

1. LUMBAR SPINE

Impact of tropisms

European Spine Journal pp 1–6 | Cite as

Age- and sex-related changes in facet orientation and tropism in lower lumbar spine: an MRI study of 600 patients

- Devanand Degulmadi Bharat R. Dave Ajay Krishnan

Purpose

We aimed to determine the age- and sex-related changes in facet orientation and facet tropism in lower lumbar spine.

Methods

Between June 2015 and December 2017, magnetic resonance imaging scans of the consecutive 600 patients performed in the outpatient department for low back pain were analyzed. The data were divided according to age into four groups: group A (< 30 years), group B (31–45 years), group C (46–60 years) and group D (> 60 years). The orientation of the facet angles at L3–4, L4–5 and L5–S1 was measured using the method described by Noren et al. Sagittal angles and tropism were determined at each level.

Results

Average facet angle is noted to increase from L3–4 to L5–S1 level in all groups irrespective of age and sex. A positive correlation is noted between age and sagittal facet orientation at all levels across all groups. Tropism was noted to be statistically significant ($p < 0.05$) at L5–S1 level. L3–4 and L4–5 levels did not show a positive correlation with respect to age. Facet angle sagittalization was significantly associated in males at L5–S1 level ($p < 0.05$) and in females at L4–5 level ($p < 0.05$).

Conclusions

Predominant morphological changes in superior articular process are responsible for remodeling of facets that occur with increasing age, resulting in sagittalization. Even though the facet orientation changes over a period of time, differential changes within the facets at the same level might not be seen.

5. SPINAL SURGERY

Immediate surgery appears most reliable with motor deficits

Spine (Phila Pa 1976). 2019 Apr 1;44(7):454-463. doi: 10.1097/BRS.0000000000002295.

Immediate Versus Delayed Surgical Treatment of Lumbar Disc Herniation for Acute Motor Deficits: The Impact of Surgical Timing on Functional Outcome.

Petr O¹, Glodny B², Brawanski K¹, Kerschbaumer J¹, Freyschlag C¹, Pinggera D¹, Rehwald R², Hartmann S¹, Ortler M¹, Thomé C¹.

STUDY DESIGN:

A retrospective cohort study.

OBJECTIVE:

The aim of the study was to assess the impact of time to surgery in patients with motor deficits (MDs) on their functional outcome. The current single-center study presents results of emergency surgery for LDH in a group of patients with acute paresis in a "real-world" setting.

SUMMARY OF BACKGROUND DATA:

MDs are a frequent symptom of lumbar disc herniation (LDH). Although surgery within 48 hours has been recommended for cauda-equina syndrome, the best timing of surgery for acute MDs continues to be debated. The effect of early surgery has been proposed but remains to be unproven.

METHODS:

A total of 330 patients with acute paresis caused by LDH acutely referred to our department and surgically treated using microsurgical discectomy from January 2013 to December 2015 were included. Based on the duration of MD and surgical timing, all patients were classified into two categories: Group I included all patients with paresis <48 hours and Group II included all patients with paresis >48 hours. Patient demographics, LDH/clinical/treatment characteristics, and outcomes were collected prospectively. Severity of paresis [Medical Research Council (MRC) Grade 0-4], surgery-related complications, functional recovery of motor/sensory deficits, sciatica, retreatment/recurrence rates, and overall neurological outcome were analyzed.

RESULTS:

Group I showed significantly faster recovery of moderate/severe paresis (MRC 0-3) at discharge, and 6-weeks/3-months follow up ($P \leq 0.001$), whereas there were no significant differences in recovery for mild paresis (MRC 4). Sensory deficits also recovered substantially faster in Group I at 6-weeks ($P=0.003$) and 3-months follow up ($P=0.045$). Body mass index, preoperative MRC-grade, and duration of MDs were identified as significant predictors for recovery of paresis at all follow ups with substantial impact on patient reported outcomes including sciatica and/or dermatomal sensory deficits.

CONCLUSION:

Given the superior rates of neurological recovery of acute moderate/severe MDs, immediate surgery should be the primary option. However, a prospective randomized clinical trial is needed to confirm the superiority of emergency surgery.

LEVEL OF EVIDENCE: 3.

6. PELVIC GIRDLE

SI pain after lumbar surgery

European Spine Journal pp 1–7| Cite as

The association between sacroiliac joint-related pain following lumbar spine surgery and spinopelvic parameters: a prospective multicenter study

- Juichi Tonosu Daisuke Kurosawa Takako Nishi Keisuke Ito Daijiro Morimoto Yoshiro Musha Hiroshi Ozawa Eiichi Murakami

Purpose

To prospectively calculate the incidence of postoperative sacroiliac joint-related pain (SIJP) and investigate the association between spinopelvic parameters and postoperative SIJP after lumbar spine surgery.

Methods

We prospectively enrolled consecutive patients who underwent lumbar spine surgery. We defined postoperative SIJP as unilateral buttock pain according to fulfillment of the following criteria within 3 months of the surgery: a sacroiliac joint (SIJ) score higher than 4/9 postoperatively; positive response to analgesic periarticular SIJ injection with fluoroscopy; no other complications related to the surgery. The patients were divided into the SIJP group and non-SIJP group. We compared the background information and analyzed the differences in spinopelvic parameters in both groups. Additionally, receiver-operating characteristic curve analyses were performed to evaluate the cutoff values of spinopelvic parameters.

Results

Of the 281 patients enrolled, 265 were included and eight developed postoperative SIJP (3.0%). There were no significant differences in the background information between groups. Preoperative and postoperative radiological evaluations revealed that the pelvic incidence (PI) in the SIJP group was significantly higher than that in the non-SIJP group, and there were no significant differences in lumbar lordosis (LL), pelvic tilt, sacral slope, and PI minus LL. For preoperative PI, the area under the curve, cutoff value, sensitivity, and specificity were 0.73739, 59, 62.5%, and 81.9%, respectively.

Conclusions

The incidence of postoperative SIJP after lumbar spine surgery was 3.0%. Higher PI values were associated with a higher risk of postoperative SIJP.

7. PELVIC ORGANS/WOMAN'S HEALTH

Risk of Prolapses

Eur J Obstet Gynecol Reprod Biol. 2019 Feb 6;235:19-25. doi: 10.1016/j.ejogrb.2019.01.031. \

Association between delivery mode and pelvic organ prolapse: A meta-analysis of observational studies.

Leng B¹, Zhou Y¹, Du S¹, Liu F¹, Zhao L¹, Sun G¹, Zhao Y².

Pelvic organ prolapse (POP) is a common disease in aged women with negative physical and psychological influences. The long-term impact of delivery mode on POP remains uncertain.

To evaluate the relationship between delivery mode and POP, a meta-analysis was carried out in this study. PubMed, Web of Science and CENTRAL were combined to search for relevant studies. Data were extracted by two investigators independently. Odd ratios (ORs) and 95% confidence intervals (95% CIs) were calculated by a random-effects model. Sensitivity analysis was performed to explore the potential source of heterogeneity. Moreover, Begg's and Egger's tests were conducted to assess the publication bias of included studies. In total, 13 eligible studies were included in our meta-analysis. Among them, six studies using objective standards for POP definition were included in Group 1, 5 studies addressing the women's own perception of POP were included Group 2, and the remaining 2 studies with both objective and subjective measures for POP assessment were included in both group 1 and group 2. Pooled estimates in our study demonstrated increased risk of POP after any vaginal delivery vs. cesarean section (Group 1: OR = 7.69; 95% CI = 4.89, 12.07; heterogeneity: $P = 0.00$, $I^2 = 85.8\%$. Group 2: OR = 2.22; 95% CI = 1.72, 2.87; heterogeneity: $P = 0.10$, $I^2 = 43.5\%$). Similar results were found in the comparison of spontaneous vaginal births only vs. cesarean sections (Group 1: OR = 7.76; 95% CI = 4.43, 13.60; Group 2: OR = 2.08; 95% CI = 1.50, 2.89).

There was no significant difference in POP between assisted vaginal delivery (including vacuum and forceps) and spontaneous vaginal births. Compared with cesarean sections, vaginal delivery (including women delivering only by spontaneous vaginal births and women with both vaginal and cesarean deliveries) is associated with an increased risk of long-term POP.

Breastfeeding reduces risk of ovarian CA

Gynecol Oncol. 2019 Jan 25. pii: S0090-8258(19)30060-5. doi: 10.1016/j.ygyno.2019.01.017.

Breastfeeding factors and risk of epithelial ovarian cancer.

Modugno F¹, Goughnour SL², Wallack D³, Edwards RP⁴, Odunsi K⁵, Kelley JL⁶, Moysich K⁷, Ness RB⁸, Brooks MM⁹.

OBJECTIVE:

Previous studies suggest that breastfeeding reduces epithelial ovarian cancer (EOC) risk. However, the effects of age, timing and episode details on the EOC-breastfeeding relationship have not been examined. The objective of this study was to examine the association between breastfeeding factors and epithelial ovarian cancer.

METHODS:

We examined breastfeeding factors among parous women in a population-based, case-control study conducted in Pennsylvania, Ohio, and New York from 2003 to 2008. We compared 689 incident EOC cases to 1572 community controls. Multivariable unconditional logistic regression was used to calculate odds ratios (ORs) and 95% confidence intervals (CIs) associated with breastfeeding patterns adjusting for potential confounders.

RESULTS:

Compared to never breastfeeding, breastfeeding any offspring was associated with a 30% reduction in EOC risk (OR = 0.70; 95%CI = 0.58-0.85). That association lasted more than 30 years (OR = 0.69, 95%CI = 0.53-0.88). An average breastfeeding episode of 3 months was also associated with reduced risk (OR = 0.73, 95%CI = 0.58-0.80). A greater number of breastfeeding episodes was associated with greater risk reduction (OR = 0.78, 95%CI = 0.64-0.96 and OR = 0.49, 95%CI = 0.36-0.68 1-2 and 3+ episodes, respectively, compared to never breastfed, trend p = 0.01). Longer breastfeeding duration was also associated with reduced risk (OR = 0.75 and 0.62 for less than and greater than 1-year total duration, respectively, compared to never breastfed). An earlier age at first breastfeeding was further associated with increased protection (OR = 0.50-0.80, for first episode at age <25, 25-29, and 30+, respectively, trend p = 0.001).

CONCLUSIONS:

Breastfeeding for as few as 3 months is associated with reduced EOC risk. Although this association decreases over time, it persists for more than 30 years. Longer cumulative duration, increasing number of breastfeeding episodes, and earlier age at first breastfeeding episode are each associated with increased benefit.

Breastfeeding improves cardiovascular health**Breastfeeding and Cardiovascular Disease Hospitalization and Mortality in Parous Women: Evidence From a Large Australian Cohort Study****Binh Nguyen Joanne Gale Natasha Nassar Adrian Bauman Grace Joshy**
, and **Ding Ding**<https://doi.org/10.1161/JAHA.118.011056>Journal of the American Heart Association. 2019;8**Abstract****Background**

Few studies have investigated the longitudinal association between breastfeeding and maternal cardiovascular disease (CVD) outcomes. This study examined the association between breastfeeding and CVD hospitalization and mortality in a large Australian cohort.

Methods and Results

Baseline questionnaire data (2006–2009) from a sample of 100 864 parous women aged ≥ 45 years from New South Wales, Australia, were linked to hospitalization and death data until June 2014 and December 2013, respectively. Analysis was restricted to women without self-reported medically diagnosed CVD at baseline or without past CVD hospitalization 6 years before study entry. Never versus ever breastfeeding and average breastfeeding duration per child, derived from self-reported lifetime breastfeeding duration and number of children, and categorized as never breastfed, <6 , >6 to 12, or >12 months/child, were assessed. Cox proportional hazards models were used to explore the association between breastfeeding and CVD outcomes. Covariates included sociodemographic characteristics, lifestyle risk factors, and medical and reproductive history. There were 3428 (3.4%) first CVD-related hospital admissions and 418 (0.4%) deaths during a mean follow-up time of 6.1 years for CVD hospitalization and 5.7 years for CVD mortality. Ever breastfeeding was associated with lower risk of CVD hospitalization (adjusted hazard ratio [95% CI]: 0.86 [0.78, 0.96]; $P=0.005$) and CVD mortality (adjusted hazard ratio [95% CI]: 0.66 [0.49, 0.89]; $P=0.006$) compared with never breastfeeding. Breastfeeding ≤ 12 months/child was significantly associated with lower risk of CVD hospitalization.

Conclusions

Breastfeeding is associated with lower maternal risk of CVD hospitalization and mortality in middle-aged and older Australian women. Breastfeeding may offer long-term maternal cardiovascular health benefits.

Factor for women to develop knee OA

Reproductive factors and risk of total knee replacement due to severe knee osteoarthritis in women, the Singapore Chinese Health Study

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DOI: <https://doi.org/10.1016/j.joca.2019.03.002>

Objectives

Knee osteoarthritis (OA) is more common in women, and may be related to reproductive or hormonal factors. We evaluated these factors with the risk of total knee replacement (TKR) for severe knee OA among women.

Methods

The Singapore Chinese Health Study recruited 63,257 Chinese aged 45-74 years from 1993 to 1998, and among them, 35,298 were women. Information on height, weight, lifestyle factors, number of biological children, ages at menarche and menopause, and use of hormonal therapies was collected through interviews. Incident cases of TKR were identified via linkage with nationwide database.

Results

There were 1,645 women with TKR after mean follow-up of 14.8 years. Higher parity was associated with increased TKR risk in a stepwise manner (P for trend <0.001). Compared to nulliparous women, those with ≥ 5 children had the highest risk [hazard ratio (HR) 2.01, 95% confidence interval (CI) 1.50-2.70]. The effect of parity on TKR risk was significantly stronger among lean women compared to heavier women; HRs (95% CIs) for highest parity was 4.86 (2.22-10.63) for women with BMI <23 kg/m² and 1.57 (1.14-2.14) for those ≥ 23 kg/m² (p for interaction = 0.001). Earlier age at menarche and use of oral contraceptives were significantly associated with TKR in a stepwise manner (P for trend ≤ 0.002). Age at menopause and use of hormonal therapy were not associated with TKR risk.

Conclusion

Higher parity, earlier age of menarche and use of oral contraceptives were associated with increased risk of TKR for severe knee OA among women.

Benign breast disease precursor to CA

Int J Cancer. 2019 Feb 6. doi: 10.1002/ijc.32112.

Benign breast disease increases breast cancer risk independent of underlying familial risk profile: Findings from a Prospective Family Study Cohort.

Zeinomar N¹, Phillips KA^{2,3,4}, Daly MB⁵, Milne RL^{2,6}, Dite GS², MacInnis RJ^{2,6}, Liao Y¹, Kehm RD¹, Knight JA^{7,8}, Southey MC⁹, Chung WK^{10,11}, Giles GG^{2,6}, McLachlan SA^{12,13}, Friedlander ML^{14,15}, Weideman PC², Glendon G⁷, Nesci S³; kConFab Investigators^{4,16}, Andrulis IL^{7,17}, Buys SS¹⁸, John EM¹⁹, Hopper JL², Terry MB^{1,10}.

Benign breast disease (BBD) is an established breast cancer (BC) risk factor, but it is unclear whether the magnitude of the association applies to women at familial or genetic risk.

This information is needed to improve BC risk assessment in clinical settings. Using the Prospective Family Study Cohort, we used Cox proportional hazards models to estimate hazard ratios (HRs) and 95% confidence intervals (CIs) for the association of BBD with BC risk. We also examined whether the association with BBD differed by underlying familial risk profile (FRP), calculated using absolute risk estimates from the Breast Ovarian Analysis of Disease Incidence and Carrier Estimation Algorithm (BOADICEA) model. During 176,756 person-years of follow-up (median: 10.9 years, maximum: 23.7) of 17,154 women unaffected with BC at baseline, we observed 968 incident cases of BC. A total of 4,704 (27%) women reported a history of BBD diagnosis at baseline. A history of BBD was associated with a greater risk of BC: HR = 1.31 (95% CI: 1.14-1.50), and did not differ by underlying FRP, with HRs of 1.35 (95% CI: 1.11-1.65), 1.26 (95% CI: 1.00-1.60), and 1.40 (95% CI: 1.01-1.93), for categories of full-lifetime BOADICEA score <20%, 20 to <35%, ≥35%, respectively. There was no difference in the association for women with BRCA1 mutations (HR: 1.64; 95% CI: 1.04-2.58), women with BRCA2 mutations (HR: 1.34; 95% CI: 0.78-2.3) or for women without a known BRCA1 or BRCA2 mutation (HR: 1.31; 95% CI: 1.13-1.53) ($p_{\text{interaction}} = 0.95$).

Women with a history of BBD have an increased risk of BC that is independent of, and multiplies, their underlying familial and genetic risk.

8. VISCERA

Infant antibiotic use and celiac disease

Association Between Antibiotics in the First Year of Life and Celiac Disease

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DOI: <https://doi.org/10.1053/j.gastro.2019.02.039>

Background & Aims

The intestinal microbiota is thought to be involved in pathogenesis of celiac disease, along with genetic variants and dietary gluten. The gut microbiota is strongly influenced by systemic antibiotics—especially in early life. We explored the association between exposure to a systemic antibiotic in the first year of life and risk of diagnosed celiac disease.

Methods

We performed an observational nationwide register-based cohort study. We included all children born in Denmark from 1995 through 2012 or Norway from 2004 through 2012. Children born in Denmark were followed until May 8, 2015 (age at end of follow-up was 2.3–20.3 years) and children born in Norway were followed until December 31, 2013 (age at end of follow-up was 1–10 years). We collected medical information from more than 1.7 million children, including 3346 with a diagnosis of celiac disease. Exposure to systemic antibiotics was defined as a dispensed systemic antibiotic in the first year of life.

Results

Exposure to systemic antibiotics in the first year of life was positively associated with diagnosed celiac disease in the Danish and in the Norwegian cohort (pooled odds ratio, 1.26; 95% CI, 1.16–1.36). We found a dose-dependent relationship between an increasing number of dispensed antibiotics and the risk of celiac disease (pooled odds ratio for each additional dispensed antibiotic, 1.08; 95% CI, 1.05–1.11). No specific type of antibiotic or age period within the first year of life was prominent. Adjustment for hospital admissions with an infectious disease in the first year of life did not change the estimates; adjustment for the number of maternally reported infections in the child in 2 large sub-cohorts reduced the association slightly (pooled odds ratio, 1.18; 95% CI, 0.98–1.39).

Conclusion

In a nationwide study of children in Denmark and Norway, we found exposure to systemic antibiotics in the first year of life to be associated with a later diagnosis of celiac disease. These findings indicate that childhood exposure to systemic antibiotics may be a risk factor for celiac disease.

12 B. CERVICAL SURGERIES**Potential of dysphagia**

Spine (Phila Pa 1976). 2018 Sep 17. doi: 10.1097/BRS.0000000000002865.

Predictive Factors of Post-operative Dysphagia in Single-level Anterior Cervical Discectomy and Fusion (ACDF).

Saville P¹, Vaishnav AS¹, McAnany S¹, Gang CH¹, Qureshi SA^{1,2}.

STUDY DESIGN:

Retrospective review of prospectively collected data
OBJECTIVE.: To investigate if zero profile devices offer an advantage over traditional plate/cage constructs for dysphagia rates in single level ACDF.

SUMMARY OF BACKGROUND DATA:

Dysphagia rates following ACDF have been reported to be as high as 83%, most cases are self-limiting, but chronic dysphagia can continue in up to 35% of patients. Zero profile devices were developed to limit dysphagia, and other plate specific complications, however the literature is currently divided regarding their efficacy.

METHODS:

Dysphagia was assessed by SWAL-QOL scores pre operatively, at 6 weeks and 12 weeks. PROMs including VAS and NDI were collected pre operatively, at 6 weeks and at 6 months. Univariate and multivariate regression analysis was conducted with SWAL-QOL score as the dependent variable.

RESULTS:

64 patients were included, 41 received a zero profile device, and 23 received plate/cage construct. Both groups were similar regarding patient demographics, except operative time, with the zero-profile group having a shorter procedure time than the cage-plate group (44.88 ± 6.54 vs 54.43 ± 14.71 minutes, $p=0.001$). At all timepoints dysphagia rates were similar between the groups. Regression analysis confirmed pre-operative SWAL-QOL and operative time were the only significant variables. PROMs were also similar between groups at all time points, except VAS neck at 6 months, which was lower in the plate-graft group (1.05 ± 1.48 vs 3.43 ± 3.21 , $p=0.007$).

CONCLUSIONS:

Operative time and pre-operative SWAL-QOL scores are predictive of dysphagia in single level ACDF. Zero profile devices had a significantly shorter operative time, and may provide a benefit in dysphagia rates in this regard.

LEVEL OF EVIDENCE: 3.

13 B. TMJ/ORAL**Periodontitis and Dementia****Association of Chronic Periodontitis on Alzheimer's Disease or Vascular Dementia**

Seulggie Choi MD Kyuwoong Kim BSc Jooyoung Chang MD Sung Min Kim BSc

<https://doi.org/10.1111/jgs.15828>

OBJECTIVES

Although chronic periodontitis has been associated with Alzheimer's disease, the effect of chronic periodontitis on vascular dementia as well as the role of lifestyle behaviors such as smoking, alcohol consumption, and physical activity in this association are still unclear.

DESIGN

Retrospective cohort study.

SETTING

Population based.

PARTICIPANTS

The study population was derived from the Korean National Health Insurance Service-Health Screening Cohort. Among 262 349 participants, diagnosis of chronic periodontitis was determined during 2003-2004.

MEASUREMENTS

Starting from 2005, participants were followed up for overall dementia, Alzheimer's disease, and vascular dementia until 2015. Cox proportional hazards regression was used to determine the adjusted hazard ratios (aHRs) and 95% confidence intervals (CIs) of dementia according to chronic periodontitis.

RESULTS

Compared with nonchronic periodontitis participants, chronic periodontitis patients had elevated risk for overall dementia (aHR = 1.06; 95% CI = 1.01-1.11) and Alzheimer's disease (aHR = 1.05; 95% CI = 1.00-1.11). There was a tendency toward increased vascular dementia risk among chronic periodontitis patients (aHR = 1.10; 95% CI = 0.98-1.22). The risk-increasing effect of chronic periodontitis on dementia tended to be stronger among participants with healthy lifestyle behaviors including never-smokers and those who exercised and did not consume alcohol.

CONCLUSION

Chronic periodontitis may be associated with a higher risk of developing dementia. Future studies that investigate whether preventing chronic periodontitis may lead to reduced risk of dementia are needed.

Periodontitis and liver disease

Liver Int. 2019 Mar;39(3):583-591. doi: 10.1111/liv.13985. Epub 2018 Oct 27.

Periodontitis is associated with incident chronic liver disease-A population-based cohort study.

Helenius-Hietala J¹, Suominen AL^{2,3,4}, Ruokonen H¹, Knuutila M⁵, Puukka P⁶, Jula A⁶, Meurman JH¹, Åberg F^{7,8}.

BACKGROUND & AIMS:

Chronic liver disease is a major health concern worldwide and the identification of novel modifiable risk factors may benefit subjects at risk. Few studies have analyzed periodontitis as a risk factor for liver complications. We studied whether periodontitis is associated with incident severe liver disease.

METHODS:

The study comprised 6165 individuals without baseline liver disease who participated in the Finnish population-based Health 2000 Survey (BRIF8901) during 2000-2001, a nationally representative cohort. Follow-up was until 2013 for liver-related admissions, liver cancer and mortality from National Hospital Discharge, Finnish Cancer Registry and Causes of Death Register, Statistics Finland. Mild to moderate periodontitis was defined as ≥ 1 tooth with periodontal pocket ≥ 4 mm deep, and advanced periodontitis as ≥ 5 teeth with such pockets. Multiple confounders were considered.

RESULTS:

A total of 79 subjects experienced a severe liver event during follow-up. When adjusted for age, sex and number of teeth, hazards ratios by Cox regression regarding incident severe liver disease were, for mild to moderate periodontitis, 2.12 (95% CI 0.98-4.58), and, for advanced periodontitis, 3.69 (95% CI 1.79-7.60). These risk estimates remained stable after additionally adjusting for alcohol use, smoking, metabolic risk, serum gamma-glutamyltransferase, dental-care habits, lifestyle and socioeconomic status. Periodontal disease-associated liver risk was accentuated among subjects with non-alcoholic fatty liver disease or heavy alcohol use at baseline.

CONCLUSIONS:

Periodontitis was associated with incident liver disease in the general population independently of various confounders. As a preventable disease, periodontal disease might present a modifiable risk factor for chronic liver disease.

20 A. ROTATOR CUFF

Massive tears

Pre-operative factors correlated with arthroscopic reparability of large-to-massive rotator cuff tears

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BMC Musculoskeletal Disorders 2019;20:111

<https://doi.org/10.1186/s12891-019-2485-4>

Background

The purpose of this study is to determine the pre-operative factors that are associated with reparability of the large-sized and massive rotator cuff tears.

Methods

Sixty-six patients were included in this prognostic study. Demographic data, radiographic and MRI parameters were collected. Arthroscopic rotator cuff repair was performed for all included patient. Complete rotator cuff repair was achieved when the tendon covered up at least 50% of the anatomical footprint. The receiver operating characteristic (ROC) curve was analysed to define the cut-off level of each significant factor.

Results

Eleven large-sized rotator cuff tears and fifty-five massive rotator cuff tears were defined from MRI. Fifty-four patients were in the complete repair group, and twelve patients were in the partial repair group. The mean duration between MRI and surgery of 5.5 weeks. Reparability was correlated with age, mediolateral (ML) and anteroposterior (AP) tear size, rotator cuff arthropathy, superior migration of humeral head, fatty infiltration and atrophy of the supraspinatus muscle, and fatty infiltration of infraspinatus muscle ($p < 0.05$). The ROC curve defined a cut-off level of each predicting factor which included age of ≥ 65 years, mediolateral tear size of ≥ 36 mm, anteroposterior tear size of ≥ 22 mm, Hamada's rotator cuff arthropathy of \geq class2, acromiohumeral interval of ≥ 6 mm, \geq stage3 supraspinatus fatty infiltration, the presence of supraspinatus muscle atrophy, and \geq stage1 infraspinatus fatty infiltration. In multivariate regression analysis, age, acromiohumeral interval, and anteroposterior tear size were statistically associated with the reparability. The intra- and inter-observer reliabilities were moderate to excellent.

Conclusion

Age, ML tear size, AP tear size, rotator cuff arthropathy, superior migration of humeral head, fatty infiltration of supraspinatus and infraspinatus muscles and supraspinatus muscle atrophy all correlate with reparability of large to massive rotator cuff tear.

31. KNEE

Knee pain in youth

Knee problems are common in young adults and associated with physical activity and not obesity: the findings of a cross-sectional survey in a university cohort

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BMC Musculoskeletal Disorders 2019;20:116

<https://doi.org/10.1186/s12891-019-2487-2>

Background

Obesity and sedentary behaviour, risk factors for knee osteoarthritis in middle-age, are increasing in younger adults. The objectives of this study were to estimate the prevalence of knee problems in young adults, to characterise these problems and explore the relationship with physical activity, physical inactivity and obesity.

Methods

Presence of knee problems was collected through self-report questionnaire from staff and students of one university aged 18–39; direct measurement of weight and height was taken and activity measured using the International Physical Activity Questionnaire. Twelve-month prevalence of knee problems was estimated. Logistic regression was used to investigate the relationship between knee problems and physical activity levels, sitting time and body mass index.

Results

The prevalence of knee problems was high (31.8% [95% CI 26.9 to 37.2%]) among the 314 participants; knee pain was the most common dominant symptom (65%). Only high physical activity levels (OR 2.6 [95% CI 1.4–4.9]) and mental distress (OR 2.3 [95% CI 1.2–4.6]) were independent risk factors for knee problems.

Conclusions

Knee problems were common among young adults, who were staff and students of a university. With increasing obesity prevalence, populations are being encouraged to become more active. More attention may need to be paid towards prevention of knee problems in such programmes, and further research is warranted.

33. MENISCUS

PRP helps

Efficacy of platelet-rich plasma in arthroscopic repair for discoid lateral meniscus tears

Wen-Li Dai, Hua Zhang, Ze-Ming Lin, Zhan-Jun Shi and Jian Wang

BMC Musculoskeletal Disorders 2019 **20**:113

<https://doi.org/10.1186/s12891-019-2500-9>

Background

To evaluate the clinical results of arthroscopic repair with or without platelet-rich plasma (PRP) for tears of the discoid lateral meniscus (DLM).

Methods

Twenty-nine patients with DLM tears within a stable knee were arthroscopically treated with meniscal suture repair. Of those, 14 were augmented with platelet-rich plasma (PRP), and 15 were performed without PRP augmentation. Patients were evaluated at baseline (the day before surgery) and then 12 and 24 months after the last injection. Evaluation included the Lysholm score, and Ikeuchi grade, Visual analogue score (VAS) for pain and failure rate. Failure was defined by patients developing symptoms of joint line pain, locking, swelling or requiring repeat arthroscopy.

Results

There was no difference in the failure rate in the PRP group (1 of 14) compared with the non-PRP group (2 of 15) ($P = 0.58$). Statistically significant improvement in Lysholm score, Ikeuchi grade and VAS for pain was documented at the last follow-up compared with baseline in both PRP and non-PRP group. No significant difference was found between the PRP group and non-PRP group on Lysholm score, Ikeuchi grade and VAS for pain at the last follow-up. In the univariate analysis of each variable, younger age ($P = 0.036$) and longer follow-up duration ($P = 0.043$) were statistically associated with a better function improvement. Whereas in multivariate analysis, only younger age ($P = 0.004$) was significantly associated with a better function improvement.

Conclusion

With regard to clinical evaluations in arthroscopic repair for DLM tears, PRP group had similar effect in pain relief and functional improvement to non-PRP group at mid-term follow-up. Future larger prospective studies with a longer follow-up are needed to determine whether PRP should be used with DLM repair.

34. PATELLA

Risk factors for pain

Br J Sports Med. 2019 Mar;53(5):270-281. doi: 10.1136/bjsports-2017-098890. Epub 2018 Sep 21.

Risk factors for patellofemoral pain: a systematic review and meta-analysis.

Neal BS^{1,2}, Lack SD^{1,2}, Lankhorst NE³, Raye A¹, Morrissey D^{1,4}, van Middelkoop M³.

BACKGROUND:

Patellofemoral pain (PFP) is a prevalent condition commencing at various points throughout life. We aimed to provide an evidence synthesis concerning predictive variables for PFP, to aid development of preventative interventions.

METHODS:

We searched Medline, Web of Science and SCOPUS until February 2017 for prospective studies investigating at least one potential risk factor for future PFP. Two independent reviewers appraised methodological quality using the Newcastle-Ottawa Scale. We conducted meta-analysis where appropriate, with standardised mean differences (SMD) and risk ratios calculated for continuous and nominal scaled data.

RESULTS:

This review included 18 studies involving 4818 participants, of whom 483 developed PFP (heterogeneous incidence 10%). Three distinct subgroups (military recruits, adolescents and recreational runners) were identified. Strong to moderate evidence indicated that age, height, weight, body mass index (BMI), body fat and Q angle were not risk factors for future PFP. Moderate evidence indicated that quadriceps weakness was a risk factor for future PFP in the military, especially when normalised by BMI (SMD -0.69, CI -1.02, -0.35). Moderate evidence indicated that hip weakness was not a risk factor for future PFP (multiple pooled SMDs, range -0.09 to -0.20), but in adolescents, moderate evidence indicated that increased hip abduction strength was a risk factor for future PFP (SMD 0.71, CI 0.39, 1.04).

CONCLUSIONS:

This review identified multiple variables that did not predict future PFP, but quadriceps weakness in military recruits and higher hip strength in adolescents were risk factors for PFP. Identifying modifiable risk factors is an urgent priority to improve prevention and treatment outcomes.

35. KNEE/TOTAL

Not recommended to leave varus deformity

J Arthroplasty. 2017 Sep;32(9S):S171-S176. doi: 10.1016/j.arth.2017.02.064. Epub 2017 Mar 2.

Leaving Residual Varus Alignment After Total Knee Arthroplasty Does Not Improve Patient Outcomes.

Meneghini RM¹, Grant TW², Ishmael MK³, Ziemba-Davis M³.

BACKGROUND:

Recent popularity of kinematic alignment and constitutional varus has caused some surgeons to leave varus limbs in residual varus after total knee arthroplasty (TKA). This study assessed whether if patients left in residual varus have improved outcomes compared with those fully corrected to neutral alignment.

METHODS:

A retrospective review of 361 consecutive primary TKAs was performed. Anatomic tibiofemoral alignment was measured and knees were categorized as neutral, varus, or valgus. Modern Knee Society scores and University of California Los Angeles Activity Level scores were collected at minimum 1-year follow-up.

RESULTS:

After exclusions for confounds and loss to follow-up, 262 knees were available for analysis, 67% (176) of which were preoperatively varus. Sixty-six percent of varus knees were corrected to neutral, 25.6% were left in residual varus, and 8.5% were corrected to valgus. Median Knee Society objective scores at latest follow-up were greater in knees corrected to neutral (97), followed by knees corrected to varus (95), and valgus (93; $P = .025$), but post hoc comparisons between pairs of medians were not significant. There was no difference between groups in any other outcome measure ($P \geq .245$) or the amount of improvement from baseline ($P \geq .423$). Sixty percent of native varus patients corrected to neutral, 64% of those corrected to varus, and 40% of those corrected to valgus reported that their knee felt normal ($P = .193$).

CONCLUSION:

Findings fail to support the notion that leaving varus knees in residual varus will improve outcomes and pain. Caution is advised when leaving limbs in residual varus after TKA.

37. OSTEOARTHRITIS/KNEE**Hip abductor strength in knee OA**

Osteoarthritis Cartilage. 2019 Feb 28. pii: S1063-4584(19)30861-1. doi: 10.1016/j.joca.2019.02.795.

Hip muscle strength and protection against structural worsening and poor function and disability outcomes in knee osteoarthritis.

Chang AH¹, Chmiel JS², Almagor O³, Hayes KW⁴, Guerhazi A⁵, Prasad PV⁶, Moisio KC⁷, Zhang Y⁸, Szymaszek J⁹, Sharma L¹⁰.

OBJECTIVE:

Examine associations of hip abductor strength with (1) cartilage damage worsening in the tibiofemoral and patellofemoral compartments 2 years later, and (2) poor function and disability outcomes 5 years later.

METHODS:

Participants had knee osteoarthritis (K/L ≥ 2) in at least one knee. Hip abductor strength was measured using Biodex Dynamometry. Participants underwent 3.0T MRI of both knees at baseline and 2 years later. Baseline-to-2-year cartilage damage progression, defined as any worsening of WORMS cartilage damage score, was assessed at each tibiofemoral and patellofemoral surface. LFFDI (Late-Life Function and Disability Instrument) and Chair-Stand-Rate were recorded at baseline and 5-year follow-up; outcomes analyzed using quintiles. Poor outcomes were defined as remaining in the same low-function quintiles or being in a worse quintile at 5-year follow-up. We analyzed associations of baseline hip abductor strength with cartilage damage worsening and function and disability outcomes using multivariable log-binomial models.

RESULTS:

275 knees from 164 persons [age = 63.7 (SD = 9.8) years, 79.3% women] comprised the structural outcome sample, and 187 persons [age = 64.2 (9.7), 78.6% women] the function and disability outcomes sample. Greater baseline hip abductor strength was associated with reduced risks of baseline-to-2-year medial patellofemoral and lateral tibiofemoral cartilage damage worsening [adjusted relative risks (RRs) range: 0.80-0.83] and with reduced risks of baseline-to-5-year poor outcomes for Chair-Stand-Rate and LFFDI Basic Lower-Extremity Function and Disability Limitation (adjusted RRs range: 0.91-0.94).

CONCLUSION:

Findings support a beneficial role of hip abductor strength for disease modification and for function and disability outcomes, and as a potential therapeutic target in managing knee osteoarthritis.

41 A. ACHILLES TENDON AND CALF

Tendon weakness in patients

PLoS One. 2019; 14(2): e0211863. doi: 10.1371/journal.pone.0211863 PMID: 30785895

Transverse tendon stiffness is reduced in people with Achilles tendinopathy: A cross-sectional study

Evan Finnamore, Alexander Scott,

Objectives

The objective of the current cross-sectional study was to examine Achilles tendon transverse stiffness in a group of recreational runners with Achilles tendinopathy, in comparison to an asymptomatic group of runners with similar training history. We also aimed to determine the between-week intra-individual reliability of this measurement technique.

Design

Cross-sectional cohort study.

Methods

A hand-held dynamometer was used to assess the transverse stiffness of the Achilles tendon (AT) in twenty-five recreational runners. In ten people with midportion Achilles tendinopathy (5 men, 5 women), measurements were taken directly over the most symptomatic location. In 15 people who were free of AT symptoms (7 men, 8 women), measurements were taken at an equivalent location on the tendon. Participants returned after one week to determine measurement reliability (intra-class correlation coefficient/ICC and minimum detectable change/MDC95). We also collected information about people's tendon loading activities, tendon thickness (ultrasound measurement), and symptoms (Victorian Institute of Sports Assessment–Achilles / VISA-A score).

Results

The AT transverse stiffness was lower in people with Achilles tendinopathy ($777 \text{ N/m} \pm 86$) compared to those who were asymptomatic ($873 \text{ N/m} \pm 72$) ($p < 0.05$). AT transverse stiffness was negatively correlated with age and tendon thickness, and positively correlated with VISA-A score and waist circumference. Reliability was good, with ICC of 0.81 in people with tendinopathy and 0.80 in healthy controls, and an MDC95 of 118 and 87N/m in these two respective groups.

Conclusions

Transverse Achilles tendon stiffness can be reliably measured in people with midportion Achilles tendinopathy, and appears to be lower in people who are older, more symptomatic, and with more extensive tendon thickening. The potential clinical utility of monitoring tendon stiffness in the management of tendon injuries merits further study.

45 B. MANUAL THERAPY CERVICAL**Forward head posture**

Disabil Rehabil. 2019 Feb 13:1-8. doi: 10.1080/09638288.2019.1571638. [

Comparison of immediate effects of sling-based manual therapy on specific spine levels in subjects with neck pain and forward head posture: a randomized clinical trial.

Kim DH^{1,2}, Kim SY³.

PURPOSE:

Forward head posture is identified as the flexion of the lower cervical spine along with the extension of the upper cervical spine, with an overall increase in the cervical curve. This study aimed to compare the immediate effect of upper-cervical level and cervicothoracic junction level manual therapy on head posture, cervical range of motion and muscle activity of the subjects with forward head posture.

METHODS:

A total 22 subjects with chronic neck pain (numeric pain rating scale >3, forward head posture: cranio-vertebral angle <51°) participated in the study and were randomly allocated into the upper-cervical (n = 11) and cervicothoracic junction (n = 11) groups. Cranio-vertebral angle, cervical range of motion, and electromyography amplitude during performance of the craniocervical flexion test were measured before and immediately after the intervention.

RESULTS/FINDINGS:

There were no significant main effects for the group by time outcome score of craniovertebral angle and electromyography amplitude. However, in the range of motion of the cervical area, the cervicothoracic junction group showed a significant increase in extension and right rotation than the upper-cervical group ($p < 0.05$). Moreover, in both groups, the electromyography amplitude of the sternocleidomastoid muscle was significantly reduced after intervention. The electromyography amplitude of the anterior scalene muscle in only the cervicothoracic junction group was significantly reduced after intervention ($p < 0.05$).

CONCLUSION:

Cervicothoracic junction manual therapy improved cervical alignment, cervical mobility (extension, rotation), and muscle recruitment ability in subjects with forward head posture. These observations may partially explain the efficacy of this manual therapy in rehabilitation of individuals with mechanical neck disorder (with forward head posture). Implications for rehabilitation Forward head posture is identified as the flexion of the lower cervical spine along with the extension of the upper cervical spine, with an overall increase in the cervical curve. Cervicothoracic area manual therapy in subjects with neck pain and forward head posture better improved the muscle recruitment ability than upper cervical area manual therapy during motor tasks.

45 D. MANUAL THERAPY EXTREMITIES**Mulligan's mobs help**

Physiotherapy. 2019 Mar;105(1):1-9. doi: 10.1016/j.physio.2018.10.001. Epub 2018 Oct 15.

Effectiveness of Mulligan's mobilization with movement techniques on pain and disability of peripheral joints: a systematic review with meta-analysis between 2008-2017.

Stathopoulos N¹, Dimitriadis Z², Koumantakis GA³.

BACKGROUND:

The Mulligan method of manual therapy advocates the use of 'mobilization with movement (MWM)' techniques to effectively manage peripheral joint 'positional fault' dysfunctions.

OBJECTIVES:

To provide an updated evidence-based systematic review and meta-analysis regarding the effectiveness of MWM techniques.

DATA SOURCES:

PubMed, EBSCOhost, PEDro, Cochrane Library and Google Scholar between 1st August 2008-31st August 2017.

STUDY SELECTION:

Two reviewers applied the population intervention comparison outcome (PICO) question to screen the studies for this review. Only RCTs/CCTs were included.

DATA EXTRACTION:

Information on study design, subjects, intervention, outcome measures and efficacy results were extracted. Methodological quality was independently assessed by two reviewers using the PEDro Scale.

DATA SYNTHESIS:

Sixteen studies with 576 participants were included in four separate meta-analyses for pain and disability. The I² index assessed the heterogeneity between studies.

RESULTS:

MWMs have demonstrated statistically significant improvements against sham treatment, passive and control intervention techniques for pain [mean difference (95%CI):-16.12 (-19.77, -12.48) & I=72%] and disability [mean difference (95%CI):-17.51 (-22.84, -12.19) 2 2 2 2 & I=88%] or against another manual therapy treatment [pain mean difference (95%CI): -10.43 (-11.38, -9.48) & I=0%], however not against another manual therapy treatment for disability. The clinical significance of the pooled differences was compared against Minimal Clinically Important Difference values.

LIMITATIONS:

No long-term effectiveness data were identified in any of the included studies.

CONCLUSIONS AND IMPLICATIONS OF KEY FINDINGS:

The overall post-intervention short-term statistical and clinical significance of MWM techniques has been verified, although the high heterogeneity identified may require further validation of those methods. Systematic review registration number: PROSPERO 2016:CRD42017071595.

48 A. STM**Trigger points and hypersensitivity**

Pain Med. 2019 Mar 1. pii: pnz020. doi: 10.1093/pm/pnz020.

Widespread Pressure Pain Sensitivity and Referred Pain from Trigger Points in Patients with Upper Thoracic Spine Pain.

Ortega-Santiago R^{1,2}, Maestre-Lerga M³, Fernández-de-Las-Peñas C^{1,2}, Cleland JA^{4,5,6}, Plaza-Manzano G^{7,8}.

OBJECTIVES:

The presence of trigger points (MTrPs) and pressure pain sensitivity has been well documented in subjects with neck and back pain; however, it has yet to be examined in people with upper thoracic spine pain. The purpose of this study was to investigate the presence of MTrPs and mechanical pain sensitivity in individuals with upper thoracic spine pain.

METHODS:

Seventeen subjects with upper thoracic spine pain and 17 pain-free controls without spine pain participated. MTrPs were examined bilaterally in the upper trapezius, rhomboid, iliocostalis thoracic, levator scapulae, infraspinatus, and anterior and middle scalene muscles. Pressure pain thresholds (PPTs) were assessed over T2, the C5-C6 zygapophyseal joint, the second metacarpal, and the tibialis anterior.

RESULTS:

The numbers of MTrPs between both groups were significantly different ($P < 0.001$) between patients and controls. The number of MTrPs for each patient with upper thoracic spine pain was 12.4 ± 2.8 (5.7 ± 4.0 active TrPs, 6.7 ± 3.4 latent TrPs). The distribution of MTrPs was significantly different between groups, and active MTrPs within the rhomboid (75%), anterior scalene (65%), and middle scalene (47%) were the most prevalent in patients with upper thoracic spine pain. A higher number of active MTrPs was associated with greater pain intensity and longer duration of pain history.

CONCLUSIONS:

This study identified active MTrPs and widespread pain hypersensitivity in subjects with upper thoracic spine pain compared with asymptomatic people. Identifying proper treatment strategies might be able to reduce pain and improve function in individuals with upper thoracic spine pain. However, future studies are needed to examine this.

Myofascial release helps LBP

Clin Biomech (Bristol, Avon). 2019 Feb 14;63:27-33. doi: 10.1016/j.clinbiomech.2019.02.009.

Effects of myofascial release in erector spinae myoelectric activity and lumbar spine kinematics in non-specific chronic low back pain: Randomized controlled trial.

Arguisuelas MD¹, Lisón JF², Doménech-Fernández J³, Martínez-Hurtado I⁴, Salvador Coloma P⁴, Sánchez-Zuriaga D⁵.

BACKGROUND:

Flexion-relaxation response of the lumbar erector spinae has been previously studied after different interventions such as exercise programs or spinal manipulation, in subjects with chronic low back pain. The objective of the study was to investigate the effects of an isolated myofascial release protocol on erector spinae myoelectric activity and lumbar spine kinematics in chronic low back pain.

METHODS:

Thirty-six participants, with nonspecific chronic low back pain, were randomized to myofascial release group (n = 18) receiving four sessions of myofascial treatment, each lasting 40 min, and to control group (n = 18) receiving a sham myofascial release. Electromyographic and kinematic variables as well as pain and disability questionnaires were analyzed.

FINDINGS:

There was a bilateral reduction of the flexion relaxation ratio in individuals receiving myofascial release and who did not show myoelectric silence at baseline (right difference M = 0.34, 95% CI [0.16, 0.33], $p \leq .05$ and left difference M = 0.45, 95% CI [0.16, 0.73], $p \leq .05$). There was also a significant reduction in pain in the myofascial release group (difference M = -9.1, 95% CI [-16.3, -1.8], $p \leq .05$) and disability (difference M = -5.6, 95% CI [-9.1, -2.1], $p \leq .05$), compared with control group. No significant differences between groups were found for the kinematic variables.

INTERPRETATION:

The myofascial release protocol contributed to the normalization of the flexion- relaxation response in individuals who did not show myoelectric silence before the intervention, and also showed a significant reduction in pain and disability compared with the sham group.

52. EXERCISE

Overcoming the stiffness of eccentric exercise

Eur J Appl Physiol. 2019 Feb 25. doi: 10.1007/s00421-019-04108-7.

The relationship between stiffness and pain following unaccustomed eccentric exercise: the effects of gentle stretch and repeated bout.

Muanjai P^{1,2}, Mickevicius M³, Kamandulis S³, Snieckus A³, Jones DA⁴.

PURPOSE:

To determine how muscle stiffness and pain which develop after eccentric exercise are affected by gentle stretching and repeated exercise.

METHODS:

Twenty-one healthy female participants undertook eccentric exercise of the elbow flexors and changes in resting elbow flexion angle (REFA; a measure of muscle stiffness), pain on stretch scale, pain elicited by pressure (PPT pain, a measure of mechanoreceptor hypersensitivity), and upper arm girth were followed for 7 days after exercise. The effects of gentle passive stretching on pain and muscle stiffness were investigated 2 and 4 days after exercise. Eleven participants also repeated the exercise with the same arm 6 weeks after the first bout.

RESULTS:

There was a significant relationship between the pain on stretch scale and increased REFA (day 4; $R^2 = 0.65$, $p < 0.001$), whereas there was no relationship between REFA and PPT pain. REFA was reduced by passive stretching and pain on stretch scale was also reduced from 3.0 (1.4, 5.1) to 0.75 (0.0, 2.0) [median (IQR), $p = 0.01$]. PPT pain was unaffected by the passive stretching, as was muscle swelling. Following the repeated bout, increases in REFA were much reduced, as was pain on stretch scale ($p = 0.02$). However, PPT pain was not significantly different between the two bouts of exercise.

CONCLUSIONS:

The results indicate that reductions in pain on stretch scale, either by gentle passive stretching or as the result of repeated exercise, are primarily due to reductions in muscle stiffness which develops after eccentric exercise, whereas

53. CORE**Isolated core exercises more effective**

PLoS One. 2019 Feb 27;14(2):e0212216. doi: 10.1371/journal.pone.0212216. eCollection 2019.

The effects of performing integrated compared to isolated core exercises.

Saeterbakken AH¹, Chaudhari A², van den Tillaar R³, Andersen V¹.

Integrated exercises that mimic daily tasks are generally preferred for improving performance and the later stages of rehabilitation, but it is unknown whether integrated core exercises are better than isolated core exercises at improving muscle activation for hypertrophy.

The aim of the study was to compare the electromyographic (EMG) activity in rectus abdominis, oblique externus, and erector spinae while performing three conditions of integrated core exercises (lunges) with three isolated core exercises (prone bridge, side bridge and back extension). The three conditions of lunges were: on a stable surface, unstable surface and with external resistance to the trunk using an elastic band. The external resistance was measured with a force cell and peaked at 75N. After one familiarization session, all exercises were performed in one experimental session in randomized order.

The isolated core exercises were performed in 20 seconds and the time performing the five repetitions with lunges was matched (20 seconds). Significantly greater peak normalized EMG activity were observed in the isolated core exercises compared to the three integrated core exercises ($P < 0.001$) with two exceptions. For the oblique externus, the isolated core exercise was only greater than the stable lunge. Lunges with elastic bands only demonstrated greater peak erector spinae activation compared the other lunge conditions. Comparing the mean EMG activity between the isolated and three integrated exercises, greater muscle activations were observed performing the isolated exercises ($P < 0.001$). Unstable lunges did not increase the peak or mean core muscle activations.

In conclusion, mean and peak EMG activity performing the isolated exercises were in general greater than the three condition of lunges. Based on these results, we recommend using isolated core exercises when the primary goal is to improve muscle activation and elicit hypertrophy, but integrated exercises once adequate initial hypertrophy is achieved.

54. POSTURE**Cervical posture improved with traction**

Spine (Phila Pa 1976). 2019 Apr 1;44(7):447-453. doi: 10.1097/BRS.0000000000002874.

Changes in the Sagittal Cranio-Cervical Posture Following a 12-Week Intervention Using a Simple Spinal Traction Device.

Shahar D¹, Sayers MGL.

STUDY DESIGN:

Non-controlled clinical trial.

OBJECTIVE:

To assess the efficacy of a simple home spinal traction device on sagittal cranio-cervical posture and related symptoms.

SUMMARY OF BACKGROUND DATA:

Forward head protraction (FHP) and cranio-cervical malalignment were shown to be consequential in the development adverse musculoskeletal radiographic findings and symptoms in that region.

METHODS:

Participants (n=13, 18-36-year-old) were drawn from a mildly symptomatic population, all presented with cranio-cervical malalignment and considerable FHP. Participants used a simple home spinal traction device for 12 weeks, 10min/d. Sagittal cervical radiographs and the SF36 health survey were obtained pre/post intervention and guideline compliance was recorded. Radiographic evaluation included typical measurements of sagittal cranio-cervical alignment and FHP (e.g., atlas plane line, vertical axis line, sagittal cranial angle, absolute rotation angle). Standard paired samples t tests, chi-squared, and effect size analyses were used to assess pre- and post-intervention changes.

RESULTS:

Each of the key radiographic variables recorded significant moderate to very large positive changes as a result of the intervention. Similarly, Chi-squared analyses indicated that sagittal cervical spine configuration tended to become more lordotic (P=0.007), with four participants shifting from a kyphotic to a lordotic presentation. SF36 health survey data demonstrated mostly significant positive changes throughout all tested domains, and moderate positive changes were recorded across all radiographic cranio-cervical measured parameters (e.g., decreased FHP, increased cervical lordosis, and cranial extension). Participants indicated high level of protocol compliance.

CONCLUSION:

This study has demonstrated that the unsupervised daily use of a simple home spinal traction device (Thoracic Pillow) proved effective in bringing positive plastic changes to the sagittal cranio-cervical alignment and reduction in symptoms in the tested population during a short intervention period.

56. ATHLETICS

Airborne athletes' spinal injuries

European Spine Journal pp 1–8| Cite as

Spinal injuries in airborne accidents: a demographic overview of 148 patients in a level-1 trauma center

- Henrik C. Bäcker Moritz C. Deml

Purpose

The purpose of this study was to investigate the type and severity of spinal injury in airborne sports, as well as patients demographics in this unique set of athletes. Paragliding is one of the most popular airborne sports in Switzerland, which thought to be no less dangerous with a high potential for spinal injury. Few studies on spinal column injuries have been performed in these high-risk athletes with only inconsistent findings.

Methods

Patient charts were analyzed for all airborne sports injuries affecting the spine from 2010 to 2017 at a level-1 trauma center in Switzerland. To classify the injuries, we used the newest AOSpine classification, ASIA-grading and the injury severity score (ISS). In total, 235 patients were admitted to the emergency department due to an airborne injury. A total of 148 patients (148/235, 63.0%) which were predominantly male (125/235, 84.5%) at a mean age of 39.4 years suffered 334 spinal fractures and 5 spinal contusions. The mean ISS was 17.3, and the L1 vertebra was most commonly affected (47.6% of cases, 68/148).

Results

A total of 78 patients (54.5% or 78/148) required spine surgery due to instability or neurological deficits (31/148 patients; 20.9%). Concomitant injuries were identified in 64.2% of cases ($n = 95$).

Conclusion

Due to the increasing popularity of airborne sports, age of patients and severity of injuries (ISS) increased compared with the literature. The thoracolumbal spine is at especially high risk. To prevent further complications, the treatment procedure has to be sought carefully and algorithm should be introduced in clinics to avoid delay in diagnostics and surgery.

57. GAIT**Changes in gait through a home program****Effects of a lower extremity exercise program on gait biomechanics and clinical outcomes in children and adolescents with obesity: A randomized controlled trial**

C.Schwab^aA.Baca^bS.Greber-Platzer^cA.Kreissl^cS.Nehrer^dM.Keilani^eR.Crevenna^eA.Kranzl^fB.Wondrasch^a
<https://doi.org/10.1016/j.gaitpost.2019.02.032>Get rights and content

Highlights

- The exercise program (EP) seemed to positively alter frontal gait variables.
- Effects were small, but indicated a reduction in hip adduction and pelvic drop.
- Hip and knee muscular strength was increased after 12 weeks in the EP group.
- Clinical outcomes indicate that the EP is feasible.
- However, low adherence highlights the need for more attractive programs.

Background Research highlights the detrimental effects of obesity on gait biomechanics and the accompanied risk of lower-extremity skeletal malalignments, increased joint stress, pain and discomfort. Individuals with obesity typically show increased knee valgus angles combined with an increased step width. Accompanying muscular dysfunctions impede their ability to compensate for these alterations, especially in the frontal plane. To date, no studies are available, which evaluated the potential effects of an exercise program (EP) in reducing these unfavorable biomechanical changes.

Research questions Is a 12-week EP, which includes hip abductor and knee extensor strength exercises and fosters dynamic knee alignment, effective in positively altering gait biomechanics in children and adolescents with obesity?

Methods This study was a randomized controlled trial having children and adolescents with obesity assigned to an EP (n = 19) or control (n = 16) group. Pain, self-rated knee function, muscle strength and 3D gait analysis during walking and stair climbing were evaluated.

Results Results indicate that the EP was able to increase muscular strength especially in the hip abductors. In addition, children from the EP group walked with less maximum hip adduction and reduced pelvic drop during weight acceptance at follow-up. No changes were present in self-rated knee function, pain or discomfort.

Significance Even though effects were small, results indicate that an EP is an effective short-term possibility to counteract the progressive development of biomechanical malalignments of the lower extremity. Clinical parameters indicated that the program was feasible. Nonetheless, low adherence highlights the need to develop more attractive programs.

58. RUNNING**Leg length and running**

J Orthop Sports Phys Ther. 2019 Mar 12:1-4. doi: 10.2519/jospt.2019.8420.

Is Cadence Related to Leg Length and Load Rate?

Tenforde AS^{1,2}, Borgstrom HE², Outerleys J¹, Davis IS^{1,2}.

BACKGROUND:

Increasing cadence is often recommended to reduce load rate and to lower injury risk. However, habitual cadence was recently shown to be unrelated to load rate. Cadence is likely influenced by leg length. If so, then cadence may be related to load rate when it is normalized to leg length.

OBJECTIVES:

To examine the relationship between cadence and leg length in both injured and uninjured runners with a rearfoot strike pattern. We hypothesized that increased leg length would be associated with lower cadence. We also evaluated the relationship between cadence normalized to leg length and the vertical average load rate (VALR), expecting that as cadence normalized to leg length increased, VALR would decrease.

METHODS:

In this cross-sectional cohort, laboratory-based study, 40 uninjured and 42 injured recreational runners with a rearfoot strike pattern were measured at self-selected speeds. The relationship of cadence to leg length was measured between groups by injury status. A secondary analysis evaluated the relationship between cadence normalized to leg length and VALR. The data were analyzed using a multiple linear regression, with injury status as a covariate. Alpha was set to .05.

RESULTS:

Accounting for injury status, leg length had a moderate negative association with cadence ($P < .001$, $r = 0.449$, standardized $\beta = -0.443$). There were no associations of VALR with cadence normalized to leg length by injury status or across participants.

CONCLUSION:

Lower cadence was observed in recreational runners with longer legs, regardless of injury status. However, cadence was not related to load rate when normalized to leg length. J Orthop Sports Phys Ther, Epub 12 Mar 2019. doi:10.2519/jospt.2019.8420.

62 A. NUTRITION/VITAMINS**Artificially sweetened beverages and decreased mortality****Long-Term Consumption of Sugar- Sweetened and Artificially Sweetened Beverages and Risk of Mortality in US Adults**

BACKGROUND: Whether consumption of sugar-sweetened beverages (SSBs) or artificially sweetened beverages (ASBs) is associated with risk of mortality is of public health interest.

METHODS: We examined associations between consumption of SSBs and ASBs with risk of total and cause-specific mortality among 37 716 men from the Health Professional's Follow-up study (from 1986 to 2014) and 80 647 women from the Nurses' Health study (from 1980 to 2014) who were free from chronic diseases at baseline. Cox proportional hazards regression was used to estimate hazard ratios and 95% confidence intervals.

RESULTS: We documented 36 436 deaths (7896 cardiovascular disease [CVD] and 12 380 cancer deaths) during 3 415 564 person-years of follow-up. After adjusting for major diet and lifestyle factors, consumption of SSBs was associated with a higher risk of total mortality; pooled hazard ratios (95% confidence intervals) across categories (<1/ mo, 1–4/mo, 2–6/week, 1–<2/d, and ≥2/d) were 1.00 (reference), 1.01 (0.98, 1.04), 1.06 (1.03, 1.09), 1.14 (1.09, 1.19), and 1.21 (1.13, 1.28; *P* trend <0.0001). The association was observed for CVD mortality (hazard ratio comparing extreme categories was 1.31 [95% confidence interval, 1.15, 1.50], *P* trend <0.0001) and cancer mortality (1.16 [1.04, 1.29], *P* trend = 0.0004). ASBs were associated with total and CVD mortality in the highest intake category only; pooled hazard ratios (95% confidence interval) across categories were 1.00 (reference), 0.96 (0.93, 0.99), 0.97 (0.95, 1.00), 0.98 (0.94, 1.03), and 1.04 (1.02, 1.12; *P* trend = 0.01) for total mortality and 1.00 (reference), 0.93 (0.87, 1.00), 0.95 (0.89, 1.00), 1.02 (0.94, 1.12), and 1.13 (1.02, 1.25; *P* trend = 0.02) for CVD mortality. In cohort-specific analysis, ASBs were associated with mortality in NHS (Nurses' Health Study) but not in HPFS (Health Professionals Follow-up Study) (*P* interaction, 0.01). ASBs were not associated with cancer mortality in either cohort.

CONCLUSIONS: Consumption of SSBs was positively associated with mortality primarily through CVD mortality and showed a graded association with dose. The positive association between high intake levels of ASBs and total and CVD mortality observed among women requires further confirmation.

Vasanti S. Malik, ScD Yanping Li, PhD An Pan, PhD Lawrence De Koning, PhD Eva Schernhammer, MD, DrPH Walter C. Willett, MD, DrPH Frank B. Hu, MD, PhD

Circulation. 2019;139:00–00. DOI: 10.1161/CIRCULATIONAHA.118.037401

63. PHARMACOLOGY

Opioid use in OA

Arthritis Care Res (Hoboken). 2019 Jan 10. doi: 10.1002/acr.23831. [Epub ahead of print]

Factors Associated With Opioid Use in Pre-surgical Knee, Hip and Spine Osteoarthritis Patients.

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Abstract

OBJECTIVE:

To evaluate rates of prescription opioid use among pre-surgical knee, hip and spine osteoarthritis (OA) patients, and associations between use and socio-demographic and health status characteristics.

METHODS:

Participants were pre-surgical patients with end-stage knee (N=577), hip (N=459) and spine (N=168) OA. Data were collected on current use of opioid and other pain medications, as well as measures of socio-demographics and health status, depression and pain (0-10 numeric rating scale). Rates of opioid use were calculated by sex, age and surgical site. Multivariable logistic regression was used to examine associations between opioid use (outcome: sometimes/daily vs. never) and other study variables.

RESULTS:

Participants were of mean age 65.6 years; 55.5% were women. 15% of patients reported 'sometimes' using opioids and 15% reported 'daily' use. Use of opioids was highest among spine OA patients (40%) and similar among knee and hip patients (28% and 30%). Younger women (<65) reported the greatest use of opioid overall, particularly among spine patients. From multivariable logistic regression, greater likelihood of opioid use was significantly associated with spine OA (vs. knee OA), obesity, being a current or former smoker, higher symptomatic joint count, greater depressive symptoms, greater pain and current use of other prescription pain medication.

CONCLUSION:

Nearly a third of pre-surgical OA patients used prescription opioid medication. Given the questionable efficacy of opioids in OA and risk of adverse effects, higher opioid use among younger individuals and those with depressive symptoms is of concern and warrants further investigation. This article is protected by copyright. All rights reserved.