

2. LBP

Some changes

Longitudinal associations of kinematics and fear-avoidance beliefs with disability, work ability and pain intensity in persons with low back pain

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Highlights

- Increased range-of-motion weakly associated with reduced disability in low back pain.
- No association between spinal velocity and disability, work ability or pain.
- Fear-avoidance belief is weakly related to velocity at start of a spinal flexion.

Abstract

Background

Impaired lumbar movement has cross-sectionally been associated with low back pain (LBP); however, the consequence of impaired movement on disability and pain in persons with LBP is poorly understood. Furthermore, fear-avoidance beliefs (FAB) may influence spinal movement, but the relation between fear-avoidance and kinematics is unclear.

Objectives

To investigate the longitudinal associations of kinematics and FAB with disability, work ability and pain in patients with LBP. Further, to explore associations between FAB and kinematics.

Design

Prospective observational study.

Method

Kinematic measures were performed on 44 persons with LBP at baseline, three and nine months. Motion sensors identified range-of-motion and velocity during a spinal flexion/extension. FAB, disability, work ability and pain were reported at all time points using questionnaires.

Results

Increased range-of-motion was weakly associated with less disability (−0.14 points, 95% CI -0.22 to −0.06). Velocity was not associated with disability, work ability or pain. Higher FAB of physical activity were associated with more disability (1.50 points, 95% CI 0.51 to 2.49) and pain (0.37 points, 95% CI 0.11 to 0.62). Higher work-related FAB was associated with lower work ability (−0.37 points, 95% CI -0.68 to −0.05). Moreover, higher FAB showed weak associations with lower velocity in the initial movement phase (−3.3°/s, 95% CI -6.1 to −0.5).

Conclusions

Of the kinematic measures, only range-of-motion was related to disability. Higher FAB was weakly associated with all self-reported outcomes and with lower velocity only at the initial flexion phase. However, the magnitude of these associations suggest marginal clinical importance.

5. SPINAL SURGERY

Femoral angle and impact post-surgical spondylo

Spine J. 2019 Apr;19(4):670-676. doi: 10.1016/j.spinee.2018.10.001. Epub 2018 Oct 5.

The impact of surgical reduction of high-grade lumbosacral spondylolisthesis on proximal femoral angle and quality of life.

Nahle IS¹, Labelle H², Parent S¹, Joncas J³, Mac-Thiong JM⁴.

BACKGROUND CONTEXT:

Abnormal proximal femoral angle (PFA) was recently found to be associated with deteriorating sagittal balance and quality of life (QoL) in high-grade spondylolisthesis (HGS). However, the influence of PFA on the QoL of patients undergoing surgery remains unknown.

PURPOSE:

This study compares the pre- and postoperative measurements of sagittal balance including PFA in patients with lumbosacral HGS after surgery. It also determines if PFA is a radiographic parameter that is associated with QoL in patients undergoing surgery.

STUDY DESIGN:

Retrospective cohort study.

PATIENT SAMPLE:

Thirty-three patients (mean age 15.6 ± 3.0 years) operated for L5-S1 HGS between July 2002 and April 2015. Thirteen had in situ fusion and 20 had reduction to a low-grade slip.

OUTCOME MEASURES:

The outcome measures included PFA and QoL scores measured from the Scoliosis Research Society SRS-30 QoL questionnaire.

METHODS:

The minimum follow-up was 2 years. PFA and QoL were compared pre- and postoperatively. Statistical analysis used nonparametric Mann-Whitney and Wilcoxon Signed Rank tests, Chi-square tests to compare proportions, and bivariate correlations with Spearman's coefficients.

RESULTS:

A decreasing PFA correlated with less pain ($r = -0.56$, $p = .010$), improved function ($r = -0.51$, $p = .022$) and better self-image ($r = -0.46$, $p = .044$) postreduction. Reduction decreased PFA by 5.1° ($p = .002$), whereas in situ fusion did not alter PFA significantly. Patients with normal preoperative PFA had similar postoperative QoL regardless of the type of surgery, except for self-image, which improved further with reduction (3.73 ± 0.49 to 4.26 ± 0.58 , $p = .015$). Patients with abnormal preoperative PFA tended to have a higher QoL in all domains after reduction.

CONCLUSION:

Decreasing PFA correlates with less pain, better function and self-image. Reduction of HGS decreases PFA. Reduction also relates to a better postoperative QoL when the preoperative PFA is abnormal. When the preoperative PFA is normal, in situ fusion is equivalent to reduction except for self-image, which is better improved after reduction.

7. PELVIC ORGANS/WOMAN'S HEALTH

C sections

BJOG. 2019 Feb 9. doi: 10.1111/1471-0528.15652.

Impact of timing of delivery on maternal and neonatal outcomes for women after three previous caesarean deliveries; a secondary analysis of the caesarean section registry.

Breslin N¹, Vander Haar E², Friedman AM², Duffy C², Gyamfi-Bannerman C².

BACKGROUND:

As more women are presenting with three previous caesarean deliveries (CD), providers may suggest early term delivery as a means to avoid the risk of spontaneous labour and associated maternal morbidity.

OBJECTIVE:

To determine whether early term delivery is associated with lower maternal and neonatal morbidity for women with three previous CD.

STUDY DESIGN:

Secondary analysis of a prospective registry of CD at 19 US academic centres from 1999 to 2002.

POPULATION:

Women with three previous CD undergoing scheduled or emergent delivery with live, singleton gestations 37-41+ weeks of gestation were included. Women with non-low transverse incisions, antepartum stillbirth, previous myomectomy, fetal anomalies, more or fewer than three previous CD or attempting trial of labour after caesarean section were excluded.

METHODS:

Gestational age was categorised by week. We fitted logistic regression models to adjust for clinically relevant or statistically significant confounders.

MAIN OUTCOME MEASURES:

The primary and secondary outcomes were composites, respectively, of maternal and neonatal morbidity.

RESULTS:

In all, 821 women met the inclusion criteria; maternal morbidity composite occurred in 9.86% and neonatal morbidity occurred in 10.5%. After adjusting for confounding variables, maternal and neonatal morbidity occurred least frequently at 39 weeks.

CONCLUSIONS:

In women with three previous CDs, adverse maternal outcomes do not increase with increasing gestational age beyond 37 weeks but early term elective repeat CDs are associated with higher neonatal morbidity. Elective delivery of women with three previous CD at 39 weeks of gestation is safe in the absence of maternal or fetal indications for early term delivery.

TWEETABLE ABSTRACT:

Delivery of women with three previous caesarean deliveries at 39 weeks, in the absence of maternal or fetal indications for early term delivery, is associated with decreased maternal morbidity.

Time up and go reduced in painful pregnant women

The Timed Up & Go test in pregnant women with pelvic girdle pain compared to asymptomatic pregnant and non-pregnant women

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DOI: <https://doi.org/10.1016/j.msksp.2019.03.006>

Highlights

- First study to compare Timed Up and Go (TUG) in pregnant and non-pregnant women.
- No difference in TUG between asymptomatic pregnant and non-pregnant women.
- Pregnant women with pelvic girdle pain (PGP) used significantly longer time on TUG.
- Pain was the most important factor influencing TUG in pregnant women with PGP.

Abstract

Background

The Timed Up and Go (TUG) test, a standardized functional mobility test, has been proposed as a physical performance-based measure in pregnant women with pelvic girdle pain (PGP).

Objectives

This cross-sectional study aimed to investigate physical function by the use of TUG in pregnant women with PGP compared to asymptomatic pregnant and non-pregnant women, and to identify factors associated with increased TUG.

Methods

In total, 25 pregnant women with PGP, 24 asymptomatic pregnant and 25 asymptomatic non-pregnant women participated. One-way analysis of variance was used to explore difference in TUG between the groups and multiple linear regression analyses to explore associations between TUG and potential explanatory variables.

Results

The time on TUG varied among pregnant women with PGP, and was significantly higher (mean (95% CI) 6.9 (6.5, 7.3) seconds) than for asymptomatic pregnant (5.8 (5.5, 6.0), $p < 0.001$) and non-pregnant (5.5 (5.4, 5.6), $p < 0.001$) women. In the total study sample, group, increased BMI and sick leave were significantly associated with increased TUG (p -values ≤ 0.02). In pregnant women with PGP, pain intensity was the only significant clinical factor associated with increased TUG ($p = 0.002$).

Conclusion

Pregnant women with PGP used longer time and showed larger variation in TUG than asymptomatic pregnant and non-pregnant women, this underpins that TUG targets activities relevant to PGP. Our results provide new knowledge about factors influencing TUG time. Importantly, multivariable analyses suggest that pain intensity should be considered when interpreting TUG time in pregnant women with PGP.

Anal incontinence following delivery

Anal incontinence after cesarean and vaginal delivery in Sweden: A national population-based study

The Lancet

Larsson C, et al. | March 26, 2019

In this observational population-based study, researchers compared the risk of acquiring anal incontinence in females who had a cesarean delivery vs those who had a vaginal delivery.

They diagnosed 416 of the 185,219 females in the cesarean delivery group with anal incontinence vs 5171 of 1,400,935 females in the vaginal delivery group. They overall reported an increase in the risk of developing anal incontinence after pregnancy and delivery. They observed odds ratio (OR) of 2.05 for females being diagnosed with anal incontinence among the combination of vaginal delivery and cesarean delivery vs the nulliparous control group.

High maternal age, high birth weight of the baby, and instrumental delivery were the strongest risk factors for anal incontinence after vaginal delivery. But, the most frequent risk factor for anal incontinence after cesarean delivery was maternal age.

Assisted births and adverse events

Medically assisted reproduction and birth outcomes: A within-family analysis using Finnish population registers

The Lancet — Goisis A, et al.

March 25, 2019

Since children born after medically assisted reproduction are at higher risk of adverse birth outcomes than children conceived naturally, researchers have identified the extent to which this excess risk should be attributed to harmful treatment effects or pre-existing parental characteristics that confound the association.

They observed an elevated risk of adverse birth outcomes among children conceived by medically assisted reproduction than did those conceived naturally even after adjustments for the recognized child and parental characteristics (the difference in birthweight of -60 g and 2.15 percentage point increased the risk of preterm delivery).

Pre-term impact future pregnancies

Women with threatened preterm labour followed by term delivery have an increased risk of spontaneous preterm birth in subsequent pregnancies: A population-based cohort study

BJOG: An International Journal of Obstetrics and Gynaecology

Cho GJ, et al. | March 28, 2019

In this population-based cohort study of 115,629 women with two consecutive deliveries during the study period, researchers examined whether a history of threatened preterm labour (TPL) followed by term delivery is associated with the risk of spontaneous preterm delivery (PTD) in subsequent pregnancy. Analyzing data of the National Health Insurance Claims Database and a national health-screening programme for infants and children in South Korea, they identified that PTD risk during a subsequent pregnancy in women with a history of TPL followed by term delivery was lower when compared to those with history of previous PTD but was significantly higher when compared to those who delivered at term without TPL.

Diastasis Rectus and linea alba stiffness**Differences in Linea Alba Stiffness and Linea Alba Distortion Between Women With and Without Diastasis Recti Abdominis: The Impact of Measurement Site and Task****- AUTHORS**

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+ AFFILIATIONS

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2019 **Volume:**0 **Issue:**0 **Pages:**1–30 **DOI:**10.2519/jospt.2019.8543

Study Design

Cross-sectional, observational cohort.

Background

The biomechanical implications of diastasis recti abdominis (DRA) are unknown.

Objectives

(1) To investigate the impact of DRA, measurement site and task on inter-rectus distance (IRD), linea alba (LA) stiffness and LA distortion measured at rest, and during head lift and semi-curl-up tasks. (2) To describe the relationships among IRD, LA stiffness and LA distortion.

Methods

B-mode ultrasound imaging and shear-wave elastography were used on a sample of 20 women. IRD, LA stiffness and LA distortion were measured at three locations while women were at rest, and repeated head lift and semi-curl-up maneuvers. All outcomes were compared between groups (DRA/no DRA), sites and tasks. Linear regression models were used to evaluate the relationships among IRD, mean and peak LA stiffness and LA distortion.

Results

Eleven women with and nine without DRA participated. Women with DRA demonstrated lower peak and mean LA stiffness and higher LA distortion compared to women without DRA. In women with DRA, IRD and LA distortion were not influenced by measurement site; IRD decreased, LA distortion increased and LA stiffness did not change during the head lift and semi-curl-up compared to rest. In women without DRA, the LA was least stiff closest to the umbilicus; it increased in stiffness during the head lift and curl-up, and did not distort or change in IRD.

Conclusions

DRA is associated with low LA stiffness and distortion during a semi-curl-up task; the amount of distortion is a function of both the IRD and LA stiffness. *J Orthop Sports Phys Ther*, Epub 26 Mar 2019. doi:10.2519/jospt.2019.8543

Vit D effects post-menopausal women

Effects of vitamin D supplementation on metabolic and endocrine parameters in healthy premenopausal women: A randomized controlled trial

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<https://doi.org/10.1016/j.clnu.2019.03.007> Get rights and content

Background & aims

Vitamin D supplementation may affect glycemic as well as hormonal regulation. Thus, the aim of the current study was to investigate whether vitamin D supplementation has any significant effects on metabolic and endocrine parameters in healthy premenopausal women. Primary outcome measure was the plasma glucose area under the curve (AUC_{gluc}).

Methods

The current study was a single-center, double-blind, randomized placebo-controlled trial that was conducted at the Medical University of Graz, Austria, between March 2013 and October 2017. One-hundred and fifty healthy premenopausal women with 25-hydroxyvitamin D (25[OH]D) concentrations <75 nmol/L once weekly received either 20,000 IU of cholecalciferol or placebo (2:1 ratio) over a total of 24 weeks.

Results

In total, 127 women (age 36.2 ± 8.7 years; BMI 25.3 ± 5.6 kg/m²; baseline 25(OH)D 55.8 ± 19.7 nmol/L) completed the study. Vitamin D supplementation had no significant effect on AUC_{gluc} (mean treatment effect 11.70; $p = 0.069$), while it had a significant treatment effect on homeostatic model assessment-insulin resistance (HOMA-IR; mean treatment effect 0.31; $p = 0.019$) and quantitative insulin-sensitivity check index (QUICKI; mean treatment effect -0.019 ; $p = 0.013$). There was no significant effect on the remaining secondary outcome parameters.

Conclusions

In this randomized-controlled trial in healthy premenopausal women, there was a significant treatment effect of vitamin D supplementation on HOMA-IR and QUICKI, while there was no significant treatment effect on AUC_{gluc}.

8. VISCERA

Relationship between

Helicobacter. 2019 Mar 25:e12576. doi: 10.1111/hel.12576

Association between Helicobacter pylori infection and nonalcoholic fatty liver disease: A systematic review and meta-analysis of observational studies.

Zhou BG¹, Yang HJ², Xu W³, Wang K⁴, Guo P⁵, Ai YW¹.

BACKGROUND:

The association between Helicobacter pylori (H. pylori) infection and nonalcoholic fatty liver disease (NAFLD) has been shown in many observational studies, but these conclusions remain controversial. Hence, we performed a meta-analysis to elucidate the association.

METHODS:

A comprehensive search was conducted on relevant studies published from inception to December 31, 2018, in PubMed, EMBASE, and Web of Science databases. Odds ratio (OR) with 95% confidence interval (95% CI) were pooled by random-effect model, generic inverse variance method. Subgroup and sensitivity analyses were also done. Publication bias was estimated by the funnel plot, Begg's test, and Egger's test.

RESULTS:

Fifteen studies (eleven cross-sectional, two case-control, and two cohort studies) were included in this meta-analysis. The pooled OR of NAFLD in patients with H. pylori infection was 1.19 (95% CI: 1.11-1.29, $P < 0.00001$) when compared with the patients without H. pylori infection. Similar results were observed when the subgroup analyses were stratified by different geographical locations, study designs, and confounders adjustment. In subgroup analysis stratified by different H. pylori testing methods, the correlation still exists when using UBT, serology, RUT, or SAT, but there was no statistically significant difference when using multiple detection methods (OR = 2.96, 95% CI: 0.37-23.94, $P = 0.31$). Sensitivity analyses showed that our results were robust. No evidence of substantial publication bias was detected.

CONCLUSIONS:

Current evidence indicated that a positive association between H. pylori infection and the risk of NAFLD. Further prospective studies are warranted to strengthen the association and to clarify whether there is a causative link between them.

Acid load diet increases risk of hypertension**Dietary acid load and risk of hypertension: a systematic review and dose-response meta-analysis of observational studies**

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Highlights

- Diet with high acid load (based on PRAL) significantly increased risk of hypertension.
- a-20 unit increase in dietary acid load (based on PRAL) was associated with 3% increased risk for hypertension.
- A significant non-linear association was seen between dietary acid load (based on NEAP) and hypertension.

Abstract**Background and aim**

Previous studies have assessed diet-induced mild metabolic acidosis in relation to blood pressure, however, data are conflicting. Current systematic review and dose-response meta-analysis aimed to summarize earlier findings from observational studies on the association between dietary acid load and hypertension.

Methods and results

We searched the online databases for relevant publications up to Feb 2019, using relevant keywords. Overall, 14 studies (3 prospective and 11 cross-sectional studies) that included 306,183 individuals and 62,264 cases of hypertension were included in the current meta-analysis. Combining effect sizes from both prospective and cross-sectional studies revealed no significant non-linear association between dietary acid load (based on net endogenous acid production (NEAP) method) and hypertension. However, stratified analysis based on study design showed a significant non-linear association between dietary acid load and hypertension in prospective studies ($P=0.006$), but not cross-sectional ones. According to linear dose-response analysis, no significant association was found between dietary acid load (based on NEAP) and hypertension (combined effect size: 1.01, 95% CI: 0.97-1.06, $P=0.51$). In terms of dietary acid load based on potential renal acid load (PRAL) method, no significant non-linear association was seen with hypertension ($P=0.52$). However, in linear dose-response analysis, a-20 unit increase in PRAL values was associated with 3% increased risk of hypertension (combined effect size: 1.03, 95% CI: 1.00-1.06, $P=0.03$).

Conclusion

We found a significant positive association between dietary acid load and hypertension. Further studies, particularly those with prospective nature, are needed to confirm our findings.

13 B. TMJ/ORAL**Smoking**

J Periodontol. 2018 Oct 12. doi: 10.1002/JPER.18-0045.

Proinflammatory cytokine levels and peri-implant parameters among cigarette smokers, individuals vaping electronic cigarettes, and non-smokers.

ArRejaie AS¹, Al-Aali KA², Alrabiah M¹, Vohra F³, Mokeem SA⁴, Basunbul G⁵, Alrahlah A⁶, Abduljabbar T³.

BACKGROUND:

Tobacco smoking compromises the prognosis of dental implant treatment and is associated with increased risk of peri-implant bone loss and increased implant failure rate. There is a dearth of studies that have compared clinical, radiographic, and immunological peri-implant parameters among cigarette smokers (CS), individuals vaping e-cigarettes (e-cigs), and non-smokers (NS). This study aimed to compare clinical and radiographic peri-implant parameters and levels of matrix metalloproteinase (MMP)-9 and interleukin (IL)-1 β levels among CS, individuals' vaping e-cigs, and NS.

METHODS:

Thirty-two CS (group 1), 31 individuals vaping e-cigs (group 2), and 32 NS (group 3) were included. Demographic- and implant-related data were collected using a structured baseline questionnaire. Peri-implant plaque index (PI), bleeding on probing (BOP), and probing depth (PD) were recorded and marginal bone loss (MBL) were assessed using standardized digital radiographs. Enzyme-linked immunosorbent assay was used to assess levels of MMP-9 and IL-1 β in peri-implant sulcular fluid. Pearson correlation coefficient was used to analyze for correlations of MMP-9 and IL-1 β levels with peri-implant parameters.

RESULTS:

BOP showed significantly higher values in group 3 as compared with groups 1 and 2 ($P < 0.01$). PI ($P < 0.01$), PD ≥ 4 mm ($P < 0.01$), and mean concentrations of MMP-9 ($P < 0.001$) and IL-1 β ($P < 0.01$) were significantly higher in groups 1 and 2 than group 3. MBL was significantly higher in group 1 as compared with group 2 and group 3 ($P < 0.01$). Significant positive correlations were found between MMP-9 ($P = 0.0198$) and IL-1 β ($P = 0.0047$) levels and MBL in group 1; and a significant positive correlation between IL-1 β and MBL in group 2 ($P = 0.0031$).

CONCLUSIONS:

Peri-implant health was compromised among CS than vaping individuals and NS. Increased levels of proinflammatory cytokines in CS and vaping individuals may suggest greater peri-implant inflammatory response.

13 D. SLEEP**Sleep and CV disease**

J Am Heart Assoc. 2019 Apr 2;8(7):e011372. doi: 10.1161/JAHA.118.011372.

How Are Sleep Characteristics Related to Cardiovascular Health? Results From the Population-Based HypnoLaus study.

Häusler N¹, Marques-Vidal P¹, Heinzer R², Haba-Rubio J².

Background Although sleep characteristics have been linked to cardiovascular disease and cardiovascular risk factors, the association between sleep characteristics measured by polysomnography and cardiovascular health (CVH) remains unknown.

Methods and Results In a population-based sample (n=1826), sleep characteristics were assessed by both sleep questionnaires and polysomnography. Global, behavioral, and biological CVH were defined according to the American Heart Association. Multinomial logistic regressions were performed to estimate relative risk ratios and 95% CI . Strong dose-response associations were found between all oxygen saturation-related variables (oxygen desaturation index, mean oxygen saturation, and percentage of total sleep time spent under 90% oxygen saturation) and obstructive sleep apnea (severity categories and apnea/hypopnea index) and global, behavioral, and biological CVH . Mean oxygen saturation had the strongest positive association (relative risk ratios 1.31 [CI 1.22-1.41]; 1.78 [CI 1.55-2.04] for intermediate relative to ideal CVH), and oxygen desaturation index had the strongest negative association (relative risk ratios 0.71 [CI 0.65-0.78]; 0.45 [CI 0.34-0.58] for intermediate relative to ideal CVH) with global CVH , and these associations were also the most robust in sensitivity analyses. The impacts of sleep architecture and sleep fragmentation were less consistent.

Conclusions Mean oxygen saturation, oxygen desaturation index, and apnea/hypopnea index were associated with CVH . Conversely, most variables related to sleep architecture and sleep fragmentation were not consistently related to CVH . Sleep-disordered breathing and the associated oxygen (de)saturation were associated with CVH more strongly than with sleep fragmentation.

Statin use and COPD

Atherosclerosis. 2019 Apr;283:61-68. doi: 10.1016/j.atherosclerosis.2019.02.007. Epub 2019 Feb 11.

Associations between statins and coronary artery disease and stroke risks in patients with asthma-chronic obstructive pulmonary disease overlap syndrome: A time-dependent regression study.

Yeh JJ¹, Lin CL², Hsu CY³, Shae Z⁴, Kao CH⁵.

BACKGROUND AND AIMS:

We aimed at determining the effects of statin use on coronary artery disease (CAD) and stroke risks in patients with asthma-chronic obstructive pulmonary disease overlap syndrome (ACOS).

METHODS:

We retrospectively enrolled patients with ACOS treated with (N = 916) and without (N = 6338) statins. The cumulative incidence of CAD and stroke (ischemic and hemorrhagic) was analyzed through time-dependent Cox proportional regression. After adjustment for sex, age, comorbidities, inhaled corticosteroid (ICS) use, and oral steroid (OS) use, we calculated the adjusted hazard ratios (aHRs) and their 95% confidence intervals (CIs) for CAD or stroke in the statin users (long-term [>600 days] and short-term [≤ 600 days]) compared with the non-users.

RESULTS:

Among the statin users, aHRs (95% CIs) for CAD and stroke were 0.50 (0.41-0.62) and 0.83 (0.63-1.09), respectively; moreover, aHRs were 0.30 (0.09-0.99) and 0.90 (0.68-1.20) for ischemic and hemorrhagic stroke, respectively. aHRs (95% CIs) for CAD and stroke were 0.58 (0.47-0.71) and 0.93 (0.70-1.23), respectively, in the short-term users and 0.23 (0.13-0.41) and 0.42 (0.19-0.89), respectively, in the long-term users.

CONCLUSIONS:

CAD risk was lower in all statin users, regardless of the duration of use, whereas ischemic stroke risk was lower only in the long-term statin users. No association was observed between hemorrhagic stroke risk and statin use.

Sleep and breast CA risk

Int J Cancer. 2019 Mar 20. doi: 10.1002/ijc.32292.

Association between sleep duration and breast cancer incidence: The Multiethnic Cohort.

Shigesato M¹, Kawai Y¹, Guillermo C¹, Youkhana F¹, Shvetsov YB¹, Setiawan VW², Haiman CA², Le Marchand L¹, Maskarinec G¹.

Breast cancer is the most common cancer and the second-leading cause of cancer-related death among women. Inconsistent findings for the relationship between melatonin levels, sleep duration, and breast cancer have been reported.

We investigated the association of sleep duration at cohort entry and its interaction with body mass index (BMI) with risk of developing breast cancer in the large population-based Multiethnic Cohort study. Among the 74,481 at-risk participants, 5,790 breast cancer cases were identified during the study period. Although we detected no significant association between sleep duration and breast cancer risk, higher risk estimates for short (HR=1.03; 95%CI: 0.97-1.09) and long sleep (HR=1.05; 95%CI: 0.95-1.15) compared to normal sleep (7-8 hours) were found. The patterns for models stratified by age, BMI, ethnicity, and hormone receptor status were similar but did not indicate significant interaction effects.

When examining the combined sleep duration and BMI interaction effect, in comparison to the normal BMI-normal sleep group, risk estimates for underweight, overweight, and obesity were similar across categories of sleep duration (≤ 6 , 7-8, ≥ 9 hours). The underweight-normal sleep group had lower breast cancer incidence (HR=0.66, 95%CI: 0.50-0.86), whereas the overweight-short sleep, overweight-normal sleep group and all obese women experienced elevated breast cancer incidence. The respective HRs for short, normal, and long sleep among obese women were 1.35 (95%CI: 1.20-1.53), 1.27 (95%CI: 1.15-1.42), and 1.46 (95%CI: 1.21-1.76). Future perspectives need to examine the possibility that sleep quality, variations in circadian rhythm, and melatonin are involved in breast cancer etiology.

14. HEADACHES

Cervical muscle strength

Cervical Muscular Endurance Performance in Women With and Without Migraine

- AUTHORS

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Published: *Journal of Orthopaedic & Sports Physical Therapy*, 2019 **Volume:**0 **Issue:**0 **Pages:**1–24 **DOI:**10.2519/jospt.2019.8816

Study Design

Cross-sectional, controlled laboratory study.

Background

Despite previous evidence, the association between migraines and cervical muscular performance is unclear.

Objective

To compare the differences in neck flexor and extensor muscle endurance between women with and without migraine.

Methods

Twenty-six women with migraine and 26 age-matched women without migraine or headache were assessed using clinical tests of neck flexor and extensor muscle endurance. The holding time (s) was compared between the groups, using the Mann-Whitney U test for independent samples.

Results

Patients with migraine exhibited a lower holding time for both neck extensor endurance ($P = .001$) and neck flexor endurance ($P < .001$) than the controls. The median neck flexor holding time was 35.0 s for the migraine group and 60.5 s for the control group. The migraine group sustained the neck extensor endurance test position for a median of 166.5 s, in contrast to 290.5 s for the control group. Both groups reported a similar level of neck pain during the endurance tests ($P > .05$); however, only individuals in the migraine group reported pain in the head during testing.

Conclusion

Females with migraine demonstrated decreased neck flexor and extensor endurance compared to females without migraine; which may indicate an association between migraine and reduced performance of the neck muscles. *J Orthop Sports Phys Ther*, Epub 26 Mar 2019. doi:10.2519/jospt.2019.8816

Migraines

The Journal of Headache and Pain December 2019, 20:29

Increased connectivity of pain matrix in chronic migraine: a resting-state functional MRI study

Mi Ji Lee Bo-yong Park Soohyun Cho Sung Tae Kim Hyunjin Park Chin-Sang Chung

Objective

To investigate the whole-brain resting-state functional connectivity in patients with chronic migraine (CM) using a data-driven method.

Methods

We prospectively recruited patients with either episodic migraine (EM) or CM aged 18–60 years who visited the headache clinic of the Samsung Medical Center from July 2016 to December 2017. All patients underwent 3 T MRI using an identical scanner. Patients were considered interictal if they did not have a migraine headache at the day and ± 1 days of functional MRI acquisition. Using the group-independent component analysis (ICA), connectivity analysis with a weighted and undirected network model was performed. The between-group differences in degree centrality (DC) values were assessed using 5000 permutation tests corrected with false discovery rate (FDR).

Results

A total of 62 patients (44 EM and 18 CM) were enrolled in this study. Among the seven functionally interpretable spatially independent components (ICs) identified, only one IC, interpreted as the pain matrix, showed a significant between-group difference in DC (CM > EM, $p = 0.046$). This association remained significant after adjustment for age, sex, migraine with aura (MWA), allodynia, depression, and anxiety ($p = 0.038$). The pain matrix was functionally correlated with the hypothalamus ($p = 0.040$, EM > CM) and dorsal raphe nucleus ($p = 0.039$, CM > EM) with different levels of strength in EM and CM.

Conclusion

CM patients have a stronger connectivity in the pain matrix than do EM patients. Functional alteration of the pain network might play a role in migraine chronification.

16. CONCUSSIONS

Exercise and recovery

Clin J Sport Med. 2019 Feb 12. doi: 10.1097/JSM.0000000000000721

Use of Supervised Exercise During Recovery Following Sports-Related Concussion.

Popovich M¹, Almeida A¹, Freeman J², Eckner JT³, Alsalaheen B¹, Lorincz M¹, Sas A¹.

OBJECTIVE:

To assess the safety of supervised exercise (SE) in acute sport-related concussion (SRC) and its influence on recovery.

DESIGN:

Retrospective cohort study.

SETTING:

University SRC clinic at a tertiary care center.

PATIENTS:

One hundred ninety-four consecutive new patient charts were reviewed. Patients were included if they were seen within 30 days of sustaining a SRC, and their medical records included all required data elements. One hundred twenty-six patients were included in the analysis.

INTERVENTIONS:

Symptomatic patients who initiated SE within 16 days of SRC (n = 24) were compared with those who did not undergo SE or initiated SE after postinjury day 16 (n = 84). Age, sex, history of previous concussions, injury severity, relevant comorbidities, and other treatments received were included in the analysis.

MAIN OUTCOME MEASURES:

The association between early SE and clearance for return to sport was determined using a hazard ratio (HR). The number of days from SRC until clearance for return to sport and the number of days symptomatic from concussion were also compared between early SE and nonearly SE cohorts.

RESULTS:

No serious adverse events occurred in the early SE group. Early SE was associated with earlier return to sport (HR = 2.35, P = 0.030). The early SE group had fewer days from SRC until clearance for return to sport (mean 26.5 ± 11.2 days vs 35.1 ± 26.5 days, P = 0.020). There was a trend toward fewer symptomatic days in the early SE group (P = 0.054).

CONCLUSION:

Early SE performed in the symptomatic stage of SRC was safe and associated with earlier return to sport.

20 A. ROTATOR CUFF**Risk factors for surgery**

J Am Acad Orthop Surg. 2019 Apr 1;27(7):e319-e323. doi: 10.5435/JAAOS-D-16-00929.

Patient-related Risk Factors for Postoperative Stiffness Requiring Surgical Intervention After Arthroscopic Rotator Cuff Repair.

Burrus MT¹, Diduch DR, Werner BC.

INTRODUCTION:

Risk factors for stiffness after arthroscopic rotator cuff repair (RCR) have been limited to studies with small patient numbers. The objective is to determine patient-related risk factors for stiffness after RCR.

METHODS:

The PearlDiver database was queried from 2007 to 2015 for patients undergoing isolated arthroscopic RCR. A multivariate binomial logistic regression analysis assessed for risk factors requiring a postoperative manipulation under anesthesia (MUA) or lysis of adhesions (LOA) within 9 months after RCR.

RESULTS:

Two hundred thirty-two of 19,229 patients (1.2%) underwent a LOA and/or MUA within 9 months after arthroscopic RCR. Significant risk factors identified were age less than 50 years (odds ratio [OR], 1.9; $P < 0.0001$), female gender (OR, 2.0; $P < 0.0001$), diabetes mellitus (DM) type I (OR, 2.7; $P < 0.0001$), hypothyroidism (OR, 1.3; $P = 0.020$), and systemic lupus erythematosus (OR, 2.1; $P = 0.004$). However, tobacco use was associated with a 0.5 risk of developing stiffness ($P < 0.0001$).

DISCUSSION:

Systemic lupus erythematosus, hypothyroidism, and DMI (but not DMII) in addition to young age and female gender were risk factors for LOA/MUA after arthroscopic RCR.

30 A. HIP IMPINGEMENT**Changes in muscle cross sectional size****Patients With Unilateral Femoroacetabular Impingement Syndrome Have Asymmetrical Hip Muscle Cross-Sectional Area and Compensatory Muscle Changes Associated With Preoperative Pain Level**

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<https://doi.org/10.1016/j.arthro.2018.11.053> Get rights and content

Purpose

To compare the symptomatic hip muscle cross-sectional area (CSA) in patients with unilateral femoroacetabular impingement syndrome (FAIS) with the asymptomatic-side hip muscle CSA and to determine whether correlations exist between the hip muscle CSA and preoperative pain level, preoperative symptom duration, and postoperative function.

Methods

We performed a retrospective review of magnetic resonance imaging data of patients who underwent hip arthroscopy from January 2012 through June 2015 for the treatment of unilateral FAIS and who had a minimum of 2 years' follow-up after hip arthroscopy for FAIS. A picture archiving and communication system workstation with an embedded region-of-interest tool was used to measure the muscle CSA of both the symptomatic and asymptomatic sides in FAIS patients. One-way repeated-measures analyses of variance were used to determine differences between symptomatic and asymptomatic hip muscle CSAs. Spearman rank correlations were used to determine relations between the symptomatic-side hip muscle CSA and preoperative pain level, preoperative symptom duration, and multiple validated patient-reported outcomes to quantify the level of function.

Results

A total of 50 patients met the inclusion criteria and were analyzed. The mean age of the patients was 34.22 ± 14.12 years, and 64% were women. Specific muscles of the symptomatic hip displaying significantly decreased CSAs compared with the asymptomatic hip included the gluteus maximus ($P = .007$), gluteus minimus ($P = .022$), and rectus femoris ($P = .028$). The tensor fascia lata ($\rho = 0.358$; $P = .011$), pectineus ($\rho = 0.369$, $P = .008$), adductor longus ($\rho = 0.286$, $P = .044$), and obturator externus ($\rho = 0.339$, $P = .016$) showed a moderate positive correlation with preoperative pain level on a visual analog scale in unilateral FAIS patients. No associations were found between the symptomatic-side hip muscle CSA in patients with unilateral FAIS and symptom duration or patient-reported function.

Conclusions

Patients with unilateral FAIS have a significantly decreased muscle CSA in the symptomatic hip compared with the asymptomatic hip. The symptomatic-side hip muscle CSA was correlated with the preoperative pain level on a visual analog scale. The association between the muscle CSA and preoperative pain level may represent a compensatory change in muscle function around the hip joint in patients with unilateral FAIS.

32 A. KNEE/ACL**Anterolateral ligament and pivot shift****A Biomechanical Study of the Role of the Anterolateral Ligament and the Deep Iliotibial Band for Control of a Simulated Pivot Shift With Comparison of Minimally Invasive Extra-articular Anterolateral Tendon Graft Reconstruction Versus Modified Lemaire Reconstruction After Anterior Cruciate Ligament Reconstruction**

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DOI: <https://doi.org/10.1016/j.arthro.2018.11.011>

Purpose

To determine whether the deep fibers of the iliotibial band (dITB) or the anterolateral ligament (ALL) provides more control of a simulated pivot shift and whether a minimally invasive anterolateral reconstruction (ALR) designed to functionally restore the ALL and dITB is mechanically equivalent to a modified Lemaire reconstruction (MLR).

Methods

Six matched pairs of cadaveric knees (N = 12) were subjected to a simulated pivot shift to evaluate anteroposterior translation; internal rotation; and valgus laxity at 0°, 30°, and 90° of flexion. The anterior cruciate ligament (ACL) was sectioned in all specimens, and retesting was performed. Within each pair, sequential sectioning of the ALL and dITB was performed, followed by testing; the contralateral knee was sectioned in reverse order. Knees underwent ACL reconstruction (ACLR) and repeat testing. Then, MLR (n = 6) or ALR (n = 6) was performed on matched pairs for final testing.

Results

Sectioning of the dITB versus ALL (after ACL sectioning) produced significantly more anterior translation at all flexion angles ($P = .004$, $P = .012$, and $P = .011$ for 0°, 30°, and 90°, respectively). The ACL-plus-dITB sectioned state had significantly more internal rotation at 0° versus ACL plus ALL ($P = .03$). ACLR plus ALR restored native anterior translation at all flexion angles. ACLR plus MLR restored anterior translation to native values only at 0° ($P = .34$). We found no statistically significant differences between ACLR plus ALR and ACLR plus MLR at any flexion angle for internal rotation or valgus laxity compared with the native state.

Conclusions

ALR of the knee in conjunction with ACLR can return the knee to its native biomechanical state without causing overconstraint. The dITB plays a more critical role in controlling anterior translation and internal rotation at 0° than the ALL. The minimally invasive ALR was functionally equivalent to MLR for restoration of knee kinematics after ACLR.

Clinical Relevance

The dITB is more important than the ALL for control of the pivot shift. A minimally invasive extra-articular tendon allograft reconstruction was biomechanically equivalent to a modified Lemaire procedure for control of a simulated pivot shift.

37. OSTEOARTHRITIS/KNEE

NSAIDS side effects

Duration of symptom relief and early trajectory of adverse events for oral NSAIDs in knee osteoarthritis: A systematic review and meta-analysis

Arthritis Care & Research
Osani MC, et al. | March 28, 2019

A sum of 26,424 participants were estimated to quantify the efficiency and adverse event (AE) trajectories of oral NSAIDs in knee osteoarthritis. Authors observed moderate, statistically significant effects of NSAIDs on the pain that peaked at 2 weeks (SMD -0.43 [-0.48, -0.38]) but the magnitude of the effects decreased over time. A significantly higher incidence of GI AEs in NSAID users was reported as compared to placebo users as early as 4 weeks. They suggested to weigh the durability of efficacy with the early onset of minor AEs along with tolerability and preferences of the candidates while formulating NSAID regimen.

40. ANKLE SPRAINS AND INSTABILITY

Tai Chi helps

J Sport Rehabil. 2019 Feb 12:1-22. doi: 10.1123/jsr.2018-0222.

Effects of a Twelve-Week Tai Chi intervention in Patients With Chronic Ankle Instability: A Randomized Controlled Trial.

Cruz-Díaz D¹, Kim KM², Hita-Contreras F¹, Bergamin M³, Aibar-Almazán A¹, Martínez-Amat A¹.

CONTEXT::

Tai Chi is a physical activity modality which is widely practiced over the world. The effectiveness of Tai Chi on postural control and balance, has been described in older population but until recently there is no studies which includes patients with Chronic Ankle Instability (CAI).

OBJECTIVES::

The aim of the present study was to evaluate the effectiveness of 12 weeks of Tai Chi intervention on dynamic balance and self-reported instability in patients with CAI.

STUDY DESIGN::

A randomized controlled trial was carried out.

SETTING::

University Physical Therapy facility.

PARTICIPANTS::

Fifty-two participants were allocated to intervention group (n=26) based on Tai Chi training or a control group (n=26) who received no intervention.

INTERVENTION::

The participants completed twelve weeks of Tai Chi intervention (one hour session/two times per week) or no intervention in the control group.

MAIN OUTCOME MEASURES::

Outcome measures included postural control and self-reported instability feeling assessed by the Star Excursion Balance Test (SEBT) and the Cumberland Ankle Instability Tool (CAIT) respectively.

RESULTS::

It was observed significant improvement in all SEBT reach distances [anterior (F= 6.26, p<0.01); posteromedial (F= 9.58, p<0.01) and posterolateral (F= 8.42, p<0.01)] in the Tai Chi group with no change in the control group p<0.01. The intervention group demonstrated significant improvement on self-reported instability feeling assessed by the CAIT questionnaire (F= 21.36, p<0.01).

CONCLUSIONS::

The obtained results suggested that twelve weeks of Tai Chi intervention has a positive effects on postural control and self-reported instability feeling in patients with CAI.

42. PLANTAR SURFACE

Pressure pain sensitivity

Topographical Pressure Pain Sensitivity Maps of the Feet Reveal Bilateral Pain Sensitivity in Patients With Unilateral Plantar Heel Pain

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Background

Plantar heel pain is one of the most common foot pain conditions treated by healthcare providers.

Objective

To investigate differences in topographical pressure pain sensitivity maps of the feet between patients with unilateral plantar heel pain and healthy subjects and to determine the relationship between topographical pressure maps, pain intensity, disability and fascia thickness.

Methods

Thirty-five patients with unilateral plantar heel pain and 35 matched healthy controls participated. Pressure pain thresholds (PPT) were assessed over 7 plantar locations on each foot. Topographical pressure pain sensitivity maps of the plantar region were generated using the averaged PPT of each assessed point. Pain and related-disability were assessed with a numerical pain rate scale (0-10) and the Foot and Ankle Ability Measure (FAAM), respectively. Plantar fascia thickness was measured via ultrasound. All outcomes were obtained by an assessor blinded to the subjects' condition.

Results

Topographical pressure sensitivity maps revealed lower bilateral PPTs in patients with plantar heel pain as compared to healthy controls, and higher PPT on the calcaneus bone ($P < 0.01$). Females showed lower PPTs than men in all areas ($P < 0.001$). Individuals with plantar heel pain also exhibited an increase of fascia thickness, but only on the affected side, compared to healthy controls. Higher pressure pain sensitivity in the foot was associated with higher pain intensity at first step in the morning and a higher fascia thickness at the calcaneus bone.

Conclusions

Topographical pressure sensitivity maps revealed that individuals with unilateral plantar heel pain exhibited generalized bilateral pressure pain sensitivity in the plantar region. Higher pain intensity and fascia thickness were associated with higher pressure pain sensitivity in individuals with plantar heel pain. Our findings can be used for improving ergonomic interventions, e.g., foot orthoses, in individuals with plantar heel pain.

49. STRETCHING

Stretching impact eccentric control

J Strength Cond Res. 2019 Feb 14. doi: 10.1519/JSC.0000000000003080.

Chronic Effects of Static and Dynamic Stretching on Hamstrings Eccentric Strength and Functional Performance: A Randomized Controlled Trial.

Barbosa GM¹, Trajano GS², Dantas GAF¹, Silva BR¹, Vieira WHB¹.

A randomized controlled trial. J Strength Cond Res XX(X): 000-000, 2019-The purpose of this study was to investigate the effect of static or dynamic stretching training program on hamstrings eccentric peak torque and functional performance.

Forty-five active healthy men were randomly allocated into 3 groups (n = 15 per group): no stretching (control), static stretching (3 sets of 30 seconds), and dynamic stretching (3 sets of 30 repetitions). Static and dynamic stretching protocols on the hamstring muscles were performed 3 times a week until complete 10 sessions. Isokinetic knee flexor eccentric peak torque (60°·s), triple hop distance, and modified 20-m sprint time were assessed in a random order before and after stretching training. A mixed-design analysis of variance was performed, with an alpha level of 0.05.

There was a significant decrease of eccentric peak torque ($p \leq 0.0001$, $-15.4 \pm 10.4\%$, within-group effect size: 1.03) after static stretching training. The static stretching training reduced eccentric torque when compared with no stretching ($-7.6 \pm 21.7\%$, between-group effect size: 0.50) and dynamic stretching ($-7.8 \pm 29.8\%$, between-group effect size: 0.51). Moreover, the reached distance on triple hop test was also reduced after static stretching protocol ($p = 0.009$, $-3.7 \pm 4.1\%$, within-group effect size: 0.29).

These findings suggest that static stretching training is sufficient to produce meaningful reductions on hamstrings eccentric torque and functional performance. Based on the results of this study, caution should be taken when prescribing of static stretching training in isolation when the purpose is to improve performance, and indirectly, to prevent hamstring strain injuries due to its possible negative effects on hopping performance and knee flexor eccentric torque.

52. EXERCISE

Nordic hamstring exercise

Impact Hip Flexion Angle on Unilateral and Bilateral Nordic Hamstring Exercise Torque and High-Density Electromyography Activity

András Hegyi, MSc¹, Johan Lahti, MSc², Jean-Patrick Giacomo, MSc³, Pauline Gerus, PhD², Neil J. Cronin, PhD¹, Jean-Benoit Morin, PhD²

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2019 **Volume:**0 **Issue:**0 **Pages:**1–37 **DOI:**10.2519/jospt.2019.8801

Background

In the bilateral Nordic hamstring exercise (NHE), hamstrings operate at relatively short lengths, which may limit this exercise's efficacy in hamstring injury prevention.

Objectives

To examine knee flexion torque, and biceps femoris long head (BFlh) and semitendinosus (ST) high-density electromyography (HD-EMG) activity during unilateral and bilateral NHE performed with either neutral (NHE0) or 90° flexed (NHE90) hips.

Methods

Exercises were performed on a novel device at eccentric 1-repetition maximum load defined for 90-15° knee range of motion. Torque and EMG signals normalised to maximal voluntary isometric activity were compared in different phases of the exercises with Statistical Parametric Mapping.

Results

Lower EMG levels were observed in NHE90 than in NHE0, mainly in the second half of the movement. Knee flexor eccentric torque was higher in NHE90 than in NHE0 from the beginning until 87% of the bilateral movement, and over the entire unilateral movement. In NHE0, ST activity was higher compared to BFlh during the initial movement phase, but lower close to knee extension. Torque and EMG activity were generally similar in the bilateral and unilateral modes.

Conclusion

If performed with neutral hips, NHE selectively activates BFlh near full knee extension. Performing NHE with hips flexed to 90° is preferable when higher passive torque and ST selectivity are targeted at a longer muscle length. Performing these exercises unilaterally could help to train each limb separately with a similar torque and EMG output to the bilateral conditions. Adaptations to these exercises should be examined. *J Orthop Sports Phys Ther*, Epub 26 Mar 2019. doi:10.2519/jospt.2019.8801

56. ATHLETICS**Artificial turf****Playing football on artificial turf as a risk factor for fifth metatarsal stress fracture: a retrospective cohort study**

1. Takayuki Miyamori Masashi Nagao Ryuichi Sawa Steve Tumilty asafumi Yoshimura Yoshitomo Saita Hiroshi Ikeda Kazuo Kaneko

Objective The fifth metatarsal stress fracture is a common injury among football players. Although several risk factors have been proposed, the association between the playing surface and development of fifth metatarsal stress fractures (MT-5) has not been evaluated. We conducted an epidemiological study using a computer-based survey to investigate the association between the playing surface and development of MT-5.

Methods This study included 1854 football players, of which 41 experienced MT-5 within the past 24 months. Baseline demographic data and the percentage of time spent playing on artificial turf and clay fields were compared between the non-MT-5 and MT-5 player groups, and the risks for development of MT-5 associated with the playing surfaces were estimated by univariate and multivariate analyses.

Results There were significant differences in body mass index, years of play, playing categories and playing time on artificial turf between non-MT-5 and MT-5 groups ($p < 0.05$). Generalised estimating equations analyses adjusted for multiple confounders demonstrated that relative to the risk of playing <20% of the time on each surface, the OR (OR: 95% CI) for MT-5 for playing on artificial turf >80% of the time increased (3.44: 1.65 to 7.18), and for playing on a clay field 61%–80% of the time, the OR decreased (0.25: 0.11 to 0.59).

Conclusions A higher percentage of playing time on an artificial turf was a risk factor for developing MT-5 in football players. This finding could be beneficial for creating strategies to prevent MT-5.

59. PAIN**Catastrophising delays recovery**

Clin J Pain. 2019 Mar;35(3):279-293. doi: 10.1097/AJP.0000000000000676.

Pain Catastrophizing and Function In Individuals With Chronic Musculoskeletal Pain: A Systematic Review and Meta-Analysis.

Martinez-Calderon J¹, Jensen MP², Morales-Asencio JM^{3,4}, Luque-Suarez A^{1,4}.

OBJECTIVES:

Pain catastrophizing (PC) is the most consistent psychosocial factor predicting of adjustment to chronic pain and may contribute to the development and long-term maintenance of chronic pain. The aim of this review was systematically review and critically appraise the concurrent and longitudinal associations between PC and both pain intensity and disability in individuals with chronic musculoskeletal pain (CMP).

MATERIALS AND METHODS:

An electronic search of PubMed, Scopus, AMED, CINAHL, PsycINFO, and PubPsych databases, as well as gray literature, was undertaken from inception until September 2018. Cross-sectional and longitudinal studies reporting on the associations between measures of PC, pain intensity, and disability were selected for review.

RESULTS:

A total of 85 observational studies (92% cross-sectional) were included, with a total sample of 13,628 participants with CMP. Very low-quality evidence (based on the GRADE criteria) indicated that higher levels of PC were often, but not always, significantly associated with and prospectively predicted both chronic pain intensity and disability. Heterogeneity was large after conducting multiple meta-analyses.

DISCUSSION:

Despite the very low quality of the available evidence, the general consistency of the findings highlights the potential role that PC may play in delaying recovery from CMP. Research that uses higher quality study designs and procedures would allow for more definitive conclusions regarding the impact of PC on pain and function.

62 A. NUTRITION/VITAMINS

Sun and Vit D

Effect of sun exposure versus oral vitamin D supplementation on serum 25-hydroxyvitamin D concentrations in young adults: A randomized clinical trial

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Highlights

- Optimal strategies to improve vitamin D status in Asian populations remain unclear.
- Enhanced sun exposure (daily ≥ 20 –30 min around noon) and 500 IU/d of oral vitamin D₃ significantly increased serum 25OHD in Korean adults.
- The mean increase of serum 25OHD was greater with oral vitamin D₃ than sun exposure.
- Compliance to sun exposure advice was relatively low.
- Little benefits on cardio-metabolic markers were found with either sun exposure or oral vitamin D₃.

Background Vitamin D inadequacy is associated with a wide range of diseases. However, optimal strategies to improve vitamin D status, especially in Asian populations, remain unclear. We tested the hypotheses that (1) relevant sun exposure or oral vitamin D supplementation would significantly increase serum 25-hydroxyvitamin D (25OHD) concentrations compared with placebo, (2) sun exposure and supplementary vitamin D would be similar in serum 25OHD increases, and (3) the two interventions may have different effects on cardio-metabolic markers.

Methods In this 8-week randomized placebo-controlled clinical trial including vitamin D-deficient adults in Seoul (37 °N), Korea, changes in serum 25OHD concentrations were compared between the sun exposure (daily ≥ 20 –30 min around noon, $n = 50$), oral vitamin D₃ (500 IU/d, $n = 50$), and control (placebo, $n = 50$) groups.

Results Both sun exposure and oral vitamin D₃ effectively increased serum 25OHD concentrations. Compared with placebo, the between-group least-squares mean (LSM) differences in changes were 2.2 ng/mL (95% CI: 0.2, 4.2) in the sun exposure group and 8.5 ng/mL (6.5, 10.5) in the oral vitamin D₃ group. Increases in serum 25OHD were greater with oral vitamin D₃ than with sun exposure (LSM difference in changes = 6.3 ng/mL, 95% CI: 4.3, 8.3). More participants in the oral vitamin D₃ group (54.2%) achieved serum 25OHD concentrations ≥ 20 ng/mL at week 8 than those in the sun exposure (12.2%) or control (4.3%) groups. Compliance with sun exposure advice was relatively low, and only those with adequate compliance had a significant increase in serum 25OHD. Changes in the cardio-metabolic markers were mostly insignificant in all groups.

Conclusions Enhanced sun exposure and 500 IU/d of oral vitamin D₃ supplementation significantly increased serum 25OHD concentrations. However, our protocol for sun exposure was not as effective as 500 IU/d of oral vitamin D₃ supplementation.