) caused by repeated physical impacts on the brain. We also aim to determine that impact incurred by the contact sports athletes during the season may result in the differences between the pre- and postseason DTI scans.

METHODS:

DTI data were collected from 10 contact-sport (mean age 20.4 ± 1.36 years) and 13 age-matched noncontact-sport (mean age 19.5 ± 1.03 years) male athletes on a 3-Tesla magnetic resonance imaging scanner. A single-shot, echo-planar imaging sequence with b-value of 1000 s/mm² and 25 gradient directions was used. Eight of the athletes were again scanned after the end of the season. The b₀ nondiffusion-weighted image was averaged five times. Voxel-wise, two-sample t tests were run for all group comparisons, and in each case, the positive false-discovery rate was computed to assess the whole-map, multiple-comparison corrected significance.

RESULTS:

There were significant differences in the fractional anisotropy values in the inferior fronto-occipital fasciculus, parts of the superior and posterior coronal radiate, and the splenium of the corpus callosum (CC) as well as smaller clusters in the genu and parts of the body of the CC. In addition, the external capsule also shows some difference between the contact and noncontact athlete brains. In addition, the preseason and postseason showed differences in these regions, however, the postseason P-values show significance in more areas of the CC.

CONCLUSIONS:

There are significant DTI changes in the CC, the external capsule, the inferior fronto-occipital fasciculus, as well as regions such as the superior/posterior corona radiata the preseason contact versus the noncontact control athletes were compared and also when the postseason contact athletes with the control athletes were compared. There are also differences in the DTI between the post- versus preseason scans.

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KEYWORDS:CC, Corpus callosum, DTI, Diffusion tensor imaging, FA, Fractional anisotropy, MD, Magnetic resonance imaging, Mean diffusivity, TBI, Traumatic brain injuryPMID:

24120614

Prevalence

Br J Sports Med. 2013 Sep 19. doi: 10.1136/bjsports-2013-092734.

Risk factors for sports concussion: an evidence-based systematic review.

Abrahams S, Mc Fie S, Patricios J, Posthumus M, September AV.

Source

UCT/MRC Research Unit for Exercise Science and Sports Medicine, Department of Human Biology, University of Cape Town, Cape Town, South Africa.

Abstract

Concussion is a common sports injury with approximately 1.6-3.8 million sport-related concussions reported in the USA annually.

Identifying risk factors may help in preventing these injuries. This systematic review aims to identify such risk factors. Three electronic databases; ScienceDirect, PubMed and SpringerLink, were searched using the keywords 'RISK FACTORS' or 'PREDISPOSITION' in conjunction with 'SPORT' and 'CONCUSSION'. Based on the inclusion and exclusion criteria, 13 628 identified titles were independently analysed by two of the authors to a final list of 86 articles. Only articles with a level of evidence of I, II and III were included according to robust study design and data analysis. The level of certainty for each risk factor was determined. A high level of certainty for increased risk of a subsequent concussion in athletes sustaining more than one previous concussion was reported in 10 of 13 studies.

Further, a high level of certainty was assigned to match play with all 29 studies reporting an increased concussion risk during matches. All other risk factors were evaluated as having a low level of certainty. Although several risk factors were identified from the appraised studies, prospective cohort studies, larger sample sizes, consistent and robust measures of risk should be employed in future research.

KEYWORDS: Concussion, Epidemiology, Evidence Based Reviews, Sporting Injuries
PMID: 24052371

Graded exercise/concussion

Curr Sports Med Rep. 2013 Nov-Dec;12(6):370-6. doi: 10.1249/JSR.0000000000000008.

Use of Graded Exercise Testing in Concussion and Return-to-Activity Management.

Leddy JJ, Willer B.

Source

1Department of Orthopaedics, University at Buffalo, Buffalo, NY; and 2Department of Psychiatry, University at Buffalo, Buffalo, NY.

Abstract

Concussion is a physiologic brain injury that produces systemic and cognitive symptoms. The metabolic and physiologic changes of concussion result in altered autonomic function and control of cerebral blood flow.

Evaluation and treatment approaches based upon the physiology of concussion may therefore add a new dimension to concussion care. In this article, we discuss the use of a standard treadmill test, the Buffalo Concussion Treadmill Test (BCTT), in acute concussion and in postconcussion syndrome (PCS). The BCTT has been shown to diagnose physiologic dysfunction in concussion safely and reliably, differentiate it from other diagnoses (e.g., cervical injury), and quantify the clinical severity and exercise capacity of concussed patients. It is used in PCS to establish a safe aerobic exercise treatment program to help speed recovery and return to activity.

The use of a provocative exercise test is consistent with world expert consensus opinion on establishing physiologic recovery from concussion.

SHOULDER GIRDLE

Kinesio Taping

Int J Sports Med. 2013 Nov;34(11):950-5. doi: 10.1055/s-0033-1334911. Epub 2013 May 13.

Does the application of kinesiotape change scapular kinematics in healthy female handball players?

Van Herzeele M, van Cingel R, Maenhout A, De Mey K, Cools A.

Source

Rehabilitation Sciences and Physiotherapy, Ghent University, Ghent, Belgium.

Abstract

Elastic taping is widely used in sports medicine for correcting functional alignment and muscle recruitment.

However, evidence regarding its influence on scapular dynamic positioning is scarce. This study aimed to investigate the effect of a specific kinesiotaping method on scapular kinematics in female elite handball players without shoulder complaints. 25 athletes (18.0 ± 1.5 years) active in the highest national division were recruited. All subjects received an elastic adhesive tape (K-active tape©) with the purpose to correct scapular position. 3-dimensional scapular motion measurements were performed (Fastrak®) during humeral elevation in the sagittal, frontal and scapular plane. The results showed that taping has a moderate to large effect (Cohen's $d > 0.7$) towards scapular posterior tilting, in all 3 planes of humeral movement and for all angles of elevation (mean posteriorizing effect of 4.23° , 3.23° and 4.33° respectively for elevation in the sagittal, frontal and scapular plane, $p < 0.001$). In addition, taping also moderately increased the scapular upward rotation at 30° , 60° and 90° of humeral abduction (mean increase of 2.90° , Cohen's $d > 0.7$).

Together these results suggest that kinesiotape application causes positive changes in scapular motion. This could support its use in sports medicine for preventing shoulder problems in overhead athletes.

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PMID: 23670362

Motion analysis

Interrater reliability of clinical tests to evaluate scapulothoracic motion Evelyn Baertschi, Jaap Swanenburg, Florian Brunner and Jan Kool

BMC Musculoskeletal Disorders 2013, **14**:315 doi:10.1186/1471-2474-14-315

Published: 5 November 2013

Abstract (provisional)

Background

Decreased scapulothoracic motion has been associated with various pathologies of the shoulder. Reliable and simple assessment methods of scapular mobility are, however lacking. The aim of this study was to evaluate the interrater reliability of four clinical tests to assess scapulothoracic motion in patients with a slightly restricted shoulder flexion.

Methods

A total of nineteen patients with a symptomatic slight restriction of shoulder flexion and twenty asymptomatic subjects were evaluated. The investigation consisted of four palpatory tests to assess scapulothoracic motion. A two-level rating scale (positive, negative) was utilised. Interrater reliability was evaluated using kappa coefficients.

Results

We found substantial to almost perfect ($Kappa = 0.63-0.4$) interrater reliability for the four tests.

Conclusion

Our study demonstrates that the four mobility tests of the shoulder are a reliable and simple instrument to assess patients with a slightly restricted shoulder flexion. Future studies should be conducted to evaluate the validity of these tests and to establish their clinical usefulness.

GLENOHUMERAL/SHOULDER

Posterior instability

Am J Sports Med. 2013 Aug 27.

Risk Factors for Posterior Shoulder Instability in Young Athletes.

Owens BD, Campbell SE, Cameron KL.

Source

John A. Feagin Jr Sports Medicine Fellowship, Keller Army Hospital, United States Military Academy, West Point, New York.

Abstract

BACKGROUND: While posterior glenohumeral instability is becoming increasingly common among young athletes, little is known of the risk factors for injury.

PURPOSE: To determine the modifiable and nonmodifiable risk factors for posterior shoulder instability in a high-risk cohort.

STUDY DESIGN: Case-control study (prognosis); Level of evidence, 2.

METHODS: A prospective cohort study in which 714 young athletes were followed from June 2006 through May 2010 was conducted. Baseline testing included a subjective history of instability, instability testing by a sports medicine fellowship-trained orthopaedic surgeon, range of motion, strength measurement with a handheld dynamometer, and bilateral noncontrast magnetic resonance imaging of the shoulder. A musculoskeletal radiologist measured glenoid version, height, depth, rotator interval (RI) height, RI width, RI area, and RI index. Participants were followed to document all acute posterior shoulder instability events during the 4-year follow-up period. The time to the posterior shoulder instability event during the follow-up period was the primary outcome of interest. Univariate and multivariable Cox proportional hazards regression models were used to analyze the data.

RESULTS: Complete data on 714 participants were obtained. During the 4-year surveillance period, 46 shoulders sustained documented glenohumeral instability events, of which only 7 were posterior in direction. The baseline factors that were associated with subsequent posterior instability during follow-up were increased glenoid retroversion ($P < .0001$), increased external rotation strength in adduction ($P = .029$) and at 45° of abduction ($P = .015$), and increased internal rotation strength in adduction ($P = .038$).

CONCLUSION: This is the largest known prospective study to follow healthy participants in the development of posterior shoulder instability. Posterior instability represents 10% of all instability events. The most significant risk factor was increased glenoid retroversion. While increased internal/external strength was also associated with subsequent instability, it is unclear whether these strength differences are causative or reactive to the difference in glenoid anatomy. This work confirms that increased glenoid retroversion is a significant prospective risk factor for posterior instability.

KEYWORDS:glenoid retroversion, injury prevention, posterior instability, shoulder instability
PMID: 23982394

Impingement/PT

Br J Sports Med. 2013 Nov 11. doi: 10.1136/bjsports-2012-091802.

Subacromial impingement syndrome--effectiveness of physiotherapy and manual therapy.

Gebremariam L, Hay EM, van der Sande R, Rinkel WD, Koes BW, Huisstede BM.

Source

Department of General Practice, Erasmus MC-University Medical Center Rotterdam, Rotterdam, The Netherlands.

Abstract

BACKGROUND:

The subacromial impingement syndrome (SIS) includes the rotator cuff syndrome, tendonitis and bursitis of the shoulder. Treatment includes surgical and non-surgical modalities. Non-surgical treatment is used to reduce pain, to decrease the subacromial inflammation, to heal the compromised rotator cuff and to restore satisfactory function of the shoulder. To select the most appropriate non-surgical intervention and to identify gaps in scientific knowledge, we explored the effectiveness of the interventions used, concentrating on the effectiveness of physiotherapy and manual therapy.

METHODS:

The Cochrane Library, PubMed, EMBASE, PEDro and CINAHL were searched for relevant systematic reviews and randomised clinical trials (RCTs). Two reviewers independently extracted data and assessed the methodological quality. A best-evidence synthesis was used to summarise the results.

RESULTS:

Two reviews and 10 RCTs were included. One RCT studied manual therapy as an add-on therapy to self-training. All other studies studied the effect of physiotherapy: effectiveness of exercise therapy, mobilisation as an add-on therapy to exercises, ultrasound, laser and pulsed electromagnetic field. Moderate evidence was found for the effectiveness of hyperthermia compared to exercise therapy or ultrasound in the short term. Hyperthermia and exercise therapy were more effective in comparison to controls or placebo in the short term (moderate evidence). For the effectiveness of hyperthermia, no midterm or long-term results were studied. In the midterm, exercise therapy gave the best results (moderate evidence) compared to placebo or controls. For other interventions, conflicting, limited or no evidence was found.

CONCLUSIONS:

Some physiotherapeutic treatments seem to be promising (moderate evidence) to treat SIS, but more research is needed before firm conclusions can be drawn.

KEYWORDS: Evidence based reviews, Exercise rehabilitation, Physiotherapy, Shoulder injuries, Soft tissue injuries PMID: 24217037

ROTATOR CUFF

Repair failures

Am J Sports Med. 2013 Aug 13.

Effect of Postoperative Repair Integrity on Health-Related Quality of Life After Rotator Cuff Repair: Healed Versus Retear Group.

Yoo JH, Cho NS, Rhee YG.

Source

Shoulder & Elbow Clinic, Department of Orthopaedic Surgery, College of Medicine, Kyung Hee University, Seoul, Korea.

Abstract

BACKGROUND: Although rotator cuff repair is performed to improve health-related quality of life (HRQL) by reducing pain and improving shoulder function, it has not been clearly demonstrated that HRQL is improved in re-tear cases.

PURPOSE: To compare HRQL outcomes after rotator cuff repair between patients with healed cuffs and those with re-tears using the Short Form-36 Health Survey (SF-36). **STUDY**

DESIGN: Cohort study; Level of evidence, 3. **METHODS:** A total of 81 patients who underwent rotator cuff repair were enrolled in this study. There were 56 patients in the healed group and 25 patients in the re-tear group. The mean age at the time of surgery was 56 years (range, 35-73 years) in the healed group and 59.7 years (range, 45-74 years) in the re-tear group. The mean follow-up period was 29.7 months (range, 14-95 months) and 26.4 months (range, 13-101 months) in the healed and re-tear groups, respectively.

RESULTS: At final follow-up, the SF-36 scores for physical and mental component summaries (PCS and MCS, respectively) revealed significant improvement, from 36.6 to 51.2 (PCS) and 34.4 to 51.6 (MCS) in the healed group ($P < .0001$ in both cases) and from 34.2 to 49.4 (PCS) and 33.4 to 53.2 (MCS) in the re-tear group ($P < .0001$ in both cases). Mean scores on the SF-36 subscale for role limitations because of physical health problems (RP) were 52.3 in the healed group and 50.6 in the re-tear group. The RP and PCS scores were significantly higher in the healed group ($P = .007$ and $P = .025$, respectively). All domains and component summaries also had a fair to moderate correlation (range, 0.296-0.496) with the SF-36 score.

CONCLUSION: Although clinical shoulder outcome measures (University of California, Los Angeles [UCLA] and American Shoulder and Elbow Surgeons [ASES] scores) and all dimensions of the SF-36 showed significant improvement in both groups after rotator cuff repair, scores were significantly higher in the healed group on RP and PCS of the SF-36 as well as on the UCLA and ASES. There was no significant difference in MCS scores between the 2 groups. Despite similar improvements in the MCS scores, there were apparent objective differences between the groups. The values were statistically significant but clinically not significant for some of these measures.

KEYWORDS: SF-36, healed, quality of life, repair, re-tear, rotator cuff tear, shoulder PMID: 23942286

Effectiveness of RC surgery

The societal and economic value of rotator cuff repair □

The Journal of Bone & Joint Surgery, 11/21/2013 Evidence Based Medicine

Mather RC, et al.

Background:

Although rotator cuff disease is a common musculoskeletal problem in the United States, the impact of this condition on earnings, missed workdays, and disability payments is largely unknown. This study examines the value of surgical treatment for full-thickness rotator cuff tears from a societal perspective.

Methods:

A Markov decision model was constructed to estimate lifetime direct and indirect costs associated with surgical and continued nonoperative treatment for symptomatic full-thickness rotator cuff tears. All patients were assumed to have been unresponsive to one six-week trial of nonoperative treatment prior to entering the model. Model assumptions were obtained from the literature and data analysis. We obtained estimates of indirect costs using national survey data and patient-reported outcomes. Four indirect costs were modeled: probability of employment, household income, missed workdays, and disability payments. Direct cost estimates were based on average Medicare reimbursements with adjustments to an all-payer population. Effectiveness was expressed in quality-adjusted life years (QALYs).

Results:

The age-weighted mean total societal savings from rotator cuff repair compared with nonoperative treatment was \$13,771 over a patient's lifetime. Savings ranged from \$77,662 for patients who are thirty to thirty-nine years old to a net cost to society of \$11,997 for those who are seventy to seventy-nine years old. In addition, surgical treatment results in an average improvement of 0.62 QALY. Societal savings were highly sensitive to age, with savings being positive at the age of sixty-one years and younger. The estimated lifetime societal savings of the approximately 250,000 rotator cuff repairs performed in the U.S. each year was \$3.44 billion.

Conclusions:

Rotator cuff repair for full-thickness tears produces net societal cost savings for patients under the age of sixty-one years and greater QALYs for all patients. Rotator cuff repair is cost-effective for all populations. The results of this study should not be interpreted as suggesting that all rotator cuff tears require surgery. Rather, the results show that rotator cuff repair has an important role in minimizing the societal burden of rotator cuff disease.

Topics

rotator cuff injury ; rotator cuff repair ; economics

Evaluating Rotator Cuff Tear

JAMA. 2013 Aug 28;310(8):837-47. doi: 10.1001/jama.2013.276187.

Does this patient with shoulder pain have rotator cuff disease?: The Rational Clinical Examination systematic review.

Hermans J, Luime JJ, Meuffels DE, Reijman M, Simel DL, Bierma-Zeinstra SM.

Source

Department of Orthopaedic Surgery, Erasmus MC University Medical Centre Rotterdam, Rotterdam, The Netherlands. j.hermans@erasmusmc.nl

Abstract

IMPORTANCE: Rotator cuff disease (RCD) is the most common cause of shoulder pain seen by physicians.

OBJECTIVE: To perform a meta-analysis to identify the most accurate clinical examination findings for RCD.

DATA SOURCES: Structured search in MEDLINE, EMBASE, and CINAHL from their inception through May 2013.

STUDY SELECTION:

For inclusion, a study must have met the following criteria: (1) description of history taking, physical examination, or clinical tests concerning RCD; (2) detailing of sensitivity and specificity; (3) use of a reference standard with diagnostic criteria prespecified; (4) presentation of original data, or original data could be obtained from the authors; and (5) publication in a language mastered by one of the authors (Danish, Dutch, English, French, German, Norwegian, Spanish, Swedish).

MAIN OUTCOMES AND MEASURES:

Likelihood ratios (LRs) of symptoms and signs of RCD or of a tear, compared with an acceptable reference standard; quality scores assigned using the Rational Clinical Examination score and bias evaluated with the Quality Assessment of Diagnostic Accuracy Studies tool.

RESULTS:

Twenty-eight studies assessed the examination of referred patients by specialists. Only 5 studies reached Rational Clinical Examination quality scores of level 1-2. The studies with quality scores of level 1-2 included 30 to 203 shoulders with the prevalence of RCD ranging from 33% to 81%. Among pain provocation tests, a positive painful arc test result was the only finding with a positive LR greater than 2.0 for RCD (3.7 [95% CI, 1.9-7.0]), and a normal painful arc test result had the lowest negative LR (0.36 [95% CI, 0.23-0.54]). Among strength tests, a positive external rotation lag test (LR, 7.2 [95% CI, 1.7-31]) and internal rotation lag test (LR, 5.6 [95% CI, 2.6-12]) were the most accurate findings for full-thickness tears. A positive drop arm test result (LR, 3.3 [95% CI, 1.0-11]) might help identify patients with RCD. A normal internal rotation lag test result was most accurate for identifying patients without a full-thickness tear (LR, 0.04 [95% CI, 0.0-0.58]).

CONCLUSIONS AND RELEVANCE:

Because specialists performed all the clinical maneuvers for RCD in each of the included studies with no finding evaluated in more than 3 studies, the generalizability of the results to a nonreferred population is unknown. A positive painful arc test result and a positive external rotation resistance test result were the most accurate findings for detecting RCD, whereas the presence of a positive lag test (external or internal rotation) result was most accurate for diagnosis of a full-thickness rotator cuff tear.

Plasma injections

Am J Sports Med. 2013 Jul 26.

Platelet-Rich Plasma Injections in the Treatment of Chronic Rotator Cuff Tendinopathy: A Randomized Controlled Trial With 1-Year Follow-up.

Kesikburun S, Tan AK, Yilmaz B, Yasar E, Yazicioglu K.

Source

Department of Physical Medicine and Rehabilitation, Turkish Armed Forces Rehabilitation Center, Gülhane Military Medical Academy, Ankara, Turkey.

Abstract

BACKGROUND:Rotator cuff tendinopathy (RCT) is a significant source of disability and loss of work. Platelet-rich plasma (PRP) has been suggested to be beneficial in the treatment of RCT.

PURPOSE:To investigate the effect of PRP injections on pain and shoulder functions in patients with chronic RCT. **STUDY**

DESIGN:Randomized controlled trial; Level of evidence, 1. **METHODS:**A total of 40 patients, 18 to 70 years of age, with (1) a history of shoulder pain for >3 months during overhead-throwing activities, (2) MRI findings of RCT or partial tendon ruptures, and (3) a minimum 50% reduction in shoulder pain with subacromial injections of an anesthetic were included in this placebo-controlled, double-blind randomized clinical trial. Patients were randomized into a PRP group (n = 20) or placebo group (n = 20). Patients received an ultrasound-guided injection into the subacromial space that contained either 5 mL of PRP prepared from autologous venous blood or 5 mL of saline solution. All patients underwent a 6-week standard exercise program. Outcome measures (Western Ontario Rotator Cuff Index [WORC], Shoulder Pain and Disability Index [SPADI], 100-mm visual analog scale [VAS] of shoulder pain with the Neer test, and shoulder range of motion) were assessed at baseline and at 3, 6, 12, and 24 weeks and 1 year after injection.

RESULTS:Comparison of the patients revealed no significant difference between the groups in WORC, SPADI, and VAS scores at 1-year follow-up ($P = .174$, $P = .314$, and $P = .904$, respectively). Similar results were found at other assessment points. Within each group, the WORC, SPADI, and VAS scores showed significant improvements compared with baseline at all time points ($P < .001$). In the range of motion measures, there were no significant group \times time interactions.

CONCLUSION: At 1-year follow-up, a PRP injection was found to be no more effective in improving quality of life, pain, disability, and shoulder range of motion than placebo in patients with chronic RCT who were treated with an exercise program.

KEYWORDS: injection, platelet-rich plasma, randomized clinical trial, rotator cuff, tendon
PMID: 23893418

Vascularization

Clin J Sport Med. 2013 Nov;23(6):444-9. doi: 10.1097/JSM.0b013e318295ba73.

Neovascularization prevalence in the supraspinatus of patients with rotator cuff tendinopathy.

Kardouni JR, Seitz AL, Walsworth MK, Michener LA.

Source

*Department of Physical Therapy, Virginia Commonwealth University, Richmond, Virginia; †Department of Physical Therapy, Bouvé College of Health Sciences, Northeastern University, Boston, Massachusetts; and ‡Department of Radiology, UCLA Medical Center, Los Angeles, California.

Abstract

OBJECTIVE:

A high prevalence of neovascularity in lower extremity tendinopathies has been reported. Neovascularity in those with rotator cuff tendinopathy exclusively has not been examined. The objective was to determine the prevalence of neovascularization in patients with rotator cuff tendinopathy compared with asymptomatic controls.

DESIGN:

Single-blind cross-sectional study.

SETTING:

Research laboratory.

PARTICIPANTS:

Participants (n = 40; age = 44.9 years, 23-62 years; 20 females) with rotator cuff tendinopathy (n = 20) but without full-thickness rotator cuff tears, and asymptomatic controls that were age, gender, and hand dominance matched (n = 20) to the patients.

INTERVENTIONS:

The participants laying in supine had their shoulder positioned in internal rotation and extension. Ultrasound images were collected of the supraspinatus tendon and subacromial bursae in the transverse and longitudinal planes using a linear transducer in color Doppler mode.

MAIN OUTCOME MEASURES:

Images were assessed for neovascularization by 2 trained raters who were blinded to group (rotator cuff tendinopathy or asymptomatic group).

RESULTS:

No statistically significant difference in neovascularization was identified between participants with and without rotator cuff tendinopathy ($\chi = 0.13$, $df = 1$, $P = 0.72$). Neovascularization was identified in 6 of 20 patients with rotator cuff tendinopathy (30%) and 5 of 20 asymptomatic control participants (25%).

CONCLUSIONS:

The authors found no differences in neovascularization rate in patients with rotator cuff tendinopathy (30%) and asymptomatic controls (25%). The study indicates that neovascularization is not related to presence of symptomatic tendinopathy in those with rotator cuff tendinopathy. Neovascularization may not be a relevant sonographic finding to aid the clinical assessment of those with rotator cuff tendinopathy.

PMID: 23732364

ELBOW

Injections for lateral epicondylitis

Clin J Sport Med. 2013 Nov;23(6):502-3. doi: 10.1097/JSM.0000000000000042.

How effective are injection treatments for lateral epicondylitis? Shiple BJ.

OBJECTIVE: To compare the effectiveness, after 3 months, of a single injection of platelet-rich plasma (PRP), glucocorticoid (GC), or saline in reducing pain in lateral epicondylitis.

DESIGN: Randomized, controlled, 3-group trial (RCT). Patients and outcome assessors were blinded to intervention group. Sample size was calculated to show a clinically important difference in patient-reported pain intensity at 12 months with 17 patients per group.

PARTICIPANTS: Patients were referred to the Rheumatology Unit by general practitioners or other rheumatology or orthopedic departments. Inclusion criteria (verified by 1 physician) were lateral epicondylitis symptoms for ≥ 3 months (pain on the lateral side of the elbow and at the lateral epicondyle on palpation and during resisted dorsiflexion of the wrist), an ultrasound (US) color Doppler flow of \geq grade 2 (range, 0-4). Exclusion criteria were age < 18 years, treatment with GC injection within 3 months, inflammatory diseases, and conditions causing chronic pain. The 60 included patients had a mean age of 45 years, 52% were women, 58% had ≥ 1 previous injection, and 58% used analgesics. **INTERVENTION:** The patients were randomized to a single US-guided injection of PRP, GC, or saline, administered by the 1 physician who had made the diagnosis. All patients were blindfolded during blood collection and injection. They all received an injection of 10 to 15 mL of lidocaine into the peritendon before the procedure. The PRP injection was of approximately 3.5 mL of autologous platelets (collected and centrifuged for 15 minutes from 27 mL of whole blood) buffered with 8.4% sodium bicarbonate, and immediately peppered into the common tendon origin. The GC injection (1 mL triamcinolon, 40 mg/mL + 2 mL lidocaine, 10 mg/mL) was delivered through 1 site. The saline injection (3 mL saline, 0.9%) was peppered in the same manner as the PRP injection. After treatment, the patients were asked to use the arm minimally for 3 days and then gradually to return to normal use. **MAIN OUTCOME MEASURES:** The pain intensity scale of the Patient-Rated Tennis Elbow Evaluation (PRTEE) questionnaire was the main outcome measure (least to most pain = 0-50 points). The secondary end points included changes in functional disability using the functional section of the PRTEE, (least to most disability = 0-100 points), US changes in color Doppler signal and tendon thickness, and adverse events, which included pain after the injection. After 3 months, if the patient was unsatisfied with the result of treatment, he or she could be released from the study to seek other management. **MAIN RESULTS:** Ten, 11, and 13 patients (58% of the total) dropped out of the PRP, GC, and saline groups, respectively, at the 3-month follow-up, thus evaluations were only made at 1 and 3 months. At 1 month, the mean reduction in pain for the PRP group versus the saline group was 1.2 (95% confidence interval [CI], -5.0 to 7.3); for the GC group versus the saline group was -8.1 (95% CI, -14.3 to -1.9); and for the GC group versus the PRP group, -9.3 (95% CI, -15.4 to -3.2). At 3 months, the mean reduction in pain for no group was significantly greater than for others (PRP vs the saline group, -2.7; 95% CI, -8.8 to 3.5; GC vs the saline group, -3.8; 95% CI, -9.9 to 2.4; GC vs the PRP group, -1.1; 95% CI, -7.2 to 5.0). The PRTEE disability scores at 1 month also favored the GC group versus saline, but no differences were found between any groups at 3 months. The improvement in Doppler grades at 3 months favored the GC group versus the saline group and the PRP group ($P < 0.0001$ for both comparisons). Mean reduction in tendon thickness was greater for the GC group versus the saline group ($P < 0.0001$) and the PRP group ($P = 0.002$). PRP injections were found to be more painful than GC and saline injections. No adverse events leading to hospitalization, and no reports of infections resulting from the injections, occurred.

CONCLUSIONS: The dropout rate of 58% at 3 months showed that none of PRP, glucocorticoid, or saline injections adequately reduced the pain and disability of lateral epicondylitis. PMID: 24169302

Injections/Lateral epicondylitis

Br J Sports Med. 2013 Nov 6. doi: 10.1136/bjsports-2013-092674. [Epub ahead of print]

Corticosteroid and platelet-rich plasma injection therapy in tennis elbow (lateral epicondylalgia): a survey of current UK specialist practice and a call for clinical guidelines.

Titchener AG, Booker SJ, Bhambher NS, Tambe AA, Clark DI.

Source

Department of Trauma and Orthopaedics, Royal Derby Hospital, Derby, UK.

Abstract

BACKGROUND:

Tennis elbow is a common condition with a variety of treatment options, but little is known about which of these options specialists choose most commonly. Corticosteroid injections in tennis elbow may reduce pain in the short-term but delay long-term recovery. We have undertaken a UK-wide survey of upper limb specialists to assess current practice.

METHODS:

Cross-sectional electronic survey of current members of the British Elbow and Shoulder Society (BESS) and the British Society for Surgery of the Hand (BSSH).

RESULTS:

271 of 1047 eligible members responded (25.9%); consultant surgeons constituted the largest group (232/271, 85%). 131 respondents (48%) use corticosteroid injections as their first-line treatment for tennis elbow. 206 respondents (77%) believed that corticosteroid injections are not potentially harmful in the treatment of tennis elbow, while 31 (11%) did not use them in their current practice. In light of recent evidence of the potential harmful effects of corticosteroid therapy, 136 (50%) had not changed their practice while 108 (40.1%) had reduced or discontinued their use. 43 respondents (16%) reported having used platelet-rich plasma injections.

CONCLUSIONS:

Recent high-quality evidence that corticosteroids may delay recovery in tennis elbow appears to have had a limited effect on current practice. Treatment is not uniform among specialists and a proportion of them use platelet-rich plasma injections.

RX

Clin J Pain. 2013 Dec;29(12):1087-96. doi: 10.1097/AJP.0b013e31828b8e7d.

Current evidence for effectiveness of interventions for cubital tunnel syndrome, radial tunnel syndrome, instability, or bursitis of the elbow: a systematic review.

Rinkel WD, Schreuders TA, Koes BW, Huisstede BM.

Source

Departments of *Rehabilitation Medicine †General Practice, Erasmus MC-University Medical Center Rotterdam, Rotterdam, The Netherlands.

Abstract

OBJECTIVE:

To provide an evidence-based overview of the effectiveness of interventions for 4 nontraumatic painful disorders sharing the anatomic region of the elbow: cubital tunnel syndrome, radial tunnel syndrome, elbow instability, and olecranon bursitis.

METHODS:

The Cochrane Library, PubMed, Embase, PEDro, and CINAHL were searched to identify relevant reviews and randomized clinical trials (RCTs). Two reviewers independently extracted data and assessed the quality of the methodology. A best-evidence synthesis was used to summarize the results.

RESULTS:

One systematic review and 6 RCTs were included. For the surgical treatment of cubital tunnel syndrome (1 review, 3 RCTs), comparing simple decompression with anterior ulnar nerve transposition, no evidence was found in favor of either one of these. Limited evidence was found in favor of medial epicondylectomy versus anterior transposition and for early postoperative therapy versus immobilization. No evidence was found for the effect of local steroid injection in addition to splinting. No RCTs were found for radial tunnel syndrome. For olecranon bursitis (1 RCT), limited evidence for effectiveness was found for methylprednisolone acetate injection plus naproxen. Concerning elbow instability, including 2 RCTs, one showed that nonsurgical treatment resulted in similar results compared with surgery, whereas the other found limited evidence for the effectiveness in favor of early mobilization versus 3 weeks of immobilization after surgery.

DISCUSSION:

In this review no, or at best, limited evidence was found for the effectiveness of nonsurgical and surgical interventions to treat painful cubital tunnel syndrome, radial tunnel syndrome, elbow instability, or olecranon bursitis. Well-designed and well-conducted RCTs are clearly needed in this field.

PMID: 23985778

Lat. Epi/platelet plasma

Arthroscopy. 2013 Nov;29(11):1851-62. doi: 10.1016/j.arthro.2013.07.272. Epub 2013 Sep 21.

The Effect of Platelet-Rich Plasma on Clinical Outcomes in Lateral Epicondylitis.

Ahmad Z, Brooks R, Kang SN, Weaver H, Nunney I, Tytherleigh-Strong G, Rushton N.

Source

Department of Orthopaedics, Norfolk and Norwich University Hospital, Norwich, England.
Electronic address: zafar.ahmad@doctors.org.uk.

Abstract

PURPOSE:

To evaluate the evidence for application of platelet-rich plasma (PRP) in lateral epicondylitis.

METHODS:

We carried out a systematic review of the current evidence on the effects of PRP in lateral epicondylitis on clinical outcomes. We performed a comprehensive search of the PubMed, Medline, Cochrane, CINAHL (Cumulative Index to Nursing and Allied Health Literature), and Embase databases using various combinations of the commercial names of each PRP preparation and "lateral epicondylitis" (with its associated terms), looking specifically at human studies. Data validity was assessed and collected on clinical outcome.

RESULTS:

Nine studies met the inclusion criteria, of which 5 were randomized controlled trials. Two cohort studies showed that PRP improved clinical satisfaction scores. One case-control study showed that PRP yielded a significantly greater improvement in symptoms compared with bupivacaine. Two randomized controlled trials compared the effect of injections of PRP and blood. Only 1 of the studies noted a significant difference at the 6-week time point. Three randomized controlled trials compared corticosteroids with PRP. Two of the smaller trials, which had follow-up periods of 6 weeks and 3 months, showed no significant difference between treatment groups. The largest randomized controlled trial found that PRP had significant benefit compared with corticosteroids with regard to pain and Disabilities of the Arm, Shoulder and Hand scores at 1- and 2-year time points.

CONCLUSIONS:

This review highlights the limited but evolving evidence for the use of PRP in lateral epicondylitis; however, further research is required to understand the concentration and preparation that facilitate the best clinical outcome. Characterizing the timing of the intervention would optimize the health economics behind the decision to treat for the patient and health care provider.

LEVEL OF EVIDENCE:

Level III, systematic review of Level I to III studies.

KinesioTaping

Int J Sports Med. 2013 Nov;34(11):1003-6. doi: 10.1055/s-0033-1333747. Epub 2013 Jun 14.
The effectiveness of kinesio taping for athletes with medial elbow epicondylar tendinopathy.

Chang HY, Cheng SC, Lin CC, Chou KY, Gan SM, Wang CH.

Source

School of Physical Therapy, Chung Shan Medical University, Taichung, Taiwan.

Abstract

Kinesio taping has also been used for athletes with Medial Elbow Epicondylar Tendinopathy (MET) as an additional treatment method.

The purpose of this study was to determine the clinical effectiveness of Kinesio tape on maximal grip strength and absolute and related force sense in athletes with MET when applied to the medial forearm. 27 male athletes who voluntarily participated in this study were divided into a healthy group (n=17) and a MET group (n=10). All subjects were assessed for the maximal grip strength and grip force sense (absolute and related force sense) under 3 taping conditions: 1) without taping; 2) with placebo Kinesio taping; and 3) with Kinesio taping. No significant interaction was found between groups and taping condition in maximal grip force and related force sense error, except for absolute force sense error (p=0.04). Both groups with absolute force sense measurements had significantly decreased errors in the placebo Kinesio taping and Kinesio taping conditions. Both taping may enhance discrimination of magnitude of grip force control (absolute force sense) in both groups when applied to the forearm.

However, Kinesio taping did not change maximal grip strength in either group. The effects of Kinesio taping on other muscle functions remain to be studied.

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PMID: 23771826

Carpel Tunnel Syndrome

US evaluation of CTS

Ann Rheum Dis. 2013 Dec 1;72(12):1934-9. doi: 10.1136/annrheumdis-2012-202328. Epub 2012 Dec 4.

Ultrasound for diagnosis of carpal tunnel syndrome: comparison of different methods to determine median nerve volume and value of power Doppler sonography.

Dejaco C, Stradner M, Zauner D, Seel W, Simmet NE, Klammer A, Heitzer P, Brickmann K, Gretler J, Fürst-Moazedzi FC, Thonhofer R, Husic R, Hermann J, Graninger WB, Quasthoff S.

Source

Department of Rheumatology and Immunology, Medical University Graz, , Graz, Austria.

Abstract

OBJECTIVE:

To compare ultrasound measurement of median nerve cross-sectional area (CSA) at different anatomical landmarks and to assess the value of power Doppler signals within the median nerve for diagnosis of carpal tunnel syndrome (CTS).

METHODS:

A prospective study of 135 consecutive patients with suspected CTS undergoing two visits within 3 months. A final diagnosis of CTS was established by clinical and electrophysiological findings. CSA was sonographically measured at five different levels at forearm and wrist; and CSA wrist to forearm ratios or differences were calculated. Intraneural power Doppler signals were semiquantitatively graded. Diagnostic values of different ultrasound methods were compared by receiver operating characteristic curves using SPSS.

RESULTS:

CTS was diagnosed in 111 (45.5%) wrists; 84 (34.4%) had no CTS and 49 (20.1%) were possible CTS cases. Diagnostic values were comparable for all sonographic methods to determine median nerve swelling, with area under the curves ranging from 0.75 to 0.85. Thresholds of 9.8 and 13.8 mm² for the largest CSA of the median nerve yielded a sensitivity of 92% and a specificity of 92%. A power Doppler score of 2 or greater had a specificity of 90% for the diagnosis of CTS. Sonographic median nerve volumetry revealed a good reliability with an intraclass correlation coefficient of 0.90 (95% CI 0.79 to 0.95).

CONCLUSIONS:

Sonographic assessment of median nerve swelling and vascularity allows for a reliable diagnosis of CTS. Determination of CSA at its maximal shape offers an easily reproducible tool for CTS classification in daily clinical practice.

KEYWORDS: Orthopedic Surgery, Qualitative research, Ultrasonography PMID: 23212030

HIP

Biomarkers/degeneration/Athletes

Am J Sports Med. 2013 Aug 19.

Elevation in Circulating Biomarkers of Cartilage Damage and Inflammation in Athletes With Femoroacetabular Impingement.

Bedi A, Lynch EB, Sibilsky Enselman ER, Davis ME, Dewolf PD, Makki TA, Kelly BT, Larson CM, Henning PT, Mendias CL.

Source

Department of Orthopaedic Surgery, University of Michigan Medical School, Ann Arbor, Michigan.

Abstract

BACKGROUND: Femoroacetabular impingement (FAI) is one of the most common causes of early cartilage and labral damage in the nondysplastic hip. Biomarkers of cartilage degradation and inflammation are associated with osteoarthritis. It was not known whether patients with FAI have elevated levels of biomarkers of cartilage degradation and inflammation.

HYPOTHESIS: Compared with athletes without FAI, athletes with FAI would have elevated levels of the inflammatory C-reactive protein (CRP) and cartilage oligomeric matrix protein (COMP), a cartilage degradation marker.

STUDY DESIGN: Controlled laboratory study.

METHODS: Male athletes with radiographically confirmed FAI (n = 10) were compared with male athletes with radiographically normal hips with no evidence of FAI or hip dysplasia (n = 19). Plasma levels of COMP and CRP were measured, and subjects also completed the Short Form-12 (SF-12) and Hip Disability and Osteoarthritis Outcome Score (HOOS) surveys.

RESULTS: Compared with controls, athletes with FAI had a 24% increase in COMP levels and a 276% increase in CRP levels as well as a 22% decrease in SF-12 physical component scores and decreases in all of the HOOS subscale scores.

CONCLUSION: Athletes with FAI demonstrate early biochemical signs of increased cartilage turnover and systemic inflammation. **CLINICAL**

RELEVANCE: Chondral injury secondary to the repetitive microtrauma of FAI might be reliably detected with biomarkers. In the future, these biomarkers might be used as screening tools to identify at-risk patients and assess the efficacy of therapeutic interventions such as hip preservation surgery in altering the natural history and progression to osteoarthritis.

KEYWORDS: C-reactive protein, HOOS, SF-12, cartilage oligomeric matrix protein, osteoarthritis PMID: 23959964

Hip abduction

Arch Dis Child. 2013 Nov;98(11):862-6. doi: 10.1136/archdischild-2012-303121. Epub 2013 Aug 14.

Is limitation of hip abduction a useful clinical sign in the diagnosis of developmental dysplasia of the hip?

Choudry Q, Goyal R, Paton RW.

Source

Department of Orthopaedics, Royal Blackburn Hospital, East Lancashire Hospitals NHS Trust, , Blackburn, Lancashire, UK.

Abstract

AIM:

The relationship between the presence and severity of sonographically diagnosed developmental dysplasia of the hip (DDH) and the clinical abnormality of limitation of hip abduction (LHA) was investigated.

METHODS:

A prospective, longitudinal, selective 'at risk' and neonatal instability hip ultrasound programme between 1 January 1996 and 31 December 2005. 2876 neonates/infants were initially screened for DDH by clinical examination and by hip ultrasound imaging. Pathological sonographically evaluated DDH was considered to be Graf Type III, IV and irreducible hip dislocation. Inclusion criteria were cases of unilateral or bilateral limitation of hip abduction hip. Exclusion criteria: syndromal, neuromuscular and skeletal dysplasia cases.

RESULTS:

492 children presented with LHA (55 unilateral LHA). The mean age of neonates/infants with either unilateral or bilateral LHA was significantly higher than those without ($p < 0.001$). In the sonographic diagnosis of Graf Type III and IV dysplasias, unilateral LHA had a PPV of 40% compared with only 0.3% for bilateral LHA. The sensitivity of unilateral LHA increased to 78.3% and a PPV 54.7% after the age of 8 weeks for Graf Types III, IV and irreducible hip dislocation.

CONCLUSIONS:

This study identifies a time-dependent association with unilateral LHA in the diagnosis of 'pathological' DDH after the age of 8 weeks. The presence of bilateral LHA in the young infant may be a normal variant and is an inaccurate clinical sign in the diagnosis of pathological DDH. LHA should be actively sought after 8 weeks of age and if present should be followed by a formal ultrasound or radiographic examination to confirm whether or not the hip is developing in a satisfactory manner.

KEYWORDS: General Paediatrics, Musculo-Skeletal, Orthopaedics, Paediatric Practice PMID: 23946334

Hip fx/sunlight

Scand J Public Health. 2013 Nov 21.

A comparison of hip fracture incidence rates among elderly in Sweden by latitude and sunlight exposure.

Nilson F, Moniruzzaman S, Andersson R.

Source

Division of Risk Management, Department of Environmental and Life Sciences, Karlstad University, Karlstad, Sweden.

Abstract

BACKGROUND:

Research has shown that hip fracture risk increases with latitude; hypothetically due to reduced sunlight exposure and its effect on bone quality.

Sweden, with large differences in latitude and UV radiation, is ideal to study in order to analyse the association between latitude and UV radiation on age- and sex-specific hip fracture rates among elderly. Method: Aggregated (2006-2008) age- and sex-specific hip fracture data was obtained for each Swedish municipality as well as the municipality's latitudinal coordinates and aggregated (2006-2008) UV radiation levels. Pearson correlations were calculated between hip fracture incidence rates, latitude and UV radiation. Independent t tests were calculated on tertile-categorized latitudinal data in order to investigate the difference in hip fracture risk between these categories. Results: Statistically significant correlations were seen in all groups between hip fracture incidence rates and latitude as well as UV radiation. The independent t tests showed that this correlation was mainly due to high incidence rates in high latitude municipalities.

Conclusions: Statistically significant correlations are seen between hip fracture incidence rates and latitude as well as UV radiation in Sweden and the northern parts of Sweden have an increased risk of hip fractures compared to the middle and southern parts. To our knowledge this is the first study using a national discharge register that shows this relationship and provides a starting point for further research to investigate why populations in northern Sweden have a higher risk of hip fractures compared to other Swedish regions.

KEYWORDS:

Elderly, UV radiation, epidemiology, falls, hip fractures, latitude

PMID: 24265166

Sports hernia

Hernia. 2013 Oct 12.

Sports hernia or groin disruption injury? Chronic athletic groin pain: a retrospective study of 100 patients with long-term follow-up.

Garvey JF, Hazard H.

Source

Groin Pain Clinic, BMA House, Suite G01, 135 Macquarie St, Sydney, Australia,
jgarvey@groinpainclinic.com.au.

Abstract

INTRODUCTION AND OBJECTIVES:

Chronic groin pain (athletic pubalgia) is a common problem in sports such as football, hockey, cricket, baseball and athletics. Multiple co-existing pathologies are often present which commonly include posterior inguinal canal wall deficiency, conjoint tendinopathy, adductor tendinopathy, osteitis pubis and peripheral nerve entrapment. The mechanism of injury remains unclear but sports that involve either pivoting on a single leg (e.g. kicking) or a sudden change in direction at speed are most often associated with athletic pubalgia. These manoeuvres place large forces across the bony pelvis and its soft tissue supports, accounting for the usual clinical presentation of multiple symptomatic abnormalities forming one pattern of injury.

RESULTS:

The diagnoses encountered in this series of 100 patients included rectus abdominis muscle atrophy/asymmetry (22), conjoint tendinopathy (16), sports (occult, incipient) hernia (16), groin disruption injury (16), classical hernia (11) traumatic osteitis pubis (5), and avulsion fracture of the pubic bone (4). Surgical management was generally undertaken only after failed conservative therapy of 3-6 months, but some professionals who have physiotherapy during the football season went directly to surgery at the end of the football season. A variety of operations were performed including groin reconstruction (15), open hernia repair with or without mesh (11), sports hernia repair (Gilmore) (7) laparoscopic repair (3), conjoint tendon repair (3) and adductor tenotomy (3). Sixty-six patients were available for follow at an average of 13 years after initial consultation and the combined success rate for both conservative treatment and surgery was 94 %.

CONCLUSION:

The authors believe that athletic pubalgia or sports hernia should be considered as a 'groin disruption injury', the result of functional instability of the pelvis. The surgical approach is aimed at strengthening the anterior pelvic soft tissues that support and stabilise the symphysis pubis.

PMID: 24121840

Sciatic nerve tests

Knee Surgery, Sports Traumatology, Arthroscopy
November 2013

Diagnostic accuracy of clinical tests for sciatic nerve entrapment in the gluteal region

Hal D. Martin, Benjamin R. Kivlan, Ian J. Palmer, RobRoy L. Martin

Abstract

Purpose

The purpose of this study was to determine the diagnostic accuracy of the straight leg raise (SLR), active piriformis, and seated piriformis stretch tests in identifying individuals with sciatic nerve entrapment.

Methods

Thirty-three individuals (female = 25 and male = 8) with a mean age of 43 years (range 15–64; SD \pm 11 years) were included in the study. Twenty-three subjects had endoscopic findings of sciatic nerve entrapment. Ten subjects without entrapment during endoscopic assessment were used as a control group. The results of the SLR, active piriformis, and seated piriformis stretch tests were retrospectively reviewed for each subject and compared between both groups. The accuracy of these tests for the endoscopic finding of sciatic nerve entrapment was determined by calculating the sensitivity, specificity, positive likelihood ratio, negative likelihood ratio, and diagnostic odds ratio.

Results

The SLR had sensitivity of 0.15, specificity of 0.95, positive likelihood ratio of 3.20, negative likelihood ratio of 0.90, and diagnostic odds ratio of 3.59. The active piriformis test had sensitivity of 0.78, specificity of 0.80, positive likelihood ratio of 3.90, negative likelihood ratio of 0.27, and diagnostic odds ratio of 14.40. The seated piriformis stretch test had sensitivity of 0.52, specificity of 0.90, positive likelihood ratio of 5.22, negative likelihood ratio of 0.53, and diagnostic odds ratio of 9.82. The most accurate findings were obtained when the results of the active piriformis test and seated piriformis stretch test were combined, with sensitivity of 0.91, specificity of 0.80, positive likelihood ratio of 4.57, negative likelihood ratio of 0.11, and diagnostic odds ratio of 42.00.

Conclusions

The active piriformis and seated piriformis stretch tests can be used to help identify patients with and without sciatic nerve entrapment in the deep gluteal region.

Replacements

Comorbidity

Ann Rheum Dis. 2013 Dec 1;72(12):1975-82. doi: 10.1136/annrheumdis-2012-202064. Epub 2012 Dec 19.

Comorbid diseases as predictors of survival of primary total hip and knee replacements: a nationwide register-based study of 96 754 operations on patients with primary osteoarthritis.

Jämsen E, Peltola M, Eskelinen A, Lehto MU.

Source

Coxa, Hospital for Joint Replacement, , Tampere, Finland.

Abstract

OBJECTIVES:

To examine how comorbid diseases (cardiovascular diseases, hypertension, diabetes, cancer, pulmonary diseases, depression, psychotic disorders and neurodegenerative diseases) affect survival of hip and knee replacements.

METHODS:

Data for this register-based study were collected by combining data from five nationwide health registers. 43 747 primary total hip and 53 007 primary total knee replacements performed for osteoarthritis were included. The independent effects of comorbid diseases on prosthesis survival were analysed using multivariate Cox regression analysis.

RESULTS:

Occurrence of one or more of the diseases analysed was associated with poorer survival of hip (HR for revision 1.16, 95% CI 1.08 to 1.23) and knee replacements (1.23, 1.16 to 1.30). Cardiovascular diseases and psychotic disorders were associated with increased risk of revision after both hip (1.19, 1.06 to 1.34 and 1.41, 1.04 to 1.91, respectively) and knee replacement (1.29, 1.14 to 1.45 and 1.41, 1.07 to 1.86, respectively). Hypertension and diabetes were associated with early revision (0-5 years after primary operation) after knee replacements (1.14, 1.01 to 1.29 and 1.27, 1.08 to 1.50, respectively). Cancer was associated with poorer survival of hip replacements (1.27, 1.05 to 1.54) and late revision (>5 years) of knee replacements (2.21, 1.31 to 3.74). Depression affected the risk of early revision after hip replacement (1.50, 1.02 to 2.21). Neurodegenerative and pulmonary diseases did not affect prosthesis survival.

CONCLUSIONS:

Comorbid diseases may play an important role in predicting survival of primary hip and knee replacements. The mechanisms underlying these findings and their effect on cost-effectiveness of joint replacements, merit further research.

KEYWORDS: Orthopedic Surgery, Osteoarthritis, Outcomes research PMID: 23253916

Cardiac problems with

BMJ. 2013 Oct 30;347:f6187. doi: 10.1136/bmj.f6187.

The relation between total joint arthroplasty and risk for serious cardiovascular events in patients with moderate-severe osteoarthritis: propensity score matched landmark analysis.

Ravi B, Croxford R, Austin PC, Lipscombe L, Bierman AS, Harvey PJ, Hawker GA.

Source

Division of Orthopaedic Surgery, Department of Surgery, University of Toronto, Canada.

Abstract

OBJECTIVE:

To examine whether total joint arthroplasty of the hip and knee reduces the risk for serious cardiovascular events in patients with moderate-severe osteoarthritis.

DESIGN:

Propensity score matched landmark analysis.

SETTING:

Ontario, Canada.

PARTICIPANTS:

2200 adults with hip or knee osteoarthritis aged 55 or more at recruitment (1996-98) and followed prospectively until death or 2011.

MAIN OUTCOME MEASURE:

Rates of serious cardiovascular events for those who received a primary total joint arthroplasty compared with those did not within an exposure period of three years after baseline assessment.

RESULTS:

The propensity score matched cohort consisted of 153 matched pairs of participants with moderate-severe arthritis. Over a median follow-up period of seven years after the landmark date (start of the study), matched participants who underwent a total joint arthroplasty during the exposure period were significantly less likely than those who did not to experience a cardiovascular event (hazards ratio 0.56, 95% confidence interval 0.43 to 0.74, $P < 0.001$). Within seven years of the exposure period the absolute risk reduction was 12.4% (95% confidence interval 1.7% to 23.1%) and number needed to treat was 8 (95% confidence interval 4 to 57 patients).

CONCLUSIONS:

Using a propensity matched landmark analysis in a population cohort with advanced hip or knee osteoarthritis, this study found a cardioprotective benefit of primary elective total joint arthroplasty.

OA

Exercise delays THR

Ann Rheum Dis. 2013 Nov 19. doi: 10.1136/annrheumdis-2013-203628.

Exercise therapy may postpone total hip replacement surgery in patients with hip osteoarthritis: a long-term follow-up of a randomised trial.

Svege I, Nordsletten L, Fernandes L, Risberg MA.

Source

Department of Orthopaedics, Norwegian Research Center for Active Rehabilitation (NAR), Oslo University Hospital, Oslo, Norway.

Abstract

BACKGROUND:

Exercise treatment is recommended for all patients with hip osteoarthritis (OA), but its effect on the long-term need for total hip replacement (THR) is unknown.

METHODS:

We conducted a long-term follow-up of a randomised trial investigating the efficacy of exercise therapy and patient education versus patient education only on the 6-year cumulative survival of the native hip to THR in 109 patients with symptomatic and radiographic hip OA. Results regarding the primary outcome measure of the trial, self-reported pain at 16 months follow-up, have been reported previously.

RESULTS:

There were no group differences at baseline. The response rate at follow-up was 94%. 22 patients in the group receiving both exercise therapy and patient education and 31 patients in the group receiving patient education only underwent THR during the follow-up period, giving a 6-year cumulative survival of the native hip of 41% and 25%, respectively ($p=0.034$). The HR for survival of the native hip was 0.56 (CI 0.32 to 0.96) for the exercise therapy group compared with the control group. Median time to THR was 5.4 and 3.5 years, respectively. The exercise therapy group had better self-reported hip function prior to THR or end of study, but no significant differences were found for pain and stiffness.

CONCLUSIONS:

Our findings in this explanatory study suggest that exercise therapy in addition to patient education can reduce the need for THR by 44% in patients with hip OA. ClinicalTrials.gov number NCT00319423 (original project protocol) and NCT01338532 (additional protocol for long-term follow-up).

KEYWORDS: Orthopedic Surgery, Osteoarthritis, Physical therapy, Rehabilitation PMID: 24255546

Progression of OA

Ann Rheum Dis. 2013 Nov 15. doi: 10.1136/annrheumdis-2013-203829.

Worsening of pain and function over 5 years in individuals with 'early' OA is related to structural damage: data from the Osteoarthritis Initiative and CHECK (Cohort Hip & Cohort Knee) study.

Wesseling J, Bierma-Zeinstra SM, Kloppenburg M, Meijer R, Bijlsma JW.

Source

Department of Rheumatology & Clinical Immunology, University Medical Center Utrecht, Utrecht, The Netherlands.

Abstract

OBJECTIVE:

To analyse the relation of joint damage on evolution of pain and physical functioning in two different cohorts of early phase of osteoarthritis (OA): Osteoarthritis Initiative (OAI) and Cohort Hip & Cohort Knee study (CHECK).

METHODS:

Longitudinal data of 4-5 years follow-up (= medium term) of CHECK study and OAI were used. The Western Ontario and McMaster Universities of Osteoarthritis Index (WOMAC) was used to measure pain and physical functioning. For comparison with CHECK a subgroup of the OAI Incidence cohort was selected, Generalised estimating equations were used and all models were adjusted for gender, Body Mass Index, age, amount of working hours, racial background and hip pain at baseline. Finally, an interaction term was added to assess a possible differential effect of radiological progression on evolution of pain and function in the two cohorts.

RESULTS:

At baseline, CHECK had less radiographic OA (K&L ≥ 2) compared with the OAI Incidence subgroup, but at follow-up CHECK had more radiographic change (51% vs 15% ≥ 1 K&L point increase; $p < 0.001$). Over 4 years of follow-up, evolution of pain and physical functioning remained fairly stable in both cohorts, however, at different levels, OAI participants had less pain and less problems with physical functioning compared to CHECK participants. Both cohorts showed the same negative effect of rapid radiological change (K&L change of 2 points) on pain and physical function.

CONCLUSIONS:

In participants with 'early symptomatic OA' rapid radiological change (change of ≥ 2 grades of K&L in 4 or 5 years) is related to worsening of pain and function.

KEYWORDS: Epidemiology, Knee Osteoarthritis, Osteoarthritis PMID: 24243926

KNEE

Alignment

Journal of Arthroplasty

Evaluation of the 3-Dimensional, Weight-bearing Orientation of the Normal Adult Knee

[Denis Nam](#), MD, [Ritesh R. Shah](#), MD, [Ryan M. Nunley](#), MD, [Robert L. Barrack](#), MD

Abstract:

The purpose of this study was to use 3-dimensional, weight-bearing images corrected for rotation to establish normative data of limb alignment and joint line orientation in asymptomatic, adult knees.

One hundred adults (200 lower extremities) were recruited to receive weight-bearing, simultaneous biplanar imaging of both lower extremities. Multiple radiographic parameters were measured from 3D images, corrected for limb rotation. 70.0% of knees were in neutral, 19.5% in varus, and 10.5% in valgus overall alignment. Only 31 % of knees possessed both a neutral mechanical axis and the absence of joint line obliquity.

There was substantial agreement between the 2D and 3D images for overall mechanical alignment ($\kappa=0.77$), but only a moderate agreement for joint line obliquity ($\kappa=0.58$). A substantial portion of asymptomatic adults possess either a varus or valgus mechanical alignment and joint line obliquity,

Medial Tibial Pain

Br J Sports Med. 2013 Oct 7. doi: 10.1136/bjsports-2012-092126. [Epub ahead of print]

The role of proximal dynamic joint stability in the development of exertional medial tibial pain: a prospective study.

Verrelst R, De Clercq D, Vanrenterghem J, Willems T, Palmans T, Witvrouw E.

Source

Rehabilitation Sciences and Physiotherapy Ghent, Ghent University, Ghent, Belgium.

Abstract

OBJECTIVE:

To prospectively determine risk factors contributing to the development of exertional medial tibial pain (EMTP).

METHODS:

Data were prospectively collected on healthy female students in physical education, who were freshmen in 2010-2011 and 2011-2012. Eighty-six female students aged 19.38 ± 0.85 years, were tested at the beginning of their first academic year. Kinematic parameters in the frontal and transverse plane were measured during a single-leg drop jump (SLDJ). For further analysis, the SLDJ task was divided in two phases: touchdown until maximal knee flexion (MKF) and then MKF until take-off, representing landing and push-off phase, respectively. The injury follow-up of the students was assessed using a weekly online questionnaire and a 3-monthly retrospective control questionnaire. EMTP was diagnosed by an experienced medical doctor. Cox regression analysis was used to identify the potential risk factors for the development of EMTP.

RESULTS:

During injury follow-up (1-2 years), 22 participants were diagnosed with EMTP. The results of this study identified that increased range of motion (ROM) in the transverse plane of hip and thorax during landing ($p=0.010$ and 0.026 , respectively) and during push off ($p=0.019$ and 0.045 , respectively) are predictive parameters for the development of EMTP in women.

CONCLUSIONS:

Increased ROM values of hip and thorax in the transverse plane, which can be interpreted as impaired ability to maintain dynamic joint stability resulting in increased accessory movements, are significant contributors to the development of EMTP in women.

KEYWORDS: Core stability/pelvis/hips, ribs, Lower extremity injuries, Sporting injuries, Women in sport PMID:24100288[PubMed - as supplied by publisher]

Knee/ACL

Tests for mobility

Am J Sports Med. 2013 Aug 15

Biomechanical Characteristics of 3 Pivot-Shift Maneuvers for the Anterior Cruciate Ligament-Deficient Knee: In Vivo Evaluation With an Electromagnetic Sensor System.

Kitamura N, Yokota M, Kondo E, Miyatake S, Nagamune K, Yasuda K.

Source

Department of Sports Medicine and Joint Surgery, Graduate School of Medicine, Hokkaido University, Sapporo, Japan.

Abstract

BACKGROUND: A disadvantage of pivot-shift maneuvers is that the examiner has to subjectively evaluate the degree of pivot shift observed. It is unknown whether the various maneuvers are biomechanically identical.

PURPOSE: To compare biomechanical features of 3 clinical maneuvers for the anterior cruciate ligament (ACL)-deficient knee: the pivot-shift test, the jerk test, and the N-test. **STUDY**

DESIGN: Controlled laboratory study. **METHODS:** A total of 28 patients with an isolated ACL injury were examined by use of 3 pivot-shift maneuvers (pivot-shift test, jerk test, and N-test). An electromagnetic sensor system was used to evaluate the 3-dimensional knee kinematics of each patient's injured and uninjured knees during each maneuver. Peak coupled anterior tibial translation (pCAT) and maximal acceleration of posterior translation (APT) were measured relative to results during a flexion-extension motion in each test.

RESULTS: The pCAT of the pivot-shift test was significantly greater than that of both the jerk test and the N-test ($P = .0020$ and $P < .0001$, respectively); there was no statistical difference in pCAT between the jerk test and the N-test. The APT of the N-test was significantly greater than that of both the pivot-shift test and the jerk test ($P < .0001$), while there was no statistical difference between the pivot-shift and the jerk tests. There was no correlation between pCAT and APT in each test.

CONCLUSION: The pivot-shift test, jerk test, and N-test have different biomechanical characteristics to induce the pivot-shift phenomenon in the ACL-deficient knee. The pivot-shift test produced the largest side-to-side difference in pCAT, whereas the N-test provoked the largest side-to-side difference in APT.

CLINICAL RELEVANCE: The biomechanical differences in pivot-shift maneuvers are caused by technical differences, and clinicians should understand these biomechanical differences while practicing the maneuvers. The electromagnetic sensor system is clinically useful for quantifying the pivot-shift phenomenon.

KEYWORDS: anterior cruciate ligament injury, electromagnetic device, knee biomechanics, pivot-shift test, rotatory instability PMID: 23950109

Trunk motions action on ACL

Am J Sports Med. 2013 Jul 24.

Trunk and Hip Biomechanics Influence Anterior Cruciate Loading Mechanisms in Physically Active Participants.

Frank B, Bell DR, Norcross MF, Blackburn JT, Goerger BM, Padua DA.

Source

Department of Exercise and Sport Science, The University of North Carolina at Chapel Hill, Chapel Hill, North Carolina.

Abstract

BACKGROUND: Excessive trunk motion and deficits in neuromuscular control (NMC) of the lumbopelvic hip complex are risk factors for anterior cruciate ligament (ACL) injury. However, the relationship between trunk motion, NMC of the lumbopelvic hip complex, and triplanar knee loads during a sidestep cutting task has not been examined.

PURPOSE: To determine if there is an association between multiplanar trunk motion, NMC of the lumbopelvic hip complex, and triplanar knee loads with ACL injury during a sidestep cutting task.

STUDY DESIGN: Descriptive laboratory study.

METHODS: The hip and knee biomechanics and trunk motion of 30 participants (15 male, 15 female) were analyzed during a sidestep cutting task using an optoelectric camera system interfaced to a force plate. Trunk and lower extremity biomechanics were calculated from the kinematic and ground-reaction force data during the first 50% of the stance time during the cutting task. Pearson product moment correlation coefficients were calculated between trunk and lower extremity biomechanics. Multiple linear regression analyses were carried out to determine the amount of variance in triplanar knee loading explained by trunk motion and hip moments.

RESULTS: A greater internal knee varus moment (mean, 0.11 ± 0.12 N·m/kg*m) was associated with less transverse-plane trunk rotation away from the stance limb (mean, $20.25^\circ \pm 4.42^\circ$; $r = -0.46$, $P = .011$) and a greater internal hip adduction moment (mean, 0.33 ± 0.25 N·m/kg*m; $r = 0.83$, $P < .05$). A greater internal knee external rotation moment (mean, 0.11 ± 0.08 N·m/kg*m) was associated with a greater forward trunk flexion (mean, $7.62^\circ \pm 5.28^\circ$; $r = 0.42$, $P = .020$) and a greater hip internal rotation moment (mean, 0.15 ± 0.16 N·m/kg*m; $r = 0.59$, $P = .001$). Trunk rotation and hip adduction moment explained 81% ($P < .05$) of the variance in knee varus moment. Trunk flexion and hip internal rotation moment explained 48% ($P < .05$) of the variance in knee external rotation moment.

CONCLUSION: Limited trunk rotation displacement toward the new direction of travel and hip adduction moment are associated with an increased internal knee varus moment, while a combined increase in trunk flexion displacement and hip internal rotation moment is associated with a higher internal knee external rotation moment.

CLINICAL RELEVANCE: Prevention interventions for ACL injury should encourage trunk rotation toward the new direction of travel and limit excessive trunk flexion while adjusting frontal- and transverse-plane hip NMC.

KEYWORDS: anterior cruciate ligament, cutting task, hip biomechanics, joint, knee biomechanics, trunk motion PMID: 23884306

Vascular Channeling

Ann Rheum Dis. 2013 Oct 4. doi: 10.1136/annrheumdis-2013-203972.

Role of vascular channels as a novel mechanism for subchondral bone damage at cruciate ligament entheses in osteoarthritis and inflammatory arthritis.

Binks DA, Gravallesse EM, Bergin D, Hodgson RJ, Tan AL, Matzelle MM, McGonagle D, Radjenovic A.

Source

Leeds Institute of Rheumatic and Musculoskeletal Medicine, University of Leeds, Leeds, UK.

Abstract

OBJECTIVES:

The purpose of this work was to test whether normal peri-enthesal vascular anatomy at anterior and posterior cruciate ligaments (ACL and PCL) was associated with distribution of peri-enthesal bone erosion/bone marrow lesions (BMLs) in inflammatory arthritis (IA) and osteoarthritis (OA).

METHODS:

Normal microanatomy was defined histologically in mice and by 3 T MRI and histology in 21 cadaveric knees. MRI of 89 patients from the Osteoarthritis Initiative and 27 patients with IA was evaluated for BMLs at ACL and PCL entheses. Antigen-induced arthritis (AIA) in mice was evaluated to ascertain whether putative peri-enthesal vascular regions influenced osteitis and bone erosion.

RESULTS:

Vascular channels penetrating cortical bone were identified in knees of non-arthritic mice adjacent to the cruciate ligaments. On MRI of normal cadavers, vascular channels adjacent to the ACL (64% of cases) and PCL (71%) entheses were observed. Histology of 10 macroscopically normal cadaveric specimens confirmed the location of vascular channels and associated subclinical changes including subchondral bone damage (80% of cases) and micro-cyst formation (50%). In the AIA model, vascular channels clearly provided a site for inflammatory tissue entry and osteoclast activation. MRI showed BMLs in the same topographic locations in both patients with early OA (41% ACL, 59% PCL) and IA (44%, 33%).

CONCLUSION:

The findings show that normal ACL and PCL entheses have immediately adjacent vascular channels which are common sites of subtle bone marrow pathology in non-arthritic joints. These channels appear to be key determinants in bone damage in inflammatory and degenerative arthritis.

KEYWORDS:inflammation, Knee Osteoarthritis, Magnetic Resonance Imaging, Osteoarthritis, Rheumatoid Arthritis

ACL Rehab

Eur J Orthop Surg Traumatol. 2013 Dec;23(8):939-43. doi: 10.1007/s00590-012-1106-9. Epub 2012 Nov 16.

Anterior cruciate ligament (ACL) autograft reconstruction with hamstring tendons: clinical research among three rehabilitation procedures.

Zhu W, Wang D, Han Y, Zhang N, Zeng Y.

Source

Department of Sports Medical, Shenzhen Second People Hospital, Sungang West Road, Futian District, Shenzhen, 518000, People's Republic of China.

Abstract

OBJECTIVE:

To compare the effects of the three rehabilitation procedures following anterior cruciate ligament (ACL) autograft reconstruction with hamstring tendons.

DESIGN:

An observational and retrospective case-controlled series.

SETTING:

The Department of Sports Medicine, Shenzhen Second People Hospital, Shenzhen, PR China.

PATIENTS OR PARTICIPANTS:

Forty-five patients who were made to undergo ACL reconstructions by using quadrupled semitendinosus and gracilis tendons were divided into three groups: accelerated rehabilitation procedures group, aggressive rehabilitation procedures group, and self-made rehabilitation procedures group.

MAIN OUTCOME MEASURES:

The knee range of motion, thigh perimeter, IKDC score, and bone tunnel diameter in 3D-CT films were evaluated 3 and 6 months and 1 year later.

RESULTS:

The knee range of motion and thigh perimeter of group A were higher than those of group B and group C at 3, 6, and 12 months. IKDC scores of group C were better than those of groups A and B. The bone tunnel widening with group B was larger than that with groups A and C, and the differences were statistically significant ($P < 0.05$).

CONCLUSION:

Early rehabilitation is beneficial for restoration of knee function after ACL reconstruction. Moderate procedure is better than accelerated procedure.

PMID: 23412233

High school athlete/ACL

A Multisport Epidemiologic Comparison of Anterior Cruciate Ligament Injuries in High School Athletics

Allan M. Joseph, Christy L. Collins, Natalie M. Henke, Ellen E. Yard, Sarah K. Fields, and R. Dawn Comstock

Journal of Athletic Training 0 0:0

Background: The knee joint is the second most commonly injured body site after the ankle and the leading cause of sport-related surgeries. Knee injuries, especially of the anterior cruciate ligament (ACL), are among the most economically costly sport injuries, frequently requiring expensive surgery and rehabilitation.

Objective: To investigate the epidemiology of ACL injuries among high school athletes by sport and sex.

Design: Descriptive epidemiology study.

Main Outcome Measure(s): Using an Internet-based data-collection tool, Reporting Information Online (RIO), certified athletic trainers from 100 nationally representative US high schools reported athlete-exposure and injury data for athletes from 9 sports during the 2007/08–2011/12 academic years. The outcome of interest in this study was ACL injuries.

Results: During the study period, 617 ACL injuries were reported during 9452180 athlete exposures (AEs), for an injury rate of 6.5 per 100000 AEs. Nationally, in the 9 sports studied, an estimated 215628 ACL injuries occurred during the study period. The injury rate was higher in competition (17.6) than practice (2.4; rate ratio [RR] = 7.3, 95% confidence interval [CI]= 6.08,8.68). Girls' soccer had the highest injury rate (12.2) followed by boys' football (11.1), with boys' basketball (2.3) and boys' baseball (0.7) having the lowest rates. In sex-comparable sports, girls had a higher rate (8.9) than boys (2.6; RR = 3.4, 95% CI = 2.64,4.47). Overall, 76.6% of ACL injuries resulted in surgery. The most common mechanisms of injury were player-to-player contact (42.8%) and no contact (37.9%).

Conclusions: Anterior cruciate ligament injury rates vary by sport, sex, and type of exposure. Recognizing such differences is important when evaluating the effectiveness of evidence-based, targeted prevention efforts. **Key Words:** [sports](#), [surveillance](#), [knee](#)

Accuracy of evaluation

Injury. 2013 Dec;44(12):1862-5. doi: 10.1016/j.injury.2013.07.024. Epub 2013 Aug 7.

Anterior cruciate ligament rupture: Delay to diagnosis.

Perera NS, Joel J, Bunola JA.

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Abstract

INTRODUCTION AND AIM:

Anterior cruciate ligament (ACL) tears are common injuries. Despite the diagnosis being in essence a clinical one, this has often proved unreliable. The objective of this study was to ascertain the delay to diagnosis of ACL injury from initial presentation and subsequent delay to review by a knee specialist.

METHODS:

The study involved a retrospective review of 130 patient case notes in a consecutive series of patients undergoing primary ACL reconstruction. Details regarding mechanism of injury, dates of initial and subsequent clinic attendances and the treating health-care professional were recorded. Other information included dates of magnetic resonance imaging (MRI) scans and when a patient first saw a knee specialist. From this, delays to clinical or radiological diagnosis were calculated.

RESULTS:

There were 82 acute and 48 chronic ACL injuries. Overall, the initial treating practitioner made the diagnosis in only 25 patients, yielding a diagnostic rate of 19.2%. Diagnoses made on MRI scan accounted for 38.5% of cases, the remainder being diagnosed clinically. The mean delay to diagnosis of ACL rupture was 65 days, and only 53 patients were diagnosed within 30 days of initial presentation. A total of 15 patients had undergone arthroscopy, eight of which were diagnostic. The mean delay to consulting a soft-tissue knee surgeon was 165 days. In the acute group, the initial diagnostic rate was only 7.3% and the mean delay to diagnosis was 82 days, with 29 patients diagnosed within 30 days.

CONCLUSIONS:

Despite 78% of the patients having a typical mechanism of ACL injury, and most attending acutely via the Emergency Department (ED), diagnosis of this common injury remains tardy. There has been at best only minor improvement in the diagnostic rate and delays, certainly of acute ACL injury, since a study in 1996. The overall clinical diagnostic rate remains disconcertingly low as does the delay to consulting a soft-tissue knee specialist.

Copyright © 2013 Elsevier Ltd. All rights reserved. **KEYWORDS:** Anterior cruciate ligament, Delays, Diagnosis, Knee surgeon, Ligament injury

Should you have ACL surgery?

Knee. 2013 Oct 23. pii: S0968-0160(13)00199-3. doi: 10.1016/j.knee.2013.10.009

Is reconstruction the best management strategy for anterior cruciate ligament rupture? A systematic review and meta-analysis comparing anterior cruciate ligament reconstruction versus non-operative treatment.

Smith TO, Postle K, Penny F, McNamara I, Mann CJ.

Source University of East Anglia, Norwich, UK. Electronic address: toby.smith@uea.ac.uk.

Abstract

AIMS:

The purpose of this study was to determine the optimal clinical and cost-effective strategy for managing people following ACL rupture.

METHODS:

A systematic review of the published (AMED, CINAHL, MEDLINE, EMBASE, PubMed, psycINFO and the Cochrane Library) and unpublished literature (OpenGrey, the WHO International Clinical Trials Registry Platform, Current Controlled Trials and the UK National Research Register Archive) was conducted on April 2013. All randomised and non-randomised controlled trials evaluating clinical or health economic outcomes of isolated ligament reconstruction versus non-surgical management following ACL rupture were included. Methodological quality was assessed using the PEDro appraisal tool. When appropriate, meta-analysis was conducted to pool data.

RESULTS:

From a total of 943 citations, sixteen studies met the eligibility criteria. These included 1397 participants, 825 who received ACL reconstruction versus 592 who were managed non-surgically. The methodological quality of the literature was poor. The findings indicated that whilst reconstructed ACL offers significantly greater objective tibiofemoral stability ($p < 0.001$), there appears limited evidence to suggest a superiority between reconstruction versus non-surgical management in functional outcomes. There was a small difference between the management strategies in respect to the development of osteoarthritis during the initial 20 years following index management strategy (Odds Ratio 1.56; $p = 0.05$).

CONCLUSIONS:

The current literature is insufficient to base clinical decision-making with respect to treatment opinions for people following ACL rupture. Whilst based on a poor evidence, the current evidence would indicate that people following ACL rupture should receive non-operative interventions before surgical intervention is considered.

© 2013. **KEYWORDS:** Anterior cruciate ligament, Clinical decision-making, Cost-effectiveness, Physiotherapy, Surgical management

Clin Orthop Relat Res. 2013 Nov 7.

Meniscal Injury After Adolescent Anterior Cruciate Ligament Injury: How Long Are Patients at Risk?

Guenther ZD, Swami V, Dhillon SS, Jaremko JL.

Source

Department of Radiology and Diagnostic Imaging, University of Alberta, 2A2.42 Walter Mackenzie Health Sciences Centre, Edmonton, AB, T6G 2B7, Canada.

Abstract

BACKGROUND:

Delay of as much as 5 months between ACL injury and surgery is known to be associated with increased risk of a medial meniscal tear, but the risk of additional meniscal tear progression with a longer delay to surgery is unclear.

QUESTIONS/PURPOSES:

We determined the (1) times of injury, MRI, and surgery in adolescents with ACL tears, and whether (2) timing of surgery, or (3) initial integrity of the meniscus seen on MR images predicted development of meniscal tears.

METHODS:

We reviewed 112 adolescents who were 15 ± 1 years old (mean \pm SD) (range, 11-16 years) with a torn ACL. These patients underwent surgical repair from 2005 to 2011 in a Canadian city. We compared dates of injury, MRI, and surgery. A pediatric and musculoskeletal fellowship-trained radiologist reread the MR images, and meniscal injuries were graded according to severity. This was compared with surgical findings described in the operative report.

RESULTS:

Time after injury to MRI and surgery averaged 77 days (range, 1-377 days) and 342 days (range, 42-1637 days), respectively. Patients with new or worsened medial meniscal tears had waited longer for surgery (445 versus 290 days; $p = 0.002$). Bucket handle medial meniscal tears were more common in patients with surgery more than 1 year after injury than others (15 of 34 versus 14 of 75; $p = 0.013$). A medial meniscal tear observed on MR images was a significant covariate for a torn meniscus at surgery (relative risk, 5.7; 95% CI, 2.8-11.6). Medial meniscal survival continued to decline sharply greater than 1 year after injury.

CONCLUSIONS:

Medial meniscal tears, especially bucket handle tears, increased steadily in frequency more than 1 year after ACL injury. Timely ACL reconstruction may be warranted to reduce the risk of further medial meniscal damage even in patients whose original injury occurred more than 1 year before.

LEVEL OF EVIDENCE: Level IV, prognostic study. See the Instructions for Authors for a complete description of levels of evidence. PMID: 24197395

Meniscus

Weight bearing

Knee Surg Sports Traumatol Arthrosc. 2013 Dec;21(12):2667-73. doi: 10.1007/s00167-012-2318-6. Epub 2012 Nov 30.

Changes in the loading of tibial articular cartilage following medial meniscectomy: a finite element analysis study.

Atmaca H, Kesemenli CC, Memişoğlu K, Ozkan A, Celik Y.

Source

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Abstract

PURPOSE:

Depending on the location and extent of the meniscectomy, loading on the tibial articular cartilage alters. The main purpose of the present study was to analyze the loading on the tibial articular cartilage following medial meniscectomy performed in various location and extent, as well as in the healthy knee, via finite element analyses on the solid models.

METHODS:

Totally, 11 finite element solid models, including the reference model, were created to investigate the effect of location (anterior, posterior, longitudinal) and extent of meniscectomy (25, 50, 75, and 100 %) on loading of tibial articular cartilage.

RESULTS:

Maximum equivalent stress of the tibial cartilage was measured 0.86 Megapascal in the reference model and increased approximately by 78 % in 25 % meniscectomy group, 177.9 % in 50 %, 473.8 % in 75 % meniscectomy group, and 752.6 % in total meniscectomy. When only the amount of meniscal tissue removed was considered ignoring the location of meniscectomy, no significant difference was found in the amount of tissue excised between 25 % meniscectomy and 50 % meniscectomy, as well as between 75 % meniscectomy and total meniscectomy.

CONCLUSION:

In all meniscectomy models, the loadings on tibial articular cartilage increased. Except total meniscectomy, the highest impact was observed in longitudinal 75 % meniscectomy. During the surgical treatment, the contributions of menisci on load absorption by increasing the tibiofemoral contact area must be considered. In fact, the increase in the rate of loading on tibial articular cartilage depends on according to type and amount of meniscectomy.

PMID: 23192762

Relaxation times

RESEARCH REPORT

Quadriceps and Hamstrings Morphology Is Related to Walking Mechanics and Knee Cartilage MRI Relaxation Times in Young Adults

Authors: Deepak Kumar, PT, PhD, OCS1, Karupppasamy Subburaj, PhD1, Wilson Lin, BS1, Dimitrios C. Karampinos, PhD2, Charles E. McCulloch, PhD3, Xiaojuan Li, PhD1, Thomas M. Link, MD1, Richard B. Souza, PT, PhD, ATC, CSCS4, Sharmila Majumdar, PhD1

. *J Orthop Sports Phys Ther* 2013;43(12):881–890. Epub 30 October 2013.

Study Design

Controlled laboratory study using a cross-sectional design.

Objectives

To analyze the relationship of quadriceps-hamstrings and medial-lateral quadriceps anatomical cross-sectional area (ACSA) ratios with knee loads during walking and articular and meniscal cartilage composition in young, healthy subjects.

Background

Muscle forces affect knee loading during walking, but it is not known if muscle morphology is associated with walking mechanics and cartilage composition in young subjects.

Methods

Forty-two knees from 27 young, healthy, active volunteers (age, 20–35 years; body mass index, <28 kg/m²) underwent 3-T magnetic resonance imaging (MRI) and 3-D motion capture. Standard MRI sequences were used for articular and meniscal cartilage T1rho and T2 relaxation times and for quadriceps and hamstrings muscle ACSA. Frontal plane kinetics during the stance phase of walking was calculated. Generalized estimating equation models were used to identify muscle variables that predicted MRI and gait parameters.

Results

Quadriceps-hamstrings and medial-lateral quadriceps ACSA ratios were positively related to frontal plane loading ($\beta = .21-.54$, $P \leq .006$), global articular cartilage relaxation times ($\beta = .22-.28$, $P \leq .041$), and the medial-lateral ratio of meniscus T1rho relaxation time ($\beta = .26-.36$, $P \leq .049$). The medial-lateral quadriceps ACSA ratio was positively related to global meniscus T1rho relaxation times ($\beta = .30$, $P = .046$).

Conclusion

Higher quadriceps-hamstrings and medial-lateral quadriceps ACSA ratios were associated with higher frontal plane loading during walking and with articular and meniscal cartilage T1rho and T2 relaxation times. These findings highlight the relationships between different knee tissues and knee mechanics in young, healthy individuals

Keyword: cartilage, gait, knee adduction moment, meniscus, quantitative MRI

Read More: <http://www.jospt.org/doi/full/10.2519/jospt.2013.4486#.UptkPqUYyes>

Am J Sports Med. 2013 Dec;41(12):2779-83. doi: 10.1177/0363546513504286. Epub 2013 Sep 26.

Meniscus tear patterns in relation to skeletal immaturity: children versus adolescents.

Shieh A, Bastrom T, Rocroft J, Edmonds EW, Pennock AT.

Source

Andrew T. Pennock, Rady Children's Hospital and Health Center, 3030 Children's Way, Suite 410, San Diego, CA 92123. apennock@rchsd.org.

Abstract

BACKGROUND:Meniscus tear patterns in the pediatric population have not been well described.

PURPOSE:To delineate the pattern of meniscus tears and the likelihood of repair at the time of surgery in both children and adolescents.

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

METHODS:

A retrospective review was performed on all patients between the ages of 10 and 19 years who underwent arthroscopic surgery for a meniscus injury at a single institution. Patients with open growth plates were classified as children, while those with closed growth plates were classified as adolescents. Demographic data were documented, including age, sex, body mass index (BMI), mechanism of injury, and time from injury to surgery. Operative reports and intraoperative photographs were used to assess the tear pattern (type, location, zone) as well as all concomitant procedures and injuries. Tears were classified as discoid, vertical, bucket-handle, radial, oblique, horizontal, fray, root detachment, or complex.

RESULTS:

Of the 293 patients reviewed, 197 (67%) had lateral meniscus tears, 65 (22%) had medial meniscus tears, and 31 (11%) had tears to both menisci. The cohort was separated into 119 (41%) children (mean age, 13.5 years) and 174 (59%) adolescents (mean age, 16.4 years). Children were more likely to have discoid meniscus tears, lower BMI, and meniscus injuries not associated with ligamentous injuries ($P < .05$). The rate of associated ligament injuries in children was 28% compared with 51% in adolescents. Overall, the most frequent tear pattern was complex (28%), followed by vertical (16%), discoid (14%), bucket-handle (14%), radial (10%), horizontal (8%), oblique (5%), fray (3%), and root detachment (2%). Complex tears were associated with boys (32% vs 20% in girls; $P < .03$) and greater mean BMI (27.4 vs 25.1 kg/m²) in those with noncomplex tears; $P < .002$, even when taking sex into account. Surgical repair was performed in 47% of all cases (56% in those treated within 3 months of injury vs 42% in those treated after 6 months; $P < .03$), and there was no difference in the repair rate between the two age groups (49% in children vs 46% in adolescents; $P > .05$).

CONCLUSION:

Adolescents and children sustain more complex meniscus injuries that are often less repairable than previously reported in the literature. Factors that are associated with greater tear complexity include male sex and obesity. Our findings also suggest that the earlier treatment of meniscus tears may increase the likelihood of repair in younger patients.

KEYWORDS:adolescents, children, knee, meniscus, meniscus tear, pediatric sports medicine, repair PMID: 24071370

Repair

Am J Sports Med. 2013 Dec;41(12):2772-8. doi: 10.1177/0363546513503444. Epub 2013 Sep 13.

Risk factors for meniscectomy after meniscal repair.

Lyman S, Hidaka C, Valdez AS, Hetsroni I, Pan TJ, Do H, Dunn WR, Marx RG.

Source

Stephen Lyman, Epidemiology and Biostatistics, Hospital for Special Surgery, 535 East 70th Street, New York, NY 10021. lymans@hss.edu.

Abstract

BACKGROUND:

Previous research suggests that a substantial percentage of meniscal repairs fail, resulting in a subsequent meniscectomy. Risk factors for failure have been investigated using small cohorts, providing ambiguous results.

PURPOSE:

To measure the frequency of and elucidate risk factors for subsequent meniscectomies after meniscal repair using a large study population from multiple surgical centers.

STUDY DESIGN:

Case-control study; Level of evidence, 3.

METHODS:

A total of 9529 patients who underwent 9609 outpatient meniscal repairs between 2003 and 2010 were identified from a statewide database of all ambulatory surgery in New York. Patients who subsequently underwent a meniscectomy were then identified. A Cox regression analysis was used to calculate the hazard ratio and 95% confidence intervals. The model included patient age, sex, comorbidities, concomitant arthroscopic procedures, laterality of the meniscus, and surgeon's yearly meniscal repair volume.

RESULTS:

The overall frequency of subsequent meniscectomies was 8.9%. Patients were at a decreased risk for subsequent meniscectomies if they underwent a concomitant anterior cruciate ligament (ACL) reconstruction ($P < .001$). Patients undergoing isolated meniscal repairs (without concomitant ACL reconstruction) were at a decreased risk if they were older ($P < .001$), had a lateral meniscal injury ($P = .002$), or were operated on by a surgeon with a higher annual meniscal repair volume (>24 cases/year; $P < .001$).

CONCLUSION:

A meniscectomy after meniscal repair is performed infrequently, supporting the notion that repairing a meniscus is a safe and effective procedure in the long term. The risk for undergoing subsequent meniscectomies is decreased in patients undergoing a concomitant ACL reconstruction, in cases of isolated meniscal repairs for patients of older age, and in patients undergoing meniscal repair by surgeons with a high case volume.

KEYWORDS: knee, knee arthroscopic surgery, meniscal repair, meniscectomy, meniscus
PMID: 24036573

ACL/Meniscus

Am J Sports Med. 2013 Dec;41(12):2766-71. doi: 10.1177/0363546513503287. Epub 2013 Sep 12.

Factors associated with meniscus repair in patients undergoing anterior cruciate ligament reconstruction.

Wyatt RW, Inacio MC, Liddle KD, Maletis GB.

Source

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Abstract

BACKGROUND: Meniscus injuries are common in patients with anterior cruciate ligament (ACL) tears. Patient demographics, surgeon characteristics, and concurrent diagnostic factors affecting the prevalence of meniscus repairs in patients undergoing ACL reconstruction (ACLR) by community-based orthopaedic surgeons have not been fully studied.

HYPOTHESIS:

Patient (age, sex, race, and body mass index [BMI]), surgeon (sports medicine fellowship training status and case volume), and injury characteristics (1 or both menisci injured, injury location, and concurrent cartilage injury) and surgical venue (case volume) are associated with a higher likelihood of meniscus repair.

STUDY DESIGN:

Cross-sectional study; Level of evidence, 3.

METHODS:

A cross-sectional study using data from a large community-based ACLR registry was performed. Patients with a meniscus injury and primary ACLR between February 2005 and June 2010 were included in the study. Meniscus repair rates by patient, surgeon, and injury characteristics were described. Associations were evaluated using generalized linear models.

RESULTS:

During the study period, 5712 primary ACLRs with a meniscus tear diagnosis were registered. There was 1 torn meniscus in 4248 (74.4%) patients, and both menisci were torn in 1464 (25.6%) patients. Medial meniscus tears were repaired in 1192 (31.2%) of 3818 cases; the remaining 2626 (68.8%) tears were not repaired, underwent alternative treatment (meniscectomy, trephination, rasped), or were left in situ. Lateral meniscus tears were repaired in 893 (26.6%) of 3358 cases; the remaining 2465 (73.4%) tears underwent alternative treatment or were left in situ. Adjusted models showed that younger patient age ($P < .001$), lower patient BMI ($P < .001$), surgeon's sports medicine fellowship training ($P < .001$), higher surgeon case volume ($P < .001$), higher surgical venue volume ($P = .019$), and medial meniscus tears ($P < .001$) were all associated with a higher likelihood of a meniscus repair.

CONCLUSION:

Younger patient age, lower patient BMI, surgeon's sports medicine fellowship training, higher surgeon case volume, and higher site volume are associated with a higher likelihood of a meniscus repair in patients undergoing primary ACLR in a large cohort from a community-based ACLR registry.

KEYWORDS: ACL, knee, meniscus, meniscus repair, sports medicine fellowship training
PMID: 24029723

Lateral meniscal tear change in alignment

Does torn discoid meniscus have effects on limb alignment and arthritic change in middle-aged patients? □

The Journal of Bone & Joint Surgery, 11/21/2013 Evidence Based Medicine

Kim SJ, et al.

The purpose of the present study was to evaluate the characteristics of the discoid lateral meniscus in patients more than forty years of age. We studied whether a torn discoid lateral meniscus that has no treatment until middle age would increase the tendency of the knee to develop a varus deformity and investigated the correlation between torn discoid lateral meniscus and osteoarthritis.

Methods:

We retrospectively reviewed the records for 164 knees in 158 patients who were more than forty years old and who underwent a knee arthroscopic procedure from 1992 to 2007. The mean age at the time of surgery was fifty-two years. Comparative evaluation of the clinical and radiographic differences between the eighty-four patients with torn discoid lateral meniscus (Group A) and the seventy-four patients with a torn normally shaped lateral meniscus (Group B) was carried out.

Results:

Preoperative standing anteroposterior radiographs, which were made for all patients, showed that varus deformity was more common in Group A than in Group B and that osteoarthritic changes in both the medial and lateral compartments were also more common in Group A. With regard to chondral injury, Outerbridge grade-3 or 4 involvement was identified in 46% of the knees in Group A and 18% of the knees in Group B.

Conclusions:

In the present study of middle-aged patients, those with a torn discoid lateral meniscus had a higher prevalence of varus knee deformity and a higher prevalence of osteoarthritis. Knees with a discoid lateral meniscus that have diminished valgus alignment should be monitored carefully with long-term follow-up because a discoid lateral meniscus may increase the risk for progression to degenerative knee osteoarthritis.

Level of Evidence:

Prognostic Level II. See Instructions for Authors for a complete description of levels of evidence.

Patella

Plica

BMC Musculoskelet Disord. 2013 Oct 12;14(1):292.

Prevalence of MRI-detected mediopatellar plica in subjects with knee pain and the association with MRI-detected patellofemoral cartilage damage and bone marrow lesions: data from the Joints On Glucosamine study.

Hayashi D, Xu L, Guermazi A, Kwok CK, Hannon MJ, Jarraya M, Green SM, Jakicic JM, Moore CE, Roemer FW.

Abstract

BACKGROUND:

The mediopatellar plica is a synovial fold representing an embryonic remnant from the developmental process of the synovial cavity formation in the knee. We aimed to examine the frequency of MRI-detected mediopatellar plica and its cross-sectional association with MRI-detected cartilage damage and bone marrow lesions (BMLs) in the patellofemoral joint (PFJ) in a cohort of subjects with knee pain.

METHODS:

342 knees with chronic frequent knee pain were evaluated for MRI-detected mediopatellar plica (type A, B or C according to the modified Sakakibara classification). Cartilage damage (scored 0 to 6) and BMLs (scored 0 to 3) were semiquantitatively assessed in four subregions of the PFJ on MRI. Hoffa-synovitis and effusion-synovitis were graded 0 to 3. Patellar length ratio (PLR), lateral patellar tilt angle (LPTA), bisect offset (BO), and sulcus angle (SA) were measured on MRI. The presence of mediopatellar plica and its association with cartilage damage and BMLs in the PFJ was assessed using logistic regression after adjusting for age, gender, body mass index, PLR, LPTA, BO, SA, and Hoffa- and effusion-synovitis.

RESULTS:

163 (47.7%) knees exhibited mediopatellar plica (76 (22.2%) type A, 69 (20.2%) type B, and 18 (5.3%) type C) on MRI. Significant cross-sectional associations of MRI-detected mediopatellar plica and cartilage damage were observed for the medial patella (adjusted odds ratio (aOR) 2.12, 95% CI 1.23-3.64 for all types combined, and aOR 4.20, 95%CI 1.92-9.19 for type B lesion), but not for the anterior medial femur or the lateral PFJ. No associations were found between the presence of MRI-detected mediopatellar plica and BMLs in any patellofemoral subregion.

CONCLUSION:

On MRI, types A and B mediopatellar plicae were commonly observed in this cohort of subjects with knee pain. MRI-detected mediopatellar plica was cross-sectionally associated with higher likelihood of the presence of MRI-detected medial patellar cartilage damage after adjustment for confounders.

Instability/surgery

Knee Surg Sports Traumatol Arthrosc. 2013 Nov 7.

Medial patellotibial ligament (MPTL) reconstruction for patellar instability.

Zaffagnini S, Grassi A, Marcheggiani Muccioli GM, Luetzow WF, Vaccari V, Benzi A, Marcacci M.

Source

Clinica Ortopedica e Traumatologica II, Laboratorio di Biomeccanica, ed Innovazione Tecnologica, Istituto Ortopedico Rizzoli, Via di Barbiano, 1/10, 40136, Bologna, Italy, s.zaffagnini@biomec.ior.it.

Abstract

PURPOSE:

To evaluate mid-term clinical and radiographic outcomes after an original medial patellotibial ligament reconstruction in patients with patellar dislocation.

METHODS:

Twenty-nine knees (27 patients, 8 males and 19 females) treated for patellar dislocation with medialization of the patellar tendon medial third combined with medial and lateral release were evaluated clinically and radiographically at a mean follow-up of 6.1 ± 2.5 years. Trochleoplasty was performed in case of severe flat trochlea (6 knees, 21 %). Aetiology of patellofemoral instability was traumatic in 6 (21 %) and atraumatic in 23 (79 %) knees. The mean age at first dislocation was 19.2 ± 10.1 years. WOMAC, subjective and objective IKDC, Kujala, VAS for pain, Tegner activity and EQ-5D scores were used. Anteroposterior, lateral and 30° axial views were performed for radiographic monitoring.

RESULTS:

There was a significant improvement of all clinical scores and significant reduction in knee pain. Twenty-four knees (83 %) were normal or nearly normal by objective IKDC score at final follow-up. Radiographs showed a higher incidence of patella alta and flat trochlea in the atraumatic group. Severe signs of patellar osteoarthritis were found in 1 knee (3 %). A higher body mass index (BMI) was correlated with worse pre-operative scores. Four knees (14 %) were considered failures (2 further dislocations, 2 revision surgeries). The overall survival rate at 6 years was 0.811.

CONCLUSIONS:

The presented techniques produced good clinical and radiographic results at mean 6.1 years follow-up, with 14 % failures. Signs of patellofemoral dysplasia were found in patients with atraumatic patellar dislocation. BMI was related to worse pre-operative clinical status.

LEVEL OF EVIDENCE: Retrospective study, Level IV. PMID: 24196574

Hip and Knee Kinematics are Associated with Pain and Self-reported Functional Status in Males and Females with Patellofemoral Pain.

Nakagawa TH, Serrão FV, Maciel CD, Powers CM.

Source

Physical Therapy, Federal University of São Carlos, Brazil.

Abstract

Altered hip and knee kinematics in the frontal and transverse planes may increase patellofemoral joint stress and contribute to the development of patellofemoral pain.

The purpose of this cross-sectional study was to evaluate the association among hip and knee kinematics, pain, and self-reported functional status in males and females with patellofemoral pain. 20 males and 20 females with patellofemoral pain participated in this study. 3-dimensional hip and knee kinematics were quantified while performing a step-down task. A visual analogue scale was used to evaluate usual knee pain. The anterior knee pain scale was used to evaluate the knee functional score. For both groups combined, greater usual pain was associated with greater peak hip adduction, hip internal rotation and knee abduction ($r=0.54-0.57$, $P<0.001$). Also, modest to low correlations ($r=-0.48$ to -0.37 , $P=0.03-0.08$) were found among hip and knee kinematics and functional score.

Stepwise regression revealed that peak hip internal rotation and hip adduction were significant predictors of pain, while peak hip adduction was the only predictor of function. Greater hip adduction, hip internal rotation and knee abduction are associated with higher levels of pain and reduced function in males and females with patellofemoral pain.

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PMID: 23771827

Tendon

Br J Sports Med. 2013 Oct 6. doi: 10.1136/bjsports-2013-092633. [Epub ahead of print]

Greater glycosaminoglycan content in human patellar tendon biopsies is associated with more pain and a lower VISA score.

Attia M, Scott A, Carpentier G, Lian O, Van Kuppevelt T, Gossard C, Papy-Garcia D, Tassoni MC, Martelly I.

Source Laboratoire CRRET, Université Paris-Est Créteil, Créteil, France.

Abstract

BACKGROUND: People with patellar tendinopathy experience chronic pain and activity limitation, but a pertinent biochemical marker correlated with these clinical features has not been identified. The Victoria Institute of Sport Assessment (VISA) questionnaire is a condition-specific patient-rated outcome measure. Since the quantity of glycosaminoglycans (GAGs) increases with advancing tendon pathology, we hypothesised that there would be a correlation between the quantity of GAGs in the patellar tendon and the VISA score.

METHODS: Tendon biopsies from athletes with chronic patellar tendinopathy (confirmed by clinical examination and MRI) were recruited (n=7), as well as controls with no history of knee pain (n=4). The quantity of sulphated GAGs in the human patellar tendons was determined with a dimethyl methylene blue (DMMB) assay; this method was first validated with rat tendon tissue. The extent and distribution of GAG species and proteoglycans (decorin, versican and aggrecan) in the human tendon biopsies were examined using immunohistochemistry.

RESULTS:

Greater sulphated GAG content of the patellar tendon was correlated with the greater tendon dysfunction ($R^2=0.798$). The quantity of aggrecan in the tendon, a chondroitin sulphate-rich proteoglycan, also increased with advancing tendon pathology.

CONCLUSIONS:

Increased GAGs in the pathological human patellar tendon are related to a worse clinical status. These findings indicate that the VISA score reflects the extent of tendon tissue pathology.

KEYWORDS: Biomechanics, Knee injuries, Orthopaedics, Shoulder injuries, Tendons

PMID:24100290

Overview

[Knee Surg Sports Traumatol Arthrosc.](#) 2013 Nov 13. [Epub ahead of print]

Patellofemoral pain syndrome.

[Petersen W](#), [Ellermann A](#), [Gösele-Koppenburg A](#), [Best R](#), [Rembitzki IV](#), [Brüggemann GP](#), [Liebau C](#).

Source

Klinik für Orthopädie und Unfallchirurgie, Martin Luther Krankenhaus, Berlin, Grunewald, Caspar Theys Strasse 27-31, 14193, Berlin, Germany, w.petersen@mlk-berlin.de.

Abstract

The patellofemoral pain syndrome (PFPS) is a possible cause for anterior knee pain, which predominantly affects young female patients without any structural changes such as increased Q-angle or significant chondral damage.

This literature review has shown that PFPS development is probably multifactorial with various functional disorders of the lower extremity. Biomechanical studies described patellar maltracking and dynamic valgus in PFPS patients (functional malalignment). Causes for the dynamic valgus may be decreased strength of the hip abductors or abnormal rear-foot eversion with pes pronatus valgus. PFPS is further associated with vastus medialis/vastus lateralis dysbalance, hamstring tightness or iliotibial tract tightness. The literature provides evidence for a multimodal non-operative therapy concept with short-term use of NSAIDs, short-term use of a medially directed tape and exercise programmes with the inclusion of the lower extremity, and hip and trunk muscles.

There is also evidence for the use of patellar braces and foot orthosis. A randomized controlled trial has shown that arthroscopy is not the treatment of choice for treatment of PFPS without any structural changes. Patients with anterior knee pain have to be examined carefully with regard to functional causes for a PFPS. The treatment of PFPS patients is non-operative and should address the functional causes.

Level of evidence V.

Knee/total

Exercise

J Bone Joint Surg Am. 2013 Nov 6;95(21):1942-9. doi: 10.2106/JBJS.L.00964.

One-to-One Therapy Is Not Superior to Group or Home-Based Therapy After Total Knee Arthroplasty: A Randomized, Superiority Trial.

Ko V, Naylor J, Harris I, Crosbie J, Yeo A, Mittal R.

BACKGROUND: The aim of this study was to determine whether center-based, one-to-one physical therapy provides superior outcomes compared with group-based therapy or a simple monitored home-based program in terms of functional and physical recovery and health-related quality of life after total knee arthroplasty.

METHODS: Patients awaiting primary total knee arthroplasty at two Sydney metropolitan hospitals were enrolled into this prospective, randomized, superiority trial preoperatively. At two weeks postoperatively, participants were randomly allocated to one of three six-week treatment programs (twelve one-to-one therapy sessions, twelve group-based therapy sessions, or a monitored home program) with use of a computer-generated sequence. Self-reported outcomes (Oxford Knee Score, Western Ontario and McMaster Universities Osteoarthritis Index pain and function subscales, and Medical Outcomes Study 12-Item Short-Form Survey) and performance-based functional outcomes were measured over twelve months postoperatively by a blinded assessor. The primary outcome was knee pain and function measured with use of the Oxford Knee Score at ten weeks postoperatively. Intention-to-treat analysis was conducted.

RESULTS: Two hundred and forty-nine patients (eighty-five who had one-to-one therapy, eighty-four who had group-based therapy, and eighty who were in the monitored home program) were randomized and 233 were available for their one-year follow-up assessment. Participants who received one-to-one therapy did not have a superior Oxford Knee Score at week ten compared with those who received the alternative interventions; the median score was 32 points for the one-to-one therapy group, 36 points for the group-based therapy group, and 34 points for the monitored home program group ($p = 0.20$). Furthermore, one-to-one therapy was not superior compared with group-based therapy or monitored home program in improving any of the secondary outcomes across the first postoperative year. No adverse events were associated with any of the treatment arms.

CONCLUSIONS: One-to-one therapy does not provide superior self-reported or performance-based outcomes compared with group-based therapy or a monitored home program, in the short term and the long term after total knee arthroplasty.

Total hip and knee return to work

Rheumatology (Oxford). 2013 Nov 23.

Return to work after total hip and knee arthroplasty: a systematic review.

Tilbury C, Schaasberg W, Plevier JW, Fiocco M, Nelissen RG, Vliet Vlieland TP.

Source

Leiden University Medical Center, Department of Orthopaedics, Walaeus Library and Department of Medical Statistics, Leiden, The Netherlands.

Abstract

Objectives. The aim of this study was to describe work status and time to return to work in patients undergoing total hip arthroplasty (THA) or total knee arthroplasty (TKA) and to determine which factors are associated with work status.

Methods. A systematic search strategy in various databases through April 2013 was performed. All clinical studies concerning patients undergoing THA or TKA providing quantitative information on work status before and after surgery were eligible for inclusion. Extracted were study characteristics, data on work status and determinants of return to work. The methodological quality was evaluated in three quality aspects (selection bias, information bias and statistical analysis bias).

Results. Nineteen studies published between 1986 and 2013 were selected (4 on THA, 14 on TKA and 1 on THA and TKA). These studies included 3872 patients with THA and 649 patients with TKA. The proportions of patients returning to work ranged from 25 to 95% at 1-12 months after THA and from 71 to 83% at 3-6 months after TKA. The average time to return to work varied from 1.1 to 13.9 weeks after THA and from 8.0 to 12.0 weeks after TKA. Factors related to work status after THA and TKA included sociodemographic, health and job characteristics. Overall, the methodological quality of the studies was moderate to low.

Conclusion. The majority of patients who are employed before THA and TKA return to work postoperatively. Comparisons of work status and the rate and speed of return to work between studies in THA and TKA are hampered by large variations in patient selection and measurement methods, underpinning the need for more standardization.

KEYWORDS: arthroplasty, employment, hip, knee, prostheses and implants, replacement, sick leave, total hip, total knee, work MID: 24273048

Stretching/manipulation

Knee Surg Sports Traumatol Arthrosc. 2013 Dec;21(12):2751-8. doi: 10.1007/s00167-012-2152-x. Epub 2012 Aug 3.

Manipulation under anaesthesia versus low stretch device in poor range of motion after TKA.

Witvrouw E, Bellemans J, Victor J.

Source

Department of Rehabilitation Sciences and Physiotherapy, Faculty of Medicine and Health Sciences, Ghent University, Ghent, Belgium, Erik.witvrouw@ugent.be.

Abstract

PURPOSE:

The purpose of this study was to evaluate the effectiveness of two frequently used non-operative treatment techniques for a stiff knee after total knee arthroplasty.

METHODS:

Sixty-four patients with a stiff knee after total knee arthroplasty (TKA) were randomized into a manipulation under anaesthesia group, or a low load stretch (stretch) group. The patients were followed up for 6 weeks and were evaluated for maximum flexion and extension, range of motion (ROM), pain, stiffness and function.

RESULTS:

Both groups showed a significant increase in knee flexion in this study. Only the stretch group showed a significant increase in extension ROM. In both groups, a significant increase in Western Ontario and McMaster Universities was observed. No significant difference was observed between both groups for the flexion or extension ROM, or for any of the pain, function or stiffness scores during this study.

CONCLUSIONS:

The results of this study showed that the stretch technique had equal or superior results concerning ROM and function compared to manipulation under anaesthesia. The stretch technique achieved this without requiring the patient to undergo in-hospital treatment or anaesthesia, limiting the costs and the risks for complications. The results of this study showed that stretching is a valuable tool for treating joint contractures of the knee. Therefore, the use of this stretching technique may be an excellent first choice of treatment modality in patients with slow progress of knee flexion or persistent knee stiffness following TKA, prior to manipulation under anaesthesia or lysis of adhesions.

LEVEL OF EVIDENCE: I. PMID: 22864680

OSTEOARTHRITIS/KNEE

Plica

PLoS One. 2013 Nov 4;8(11):e79662. doi: 10.1371/journal.pone.0079662.

Matrix Metalloproteases and Tissue Inhibitors of Metalloproteinases in Medial Plica and Pannus-like Tissue Contribute to Knee Osteoarthritis Progression.

Yang CC, Lin CY, Wang HS, Lyu SR.

Source

Department of Anatomy, National Yang-Ming University, Taipei, Taiwan, R.O.C.

Abstract

Osteoarthritis (OA) is characterized by degradation of the cartilage matrix, leading to pathologic changes in the joints. However, the pathogenic effects of synovial tissue inflammation on OA knees are not clear.

To investigate whether the inflammation caused by the medial plica is involved in the pathogenesis of osteoarthritis, we examined the expression of matrix metalloproteinases (MMPs), tissue inhibitors of metalloproteinases (TIMPs), interleukin (IL)-1 β , and tumor necrosis factor (TNF)- α in the medial plica and pannus-like tissue in the knees of patients with medial compartment OA who underwent either arthroscopic medial release (stage II; 15 knee joints from 15 patients) or total knee replacement (stage IV; 18 knee joints from 18 patients). MMP-2, MMP-3, MMP-9, IL-1 β , and TNF- α mRNA and protein levels measured, respectively, by quantitative real-time PCR and Quantibody human MMP arrays, were highly expressed in extracts of medial plica and pannus-like tissue from stage IV knee joints. Immunohistochemical staining also demonstrated high expression of MMP-2, MMP-3, and MMP-9 in plica and pannus-like tissue of stage IV OA knees and not in normal cartilage. Some TIMP/MMP ratios decreased significantly in both medial plica and pannus-like tissue as disease progressed from stage II to stage IV. Furthermore, the migration of cells from the pannus-like tissue was enhanced by IL-1 β , while plica cell migration was enhanced by TNF- α .

The results suggest that medial plica and pannus-like tissue may be involved in the process of cartilage degradation in medial compartment OA of the knee.

PMID: 24223987 [PubMed - in process] PMCID: PMC3817135

Platelet rich injections

Arch Phys Med Rehabil. 2013 Nov 27. pii: S0003-9993(13)01212-4. doi: 10.1016/j.apmr.2013.11.006.

Comparative Effectiveness of Platelet-Rich Plasma Injections for Treating Knee Joint Cartilage Degenerative Pathology: A Systematic Review and Meta-analysis.

Chang KV, Hung CY, Aliwarga F, Wang TG, Han DS, Chen WS.

Source

Department of Physical Medicine and Rehabilitation, National Taiwan University Hospital, BeiHu Branch and National Taiwan University College of Medicine, Taipei, Taiwan; Graduate Institute of Epidemiology and Preventive Medicine, National Taiwan University, Taipei, Taiwan.

Abstract

OBJECTIVES:

To explore the effectiveness of platelet-rich plasma (PRP) in treating cartilage degenerative pathology in knee joints.

DATA SOURCES:

Electronic databases, including PubMed and Scopus, were searched from the earliest record to September 2013.

STUDY SELECTION:

We included single-arm prospective studies, quasi-experimental, and randomized controlled trials that employed PRP to treat knee chondral degenerative lesions. Eight single-arm studies, 3 quasi-experimental, and 5 randomized controlled trials were identified, comprising 1543 participants.

DATA EXTRACTION:

We determined effect sizes for the selected studies by extracting changes in functional scales following the interventions and compared the PRP group pooled values with the pre-treatment baseline and the groups receiving placebo or hyaluronic acid (HA) injections.

DATA SYNTHESIS:

PRP injections in patients with knee degenerative pathology showed continual efficacy for 12 months compared with their pre-treatment condition. The effectiveness of PRP was likely better and more prolonged than HA. Injection doses equal to or less than 2, the use of a single-spinning approach, and lack of additional activators led to an uncertainty in the treatment effects. Patients with lower degrees of cartilage degeneration achieved superior outcomes as opposed to those affected by advanced osteoarthritis.

CONCLUSIONS:

PRP application improves function from basal evaluations in patients with knee joint cartilage degenerative pathology and tends to be more effective than HA administration. Discrepancy in the degenerative severity modifies the treatment responses, leading to participants with lower degrees of degeneration to benefit more from PRP injections.

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KEYWORDS:

HA, OA, PRP, cartilage, hyaluronic acid, knee, osteoarthritis, platelet-rich plasma

PMID: 24291594

Leptin levels with OA

Ann Rheum Dis. 2013 Sep 27. doi: 10.1136/annrheumdis-2013-203308.

Cross-sectional and longitudinal associations between circulating leptin and knee cartilage thickness in older adults.

Stannus OP, Cao Y, Antony B, Blizzard L, Cicuttini F, Jones G, Ding C.

Source Menzies Research Institute Tasmania, University of Tasmania, Hobart, Australia.

Abstract

OBJECTIVE:

To investigate cross-sectional and longitudinal associations between serum leptin levels and knee cartilage thickness in older adults.

METHODS:

A prospective cohort of 163 randomly selected subjects (mean 63 years, range 52-78, 46% women) was studied. Knee cartilage thickness at medial tibial, lateral tibial, femoral and patellar sites was determined using T1-weighted fat-suppressed MRI. Serum leptin levels were measured by radioimmunoassay. Radiographic osteoarthritis, body fat (%), trunk fat (%), weight and height were measured, and body mass index (BMI) was calculated.

RESULTS:

Cross-sectionally, serum levels of leptin were negatively associated with femoral (β : -0.013, 95% CI -0.022 to -0.003), medial tibial (β : -0.009, 95% CI -0.018 to -0.001), lateral tibial (β : -0.012, 95% CI -0.021 to -0.003) and patellar (β : -0.014, 95% CI -0.026 to -0.002) cartilage thickness after adjustment for covariates. Moreover, BMI, trunk fat and total body fat were negatively associated with cartilage thickness, and the significant associations disappeared after further adjustment for leptin. Longitudinally, both baseline leptin and change in leptin were associated with greater changes in medial tibial cartilage thickness (β : -0.004, 95% CI -0.007 to -0.001 and β : -0.009, 95% CI -0.018 to -0.001, respectively) in multivariable analyses.

CONCLUSIONS:

Serum levels of leptin are independently and consistently associated with reduced cartilage thickness cross-sectionally and longitudinally. In addition, the associations between adiposity measures and cartilage thickness are mediated by leptin, suggesting leptin may play a key role in cartilage thinning.

KEYWORDS: Knee Osteoarthritis, Magnetic Resonance Imaging, Osteoarthritis

Stability/OA

Research article

Self-reported knee joint instability is related to passive mechanical stiffness in medial knee osteoarthritis

Mark W Creaby, Tim V Wrigley, Boon-Whatt Lim, Rana S Hinman, Adam L Bryant and Kim L Bennell

BMC Musculoskeletal Disorders 2013, **14**:326 doi:10.1186/1471-2474-14-326

Abstract (provisional)

Background

Self-reported knee joint instability compromises function in individuals with medial knee osteoarthritis and may be related to impaired joint mechanics. The purpose of this study was to evaluate the relationship between self-reported instability and the passive varus-valgus mechanical behaviour of the medial osteoarthritis knee.

Methods

Passive varus-valgus angular laxity and stiffness were assessed using a modified isokinetic dynamometer in 73 participants with medial tibiofemoral osteoarthritis. All participants self-reported the absence or presence of knee instability symptoms and the degree to which instability affected daily activity on a 6-point likert scale.

Results

Forward linear regression modelling identified a significant inverse relationship between passive mid-range knee stiffness and symptoms of knee instability ($r = 0.27$; $P < 0.05$): reduced stiffness was indicative of more severe instability symptoms. Angular laxity and end-range stiffness were not related to instability symptoms ($P > 0.05$).

Conclusions

Conceivably, a stiffer passive system may contribute toward greater joint stability during functional activities. Importantly however, net joint stiffness is influenced by both active and passive stiffness, and thus the active neuromuscular system may compensate for reduced passive stiffness in order to maintain joint stability. Future work is merited to examine the role of active stiffness in symptomatic joint stability.

Wide spread pain

Phys Ther. 2013 Nov 14.

Knee Pain With Daily Tasks, Knee Osteoarthritis Severity, and Widespread Pain.

Riddle DL, Stratford PW.

Source

D.L. Riddle, PT, PhD, FAPTA, Departments of Physical Therapy and Orthopaedic Surgery, Virginia Commonwealth University, PO Box 980224, Richmond, VA 23298-0224 (USA).

Abstract

BACKGROUND:

The presence of widespread pain is simple to determine and is known to increase risk for persistent symptoms.

OBJECTIVE:

We hypothesized that persons with minimal or no knee osteoarthritis and high WOMAC Pain scores would be more likely to report widespread pain than other subgroups.

DESIGN AND METHODS:

We used data from the Multicenter Osteoarthritis Study (MOST), a multi-center study of people with or at high risk for knee OA. A total of 755 persons with unilateral knee pain and 851 persons with bilateral knee pain met our inclusion criteria. Widespread pain was assessed by use of body diagrams and radiographic Kellgren and Lawrence grades were recorded for each knee. The WOMAC Pain score quantified knee pain with daily tasks.

RESULTS:

A higher proportion of persons in the high knee pain/low knee OA subgroup had widespread pain as compared to the high pain/high knee OA, low pain/high knee OA and low pain/low knee OA subgroups, particularly for persons with bilateral knee pain (relative risk estimates ranging from 1.7 (95%CI=1.2, 2.4) to 2.3 (95%CI = 1.6, 3.3)).

LIMITATIONS:

The cross sectional design is a limitation of the study.

CONCLUSIONS:

Patients with either no or minimal knee OA and high knee pain with daily tasks are particularly likely to report widespread pain. This subgroup of patients is likely to be at risk for not responding to knee OA treatment that focuses only on physical impairment. Assessment of the presence of widespread pain along with knee pain intensity and osteoarthritis status may assist physical therapists in identifying subgroups of patients who may require additional treatment.

PMID: 24231230

Joint loading/Obesity

Osteoarthritis Cartilage. 2013 Oct 14. pii: S1063-4584(13)00975-8. doi: 10.1016/j.joca.2013.10.003.

Is increased joint loading detrimental to obese patients with knee osteoarthritis? A secondary data analysis from a randomized trial.

Henriksen M, Hunter DJ, Dam EB, Messier SP, Andriacchi TP, Lohmander LS, Aaboe J, Boesen M, Gudbergson H, Bliddal H, Christensen R.

Source

The Parker Institute, Department of Rheumatology, Copenhagen University Hospital, Frederiksberg, Copenhagen F, Denmark.

Abstract

OBJECTIVE:

To investigate whether increased knee joint loading due to improved ambulatory function and walking speed following weight loss achieved over 16 weeks accelerates symptomatic and structural disease progression over a subsequent 1 year weight maintenance period in an obese population with knee osteoarthritis (OA).

METHODS:

Data from a prospective study of weight loss in obese patients with knee OA (the CARtilage in obese knee Osteoarthritis (CAROT) study) were used to determine changes in knee joint compressive loadings (model estimated) during walking after a successful 16 week weight loss intervention. The participants were divided into 'Unloaders' (participants that reduced joint loads) and 'Loaders' (participants that increased joint loads). The primary symptomatic outcome was changes in knee symptoms, measured with the Knee injury and Osteoarthritis Outcome Score (KOOS) questionnaire, during a subsequent 52 weeks weight maintenance period. The primary structural outcome was changes in tibiofemoral cartilage loss assessed semi-quantitatively (Boston Leeds Knee Osteoarthritis Score (BLOKS) from MRI after the 52 weight maintenance period.

RESULTS:

157 participants (82% of the CAROT cohort) with medial and/or lateral knee OA were classified as Unloaders (n = 100) or Loaders (n = 57). The groups showed similar significant changes in symptoms (group difference: -2.4 KOOS points [95% CI -6.8:1.9]) and cartilage loss (group difference: -0.06 BLOKS points [95% CI -0.22:0.11]) after 1 year, with no statistically significant differences between Loaders and Unloaders.

CONCLUSION:

For obese patients undergoing a significant weight loss, increased knee joint loading for 1 year was not associated with accelerated symptomatic and structural disease progression compared to a similar weight loss group that had reduced ambulatory compressive knee joint loads.

CLINICALTRIALS.GOV:

NCT00655941.

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FOOT AND ANKLE

Compartment syndrome

Management of chronic exertional compartment syndrome and fascial hernias in the anterior lower leg with the forefoot rise test and limited fasciotomy

□

Foot & Ankle International, 11/25/2013 Evidence Based Medicine

Finestone AS, et al

Abstract

Background: Chronic exertional compartment syndrome can present either as anterolateral lower leg pain or as painful muscle herniation. If an athlete or a soldier wants to continue training, there is no proven effective nonoperative treatment, and fasciotomy of 1 or more of the lower leg muscle compartments is usually recommended. Our clinical protocol differs from most reported ones in the use of the forefoot rise test to increase pressure and provoke pain and our recommending minimal surgery of the anterior compartment only. We present results of surgery based on our clinical management flowchart.

Methods: Patients who had surgery during a 12-year period were reviewed by telephone interview or office examination. Pain was graded from 0 (none) to 4 (unbearable). Preoperative resting and exercise anterior compartment pressures were evaluated in most subjects before and immediately following a repeated weight-bearing forefoot rise test. Surgery was under local anesthesia, limited to the anterior compartment only and percutaneous (excepting muscle hernias). There were 36 patients, mean age 24 years.

Results: Of 16 patients who were originally operated unilaterally, 5 patients were later operated on the other side. Mean presurgery resting pressure was 56 mm Hg (40-80 mm Hg) rising to 87 mm Hg (55-150 mm Hg) with exercise. Mean exercise pain score dropped from 2.9 presurgery to 1.3 postsurgery ($n = 35$, $P < .0001$). Complications included superficial peroneal nerve injury (3 legs in 3 patients, 1 requiring reoperation).

Conclusion: When we used our clinical management flowchart based on the forefoot rise test, percutaneous fasciotomy of the anterior compartment alone provided good clinical results. Care must be taken to prevent injury to the superficial peroneal nerve in the distal lower leg.

Level of Evidence: Level IV, retrospective case series

Rearfoot motion

Man Ther. 2013 Oct 29. pii: S1356-689X(13)00183-5. doi: 10.1016/j.math.2013.10.003.

Clinical measures of hip and foot-ankle mechanics as predictors of rearfoot motion and posture.

Souza TR, Mancini MC, Araújo VL, Carvalhais VO, Ocarino JM, Silva PL, Fonseca ST.

Source

Graduate Program in Rehabilitation Sciences, Universidade Federal de Minas Gerais, Av. Antônio Carlos 6627, Escola de Educação Física, Fisioterapia e Terapia Ocupacional, CEP 31270-010 Belo Horizonte, MG, Brazil.

Abstract

Health professionals are frequently interested in predicting rearfoot pronation during weight-bearing activities.

Previous inconsistent results regarding the ability of clinical measures to predict rearfoot kinematics may have been influenced by the neglect of possible combined effects of alignment and mobility at the foot-ankle complex and by the disregard of possible influences of hip mobility on foot kinematics. The present study tested whether using a measure that combines frontal-plane bone alignment and mobility at the foot-ankle complex and a measure of hip internal rotation mobility predicts rearfoot kinematics, in walking and upright stance.

Twenty-three healthy subjects underwent assessment of forefoot-shank angle (which combines varus bone alignments at the foot-ankle complex with inversion mobility at the midfoot joints), with a goniometer, and hip internal rotation mobility, with an inclinometer. Frontal-plane kinematics of the rearfoot was assessed with a three-dimensional system, during treadmill walking and upright stance. Multivariate linear regressions tested the predictive strength of these measures to inform about rearfoot kinematics.

The measures significantly predicted ($p \leq 0.041$) mean eversion-inversion position, during walking ($r^2 = 0.40$) and standing ($r^2 = 0.31$), and eversion peak in walking ($r^2 = 0.27$). Greater values of varus alignment at the foot-ankle complex combined with inversion mobility at the midfoot joints and greater hip internal rotation mobility are related to greater weight-bearing rearfoot eversion.

Each measure (forefoot-shank angle and hip internal rotation mobility) alone and their combination partially predicted rearfoot kinematics. These measures may help detecting foot-ankle and hip mechanical variables possibly involved in an observed rearfoot motion or posture.

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KEYWORDS:

Clinical measures, Foot pronation, Hip, Prediction

PMID: 24268425 [PubMed - as supplied by publisher]

Posture

Journal of American Podiatric Association (J Am Podiatr Med Assoc 103(5): 405–410, 2013)

A Quick and Reliable Procedure for Assessing Foot Alignment in Athletes

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+

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Abstract

Background: Quick procedures with proper psychometric properties that can capture the combined alignment of the foot-ankle complex in a position that may be more representative of the status of the lower limb during ground contact are essential for assessing a large group of athletes.

Methods: The assessed lower limb was positioned with the calcaneus surface facing upward in a way that all of the marks could be seen at the center of the camera display. After guaranteeing maintenance of the foot at 90° of dorsiflexion actively sustained by the athlete, the examiner took the picture of the foot-ankle alignment.

Results: Intraclass correlation coefficients ranging from 0.82 to 0.93 demonstrated excellent intratester and intertester reliability for the proposed measurements of forefoot, rearfoot, and shank-forefoot alignments. The intraclass correlation coefficient between the shank-forefoot measures and the sum of the rearfoot and forefoot measures was 0.98, suggesting that the shank-forefoot alignment measures can represent the combined rearfoot and forefoot alignments.

Conclusions: This study describes a reliable and practical measurement procedure for rearfoot, forefoot, and shank-forefoot alignments that can be applied to clinical and research situations as a screening procedure for risk factors for lower-limb injuries in athletes.

Ankle classification

Knee Surg Sports Traumatol Arthrosc. 2013 Dec;21(12):2759-63. doi: 10.1007/s00167-012-2165-5. Epub 2012 Aug 9.

Variations in ankle registration using two different anatomic landmarks: a radiographic study.

Suero EM, Citak M, Claps C, Pearle AD, Plaskos C.

Source

Department of Orthopaedic Surgery, Hospital for Special Surgery, 535 E 70th St., New York, NY, 10021, USA, eduardosuero@gmail.com.

Abstract

PURPOSE:

To quantify the average deviation in tibial mechanical axis registration when registering the ankle centre using (a) the extreme medial and lateral points and (b) the most distal points, of the respective malleoli, and to identify whether body mass index (BMI) had any significant effect on mechanical axis registration error.

METHODS:

The preoperative standing hip-knee-ankle radiographs of 40 patients who underwent navigated TKR at our institution were reviewed. The divergence from the anatomic ankle centre in degrees and millimetres was compared when using the Extremes Midpoint and the Distal Midpoint techniques.

RESULTS:

No significant divergence was measured with either the Extremes Midpoint (0.2° lateral, SD = 0.5°; 1.1 mm lateral, SD = 2.6 mm) or the Distal Midpoint (0.2° lateral, SD = 0.6°; 1.7 mm lateral, SD = 2.3 mm) techniques. BMI had no significant effect on these differences.

CONCLUSIONS:

Both the Extremes Midpoint and the Distal Midpoint techniques offer accurate registration of the ankle centre. BMI does not seem to affect the registration of the ankle centre with either technique. The findings of this study will help knee surgeons when choosing an ankle registration technique. These results may also lead to more accurate knee replacement navigation systems.

LEVEL OF EVIDENCE: III. MID: 22875370

Shoes

Mid sole hardness

Br J Sports Med. 2013 Sep 16. doi: 10.1136/bjsports-2013-092613.

Influence of midsole hardness of standard cushioned shoes on running-related injury risk.

Theisen D, Malisoux L, Genin J, Delattre N, Seil R, Urhausen A.

Source

Sports Medicine Research Laboratory, Public Research Centre for Health, Luxembourg, Grand-Duchy of Luxembourg.

Abstract

BACKGROUND:

In this double-blind randomised controlled trial, we tested if leisure-time runners using shoes with less compliant midsoles have a higher running-related injury (RRI) risk.

METHOD:

We provided 247 runners with standard running shoes having either a soft study shoes (soft-SS) or a hard study shoes (hard-SS) midsole and followed them prospectively for 5 months regarding RRI. All information about sports practice and injuries was uploaded on a dedicated internet platform and checked for consistency and completeness. RRI was defined as any first-time pain sustained during or as a result of running practice and impeding normal running activity for at least 1 day. Cox proportional hazards regressions were used to identify RRI risk factors.

RESULT:

The type of study shoes used for running was not associated with RRIs (HR=0.92; 95% CI 0.57 to 1.48). The hard-SS had a 15% greater overall stiffness in the heel region. The two study groups were similar regarding personal and sports participation characteristics, except for years of running experience, which was higher ($p<0.05$) in the hard-SS group. Global RRI incidence was 12.1 RRI/1000 h of running. No between-group differences were found regarding injury location, type, severity or category. Nevertheless, the adjusted regression model revealed positive associations with RRI risk for body mass index (HR=1.126; 95% CI 1.033 to 1.227), previous injury (HR=1.735; 95% CI 1.037 to 2.902) and mean session intensity (HR=1.396; 95% CI 1.040 to 1.874). Protective factors were previous regular running activity (HR=0.422; 95% CI 0.228 to 0.779) and weekly volume of other sports activities (HR=0.702; 95% CI 0.561 to 0.879).

CONCLUSIONS:

Midsole hardness of modern cushioned running shoes does not seem to influence RRI risk.

KEYWORDS: Injury Prevention, Running, Running shoes, Sporting injuries PMID: 24043665

ANKLE/INSTABILITY

Repeated ankle strains

Clin J Sport Med. 2013 Nov;23(6):483-7. doi: 10.1097/JSM.0b013e31829afc03.

Increased frequency of ankle sprain does not lead to an increase in ligament laxity.

Liu K, Gustavsen G, Kaminski TW.

Source

*Department of Exercise and Sport Science, University of Evansville, Evansville, Indiana;

†Biomechanics and Movement Sciences, University of Delaware, Newark, Delaware; and

‡Department of Kinesiology and Applied Physiology, University of Delaware, Newark, Delaware.

Abstract

OBJECTIVE:

Ankle sprains are the most common injury in the active population. With high reinjury rates and complaints of the ankle "giving way," it has been suggested that laxity of ankle ligaments increases with repeated sprains. The objective of this study was to determine if a relationship exists between ligament laxity and the number of ankle sprains.

DESIGN:

Cross-sectional study.

SETTING:

Biomechanics laboratory.

PARTICIPANTS:

A total of 203 Division I collegiate athletes (84 women; 119 men; age, 18.5 ± 1.1 years; height, 178.5 ± 10.8 cm; mass, 79.8 ± 18.7 kg) participated in the study.

INTERVENTION:

Each participant reported the number of previous sprains on each ankle. Ligament laxity was measured using an instrumented ankle arthrometer.

MAIN OUTCOME MEASURES:

Measurements for anterior displacement (AD), inversion (IV), and eversion (EV) rotation of the ankle were obtained using an instrumented ankle arthrometer.

RESULTS:

There was no relationship between ligament laxity and the number of ankle sprains in either direction (AD, $P = 0.86$; IV, $P = 0.64$; EV, $P = 0.81$). In addition, comparing ligament laxity between previously sprained ankles and ankles that have never been sprained resulted in no differences in the direction of movement (AD, $P = 0.98$; IV, $P = 0.96$; EV, $P = 0.67$).

CONCLUSIONS:

Despite anecdotal evidence suggesting repeated ankle sprains increase ligament laxity, this report involving a large data set and a reliable measurement analysis found no relationship between the two. The results of this study make it necessary to rethink the causes of ligament laxity. Therefore, further research is necessary to understand the causes of "giving way" of the ankle and their role in repeated ankle sprains.

PMID: 23917734

Lisfrank injury

Anatomic predisposition to ligamentous lisfrank injury: A matched case-control study □

The Journal of Bone & Joint Surgery, 11/21/2013 Evidence Based Medicine

Gallagher SM, et al.

Background:

Subtle, or ligamentous, Lisfranc injuries occur following low-energy trauma to the midfoot and can be debilitating. Since they are ligamentous, they may not heal, requiring arthrodesis in some cases. Certain mortise anatomic characteristics on radiographs have been shown to be associated with a predisposition to the ligamentous subtype of Lisfranc injuries. It is not known whether there are other morphometric characteristics, such as arch height or the relative length of the second metatarsal, that can similarly influence the predisposition to these injuries.

Methods:

The present retrospective matched case-control study involved fifty-two control subjects and twenty-six patients with ligamentous Lisfranc injuries treated from 2006 to 2010 at two institutions. Clinical and radiographic data (second metatarsal length relative to foot length, first intermetatarsal angle, navicular-cuboid overlap relative to cuboid vertical height, first metatarsal-talus angle, and calcaneal pitch angle) were examined for the existence of significant differences between control and Lisfranc subjects. Logistic regression analysis was then performed to evaluate potential risk for injury on the basis of these anatomic variables.

Results:

Compared with matched controls, patients with a ligamentous Lisfranc injury were found to have a significantly smaller ratio of second metatarsal length to foot length ($p < 0.001$) on weight-bearing radiographs.

Conclusions:

Occurrence of a ligamentous Lisfranc injury was shown to be associated with a smaller ratio of second metatarsal length to foot length; >50% of patients in the injury group had a ratio of <29%.

Level of Evidence:

Prognostic Level III. See Instructions for Authors for a complete description of levels of evidence.

Topics **lisfranc's dislocation ; metatarsal bone ; foot**

Achilles Tendon

Biomechanics AT

Prospective analysis of intrinsic and extrinsic risk factors on the development of Achilles tendon pain in runners.

T. Hein, P. Janssen¹, U. Wagner-Fritz, G. Haupt, S. Grau¹,

Article first published online: 31 OCT 2013

DOI: 10.1111/sms.12137

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OBJECTIVE

There are currently no generally accepted, consistent results that clearly characterize factors causing Achilles tendon pain (AT) in runners. Therefore, we carried out a prospective study to evaluate the multifactorial influence of clinical, biomechanical (isometric strength measurements and three-dimensional kinematics) and training-related risk factors on the development of AT.

METHODS

Two hundred sixty-nine uninjured runners were recruited and underwent an initial examination. One hundred forty-two subjects completed their participation by submitting training information on a weekly basis over a maximal period of 1 year.

RESULTS

Forty-five subjects developed an overuse injury, with 10 runners suffering from AT. In an uninjured state, AT runners already demonstrated decreased knee flexor strength and abnormal lower leg kinematics (sagittal knee and ankle joint) compared with a matched control group. A relationship between years of running experience or previous overuse injuries and the development of new symptoms could not be established.

CONCLUSIONS

The interrelationship of biomechanical and training-specific variables on the generation of AT is evident. A combination of alterations in lower leg kinematics and higher impacts caused by fast training sessions might lead to excessive stress on the Achilles tendon during weight bearing and thus to AT in recreational runners.

KEYWORDS: overuse injury; achilles tendon pain; running; prospective; clinical data; 3D-kinematics; isometric strength measurement; training; multifactorial

Tension on repaired

Am J Sports Med. 2013 Sep 4. [Epub ahead of print]

Early Controlled Tension Improves the Material Properties of Healing Human Achilles Tendons After Ruptures: A Randomized Trial.

Schepull T, Aspenberg P.

Source

Orthopedics, Department of Clinical and Experimental Medicine, Faculty of Health Sciences, Linköping University, Linköping, Sweden.

Abstract

BACKGROUND:Weightbearing in a fixed brace after acute Achilles tendon ruptures does not necessarily lead to mechanical tension in the tendon. Early motion has a positive effect on the clinical outcome, but it is not clear if this is because of effects on tendon strength or unspecific effects. The aim of this study was to examine if tensional loading leads to an improvement in the mechanical properties of the healing Achilles tendon.

HYPOTHESIS:The elastic modulus of the tendon callus is increased by early tensional loading.

STUDY DESIGN:Randomized controlled trial; Level of evidence, 2.

METHODS:Thirty-five patients with an acute Achilles tendon rupture were recruited consecutively. They underwent surgery with a single suture and received metal markers in the distal and proximal parts of the tendon. After surgery, the patients were randomized to either cast immobilization for 7 weeks or tensional loading. The latter group wore a cast for 2 weeks and then a removable foam walker boot for 5 weeks. They were instructed to remove the boot twice daily and push a special training pedal to produce a predetermined, gradually increasing tensional load on the healing tendon. At 7, 19, and 52 weeks postoperatively, the patients were investigated with roentgen stereophotogrammetric analysis under different loading conditions and computed tomography. The collected data allowed calculation of the modulus of elasticity. At 52 weeks, the clinical outcome was also examined using the Achilles tendon Total Rupture Score (ATRS) and the heel-raise index.

RESULTS:The elastic modulus at 19 and 52 weeks was higher in the tensional loading group. There was no significant difference in the ATRS or heel-raise index at 52 weeks. As in previous studies, there was a significant correlation between the modulus at 7 weeks and the heel-raise index at 52 weeks. There were no signs of tendon elongation.

CONCLUSION:Early tensional loading improves the mechanical properties of the healing Achilles tendon.

KEYWORDS:Achilles tendon, loading, modulus of elasticity, rupture, weightbearing
PMID: 24005873

Plantar surface

RESEARCH REPORT

Hyperemia in Plantar Fasciitis Determined by Power Doppler Ultrasound

Authors: Andrew M. McMillan, PhD^{1,2}, Karl B. Landorf, PhD^{1,2}, Julie M. Gregg, PhD³, Jason De Luca, DMU³, Matthew P. Cotchett, BPod(Hons)^{1,2}, Hylton B. Menz, PhD^{1,2}

Study Design Cross-sectional observational study.

Objectives

To investigate the presence of soft tissue hyperemia in plantar fasciitis with power Doppler ultrasound.

Background

Localized hyperemia is an established feature of tendinopathy, suggesting that neurovascular in-growth may contribute to tendon-associated pain in some patients. The presence of abnormal soft tissue vascularity can be assessed with Doppler ultrasound, and a positive finding can assist with targeted treatment plans. However, very little is known regarding the presence of hyperemia in plantar fasciitis and the ability of routine Doppler ultrasound to identify vascular in-growth in the plantar fascia near its proximal insertion.

Methods

This observational study included 30 participants with plantar fasciitis unrelated to systemic disease and 30 age- and sex-matched controls. Ultrasound examination was performed with a 13- to 5-MHz linear transducer, and power Doppler images were assessed by 2 blinded investigators.

Results

Hyperemia of the plantar fascia was present in 8 of 30 participants with plantar fasciitis and in 2 of 30 controls. The between-group difference for hyperemia, using a 4-point scale, was statistically significant, with participants with plantar fasciitis showing increased Doppler ultrasound signal compared to controls (Mann-Whitney U , $P = .03$). However, the majority of participants with plantar fasciitis with evidence of hyperemia demonstrated very mild color changes, and only 3 were found to have moderate or marked hyperemia.

Conclusion

Mild hyperemia can occur with plantar fasciitis, but most individuals will not exhibit greater soft tissue vascularity when assessed with routine Doppler ultrasound. Clinicians treating plantar fasciitis should not consider a positive Doppler signal as essential for diagnosis of the condition but, rather, as a feature that may help to refine the treatment plan for an individual patient. *J Orthop Sports Phys Ther* 2013;43(12):875–880. Epub 11 October 2013.
doi:10.2519/jospt.2013.4810

Keyword: heel pain, imaging, neovascularization **Read More:**

<http://www.jospt.org/doi/abs/10.2519/jospt.2013.4810#.UptjsKUYyes>

Cortisone/plantar ruptures

Foot Ankle Int. 2013 Nov 25.

Risk Factors Affecting Chronic Rupture of the Plantar Fascia.

Lee HS, Choi YR, Kim SW, Lee JY, Seo JH, Jeong JJ.

Source

Department of Orthopedic Surgery, Asan Medical Center, College of Medicine, Ulsan University, Seoul, Korea.

Abstract

BACKGROUND:

Prior to 1994, plantar fascia ruptures were considered as an acute injury that occurred primarily in athletes. However, plantar fascia ruptures have recently been reported in the setting of preexisting plantar fasciitis. We analyzed risk factors causing plantar fascia rupture in the presence of preexisting plantar fasciitis.

METHODS:

We retrospectively reviewed 286 patients with plantar fasciitis who were referred from private clinics between March 2004 and February 2008. Patients were divided into those with or without a plantar fascia rupture. There were 35 patients in the rupture group and 251 in the nonrupture group. The clinical characteristics and risk factors for plantar fascia rupture were compared between the 2 groups. We compared age, gender, the affected site, visual analog scale pain score, previous treatment regimen, body mass index, degree of ankle dorsiflexion, the use of steroid injections, the extent of activity, calcaneal pitch angle, the presence of a calcaneal spur, and heel alignment between the 2 groups.

RESULTS:

Of the assessed risk factors, only steroid injection was associated with the occurrence of a plantar fascia rupture. Among the 35 patients with a rupture, 33 had received steroid injections. The odds ratio of steroid injection was 33.

CONCLUSION:

Steroid injections for plantar fasciitis should be cautiously administered because of the higher risk for plantar fascia rupture.

LEVEL OF EVIDENCE:

Level III, retrospective comparative study.

KEYWORDS:

plantar fascia rupture, plantar fasciitis, risk factors, steroid injection

PMID: 24275488

Hallux Valgus

Cuneiforms

J Foot Ankle Surg. 2013 Nov 7. pii: S1067-2516(13)00395-5. doi: 10.1053/j.jfas.2013.09.011.

Observed Changes in First Metatarsal and Medial Cuneiform Positions after First Metatarsophalangeal Joint Arthrodesis.

Dayton P, Kauwe M, Kauwe JS, Feilmeier M, Hirschi J.

Source

UnityPoint Clinic, Trinity Regional Medical Center, Fort Dodge, IA; Adjunct Professor, Des Moines University College of Podiatric Medicine and Surgery, Des Moines, IA. Electronic address: daytonp@me.com.

Abstract

The first intermetatarsal angle (IMA) is known to decrease after first metatarsophalangeal joint arthrodesis, although the exact mechanism by which this decrease occurs is not known.

We measured the first IMA and obliquity of the medial cuneiform on anteroposterior weightbearing preoperative and postoperative radiographs in 86 feet and analyzed the statistical correlation between the IMA and the medial cuneiform angle.

A change in the first IMA after first metatarsophalangeal joint fusion showed a strong positive correlation with a change in cuneiform obliquity ($p < .0001$). This finding was consistent in the direction and magnitude in each of 3 clinical subgroups: normal, $p = .087$; moderate deformity, $p = .011$; and severe deformity, $p = .10$. A comparison of the preoperative IMA and cuneiform obliquity revealed a trend toward a positive relationship but did not reach statistical significance ($p = .08$). The preoperative association between the IMA and medial cuneiform obliquity was not significant in any clinical subgroup, and the postoperative association between the IMA and cuneiform obliquity was not significant ($p = .65$). Clinical subgroup analysis showed no significant association between the IMA and the normal ($p = .73$) and moderately ($p = .69$) deformed feet, although the postoperative association between the IMA and cuneiform obliquity in the severely deformed group was significantly ($p = .034$) positive.

A linear relationship between the reduction of the first IMA and medial cuneiform obliquity after metatarsophalangeal joint fusion was observed. Our findings suggest that frontal plane rotation influences cuneiform obliquity.

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KEYWORDS: 4, atavism, first ray, fusion, hallux valgus, motion, rotation PMID: 24211104

Mid foot

J Foot Ankle Surg. 2013 Nov 9. pii: S1067-2516(13)00396-7. doi: 10.1053/j.jfas.2013.09.012.

Reduction of Intermetatarsal Angle after First Metatarsophalangeal Joint Arthrodesis in Patients with Hallux Valgus.

Feilmeier M, Dayton P, Wienke JC Jr.

Source

Assistant Professor, Des Moines University College of Podiatric Medicine and Surgery, Des Moines, IA. Electronic address: Mindi.Feilmeier@dmu.edu.

Abstract

We present a radiographic review of 94 patients who underwent first metatarsophalangeal joint arthrodesis.

The main focus of our review was to assess the change in the intermetatarsal angle (IMA). The change in the IMA was measured for the entire group and for 2 subgroups (IMA 11° to 15° and IMA >15°). The results of the angular measurements for the total data set were as follows: mean preoperative first IMA, 15.32° (range 11° to 24°), mean postoperative IMA, 9.88° (range 3° to 18°), and mean change in IMA of 5.44° (range -2° to 13°; $p < .001$). Group 1, with an IMA of 11° to 15°, included 52 patients, with a mean change in the IMA of 4.21° (range -2° to 9°; $p < .001$). Group 2, with an IMA greater than 15° (range 16° to 24°), included 42 patients, with a mean change in the IMA of 6.83° (range 2° to 13°; $p < .001$). The change in the preoperative to postoperative IMA in group 1 compared with that in group 2 was statistically significant ($p < .001$).

The results of the present study have confirmed the observations of previous investigators that arthrodesis of the first metatarsophalangeal joint for hallux abducto valgus deformity results in a reduction of the IMA and that a proportionately larger reduction can be expected when the IMA is larger.

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KEYWORDS:

4, first metatarsophalangeal joint, fusion, hallux valgus, intermetatarsal angle, reduction PMID: 24220285

MANUAL THERAPY

T spine manip on heart rate

Journal of Manipulative and Physiological Therapeutics

Volume 29, Issue 8 , Pages 603-610, October 2006

The Effects of Thoracic Manipulation on Heart Rate Variability: A Controlled Crossover Trial

- [Brian Budgell](#), DC, PhD , [Barbara Polus](#), PhD 

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Abstract

Objective

The objective of this study was to measure the effects of thoracic spinal manipulation on heart rate variability (HRV) in a cohort of healthy young adults.

Methods

A controlled crossover trial that was conducted on 28 healthy young adults (23 men and 5 women; age range, 18-45 years; mean age, 29 ± 7 years) measured HRV before and after a sham procedure and a thoracic spinal manipulation.

Results

In healthy young adults, thoracic spinal manipulation was associated with changes in HRV that were not duplicated by the sham procedure. The ratio of the powers of the low-frequency and high-frequency components increased from 0.9562 ± 0.9192 to 1.304 ± 1.118 ($P = .0030$, Wilcoxon signed rank test). In subjects undergoing sham spinal manipulation, there was no statistically significant change in the low-frequency or the high-frequency component of the power spectrum; neither was there any in the ratio of the two regardless of whether the comparison was made using the paired t test or the Wilcoxon signed rank test.

Conclusion

High-velocity and low-amplitude manipulation of the thoracic spine appears to be able to influence autonomic output to the heart in ways that are not duplicated by a sham procedure or by other forms of somatic/physical therapies.

Manipulation/prevention of stress fracture

J Am Osteopath Assoc. 2013 Dec;113(12):882-90. doi: 10.7556/jaoa.2013.066.

Preventive osteopathic manipulative treatment and stress fracture incidence among collegiate cross-country athletes.

Brumm LF, Janiski C, Balawender JL, Feinstein A.

Source

ATC, University of New England College of Osteopathic Medicine, Department of Osteopathic Manipulative Medicine, Alford Center, 11 Hills Beach Rd, Biddeford, ME 04005-9526.
janiskic@msu.edu.

Abstract

CONTEXT:

Stress fractures are common among athletes, particularly distance runners, with many theories regarding the etiologic process of stress fractures and various studies identifying risk factors or suggesting preventive techniques. To our knowledge, no previous studies have discussed the possible causative effects of somatic dysfunction or the preventive capabilities of osteopathic manipulative treatment (OMT).

OBJECTIVE:

To apply a preventive OMT protocol for cross-country athletes to reduce the incidence of stress fractures. Design: Cohort study.

METHODS:

Examinations of cross-country athletes at an NCAA (National Collegiate Athletic Association) Division I university were performed by supervising physician-examiners and first- and second-year osteopathic medical students during several consecutive academic years. Athletes re-enrolled in the study each year they continued to be eligible. The intervention included osteopathic structural examination and OMT that focused on somatic dysfunction identified in the pelvis, sacrum, and lower extremities.

RESULTS:

More than 1800 participant examinations were performed on 124 male and female participants by 3 supervising physician-examiners and 141 osteopathic medical students over the course of 5 consecutive academic years (2004-2005 to 2008-2009). Data from these academic years were compared with data from the previous 8 academic years (1996-1997 to 2003-2004). An average of 20 new participants enrolled yearly. The number of annual stress fractures per team ranged from 0 to 6 for male participants and 1 to 6 for female participants. The cumulative annual incidence of stress fractures for male participants demonstrated a statistically significant decrease from 13.9% (20 of 144) before intervention to 1.0% (1 of 105) after intervention, resulting in a 98.7% relative reduction in stress-fracture diagnosis ($P=.019$). The cumulative annual incidence for female participants showed a minimal decrease from 12.9% (23 of 178) before intervention to 12.0% (17 of 142) after intervention, an 8.5% relative reduction in stress-fracture diagnosis ($P=.671$). The cumulative annual incidence of all participants decreased from 13.4% (43 of 322) before intervention to 7.3% (18 of 247) after intervention, a 45% relative reduction in stress-fracture diagnosis ($P=.156$).

CONCLUSION:

There was a statistically significant decrease in the cumulative annual incidence of stress fractures in male, but not female, cross-country athletes after receiving OMT.

PMID: 24285030

Chiropractic/Medicare

Spine J. 2013 Nov;13(11):1449-54. doi: 10.1016/j.spinee.2013.05.012. Epub 2013 Jun 15.

Trends in the use and cost of chiropractic spinal manipulation under Medicare Part B.

Whedon JM, Song Y, Davis MA.

SourceThe Dartmouth Institute for Health Policy and Clinical Practice, Dartmouth College, 30 Lafayette St, Lebanon, NH 03756, USA. Electronic address: james.m.whedon@dartmouth.edu.

Abstract

BACKGROUND CONTEXT:Concern about improper payments to chiropractic physicians prompted the US Department of Health and Human Services to describe chiropractic services as a "significant vulnerability" for Medicare, but little is known about trends in the use and cost of chiropractic spinal manipulation provided under Medicare.

PURPOSE:To quantify the volume and cost of chiropractic spinal manipulation services for older adults under Medicare Part B and identify longitudinal trends.

STUDY DESIGN/SETTING:Serial cross-sectional design for retrospective analysis of administrative data.

PATIENT SAMPLE:Annualized nationally representative samples of 5.0 to 5.4 million beneficiaries.

OUTCOME MEASURES:Chiropractic users, allowed services, allowed charges, and payments.

METHODS: Descriptive statistics were generated by analysis of Medicare administrative data on chiropractic spinal manipulation provided in the United States from 2002 to 2008. A 20% nationally representative sample of allowed Medicare Part B fee-for-service claims was merged, based on beneficiary identifier, with patient demographic data. The data sample was restricted to adults aged 65 to 99 years, and duplicate claims were excluded. Annualized estimates of outcome measures were extrapolated, per beneficiary and per user rates were estimated, and volumes were stratified by current procedural terminology code.

RESULTS:

The number of Medicare beneficiaries who used chiropractic spinal manipulation grew 13% from 2002 to 2004, remained flat through 2007, and then declined 5% through 2008. An estimated 1.7 million beneficiaries (6.9%) used 18.6 million allowed chiropractic services in 2008. In inflation-adjusted dollars, allowed charges per user increased 4% through 2005 and then declined by 17% through 2008; payments per user increased by 5% from 2002 to 2005 and then declined by 18% through 2008. Expenditures for chiropractic in 2008 totaled an estimated \$420 million.

Longitudinal trends in allowed claims for spinal manipulation varied by procedure: the relative frequency of treatment of one to two spinal regions declined from 43% to 29% of services, treatment of three to four regions increased from 48% to 62% of services, and treatment of five regions remained flat at 9% of services.

CONCLUSIONS:

Chiropractic claims account for less than 1/10th of 1% of overall Medicare expenditures. Allowed services, allowed charges, and fee-for-service payments for chiropractic spinal manipulation under Medicare Part B generally increased from 2002, peaked in 2005 and 2006, and then declined through 2008. Per user spending for chiropractic spinal manipulation also declined by 18% from 2006 to 2008, in contrast to 10% growth in total spending per beneficiary and 16% growth in overall Medicare spending.

Copyright © 2013 Elsevier Inc. All rights reserved.**KEYWORDS:** Aged, Chiropractic, Medicare, UsePMID: 23773429 [

Calcaneal manip

Man Ther. 2013 Nov 10. pii: S1356-689X(13)00188-4. doi: 10.1016/j.math.2013.11.001.

Acute effects of rearfoot manipulation on dynamic standing balance in healthy individuals.

Wassinger CA, Rockett A, Pitman L, Murphy MM, Peters C.

Source

East Tennessee State University, Department of Physical Therapy, Johnson City, TN 37604, United States. Electronic address: wassinger@etsu.edu.

Abstract

Dynamic standing balance is essential to perform functional activities and is included in the treatment of many lower extremity injuries.

Physiotherapists utilize many methods to restore standing balance including stability exercises, functional retraining, and manual therapy. The purpose of this study was to investigate the effects of a rearfoot distraction manipulation on dynamic standing balance. Twenty healthy participants (age: 24.4 ± 2.8 years; height: 162.9 ± 37.7 cm; mass: 68.0 ± 4.8 kg; right leg dominant = 20) completed this study. Following familiarization, dynamic standing balance was assessed during: (1) an experimental condition immediately following a rearfoot distraction manipulation, and (2) a control condition. Dominant leg balance was quantified using the Y-balance test which measures lower extremity reach distances. Reach distances were normalized to leg length and measured in the anterior, posteromedial and posterolateral directions. Overall balance was calculated through the summing of all normalized directions. Paired t-tests and Wilcoxon rank tests were used to compare balance scores for parametric and non-parametric data as appropriate. Significance was set at 0.05 a priori. Effect size (ES) was calculated to determine the clinical impact of the manipulation. Increased reach distances (indicating improved balance) were noted following manipulation for overall balance ($p = 0.03$, $ES = 0.26$) and in the posteromedial direction ($p = 0.01$, $ES = 0.42$). Reach distances did not differ for the anterior ($p = 0.11$, $ES = 0.16$) or posterolateral ($p = 0.11$, $ES = 0.25$) components.

Dynamic standing balance improved after a rearfoot distraction manipulation in healthy participants. It is hypothesized that manual therapy applied to the foot and ankle may be beneficial to augment other therapeutic modalities when working with patients to improve dynamic standing balance.

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KEYWORDS:

Ankle, Dynamic standing balance, Manipulation

PMID: 24291363

STM

Trigger points

J Pain. 2013 Nov 1. pii: S1526-5900(13)01318-7. doi: 10.1016/j.jpain.2013.10.009.

Latent myofascial trigger points are associated with an increased intramuscular electromyographic activity during synergistic muscle activation.

Ge HY, Monrde S, Graven-Nielsen T, Arendt-Nielsen L.

Source

Laboratory for Musculoskeletal Pain and Motor Control, Center for Sensory-Motor Interaction (SMI), Department of Health Science and Technology, Aalborg University, Aalborg, DK-9220, Denmark. Electronic address: ghy@hst.aau.dk.

Abstract

The aim of this study was to evaluate intramuscular muscle activity from a latent myofascial trigger point (MTP) in a synergistic muscle during isometric muscle contraction.

Intramuscular activity was recorded with an intramuscular electromyographic (EMG) needle inserted into a latent MTP or a non-MTP in upper trapezius at rest and during isometric shoulder abduction at 90° performed at 25% of maximum voluntary contraction in 15 healthy subjects. Surface EMGs were recorded from the middle deltoid muscle, upper-, middle-, and lower- parts of the trapezius muscle. Maximal pain intensity and referred pain induced by EMG needle insertion and maximal pain intensity during contraction were recorded on a visual analogue scale (VAS). The results showed that higher VAS scores were observed following needle insertion and during muscle contraction for latent MTPs than non-MTPs ($P < 0.01$). The intramuscular EMG activity in the upper trapezius muscle was significantly higher at rest and during shoulder abduction at latent MTPs compared with non-MTPs ($P < 0.001$).

This study provides evidence that latent MTPs are associated with increased intramuscular, but not surface, EMG amplitude of synergist activation. The increased amplitude of synergistic muscle activation may result in incoherent muscle activation pattern of synergists inducing spatial development of new MTPs and the progress to active MTPs.

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KEYWORDS:

Intramuscular electromyography, isometric contraction, motor control, muscle synergy, myofascial trigger points PMID: 24189107

Massage/STM/Carpel tunnel

J Bodyw Mov Ther. 2013 Jul;17(3):332-8. doi: 10.1016/j.jbmt.2012.12.003. Epub 2012 Dec 23.

Massage therapy as an effective treatment for carpal tunnel syndrome.

Elliott R, Burkett B.

Source

Centre for Healthy Activities Sport and Exercise, University of the Sunshine Coast,
Maroochydore, DC 4558, Australia.

Abstract

Carpal tunnel syndrome is a common peripheral entrapment that causes neuralgia in the median nerve distribution of the hand. The primary aim of this study was to evaluate the efficacy of massage therapy as a treatment for carpal tunnel syndrome. Within this process, the locations of trigger-points that refer neuropathy to the hand were identified. The creation of massage pressure tables provides a means of treatment reproducibility. Twenty-one participants received 30 min of massage, twice a week, for six weeks. Carpal tunnel questionnaires, the Phalen, Tinel, and two-point discrimination tests provided outcome assessment. The results demonstrated significant ($p < 0.001$) change in symptom severity and functional status from two weeks.

Based on this study, the combination of massage and trigger-point therapy is a viable treatment option for carpal tunnel syndrome and offers a new treatment approach.

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PMID: 23768278

Muscles

Compartment syndrome

Am J Sports Med. 2013 Aug 2.

Risk Factors for Chronic Exertional Compartment Syndrome in a Physically Active Military Population.

Waterman BR, Liu J, Newcomb R, Schoenfeld AJ, Orr JD, Belmont PJ Jr.

Source

Department of Orthopaedic Surgery and Rehabilitation, William Beaumont Army Medical Center, El Paso, Texas.

Abstract

BACKGROUND: Chronic exertional compartment syndrome (CECS) is a common source of lower extremity pain in physically active military service members. While anatomic risk factors of CECS have been proposed, there is no existing study that evaluates the correlation of demographic and occupational risk factors and the overall incidence rate of CECS in an active military population.

HYPOTHESIS: Young, enlisted service members in the United States (US) ground military forces would demonstrate higher incidence rates of CECS in the study population because of greater exposure to at-risk dismounted activity on the battlefield and in training.

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

METHODS: A retrospective study of all US active military service members with diagnosed nontraumatic exertional compartment syndrome of the lower extremity (code 729.72 in the International Classification of Diseases, 9th Edition) between 2006 and 2011 was performed using the Defense Medical Epidemiology Database. Demographic and occupational risk factors such as sex, age, race, branch of military service, and military rank were individually subcategorized, and cumulative and subgroup incidence rates of CECS were calculated using a multivariate Poisson regression model.

RESULTS: A total of 4100 diagnosed cases of CECS were identified within an at-risk population of 8,320,201, which correlates to an incidence rate of 0.49 cases per 1000 person-years. The annual adjusted incidence rate of CECS increased from 0.06 cases per 1000 person-years in 2006 to 0.33 cases per 1000 person-years in 2009. Increasing chronological age, female sex, white race, junior enlisted rank, and Army service were significantly correlated with an elevated risk for CECS.

CONCLUSION: This study systematically evaluated the epidemiology of CECS among an idealized subset at risk for this condition. Sex, age, race, military rank, and branch of service were all important factors associated with the incidence of CECS in this physically active population.

KEYWORDS: chronic exertional compartment syndrome, epidemiology, exercise induced, military PMID: 23911700

Compartment/botulism

Am J Sports Med. 2013 Aug 22.

Intramuscular Pressure Before and After Botulinum Toxin in Chronic Exertional Compartment Syndrome of the Leg: A Preliminary Study.

Isner-Horobeti ME, Dufour SP, Blaes C, Lecocq J.

Source

Physical and Rehabilitation Medicine Department, Strasbourg University, University Institute of Rehabilitation Clémenceau, Strasbourg, France.

Abstract

BACKGROUND: Botulinum toxin A (BoNT-A) is used in the treatment of muscle hypertrophy but has never been used in chronic exertional compartment syndrome (CECS). The objective diagnostic criterion in this condition is an abnormally elevated intramuscular pressure (IMP) in the compartment. In this study, the IMP was measured 1 minute (P1) and 5 minutes (P5) after the exercise was stopped before and after BoNT-A injection.

HYPOTHESIS: Botulinum toxin A reduces the IMP (P1 and P5) and eliminates the pain associated with

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

METHODS: Botulinum toxin A was injected into the muscles of moderately trained patients with an anterior or anterolateral exertional compartment syndrome of the leg. The BoNT-A dose (mean \pm SD) ranged from 76 ± 7 to 108 ± 10 U per muscle, depending on which of the 5 muscles in the 2 compartments were injected. The primary end point was IMP (P1, P5). Secondary end points were exertional pain, muscle strength, and safety. Follow-up was conducted up to 9 months.

RESULTS: A total of 25 anterior compartments and 17 lateral compartments were injected in 16 patients. The time interval (mean \pm SD) between the BoNT-A injection and after BoNT-A injection IMP measurement was 4.4 ± 1.6 months (range, 3-9 months). In the anterior compartment, P1 and P5 fell by $63\% \pm 17\%$ ($P < .00001$) and $59\% \pm 24\%$ ($P < .0001$), respectively; in the lateral compartment, P1 and P5 fell by $68\% \pm 21\%$ ($P < .001$) and $63\% \pm 21\%$ ($P < .01$), respectively. Exertional pain and muscle strength were monitored, based on the Medical Research Council score. The exertional pain was completely eliminated in 15 patients (94%). In 5 patients (31%), the strength of the injected muscles remained normal. In 11 patients (69%), strength decreased from 4.5 (out of 5) to 3.5 ($P < .01$), although without functional consequences. In the conditions of this study, BoNT-A showed a good safety profile in patients with CECS.

CONCLUSION: In this case series, BoNT-A reduced the IMP and eliminated exertional pain in anterior or anterolateral CECS of the leg for up to 9 months after the intervention. The mode of action of BoNT-A is still unclear. A randomized controlled study should be carried out to determine whether BoNT-A can be used as a medical alternative to surgical treatment.

KEYWORDS: botulinum toxin, exertional compartment syndrome, intramuscular pressure, leg pain PMID: 23969633

Compartment syndrome/Surgery

Br J Sports Med. 2013 Sep 24. doi: 10.1136/bjsports-2013-092518.

Is surgery effective for deep posterior compartment syndrome of the leg? A systematic review.

Winkes MB, Hoogeveen AR, Scheltinga MR.

Source

Department of Surgery, Máxima Medical Center, Veldhoven, The Netherlands.

Abstract

BACKGROUND:

Results of surgery for lower leg deep posterior chronic exertional compartment syndrome (dp-CECS) are inferior compared to other types of CECS. Factors influencing suboptimal surgical results are unknown. The purpose of this systematic review was to provide a critical analysis of the existing literature on the surgical management of dp-CECS aimed at identifying parameters determining surgical results.

METHODS:

A literature search was performed using Pubmed, EMBASE, MEDLINE and CINAHL (EBSCO). Studies including surgical results for dp-CECS were systematically reviewed.

RESULTS:

7 studies of level III evidence reporting on a total of 131 patients met inclusion criteria (>5 patients, reporting intracompartmental pressures (ICP), clearly stating postoperative outcome). Only four studies strictly adhered to predefined ICP criteria. Cutoff ICP levels varied widely among the 7 studies. Surgical procedures ranged from a superficial crural fasciotomy to multiple fasciotomies of various deep posterior compartments. No single surgical procedure proved superior. Prolonged high ICP levels following provocation were associated with postoperative success. Success rates after fasciotomy were modest ranging from 30% to 65%. Risk factors for failure of surgery were not identified.

CONCLUSIONS:

The quality of studies reporting on surgery for dp-CECS is poor. Prospective, controlled or randomised studies are lacking. Diagnostic criteria and surgical techniques are diverse. As functional results of current management regimes are disappointing, future studies of dp-CECS should focus on optimising diagnostic criteria and standardisation of treatment modalities.

KEYWORDS: Adolescents, Athletics, Lower extremity injuries, Lower limb surgery, Muscle damage/injuries PMID:24065078

Hamstrings

Knee Surg Sports Traumatol Arthrosc. 2013 Nov 5.

The hamstring muscle complex.

van der Made AD, Wieldraaijer T, Kerkhoffs GM, Kleipool RP, Engebretsen L, van Dijk CN, Golanó P.

Source

Department of Orthopaedic Surgery, Academic Medical Center, University of Amsterdam, PO Box 22700, 1100 DE, Amsterdam, The Netherlands, a.d.vandermade@amc.uva.nl.

Abstract

PURPOSE:

The anatomical appearance of the hamstring muscle complex was studied to provide hypotheses for the hamstring injury pattern and to provide reference values of origin dimensions, muscle length, tendon length, musculotendinous junction (MTJ) length as well as width and length of a tendinous inscription in the semitendinosus muscle known as the raphe.

METHODS:

Fifty-six hamstring muscle groups were dissected in prone position from 29 human cadaveric specimens with a median age of 71.5 (range 45-98).

RESULTS:

Data pertaining to origin dimensions, muscle length, tendon length, MTJ length and length as well as width of the raphe were collected. Besides these data, we also encountered interesting findings that might lead to a better understanding of the hamstring injury pattern. These include overlapping proximal and distal tendons of both the long head of the biceps femoris muscle and the semimembranosus muscle (SM), a twist in the proximal SM tendon and a tendinous inscription (raphe) in the semitendinosus muscle present in 96 % of specimens.

CONCLUSION:

No obvious hypothesis can be provided purely based on either muscle length, tendon length or MTJ length. However, it is possible that overlapping proximal and distal tendons as well as muscle architecture leading to a resultant force not in line with the tendon predispose to muscle injury, whereas the presence of a raphe might play a role in protecting the muscle against gross injury. Apart from these architectural characteristics that may contribute to a better understanding of the hamstring injury pattern, the provided reference values complement current knowledge on surgically relevant hamstring anatomy. LEVEL OF EVIDENCE: IV.

PMID: 24190369

Stretching

Gastroc/foot position

Foot Ankle Int. 2013 Nov 20.

The Effect of Subtalar Joint Position on Dorsiflexion of the Ankle/Rearfoot Versus Midfoot/Forefoot During Gastrocnemius Stretching.

Johanson MA, Dearment A, Hines K, Riley E, Martin M, Thomas J, Geist K.

Source

Emory University School of Medicine, Atlanta, GA, USA.

Abstract

BACKGROUND:

Limited ankle joint dorsiflexion passive range of motion (PROM) has been associated with common chronic lower extremity conditions, and clinicians often instruct patients in stretching exercises to increase dorsiflexion. However, little is known about how subtalar joint (STJ) position affects dorsiflexion at the midfoot/forefoot versus ankle/rearfoot during gastrocnemius stretching. The purpose of this study was to determine if more dorsiflexion occurs at the ankle/rearfoot and less at the midfoot/forefoot during gastrocnemius stretching with the STJ positioned in supination versus pronation.

METHODS:

In this repeated measures design, 27 participants (23 females, 4 males; mean age = 31.3 years, SD = 10.7) with current or recent history of lower extremity chronic conditions and less than 10 degrees ankle dorsiflexion measured with the knee in extension on the involved side(s) performed five 30-second gastrocnemius stretching trials in pronation and supination on each side in a randomly determined sequence. A 7-camera Vicon Motion Analysis System and an AMTI force plate were used to measure midfoot/forefoot dorsiflexion, ankle/rearfoot dorsiflexion, knee extension, and normalized vertical ground reaction force.

RESULTS:

Two-way repeated measures ANOVA revealed a significant increase in midfoot/forefoot dorsiflexion when stretching in pronation compared to supination ($P < .001$). ANOVAs also demonstrated significantly more extension of the knee when stretching in supination compared to pronation ($P < .001$), and increased normalized vertical ground reaction force when stretching in supination compared to pronation ($P = .032$). With the numbers available, no significant difference in ankle/rearfoot dorsiflexion when stretching in supination compared to pronation could be detected ($P > .05$).

CONCLUSION:

Gastrocnemius stretching in pronation resulted in more dorsiflexion at the midfoot/forefoot than stretching in supination.

CLINICAL RELEVANCE:

Clinicians may want to consider STJ position during gastrocnemius stretching to either facilitate or limit recruitment of dorsiflexion motion at the midfoot/forefoot.

KEYWORDS: ankle dorsiflexion, gastrocnemius stretching, subtalar joint PMID: 24259750

BET
Exercise

Pilates

Phys Ther. 2013 Oct 31.

The Definition and Application of Pilates Exercise to Treat People With Chronic Low Back Pain: A Delphi Survey of Australian Physical Therapists.

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

Source

C. Wells, School of Science and Health, University of Western Sydney, Locked Bag 1797, Penrith, New South Wales, Australia 2751.

Abstract

BACKGROUND:

Pilates exercise is recommended for people with chronic low back pain (CLBP). In the literature, however, Pilates exercise is described and applied differently to treat people with CLBP. This makes it difficult to evaluate its effectiveness.

OBJECTIVE:

The aim of this study was to establish a consensus regarding the definition and application of Pilates exercise to treat people with CLBP.

METHODS:

A panel of 30 Australian physiotherapists, experienced in treating people with CLBP using Pilates exercise, were surveyed using the Delphi technique. Three electronic questionnaires were used to collect opinions. Answers to open-ended questions were analysed thematically, combined with systematic literature review findings, and translated into statements about Pilates exercise for people with CLBP. Participants then rated their level of agreement with these statements using a six-point Likert scale. Consensus was achieved when 70% of panel members strongly agreed, agreed, or somewhat agreed with an item, or strongly disagreed, disagreed, or somewhat disagreed.

RESULTS:

Thirty physiotherapists completed all 3 questionnaires and reached a consensus on the majority of items. Participants agreed that Pilates exercise requires body awareness, breathing, movement control, posture, and education. It was recommended that people with CLBP should undertake supervised sessions for 30-60 minutes twice per week for 3-6 months. Participants also suggested that people with CLBP would benefit from individualized assessment and exercise prescription, supervision and functional integration of exercises, and use of specialised equipment.

CONCLUSION:

These findings contribute to a better understanding of Pilates exercise and how it is utilised by physiotherapists to treat people with CLBP. This information provides direction for future research into Pilates exercise but findings need to be interpreted within the context of study limitations.

PMID: 24179139

C spine deep flexor strengthening

J Manipulative Physiol Ther. 2013 Nov-Dec;36(9):604-11. doi: 10.1016/j.jmpt.2013.08.004.
Epub 2013 Oct 21.

Effects of deep cervical flexor training on pressure pain thresholds over myofascial trigger points in patients with chronic neck pain.

Lluch E, Arguisuelas MD, Coloma PS, Palma F, Rey A, Falla D.

Source

PhD student, Department of Physiotherapy, University of Valencia, Valencia, Spain.

Abstract

OBJECTIVE:

The purpose of this study was to assess the effects of a low-load training program for the deep cervical flexors (DCFs) on pain, disability, and pressure pain threshold (PPT) over cervical myofascial trigger points (MTrPs) in patients with chronic neck pain.

METHODS:

Thirty patients with chronic idiopathic neck pain participated in a 6-week program of specific training for the DCF, which consisted of active craniocervical flexion performed twice per day (10-20 minutes) for the duration of the trial. Perceived pain and disability (Neck Disability Index, 0-50) and PPT over MTrPs of the upper trapezius, levator scapulae, and splenius capitis muscles were measured at the beginning and end of the training period.

RESULTS:

After completion of training, there was a significant reduction in Neck Disability Index values (before, 18.2 ± 12.1 ; after, 13.5 ± 10.6 ; $P < .01$). However, no significant changes in PPT were observed over the MTrPs.

CONCLUSION:

Patients performing DCF training for 6 weeks demonstrated reductions in pain and disability but did not show changes in pressure pain sensitivity over MTrPs in the splenius capitis, levator scapulae, or upper trapezius muscles.

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KEYWORDS: Exercise, Neck Muscles, Neck Pain, Trigger Points PMID: 24152997

Vibration

J Manipulative Physiol Ther. 2013 Nov-Dec;36(9):564-71. doi: 10.1016/j.jmpt.2013.09.001.
Epub 2013 Oct 22.

Trunk neuromuscular responses to a single whole-body vibration session in patients with chronic low back pain: a cross-sectional study.

Boucher JA, Abboud J, Dubois JD, Legault E, Descarreaux M, Henchoz Y.

Source

PhD student, Département de Psychologie, Université du Québec à Trois-Rivières, Trois-Rivières, Québec, Canada.

Abstract

OBJECTIVE:

Whole-body vibration (WBV) exercise is progressively adopted as an alternative therapeutic modality for enhancing muscle force and muscle activity via neurogenic potentiation. So far, possible changes in the recruitment patterns of the trunk musculature after WBV remain undetermined. The main objective of this study was to evaluate the short-term effects of a single WBV session on trunk neuromuscular responses in patients with chronic low back pain (cLBP) and healthy participants.

METHODS:

Twenty patients with cLBP and 21 healthy participants performed 10 trunk flexion-extensions before and after a single WBV session consisting of five 1-minute vibration sets. Surface electromyography (EMG) of erector spinae at L2-L3 and L4-L5 and lumbopelvic kinematic variables were collected during the trials. Data were analyzed using 2-way mixed analysis of variance models.

RESULTS:

The WBV session led to increased lumbar EMG activity during the flexion and extension phases but yielded no change in the quiet standing and fully flexed phases. Kinematic data showed a decreased contribution to the movement of the lumbar region in the second extension quartile. These effects were not different between patients with cLBP and healthy participants.

CONCLUSIONS:

Increased lumbar EMG activity after a single WBV session most probably results from potentiation effects of WBV on lumbar muscles reflex responses. Decreased EMG activity in full trunk flexion, usually observed in healthy individuals, was still present after WBV, suggesting that the ability of the spine stabilizing mechanisms to transfer the extension torque from muscles to passive structures was not affected.

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KEYWORDS:

Electromyography, Kinematics, Low Back Pain, Vibration

PMID: 24156915

Group exercise/LBP

A physiotherapy survey to investigate the use of exercise therapy and group exercise programmes for management of non-specific chronic low back pain

Author: Daulat, Alex

Source: International Musculoskeletal Medicine, Volume 35, Number 3, September 2013 , pp. 106-116(11)

Publisher: Maney Publishing

Objectives

To establish exercise prescription by individual therapists as well as the type and content of group exercise programmes used in clinical practice for management of chronic low back pain (CLBP).

Introduction

Group exercise programmes are a cost-effective treatment for managing CLBP but lack individualized exercise and education specific to the patient. Those patients for whom English is not their first language may be excluded from attending these programmes.

Methods

One hundred and fifty-four questionnaires were sent to 15 physiotherapy departments using convenience sampling within the Greater London area including 2 in independent practice. Closed questions and free response spaces provided were used to obtain information on exercise prescription and the content of group exercise programmes.

Results

There was a 63% response rate. Stretching, core stability, and lumbar stabilization were the most frequently used exercise types by individual therapists. Ninety seven percent of respondents utilized group programmes. Only 47% of all respondents were able to refer non-English speaking patients to the group programmes. The most frequently used group exercise was the Back to Fitness Programme. Group programmes generally lacked individualized exercises and education given on an individual basis. None of the group programmes offered manual therapy.

Conclusions

An alternative group physiotherapy programme should be considered alongside current programmes consisting of an individualized multimodal exercise programme carried over from the referring therapist. This group programme would consist of individual education sessions and manual therapy if appropriate. This would allow interpreters to be arranged for patients for whom English is not their first language.

Keywords: Chronic low back pain; Core stability; Exercise programme; Lumbar stabilization; Multimodal

LBP/Exercise prescription

Eur J Pain. 2013 Sep 24. doi: 10.1002/j.1532-2149.2013.00403.x.

Should physical activity recommendation depend on state of low back pain?

Holtermann A, Clausen T, Jørgensen MB, Mork PJ, Andersen LL.

Source

National Research Centre for the Working Environment, Copenhagen, Denmark.

Abstract

BACKGROUND:

Leisure time physical activity is recommended for preventing long-term sickness absence (LTSA). Although low back pain (LBP) is a risk factor for sickness absence and physical activity is recommended for people with LBP, it is unknown if leisure time physical activity prevents LTSA among persons with different levels of LBP.

METHODS:

Prospective cohort study among 8655 Danish female healthcare workers responding to a questionnaire in 2004-2005 on leisure time physical activity and LBP, and subsequently followed for 1 year on periods with LTSA \geq 2 consecutive weeks or more of sickness absence in a national register of social transfer payments (DREAM). Multi-adjusted Cox regression analysis was used to model risk estimates for LTSA associated with low, moderate, high and very high leisure time physical activity at baseline among healthcare workers with no LBP (0 days past 12 months, n = 2761), non-chronic LBP (1-30 days the past 12 months, n = 3942) and persistent LBP (>30 days the past 12 months, n = 1952).

RESULTS:

A strongly reduced risk for LTSA from high leisure time physical activity was found among healthcare workers with no LBP [hazard ratio (HR): 95% confidence interval (CI) 0.47:0.23-0.97 for low vs. very high activity] and non-chronic LBP (HR: 95%CI 0.43:0.23-0.84 of low vs. very high activity), but not among healthcare workers with persistent LBP (HR: 95%CI 1.15:0.55-2.44 of low vs. very high activity).

CONCLUSIONS:

Leisure time physical activity is a strong predictive factor on LTSA among female healthcare workers with no and non-chronic LBP, but not among those with more persistent LBP.

Extensor muscles

Research article

Relationship of moderate and low isometric lumbar extension through architectural and muscular activity variables: a cross sectional study

Antonio I Cuesta-Vargas and Manuel Gonzalez-Sanchez

BMC Medical Imaging 2013, **13**:38 doi:10.1186/1471-2342-13-38

Background

No study relating the changes obtained in the architecture of erector spinae (ES) muscle were registered with ultrasound and different intensities of muscle contraction recorded by surface EMG (electromyography) on the ES muscle was found. The aim of this study was analyse the relationship in the response of the ES muscle during isometric moderate and light lumbar isometric extension considering architecture and functional muscle variables.

Methods

Cross-sectional study. 46 subjects (52% men) with a group mean age of 30.4 (+/-7.78). The participants developed isometric lumbar extension while performing moderate and low isometric trunk and hip extension in a sitting position with hips flexed 90 degrees and the lumbar spine in neutral position. During these measurements, electromyography recordings and ultrasound images were taken bilaterally. Bilaterally pennation angle, muscle thickness, torque and muscle activation were measured. This study was developed at the human movement analysis laboratory of the Health Science Faculty of the University of Malaga (Spain).

Results

Strong and moderate correlations were found at moderate and low intensities contraction between the variable of the same intensity, with correlation values ranging from 0.726 (Torque Moderate - - EMG Left Moderate) to 0.923 (Angle Left Light -- Angle Right Light) ($p < 0.001$). This correlation is observed between the variables that describe the same intensity of contraction, showing a poor correlation between variables of different intensities.

Conclusion

There is a strong relationship between architecture and function variables of ES muscle when describe an isometric lumbar extension at light or moderate intensity

Exercise cholesterol

Sports Med. 2013 Oct 31.

Differential Effects of Aerobic Exercise, Resistance Training and Combined Exercise Modalities on Cholesterol and the Lipid Profile: Review, Synthesis and Recommendations.

Mann S, Beedie C, Jimenez A.

Source

UKActive Research Institute, Centre for Sports Science and Human Performance, University of Greenwich, Chatham Maritime, Kent, ME4 4TB, UK, stevemann480@gmail.com.

Abstract

There is a direct relationship between chronically elevated cholesterol levels (dyslipidaemia) and coronary heart disease.

A reduction in total cholesterol is considered the gold standard in preventative cardiovascular medicine. Exercise has been shown to have positive impacts on the pathogenesis, symptomatology and physical fitness of individuals with dyslipidaemia, and to reduce cholesterol levels. The optimal mode, frequency, intensity and duration of exercise for improvement of cholesterol levels are, however, yet to be identified. This review assesses the evidence from 13 published investigations and two review articles that have addressed the effects of aerobic exercise, resistance training and combined aerobic and resistance training on cholesterol levels and the lipid profile.

The data included in this review confirm the beneficial effects of regular activity on cholesterol levels and describe the impacts of differing volumes and intensities of exercise upon different types of cholesterol. Evidence-based exercise recommendations are presented, aimed at facilitating the prescription and delivery of interventions in order to optimize cholesterol levels.

PMID: 24174305

Lumbar ex

PM R. 2013 Nov 7. pii: S1934-1482(13)01148-9. doi: 10.1016/j.pmrj.2013.11.002.

Back Strength Predicts Walking Improvement in Obese, Older Adults With Chronic Low Back Pain.

Vincent HK, Vincent KR, Seay AN, Conrad BP, Hurley RW, George SZ.

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Abstract

OBJECTIVE: To compare the effects of four months of isolated lumbar resistance exercise and total body resistance exercise on walking performance in obese, older adults with chronic low back pain (LBP). A secondary analysis examined whether responsiveness to training modulated walking improvement.

DESIGN:

Randomized, controlled trial (RCT) **SETTING:** Research laboratory affiliated with tertiary care facility **METHODS:** and **Intervention:** Participants (N=49; 60-85 years) were randomized into a 4-month resistance exercise intervention (TOTRX), lumbar extensor exercise intervention (LEXT) or a control group (CON).

MAIN OUTCOME MEASUREMENTS:

Walking performance, maximal low back strength and leg strength, and average resting and low back pain severity score (from an 11-point numerical pain rating scale; NRS_{pain}) were collected at baseline and month four.

RESULTS:

The TOTRX and LEXT improved lumbar extensor strength relative to CON, and the TOTRX ($p < .05$). NRS_{pain} scores at month four were lowest in the TOTRX group compared to the LEXT and CON groups, respectively (2.0 ± 1.7 points versus 3.7 ± 2.6 points and 4.6 ± 2.4 points; $p < .006$). 53% and 67% of participants in the TOTRX and LEXT groups were responders who made lumbar extensor strength gains that achieved $\geq 20\%$ greater than baseline values. Although the TOTRX demonstrated the greatest improvement in walking endurance among the intervention groups, this did not reach significance ($10.1 \pm 12.2\%$ improvement in TOTRX versus $7.4 \pm 30.0\%$ LEXT and $-1.7 \pm 17.4\%$ CON; $p = .11$). Gait speed increased most in the TOTRX ($9.0 \pm 13.5\%$) compared to the LEXT and CON groups ($p < .05$). The change lumbar extensor strength explained 10.6% of the variance of the regression model for the change in walking endurance ($p = .024$).

CONCLUSIONS:

LEXT and TOTRX made similar modest improvements in walking endurance. Lumbar extensor strength gain compared to leg strength gain is a moderate but important contributor to walking endurance in obese older adults with chronic LBP. Responders to resistance exercise programs (even those with only lumbar extension exercise) who make at least a 20% improvement in strength can expect better improvement in walking endurance than those who do not achieve this strength improvement.

Copyright © 2013 American Academy of Physical Medicine and Rehabilitation. Published by Elsevier Inc. All rights reserved. **KEYWORDS:** low back, obesity, pain, physical function Introduction, walking PMID: 24211698

Lumbar Extensor strengthening

Br J Sports Med. 2013 Oct 3. doi: 10.1136/bjsports-2013-092197.

A review of the specificity of exercises designed for conditioning the lumbar extensors.

Steele J, Bruce-Low S, Smith D.

Source

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Abstract

OBJECTIVE:

To review the specificity of exercises designed to condition the lumbar extensor musculature (ie, lumbar erector spinae and multifidus).

METHODS:

A review of studies examining effects of exercises designed to condition the lumbar extensors was conducted. Included were studies that examined the acute activation and chronic adaptation of the lumbar extensor musculature in response to benches and roman chair trunk extensions, free weights exercises (ie, deadlifts, squats, good-mornings, etc), floor and stability ball exercise (ie, trunk extensions, bridging, four-point kneeling, etc) and resistance machines (ie, those with and without pelvic restraints).

RESULTS:

Evidence suggests that the reviewed exercises designed to condition the lumbar extensors all may result in significant activation of this musculature during their performance. However, examination of training studies shows that for benches and roman chair trunk extensions, free weights exercises, floor and stability ball exercise and resistance machines without appropriate pelvic restraints, evidence suggests that they may be less effective for inducing chronic adaptations in the lumbar extensors as a result of their performance. Contrastingly, resistance machines that employ appropriate pelvic restraint to isolate lumbar extension are better evidenced to confer specific adaptations to the lumbar extensors.

CONCLUSIONS:

Numerous exercise approaches have been designed with the intention of conditioning the lumbar extensors. Those examined appear to activate the lumbar extensors; however, the specificity of many of these exercises for producing chronic adaptations may be questionable, potentially due to the compound nature of them allowing involvement of other musculature such as the hip extensors. Many of the reviewed exercises offer potential to condition the lumbar extensors, however, isolation of lumbar extension through appropriate pelvic restraint appears important for optimising specific adaptations in the lumbar extensors.

KEYWORDS:

Back injuries, Exercise, Injury Prevention, Physiotherapy, Sporting injuries

PMID: 24092889

Eccentric/strengthening

Research article

Strength gain through eccentric isotonic training without changes in clinical signs or blood markers

Thâmara Alves, Flávia A Guarnier, Fernanda AS Campoy, Mariana O Gois, Máira C Albuquerque, Patrícia M Seraphim, Jayme Netto, Luiz Carlos Vanderlei, Carlos R

BMC Musculoskeletal Disorders 2013, **14**:328 doi:10.1186/1471-2474-14-328

Background

Localized exercises are widely used in rehabilitation processes. The predominant options are exercises with an emphasis on either concentric or eccentric contractions. Eccentric exercises promote greater strength gains compared to classical concentric stimuli, but can cause muscle damage. The aim of present study was to compare strength training composed of 10 sessions with progressive loads between groups with a predominance of concentric versus eccentric contraction through an analysis of isotonic strength, pressure pain threshold, creatine kinase, tumor necrosis factor-alpha and cortisol.

Methods

One hundred twenty male subjects were divided into four groups: C1 and E1 -- single session of maximum strength with emphasis on concentric and eccentric contraction, respectively; C10 and E10 -- 10 sessions with progressive loads from 80% to maximum strength with emphasis on concentric and eccentric contraction, respectively.

Results

Isotonic strength increased by 10% in E10 following the ten training sessions. C1 and E1 exhibited a lower pressure pain threshold 48 hours after the sessions in comparison to C10 and E10, respectively. Creatine kinase was increased in C1 in comparison to baseline, with significant differences ($p \leq 0.05$) in comparison to E1 at 48 and 96 hours as well as C10 at 48, 72 and 96 hours. No significant differences were found in TNF-alpha or cortisol among the groups or evaluation times.

Conclusion

Eccentric contraction training promotes functional adaptation. Moreover, both concentric and eccentric contraction training have a protective effect on the muscle in relation to a single session of maximum strength exercise.

Walking/Osteoporosis

Menopause. 2013 Nov;20(11):1216-26. doi: 10.1097/GME.000000000000100.

Effects of walking on the preservation of bone mineral density in perimenopausal and postmenopausal women: a systematic review and meta-analysis.

Ma D, Wu L, He Z.

Source

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Abstract

OBJECTIVE:

This study aims to critically evaluate the effects of a walking intervention on bone mineral density (BMD) in perimenopausal and postmenopausal women and to identify the optimal duration of this walking exercise intervention.

METHODS:

Two independent reviewers assessed for eligibility randomized and nonrandomized controlled trials evaluating the effects of walking on BMD in perimenopausal and postmenopausal women. Heterogeneity, potential publication bias, and the quality of the included trials were assessed.

RESULTS:

Ten trials were eligible for inclusion. A meta-analysis of trials assessing lumbar spine BMD showed no significant effects (weighted mean difference [WMD] [fixed effects], 0.01 g/cm; 95% CI, -0.00 to 0.02; P = 0.05) regardless of the length of the intervention duration. BMD at the femoral neck increased after long intervention durations (6 mo to 1-2 y), although no significant effect could be seen when all trials assessing femoral neck BMD were taken into account (WMD [fixed effects], 0.01 g/cm; 95% CI, -0.00 to 0.01; P = 0.07). The effects of walking on the radius and whole body were not significant (WMD [random effects], -0.01 g/cm; 95% CI, -0.06 to 0.04; P = 0.71; and WMD [fixed effects], 0.04 g/cm; 95% CI, -0.00 to 0.08; P = 0.06, respectively).

CONCLUSIONS:

Walking as a singular exercise therapy has no significant effects on BMD at the lumbar spine, at the radius, or for the whole body in perimenopausal and postmenopausal women, although significant and positive effects on femoral neck BMD in this population are evident with interventions more than 6 months in duration.

Core
TA/Multifidus

J Pain. 2013 Oct 31. pii: S1526-5900(13)01317-5. doi: 10.1016/j.jpain.2013.10.008.

Do changes in transversus abdominis and lumbar multifidus during conservative treatment explain changes in clinical outcomes related to non-specific low back pain? A systematic review.

Wong AY, Parent EC, Funabashi M, Kawchuk GN.

Source

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Abstract

Previous research describes an inconsistent relation between temporal changes in transversus abdominis or lumbar multifidus and temporal changes in clinical outcomes.

Unfortunately, a relevant systematic review is unavailable. As a result, this systematic review was designed to summarize evidence regarding the association between temporal changes in muscle morphometry and activity in response to treatment and temporal changes in clinical outcomes. Candidate publications were identified from six electronic databases. Fifteen articles were included after scrutinization by two reviewers using the predetermined selection criteria. The methodological quality of these articles was appraised using a standard tool. These methods revealed strong evidence that temporal alterations in transversus abdominis thickness change during contraction (as measured by B-mode or M-mode ultrasound) or feedforward activation of transversus abdominis (assessed via electromyography, tissue Doppler imaging or M-mode ultrasound) were unrelated to temporal changes in LBP/LBP-related disability. There was limited evidence that temporal changes in transversus abdominis lateral sliding or lumbar multifidus endurance were unrelated to temporal changes in LBP intensity. Conflicting evidence was found for the relation between temporal changes in lumbar multifidus morphometry and temporal changes in LBP/LBP-related disability. This review highlights that temporal changes in transversus abdominis features tend to be unrelated to the corresponding LBP/LBP-related disability improvements while the relation between multifidus changes and clinical improvements remains uncertain.

PERSPECTIVE:

This systematic review highlighted that changes in morphometry or activation of transversus abdominis following conservative treatments tend not to be associated with the corresponding changes in clinical outcomes. The relation between post-treatment changes in characteristics of lumbar multifidus and clinical improvements remains uncertain.

© 2013 by the American Pain Society. **KEYWORDS:** Transversus abdominis, low back pain, lumbar multifidus, temporal changes, ultrasound imaging PMID: 24184573

Bridging/Hip abd/add

Man Ther. 2013 Nov 10. pii: S1356-689X(13)00189-6. doi: 10.1016/j.math.2013.11.002.

Effects of integrating hip movements into bridge exercises on electromyographic activities of selected trunk muscles in healthy individuals.

Park HJ, Oh DW, Kim SY.

Source

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Abstract

This study aimed to identify the electromyographic (EMG) effects in selected trunk muscles after incorporating hip movement into bridging exercise.

Twenty-six healthy adults (13 men and 13 women) volunteered for this experiment. EMG data (% maximum voluntary isometric contraction) were recorded from the rectus abdominis (RA), obliquus internus (OI), erector spinae (ES), and multifidus (MF) muscles of the dominant side while the subjects performed 3 types of bridging exercise, including bridging alone (Bridging 1), bridging with unilateral hip movements (Bridging 2), and bridging with bilateral hip movements (Bridging 3) in a sling suspension system. The RA and OI showed greater EMG activity during Bridging 2 and 3 compared to Bridging 1, with the greatest OI activity during Bridging 3 ($p < 0.05$), and the activity of the MF appeared to be greater during Bridging 3 than during Bridging 1 and 2 ($p < 0.05$). Furthermore, the OI/RA and MF/ES ratios were significantly higher for Bridging 2 (OI/RA = 1.89 ± 1.41 ; MF/ES = 1.03 ± 0.19) and Bridging 3 (OI/RA = 2.34 ± 1.86 ; MF/ES = 1.03 ± 0.15) than Bridging 1 (OI/RA = 1.35 ± 0.92 ; MF/ES = 0.98 ± 0.16). The OI/RA ratio was significantly higher for Bridging 3 than for Bridging 2.

Based on these results, adding hip abduction and adduction, particularly bilateral movements, could be a useful method to enhance OI and MF EMG activity and their activities relative to global muscles during bridging exercise.

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KEYWORDS:

Bridging exercise, Electromyography, Hip movement, Trunk muscles

PMID: 24290206

Hypermobility/exercise

Physiotherapy. 2013 Oct 5. pii: S0031-9406(13)00084-9. doi: 10.1016/j.physio.2013.09.002.

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

Palmer S, Bailey S, Barker L, Barney L, Elliott A.

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Abstract BACKGROUND:

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

OBJECTIVES: To establish the effectiveness of therapeutic exercise for JHS.

DESIGN: Systematic literature review.

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

STUDY ELIGIBILITY CRITERIA (PARTICIPANTS AND INTERVENTIONS):

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

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

RESULTS:

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

LIMITATIONS:

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

CONCLUSIONS AND IMPLICATIONS OF KEY FINDINGS:

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

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KEYWORDS: Benign hypermobility syndrome, Exercise, Exercise therapy, Joint hypermobility, Systematic review PMID: 24238699

Multifidus

Br J Sports Med. 2013 Sep 12. doi: 10.1136/bjsports-2013-092402. [Epub ahead of print]

Early multimodal rehabilitation following lumbar disc surgery: a randomised clinical trial comparing the effects of two exercise programmes on clinical outcome and lumbar multifidus muscle function.

Hebert JJ, Fritz JM, Thackeray A, Koppenhaver SL, Teyhen D.

Source School of Psychology and Exercise Science, Murdoch University, Murdoch, Western Australia, Australia.

Abstract

BACKGROUND: The optimal components of postoperative exercise programmes following single-level lumbar discectomy have not been identified. Facilitating lumbar multifidus (LM) function after discectomy may improve postoperative recovery. The aim of this study was to compare the clinical and muscle function outcomes of patients randomised to receive early multimodal rehabilitation following lumbar discectomy consisting of exercises targeting specific trunk muscles including the LM or general trunk exercises.

METHODS: We included participants aged 18 to 60 years who were scheduled to undergo single-level lumbar discectomy. After two postoperative weeks, participants were randomly assigned to receive an 8-week multimodal exercise programme including either general or specific trunk exercises. The primary outcome was pain-related disability (Oswestry Index). Secondary outcomes included low back and leg pain intensity (0-10 numeric pain rating scale), global change, sciatica frequency, sciatica bothersomeness and LM function measured with real-time ultrasound imaging. Treatment effects 10 weeks and 6 months after surgery were estimated with linear mixed models.

RESULTS:

61 participants were randomised to receive a general trunk (n=32) or specific (n=29) exercise programme. There were no between-group differences in clinical or muscle function outcomes. Participants in both groups experienced improvements in most outcome measures.

CONCLUSIONS:

Following lumbar discectomy, multimodal rehabilitation programmes comprising specific or general trunk exercises have similar effects on clinical and muscle function outcomes. Local factors such as the individual patient characteristics identified by specific assessment findings, clinician expertise and patient preferences should direct therapy selection when considering the types of exercises tested in this trial for inclusion in rehabilitation programmes following lumbar disc surgery.

KEYWORDS: Back injuries, Core stability/pelvis/hips, ribs, Exercise rehabilitation, Physiotherapy, Skeletal Muscle Physiology PMID:24029724

Posture

Disc Degeneration

Eur Spine J. 2013 Nov 13. [Epub ahead of print]

Primary prevention of disc degeneration-related symptoms.

Lazary A, Szövérfi Z, Szita J, Somhegyi A, Kümin M, Varga PP.

Source

National Center for Spinal Disorders, Buda Health Center, Kiralyhago u. 1-3., Budapest, 1126, Hungary, aron.lazary@bhc.hu.

Abstract

INTRODUCTION:

It has been shown previously that a history of low back pain often begins in childhood or adulthood. Indeed, the prevalence of severe back symptoms among schoolchildren is not insignificant. Possibilities for the primary prevention of intervertebral disc degeneration-related conditions are poorly reported in the literature despite the assumed socio-economical impact of the prevention of these conditions.

METHODS:

In this review, the authors have collated published data on the prevalence and risk factors of childhood low back pain as well as the structure and results of published primary prevention programs.

RESULTS:

The prevalence of self-reported low back pain is 7-65 % among children and it increases with age. Several lifestyle factors have been reported as significant risk factors for back pain, many of which are related to the schools. Current educational primary prevention programs in schools show no clear or long-term stable effect.

CONCLUSION:

Considering the growing evidence about the importance of normal and bad posture, an exercise-based posture correction program is suggested as a school-based primary prevention of disc degeneration-related symptoms. Further, prospective randomized studies with more than 20 years follow-up, however, are strongly required to confirm it.

Straighten up command

Active self-correction of back posture in children instructed with straighten your back command □

Manual Therapy , 11/19/2013 Clinical Article

Czaprowsk D, et al. –

Abstract

The ability to adopt the properly corrected body posture is one of the factors determining the effectiveness of therapeutic programmes. This study determined the active self-correction expressed by the change of sagittal spinal curvatures (in standing and sitting positions) in 249 children (136 females, 113 males, aged 10–14 years) instructed with ‘straighten your back’ command (SYB). Spinal curvatures (sacral slope-SS, lumbar lordosis-LL, global, lower and upper thoracic kyphosis-TK, LK, UK, respectively) were assessed using Saunders inclinometer. The assessment was done in spontaneous standing and sitting positions and in the positions adopted after the SYB.

In a standing position SYB led to the significant ($P < 0.001$) increase in SS, and the significant ($P < 0.01$) decrease in LL, TK, LK, UK. In a sitting position SYB led to significant changes ($P < 0.001$) from kyphotic to lordotic position of SS and LL and to the significant ($P < 0.001$) reduction of TK ($36.5^\circ \pm 10.8$ vs. $23.5^\circ \pm 11$) and the flattening of LK ($15.2^\circ \pm 8.7$ vs. $1.0^\circ \pm 8.4$). There were gender-based discrepancy regarding active self-correction only for LL in a standing and UK in a sitting position. Females demonstrated a significant decrease in LL ($P < 0.001$). UK significantly increased only in males ($P < 0.001$).

The ‘straighten your back’ command leads to moving the spine away from mid-range towards end range of motion. Therefore, the command should not be used to elicit the most optimal back posture. Further studies are needed to determine if the active self-correction is different in females and males.

Keywords: [Self-correction](#), [Body posture](#), [Spine curvatures](#)

Scoliosis

Cerebral function

Cerebellar function and hypermobility in patients with idiopathic scoliosis

Authors: Kobesova, Alena¹; Drdakova, Lenka¹; Andel, Ross²; Kolar, Pavel¹

Source: International Musculoskeletal Medicine, Volume 35, Number 3, September 2013 , pp. 99-105(7)

Publisher: Maney Publishing

Abstract:

Objectives

To determine if individuals with adolescent idiopathic scoliosis (AIS) present with significant cerebellar dysfunction and hypermobility when compared with healthy controls.

Methods

International Cooperative Ataxia Rating Scale (ICARS), pendulum reflexes, and 10 hypermobility tests according to Janda were assessed in 11 subjects with radiologically confirmed structural idiopathic scoliosis and in 11 individuals without scoliosis.

Results

Idiopathic scoliosis group scored significantly worse in gait and posture ICARS subscale ($P = 0.014$) and in total ICARS ($P = 0.021$). There was no significant difference in pendulum reflexes between the groups. Comparing with the healthy controls, the AIS group presented with significant hypermobility in head rotation ($P = 0.038$) and forward bend tests ($P = 0.041$). Total evaluation of all 10 hypermobility tests approached statistical significance ($P = 0.051$) with the AIS group, demonstrating greater hypermobility.

Conclusions

Signs of cerebellar dysfunction and hypermobility were identified in subjects with idiopathic scoliosis, which may be an important aspect in rehabilitation.

Keywords: Cerebellum; Hypermobility; Idiopathic scoliosis; International Cooperative Ataxia Rating Scale

Document Type: Research Article

Vertebrae's

Spine J. 2013 Nov;13(11):1510-20. doi: 10.1016/j.spinee.2013.06.047. Epub 2013 Aug 27.

Clinical anatomy of vertebrae in scoliosis: global analysis in four different diseases by multiplanar reconstructive computed tomography.

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Source Department of Orthopedics, Korea University Ansan Hospital, Gojan Dong, Danwon Gu, Ansan 425-707, Republic of Korea. Electronic address: osspine@korea.ac.kr.

Abstract

BACKGROUND CONTEXT:

Few accurate analyses of clinically useful vertebral anatomy have been conducted, and most have focused on thoracic idiopathic scoliosis.

PURPOSE:

To evaluate the different anatomic characteristics in scoliosis by disease type and level.

STUDY DESIGN:

Observational cohort study.

PATIENT SAMPLE:

Forty-eight patients with scoliosis were included in this study.

OUTCOME MEASURES:

Subjects underwent computed tomography (CT) of the whole spine.

METHODS:

Forty-eight patients with scoliosis were included in this study: 15 adolescent idiopathic, 11 cerebral palsy (CP), 10 muscular dystrophy (MD), and 12 congenital (CG) scoliosis patients with similar demographics. Subjects underwent CT of the whole spine, preoperatively. Eight anatomic parameters were measured in multiplanar reconstructive CT images, and statistical analysis was performed to investigate differences.

RESULTS:

In general, values in the anatomic parameters were similar for the four diseases. Each parameter showed the unique change pattern according to the spinal level regardless of curvature shape, direction, or magnitude. In particular, chord length (CL) in MD and CG scoliosis was lower than in adolescent idiopathic scoliosis (AIS) and CP, and pedicle rib unit length was lower in CG scoliosis than in the other diseases ($p < .05$). Comparisons of convex and concave anatomies in AIS showed that inner pedicle width (PWI) and outer pedicle width (PWO) were wider for convex side, CL, pedicle width, and transverse pedicle angle were greater for concave side ($p < .05$), and differences were more significant at apices. However, in CP, PWI and PWO were similar between convex and concaves sides ($p > .05$). Although PWI and PWO were wider for convex sides and CL and pedicle length were greater for concave sides in MD ($p < .05$), differences were less significant at apices. Particularly, CG scoliosis showed severely deformed anatomy, with differences of seven parameters at apical vertebrae ($p < .05$).

CONCLUSION:

Clinical anatomies of vertebrae in scoliosis were found to differ significantly at different levels and in terms of convexity and disease type.

Copyright © 2013 Elsevier Inc. All rights reserved. **KEYWORDS:** Computed tomography, Multiplanar reconstruction, Scoliosis, Vertebral morphology PMID: 23992938

Scoliosis measurements

Spine (Phila Pa 1976). 2013 Aug 5.

An Innovative Fulcrum Bending Radiographic Technique to Assess Curve Flexibility in Patients With Adolescent Idiopathic Scoliosis.

Li J, Hwang S, Wang F, Chen Z, Wu H, Li B, Xianzhao Wei, Xiaodong Zhu, Ming Li.

Source

1Department of Orthopaedic Surgery, Changhai Hospital, Second Military Medical University, Shanghai, China; and 2Department of Neurosurgery, Tufts Medical Center and Floating Hospital for Children, Boston, MA, USA The first 4 authors (JFL, SHW, FW and ZQC) contributed equally.

Abstract

STRUCTURED ABSTRACT:

Study Design. A prospective clinical and radiographic study.

Objective. To introduce a re-designed fulcrum bending radiographic method and to validate the effectiveness of this method in assessing patients with AIS.

Summary of Background Data. Several radiographic methods exist to evaluate curve flexibility in adolescent idiopathic scoliosis (AIS) patients. The technique of fulcrum-bending radiographs (FBR) has been demonstrated to better predict coronal plane correction of main thoracic curves. However, the amount of weight applied may affect the results of flexibility evaluation and have not been well studied to date.

Methods. 17 AIS patients with 19 curves were involved in this study. The assessment of radiographs included preoperative standing posterior-anterior (PA), supine side-bending, traditional FBR, new FBR (CH-FBR) and postoperative standing PA radiographs. CH-FBR was performed at variable device heights while measuring the applied weight at the apex.

Results. Preoperatively, the mean Cobb angle was 47.5 ± 8.8 degrees on the posterior-anterior radiographs, 14.3 ± 7.0 on supine side-bending radiographs, 13.3 ± 5.7 degrees on traditional FBR, 11.3 ± 4.5 degrees at the lowest height using CH-FBR (lowest weight) and 7.8 ± 4.1 degrees at the optimized height using CH-FBR (maximal weight). Postoperatively, the mean Cobb angle was 9.1 ± 5.2 degrees. There was a significant difference found between supine side-bending radiograph and postoperative Cobb angle ($p = 0.001$), traditional FBR and postoperative Cobb angle ($p = 0.002$). There was no significant difference found between optimized height CH-FBR and postoperative Cobb angle ($p = 0.16$). Correlation analysis indicated that the maximum height of CH-FBR positively correlated with maximum weight applied ($r = 0.68$, $r = 0.46$, $p = 0.001$).

Conclusion. CH-FBR is a more reliable and effective method than traditional FBR and supine side-bending radiographs to measure curve flexibility in AIS patients. Moreover, the flexibility suggested by the CH fulcrum bending radiographs more closely approximated the postoperative results from posterior pedicle screw instrumentation.

PMID: 23921321

ATHLETICS

LBP/Disc/Hockey

Am J Sports Med. 2013 Aug 16.

Performance-Based Outcomes After Nonoperative Treatment, Discectomy, and/or Fusion for a Lumbar Disc Herniation in National Hockey League Athletes.

Schroeder GD, McCarthy KJ, Micev AJ, Terry MA, Hsu WK.

Source

Department of Orthopaedic Surgery, Northwestern University Feinberg School of Medicine, Chicago, Illinois.

Abstract

BACKGROUND:Ice hockey players have a high incidence of lumbar spine disorders; however, there is no evidence in the literature to guide the treatment of an ice hockey player with a herniated lumbar disc.

PURPOSE:To determine the performance-based outcomes in professional National Hockey League (NHL) athletes with a lumbar disc herniation after either nonsurgical or surgical treatment.

STUDY DESIGN:Descriptive epidemiological study.

METHODS:Athletes in the NHL with a lumbar disc herniation were identified through team injury reports and archives on public record. The return-to-play rate, games played per season, points per game, and performance score for each player were determined before and after the diagnosis of a lumbar disc herniation. Statistical analysis was used to compare preinjury and postinjury performance measures for players treated with either nonsurgical or surgical treatment. **RESULTS:**A total of 87 NHL players met the inclusion criteria; 31 underwent nonoperative care, 48 underwent a discectomy, and 8 underwent a single-level fusion. The return-to-play rate for all players was 85%. There was a significant decrease in performance in all players after a lumbar disc herniation in games played per season, points scored per game, and performance score. A comparison of the posttreatment results for the nonsurgical and surgical patient groups revealed no significant difference in performance measures. Notably, the lumbar fusion group did not show a decrease in games played per season or performance score after surgery, likely secondary to a small sample size.

CONCLUSION:National Hockey League players with a lumbar disc herniation have a high return-to-play rate regardless of the type of treatment; however, performance-based outcomes may decrease compared with preinjury levels. The study data suggest that a lumbar fusion is compatible with a return to play in the NHL, which is in contrast to other professional sports.

KEYWORDS:discectomy, fusion, ice hockey, lumbar disc herniation, lumbar spine PMID: 23956134

ACL/sports specific

Am J Sports Med. 2013 Dec;41(12):2814-8. doi: 10.1177/0363546513501791. Epub 2013 Sep 4.

Sport-specific injury pattern recorded during anterior cruciate ligament reconstruction.

Granán LP, Inacio MC, Maletis GB, Funahashi TT, Engebretsen L.

Source

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Abstract

BACKGROUND:

Anterior cruciate ligament (ACL) injuries are more commonly seen with certain cutting and pivoting sports. However, injury patterns associated with these sports have not been well described.

PURPOSE:

(1) To describe the patient demographics and injury pattern at the time of ACL reconstruction (ACLR) by activities that lead to ACL injuries and (2) to estimate the association of activities at the time of injury with the odds of isolated ACL injuries as well as with meniscus, cartilage, and multiligament injuries diagnosed at the time of ACLR.

STUDY DESIGN:

Cross-sectional study; Level of evidence, 3.

METHODS:

This study combined 2 ACLR registry cohorts, from Norway and the United States, from 2004 to 2011. A cohort of 10,958 primary ACLRs was included. The most prevalent sports activities at the time of injury were the following: soccer, skiing, American football, basketball, and team handball. The end points were the concurrent injury patterns at the time of ACLR: isolated ACL, meniscus, cartilage, and multiligament injuries.

RESULTS:

All sports were compared with the most prevalent injury mechanism: soccer. Skiing injuries were 1.13 (95% confidence interval [CI], 1.01-1.27) times more likely to result in isolated ACL tears, 2.05 (95% CI, 1.01-4.16) times more likely to result in posterior cruciate ligament tears, 1.94 (95% CI, 1.51-2.49) times more likely to result in medial collateral ligament (MCL) tears, and 1.73 (95% CI, 1.38-2.17) times more likely to result in multiligament injuries. Athletes playing American football were 2.72 (95% CI, 1.32-5.62) times more likely to have MCL tears. Those injured playing basketball were 1.28 (95% CI, 1.06-1.54) times more likely to have lateral meniscus tears, 1.23 (95% CI, 1.01-1.51) times more likely to have cartilage damage, and 1.38 (95% CI, 1.11-1.72) times more likely to have meniscus and cartilage injuries. Athletes injured playing team handball were less likely to have MCL tears (odds ratio [OR], 0.68; 95% CI, 0.46-0.99) and more likely to have lateral meniscus injuries (OR, 1.27; 95% CI, 1.10-1.48).

CONCLUSION:

Injury patterns were associated with certain sports. Compared with soccer, American football has a higher likelihood of resulting in multiligament injuries, whereas basketball has a higher likelihood of resulting in cartilage and lateral meniscus injuries. Injury patterns seen at the time of surgery may reflect the forces applied to the knee by the specific sports performed.

KEYWORDS: anterior cruciate ligament (ACL), articular cartilage, epidemiology, knee, ligaments, meniscus, registry PMID: 24005874

Injury prevention

Br J Sports Med. 2013 Oct 7. doi: 10.1136/bjsports-2013-092538.

The effectiveness of exercise interventions to prevent sports injuries: a systematic review and meta-analysis of randomised controlled trials.

Lauersen JB, Bertelsen DM, Andersen LB.

Source

Institute of Sports Medicine Copenhagen, Bispebjerg Hospital, Copenhagen NV, Denmark.

Abstract

BACKGROUND:

Physical activity is important in both prevention and treatment of many common diseases, but sports injuries can pose serious problems.

OBJECTIVE:

To determine whether physical activity exercises can reduce sports injuries and perform stratified analyses of strength training, stretching, proprioception and combinations of these, and provide separate acute and overuse injury estimates.

MATERIAL AND METHODS:

PubMed, EMBASE, Web of Science and SPORTDiscus were searched and yielded 3462 results. Two independent authors selected relevant randomised, controlled trials and quality assessments were conducted by all authors of this paper using the Cochrane collaboration domain-based quality assessment tool. Twelve studies that neglected to account for clustering effects were adjusted. Quantitative analyses were performed in STATA V.12 and sensitivity analysed by intention-to-treat. Heterogeneity (I²) and publication bias (Harbord's small-study effects) were formally tested.

RESULTS:

25 trials, including 26 610 participants with 3464 injuries, were analysed. The overall effect estimate on injury prevention was heterogeneous. Stratified exposure analyses proved no beneficial effect for stretching (RR 0.963 (0.846-1.095)), whereas studies with multiple exposures (RR 0.655 (0.520-0.826)), proprioception training (RR 0.550 (0.347-0.869)), and strength training (RR 0.315 (0.207-0.480)) showed a tendency towards increasing effect. Both acute injuries (RR 0.647 (0.502-0.836)) and overuse injuries (RR 0.527 (0.373-0.746)) could be reduced by physical activity programmes. Intention-to-treat sensitivity analyses consistently revealed even more robust effect estimates.

CONCLUSIONS:

Despite a few outlying studies, consistently favourable estimates were obtained for all injury prevention measures except for stretching. Strength training reduced sports injuries to less than 1/3 and overuse injuries could be almost halved.

KEYWORDS: Evidence based reviews, Injury Prevention, Orthopaedics, Sporting injuries, Training PMID: 24100287

Soccer training

Int J Sports Med. 2013 Nov;34(11):963-8. doi: 10.1055/s-0033-1337943. Epub 2013 Apr 2.

Monitoring Training in Elite Soccer Players: Systematic Bias between Running Speed and Metabolic Power Data.

Gaudino P, Iaia FM, Alberti G, Strudwick AJ, Atkinson G, Gregson W.

Source

Research Institute for Sport and Exercise Sciences, Liverpool John Moores University, Liverpool, United Kingdom.

Abstract

We compared measurements of high-intensity activity during field-based training sessions in elite soccer players of different playing positions.

Agreement was appraised between measurements of running speed alone and predicted metabolic power derived from a combination of running speed and acceleration. Data was collected during a 10-week phase of the competitive season from 26 English Premier League outfield players using global positioning system technology. High-intensity activity was estimated using the total distance covered at speeds $>14.4 \text{ km} \cdot \text{h}^{-1}$ (TS) and the equivalent metabolic power threshold of $>20 \text{ W} \cdot \text{kg}^{-1}$ (TP), respectively. We selected 0.2 as the -minimally important standardised difference between methods. Mean training session TS was $478 \pm 300 \text{ m}$ vs. $727 \pm 338 \text{ m}$ for TP ($p < 0.001$). This difference was greater for central defenders ($\sim 85\%$) vs. wide defenders and attackers ($\sim 60\%$) ($p < 0.05$). The difference between methods also decreased as the proportion of high-intensity distance within a training session increased ($R^2 = 0.43$; $p < 0.001$).

We conclude that the high-intensity demands of soccer training are underestimated by traditional measurements of running speed alone, especially in training sessions or playing positions associated with less high-intensity activity. Estimations of metabolic power better inform the coach as to the true demands of a training session.

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Weight loss cycling

Br J Sports Med. 2013 Sep 18. doi: 10.1136/bjsports-2013-092689.

Effect of rapid weight loss on performance in combat sport male athletes: does adaptation to chronic weight cycling play a role?

Mendes SH, Tritto AC, Guilherme JP, Solis MY, Vieira DE, Franchini E, Lancha AH Jr, Artioli GG.

Source

Laboratory of Applied Nutrition and Metabolism, School of Physical Education and Sport, University of São Paulo, São Paulo, Brazil.

Abstract

BACKGROUND:

Studies failing to show a negative effect of rapid weight loss (RWL) on performance have been conducted in athletes who have been cycling weight for years. It has been suggested that chronic weight cycling could lead combat athletes to become resistant to the stresses associated with weight loss. To investigate the effects of RWL up to 5% of body mass on high-intensity intermittent performance in weight cyclers (WC) and non-weight cyclers (non-WC).

METHODS:

Eighteen male combat athletes (WC: n=10; non-WC: n=8) reduced up to 5% of their body mass in 5 days. Body composition, high-intensity performance and plasma lactate were assessed preweight loss and postweight loss. Athletes had 4 h to re-feed and rehydrate following the weigh-in. Food intake was recorded during the weight loss and the recovery periods.

RESULTS:

Athletes significantly decreased body mass, lean body mass (most likely due to fluid loss) and fat mass following weight loss. No significant changes in performance were found from preweight loss to postweight loss in both groups. Plasma lactate was significantly elevated after exercise in both groups, but no differences were found between groups and in response to RWL. For all these variables no differences were observed between groups. Athletes from both groups ingested high amounts of energy and carbohydrates during the recovery period after the weigh-in.

CONCLUSIONS:

Chronic weight cycling does not protect athletes from the negative impact of RWL on performance. The time to recover after weigh-in and the patterns of food and fluid ingestion during this period is likely to play the major role in restoring performance to baseline levels.

KEYWORDS: Judo, Physical activity measurement, Sports and nutrition PMID: 24047570

Hydration

Br J Sports Med. 2013 Sep 20. doi: 10.1136/bjsports-2013-092417.

Current hydration guidelines are erroneous: dehydration does not impair exercise performance in the heat.

Wall BA, Watson G, Peiffer JJ, Abbiss CR, Siegel R, Laursen PB.

Source

School of Exercise Biomedical and Health Science, Edith Cowan University, Joondalup, Western Australia, Australia.

Abstract

BACKGROUND:

Laboratory studies that support the hydration guidelines of leading governing bodies have shown that dehydration to only -2% of body mass can lead to increase in body temperature and heart rate during exercise, and decrease in performance. These studies, however, have been conducted in relatively windless environments (ie, wind speed <12.9 km/h), without participants being blinded to their hydration status.

AIM:

To investigate the effect of blinded hydration status on cycling time-trial performance in the heat with ecologically valid facing wind speed conditions.

METHODS:

During three experimental trials, 10 cyclists were dehydrated to -3% body mass by performing 2 h of submaximal exercise (walking and cycling) in the heat, before being reinfused with saline to replace 100%, 33% or 0% of fluid losses, leaving them 0%, -2% or -3% hypohydrated, respectively. Participants then completed a 25 km time trial in the heat (33°C, 40% relative humidity; wind speed 32 km/h) during which their starting hydration status was maintained by infusing saline at a rate equal to their sweat rate. The treatment was participant-blinded and the order was randomised. Completion time, power output, heart rate, rectal temperature and perceptual variables were measured.

RESULTS:

While rectal temperature was higher beyond 17 km of the time trial in the -3% vs 0% conditions (38.9±0.3°C vs 38.6±0.3°C; p<0.05), no other differences between trials were shown.

CONCLUSION:

When well-trained cyclists performed a 25 km cycling time trial under ecologically valid conditions and were blinded to their hydration status, performance, physiological and perceptual variables were not different between trials. These data do not support the residing basis behind many of the current hydration guidelines.

KEYWORDS: Cycling, Dehydration, Endurance, Fluid Balance, Thermoregulation PMID: 24055782

Hypertension/Football players

Circ Cardiovasc Qual Outcomes. 2013 Nov 1;6(6):716-723. Epub 2013 Nov 12.

High Prevalence of Hypertension Among Collegiate Football Athletes.

Karpinos AR, Roumie CL, Nian H, Diamond AB, Rothman RL.

Source

Departments of Medicine, Pediatrics, Biostatistics, and Orthopaedics and Rehabilitation, Vanderbilt University Medical Center, Nashville, TN; and Geriatric Research Education and Clinical Center, Veterans Affairs Tennessee Valley Healthcare System, Nashville, TN.

Abstract

Background- The prevalence of hypertension among collegiate football athletes is not well described.

Methods and Results- A retrospective cohort of all male athletes who participated in varsity athletics at a National Collegiate Athletic Association Division I university between 1999 and 2012 was examined through chart review. Mandatory annual preparticipation physical examinations included blood pressure, body mass index, medication use, and supplement use. Prevalence of hypertension was compared between football and nonfootball athletes. A mixed-effects linear regression model examined change in blood pressure over time. Six hundred thirty-six collegiate athletes, including 323 football players, were identified. In the initial year of athletic participation, 19.2% of football athletes had hypertension and 61.9% had prehypertension. The prevalence of hypertension was higher among football athletes than in nonfootball athletes in their initial (19.2% versus 7.0%; $P < 0.001$) and final (19.2% versus 10.2%; $P = 0.001$) years of athletic participation. In adjusted analyses, the odds of hypertension were higher among football athletes in the initial year (adjusted odds ratio, 2.28; 95% confidence interval, 1.21-4.30) but not in the final year (adjusted odds ratio, 1.25; 95% confidence interval, 0.69-2.28). Over the course of their collegiate career, football athletes had an annual decrease in systolic blood pressure (-0.82 mm Hg; $P = 0.002$), whereas nonfootball athletes did not (0.18 mm Hg; $P = 0.58$).

Conclusions- Hypertension and prehypertension were common among collegiate football athletes, and football athletes were more likely to have hypertension compared with male nonfootball athletes. This presents a potential cardiovascular risk in a young population of athletes. Strategies for increasing awareness, prevention, and treatment are needed.

KEYWORDS:

athletes, blood pressure, epidemiology, exercise, hypertension

PMID: 24221829

Swimmers shoulders

Clin J Sport Med. 2013 Nov;23(6):450-5. doi: 10.1097/JSM.0b013e31829aa8ff.

Practice habits and attitudes and behaviors concerning shoulder pain in high school competitive club swimmers.

Hibberd EE, Myers JB.

Source

Department of Exercise and Sport Science, University of North Carolina at Chapel Hill, Chapel Hill, North Carolina.

Abstract

OBJECTIVE:

The objective of this study is to describe the practice habits, injury frequency, and attitudes and behaviors concerning shoulder pain in high school-aged competitive swimmers and describe the relationship between attitudes and behaviors.

DESIGN:

Cross-sectional research design.

SETTING:

Local swimming clubs.

PARTICIPANTS:

One hundred two swimmers, aged 13-18 years, at the top training level of their club team were included in the study.

ASSESSMENT OF RISK FACTORS:

Participants were given a survey with questions regarding swimming practice and attitudes and behaviors concerning shoulder pain.

MAIN OUTCOME MEASURES:

Practice habits (yards/week, practice/week, dry-land and weight/week, and months swimming/year) and attitudes and behaviors concerning shoulder pain.

RESULTS:

Subjects completed an average of 6.89 ± 1.41 swimming practices/wk of 6000 to 7000 yd/practice. The majority of swimmers believe that mild and moderate shoulder pain is normal in swimming and should be tolerated to complete practice, while a majority responded that they swim with shoulder pain. Seventy-three percent of swimmers reported using pain medication to manage their shoulder pain. There was a significant correlation between attitude and behaviors of moderate and severe shoulder pain.

CONCLUSIONS:

Club swimmers have a high frequency of practices, comparable to collegiate and professional swimmers. They believe that shoulder pain is normal and should be tolerated to complete practice. The association between the swimmers' attitudes and behaviors indicates that the interventions that educate the swimmers, coaches, and parents may be effective in changing their attitudes and ultimately their behaviors, decreasing the number of athletes who train with shoulder pain.

PMID: 24042443

Adolescent sports practice

Arch Dis Child. 2013 Nov 20. doi: 10.1136/archdischild-2013-303729.

Weekly sport practice and adolescent well-being.

Merglen A, Flatz A, Bélanger RE, Michaud PA, Suris JC.

Source

Institute of Social and Preventive Medicine, University of Lausanne, , Lausanne, Switzerland.

Abstract

OBJECTIVE:

Sport practice is widely encouraged, both in guidelines and in clinical practice, because of its broad range of positive effects on health. However, very limited evidence directly supports this statement among adolescents and the sport duration that we should recommend remains unknown. We aimed to determine sport durations that were associated with poor well-being.

METHODS:

We conducted a survey including 1245 adolescents (16-20 years) from the general Swiss population. Participants were recruited from various settings (sport centres, peers of sport practicing adolescents, websites) and asked to complete a web-based questionnaire. Weekly sport practice was categorised into four groups: low (0-3.5 h), average (\approx recommended 7 h (3.6-10.5)), high (\approx 14 h (10.6-17.5)) and very high (>17.5 h). We assessed well-being using the WHO-5 Well-Being Index.

RESULTS:

Compared with adolescents in the average group, those in the very high group had a higher risk of poor well-being (OR 2.29 (95% CI 1.11 to 4.72)), as did those in the low group (OR 2.33 (1.58 to 3.44)). In contrast, those in the high group had a lower risk of poor well-being than those in the average group (OR 0.46 (0.23 to 0.93)).

CONCLUSIONS:

We found an inverted, U-shaped relationship between weekly sport practice duration and well-being among adolescents. The peak scores of well-being were around 14 h per week of sport practice, corresponding to twice the recommended 7 h. Practicing higher sport durations was an independent risk factor of poor well-being.

KEYWORDS:

adolescent, mental health, overtraining, sport, well-being

PMID: 24257080

Swimmers Breathing

Br J Sports Med. 2013 Nov 1. doi: 10.1136/bjsports-2013-092523. [Epub ahead of print]

Respiratory muscle specific warm-up and elite swimming performance.

Wilson EE, McKeever TM, Lobb C, Sherriff T, Gupta L, Hearson G, Martin N, Lindley MR, Shaw DE.

Source

Nottingham Respiratory Research Unit (NRRU), School of Medicine, The University of Nottingham, Nottingham City Hospital, Nottingham, UK.

Abstract

BACKGROUND:

Inspiratory muscle training has been shown to improve performance in elite swimmers, when used as part of routine training, but its use as a respiratory warm-up has yet to be investigated.

AIM:

To determine the influence of inspiratory muscle exercise (IME) as a respiratory muscle warm-up in a randomised controlled cross-over trial.

METHODS:

A total of 15 elite swimmers were assigned to four different warm-up protocols and the effects of IME on 100 m freestyle swimming times were assessed. Each swimmer completed four different IME warm-up protocols across four separate study visits: swimming-only warm-up; swimming warm-up plus IME warm-up (2 sets of 30 breaths with a 40% maximum inspiratory mouth pressure load using the Powerbreathe inspiratory muscle trainer); swimming warm-up plus sham IME warm-up (2 sets of 30 breaths with a 15% maximum inspiratory mouth pressure load using the Powerbreathe inspiratory muscle trainer); and IME-only warm-up. Swimmers performed a series of physiological tests and scales of perception (rate of perceived exertion and dyspnoea) at three time points (pre warm-up, post warm-up and post time trial).

RESULTS:

The combined standard swimming warm-up and IME warm-up were the fastest of the four protocols with a 100 m time of 57.05 s. This was significantly faster than the IME-only warm-up (mean difference=1.18 s, 95% CI 0.44 to 1.92, $p<0.01$) and the swim-only warm-up (mean difference=0.62 s, 95% CI 0.001 to 1.23, $p=0.05$).

CONCLUSIONS:

Using IME combined with a standard swimming warm-up significantly improves 100 m freestyle swimming performance in elite swimmers.

Injury prevention

Br J Sports Med. 2013 Oct 7. doi: 10.1136/bjsports-2013-092538. [Epub ahead of print]

The effectiveness of exercise interventions to prevent sports injuries: a systematic review and meta-analysis of randomised controlled trials.

Lauersen JB, Bertelsen DM, Andersen LB.

Source

Institute of Sports Medicine Copenhagen, Bispebjerg Hospital, Copenhagen NV, Denmark.

Abstract

BACKGROUND:

Physical activity is important in both prevention and treatment of many common diseases, but sports injuries can pose serious problems.

OBJECTIVE: To determine whether physical activity exercises can reduce sports injuries and perform stratified analyses of strength training, stretching, proprioception and combinations of these, and provide separate acute and overuse injury estimates.

MATERIAL AND METHODS: PubMed, EMBASE, Web of Science and SPORTDiscus were searched and yielded 3462 results. Two independent authors selected relevant randomised, controlled trials and quality assessments were conducted by all authors of this paper using the Cochrane collaboration domain-based quality assessment tool. Twelve studies that neglected to account for clustering effects were adjusted. Quantitative analyses were performed in STATA V.12 and sensitivity analysed by intention-to-treat. Heterogeneity (I^2) and publication bias (Harbord's small-study effects) were formally tested.

RESULTS: 25 trials, including 26 610 participants with 3464 injuries, were analysed. The overall effect estimate on injury prevention was heterogeneous. Stratified exposure analyses proved no beneficial effect for stretching (RR 0.963 (0.846-1.095)), whereas studies with multiple exposures (RR 0.655 (0.520-0.826)), proprioception training (RR 0.550 (0.347-0.869)), and strength training (RR 0.315 (0.207-0.480)) showed a tendency towards increasing effect. Both acute injuries (RR 0.647 (0.502-0.836)) and overuse injuries (RR 0.527 (0.373-0.746)) could be reduced by physical activity programmes. Intention-to-treat sensitivity analyses consistently revealed even more robust effect estimates.

CONCLUSIONS: Despite a few outlying studies, consistently favourable estimates were obtained for all injury prevention measures except for stretching. Strength training reduced sports injuries to less than 1/3 and overuse injuries could be almost halved.

KEYWORDS: Evidence based reviews, Injury Prevention, Orthopaedics, Sporting injuries, Training PMID:24100287

Training

Sports Med. 2013 Oct 16.

Sprint Interval Training Effects on Aerobic Capacity: A Systematic Review and Meta-Analysis.

Gist NH, Fedewa MV, Dishman RK, Cureton KJ.

Source

Department of Kinesiology, University of Georgia, Athens, GA, USA, nicholas.gist@usma.edu.

Abstract

BACKGROUND:

Sprint interval training (SIT) involving repeated 30-s "all out" efforts have resulted in significantly improved skeletal muscle oxidative capacity, maximal oxygen uptake, and endurance performance. The positive impact of SIT on cardiorespiratory fitness has far-reaching health implications.

OBJECTIVE:

The objective of this study was to perform a systematic review of the literature and meta-analysis to determine the effects of SIT on aerobic capacity.

METHODS:

A search of the literature was conducted using the key words 'sprint interval training', 'high intensity intermittent training/exercise', 'aerobic capacity', and 'maximal oxygen uptake'. Seventeen effects were analyzed from 16 randomized controlled trials of 318 participants. The mean \pm standard deviation number of participants was 18.7 ± 5.1 . Participant age was 23.5 ± 4.3 years.

RESULTS:

The effect size calculated for all studies indicates that supramaximal-intensity SIT has a small-to-moderate effect (Cohen's $d = 0.32$, 95 % CI 0.10-0.55; $z = 2.79$, $P < 0.01$) on aerobic capacity with an aggregate improvement of ~ 3.6 mL \cdot kg $^{-1}\cdot$ min $^{-1}$ (~ 8 % increase). The effect is moderate to large in comparison with no-exercise control groups (Cohen's $d = 0.69$, 95 % CI 0.46-0.93; $z = 5.84$, $P < 0.01$) and not different when compared with endurance training control groups (Cohen's $d = 0.04$, 95 % CI -0.17 to 0.24; $z = 0.36$, $P = 0.72$).

CONCLUSION:

SIT improves aerobic capacity in healthy, young people. Relative to continuous endurance training of moderate intensity, SIT presents an equally effective alternative with a reduced volume of activity. This evaluation of effects and analysis of moderating variables consolidates the findings of small-sample studies and contributes to the practical application of SIT to improve cardiorespiratory fitness and health.

PMID: 24129784

GAIT

Neck pain and gait

Manual Therapy , 11/05/2013 **Clinical Article**

The effects of head movement and walking speed on gait parameters in patients with chronic neck pain*

- [Sureeporn Uthaikhup](#), [Somporn Sunkarat](#), [Khanamporn Khamsaen](#), [Kitti Meeyan](#), [Julia Treleaven](#)

Abstract

It has been documented that neck pain can influence sensorimotor function.

However, little is known about the effects of head movement and walking speed on gait characteristics in patients with neck pain. The aim of this study was to determine gait characteristics of patients with neck pain during walking with different head movements and gait speeds as compared to a control group without neck pain. Twenty women aged between 18 and 59 years with chronic neck pain (>3 months) and 20 healthy controls of similar age, weight and height were recruited into the study. Participants with neck pain completed the Neck Disability Index and Visual Analogue Pain Scale. The experiment consisted of two walking sessions. The first session included walking with head straight, head up-down, and head turns from side to side. The second session included walking at comfortable and maximum speeds. Each trial was performed twice. Gait parameters measured using GAITRite walkway system were step length, stride length, step time, stride time, step width, cadence and gait speed. Patients with chronic neck pain demonstrated a narrower step width, a shorter step length and a slower gait speed during walking with the head movements and at maximum speed compared to the control group (all $p < 0.05$). Maximum gait speed was moderately correlated with pain intensity and disability ($p < 0.01$).

The results suggest that patients with chronic neck pain have gait disturbances. This supports the notion that assessment of gait should be addressed in patients with persistent neck pain.

Keywords: [Neck pain](#), [Cervical spine](#), [Gait](#), [Sensorimotor function](#)

PAIN

Brain sites

Eur J Pain. 2013 Oct 28. doi: 10.1002/j.1532-2149.2013.00407.x.

Neuronal differences between chronic low back pain and depression regarding long-term habituation to pain.

Rodriguez-Raecke R, Ihle K, Ritter C, Muhtz C, Otte C, May A.

Source

Department of Systems Neuroscience, University Medical Center Hamburg-Eppendorf, Germany.

Abstract

BACKGROUND:

Longitudinal studies of experimental pain are rare and little is known about the differences regarding sensitization and habituation over longer periods in patients with chronic pain or depression compared with controls.

METHODS:

We used a standardized longitudinal painful heat paradigm that was designed to induce long-term habituation in 19 patients with chronic low back pain (CLBP), 21 patients with depression (DEP) and 21 healthy participants (controls) over a time course of eight consecutive days. We applied functional magnetic resonance imaging on the first and last day of this period and after 3 months.

RESULTS:

Although the pain paradigm was standardized, patients with DEP exhibited significantly higher pain thresholds and a trend to higher pain ratings and, in functional imaging, showed less activation of the operculum and the secondary somatosensory cortex (S2) as compared to patients with CLBP and controls. Conversely, patients with CLBP showed increased activation in the anterior insula and parietal operculum as compared to patients with DEP and controls. Within session, all participants sensitized to pain, which was associated with higher activation levels in the thalamus, amygdala, midcingulate cortex, and sensory and motor areas. However, patients with depression showed significantly less activation in midbrain and brainstem areas.

CONCLUSION:

Given that pain and depression potentiate each other clinically, our data suggest that this may involve different cortical pain areas.

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PMID: 24167119

Pain expressions

J Pain. 2013 Nov;14(11):1407-15. doi: 10.1016/j.jpain.2013.07.015.

The two sides of pain communication: effects of pain expressiveness on vicarious brain responses revealed in chronic back pain patients.

Vachon-Presseau E, Roy M, Martel MO, Albouy G, Sullivan MJ, Jackson PL, Rainville P.

Source Département de psychologie, Université de Montréal, Montreal, Quebec, Canada; Centre de recherche de l'Institut universitaire de gériatrie de Montréal (CRIUGM), Montreal, Quebec, Canada. Electronic address: vachon.presseau@gmail.com.

Abstract The dominant socioaffective model of empathy has emphasized the overlap between brain mechanisms involved in the encoding and the decoding of internal states. The role of dispositional empathy has been extensively studied in this research, but several other individual factors fundamental to communication processes have been largely ignored.

METHOD

We studied the effects of dispositional expressiveness in chronic back pain patients to determine if the decoding of communicative and noncommunicative information signaling pain in others would be enhanced in individuals displaying a spontaneous propensity to consistently express more pain during a behavioral-observational naturalistic standardized lifting task performed on 2 separate occasions. Blood oxygenation level-dependent signal change was measured in response to pictures showing facial pain expressions and hands/feet in pain-evoking situations in chronic back pain patients and healthy controls.

RESULTS

Vicarious brain responses to others' pain were comparable between groups. However, more expressive patients rated others' pain higher and showed stronger vicarious pain responses in the right ventral part of the inferior frontal gyrus, the right insula, and the midbrain. Activity in the right insula correlated positively with both the patients' expressiveness (encoding) and the intensity of the pain perceived in the images (decoding), suggesting that this structure linked the dispositional expressiveness with vicarious pain perception. Importantly, these effects were independent from dispositional empathy and were found with both communicative (facial expression) and noncommunicative (hand and foot) cues.

CONCLUSIONS:

These results suggest that dispositional expressiveness is a self-related factor that facilitates vicarious pain processing and might reflect individual tendencies to rely on social coping strategies. This article shows that pain expressivity in chronic pain patients increased the vicarious brain responses and the sensibility to others' pain. These results may help provide empirical support for better defining models of pain communication in chronic pain patients.

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KEYWORDS: Pain communication, chronic back pain, empathy, functional magnetic resonance imaging, pain expressiveness

Central effects of pain medication

Brain imaging reveals dynamic changes caused by pain medicines □

University of Michigan Health System, 11/21/2013

Study suggests role of brain imaging in creating personalized treatment of chronic pain. A study in the December issue of *Anesthesiology* suggests a role for brain imaging in the assessment and potential treatment of chronic pain. University of Michigan researchers are the first to use brain imaging procedures to track the clinical action of pregabalin, a drug known by the brand name Lyrica® that is prescribed to patients suffering from fibromyalgia and neuropathic pain. Three different brain imaging procedures were performed – proton magnetic resonance spectroscopy, functional magnetic resonance imaging and functional connectivity magnetic resonance imaging – in 17 patients with fibromyalgia. Brain imaging conducted at the U–M Health System suggests pregabalin works in part by reducing the concentration of glutamate within the insula, which is consistent with animal studies. These reductions in glutamate were also accompanied by decreases in insula connectivity and reductions in clinical pain ratings. This type of brain activity imaging may help in the development of new pain medicines and personalized chronic pain treatment.

Central processing of pain

The important role of CNS facilitation and inhibition for chronic pain □

International Journal of Clinical Rheumatology, 11/21/2013 Review Article

Staud R

Abstract:

Multiple studies have demonstrated that the pain experience among individuals is highly variable. Even under circumstances where the tissue injuries are similar, individual pain experiences may vary drastically. However, this individual difference in pain sensitivity is not only related to sensitivity of peripheral pain receptors, but also to variability in CNS pain processing. Peripheral impulses derived from tissue receptors undergo modification in dorsal horn neurons that can either result in inhibition or facilitation of pain. Such influences are particularly apparent in inflammation where not only peripheral, but also central, pain modulatory mechanisms can significantly increase nociceptive pain. Emotional state, level of anxiety, attention and distraction, memories, stress, fatigue and many other factors can either increase or reduce the pain experience. Increasing evidence suggests that ‘bottom–up’ and ‘top–down’ modulatory circuits within the spinal cord and brain play an important role in pain processing, which can profoundly affect the experience of pain.

Keywords: [chronic pain](#); [facilitation](#); [inhibition](#)

Sleep problems/pain

Sleep. 2013 Nov 1;36(11):1693-8. doi: 10.5665/sleep.3130.

The role of sleep problems in the development of depression in those with persistent pain: a prospective cohort study.

Campbell P, Tang N, McBeth J, Lewis M, Main CJ, Croft PR, Morphy H, Dunn KM.

Source

Arthritis Research UK Primary Care Centre, Keele University, UK.

Abstract

STUDY OBJECTIVES:

One theoretical model suggests a pathway between pain and the development of depression through sleep problems. Here, we prospectively test the hypothesis that incident sleep problems, in those with persistent pain, increase risk of new onset probable depression, and investigate the role of "pain that interferes with daily life" (pain interference) on this pathway.

DESIGN:

Prospective cohort study.

SETTING:

Community based population study within UK.

PARTICIPANTS:

Participants with persistent pain nested within a larger longitudinal community study.

MEASUREMENTS:

Participants were mailed health questionnaires at baseline (time 1) with follow-up at 3 years (time 2) and 6 years from baseline (time 3). Questionnaires at baseline and at follow up contained measures of sleep problems (Jenkins Sleep Questionnaire), depressive symptoms (Hospital Anxiety and Depressive Scale), and pain interference.

RESULTS:

In total, 2,622 participants returned health questionnaires at all time points and indicated the presence of pain at each time point. After adjustment for age, gender, marital status, employment status, alcohol intake, smoking status, and body mass index, having a new period of sleep problems at year 3 more than trebled the risk of a new period of probable depression at year 6 (relative risk 3.47, 95% CI 1.97 to 6.03). Mediation analysis showed that pain interference played a significant but relatively minor role in the pathway.

CONCLUSION:

Clinicians treating patients with persistent pain may wish to consider options that involve addressing the prevention or treatment of sleep problems, in addition to their primary focus of pain management.

CITATION:

Campbell P; Tang N; McBeth J; Lewis M; Main CJ; Croft PR; Morphy H; Dunn KM. The role of sleep problems in the development of depression in those with persistent pain: a prospective cohort study. *SLEEP* 2013;36(11):1693-1698.

KEYWORDS: Persistent pain, cohort, depression, pain interference, sleep problems PMID: 24179303

Depression/pain/work

J Occup Environ Med. 2013 Nov;55(11):1281-5. doi: 10.1097/JOM.0b013e3182a4ffc4.

The Relation of Co-occurring Musculoskeletal Pain and Depressive Symptoms With Work Ability.

Shiri R, Kaila-Kangas L, Ahola K, Kivekäs T, Viikari-Juntura E, Heliövaara M, Miranda H, Leino-Arjas P.

Source

From the Centre of Expertise for Health and Work Ability (Drs Shiri, Kaila-Kangas, and Leino-Arjas), Disability Prevention Centre (Drs Shiri, Viikari-Juntura, and Leino-Arjas), and Centre of Expertise for Work Organizations (Drs Ahola and Kivekäs), Finnish Institute of Occupational Health, Helsinki, Finland; Department of Health and Functional Capacity (Dr Heliövaara), National Institute for Health and Welfare, Helsinki, Finland; and Occupational Health Services (Dr Miranda), OP-Pohjola Group, Helsinki, Finland.

Abstract

OBJECTIVE:

To examine the relationship of musculoskeletal pain and depressive symptoms, occurring alone or both together, with self-rated current work ability and thoughts of early retirement.

METHODS:

In a nationally representative sample drawn in 2000-2001, we studied actively working subjects aged 30 to 64 years (n = 4009).

RESULTS:

Musculoskeletal pain was associated with moderate/poor physical work ability (adjusted odds ratio [OR] = 2.9; 95% confidence interval [CI], 2.0 to 4.2) and mental work ability (OR = 1.6; 95% CI, 1.2 to 2.2). Depressive symptoms were associated with moderate/poor mental work ability only (adjusted OR = 4.2; 95% CI, 2.3 to 7.9). Moreover, only musculoskeletal pain was associated with thoughts of early retirement (OR = 1.4; 95% CI, 1.1 to 1.8). There was an interaction between musculoskeletal pain and depressive symptoms regarding physical work ability and thoughts of early retirement.

CONCLUSION:

Co-occurrence of musculoskeletal pain and depressive symptoms is strongly related to poor self-rated physical work ability.

PMID: 24164766

Work/LBP

Clin J Pain. 2013 Dec;29(12):1015-20. doi: 10.1097/AJP.0b013e31827ff0c0.

Are psychosocial factors associated with low back pain and work absence for low back pain in an occupational cohort?

Urquhart DM, Kelsall HL, Hoe VC, Cicuttini FM, Forbes AB, Sim MR.

Source

*Department of Epidemiology and Preventive Medicine, School of Public Health and Preventive Medicine, The Alfred Centre, Monash University, Melbourne, Vic., Australia †Centre for Occupational and Environmental Health, Department of Social and Preventive Medicine, Faculty of Medicine, University of Malaya, Kuala Lumpur, Malaysia.

Abstract

OBJECTIVES:

To examine the relationship between individual and work-related psychosocial factors and low back pain (LBP) and associated time off work in an occupational cohort.

METHODS:

A self-administered questionnaire was completed by nurses working across 3 major public hospitals. Participants provided sociodemographic data and information on the occurrence of LBP, time off work, and psychosocial factors.

RESULTS:

One thousand one hundred eleven participants (response rate 38.6%) were included in the study. Fifty-six percent of participants reported LBP in the previous year. When individual psychosocial factors were examined in the same model, the relationship between somatization and LBP persisted (OR 1.64; 95% confidence interval [CI], 1.35, 2.01). Low job security was also significantly associated with LBP independent of the other work-related factors (OR 0.82; 95% CI, 0.69, 0.98). Of those participants with LBP, 30% reported absence from work due to LBP. When absence from work was examined, negative beliefs (OR 0.97; 95% CI, 0.94, 1.00) and pain catastrophizing (OR 1.33; 95% CI, 1.04, 1.71) were independently associated with time off work, along with low job satisfaction (OR 0.71; 95% CI, 0.51, 0.97) and high job support (OR 1.35; 95% CI, 1.04, 1.75).

CONCLUSIONS:

Somatization and low job security were found to be independently associated with occupational LBP, whereas negative beliefs, pain catastrophizing, reduced job satisfaction, and high job support were independently related to time off work. Longitudinal studies are needed to determine whether these individual and work-related psychosocial factors predict, or alternatively, are outcomes of pain and time off work associated with LBP.

PMID: 23370089

Communications/pain

Patient Prefer Adherence. 2013 Oct 23;7:1117-27. doi: 10.2147/PPA.S50695.

Predictors of communication preferences in patients with chronic low back pain.

Farin E, Gramm L, Schmidt E.

Source

University Freiburg, Medical Center, Department of Quality Management and Social Medicine, Freiburg, Germany.

Abstract

BACKGROUND:

The objective of this exploratory study was to identify patient-related predictors of communication preferences in patients with chronic low back pain for various dimensions of patient-physician communication (patient participation and orientation, effective and open communication, emotionally supportive communication, communication about personal circumstances).

METHODS:

Eleven rehabilitation centers from various parts of Germany participated in collection of data between 2009 and 2011. A total of 701 patients with chronic low back pain were surveyed at the start of rehabilitation. The patient questionnaire captured communication preferences, pain impact, pain intensity, and psychologic variables (fear avoidance beliefs, illness coherence, control beliefs, communication self-efficacy, and personality characteristics). The rehabilitation physicians filled out a documentation sheet containing information on diagnosis, inability to work, duration of the illness, and comorbidity at the beginning and end of rehabilitation. Hierarchical regression analyses were performed.

RESULTS:

On average, effective, open, and patient-centered communication was very important for patients with back pain, emotionally supportive communication was important, and communication about personal circumstances was somewhat important. The variance in communication preferences explained by the predictors studied here was 8%-19%. Older patients showed a lower preference for patient-centered and open communication, but a higher preference for communication about personal circumstances. Patients with psychologic risk factors (eg, fear avoidance beliefs), extroverted patients, and patients with high self-efficacy in patient-physician interaction generally had higher expectations of the physician's communicative behavior.

CONCLUSION:

Providers should take into consideration the fact that patients with back pain have a strong need for effective, open, and patient-centered communication. A flexible approach to communication needs appears to be especially important for communication about emotional and personal circumstances, because the patients differ most clearly in this respect. Personal characteristics provided only initial clues to possible preferences; for more precision, an individual assessment (by means of questionnaires or discussion) is needed.

KEYWORDS: low back pain, patient-physician communication, patient-physician relationship, preferences, rehabilitation PMID: 24187489

Pain faces

Emotional faces alter pain perception □

European Journal of Pain, 10/30/2013 Clinical Article

Bayet S, et al. –

Although emotional faces might be particularly suited for the investigation of emotional pain modulation, they have thus far rarely been used. In particular, previous studies using emotional faces for pain modulation did not assess modulation of mood, did not differentiate pain intensity and unpleasantness, and did not investigate the interaction with attentional state. Here, the authors assessed how viewing emotional faces impacts the perceived intensity and unpleasantness of experimentally induced pain as well as subjects' mood. These results provide evidence that viewing emotional faces modulates perceived pain intensity and unpleasantness and that this pain modulation is related to mood changes, at least for intensity. Faces might be a reliable and socially relevant tool to study the impact of discrete emotions on pain perception.

Methods

- Healthy subjects viewed sad, happy or neutral faces, and short painful thermal stimuli were simultaneously applied to the volar forearm.
- Subjects provided ratings of pain intensity, pain unpleasantness and mood after blocks consisting of eight pairs of thermal stimuli and eight pairs of faces.
- Each subject viewed six blocks in total (two of each emotion).
- Perceptual discrimination tasks ensured that subjects either focused on the pain or on the emotional faces.

Results

- Subjects reported higher pain unpleasantness and higher pain intensity as well as worse mood when they viewed blocks of sad faces compared with blocks of happy or neutral faces.
- Changes in mood correlated with modulation of pain intensity, but not unpleasantness.

No interaction was observed between emotional pain modulation and attentional state.

Pain faces

Eur J Pain. 2013 Oct 31. doi: 10.1002/j.1532-2149.2013.00421.x.

The faces of pain: A cluster analysis of individual differences in facial activity patterns of pain.

Kunz M, Lautenbacher S.

Source

Physiological Psychology, Otto-Friedrich University Bamberg, Germany; Biological Psychology, Ludwig Maximilian University, Munich, Germany.

Abstract

BACKGROUND:

There is general agreement that facial activity during pain conveys pain-specific information but is nevertheless characterized by substantial inter-individual differences. With the present study we aim to investigate whether these differences represent idiosyncratic variations or whether they can be clustered into distinct facial activity patterns.

METHODS:

Facial actions during heat pain were assessed in two samples of pain-free individuals (n = 128; n = 112) and were later analysed using the Facial Action Coding System. Hierarchical cluster analyses were used to look for combinations of single facial actions in episodes of pain. The stability/replicability of facial activity patterns was determined across samples as well as across different basic social situations.

RESULTS:

Cluster analyses revealed four distinct activity patterns during pain, which stably occurred across samples and situations: (I) narrowed eyes with furrowed brows and wrinkled nose; (II) opened mouth with narrowed eyes; (III) raised eyebrows; and (IV) furrowed brows with narrowed eyes. In addition, a considerable number of participants were facially completely unresponsive during pain induction (stoic cluster). These activity patterns seem to be reaction stereotypies in the majority of individuals (in nearly two-thirds), whereas a minority displayed varying clusters across situations.

CONCLUSION:

These findings suggest that there is no uniform set of facial actions but instead there are at least four different facial activity patterns occurring during pain that are composed of different configurations of facial actions. Raising awareness about these different 'faces of pain' might hold the potential of improving the detection and, thereby, the communication of pain.

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Inpatient light exposure

J Adv Nurs. 2013 Oct 27. doi: 10.1111/jan.12282.

Hospital lighting and its association with sleep, mood and pain in medical inpatients.

Bernhofer EI, Higgins PA, Daly BJ, Burant CJ, Hornick TR.

Source

Office of Research and Innovation, Nursing Institute, Cleveland Clinic, Cleveland, Ohio, USA.

Abstract

AIMS:

To describe light exposure, sleep-wake patterns, mood, pain and their relationships in adult medical inpatients.

BACKGROUND:

The hospital environment may contribute to patient discomfort by providing a lighting structure that interferes with circadian rhythmicity, sleep, mood and pain.

DESIGN:

A descriptive correlational design was used in this preliminary study.

METHODS:

Between May 2011-April 2012, data were collected from a convenience sample of 23 women and 17 men admitted to a large academically affiliated hospital in the United States. Over 72 hours, light exposure and sleep-wake patterns were continuously measured with wrist actigraph/light meters for each participant. Mood was measured daily using the Profile Of Mood States Brief™ Form. Subjective pain scores were abstracted from medical records.

RESULTS:

Light exposure levels were low: mean daytime light intensity was 104.80 lux. Sleep time was fragmented and low: mean 236.35 minutes of sleep/night. Intra-daily stability scores indicated little sleep-wake synchronization with light. Fatigue and total mood disturbance scores were high and inversely associated with light. Pain levels were also high and positively associated with fatigue, but not directly with light exposure. Low light exposure significantly predicted fatigue and total mood disturbance.

CONCLUSION:

Medical inpatients were exposed to light levels insufficient for circadian entrainment. Nevertheless, higher light exposure was associated with less fatigue and lower total mood disturbance in participants with pain, suggesting the need for further investigation to determine if manipulating light exposure for medical inpatients would be beneficial in affecting sleep-wake disturbances, mood and pain.

© 2013 John Wiley & Sons Ltd. **KEYWORDS:** actigraph, circadian rhythm, fatigue, hospital lighting, medical inpatients, mood, nursing, pain, sleep PMID: 24164506

Complex regional Pain

Brain changes

J Pain. 2013 Nov 7. pii: S1526-5900(13)01352-7. doi: 10.1016/j.jpain.2013.10.011

Complex Regional Pain Syndrome is associated with structural abnormalities in pain-related regions of the human brain.

Barad MJ, Ueno T, Younger J, Chatterjee N, Mackey S.

Source

Clinical Assistant Professor Anesthesia (Pain Management) and Neurology & Neurological Sciences. Stanford University School of Medicine, Stanford University, Palo Alto, CA. Electronic address: mbarad@stanford.edu.

Abstract

Complex regional pain syndrome (CRPS) is a chronic condition that involves significant hyperalgesia of the affected limb, typically accompanied by localized autonomic abnormalities, and frequently motor dysfunction. Although central brain systems are thought to play a role in the development and maintenance of CRPS, these systems have not been well characterized. In this study, we used structural magnetic resonance imaging (sMRI) to characterize differences in gray matter volume between patients with right upper extremity CRPS and matched controls. Analyses were carried out using a whole brain voxel-based morphometry (VBM) approach. The CRPS group showed decreased gray matter volume in several pain-affect regions, including the dorsal insula, left orbitofrontal cortex, and several aspects of the cingulate cortex. Greater gray matter volume in CRPS patients was seen in the bilateral dorsal putamen and right hypothalamus. Correlation analyses with self-reported pain were then performed on the CRPS group. Pain duration was associated with decreased gray matter in the left dorsolateral prefrontal cortex. Pain intensity was positively correlated with volume in the left posterior hippocampus and left amygdala, and negatively correlated with the bilateral dorsolateral prefrontal cortex. Our findings demonstrate that CRPS is associated with abnormal brain system morphology, particularly pain-related sensory, affect, motor, and autonomic systems.

PERSPECTIVE:

This paper presents structural changes in the brains of patients with Complex Regional Pain Syndrome helping us differentiate CRPS from other chronic pain syndromes and furthering our understanding of this challenging disease.

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KEYWORDS: CRPS, Complex Regional Pain Syndrome, VBM, Voxel-based morphometry, chronic pain, neuroimaging PMID: 24212070

Wrist/pain 1st week after fx

J Pain. 2013 Nov 19. pii: S1526-5900(13)01201-7. doi: 10.1016/j.jpain.2013.08.009.

Intense Pain Soon After Wrist Fracture Strongly Predicts Who Will Develop Complex Regional Pain Syndrome: Prospective Cohort Study.

Moseley GL, Herbert RD, Parsons T, Lucas S, Van Hilten JJ, Marinus J.

Source

Sansom Institute for Health Research, The University of South Australia, North Terrace, Adelaide, Australia; Neuroscience Research Australia, Randwick, New South Wales, Australia; Department of Physiology, Anatomy & Genetics, University of Oxford, Oxford, United Kingdom.. Electronic address: Lorimer.Moseley@unisa.edu.au.

Abstract

Complex regional pain syndrome (CRPS) is a distressing and difficult-to-treat complication of wrist fracture. Estimates of the incidence of CRPS after wrist fracture vary greatly. It is not currently possible to identify who will go on to develop CRPS after wrist fracture. In this prospective cohort study, a nearly consecutive sample of 1,549 patients presenting with wrist fracture to 1 of 3 hospital-based fracture clinics and managed nonsurgically was assessed within 1 week of fracture and followed up 4 months later. Established criteria were used to diagnose CRPS. The incidence of CRPS in the 4 months after wrist fracture was 3.8% (95% confidence interval = 2.9-4.8%). A prediction model based on 4 clinical assessments (pain, reaction time, dysynchiria, and swelling) discriminated well between patients who would and would not subsequently develop CRPS (c index .99). A simple assessment of pain intensity (0-10 numerical rating scale) provided nearly the same level of discrimination (c index .98). One in 26 patients develops CRPS within 4 months of nonsurgically managed wrist fracture. A pain score of ≥ 5 in the first week after fracture should be considered a "red flag" for CRPS.

PERSPECTIVE:

This study shows that excessive baseline pain in the week after wrist fracture greatly elevates the risk of developing CRPS. Clinicians can consider a rating of greater than 5/10 to the question "What is your average pain over the last 2 days?" to be a "red flag" for CRPS.

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KEYWORDS:

Complex regional pain syndrome, chronic pain, dysynchiria, reflex sympathetic dystrophy

PMID: 24268113

Fibromyalgia

Heart rate variability

Scand J Rheumatol. 2013;42(6):505-8. doi: 10.3109/03009742.2012.755564. Epub 2013 Feb 20.

Heart rate variability in fibromyalgia patients and healthy controls during non-REM and REM sleep: a case-control study.

Mork P, Nilsson J, Lorås H, Riva R, Lundberg U, Westgaard R.

Source

Department of Human Movement Science, Norwegian University of Science and Technology , Trondheim , Norway.

Abstract

Objectives: To investigate heart rate variability (HRV) in fibromyalgia (FM) patients and healthy controls (HCs) during different sleep stages, and to examine the association of HRV with pain and sleep quality.

Method: Polysomnography was recorded from 23 female FM patients and 22 age- and sex-matched HCs. HRV was recorded from bedtime until awakening including the standard deviation of normal-to-normal intervals (SDNN), the root mean square successive difference (RMSSD), and the low (LF; 0.04-0.15 Hz) and high (HF; 0.15-0.4 Hz) frequency power. Subjective scores of neck/shoulder pain and sleep quality were obtained at bedtime and awakening.

Results: Both patients and HCs showed high incidence of arousals per hour (FM: 16 ± 9.7 ; HCs: 17 ± 11). RMSSD was lower in patients than HCs during non-rapid eye movement (non-REM) stage 2 (N2) sleep (mean \pm SD; 30 ± 12 ms vs. 42 ± 13 ms, $p < 0.002$) and during REM sleep (23 ± 11 ms vs. 37 ± 16 ms, $p < 0.003$). HRV did not differ between groups during N3 sleep ($p > 0.19$ for all comparisons). In patients, SDNN, RMSSD, and HF power showed modest positive correlations with sleep quality (HF power during N3 sleep showed the highest correlation; Spearman's $\rho = 0.54$) and modest negative correlations with neck/shoulder pain (RMSSD during N3 sleep showed the highest correlation with pain at bedtime; Spearman's $\rho = -0.51$).

Conclusions: RMSSD, indicative of parasympathetic predominance, is attenuated in FM patients compared to HCs during N2 sleep and REM sleep. This difference was not present for the HF component. HRV during sleep in FM patients is moderately and positively associated with sleep quality and moderately and negatively associated with neck/shoulder pain.

PMID: 23425526

NUTRITION/VITAMINS

Vit D chronic LBP

Int J Rheum Dis. 2013 Oct 14. doi: 10.1111/1756-185X.12172.

The effect of vitamin D on nonspecific low back pain.

Sandoughi M, Zakeri Z, Mirhosainee Z, Mohammadi M, Shahbakhsh S.

Source

Department of Internal Medicine, Ali-Ebne-Abitaleb Hospital, Iran.

Abstract

BACKGROUND:

Nonspecific low back pain is known as one of the most common reasons for chronic low back pain (CLBP) that burdens healthcare systems with high costs. According to a hypothesis, CLBP has been associated with vitamin D3 deficiency, the goal of this study is to evaluate the effect of vitamin D3 administration on improvements in CLBP.

MATERIALS AND METHODS:

This double blind randomized clinical trial included 53 patients aged between 18-40 years with nonspecific CLBP. Pain was measured using the pain visual analogue scale score (VAS), and serum 25-OH-vitamin D level was measured using an enzyme-linked immunosorbent assay kit. The patients were randomly divided into two groups based on sex and weight. Pearl of vitamin D3 (50 000 IU) or placebo was administered orally every week for 8 weeks. Data were analyzed via SPSS 17th edition software using two-tailed paired t-test and chi-square test.

RESULTS:

There were 26 and 27 patients in drug and placebo groups respectively. Out of 53 subjects, 75.47% were female. There was no statistically significant difference in the mean age, sex, and mean weight between the two groups. The mean serum 25-OH-vitamin D level was 18.86 ± 9.24 nmol/L on the first visit. After 8 weeks of intervention, the mean serum 25-OH-vitamin D level changed from 17.88 ± 9.04 to 27.52 ± 9.04 ($P = 0.043$) and from 19.81 ± 9.60 to 18.91 ± 7.84 ($P = 0.248$) in drug and placebo groups, respectively. The mean VAS score for pain decreased from 5.42 ± 1.65 to 3.03 ± 3.14 ($P = 0.001$) and from 6.42 ± 1.62 to 3.11 ± 3.08 ($P = 0.001$) among drug and placebo groups, respectively. The mean changes in chronic pain were 2.38 ± 2.62 , 95% confidence interval (CI) = 1.32-3.44 in the drug group and 3.33 ± 3.67 , 95%CI = 0.61-2.55 in the placebo group. No significant statistical difference between the two groups was observed.

CONCLUSION:

According to our results, both vitamin D3 and placebo treatments improved CLBP and there was no significant difference between vitamin D3 and placebo groups.

Vit. D Hip

Vitamin D insufficiency in osteoporotic hip fracture patients : Rapid substitution therapy with high dose oral cholecalciferol (vitamin D3)

2013, N° 5 (Vol. 79/5) p.578-586

Andy DE JONG, Kate Woods, Lise VAN GESTEL, Mohanraj SURESH, Matthew PORTEOUS
From West Suffolk Hospital, Bury St Edmunds, Suffolk, UK

Abstract:

BACKGROUND

Assessment and treatment of osteoporosis are recommended following hip fracture. Osteoporosis treatment assumes an adequate calcium intake and a normal vitamin D plasma level.

METHODS

The authors conducted a study in three phases. Phase I : circulating 25-hydroxyvitamin D levels were retrospectively recorded from in the case records of 381 consecutive patients with 387 hip fractures, between March 2010 and September 2011.

RESULTS

Only 27 patients had sufficient (> 75 nmol/L) circulating vitamin D, and of these 22 were taking vitamin D supplements. The remainder, 354 patients, had abnormally low vitamin D levels, with a mean value of 26.4 nmol/L. These findings confirmed literature data, and gave rise to the prospective Phase II (October 2011) : 14 consecutive patients with a hip fracture received rapid substitution therapy with 50,000 IU cholecalciferol (vitamin D3) daily for 3 days. Patients with corrected calcium level (calcium level based on the serum albumin level) > 2.60 mmol/L were excluded from phase II (and phase III), in order to avoid hypercalcemia. Substitution resulted in an increase in vitamin D plasma levels from ± 29.6 nmol/L to ± 81.4 nmol/L ($p < 0.0001$), after ± 14 days. However, vitamin D level remained below the desired threshold of 75 nmol/L in 29%. Therefore it was decided to increase the treatment period from 3 days to 7 days in the next 54 patients with a hip fracture in a prospective phase III (October 2011-January 2012). This time rapid substitution resulted in an increase from ± 31.4 nmol/L to ± 131.1 nmol/L ($p < 0.0001$), after ± 16 days, and 100% of treated patients achieved plasma levels above the desired threshold of 75 nmol/L.

CONCLUSION:

Virtually all patients with a hip fracture have low vitamin D plasma levels ; substitution with 50,000 IU oral cholecalciferol daily for 7 days increases vitamin D plasma levels rapidly, safely and consistently.

Vit D health of systems

Clin Endocrinol (Oxf). 2013 Nov 21. doi: 10.1111/cen.12368.

Effects of Vitamin D in Skeletal Muscle: Falls, Strength, Athletic Performance and Insulin Sensitivity.

Girgis CM, Clifton-Bligh RJ, Turner N, Lau SL, Gunton JE.

Source

Diabetes and Transcription Factors Group, Garvan Institute of Medical Research (GIMR), Sydney, NSW, Australia; Faculty of Medicine, University of Sydney, Sydney, NSW, Australia.

Abstract

Accompanying the high rates of vitamin D deficiency observed in many countries, there is increasing interest in the physiological functions of vitamin D. Vitamin D is recognised to exert extra-skeletal actions in addition to its classic roles in bone and mineral homeostasis. Here we review the evidence for vitamin D's actions in muscle on the basis of observational studies, clinical trials and basic research. Numerous observational studies link vitamin D deficiency with muscle weakness and sarcopaenia. Randomised trials predominantly support an effect of vitamin D supplementation and the prevention of falls in older or institutionalised patients. Studies have also examined the effect of vitamin D in athletic performance, both inferentially by UV radiation and directly by vitamin D supplementation. Effects of vitamin D in muscle metabolic function, specifically insulin sensitivity, are also addressed in this review. At a mechanistic level, animal studies have evaluated the roles of vitamin D and associated minerals, calcium and phosphate, in muscle function. In vitro studies have identified molecular pathways by which vitamin D regulates muscle cell signalling and gene expression. This review evaluates evidence for the various roles of vitamin D in skeletal muscle and discusses controversies that have made this a dynamic field of research. This article is protected by copyright. All rights reserved.

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PMID: 24256495

Vit D/foot fx

Foot Ankle Int. 2013 Oct 14.

Prevalence of Vitamin D Deficiency in Patients with Foot and Ankle Injuries.

Smith JT, Halim K, Palms DA, Okike K, Bluman EM, Chiodo CP.

Source

Brigham Foot and Ankle Center at the Faulkner, Jamaica Plain, MA, USA.

Abstract

BACKGROUND:

Vitamin D deficiency has been identified as one of the most common causes of fragility fractures and poor fracture healing. Although rates of vitamin D deficiency have been delineated in various orthopaedic populations, little is known about the prevalence of vitamin D deficiency in patients with foot and ankle disorders. The goal of this study was to identify the prevalence of vitamin D deficiency in patients with a low energy fracture of the foot or ankle.

METHODS:

Over a 6-month period, a serum 25-OH vitamin D level was obtained from consecutive patients with a low energy ankle fracture, fifth metatarsal base fracture, or stress fracture of the foot or ankle. For comparative purposes, vitamin D levels in patients with an ankle sprain and no fracture were also examined.

RESULTS:

The study cohort included 75 patients, of which 21 had an ankle fracture, 23 had a fifth metatarsal base fracture, and 31 had a stress fracture. The mean age was 52 (range, 16-80) years. Thirty-five of the fracture patients (47%) had an insufficient vitamin D level (below the recommended level of 30 ng/mL), and 10 of the patients (13%) had a level that was deficient (< 20 ng/mL). Vitamin D levels were significantly lower in those with a fracture than in those with an ankle sprain ($P = .02$). In the fracture cohort, the factors significantly associated with vitamin D insufficiency in the multivariate analysis were smoking ($P = .03$), obesity ($P = .003$), and other medical risk factors for vitamin D deficiency ($P = .03$).

CONCLUSION:

Hypovitaminosis D was common among patients with a foot or ankle injury seen at our institution. Patients with a low energy fracture of the foot or ankle were at particular risk for low vitamin D, especially if they smoked, were obese, or had other medical risk factors. Given that supplementation with vitamin D (\pm calcium) has been shown to reduce the risk of fragility fractures and improve fracture healing, monitoring of 25-OH vitamin D and supplementation should be considered in patients with fractures.

LEVEL OF EVIDENCE:

Level III, prospective case control.

KEYWORDS: Vitamin D deficiency, ankle fracture, hypovitaminosis D, metatarsal fracture, stress fracture PMID: 24127268

Vit D hip Fx

J Orthop Trauma. 2013 Dec;27(12):e275-e280.

Vitamin D Insufficiency in Patients With Acute Hip Fractures of All Ages and Both Sexes in a Sunny Climate.

Johnson AL, Smith JJ, Smith JM, Sanzone AG.

Source

*Sharp Hospital Healthcare System, San Diego, CA; and †San Diego Orthopaedic Trauma Fellowship, San Diego, CA.

Abstract

OBJECTIVES::

To determine the incidence of vitamin D deficiency in patients with hip fractures of all ages who live in the southwest United States.

DESIGN::

Retrospective comparative study.

SETTING::

Two level 2 trauma centers and 2 community hospitals in San Diego, CA.

PATIENTS/PARTICIPANTS::

Four hundred forty-eight patients who sustained a hip fracture from December 2010 to December 2011 and a control group of 1091 patients who underwent elective primary total hip or knee surgery during the same time period.

MAIN OUTCOME MEASUREMENTS::

Serum 25-hydroxyvitamin D (25(OH)D) levels.

RESULTS::

The mean 25(OH)D level for both the Hip Fracture (26.38 ng/mL) and Total Joint (29.92 ng/mL) Groups showed vitamin D insufficiency, with the Hip Fracture Group having lower levels ($P < 0.05$). More patients in the Hip Fracture Group were deficient or insufficient (65.8% vs 54.0%, $P < 0.05$). Patients aged 71 years or older were more deficient or insufficient in the Hip Fracture Group than in the Total Joint Group (66.7% vs 47.13%, $P < 0.05$). There was no difference when comparing males versus females ($P > 0.05$). Females in the Hip Fracture Group were more deficient or insufficient (67.3% vs 54.3%, $P < 0.05$) than in the Total Joint Group.

CONCLUSIONS::

The majority of patients aged 18 years or older of both sexes with hip fractures had vitamin D insufficiency and those aged 71 years or older had significantly lower 25(OH)D levels than a control group of total joint patients.

LEVEL OF EVIDENCE::

Prognostic Level III. See Instructions for Authors for a complete description of levels of evidence.

PMID: 23515125

Vit D/cartilage thickness

Clin Rheumatol. 2013 Nov 13.

Does vitamin D affect femoral cartilage thickness? An ultrasonographic study.

Malas FU, Kara M, Aktekin L, Ersöz M, Ozçakar L.

Source

Ankara Physical Medicine and Rehabilitation Training and Research Hospital, Sıhhiye, Ankara, Turkey, fevunsal@hotmail.com.

Abstract

This study aims to investigate the association between vitamin D levels and distal femoral cartilage thickness in healthy subjects.

Eighty patients who were admitted to our outpatient clinic between May and July 2013 were classified into three subgroups according to their 25-OH vitamin D levels of <10, 10-20, and \geq 20 ng/mL. Distal femoral cartilage thickness was measured from the midpoints of the right medial condyle (RMC), right lateral condyle (RLC), right intercondylar area (RIA), left medial condyle (LMC), left lateral condyle (LLC), and left intercondylar area (LIA) by using musculoskeletal ultrasound (US). The group with severe vitamin D deficiency (<10 ng/mL) had thinner femoral cartilage thickness at LMC ($p = 0.005$). Positive correlations were determined only between vitamin D levels and US measurements in the severe vitamin D deficiency group at RLC ($r = 0.444$, $p = 0.020$), LMC ($r = 0.357$, $p = 0.067$), and LLC ($r = 0.568$, $p = 0.002$).

Low levels of vitamin D seem to affect the femoral cartilage thickness, adversely. Further studies are necessary to ascertain the clinical relevance of this change in cartilage thickness and whether vitamin D supplementation can reverse the cartilage thinning process or the allied clinical symptoms in the course of knee osteoarthritis.

Vit D/osteoarthritis/Intestinal problems

Clin Nutr. 2013 Feb 21. pii: S0261-5614(13)00051-4. doi: 10.1016/j.clnu.2013.02.005.

High prevalence of vitamin D deficiency and osteoporosis in out-patients with intestinal failure.

Ellegård L, Kurlberg G, Bosaeus I.

Source

Department of Clinical Nutrition, Sahlgrenska University Hospital, Göteborg, Sweden. Electronic address: lasse.ellegard@nutrition.gu.se.

Abstract

BACKGROUND:

In intestinal failure, specific nutrient deficiencies especially for fat-soluble vitamins can be expected in addition to energy-protein malnutrition. We report serum levels of fat soluble vitamins, and bone density in out-patients with intestinal failure (IF).

METHODS:

106 outpatients with IF were assessed during routine visits. 78 patients underwent DXA-scan for bone density. Vitamin D levels < 50 nmol/l were defined as deficiency, and 75-150 as optimal. Vitamin A and E deficiencies were defined as <1.0 and <14 µmol/l respectively. INR ≥ 1.2 without liver disease or anti-vitamin K therapy was classified as vitamin K deficiency.

RESULTS:

Mean serum vitamin D level was 45 nmol/l at first visit, and 64 nmol/l at follow up (n = 76, p = 0.0001 by paired t-test). Overall prevalence of vitamin D deficiency was 67%. Only 12% of all patients had optimal D-vitamin status. 88% of assessed patients had low bone density. 12% had subnormal vitamin A levels and 25% had subnormal vitamin E levels. 32% had abnormal INR values. At follow up 34% remained vitamin D deficient whereas 29% had optimal levels. By oral substitution, vitamin A and E status were normalised, and K status improved.

CONCLUSION:

Vitamin D deficiency and osteoporosis are common in outpatients with intestinal failure, and should be adequately substituted.

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Hyaluronic Acid

Relative efficacy of hyaluronic acid in comparison with NSAIDs for knee osteoarthritis: A systematic review and meta-analysis □

Seminars in Arthritis and Rheumatism, 11/12/2013 Evidence Based Medicine Review Article

Bannuru RR, et al

Abstract

Objective

To assess the relative efficacy of intra-articular hyaluronic acid (IAHA) in comparison with non-steroidal anti-inflammatory drugs (NSAIDs) for knee osteoarthritis (OA).

Methods

We searched Medline, EMBASE, Google Scholar, ISI Web of Science, and Cochrane Database from inception until February 2013. Randomized controlled trials comparing HA with NSAIDs for knee OA were included if they reported at least one pain outcome. Two reviewers abstracted data and determined quality. Outcomes included pain, function, and stiffness. Random-effects meta-analyses were performed.

Results

Five trials (712 participants) contributed to the pain analysis. Both groups showed improvement from baseline. The analysis found an effect size (ES) of -0.07 (95% CI: -0.24 to 0.10) at trial end, favoring neither treatment. There were no statistically significant differences between the groups at 4 and 12 weeks in function [ES = -0.08 (95% CI: -0.39 to 0.23)] or stiffness [ES = 0.03 (95% CI: -0.27 to 0.34)] analyses based on two trials. Injection site pain was the most common adverse event reported in the HA group, and gastrointestinal adverse events were more common in the NSAIDs group.

Conclusion

This meta-analysis suggests that IAHA is not significantly different from continuous oral NSAIDs at 4 and 12 weeks. Our study detected no safety concerns; however, the included trials had only a short follow-up duration. Given the favorable safety profile of IAHA over NSAIDs, this result suggests that IAHA might be a viable alternative to NSAIDs for knee OA, especially for older patients at greater risk for systemic adverse events.

Keywords: [Osteoarthritis](#), [NSAIDs](#), [Knee osteoarthritis](#), [Treatment](#)

Glucosamine

BMC Complement Altern Med. 2013 Nov 13;13(1):316.

Prescribing patterns of glucosamine in an older population: a national cohort study.

Galvin R, Cousins G, Boland F, Motterlini N, Bennett K, Fahey T.

Abstract

BACKGROUND:

Glucosamine is commonly prescribed as a disease modulating agent in osteoarthritis. However, the evidence to date suggests that it has a limited impact on the clinical symptoms of the disease including joint pain, radiological progression, function and quality of life. The aim of this study was to examine the prescribing patterns of glucosamine from 2002--2011 in an elderly Irish national population cohort using data from the Health Service Executive Primary Care Reimbursement (HSE-PCRS) General medical services (GMS) Scheme.

METHODS:

Patients aged ≥ 70 years on the HSE-PCRS pharmacy claims database between January 2002 and December 2011 were included. ATC code M01AX05 (glucosamine) was extracted. Prevalence rates per 1000 eligible population with 95% confidence intervals were calculated for all years and age groups (70--74 years, ≥ 75 years). A negative binomial regression analysis was used to determine longitudinal usage trends and compare prevalence rates across years, sex and age groups.

RESULTS:

The annual patient rate of glucosamine prescribing increased significantly from 13.0/1000 eligible population (95% CI 12.6-13.4) in 2002 to 68.7/1000 population (95% CI 67.8-69.5) in 2009 before decreasing to 62.4/1000 population (95% CI 61.6-63.2) in 2011. The rate of prescribing of glucosamine varied with sex, with women receiving significantly more prescriptions than men. The cost of glucosamine also increased from 2002--2008. In 2008 total expenditure reached a high of [euro sign]4.6 million before decreasing to [euro sign]2.6 million in 2011.

CONCLUSION:

The national trend in prescribing of glucosamine increased significantly from 2002 to 2009 before decreasing in 2010 and 2011, in keeping with current international guidelines. There is a need for awareness among healthcare professionals and patients alike of the best available evidence to inform decision making relating to the prescription and consumption of such supplements.

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Coffee/Tea/Hip fracture

Osteoporos Int. 2013 Nov 6.

Coffee, tea, and the risk of hip fracture: a meta-analysis.

Sheng J, Qu X, Zhang X, Zhai Z, Li H, Liu X, Li H, Liu G, Zhu Z, Hao Y, Qin A, Dai K.

Source

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Abstract

The present meta-analysis shows no clear association between coffee consumption and the risk of hip fractures. There was a nonlinear association between tea consumption and the risk of hip fracture. Compared to no tea consumption, drinking 1-4 cups of tea daily was associated with a lower risk of hip fracture.

INTRODUCTION:

Prospective cohort and case-control studies have suggested that coffee and tea consumption may be associated with the risk of hip fracture; the results have, however, been inconsistent. We conducted a meta-analysis to assess the association between coffee and tea consumption and the risk of hip fracture.

METHODS:

We performed systematic searches using MEDLINE, EMBASE, and OVID until February 20, 2013, without limits of language or publication year. Relative risks (RRs) with 95 % confidence intervals (CI) were derived using random-effects models throughout all analyses. We conducted categorical, dose-response, heterogeneity, publication bias, and subgroup analyses.

RESULTS:

Our study was based on 195,992 individuals with 9,958 cases of hip fractures from 14 studies, including six cohort and eight case-control studies. The pooled RRs of hip fractures for the highest vs. the lowest categories of coffee and tea consumption were 0.94 (95 % CI 0.71-1.17) and 0.84 (95 % CI 0.66-1.02), respectively. For the dose-response analysis, we found evidence of a nonlinear association between tea consumption and the risk of hip fracture (p nonlinearity < 0.01). Compared to no tea consumption, 1-4 cups of tea per day may reduce the risk of hip fracture by 28 % (0.72; 95 % CI 0.56-0.88 for 1-2 cups/day), 37 % (0.63; 95 % CI 0.32-0.94 for 2-3 cups/day), and 21 % (0.79; 95 % CI 0.62-0.96 for 3-4 cups/day).

CONCLUSIONS:

We found no significant association between coffee consumption and the risk of hip fracture. A nonlinear association emerged between tea consumption and the risk of hip fracture; individuals drinking 1-4 cups of tea per day exhibited a lower risk of hip fractures than those who drank no tea. The association between 5 daily cups of tea, or more, and hip fracture risk should be investigated.

PMID: 24196722

PHARMACOLOGY

Opioid drugs

Eur J Anaesthesiol. 2014 Jan;31(1):35-40. doi: 10.1097/EJA.0b013e328365ae28.

Intravenous nonopioid analgesic drugs in chronic low back pain patients on chronic opioid treatment: A crossover, randomised, double-blinded, placebo-controlled study.

Wetzel L, Zadrazil M, Paternostro-Sluga T, Authried G, Kozek-Langenecker S, Scharbert G.

BACKGROUND:

Addition of nonopioid analgesic drugs reduces pain and opioid requirements in acute low back pain. In noncancer chronic low back pain (CLBP), the efficacy of a combined regimen to reduce breakthrough pain has not been proven so far.

OBJECTIVE:

Evaluation of the effects of intravenous (i.v.) nonopioid analgesic drugs on pain intensity and lumbar mobility in CLBP patients on chronic opioid therapy.

DESIGN: Randomised, placebo-controlled, double blinded, crossover study.

SETTING: Vienna General Hospital, Austria, from December 2002 to May 2004.

PATIENTS:

Thirty-six adults with CLBP on chronic opioid therapy. Inclusion criteria are as follows: American Society of Anesthesiologists' physical status less than 3, visual analogue scale (VAS) more than 4 and no known allergy to any of the used drugs.

INTERVENTION:

After written informed consent and VAS assessment, any oral nonopioid analgesic drug (NSAIDs, metamizol, paracetamol) was replaced by placebo 10 days before the first test infusion as a washout period. Coanalgesics (anticonvulsants, antidepressants) were maintained. Each patient received randomly four i.v. test infusions of diclofenac 75 mg (and orphenadrine 30 mg), parecoxib 40 mg, paracetamol 1 g and isotonic saline. A washout time of 72 h was allowed between each infusion.

MAIN OUTCOME MEASURES:

Primary outcome was as follows: VAS pain intensity (0 to 100 mm) at inclusion, before and within 30 min after infusion. Secondary outcomes were as follows: Roland-Morris questionnaire, McGill pain questionnaire and a test panel of physical functioning for spinal mobility, muscular endurance, balance and coordination. The differences in means of the above assessments among the groups were analysed.

RESULTS:

We found an improvement in VAS from the day of inclusion to the day of each appointment. We observed no improvement in pain intensity (VAS) or in any of the physical functioning tests immediately before versus after administration of the four i.v. drugs. Reductions in sensory, affective and cognitive dimensions of the McGill pain questionnaire were statistically significant in the diclofenac group. A trend of McGill pain questionnaire improvement existed in the other groups.

CONCLUSION:

The present data show that the anticipation of an i.v. infusion of nonopioid analgesic drug improves VAS significantly, probably through expectation-related mechanisms. However, single dose i.v. infusions of nonopioid analgesic drugs fail to improve pain intensity and spinal mobility in CLBP patients on chronic opioid treatment, even immediately after the infusion.

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