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ASSOCIATION BETWEEN PARITY AND DYNAMIC FOOT FUNCTION IN THE MOST STUDY

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Purpose: Women are disproportionately afflicted by knee osteoarthritis (OA) and parity is associated with both incident knee replacement and radiographic OA. Increased body mass, an anteriorly displaced center of mass and hormonal changes during pregnancy alter musculoskeletal structure and may lead to lasting functional changes in the lower limbs. The feet, in particular, demonstrate flatter arches as a consequence of greater parity and could have increased pronation during gait. If such an alteration does occur during gait, it would likely affect alignment and load distribution at the knee, thus influencing a woman's risk of developing knee OA. To explore this possibility, this study aimed to determine the association between parity and foot pronation, as measured by the center of pressure excursion index (CPEI), during walking.
Methods: Data were acquired through the Multicenter Osteoarthritis Study (MOST), a longitudinal cohort study of adults aged 50-79 years with or at elevated risk for knee OA. At the 60-month visit, plantar pressure was assessed using an emed-X digital plantar pressure measuring device, to quantify the CPEI in each foot, averaged over 5 trials of walking at a self-selected pace. Smaller CPEI values indicate increased pronation (functionally flatter arches). Foot pronation (CPEI) was categorized into quartiles, and the odds of lower values (i.e. greater functional foot pronation) was modeled using generalized estimating equations (GEE) proportional odds models. Models were adjusted for age, BMI, and greater than one observation per participant. To confirm the results of these categorical analyses, we conducted sensitivity analyses, including only those participants who did not report foot or knee pain during walking for the CPEI examination. We also confirmed the findings, treating CPEI data as continuous.
Results: Of the 1820 female MOST participants, 1186 had data for parity and CPEI available (attended clinic visit and did not have difficulty walking or foot wounds). At the time of data collection, the mean±SD age was 67.7±7.5 years, BMI was 30.6±6.2 kg/m^2, 13% were non-White, and 42% of limbs had radiographic knee OA. Of included participants, 95% had been married, 13% had never had children and parity was 1-2 for 43%, 3-4 for 35% and ≥5 for 9%. While the odds of having greater foot pronation (lower CPEI) increased with increasing parity group, this did not reach statistical significance once adjusted for age and BMI (Tables 1 and 2). Similar results followed in sensitivity analyses.
Conclusions: After adjustment for age and BMI, there was not a statistically significant association detected between number of pregnancies carried and increased foot pronation during walking. The apparent association prior to adjustment may indicate that greater parity is associated with greater functional collapse (pronation) of the feet during walking and that this association is, in part, due to the effect of BMI. Additional study is necessary to assess the extent to which the elevated risk for knee OA in women may be related to compensations occurring at the feet following pregnancies.

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A SYSTEMATIC REVIEW AND META-ANALYSIS OF KNEE KINEMATICS AND MOMENTS AFTER ANTERIOR CRUCIATE LIGAMENT RECONSTRUCTION: IMPLICATIONS FOR POST-TRAUMATIC KNEE OSTEOARTHRITIS

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Purpose: Anterior cruciate ligament (ACL) injury can substantially increase the risk of osteoarthritis (OA), with an increasing number of young adults (<40years) exhibiting post-traumatic knee OA as a result of ACL injury. Unfortunately, surgical reconstruction (ACLR) does not improve prognosis. It has been hypothesised that the alterations in gait that are observed after ACLR may partially drive some of the degenerative changes that follow ACLR. However, the current literature reports much variability in gait characteristics after ACLR. Thus, it is important to synthesise evidence to identify potentially modifiable biomechanical features in ACLR, as this may assist in developing targeted interventions to prevent development and/or slow progression of post-traumatic knee OA. The purpose of this study was to conduct a systematic review and, where possible, meta-analysis of knee kinematics and net joint moments after ACLR.
Methods: In accordance with PRISMA guidelines, a comprehensive search strategy was used to search MEDLINE via OVID, EMBASE via OVID, CINAHL via EBSCO, Scopus, Web of Science, SPORTDiscus, and the full Cochrane Library, while reference lists of included papers and previous systematic reviews were hand searched. Studies were eligible for inclusion if they were cross-sectional, human-based observational studies comparing knee joint kinematics and moments of ACLR individuals, with either the uninjured contralateral knee or healthy controls as a comparator group. Included studies underwent methodological quality assessment by two independent reviewers, using a modified version of the Downs and Black scale. Data pooling was conducted with Review Manager software (v5), using a random effects model. Qualitative synthesis was performed where data pooling was not possible.

Table 1. Association Between Quartiles of CPEI and Parity

	Unadjusted Odds Ratio (95% CI)	Unadjusted p-value for linear trend	Adjusted Odds Ratio (95% CI)	Adjusted p-value for linear trend
Parity 1-2 vs. 0	1.04 (0.78, 1.37)	0.0077	1.00 (0.76, 1.33)	0.0750
Parity 3-4 vs. 0	1.29 (0.97, 1.72)		1.20 (0.90, 1.60)	
Parity ≥5 vs. 0	1.51 (1.03, 2.21)		1.32 (0.89, 1.95)	
Age	–	–	1.01 (1.00, 1.03)	0.0119
BMI	–	–	0.97 (0.96, 0.99)	0.0002

Table 2. Analyses of CPEI as a Continuous Measurement (with Mean CPEI for Each Parity Group)

	Unadjusted Mean CPEI (95% CI)	Unadjusted p-value for linear trend	Adjusted Mean CPEI (95% CI)	Adjusted p-value for linear trend
Parity 0	19.1 (18.2, 20.1)	0.0052	18.9 (18.0, 19.9)	0.0722
Parity 1-2	18.9 (18.4, 19.4)		18.8 (18.3, 19.3)	
Parity 3-4	18.1 (17.5, 18.6)		18.2 (17.6, 18.7)	
Parity ≥5	17.5 (16.4, 18.6)		17.9 (16.8, 19.0)	