GREAT BRITAIN'S OLYMPIANS WITH GENERALISED JOINT HYPERMOBILITY HAVE A HIGHER PREVALENCE OF KNEE OSTEOARTHRITIS

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Purpose: Individuals with generalized joint hypermobility (GJH) are reported, in the clinical setting, to be at greater risk of developing musculoskeletal related joint pain, joint dislocations and tendinopathies. It is hypothesized that impaired static and dynamic neuromuscular movement control in those with GJH is responsible for contributing to an increased risk of injury and subsequent knee osteoarthritis (OA). Yet, to date, it remains unproven if there is an association between GJH and knee OA. Whilst GJH is a known risk factor for injury in elite athletes, there is virtually no evidence to determine the long-term sequelae including the risk of developing knee OA in later life. This study aimed to determine in Great Britain's (GB) Olympians, aged 40-years and older, (1) the individual risk factors associated with the onset of knee OA, and (2) if GJH is a risk factor or protector for the onset of knee OA.

Methods: A cross-sectional study. A web-based and paper questionnaire was used to collect data on putative risk factors associated with the onset of OA. The presence of OA was defined by a self-reported clinician-diagnosis, whereby GB Olympians confirmed that a physician or a healthcare professional had previously diagnosed them with the condition. The most severe knee was selected as the index joint for data analysis. GJH was determined by a self-examination revised Beighton score of $\geq 4/9$. The modified Beighton score was recorded using an original, self-reported electronic joint hypermobility instrument that was validated and shown to be highly sensitive, specific, and comparable to expert clinical assessment. Relative risk (RR) was estimated using odds ratio (OR) and confounding factors were adjusted (aOR) using logistic regression. The Faculty of Medicine and Health Sciences Research Ethics Committee at the University of Nottingham approved the study.

Results: The response rate was 32%, with 605 returns achieved from GB Olympians (40-97 years), between the 22^{nd} of May 2014 and the 31^{st} January 2015. Questionnaires with missing data were excluded from the data analysis. The prevalence of knee OA was 14.2% (n = 85/597) and GJH 13.8% (n = 70/509). A Pearson's chi-square test indicated that GB Olympians with GJH during their twenties were more likely to develop knee OA $X^2(1) = 4.95$, p < .05 (OR, 2.05; 95% Cl, 1.08, 3.89). Logistic regression analysis using five predictors (age, body mass index, gender, previous knee injury and GJH) was able to correctly classify 87% of cases. The chi-square value for the Hosmer and Lemeshow Test indicated support for the fit of the multivariable regression model p > .05.

The strongest predictor of knee OA was a history of a previous significant knee injury [aOR, 4.95; 95% CI 2.68, 9.13]. The odds of GB Olympians reporting knee OA was significantly higher with a oneunit increase in body mass index (Kg/m2) [aOR, 1.07; 95% CI 1.01, 1.14], and a one-unit increase in age [aOR, 1.06; 95% CI 1.03, 1.08]. GB Olympians who reported early-life (20-29 years) GJH (Beighton \geq 4/9) were more likely to report knee OA [aOR, 2.32; 95% CI 1.11, 4.84]. Furthermore, female athletes with GJH were more vulnerable [OR, 2.53; 95% CI 1.06, 6.00] to knee OA than their male counterparts [OR 1.69; 95% CI 0.60, 4.80].

Conclusions: Implications for the prevention of knee OA include a reduction in body mass index and protection from knee injury. Future research should determine whether GJH is a risk factor associated with the onset of knee OA in the general population, particularly among females.