2. LBP

Distress and care

J Orthop Sports Phys Ther. 2018 Mar 27:1-5. doi: 10.2519/jospt.2018.7670.

Outcomes in Distressed Patients With Chronic Low Back Pain: Subgroup Analysis of a Clinical Trial.

Ben-Ami N[1], Shapiro Y[1], Pincus T[2].

Study Design Subgroup analysis of a controlled clinical trial.

Background Current evidence suggests that people with chronic low back pain who are distressed may require different interventions than do those who are not distressed. Recently, the enhanced transtheoretical model intervention (ETMI) reported significant improvements in disability and pain and increased physical activity in patients with chronic low back pain compared to physical therapy as usual.

Objectives To compare outcomes between ETMI and physical therapy interventions for participants with and without self-reported distress.

Methods We tested the interaction between intervention (ETMI versus physical therapy) and distress status (using the Medical Outcomes Study 12-Item Short-Form Health Survey cut point), and performed between-group comparisons on 3 separate outcomes (disability, pain, and physical activity) at 3 and 12 months.

Results In the ETMI group, 57 of 108 participants were considered distressed, versus 62 of 106 participants in the physical therapy group. The interaction between intervention and distress at 12 months was significant. Participants improved with both interventions, but the magnitude of change in distressed participants who received ETMI was larger than that in distressed participants who received physical therapy (mean ± SD difference from baseline in disability of 6.1 ± 6.1 in the ETMI group, compared with 3.4 ± 6.7 in the physical therapy group).

Conclusion The enhanced transtheoretical model intervention was significantly more effective than physical therapy in participants with distress. The trial was registered in ClinicalTrials.gov (NCT01631344). Level of Evidence Therapy, level 2b. J Orthop Sports Phys Ther 2018;48(6):1-5. doi:10.2519/jospt.2018.7670.

6. PELVIC GIRDLE

Pelvic girdle pain

Urology. 2018 Mar 28. pii: S0090-4295(18)30276-0. doi: 10.1016/j.urology.2018.03.021

Physical Examination for Men and Women with Urological Chronic Pelvic Pain Syndromes: a MAPP Network Study.

Yang CC[1], Miller JL[2], Omidpanah A[3], Krieger JN[2].

OBJECTIVES:
To examine the feasibility of implementing a standardized, clinically relevant genitourinary examination for both men and women and to identify physical examination findings characteristic of urological chronic pelvic pain syndromes (UCPPS).

METHODS:
This study analyzed two samples: men and women with UCPPS who participated in the MAPP Research Network Epidemiology and Phenotyping (EP) Study, and age-matched controls who were either positive for chronic fatigue syndrome or healthy (pain-free). We compared physical examination findings in both positive and healthy controls to UCPPS cases, findings from both the EP examinations and from an extended genitourinary examination.

RESULTS:
EP and extended examinations were performed on 143 participants: 62 UCPPS cases (30 women, 32 men), 42 positive controls (15 women, 27 men), and 39 healthy controls (22 women, 17 men). EP examinations showed that pelvic floor tenderness was more prevalent in cases (55.0%) than in positive (14.6%) or healthy controls (10.5%). Extended examinations revealed specific areas of tenderness in the pelvic floor musculature. Cases were also more likely than healthy controls to report tenderness in multiple areas, including suprapubic, symphysis pubis, and posterior superior iliac spine, and on bimanual examination. No comparative findings were specific to biological sex, and no evidence of pudendal neuropathy was observed on extended examination of cases or controls.

CONCLUSIONS:
The extended genitourinary examination is an easily administered addition to the assessment of men and women during evaluation for UCPPS. Physical findings may help to better categorize UCPPS patients into clinically relevant subgroups for optimal treatment.

ABSTRACTS

TA contraction in pelvic girdle pain

Musculoskelet Sci Pract. 2017 Dec;32:78-83. doi: 10.1016/j.msksp.2017.09.001. Epub 2017 Sep 6.

Contraction of the transverse abdominal muscle in pelvic girdle pain is enhanced by pain provocation during the task.

Mens JM[1], Pool-Goudzwaard A[2].

BACKGROUND:
Understanding of the pathogenesis of pain in the lumbopelvic region remains a challenge. It is suggested that lumbopelvic pain is related to decreased contraction of the transverse abdominal muscles (TrA).

OBJECTIVE:
To investigate how pain provoked by a task influences TrA contraction during that task.

DESIGN:
A case-control cross-sectional study.

METHOD:
We recruited 40 non-pregnant women with persistent pregnancy-related posterior pelvic girdle pain (PGP) and 33 parous women (healthy controls) without PGP. TrA thickness was measured by ultrasound at various levels of bilateral hip adduction, with increments of 20 N from 0 to 140 N. Pain during the tests was registered.

RESULTS:
After correction for the level of adduction force, TrA thickness increase during pain-provoking tests of participants with PGP was 6.3 percentage points higher than in their pain-free tests ($p = 0.01$) and 0.91 percentage points higher than in the pain-free tests of healthy controls ($p < 0.01$).

CONCLUSION:
TrA contraction in PGP is enhanced when a task provokes pain. These results may have consequences for the treatment of persistent pregnancy-related posterior pelvic girdle pain

7. PELVIC ORGANS/WOMAN'S HEALTH

Hypothyroidism and infants

Clin Endocrinol (Oxf). 2018 Apr;88(4):575-584. doi: 10.1111/cen.13550. Epub 2018 Feb 8.

Maternal thyroid hormone insufficiency during pregnancy and risk of neurodevelopmental disorders in offspring: A systematic review and meta-analysis.

Thompson W[1], Russell G[2,3], Baragwanath G[4], Matthews J[1,3], Vaidya B[4,5], Thompson-Coon J[1].

BACKGROUND:
In the last 2 decades, several studies have examined the association between maternal thyroid hormone insufficiency during pregnancy and neurodevelopmental disorders in children and shown conflicting results.

AIM:
This systematic review aimed to assess the evidence for an association between maternal thyroid hormone insufficiency during pregnancy and neurodevelopmental disorders in children. We also sought to assess whether levothyroxine treatment for maternal thyroid hormone insufficiency improves child neurodevelopment outcomes.

METHODS:
We performed systematic literature searches in MEDLINE, EMBASE, PSYCinfo, CINAHL, AMED, BNI, Cochrane, Scopus, Web of Science, GreyLit, Grey Source and Open Grey (latest search: March 2017). We also conducted targeted web searching and performed forwards and backwards citation chasing. Meta-analyses of eligible studies were carried out using the random-effects model.

RESULTS:
We identified 39 eligible articles (37 observational studies and 2 randomized controlled trials [RCT]). Meta-analysis showed that maternal subclinical hypothyroidism and hypothyroxinaemia are associated with indicators of intellectual disability in offspring (odds ratio [OR] 2.14, 95% confidence interval [CI] 1.20 to 3.83, P = .01, and OR 1.63, 95% CI 1.03 to 2.56, P = .04, respectively). Maternal subclinical hypothyroidism and hypothyroxinaemia were not associated with attention deficit hyperactivity disorder, and their effect on the risk of autism in offspring was unclear. Meta-analysis of RCTs showed no evidence that levothyroxine treatment for maternal hypothyroxinaemia or subclinical hypothyroidism reduces the incidence of low intelligence quotient in offspring.

LIMITATIONS:
Although studies were generally of good quality, there was evidence of heterogeneity between the included observational studies (I^2 72%-79%).

CONCLUSION:
Maternal hypothyroxinaemia and subclinical hypothyroidism may be associated with intellectual disability in offspring. Currently, there is no evidence that levothyroxine treatment, when initiated 8- to 20-week gestation (mostly between 12 and 17 weeks), for mild maternal thyroid hormone insufficiency during pregnancy reduces intellectual disability in offspring.

Lactose intolerant infants

One-third of children with lactose intolerance managed to achieve a regular diet at the three-year follow-up point

Anat Yerushalmy-Feler Hagai Soback Ronit Lubetzky Amir Ben-Tov Margalit Dali-Levy Tut Galai Shlomi Cohen

https://doi.org/10.1111/apa.14305
Abstract

Aim

This study described outcomes following treatment for lactose intolerance, which is common in children.

Methods

The medical records of children aged 6–18 years who underwent lactose hydrogen breath testing at Dana-Dwek Children's Hospital, Tel Aviv, Israel, from August 2012 to August 2014 were analysed. We compared 154 children with gastrointestinal symptoms and positive lactose hydrogen breath tests to 49 children with negative test results.

Results

Of the 154 children in the study group, 89 (57.8%) were advised to follow a lactose-restricted diet, 32 (20.8%) were advised to avoid lactose completely, 18 (11.7%) were instructed to use substitute enzymes, and 15 (9.7%) did not receive specific recommendations. Only 11 patients (7.1%) received recommendations to add calcium-rich foods or calcium supplements to their diet. Lactose reintroduction was attempted in 119 of 154 patients (77.3%), and 65 of 154 (42.2%) experienced clinical relapses. At the final follow-up of 3.3 years, 62.3% of the study children were still observing a restricted diet. Older children and those who were symptomatic during lactose hydrogen breath testing were more likely to be on a prolonged restricted diet.

Conclusion

Our long-term follow-up of lactose-intolerant children showed that only a third were able to achieve a regular diet.

Hypothyroidism and infant developmental disorders

Clin Endocrinol (Oxf). 2018 Apr;88(4):575-584. doi: 10.1111/cen.13550. Epub 2018 Feb 8.

Maternal thyroid hormone insufficiency during pregnancy and risk of neurodevelopmental disorders in offspring: A systematic review and meta-analysis.

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RESULTS:
We identified 39 eligible articles (37 observational studies and 2 randomized controlled trials [RCT]). Meta-analysis showed that maternal subclinical hypothyroidism and hypothyroxinaemia are associated with indicators of intellectual disability in offspring (odds ratio [OR] 2.14, 95% confidence interval [CI] 1.20 to 3.83, P = .01, and OR 1.63, 95% CI 1.03 to 2.56, P = .04, respectively). Maternal subclinical hypothyroidism and hypothyroxinaemia were not associated with attention deficit hyperactivity disorder, and their effect on the risk of autism in offspring was unclear. Meta-analysis of RCTs showed no evidence that levothyroxine treatment for maternal hypothyroxinaemia or subclinical hypothyroidism reduces the incidence of low intelligence quotient in offspring.

LIMITATIONS:
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CONCLUSION:
Maternal hypothyroxinaemia and subclinical hypothyroidism may be associated with intellectual disability in offspring. Currently, there is no evidence that levothyroxine treatment, when initiated 8- to 20-week gestation (mostly between 12 and 17 weeks), for mild maternal thyroid hormone insufficiency during pregnancy reduces intellectual disability in offspring.

ABSTRACTS

Cannabis negative effects during pregnancy

The Journal of Pediatrics Original Articles

Cannabis Use During the Perinatal Period in a State With Legalized Recreational and Medical Marijuana: The Association Between Maternal Characteristics, Breastfeeding Patterns, and Neonatal Outcomes

- Tessa L. Crume, PhD, MSPH[1,,], Ashley L. Juhl, MSPH[2], Ashley Brooks-Russell, PhD, MPH[3], Katelyn E. Hall, MPH[4], Erica Wymore, MD, MPH[5], Laura M. Borgelt, PharmD[6]

https://doi.org/10.1016/j.jpeds.2018.02.005

Objectives

To evaluate state-level prevalence estimates of prenatal and early postnatal cannabis use in a state with legalized medical and recreational marijuana and the association with adverse neonatal outcomes.

Study design

We conducted a cross-sectional study on 3,207 respondents from the 2014-2015 Colorado Pregnancy Risk Assessment Monitoring System with state-developed questions on cannabis use. Differences in perinatal cannabis use were evaluated according to maternal characteristics, breastfeeding patterns, and pregnancy intendedness. Multiple logistic regression models evaluated the relationship between prenatal cannabis use and adverse neonatal outcomes including low birth weight, small for gestational age, preterm birth, and admission to the neonatal intensive care unit.

Results

The self-reported prevalence of cannabis use at any time during pregnancy was 5.7 ± 0.5% and the prevalence of early postnatal cannabis use among women who breastfed was 5.0% (95% CI, 4.1%-6.2%). Prenatal cannabis use was associated with a 50% increased likelihood of low birth weight, independent of maternal age, race/ethnicity, level of education, and tobacco use during pregnancy (OR, 1.5; 95% CI, 1.1-2.1; $P = .02$). Small for gestational age, preterm birth, and neonatal intensive care unit admission were not associated with prenatal cannabis use, independent of prenatal tobacco use.

Conclusions

Our findings underscore the importance of screening for cannabis use during prenatal care and the need for provider counselling about the adverse health consequences of continued use during pregnancy and lactation.

8. VISCERA

IBS and diet

J Gastroenterol Hepatol. 2017 Nov 20. doi: 10.1111/jgh.14051.

Low fermentable oligo-di-mono-saccharides and polyols diet versus general dietary advice in patients with diarrhea-predominant irritable bowel syndrome: A randomized controlled trial.

Zahedi MJ[1], Behrouz V[1], Azimi M[1].

BACKGROUND AND AIM:
Recent evidence indicates that new approach of the diet with low fermentable oligo-di-mono-saccharides and polyols (FODMAPs) may have an effective role in management of the patients with irritable bowel syndrome (IBS). We compared the results of low FODMAP diet with current dietary treatment, general dietary advices (GDA), on the clinical response in patients with diarrhea subtype of IBS (IBS-D).

METHODS:
In this randomized, controlled, single-blind trial, we included 110 patients with IBS-D in two intervention groups. Participants were randomly assigned to the low FODMAP diet (n = 55) and GDA (n = 55) for 6 weeks after a 10-day screening period. Gastrointestinal symptoms and bowel habit status were evaluated using a symptom severity scoring system and Bristol stool form scale pre-intervention and post-intervention. Patients completed 3-day food diary before and after the intervention.

RESULTS:
Of 110 patients, 101 completed the dietary interventions. At the baseline, the nutrient intake, severity of symptoms, and demographic data were similar between two groups. After 6 weeks, the low FODMAP diet improves significantly overall gastrointestinal symptoms scores, stool frequency, and consistency versus GDA group ($P < 0.001$, $P < 0.001$, and $P = 0.003$, respectively). Compared with the baseline, both intervention groups expressed a significant reduction in overall scores of symptom severity scoring system, abdominal pain, distension, consistency, and frequency, but this reduction is greater in low FODMAP diet group.

CONCLUSIONS:
Both low FODMAP diet and GDA in patients with IBS-D led to adequate improvement of gastrointestinal symptoms for 6 weeks. However, the low FODMAP diet has greater benefits in IBS improvement.

CV health and proteins

Int J Epidemiol. 2018 Apr 2. doi: 10.1093/ije/dyy030.

Patterns of plant and animal protein intake are strongly associated with cardiovascular mortality: the Adventist Health Study-2 cohort.

Tharrey M[1,2], Mariotti F[2], Mashchak A[1], Barbillon P[3], Delattre M[3], Fraser GE[1].

BACKGROUND:
Current evidence suggests that plant and animal proteins are intimately associated with specific large nutrient clusters that may explain part of their complex relation with cardiovascular health. We aimed at evaluating the association between specific patterns of protein intake with cardiovascular mortality.

METHODS:
We selected 81 337 men and women from the Adventist Health Study-2. Diet was assessed between 2002 and 2007, by using a validated food frequency questionnaire. Dietary patterns based on the participants' protein consumption were derived by factor analysis. Cox regression analysis was used to estimate multivariate-adjusted hazard ratios (HRs) adjusted for sociodemographic and lifestyle factors and dietary components.

RESULTS:
There were 2276 cardiovascular deaths during a mean follow-up time of 9.4 years. The HRs for cardiovascular mortality were 1.61 [98.75% confidence interval (CI), 1.12 2.32; P-trend < 0.001] for the 'Meat' protein factor and 0.60 (98.75% CI, 0.42 0.86; P-trend < 0.001) for the 'Nuts & Seeds' protein factor (highest vs lowest quintile of factor scores). No significant associations were found for the 'Grains', 'Processed Foods' and 'Legumes, Fruits & Vegetables' protein factors. Additional adjustments for the participants' vegetarian dietary pattern and nutrients related to cardiovascular disease outcomes did not change the results.

CONCLUSIONS:
Associations between the 'Meat' and 'Nuts & Seeds' protein factors and cardiovascular outcomes were strong and could not be ascribed to other associated nutrients considered to be important for cardiovascular health. Healthy diets can be advocated based on protein sources, preferring low contributions of protein from meat and higher intakes of plant protein from nuts and seeds.

Lifestyle and mortality

J Epidemiol Community Health. 2018 Mar 30. pii: jech-2017-210363. doi: 10.1136/jech-2017-210363.

Association between changes in lifestyle and all-cause mortality: the Health and Lifestyle Survey.

White J[1,2], Greene G[3], Kivimaki M[4], Batty GD[4].

BACKGROUND:
To examine the combined influence of changes in physical activity, diet, smoking and alcohol consumption on all-cause mortality.

METHODS:
Health behaviours were assessed in 1984/1985 and 1991/1992 in 8123 adults from the UK (4666 women, median age 41.0 years). An unhealthy lifestyle score was calculated, allocating one point for smoking, fruits and vegetables <3 times a day, physical activity <2 hours a week and >14 units (women) or >21 units of alcohol (men) per week.

RESULTS:
There were 2003 deaths over a median follow-up of 6.6 years (IQR 5.9-7.2) following the resurvey. The modal change in the unhealthy lifestyle score was zero, 41.8% had the same score, 35.5% decreased and 22.7% increased score between surveys. A one unit decrease in the unhealthy lifestyle score was not associated with a beneficial effect on mortality (HR 0.93; 95% CI 0.83 to 1.04). A one unit increase in the unhealthy lifestyle score increased the risk of mortality (adjusted HR 1.09; 95% CI 1.01 to 1.18).

CONCLUSIONS:
In this general population sample, the adoption of an unhealthy lifestyle was associated with an increased risk of mortality.

Mortality

Comparative trends in heart disease, stroke, and all-cause mortality in the United States and a large integrated healthcare delivery system
American Journal of Medicine — | April 05, 2018
Sidney S, et al.

Authors analyzed differences between the U.S. and Kaiser Permanente Northern California (KPNC), a large integrated healthcare delivery system, with regard to recent trends in heart disease, stroke, and total mortality. There were notable declines in heart disease, stroke, coronary heart disease and all-cause mortality, with more drastic declines in the 45-65 age group within KPNC vs the U.S.

This research highlights, in part, how effective high-quality, coordinated, age-specific cardiovascular risk management programs are and encourage their use in the vulnerable middle-aged population.

GI problems and psychological distress

Are self-reported gastrointestinal symptoms among older adults associated with increased intestinal permeability and psychological distress?

John-Peter Ganda Mall, Lina Östlund-Lagerström, Carl Mårten Lindqvist, Samal Algilani, Dara Rasoal, Dirk Repsilber, Robert J. Brummer, Åsa V. Keita and Ida Schoultz

https://doi.org/10.1186/s12877-018-0767-6

Background

Despite the substantial number of older adults suffering from gastrointestinal (GI) symptoms little is known regarding the character of these complaints and whether they are associated with an altered intestinal barrier function and psychological distress. Our aim was to explore the relationship between self-reported gut health, intestinal permeability and psychological distress among older adults.

Methods

Three study populations were included: 1) older adults with GI symptoms ($n = 24$), 2) a group of older adults representing the general elderly population in Sweden ($n = 22$) and 3) senior orienteering athletes as a potential model of healthy ageing ($n = 27$). Questionnaire data on gut-health, psychological distress and level of physical activity were collected. Intestinal permeability was measured by quantifying zonulin in plasma. The level of systemic and local inflammation was monitored by measuring C-reactive protein (CRP), hydrogen peroxide in plasma and calprotectin in stool samples. The relationship between biomarkers and questionnaire data in the different study populations was illustrated using a Principal Component Analysis (PCA).

Results

Older adults with GI symptoms displayed significantly higher levels of both zonulin and psychological distress than both general older adults and senior orienteering athletes. The PCA analysis revealed a separation between senior orienteering athletes and older adults with GI symptoms and showed an association between GI symptoms, psychological distress and zonulin.

Conclusions

Older adults with GI symptoms express increased plasma levels of zonulin, which might reflect an augmented intestinal permeability. In addition, this group suffer from higher psychological distress compared to general older adults and senior orienteering athletes. This relationship was further confirmed by a PCA plot, which illustrated an association between GI symptoms, psychological distress and intestinal permeability.

Chronic pelvic pain

Urology. 2018 Mar 28. pii: S0090-4295(18)30276-0. doi: 10.1016/j.urology.2018.03.021

Physical Examination for Men and Women with Urological Chronic Pelvic Pain Syndromes: a MAPP Network Study.

Yang CC[1], Miller JL[2], Omidpanah A[3], Krieger JN[2].

OBJECTIVES:
To examine the feasibility of implementing a standardized, clinically relevant genitourinary examination for both men and women and to identify physical examination findings characteristic of urological chronic pelvic pain syndromes (UCPPS).

METHODS:
This study analyzed two samples: men and women with UCPPS who participated in the MAPP Research Network Epidemiology and Phenotyping (EP) Study, and age-matched controls who were either positive for chronic fatigue syndrome or healthy (pain-free). We compared physical examination findings in both positive and healthy controls to UCPPS cases, findings from both the EP examinations and from an extended genitourinary examination.

RESULTS:
EP and extended examinations were performed on 143 participants: 62 UCPPS cases (30 women, 32 men), 42 positive controls (15 women, 27 men), and 39 healthy controls (22 women, 17 men). EP examinations showed that pelvic floor tenderness was more prevalent in cases (55.0%) than in positive (14.6%) or healthy controls (10.5%). Extended examinations revealed specific areas of tenderness in the pelvic floor musculature. Cases were also more likely than healthy controls to report tenderness in multiple areas, including suprapubic, symphysis pubis, and posterior superior iliac spine, and on bimanual examination. No comparative findings were specific to biological sex, and no evidence of pudendal neuropathy was observed on extended examination of cases or controls.

CONCLUSIONS:
The extended genitourinary examination is an easily administered addition to the assessment of men and women during evaluation for UCPPS. Physical findings may help to better categorize UCPPS patients into clinically relevant subgroups for optimal treatment.

Vascular inflammation

ORIGINAL RESEARCH ARTICLE

Inflammatory and Cholesterol Risk in the FOURIER Trial (Further Cardiovascular Outcomes Research With PCSK9 Inhibition in Patients With Elevated Risk)

Erin A. Bohula, Robert P. Giugliano, Lawrence A. Leiter, Subodh Verma, Jeong-Gun Park, Peter S. Sever, Armando Lira Pineda, Narimon Honarpour, Huei Wang, Sabina A. Murphy, Anthony Keech, Terje R. Pedersen, Marc S. Sabatine

https://doi.org/10.1161/CIRCULATIONAHA.118.034032

Abstract

BACKGROUND: In the FOURIER trial (Further Cardiovascular Outcomes Research With PCSK9 Inhibition in Patients With Elevated Risk), the PCSK9 (proprotein convertase subtilisin/kexin type 9) inhibitor evolocumab reduced low-density lipoprotein cholesterol (LDL-C) and cardiovascular risk. It is not known whether the efficacy of evolocumab is modified by baseline inflammatory risk. We explored the efficacy of evolocumab stratified by baseline high-sensitivity C-reactive protein (hsCRP). We also assessed the importance of inflammatory and residual cholesterol risk across the range of on-treatment LDL-C concentrations.

METHODS: Patients (n=27564) with stable atherosclerotic cardiovascular disease and LDL-C ≥70 mg/dL on a statin were randomly assigned to evolocumab versus placebo and followed for a median of 2.2 years (1.8-2.5). The effects of evolocumab on the primary end point of cardiovascular death, myocardial infarction, stroke, hospitalization for unstable angina or coronary revascularization, and the key secondary end point of cardiovascular death, myocardial infarction, or stroke were compared across strata of baseline hsCRP (<1, 1-3, and >3 mg/dL). Outcomes were also assessed across values for baseline hsCRP and 1-month LDL-C in the entire trial population. Multivariable models adjusted for variables associated with hsCRP and 1-month LDL-C were evaluated.

RESULTS: A total of 7981 (29%) patients had a baseline hsCRP<1 mg/L, 11177 (41%) had a hsCRP 1 to 3 mg/L, and 8337 (30%) had a hsCRP >3 mg/L. Median (interquartile range) baseline hsCRP was 1.8 (0.9-3.6) mg/L and levels were not altered by evolocumab (change at 48 weeks of -0.2 mg/dL [-1.0 to 0.4] in both treatment arms). In the placebo arm, patients in higher baseline hsCRP categories experienced significantly higher 3-year Kaplan-Meier rates of the primary and key secondary end points: 12.0%, 13.7%, and 18.1% for the primary end point (P_{trend}<0.0001) and 7.4%, 9.1%, and 13.2% for the key secondary end point (P_{trend}<0.0001) for categories of <1, 1 to 3, and >3 mg/dL, respectively. The relative risk reductions for the primary end point and key secondary end point with evolocumab were consistent across hsCRP strata (*P*-interactions>0.15 for both). In contrast, the absolute risk reductions with evolocumab tended to be greater in patients with higher hsCRP: 1.6%, 1.8%, and 2.6% and 0.8%, 2.0%, and 3.0%, respectively, for the primary and key secondary end points across hsCRP strata. In adjusted analyses of the association between LDL-C and hsCRP levels and cardiovascular risk, both LDL-C and hsCRP were independently associated with the primary outcome (*P*<0.0001 for each).

CONCLUSIONS: LDL-C reduction with evolocumab reduces cardiovascular events across hsCRP strata with greater absolute risk reductions in patients with higher-baseline hsCRP. Event rates were lowest in patients with the lowest hsCRP and LDL-C.

Crohn's disease and surgery

Digestive Diseases and Sciences
pp 1–8| Cite as

Colonic Crohn's Disease Is Associated with Less Aggressive Disease Course Than Ileal or Ileocolonic Disease

- Umang Arora Govind Makharia Vineet Ahuja

Abstract

Background

The literature on disease characteristics of colonic Crohn's disease (CD) is sparse, especially from Asia, where the burden of inflammatory bowel disease is on the rise. The present study aims to describe the disease characteristics of colonic CD, and compare it with that of ileal/ileocolonic disease.

Methods

This retrospective study included adult patients of CD (diagnosed by standard criteria, follow-up duration > 6 months) on follow-up between August 2004 and January 2016. The disease location was classified by Montreal classification. The data were recorded on demographic characteristics, smoking status, disease phenotype, disease course, treatment received, hospitalization and surgeries.

Results

Of 406 CD patients, 123 had colonic [mean age (at onset) 30.4 ± 13.2 years, 59.3% males] and 265 had ileal/ileocolonic disease [mean age (at onset) 32.9 ± 13.8 years, 61.5% males] while 18 patients had isolated upper GI disease. The frequency of inflammatory behavior (B1 phenotype; 61.8 vs. 46.4%, $p = 0.003$), perianal disease (23.6 vs. 4.5%, $p < 0.001$), and extra-intestinal manifestation (42.3 vs. 30.2%, $p = 0.019$) was higher in colonic than ileal/ileocolonic CD. Though not statistically significant, requirement of atleast one course of steroid was lower in colonic CD (72.7 vs. 84.2%, $p = 0.098$). Although there was no difference in the frequency of hospitalization (30.1 vs. 27.1%, $p = 0.45$), the overall requirement for surgery was significantly lower in colonic CD (17.1 vs. 26.1%, $p = 0.032$) and patients with colonic disease had a lower cumulative probability of first surgery in the first 10 years of follow-up [Hazard ratio 0.556 (95% CI 0.313–0.985), $p = 0.045$].

Conclusion

Colonic CD was associated with less aggressive disease behavior and lower requirement of surgery as compared to ileal/ileocolonic CD.

10 A. CERVICAL SPINE

Longus Colli

Musculoskelet Sci Pract. 2017 Dec;32:104-113. doi: 10.1016/j.msksp.2017.10.005. Epub 2017 Oct 16.

Do longus capitis and colli really stabilise the cervical spine? A study of their fascicular anatomy and peak force capabilities.

Kennedy E[1], Albert M[2], Nicholson H[3].

BACKGROUND:
Longus capitis and colli are proposed to play a role in stabilising the cervical spine, targeted in clinical and research practice with cranio-cervical flexion. However, it is not clear if these muscles are anatomically or biomechanically suited to a stabilising role.

OBJECTIVES:
To describe the fascicular morphology of the longus capitis and colli, and estimate their peak force generating capabilities across the individual cervical motion segments.

STUDY DESIGN:
Biomechanical force modelling based on anatomical data.

METHODS:
Three-part design including cadaveric dissection (n = 7), in vivo MRI muscle volume calculation from serial slices in young healthy volunteers (n = 6), and biomechanical modelling of the peak force generating capacities based on computed tomography scans of the head and neck.

RESULTS:
Longus capitis and colli are small muscles spanning multiple cervical motion segments. Bilateral peak flexion torque estimates were higher in the upper cervical spine (0.5 Nm), and unlikely to affect motion below the level of C5 (<0.2 Nm). Peak shear estimates were negligible (<20 N), while peak compression estimates were small (<80 N).

CONCLUSIONS:
These data highlight the complex anatomy and small force capacity of longus capitis and colli, and have implications for their function. In particular, the small peak compression forces indicate that these muscles have a limited capacity to contribute to cervical stability via traditional mechanisms. This implies that the mechanism(s) by which cranio-cervical flexion exercises produce clinical benefits is worth exploring further.

Perceptual changes with neck rotation

Musculoskelet Sci Pract. 2017 Dec;32:51-56. doi: 10.1016/j.msksp.2017.08.010. Epub 2017 Aug 26.

Influence of neck torsion on near point convergence in subjects with idiopathic neck pain.

Giffard P[1], Daly L[2], Treleaven J[3].

BACKGROUND:
People with neck pain (NP) experience sensorimotor and oculomotor deficits thought to be due to abnormal cervical afferent input. Convergence insufficiency (CI) measured by near point convergence (NPC) may be a feature in NP and neck torsion might help to differentiate a cervical cause.

OBJECTIVES:
This study aimed to investigate repeatability and reliability of NPC in neutral and torsion and compare between idiopathic NP and controls along with correlation to the Convergence Insufficiency Symptom Survey (CISS).

DESIGN:
Comparative cross sectional observational study.

METHOD:
A Royal Airforce (RAF) Rule measured NPC with the neck in neutral and in 45° torsion to the left and right in 42 subjects. A revised 15 item CISS was also completed. The average of 3 trials in each position and torsion difference were calculated. Within one week, NPC inter-rater and test-retest reliability was evaluated in 10 subjects.

RESULTS:
A significant NPC torsion difference was demonstrated in participants with NP compared to controls ($P = 0.01$). No significant differences were seen for NPC values in neutral ($P = 0.73$). High inter-rater reliability (ICC = 0.95) and repeatability (ICC = 0.84) was obtained. No correlations were present between the CISS and NPC measures ($r \leq 0.18$).

CONCLUSIONS:
NPC is impaired in neck torsion compared to neutral in NP supporting a cervical afferent cause. NPC, measured using the RAF Rule, is a reliable and repeatable measure and can be used to assess NPC and CI in those with NP. Objective rather than self-reported measures should be used to examine CI in NP.

14. HEADACHES

HA's and depression

Headache. 2018 Mar;58(3):407-415. doi: 10.1111/head.13215. Epub 2017 Oct 18.

Associations Between Depression/Anxiety and Headache Frequency in Migraineurs: A Cross-Sectional Study.

Chu HT[1], Liang CS[1], Lee JT[2], Yeh TC[3], Lee MS[4], Sung YF[2], Yang FC[2].

BACKGROUND:
While migraines have been associated with emotional disturbances, it remains unknown whether the intensity of emotional expression is directly related to migraine frequency.

OBJECTIVE:
The present study investigated depression/anxiety among migraineurs.

METHODS:
This cross-sectional study included 588 clinical outpatients in Taiwan. Migraines were stratified by attack frequency, with and without auras, and with well-controlled confounding variables. Demographic and clinical data, including sleep characteristics, were collected. Multivariable linear regressions were employed to examine whether migraine frequency (1-4 headache days per month, 5-8 headache days per month, 9-14 headache days per month, or >14 headache days per month) was associated with depression/anxiety symptoms, as indicated by the Beck's Depression Inventory (BDI) and Hospital Anxiety and Depression Subscales (HADS).

RESULTS:
BDI total scores were highest in patients with chronic migraines (mean ± SD: 13.2 ± 8.5), followed by those with high frequency (12.1 ± 8.5), medium frequency (10.6 ± 8.0), low frequency (9.1 ± 7.1), and lowest in nonmigraine controls (6.6 ± 5.9), with a significant trend in frequency (P trend < .001); similar results were obtained for HADS scores. BDI and HADS scores were independently related to high-frequency episodic and chronic migraine frequency and to poor sleep quality. The relationship between BDI score and migraine frequency was present in both aura-present (P trend = .001) and aura-absent subgroups (P trend = .029).

CONCLUSION:
Higher migraine frequency, either with or without auras, correlated with higher symptom scores of anxiety and depression.

Distinguishing a subarachnoid HA

Headache. 2018 Mar;58(3):364-370. doi: 10.1111/head.13218. Epub 2017 Nov 4.

Distinguishing Characteristics of Headache in Nontraumatic Subarachnoid Hemorrhage.

Mac Grory B[1], Vu L[2], Cutting S[1], Marcolini E[3], Gottschalk C[2], Greer D[4].

INTRODUCTION:
Subarachnoid hemorrhage (SAH) is a life-threatening emergency that is frequently missed due to its varied and often subtle presentation. The most common presentation of SAH is with a severe headache. The classical adjective used in SAH is "thunderclap"; however, this has not been well defined in the literature, rendering it a challenge to triage patients in clinical practice presenting with severe headache.

METHODS:
We undertook a prospective, observational study at a tertiary academic medical center examining the clinical characteristics of the presenting headache in SAH. We enrolled patients through the emergency department and from the neurosciences intensive care unit, and documented clinical features of the headache including the time to peak intensity, location, associated symptoms, and activities that caused worsening.

RESULTS:
One hundred and fifty-eight subjects were enrolled, of whom 20 patients had SAH and 138 did not. Notable distinguishing features on history included occipital location (55% in the SAH group vs 22% in the non-SAH group, $P < .001$), "stabbing" quality (35% in the SAH group vs 5% in the non-SAH group, $P < .001$), presence of prior headache (50% in the SAH group vs 83% in the non-SAH group, $P = .002$), and associated meningismus (80% in the SAH group and 42% in the non-SAH group, $P = .002$). Sixty-five percent of patients with SAH reported that their headache peaked within 1 second of onset, compared with only 10% of those without SAH ($P < .001$).

CONCLUSION:
This is the first study that has sought to examine in detail the clinical characteristics of the presenting headache in SAH. Our study suggests that the clinical features of headache with SAH are distinct from those associated with other headache syndromes, and that this may prove useful in the acute care setting in triaging patients with a chief complaint of headache.

KEYWORDS: disabling headache; emergency department; missed diagnosis; subarachnoid hemorrhage; thunderclap headache; triage
PMID: 29105063 DOI: 10.1111/head.13218

HA's and suicide

Headache. 2018 Mar;58(3):371-380. doi: 10.1111/head.13235. Epub 2017 Nov 29.

Association Between Migraine and Suicidal Behaviors: A Nationwide Study in the USA.

Friedman LE[1], Zhong QY[1], Gelaye B[1], Williams MA[1], Peterlin BL[2].

BACKGROUND:
Recent studies show migraineurs are at an increased risk of developing suicidal behaviors, even after controlling for comorbid depression. However, previous research has not examined the impact of psychiatric mood disorders on suicidal behaviors in migraineurs within a nationally representative sample.

OBJECTIVE:
A cross-sectional study was used to investigate the association between migraine and suicidal behaviors and determine whether psychiatric comorbidities modify this association in a nationwide inpatient cohort.

METHODS:
We analyzed the Nationwide Inpatient Sample of hospitalizations compiled from USA billing data. Migraine, suicidal behaviors, and psychiatric disorders were identified based on the International Classification of Diseases, 9th Revision, Clinical Modification diagnosis codes from hospitalization discharges (2007-2012). Weighted national estimates were used to estimate odds ratios (OR) and 95% confidence intervals (CI).

RESULTS:
156,172,826 hospitalizations were included, of which 1.4% had a migraine diagnosis and 1.6% had a diagnosis of suicidal behavior. Migraineurs had a 2.07-fold increased odds of suicidal behaviors (95%CI: 1.96-2.19) compared with non-migraineurs. We repeated analyses after stratifying by depression, anxiety, or posttraumatic stress disorder (PTSD). Among hospitalizations with depression, migraine was associated with a 20% reduced odds of suicidal behaviors (95%CI: 0.76-0.85). Among hospitalizations without depression, migraine was associated with 2.35-fold increased odds of suicidal behaviors (95%CI: 2.20-2.51). In stratified analyses, we noted that among hospitalizations with anxiety, migraineurs had slightly increased odds of suicidal behaviors (OR: 1.07, 95%CI: 1.02-1.13). Among hospitalizations without anxiety, migraine was associated with a 2.06-fold increased odds of suicidal behaviors (95%CI: 1.94-2.20). Similarly, in analyses stratified by PTSD, migraine was not associated with an increased risk of suicidal behaviors (OR: 1.00, 95%CI: 0.94-1.07) among those with PTSD. However, the odds of suicidal behaviors were increased among hospitalizations without PTSD (OR: 1.95, 95%CI: 1.84-2.08).

CONCLUSION:
Chronic conditions that do not affect the current hospitalization may not have been reported. The presence of psychiatric diagnoses influences associations of suicidal behaviors with migraine in a national inpatient sample. Migraineurs with diagnosed comorbid psychiatric disorders may be receiving care that mitigates their risk for suicidal behaviors.

Strength training helps HA's

Musculoskelet Sci Pract. 2017 Dec;32:38-43. doi: 10.1016/j.msksp.2017.08.003. Epub 2017 Aug 14.

Effect of resistance training on headache symptoms in adults: Secondary analysis of a RCT.

Andersen CH[1], Jensen RH[2], Dalager T[3], Zebis MK[4], Sjøgaard G[3], Andersen LL[5].

BACKGROUND:
While strength training for the neck and shoulder muscles may be effective in reducing headache, the optimal combination of exercise frequency and duration is unknown. This study investigates the effect of different time-wise combinations of one weekly hour of strength training for the neck and shoulder muscles on headache frequency, intensity, and use of analgesics.

METHODS:
A total of 573 office workers were randomly allocated at the cluster-level to five groups; 3 × 20 min a week of minimally supervised (3MS), 1 × 60 (1WS), 3 × 20 (3WS) or 9 × 7 (9WS) min a week of supervised high-intensity strength training for 20 weeks, or to a reference group without training (REF). Headache frequency, intensity, and use of analgesics in relation to headache were determined by questionnaire at baseline and follow-up.

RESULTS:
The intention-to-treat analysis showed reduced headache frequency and intensity of approximately 50% in all training groups compared with REF at 20-week follow-up ($P < 0.001$). Use of analgesics was lower in the supervised training groups (1WS, 3WS and 9WS), but not in the group with minimal training supervision (3MS), compared with REF at follow-up.

CONCLUSION:
One hour of specific strength training - regardless of the distribution during the week - effectively reduced both headache frequency and intensity in office workers. Thus, a large time-wise flexibility exists when implementing specific strength training at the workplace. However, only supervised training led to a reduction in use of analgesics for headache.

45 A. MANUAL THERAPY LUMBAR & GENERAL

McKenzie's effectiveness

Effectiveness of the McKenzie Method (Mechanical Diagnosis and Therapy) for Treating Low Back Pain: Literature Review With Meta-analysis

Authors: Olivier T. Lam, PT[1], David M. Strenger, PT[2], Matthew Chan-Fee, PT[3], Paul Thuong Pham, PT[4],Richard A. Preuss, PT, PhD[5], Shawn M. Robbins, PT, PhD[5]
Published: *Journal of Orthopaedic & Sports Physical Therapy*, 2018 **Volume:**0 **Issue:**0 **Pages:**1–53 **DOI:**10.2519/jospt.2018.7562

Study Design
Literature review with meta-analysis.

Background
Mechanical Diagnosis and Therapy (MDT), a classification-based system, aims to classify patients into homogenous subgroups to direct treatment.

Objectives
To examine MDT's effectiveness for improving pain and disability in patients with either acute (<12 weeks duration) or chronic (>12 weeks duration) low back pain (LBP).

Methods
Randomized controlled trials examining MDT in patients with LBP were identified from 6 databases. Independent investigators assessed the studies for exclusion, extracted data, and assessed risk of bias. The standardized mean differences (SMD) with 95% confidence intervals (CIs) were calculated to compare the effects of MDT to other interventions in patients with acute or chronic LBP.

Results
Of the 17 studies meeting inclusion criteria, 12 yielded valid data for analysis. In acute LBP, there was no significant difference for pain resolution (P=.11) and disability (P=.61) between MDT and other interventions. In chronic LBP, there was a significant difference in disability (SMD=-0.45) with results favoring MDT compared to exercise alone. There were no significant differences between MDT and manual therapy plus exercise (P>.05) for pain and disability outcomes.

Conclusion
There is moderate to high evidence that MDT is not superior than other rehabilitation interventions for reducing pain and disability in patients with acute LBP. In patients with chronic LBP, there is moderate to high evidence that MDT is superior to other rehabilitation interventions for reducing pain and disability; however, this depends on the type of intervention being compared to MDT.

Level of Evidence
Therapy, level 1a. *J Orthop Sports Phys Ther, Epub 30 Mar 2018. doi:10.2519/jospt.2018.7562*

45 D. MANUAL THERAPY EXTREMITIES

For PFP

J Orthop Sports Phys Ther. 2018 Jan 6:1-48. doi: 10.2519/jospt.2018.7243.

Effectiveness of Manual Therapy on Pain and Self-Reported Function in Individuals With Patellofemoral Pain: Systematic Review and Meta-Analysis.

Eckenrode BJ[1,2], Kietrys DM[3], Parrott JS[2].

Study Design Systematic literature review with meta-analysis.

Background Management of patellofemoral pain (PFP) may include the utilization of manual therapy (MT) techniques to the patellofemoral joint, surrounding soft tissues, and/or lumbospelvic region.

Objectives To determine the effectiveness of MT, either used alone or as an adjunct intervention, compared to standard treatment or sham, for reducing pain and improving self-report function in individuals with PFP.

Methods An electronic literature search (PubMed, OVID, CENTRAL, and CINAHL databases) was conducted for studies investigating MT for individuals with PFP. Studies comparing the provision of MT (local or remote to the knee), either used alone or in combination with other interventions, to control or sham interventions through August 2017 were included. Data for pain and patient self-reported outcomes were collected and synthesized. Trials were assessed via the Cochrane risk-of-bias tool, and a meta-analysis of the evidence was performed.

Results Nine studies were included in the review, with 5 rated as having a low risk-of-bias. The use of MT, applied to the local knee structure, was associated with favorable short-term changes in self-reported function and pain in individuals with PFP, when compared to a comparison (control or sham) intervention, but the changes were clinically meaningful only for pain (defined as a 2 cm or 2 points improvement on the visual analog scale or numeric pain rating scale). The evidence regarding lumbopelvic manipulation was inconclusive for pain improvement in individuals with PFP based on 3 studies.

Conclusion The data from this review cautiously suggest that MT may be helpful short-term for decreasing pain in patients with PFP. Several studies integrated MT into a comprehensive treatment program. Changes in self-reported function with the inclusion of manual therapy were shown to be significant, but not clinically meaningful. Limitations in studies performed to date suggest that future research should determine the optimal techniques and dosage of MT and perform longer follow-up to monitor long-term effects. Level of Evidence Therapy, Level 1a. J Orthop Sports Phys Ther, Epub 6 Jan 2018. doi:10.2519/jospt.2018.7243.

48 A. STM

Deep friction massage

Musculoskelet Sci Pract. 2017 Dec;32:92-97. doi: 10.1016/j.msksp.2017.09.005. Epub 2017 Sep 14.

Cyriax's deep friction massage application parameters: Evidence from a cross-sectional study with physiotherapists.

Chaves P[1], Simões D[2], Paço M[3], Pinho F[4], Duarte JA[5], Ribeiro F[6].

BACKGROUND:
Deep friction massage is one of several physiotherapy interventions suggested for the management of tendinopathy.

OBJECTIVES:
To determine the prevalence of deep friction massage use in clinical practice, to characterize the application parameters used by physiotherapists, and to identify empirical model-based patterns of deep friction massage application in degenerative tendinopathy.

DESIGN:
observational, analytical, cross-sectional and national web-based survey.

METHODS:
478 physiotherapists were selected through snow-ball sampling method. The participants completed an online questionnaire about personal and professional characteristics as well as specific questions regarding the use of deep friction massage. Characterization of deep friction massage parameters used by physiotherapists were presented as counts and proportions. Latent class analysis was used to identify the empirical model-based patterns. Crude and adjusted odds ratios and 95% confidence intervals were computed.

RESULTS:
The use of deep friction massage was reported by 88.1% of the participants; tendinopathy was the clinical condition where it was most frequently used (84.9%) and, from these, 55.9% reported its use in degenerative tendinopathy. The "duration of application" parameters in chronic phase and "frequency of application" in acute and chronic phases are those that diverge most from those recommended by the author of deep friction massage.

CONCLUSION:
We found a high prevalence of deep friction massage use, namely in degenerative tendinopathy. Our results have shown that the application parameters are heterogeneous and diverse. This is reflected by the identification of two application patterns, although none is in complete agreement with Cyriax's description.

Bone

Calcif Tissue Int. 2010 Nov;87(5):450-60. doi: 10.1007/s00223-010-9404-x. Epub 2010 Aug 22.

Contribution of mineral to bone structural behavior and tissue mechanical properties.

Donnelly E[1], Chen DX, Boskey AL, Baker SP, van der Meulen MC.

Bone geometry and tissue material properties jointly govern whole-bone structural behavior.

While the role of geometry in structural behavior is well characterized, the contribution of the tissue material properties is less clear, partially due to the multiple tissue constituents and hierarchical levels at which these properties can be characterized. Our objective was to elucidate the contribution of the mineral phase to bone mechanical properties across multiple length scales, from the tissue material level to the structural level. Vitamin D and calcium deficiency in 6-week-old male rats was employed as a model of reduced mineral content with minimal collagen changes. The structural properties of the humeri were measured in three-point bending and related to the mineral content and geometry from microcomputed tomography. Whole-cortex and local bone tissue properties were examined with infrared (IR) spectroscopy, Raman spectroscopy, and nanoindentation to understand the role of altered mineral content on the constituent material behavior. Structural stiffness (-47%) and strength (-50%) were reduced in vitamin D-deficient (-D) humeri relative to controls. Moment of inertia (-38%), tissue mineral density (TMD, -9%), periosteal mineralization (-28%), and IR mineral:matrix ratio (-19%) were reduced in -D cortices.

Thus, both decreased tissue mineral content and changes in cortical geometry contributed to impaired skeletal load-bearing function. In fact, 97% of the variability in humeral strength was explained by moment of inertia, TMD, and IR mineral:matrix ratio. The strong relationships between structural properties and cortical material composition demonstrate a critical role of the microscale material behavior in skeletal load-bearing performance.

Use of massage

Musculoskelet Sci Pract. 2017 Dec;32:31-37. doi: 10.1016/j.msksp.2017.07.003. Epub 2017 Jul 15.

Prevalence, patterns, and predictors of massage practitioner utilization: Results of a US nationally representative survey.

Sundberg T[1], Cramer H[2], Sibbritt D[3], Adams J[3], Lauche R[3].

BACKGROUND:
The use of massage therapy is common, especially in patients with musculoskeletal pain. The purpose of this study was to examine the prevalence, utilization, socio-demographic and health-related predictors of massage practitioner consultations in the US population.

METHODS:
Cross-sectional data from the 2012 National Health Interview Survey for adults (n = 34,525).

RESULTS:
Prevalence of massage practitioner utilization were 12.8% (lifetime) and 6.8% (last 12 months). Compared to non-users, those who used massage in the last year were more likely: female, at least high school educated, annual income ≥ US$ 15,000, diagnosed with spinal pain or arthritis, report moderate physical activity level as compared to low level, and consume alcohol as compared to being abstinent. Massage was mainly used for general wellness or disease prevention (56.3%), but also for specific, typically musculoskeletal, health problems (41.9%) for which 85.2% reported massage helped to some or a great deal. Most (59.1%) did not disclose massage use to their health care provider, despite 69.4% reporting massage therapy combined with medical treatment would be helpful.

CONCLUSIONS:
Approximately 7% (15.4 million) of US adults used massage therapy in the past year, mainly for general disease prevention, wellness or musculoskeletal pain. The majority of respondents reported positive outcomes of massage on specific health problems and overall well-being. Massage utilization was rarely covered by health insurance. Despite the majority of massage users considered massage therapy combined with medical care helpful, most did not disclose massage therapy use to their health care provider.

49. STRETCHING

Elderly and stretching

Musculoskelet Sci Pract. 2017 Dec;32:98-103. doi: 10.1016/j.msksp.2017.09.006. Epub 2017 Sep 25.

Acute effects of static stretching on the shear elastic moduli of the medial and lateral gastrocnemius muscles in young and elderly women.

Nakamura M[1], Ikezoe T[2], Nishishita S[3], Umehara J[2], Kimura M[4], Ichihashi N[2].

PURPOSE:
Generally, static stretching (SS) is the recommended intervention for a decline in the range of motion among elderly adults. However, no study has investigated the acute effects of SS on the shear elastic modulus in elderly people. The aims of the present study were to investigate the acute effects of SS on the shear elastic moduli of the medial and lateral gastrocnemius muscles and to examine the differences in these acute effects between young and elderly women.

METHODS:
This study included 15 healthy young women (age: 23.1 ± 3.4 years) and 15 healthy elderly women (age: 75.9 ± 2.8 years) with no history of neuromuscular disease or musculoskeletal injury involving the lower limbs. The shear elastic moduli of the medial and lateral gastrocnemius muscles (MG and LG, respectively) were measured using ultrasound shear wave elastography at 30° plantar flexion, 0°, and 20° dorsiflexion before and immediately after 5 min of SS with the knee extended.

RESULTS:
The shear elastic moduli of the MG and LG in all ankle position decreased after SS in both the young and elderly women, and there were no significant differences in the percent changes in the shear elastic moduli of the MG and LG at all ankle positions between the young and elderly women.

CONCLUSIONS:
These results suggested that 5 min of SS might be effective for decreasing shear elastic modulus in both young and elderly women and that the effects on shear elastic modulus are similar between young and elderly women.

Adductor stretching

Musculoskelet Sci Pract. 2017 Dec;32:70-77. doi: 10.1016/j.msksp.2017.08.011. Epub 2017 Sep 1.

Acute changes of hip joint range of motion using selected clinical stretching procedures: A randomized crossover study.

Hammer AM[1], Hammer RL[2], Lomond KV[3], O'Connor P[4].

BACKGROUND:
Hip adductor flexibility and strength is an important component of athletic performance and many activities of daily living. Little research has been done on the acute effects of a single session of stretching on hip abduction range of motion (ROM).

OBJECTIVES:
The aim of this study was to compare 3 clinical stretching procedures against passive static stretching and control on ROM and peak isometric maximal voluntary contraction (MVC).

DESIGN:
Using a randomized crossover study design, a total of 40 participants (20 male and 20 female) who had reduced hip adductor muscle length attended a familiarization session and 5 testing sessions on non-consecutive days.

METHOD:
Following the warm-up and pre-intervention measures of ROM and MVC, participants were randomly assigned 1 of 3 clinical stretching procedures (modified lunge, multidirectional, and joint mobilization) or a static stretch or control condition. Post-intervention measures of ROM and MVC were taken immediately following completion of the assigned condition.

RESULTS:
An ANOVA using a repeated measure design with the change score was conducted. All interventions resulted in small but statistically significant ($p < 0.05$) increases (1.0°-1.7°) in ROM with no inter-condition differences except one. Multidirectional stretching was greater than control ($p = 0.031$).

CONCLUSIONS:
These data suggest that a single session of stretching has only a minimal effect on acute changes of hip abduction ROM. Although hip abduction is a frontal plane motion, to effectively increase the extensibility of the structures that limit abduction, integrating multi-planar stretches may be indicated.

52. EXERCISE

Exercise and outlook and longevity

Long-term changes in depressive symptoms and estimated cardiorespiratory fitness and risk of all-cause mortality: The Nord-Trondelag Health Study
Mayo Clinic Proceedings — | April 05, 2018
Carlsen T, et al.

The independent and combined correlations of long-term changes in depressive symptoms (DSs) and estimated cardiorespiratory fitness (eCRF) with all-cause mortality were analyzed by the authors in middle-aged and older individuals attending both the second (from August 15, 1995, through June 18, 1997) and third (from October 3, 2006, through June 25, 2008) health surveys of the Nord-Trondelag Health Study, Norway, and followed until December 31, 2014. It was determined that maintaining low DSs and high eCRF was independently related to a lower risk of all-cause mortality.

Findings illustrated lowest mortality risk for persistently high eCRF combined with decreased or persistently low DSs. Hence, stress was laid on the effect of preventing DSs and maintaining high CRF on long-term mortality risk, significant for long-term population health.

Importance in the elderly

BMC Geriatr. 2018 Mar 27;18(1):80. doi: 10.1186/s12877-018-0770-y.

Physical activity and fitness are associated with verbal memory, quality of life and depression among nursing home residents: preliminary data of a randomized controlled trial.

Arrieta H[1], Rezola-Pardo C[1], Echeverria I[1], Iturburu M[2], Gil SM[1], Yanguas JJ[2], Irazusta J[1], Rodriguez-Larrad A[3].

BACKGROUND:
Few studies have simultaneously examined changes in physical, cognitive and emotional performance throughout the aging process.

METHODS:
Baseline data from an ongoing experimental randomized study were analyzed. Physical activity, handgrip, the Senior Fitness Test, Trail Making Test A, Rey Auditory-Verbal Learning Test, Quality of Life-Alzheimer's Disease Scale (QoL-AD) and the Goldberg Depression Scale were used to assess study participants. Logistic regression models were applied.

TRIAL REGISTRATION:
ACTRN12616001044415 (04/08/2016).

RESULTS:
The study enrolled 114 participants with a mean age of 84.9 (standard deviation 6.9) years from ten different nursing homes. After adjusting for age, gender and education level, upper limb muscle strength was found to be associated with Rey Auditory-Verbal Learning Test [EXP(B): 1.16, 95% confidence interval (CI): 1.04-1.30] and QoL-AD [EXP(B): 1.18, 95% CI: 1.06-1.31]. Similarly, the number of steps taken per day was negatively associated with the risk of depression according to the Goldberg Depression Scale [EXP(B): 1.14, 95% CI: 1.000-1.003]. Additional analyses suggest that the factors associated with these variables are different according to the need for using an assistive device for walking. In those participants who used it, upper limb muscle strength remained associated with Rey Auditory-Verbal Learning Test [EXP(B): 1.21, 95% CI: 1.01-1.44] and QoL-AD tests [EXP(B): 1.19, 95% CI: 1.02-1.40]. In those individuals who did not need an assistive device for walking, lower limb muscle strength was associated with Rey Auditory-Verbal Learning Test [EXP(B): 1.35, 95% CI: 1.07-1.69], time spent in light physical activity was associated with QoL-AD test [EXP(B): 1.13, 95% CI: 1.00-1.02], and the number of steps walked per day was negatively associated with the risk of depression according to the Goldberg Depression Scale [EXP(B): 1.27, 95% CI: 1.000-1.004].

CONCLUSIONS:
Muscle strength and physical activity are factors positively associated with a better performance on the Rey Auditory-Verbal Learning Test, QoL-AD and Goldberg Depression Scale in older adults with mild to moderate cognitive impairment living in nursing homes. These associations appeared to differ according to the use of an assistive device for walking. Our findings support the need for the implementation of interventions directed to increase the strength and physical activity of individuals living in nursing homes to promote physical, cognitive and emotional benefits.

53. CORE

Longus Colli

Musculoskelet Sci Pract. 2017 Dec;32:104-113. doi: 10.1016/j.msksp.2017.10.005. Epub 2017 Oct 16.

Do longus capitis and colli really stabilise the cervical spine? A study of their fascicular anatomy and peak force capabilities.

Kennedy E[1], Albert M[2], Nicholson H[3].

BACKGROUND:
Longus capitis and colli are proposed to play a role in stabilising the cervical spine, targeted in clinical and research practice with cranio-cervical flexion. However, it is not clear if these muscles are anatomically or biomechanically suited to a stabilising role.

OBJECTIVES:
To describe the fascicular morphology of the longus capitis and colli, and estimate their peak force generating capabilities across the individual cervical motion segments.

STUDY DESIGN:
Biomechanical force modelling based on anatomical data.

METHODS:
Three-part design including cadaveric dissection (n = 7), in vivo MRI muscle volume calculation from serial slices in young healthy volunteers (n = 6), and biomechanical modelling of the peak force generating capacities based on computed tomography scans of the head and neck.

RESULTS:
Longus capitis and colli are small muscles spanning multiple cervical motion segments. Bilateral peak flexion torque estimates were higher in the upper cervical spine (0.5 Nm), and unlikely to affect motion below the level of C5 (<0.2 Nm). Peak shear estimates were negligible (<20 N), while peak compression estimates were small (<80 N).

CONCLUSIONS:
These data highlight the complex anatomy and small force capacity of longus capitis and colli, and have implications for their function. In particular, the small peak compression forces indicate that these muscles have a limited capacity to contribute to cervical stability via traditional mechanisms. This implies that the mechanism(s) by which cranio-cervical flexion exercises produce clinical benefits is worth exploring further.

TA contraction in Pelvic girdle pain

Musculoskelet Sci Pract. 2017 Dec;32:78-83. doi: 10.1016/j.msksp.2017.09.001. Epub 2017 Sep 6.

Contraction of the transverse abdominal muscle in pelvic girdle pain is enhanced by pain provocation during the task.

Mens JM[1], Pool-Goudzwaard A[2].

BACKGROUND:
Understanding of the pathogenesis of pain in the lumbopelvic region remains a challenge. It is suggested that lumbopelvic pain is related to decreased contraction of the transverse abdominal muscles (TrA).

OBJECTIVE:
To investigate how pain provoked by a task influences TrA contraction during that task.

DESIGN:
A case-control cross-sectional study.

METHOD:
We recruited 40 non-pregnant women with persistent pregnancy-related posterior pelvic girdle pain (PGP) and 33 parous women (healthy controls) without PGP. TrA thickness was measured by ultrasound at various levels of bilateral hip adduction, with increments of 20 N from 0 to 140 N. Pain during the tests was registered.

RESULTS:
After correction for the level of adduction force, TrA thickness increase during pain-provoking tests of participants with PGP was 6.3 percentage points higher than in their pain-free tests ($p = 0.01$) and 0.91 percentage points higher than in the pain-free tests of healthy controls ($p < 0.01$).

CONCLUSION:
TrA contraction in PGP is enhanced when a task provokes pain. These results may have consequences for the treatment of persistent pregnancy-related posterior pelvic girdle pain

59. PAIN

Pain adaptability

J Pain. 2018 Mar 26. pii: S1526-5900(18)30111-1. doi: 10.1016/j.jpain.2018.03.002

Pain Adaptability in Individuals with Chronic Musculoskeletal Pain is Not Associated with Conditioned Pain Modulation.

Wan DWL[1], Arendt-Nielsen L[2], Wang K[2], Xue CC[1], Wang Y[1], Zheng Z[3].

Healthy humans can be divided into the pain adaptive (PA) and the pain non-adaptive (PNA) groups; PA showed a greater decrease in pain rating to a cold pressor test (CPT) than PNA. This study examined if the dichotomy of pain adaptability existed in individuals with chronic musculoskeletal pain (MSK). CPTs at 2°C and 7°C were used to assess the status of pain adaptability in participants with either chronic non-specific low back pain or knee osteoarthritis. The participants' potency of conditioned pain modulation (CPM) and local inhibition were measured. The strengths of pain adaptability at both CPTs were highly correlated. PA and PNA did not differ in their demographics, pain thresholds from thermal and pressure stimuli, or potency of local inhibition or CPM. PA reached their maximum pain faster than PNA (t_{41}=-2.76, $p<0.01$), and had a gradual reduction of pain unpleasantness over seven days whereas PNA did not ($F_{(6,246)} = 3.01$, $p = 0.01$). The dichotomy of pain adaptability exists in MSK patients. Consistent with the healthy human study, the strength of pain adaptability and potency of CPM are not related. Pain adaptability could be another form of endogenous pain inhibition which clinical implication is yet to be understood.

PERSPECTIVE:
The dichotomy of pain adaptability was identified in healthy humans. The current study confirms that this dichotomy also exists in individuals with chronic musculoskeletal pain, and could be reliably assessed with cold pressor tests at 2°C and 7°C. Similar to the healthy human study, pain adaptability is not associated with conditioned pain modulation, and may reflect the temporal aspect of pain inhibition.

Catastrophizing

The impact of anxiety and catastrophizing on interleukin-6 responses to acute painful stress

Authors Lazaridou A, Martel MO, Cahalan CM, Cornelius MC, Franceschelli O, Campbell CM, Haythornthwaite JA, Smith M, Riley J, Edwards RR
DOI https://doi.org/10.2147/JPR.S147735

Objective: To examine the influence of anxiety and pain-related catastrophizing on the time course of acute interleukin-6 (IL-6) responses to standardized noxious stimulation among patients with chronic pain.
Methods: Data were collected from 48 participants in the following demographically matched groups: patients with chronic pain (n=36) and healthy controls (n=12). Participants underwent a series of Quantitative Sensory Testing (QST) procedures assessing responses to mechanical and thermal stimuli during two separate visits, in a randomized order. One visit consisted of standard, moderately painful QST procedures, while the other visit involved nonpainful analogs to these testing procedures. Blood samples were taken at baseline, and then for up to 2 hours after QST in order to study the time course of IL-6 responses.
Results: Results of multilevel analyses revealed that IL-6 responses increased across assessment time points in both visits ($p<0.001$). While patients with chronic pain and healthy controls did not differ in the magnitude of IL-6 responses, psychological factors influenced IL-6 trajectories only in the chronic pain group. Among patients, increases in catastrophizing over the course of the QST session were associated with elevated IL-6 responses only during the painful QST session ($p<0.05$). When controlling for anxiety, results indicated that the main multilevel model among patients remained significant ($p<0.05$).
Conclusion: Under specific conditions (eg, application of a painful stressor), catastrophizing may be associated with amplified proinflammatory responses in patients with persistent pain. These findings suggest that psychosocial interventions that reduce negative pain-related cognitions may benefit patients' inflammatory profiles.

Neuropathic

The Journal of Pain

Catastrophizing, Solicitous Responses From Significant Others and Function in Individuals with Neuropathic Pain, Osteoarthritis or Spinal Pain in the General Population

- Mari Glette[1, 2, ,], Tore C. Stiles[2, 3]Tormod Landmark[2, 3], Mark P. Jensen[4], Astrid Woodhouse[1, 2], Stephen Butler[2, 5,6], Petter C. Borchgrevink[1, 2],

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Highlights

• Pain catastrophizing is associated with less psychological and physical function

• Solicitous responding to pain is associated with less insomnia severity

• A neuropathic pain diagnosis is associated with higher levels of insomnia severity

• Neuropathic or spinal pain is associated with higher levels of psychological distress

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Abstract

That certain psychological factors are negatively associated with function in patients with chronic pain is well established.

However, few studies have evaluated these factors in individuals with chronic pain from the general population. The aims of this study were to (1) evaluate the unique associations between catastrophizing and perceived solicitous responses and psychological function, physical function and insomnia severity in individuals with neuropathic pain, osteoarthritis or spinal pain in the general population and to (2) determine if diagnosis moderates the associations found.

Five-hundred-and-fifty-one individuals from the general population underwent examinations with a physician and physiotherapist, and a total of 334 individuals were diagnosed with either neuropathic pain (n=34), osteoarthritis (n=78) or spinal pain (n=222). Results showed that catastrophizing was significantly associated with reduced psychological and physical function, explaining 24% and 2% of variance respectively, while both catastrophizing and perceived solicitous responding were significantly and uniquely associated with insomnia severity, explaining 8% of the variance.

Perceived solicitous responding was significantly negatively associated with insomnia severity. Moderator analyses indicated that (1) the association between catastrophizing and psychological function was greater among individuals with spinal pain and neuropathic pain than those with osteoarthritis and (2) the association between catastrophizing and insomnia was greater among individuals with spinal pain and osteoarthritis than those with neuropathic pain. No statistically significant interactions including perceived solicitous responses were found.

The findings support earlier findings of an association between catastrophizing and function among individuals with chronic pain in the general population, and suggest that diagnosis may serve a moderating role in some of these associations.

Adaptability

J Pain. 2018 Mar 26. pii: S1526-5900(18)30111-1. doi: 10.1016/j.jpain.2018.03.002.

Pain Adaptability in Individuals with Chronic Musculoskeletal Pain is Not Associated with Conditioned Pain Modulation.

Wan DWL[1], Arendt-Nielsen L[2], Wang K[2], Xue CC[1], Wang Y[1], Zheng Z[3].

Healthy humans can be divided into the pain adaptive (PA) and the pain non-adaptive (PNA) groups; PA showed a greater decrease in pain rating to a cold pressor test (CPT) than PNA. This study examined if the dichotomy of pain adaptability existed in individuals with chronic musculoskeletal pain (MSK). CPTs at 2°C and 7°C were used to assess the status of pain adaptability in participants with either chronic non-specific low back pain or knee osteoarthritis. The participants' potency of conditioned pain modulation (CPM) and local inhibition were measured. The strengths of pain adaptability at both CPTs were highly correlated. PA and PNA did not differ in their demographics, pain thresholds from thermal and pressure stimuli, or potency of local inhibition or CPM. PA reached their maximum pain faster than PNA (t_{41}=-2.76, p<0.01), and had a gradual reduction of pain unpleasantness over seven days whereas PNA did not ($F_{(6,246)}$ = 3.01, p = 0.01). The dichotomy of pain adaptability exists in MSK patients. Consistent with the healthy human study, the strength of pain adaptability and potency of CPM are not related. Pain adaptability could be another form of endogenous pain inhibition which clinical implication is yet to be understood.

PERSPECTIVE:
The dichotomy of pain adaptability was identified in healthy humans. The current study confirms that this dichotomy also exists in individuals with chronic musculoskeletal pain, and could be reliably assessed with cold pressor tests at 2°C and 7°C. Similar to the healthy human study, pain adaptability is not associated with conditioned pain modulation, and may reflect the temporal aspect of pain inhibition.

KEYWORDS: Cold pressor test; conditioned pain modulation; musculoskeletal pain; pain adaptability; pressure pain threshold
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62 A. NUTRITION/VITAMINS

Wealth loss and mortality

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Association of a Negative Wealth Shock With All-Cause Mortality in Middle-aged and Older Adults in the United States.

Pool LR[1], Burgard SA[2,3,4], Needham BL[3], Elliott MR[4,5], Langa KM[4,6,7,8], Mendes de Leon CF[3].

IMPORTANCE:
A sudden loss of wealth-a negative wealth shock-may lead to a significant mental health toll and also leave fewer monetary resources for health-related expenses. With limited years remaining to regain lost wealth in older age, the health consequences of these negative wealth shocks may be long-lasting.

OBJECTIVE:
To determine whether a negative wealth shock was associated with all-cause mortality during 20 years of follow-up.

DESIGN, SETTING, AND PARTICIPANTS:
The Health and Retirement Study, a nationally representative prospective cohort study of US adults aged 51 through 61 years at study entry. The study population included 8714 adults, first assessed for a negative wealth shock in 1994 and followed biennially through 2014 (the most recent year of available data).

EXPOSURES:
Experiencing a negative wealth shock, defined as a loss of 75% or more of total net worth over a 2-year period, or asset poverty, defined as 0 or negative total net worth at study entry.

MAIN OUTCOMES AND MEASURES:
Mortality data were collected from the National Death Index and postmortem interviews with family members. Marginal structural survival methods were used to account for the potential bias due to changes in health status that may both trigger negative wealth shocks and act as the mechanism through which negative wealth shocks lead to increased mortality.

RESULTS:
There were 8714 participants in the study sample (mean [SD] age at study entry, 55 [3.2] years; 53% women), 2430 experienced a negative wealth shock during follow-up, 749 had asset poverty at baseline, and 5535 had continuously positive wealth without shock. A total of 2823 deaths occurred during 80 683 person-years of follow-up. There were 30.6 vs 64.9 deaths per 1000 person-years for those with continuously positive wealth vs negative wealth shock (adjusted hazard ratio [HR], 1.50; 95% CI, 1.36-1.67). There were 73.4 deaths per 1000 person-years for those with asset poverty at baseline (adjusted HR, 1.67; 95% CI, 1.44-1.94; compared with continuously positive wealth).

CONCLUSIONS AND RELEVANCE:
Among US adults aged 51 years and older, loss of wealth over 2 years was associated with an increased risk of all-cause mortality. Further research is needed to better understand the possible mechanisms for this association and determine whether there is potential value for targeted interventions.

Vit D

Research

Plasma 25-hydroxyvitamin D concentration and subsequent risk of total and site specific cancers in Japanese population: large case-cohort study within Japan Public Health Center-based Prospective Study cohort

BMJ 2018; 360 doi: https://doi.org/10.1136/bmj.k671 *Sanjeev Budhathoki, staff scientist***1**, *for the Japan Public Health Center-based Prospective Study Group*

Abstract
Objective To evaluate the association between pre-diagnostic circulating vitamin D concentration and the subsequent risk of overall and site specific cancer in a large cohort study.
Design Nested case-cohort study within the Japan Public Health Center-based Prospective Study cohort.
Setting Nine public health centre areas across Japan.
Participants 3301 incident cases of cancer and 4044 randomly selected subcohort participants.
Exposure Plasma concentration of 25-hydroxyvitamin D measured by enzyme immunoassay. Participants were divided into quarters based on the sex and season specific distribution of 25-hydroxyvitamin D among subcohorts. Weighted Cox proportional hazard models were used to calculate the multivariable adjusted hazard ratios for overall and site specific cancer across categories of 25-hydroxyvitamin D concentration, with the lowest quarter as the reference.
Main outcome measure Incidence of overall or site specific cancer.
Results Plasma 25-hydroxyvitamin D concentration was inversely associated with the risk of total cancer, with multivariable adjusted hazard ratios for the second to fourth quarters compared with the lowest quarter of 0.81 (95% confidence interval 0.70 to 0.94), 0.75 (0.65 to 0.87), and 0.78 (0.67 to 0.91), respectively (P for trend=0.001). Among the findings for cancers at specific sites, an inverse association was found for liver cancer, with corresponding hazard ratios of 0.70 (0.44 to 1.13), 0.65 (0.40 to 1.06), and 0.45 (0.26 to 0.79) (P for trend=0.006). A sensitivity analysis showed that alternately removing cases of cancer at one specific site from total cancer cases did not substantially change the overall hazard ratios.
Conclusions In this large prospective study, higher vitamin D concentration was associated with lower risk of total cancer. These findings support the hypothesis that vitamin D has protective effects against cancers at many sites.

Vit. B 12

Ann Nutr Metab. 2018 Mar 29;72(4):265-271. doi: 10.1159/000488326.

Vitamin B12 Deficiency and the Role of Gender: A Cross-Sectional Study of a Large Cohort.

Margalit I[1], Cohen E[1,2], Goldberg E[1,2], Krause I[1,2].

BACKGROUND:
Vitamin B12 deficiency is associated with hematological, neurological, and cardiovascular consequences. Epidemiologic data on these related illnesses indicate gender differences.

METHODS:
A cross-sectional study was designed to examine gender differences in vitamin B12 deficiency among a healthy population. Data from healthy individuals aged 18-65, who were provided with a routine medical evaluation during 2000-2014, were retrieved from the medical charts. Individuals with background illnesses and those who had used medications or nutritional supplements were excluded. Vitamin B12 deficiency was defined by 2 cutoff values (206 and 140 pmol/L). The multivariate analysis was adjusted for age, body mass index, estimated glomerular filtration rate, hyperhomocysteinemia, folate deficiency, albumin, and transferrin saturation. Sensitivity analyses were implemented by excluding individuals with anemia, hyperhomocysteinemia, or folate deficiency and by age stratification.

RESULTS:
In all, 7,963 individuals met the inclusion criteria. Serum vitamin B12 mean levels were 312.36 and 284.31 pmol/L for women and men respectively ($p < 0.001$). Deficiency prevalence was greater for men (25.5%) in comparison with women (18.9%; $p < 0.001$). Men were strongly associated with severe deficiency (adjusted OR 2.26; 95% CI 1.43-3.56).

CONCLUSIONS:
Among the healthy population, men are susceptible to vitamin B12 deficiency. This can be explained by neither diet habits nor estrogen effects. Genetic variations are therefore hypothesized to play a role.

63. PHARMACOLOGY

Marijuana and decreased opioid use

JAMA Intern Med. 2018 Apr 2. doi: 10.1001/jamainternmed.2018.1007.

Association of Medical and Adult-Use Marijuana Laws With Opioid Prescribing for Medicaid Enrollees.

Wen H[1], Hockenberry JM[2,3].

IMPORTANCE:
Overprescribing of opioids is considered a major driving force behind the opioid epidemic in the United States. Marijuana is one of the potential nonopioid alternatives that can relieve pain at a relatively lower risk of addiction and virtually no risk of overdose. Marijuana liberalization, including medical and adult-use marijuana laws, has made marijuana available to more Americans.

OBJECTIVE:
To examine the association of state implementation of medical and adult-use marijuana laws with opioid prescribing rates and spending among Medicaid enrollees.

DESIGN, SETTING, AND PARTICIPANTS:
This cross-sectional study used a quasi-experimental difference-in-differences design comparing opioid prescribing trends between states that started to implement medical and adult-use marijuana laws between 2011 and 2016 and the remaining states. This population-based study across the United States included all Medicaid fee-for-service and managed care enrollees, a high-risk population for chronic pain, opioid use disorder, and opioid overdose.

EXPOSURES:
State implementation of medical and adult-use marijuana laws from 2011 to 2016.

MAIN OUTCOMES AND MEASURES:
Opioid prescribing rate, measured as the number of opioid prescriptions covered by Medicaid on a quarterly, per-1000-Medicaid-enrollee basis.

RESULTS:
State implementation of medical marijuana laws was associated with a 5.88% lower rate of opioid prescribing (95% CI, -11.55% to approximately -0.21%). Moreover, the implementation of adult-use marijuana laws, which all occurred in states with existing medical marijuana laws, was associated with a 6.38% lower rate of opioid prescribing (95% CI, -12.20% to approximately -0.56%).

CONCLUSIONS AND RELEVANCE:
The potential of marijuana liberalization to reduce the use and consequences of prescription opioids among Medicaid enrollees deserves consideration during the policy discussions about marijuana reform and the opioid epidemic.