

## 7. PELVIC ORGANS/WOMAN'S HEALTH

### Fetal complications from pesticide exposure

#### Research

#### Prenatal and infant exposure to ambient pesticides and autism spectrum disorder in children: population based case-control study

*BMJ* 2019; 364 doi: <https://doi.org/10.1136/bmj.1962> Xin Cui, research assistant<sup>2 3 4</sup>,

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#### Abstract

**Objective** To examine associations between early developmental exposure to ambient pesticides and autism spectrum disorder.

**Design** Population based case-control study.

**Setting** California's main agricultural region, Central Valley, using 1998-2010 birth data from the Office of Vital Statistics.

**Population** 2961 individuals with a diagnosis of autism spectrum disorder based on the *Diagnostic and Statistical Manual of Mental Disorders*, fourth edition, revised (up to 31 December 2013), including 445 with intellectual disability comorbidity, were identified through records maintained at the California Department of Developmental Services and linked to their birth records. Controls derived from birth records were matched to cases 10:1 by sex and birth year.

**Exposure** Data from California state mandated Pesticide Use Reporting were integrated into a geographic information system tool to estimate prenatal and infant exposures to pesticides (measured as pounds of pesticides applied per acre/month within 2000 m from the maternal residence). 11 high use pesticides were selected for examination a priori according to previous evidence of neurodevelopmental toxicity in vivo or in vitro (exposure defined as ever v never for each pesticide during specific developmental periods).

**Main outcome measure** Odds ratios and 95% confidence intervals using multivariable logistic regression were used to assess associations between pesticide exposure and autism spectrum disorder (with or without intellectual disabilities) in offspring, adjusting for confounders.

**Results** Risk of autism spectrum disorder was associated with prenatal exposure to glyphosate (odds ratio 1.16, 95% confidence interval 1.06 to 1.27), chlorpyrifos (1.13, 1.05 to 1.23), diazinon (1.11, 1.01 to 1.21), malathion (1.11, 1.01 to 1.22), avermectin (1.12, 1.04 to 1.22), and permethrin (1.10, 1.01 to 1.20). For autism spectrum disorder with intellectual disability, estimated odds ratios were higher (by about 30%) for prenatal exposure to glyphosate (1.33, 1.05 to 1.69), chlorpyrifos (1.27, 1.04 to 1.56), diazinon (1.41, 1.15 to 1.73), permethrin (1.46, 1.20 to 1.78), methyl bromide (1.33, 1.07 to 1.64), and myclobutanil (1.32, 1.09 to 1.60); exposure in the first year of life increased the odds for the disorder with comorbid intellectual disability by up to 50% for some pesticide substances.

**Conclusion** Findings suggest that an offspring's risk of autism spectrum disorder increases following prenatal exposure to ambient pesticides within 2000 m of their mother's residence during pregnancy, compared with offspring of women from the same agricultural region without such exposure. Infant exposure could further increase risks for autism spectrum disorder with comorbid intellectual disability.

**Migraines and pregnancy problems****Pregnancy, Birth, Neonatal, and Postnatal Neurological Outcomes After Pregnancy With Migraine**

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<https://doi.org/10.1111/head.13536>

**Background**

Prevalence of migraine is high during the reproductive age. Although migraine often improves during pregnancy, the risk of adverse pregnancy, birth, neonatal, and neurological outcomes in mother and offspring remains poorly understood.

**Objective**

To investigate the associations between maternal migraine and risks of adverse pregnancy outcomes in the mother, and birth, neonatal and postnatal outcomes in the offspring.

**Methods**

We used Danish population registries to assemble a cohort of pregnancies among women with migraine and an age- and conception year-matched comparison cohort of pregnancies among women without migraine. The study period was 2005-2012. We computed adjusted prevalence ratios (aPRs) for pregnancy and birth outcomes and adjusted risk ratios (aRRs) for neonatal and postnatal outcomes, adjusting for age, preconception medical history, and preconception reproductive history.

**Results**

We identified 22,841 pregnancies among women with migraine and 228,324 matched pregnancies among women without migraine. Migraine was associated with an increased risk of pregnancy-associated hypertension disorders (aPR: 1.50 [95% confidence interval (CI): 1.39-1.61]) and miscarriage (aPR: 1.10 [95% CI: 1.05-1.15]). Migraine was associated with an increased prevalence of low birth weight (aPR: 1.14 [95% CI: 1.06-1.23]), preterm birth (aPR: 1.21 [95% CI: 1.13-1.30]) and cesarean delivery (aPR: 1.20 [95% CI: 1.15-1.25]), but not of small for gestational age offspring (aPR: 0.94 [95% CI: 0.88-0.99]) and birth defects (aPR: 1.01 [95% CI: 0.93-1.09]). Offspring prenatally exposed to maternal migraine had elevated risks of several outcomes in the neonatal and postnatal period, including intensive care unit admission (aRR: 1.22 [95% CI: 1.03-1.45]), hospitalization (aRR: 1.12 [95% CI: 1.06-1.18]), dispensed prescriptions (aRR: 1.34 [95% CI: 1.24-1.45]), respiratory distress syndrome (aRR: 1.20 [95% CI: 1.02-1.42]), and febrile seizures (aRR: 1.27 [95% CI: 1.03-1.57]), but not of death (aRR: 0.67 [95% CI: 0.43-1.04]) and cerebral palsy (aRR: 1.00 [95% CI: 0.51-1.94]).

**Conclusions**

Women with migraine and their offspring have greater risks of several adverse pregnancy outcomes than women without migraine.

## 8. VISCERA

### IBS – systemic inflammatory conditions

Clin Gastroenterol Hepatol. 2019 Mar 29. pii: S1542-3565(19)30305-2. doi: 10.1016/j.cgh.2019.03.040

#### **Incidence of Immune-mediated Inflammatory Diseases Among Patients With Inflammatory Bowel Diseases in Denmark.**

Burisch J<sup>1</sup>, Jess T<sup>2</sup>, Egeberg A<sup>3</sup>.

##### *BACKGROUND & AIMS:*

It is not clear whether the co-occurrence of immune-mediated inflammatory diseases (IMIDs) affects the course of inflammatory bowel diseases (IBD). We investigated the occurrence of IMIDs in relation to onset of IBD and the effects of concurrent IMIDs on IBD outcomes in a nationwide study of the Danish population.

##### *METHODS:*

We used a nationwide cohort of all individuals diagnosed with IBD, including Crohn's disease (CD) or ulcerative colitis (UC), in Denmark from 2007 through 2016 (n=14,377). Patients were match with individuals without IBD from the general population (controls, n=71,885). All cohort members were followed from birth until 2016, their migration, or their death. The occurrence of IMIDs was assessed using the Danish national patient register and Registry of Medicinal Products Statistics.

##### *RESULTS:*

A total of 3,235 patients with a diagnosis of IBD (22.5%) has also received a diagnosis of an IMID; most IMIDs occurred before the onset of IBD (n=2,600, 80.3%). The most common IMIDs observed were psoriasis, asthma, type 1 diabetes, and iridocyclitis. Patients with IBD treated with infliximab were at reduced risk of developing IMIDs (CD adjusted odds ratio [aOR], 0.52; 95% CI, 0.34-0.81 and UC aOR, 0.47; 95% CI, 0.29-0.76). Co-occurrence of IMIDs increased the risk of surgery in patients with CD that developed IMIDs after CD onset (aOR, 2.30; 95% CI, 1.46-4.20) but not in UC.

##### *CONCLUSIONS:*

In a nationwide study of the Danish population, 22.5% of patients with IBD also had at least 1 concurrent IMID. Co-occurrence of IMIDs increased the risk of surgery in patients with CD.

**Mercury and CV disease**

Heart. 2019 May 4. pii: heartjnl-2019-314755. doi: 10.1136/heartjnl-2019-314755.

**Serum long-chain omega-3 fatty acids, hair mercury and exercise-induced myocardial ischaemia in men.**

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**OBJECTIVE:**

Long-chain omega-3 polyunsaturated fatty acids (PUFA) from fish have been inversely associated with coronary heart disease (CHD) risk. Fish may also contain methylmercury, which has been associated with higher CHD risk and may diminish the cardioprotective effect of long-chain omega-3 PUFA. We investigated the associations of serum long-chain omega-3 PUFA and hair mercury with the odds for myocardial ischaemia during exercise.

**METHODS:**

A total of 2199 men from the Kuopio Ischaemic Heart Disease Risk Factor Study, aged 42-60 years were studied in 1984-89. Of the 2199 men, 342 had history of CHD. The men performed a maximal symptom-limited exercise stress test using an electrically braked bicycle ergometer. ORs for exercise-induced myocardial ischaemia were estimated with logistic regression.

**RESULTS:**

In the multivariable analysis, those in the highest versus lowest serum long-chain omega-3 PUFA quartile had 33% lower odds of myocardial ischaemia (OR 0.67, 95% CI 0.51 to 0.87, p-trend=0.006). The association was stronger among those with CHD history (OR 0.10, 95% CI 0.03 to 0.39, p-trend <0.001), than among those without (OR 0.80, 95% CI 0.57 to 1.12, p-trend=0.17) (p-interaction=0.01). Higher hair mercury concentration was associated with increased odds for myocardial ischaemia in the entire population (OR 1.62, 95% CI 1.22 to 2.14, p-trend=0.002).

**CONCLUSION:**

Higher circulating concentrations of the long-chain omega-3 PUFAs, a marker for fish consumption, were associated with lower occurrence of exercise-induced myocardial ischaemia, but only among men with CHD history. Hair mercury concentration was directly associated with the occurrence of exercise-induced myocardial ischaemia in the entire study population.

## CV disease and stress

**Psychological Distress and Subsequent Cardiovascular Events in Individuals With Coronary Artery Disease****Pratik Pimple Bruno B. Lima J. Douglas Bremner John Hanfelt Tene Lewis ,  
Arshed A. Quyyumi , and Viola Vaccarino**<https://doi.org/10.1161/JAHA.118.011866>Journal of the American Heart Association. 2019;8

## Background

Higher symptom levels of a variety of measures of emotional distress have been associated with cardiovascular disease (CVD), especially among women. Here, our goal was to investigate the association between a composite measure of psychological distress and incident cardiovascular events.

## Methods and Results

In a prospective cohort study, we assessed 662 individuals (28% women; 30% blacks) with stable coronary artery disease. We used a composite score of psychological distress derived through summation of Z-transformed psychological distress symptom scales (depression, posttraumatic stress, anxiety, anger, hostility, and perceived stress) as a predictor of an adjudicated composite end point of adverse events (cardiovascular death, myocardial infarction, stroke, heart failure, or unstable angina). During a mean follow-up of 2.8 years, 120 (18%) subjects developed CVD events. In the overall population, there was no association between the psychological distress measure and CVD events, but there was a sex-based interaction ( $P=0.004$ ). In women, higher psychological distress was associated with a higher incidence of CVD events; each SD increase in the composite score of psychological distress was associated with 1.44 times adjusted hazard of CVD events (95% CI, 1.09–1.92). No such association was found in men.

## Conclusions

Among patients with coronary artery disease, higher psychological distress is associated with future cardiovascular events in women only.

## 10 A. CERVICAL SPINE

### Neck problems in dentists

#### **Risk for cervical herniated intervertebral disc in dentists: a nationwide population-based study**

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*BMC Musculoskeletal Disorders* 2019 **20**:189

<https://doi.org/10.1186/s12891-019-2559-3>

#### Background

Prolonged static postures (PSPs) may predispose dentists to develop cervical herniated intervertebral disc (C-HIVD); however, there is limited evidence supporting this in the literature thus far. We conducted this study to fit the data gap.

#### Methods

We conducted a retrospective nationwide population-based study using the Taiwan National Health Insurance Research Database to identify 10,930 dentists, an identical number of age- and sex-matched participants from the general population, and 73,718 other health care providers (HCPs, non-dentists). Comparisons for the risk of developing C-HIVD between dentists and the general population, and between dentists and other HCPs were performed by tracing their medical histories between 2007 and 2011.

#### Results

Dentists had a cumulative incidence rate of 1.1% for C-HIVD during the 5-year follow-up period. Overall, there was no difference of the risk for C-HIVD between dentists and the general population after adjusting for hypertension, hyperlipidemia, liver disease, mental disorders, diabetes mellitus, coronary artery disease, chronic obstructive pulmonary disease, malignancy, stroke, and renal disease (adjusted odds ratio [AOR]: 1.2, 95% confidence interval [CI]: 0.9–1.6). However, stratified analysis showed that younger dentists ( $\leq 34$  years) had a trend of higher risk for C-HIVD than members of the younger general population (AOR: 1.9, 95% CI: 0.9–4.1). There was no difference found between dentists and other HCPs (AOR: 0.9, 95% CI: 0.8–1.1).

#### Conclusion

Younger dentists had a trend of higher risk of developing C-HIVD than members of the general population.

## 15. VESTIBULAR

### Headaches and bppv

JAMA Otolaryngol Head Neck Surg. 2019 Jan 24. doi: 10.1001/jamaoto.2018.4016

#### **Association Between Migraine and Benign Paroxysmal Positional Vertigo Among Adults in South Korea.**

Kim SK<sup>1</sup>, Hong SM<sup>1</sup>, Park IS<sup>1</sup>, Choi HG<sup>2</sup>.

##### *IMPORTANCE:*

Patients with migraine often experience various types of vertigo, and several studies have suggested an epidemiologic and physiologic association of migraine and vertigo with vestibule. However, few researchers have investigated the association between migraine and benign paroxysmal positional vertigo (BPPV).

##### *OBJECTIVE:*

To determine the incidence of BPPV in individuals with migraine in a large national population-based sample.

##### *DESIGN, SETTING, AND PARTICIPANTS:*

This cohort study obtained data from the Korean Health Insurance Review and Assessment Service covering the period January 1, 2002, through December 31, 2013. These data included personal information, health insurance claim codes, diagnostic codes, death records, socioeconomic data, and medical examination data for each individual in the database. A 1:4 matching method was used to select individuals for the migraine group (n = 40 682) and the control group (n = 162 728). Individuals who had a history of BPPV before the index date, for whom a match could not be identified, and who received a migraine diagnosis before age 20 years were excluded from the analysis. Data analysis was conducted from September 1, 2015, to December 31, 2017.

##### *MAIN OUTCOMES AND MEASURES:*

The crude and adjusted (by age, sex, income, region of residence, and medical history [hypertension, diabetes, or dyslipidemia]) hazard ratios for migraine and BPPV were analyzed using the Cox proportional hazards regression model.

##### *RESULTS:*

Of the 40 682 individuals in the migraine group, 10 381 (25.5%) were male and 30 301 (74.5%) were female. Of the 162 728 controls, 41 524 (25.5%) were male and 121 204 (74.5%) were female. The incidence of BPPV was statistically significantly higher in the migraine group than in the control group (2431 [6.0%] vs 3677 [2.3%]). Migraine increased the risk of BPPV (adjusted hazard ratio, 2.54; 95% CI, 2.41-2.68). In a subgroup analysis, the incidence of BPPV in all age groups and in both men and women was statistically significantly higher in the migraine group than in the control group. The incidence of BPPV was the highest in men younger than 40 years (adjusted hazard ratio, 4.49; 95% CI, 3.05-6.62), and the HR decreased in both men and women as age increased.

##### *CONCLUSIONS AND RELEVANCE:*

Migraine appeared to be statistically significantly associated with higher incidence of BPPV; future studies are needed to determine the association between BPPV and specific factors related to migraine.

### 30 A. HIP IMPINGEMENT

#### Arthroscopic surgery helps

#### Arthroscopic Surgery for Femoroacetabular Impingement in Skeletally Immature Athletes: Radiographic and Clinical Analysis

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DOI: <https://doi.org/10.1016/j.arthro.2019.01.029>

#### Purpose

To evaluate radiographic and clinical outcomes after arthroscopic femoroacetabular impingement (FAI) correction in symptomatic adolescent athletes with open physes.

#### Methods

We retrospectively reviewed radiographic and clinical outcomes in patients treated with a non-physes-sparing arthroscopic approach for symptomatic FAI with open physes and a minimum 1-year follow-up. Specific plain radiographic and computed tomography parameters were determined, and preoperative and postoperative outcomes were prospectively evaluated with modified Harris Hip Score (mHHS), 12-Item Veterans-Rand, and pain on a visual analog scale.

#### Results

Thirty-seven hips (28 patients; 75% male) with a mean age of 15.9 years (range, 12.8-18.3 years) had imaging studies consistent with open femoral neck and iliac crest physes. The ischial tuberosity and greater trochanteric physes were open in 95% and 54% of the hips, respectively. All patients participated in organized athletics, and 50% were in multiple sports year-round. Mean follow-up was 39.8 months post-arthroscopic FAI correction. There was a mean 27.7-point improvement in the mHHS ( $P < .001$ ), a 4.8-point decrease in the visual analog scale for pain ( $P < .001$ ), and a 15.2-point improvement in the 12-Item Veterans-Rand physical component ( $P < .001$ ). Ninety-three percent of patients returned to their preinjury level of sports participation without limitations. Thirty (81.1%) patients demonstrated improvements in mHHS greater than the minimally clinically important difference (of mHHS 8 points). Two patients could not reach minimally clinically important difference because of a preoperative mHHS of  $> 92$ . There were no postoperative physes growth arrests, growth disturbances, physes instability, or avascular necrosis.

#### Conclusions

A non-physes-sparing arthroscopic approach for FAI in adolescents with open physes is safe and effective with no evidence of clinically relevant complication of growth arrest-related deformity or physes instability in patients with a minimum of 1 year (mean, 39.8 months) of follow-up after surgery. Young, highly athletic adolescent patients with larger FAI deformities demonstrated greater outcomes improvement after arthroscopy. **Level of Evidence** Level IV, therapeutic case series.



### 33. MENISCUS

#### Non-opioid use

Orthopedics. 2018 Jul 1;41(4):209-214. doi: 10.3928/01477447-20180613-02. Epub 2018 Jun 18.

#### **Patient Satisfaction With Nonopioid Pain Management Following Knee Arthroscopic Partial Meniscectomy and/or Chondroplasty.**

Carrier CS, Garvey KD, Brook EM, Matzkin EG.

The purpose of this study was to determine the efficacy of nonopioid pain management following arthroscopic partial meniscectomy and/or chondroplasty and to assess patients' attitudes regarding their need for opioid pain medication following these procedures.

Patients who underwent a knee arthroscopy procedure for either partial meniscectomy and/or chondroplasty from July 2016 to January 2017 by a single surgeon at a single institution were included. Medical records were reviewed, and demographics were recorded. Two weeks postoperatively, patients self-reported opioid and nonopioid medication use. Patients were also questioned regarding their perceived need for opioid medication, whether they felt their pain was adequately controlled, and how their pain compared with their preoperative expectations. Thirty-four patients (17 male, 17 female), with a mean age at the time of surgery of 47.79 years (range, 19-68 years), were included. Eighty-two percent (n=28) of the patients reported using nonopioid analgesics for pain control, whereas 18% (n=6) reported using opioids. Of those not using opioids, 96.4% (n=27) reported not feeling the need for opioid medications. Three of 6 patients requiring opioids were unable to take nonsteroidal anti-inflammatory drugs. All 6 patients who took opioids felt that they needed them for adequate pain control.

This study provides initial encouragement that it is largely possible to remove opioids from the postoperative pain regimen of knee arthroscopy patients and maintain adequate pain control and patient satisfaction. [Orthopedics. 2018; 41(4):209-214.].

## 35. KNEE/TOTAL

Advanced age not a barrier to

### **Advanced age is not a barrier to Total Knee Arthroplasty: A detailed analysis of outcomes and complications in an elderly cohort compared to average age TKA patients**

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DOI: <https://doi.org/10.1016/j.arth.2019.05.007>

#### **Background**

Life expectancy and higher complication rates have made the routine use of total knee arthroplasty (TKA) in elderly patients disputed by some authors. The purpose of this study was to assess patient and implant survivorship, complication and revision rates, and patient reported outcomes (PROMS) in a cohort of patients aged over 80 undergoing TKA. A comparison with a propensity matched cohort of patients of average age within our database for TKA was performed.

#### **Methods**

A retrospective review of prospectively collected data identified 644 patients over the age of 80 undergoing a TKA within a 14-year period. After calculating the average age of all TKA patients within the reviewed database, a cohort deemed average age was created within 1 standard deviation of the average age and matched using the following criteria: gender, surgeon, diagnosis, procedure type and year. The primary outcomes were survivorship of the implant and the patient. The secondary outcomes were complications, transfusion rates, discharge destination and PROMS.

#### **Results**

The revision rate was low for both groups ( $p=0.051$ ). Implant survivorship at 10 years was similar ( $p=0.07$ ). Mortality rate was higher in the elderly ( $p<0.001$ ). General complication rate was higher in the elderly ( $p=0.031$ ). Surgical complications rates were similar ( $p=0.702$ ). The PROMS at final follow-up were 4% lower in the elderly ( $p<0.001$ ).

#### **Conclusion**

TKA in the elderly is a safe procedure. With measures minimizing the perioperative complications and blood loss, the outcome can be expected to be similar to patients of average age. The projected implant and patient survivorship in the elderly cohort is long enough to suggest that TKA in the elderly could have a high impact on remaining quality of life.

Level III retrospective study

## 37. OSTEOARTHRITIS/KNEE

### HA helps

#### **The effectiveness of high molecular weight hyaluronic acid for knee osteoarthritis in patients in the working age: a randomised controlled trial**

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*BMC Musculoskeletal Disorders* 2019 **20**:196

<https://doi.org/10.1186/s12891-019-2546-8>

#### Background

High molecular weight (HMW) hyaluronic acid (HA) is a treatment option for knee osteoarthritis (OA). The efficacy of HMW-HA in knee OA is investigated extensively, but the effectiveness in patients in the working age is unknown. Nevertheless, the number knee OA patients in the working age is increasing. Surgical treatment options are less eligible in these patients and productivity losses are high. In this study the effectiveness of intra-articular HMW-HA added to regular non-surgical usual care in everyday clinical practice (UC) compared to UC over 52 weeks in symptomatic knee OA patients in the working age was investigated.

#### Methods

In this open labelled randomized controlled trial, subjects aged between 18 and 65 years with symptomatic knee OA (Kellgren and Lawrence I-III) were enrolled and randomized to UC + 3 weekly injections with HMW-HA (intervention) or UC only (control). The primary outcome was the between group difference in responders to therapy according to OMERACT-OARSI criteria after 52 weeks. These criteria include the domains pain, knee related function and patient's global assessment (PGA). Function was evaluated with the KOOS questionnaire. Pain was assessed with the Numeric Rating Scale. Secondary outcome comprised the between group difference on the individual responder domains, as analysed with a random effects model. Odds Ratios (OR) were calculated by logistic regression analysis. Sensitivity analyses were performed.

#### Results

In total, 156 subjects were included (intervention group 77, control group 79). Subjects in the intervention group (HMW-HA + UC) were more often responder compared to the controls (UC). Depending on whether pain during rest or pain during activity was included in the responder domains, 57.1% versus 34.2% ( $p = 0.006$ ) and 54.5% versus 34.2% ( $p = 0.015$ ) was responder to therapy respectively. The results of the secondary outcome analyses show that scores on individual responder domains over all follow-up moments were statistically significant in favour of the intervention group in the domains pain during rest ( $\delta$  0.8, 95%CI 0.2; 1.4,  $p = 0.010$ ), knee related function ( $\delta$  - 6.8, 95%CI -11.9; - 1.7,  $p = 0.010$ ) and PGA ( $\delta$  - 0.7, 95%CI -0.9; - 0.4,  $p < 0.0001$ ).

#### Conclusions

Intra-articular HMW-HA added to usual care is effective for knee OA in patients in the working age.

## 58. RUNNING

### Shod vs barefoot running

Sport Sciences for Health

December 2018, Volume 14, Issue 3, pp 485–494 | **Sport Sciences for Health 2018**

#### **Effects of barefoot and shod running on lower extremity joint loading, a musculoskeletal simulation study**

- Jonathan Sinclair

#### **Purpose**

The aim of the current investigation was to utilize a musculoskeletal simulation-based approach, to examine the effects of barefoot and shod running on lower extremity joint loading during the stance phase.

#### **Methods**

Twelve male runners, ran over an embedded force plate at 4.0 m/s, in both barefoot and shod conditions. Kinematics of the lower extremities were collected using an eight-camera motion capture system. Lower extremity joint loading was also explored using a musculoskeletal simulation and mathematical modelling approach, and differences between footwear conditions were examined using paired samples *t* tests.

#### **Results**

Peak Achilles tendon force was significantly larger ( $P = 0.039$ ) when running barefoot (6.85 BW) compared to shod (6.07 BW). In addition, both medial ( $P = 0.013$ ) and lateral ( $P = 0.007$ ) tibiofemoral instantaneous load rates were significantly larger in the barefoot (medial 289.17 BW/s and lateral 179.59 BW/s) in relation to the shod (medial 167.57 BW/s and lateral 116.40 BW/s) condition. Finally, the barefoot condition (9.70 BW) was associated with a significantly larger ( $P = 0.037$ ) peak hip force compared to running shod (8.51 BW).

#### **Conclusions**

The current investigation indicates that running barefoot may place runners at increased risk from the biomechanical factors linked to the etiology of chronic lower extremity pathologies. However, future analyses using habitual barefoot runners, are required before more definitive affirmations regarding injury predisposition can be made.

**Foot strength and barefoot running**

Published: 27 February 2018

**Foot strength and stiffness are related to footwear use in a comparison of minimally- vs. conventionally-shod populations**

Nicholas B. Holowka, Ian J. Wallace & Daniel E. Lieberman

*Scientific Reports* volume 8, Article number: 3679 (2018) |

The longitudinal arch (LA) helps stiffen the foot during walking, but many people in developed countries suffer from flat foot, a condition characterized by reduced LA stiffness that can impair gait.

Studies have found this condition is rare in people who are habitually barefoot or wear minimal shoes compared to people who wear conventional modern shoes, but the basis for this difference remains unknown. Here we test the hypothesis that the use of shoes with features that restrict foot motion (e.g. arch supports, toe boxes) is associated with weaker foot muscles and reduced foot stiffness. We collected data from minimally-shod men from northwestern Mexico and men from urban/suburban areas in the United States who wear ‘conventional’ shoes. We measured dynamic LA stiffness during walking using kinematic and kinetic data, and the cross-sectional areas of three intrinsic foot muscles using ultrasound. Compared to conventionally-shod individuals, minimally-shod individuals had higher and stiffer LAs, and larger abductor hallucis and abductor digiti minimi muscles. Additionally, abductor hallucis size was positively associated with LA stiffness during walking.

Our results suggest that use of conventional modern shoes is associated with weaker intrinsic foot muscles that may predispose individuals to reduced foot stiffness and potentially flat foot.

## 61. FIBROMYALGIA

## Risk factors for TKR

Ann Transl Med. 2019 Feb; 7(4): 64. doi: 10.21037/atm.2018.12.60 PMID: 30963059

**A nationwide comparative analysis of medical complications in fibromyalgia patients following total knee arthroplasty**

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**Background** Fibromyalgia is a disease primarily characterized by chronic widespread pain and associated symptoms of fatigue, mild cognitive impairment, and sleep disturbance. The condition affects 1% to 6% of the general population in the United States and is more commonly diagnosed in women (2:1 ratio). There is evidence to suggest that fibromyalgia patients may be more at risk of postoperative complications. The rate of total knee arthroplasties (TKAs) performed worldwide is escalating and thus it is expected that the proportion of fibromyalgia patients under orthopaedic care will increase accordingly. However, the literature on TKA outcomes in this subpopulation is limited. We assessed whether fibromyalgia patients have a higher likelihood of developing medical complications compared to a matched cohort of non-fibromyalgia patients following TKA. Specifically, we assessed the likelihood of developing (I) any medical complication and (II) specific medical complications.

**Methods** Using the Medicare Standard Analytical Files of the PearlDiver supercomputer, patients who underwent a TKA between 2005 and 2014 were queried. Propensity score matching was used to match patients with and without fibromyalgia in a 1:1 ratio based on age, sex, and the Charlson Comorbidity Index (CCI). A total cohort of 305,510 patients (female =242,198; male =59,810; and unknown =3,502) with (n=152,755) and without fibromyalgia (n=152,755) was identified. Statistical analyses involved the calculation of odds ratios, 95% confidence intervals (95% CI), and P values (<0.05) were utilized to evaluate the occurrence of any and specific medical complications.

**Results** Compared to a matched cohort of non-fibromyalgia patients, fibromyalgia patients had increased odds of developing any medical complication following TKA [odds ratio (OR): 1.95, 95% CI: 1.86–2.04, P<0.001]. Furthermore, compared to a matched cohort, these patients had significantly greater odds of developing urinary tract infections (OR: 2.08, 95% CI: 1.89–2.29, P<0.001), acute post-hemorrhagic anemia (OR: 1.56, 95% CI: 1.41–1.73, P<0.001), thoracic or lumbosacral neuritis or radiculitis (OR: 5.85, 95% CI: 4.82–7.10, P<0.001), shortness of breath (OR: 3.02, 95% CI: 2.60–3.51, P<0.001), other diseases of lung not elsewhere classified (OR: 2.32, 95% CI: 1.77–3.03, P<0.001), other respiratory abnormalities (OR: 3.49, 95% CI: 2.87–4.24, P<0.001), transfusion of packed cells (OR: 1.69, 95% CI: 1.36–2.10, P<0.001), pneumonia (OR: 2.17, 95% CI: 1.71–2.76, P<0.001), acute kidney failure (OR: 1.27, 95% CI: 1.02–1.57, P<0.05), and neuralgia neuritis and radiculitis (OR: 5.29, 95% CI: 3.53–7.92, P<0.001).

**Conclusions** As the number of fibromyalgia patients under orthopaedic care is expected to rise, it is imperative that the TKA outcomes of these patients are tracked in order to provide optimal patient care. This study identified fibromyalgia as a risk factor for a number of medical complications following TKA. Orthopaedic surgeons must be aware of the potential for poor TKA outcomes among these patients and should provide them with appropriate medical care and pre-operative guidance.