Hip Cartilage Defects in Elite Athletes: Association with Specific Sports and 'At-Risk' motions

Aaron Casp¹, Spencer McAuley Comfort², Karen K Briggs³, Marc J Philippon⁴

¹University of Alabama at Birmingham, ²Steadman Philippon Research Institute, ³Steadman Philippon Research Inst, ⁴Steadman Clinic

INTRODUCTION:

Chondral injuries, especially in high-level athletes, can have drastic functional detriments. Much of the prior work on osteochondral injury has studied the knee, however emphasis on the hip has emerged with advances in hip preservation techniques. While hip chondral defects have been shown to be associated with femoroacetabular impingement (FAI), a more in-depth understanding of the determining factors is needed due to the limited spontaneous repair capacity of cartilage. It is currently unclear if the type of sport or specific motions are related to the prevalence or severity of chondral defects seen in athletes.

The purpose of this study is to evaluate the prevalence of chondral defects across specific sports and present a novel classification to characterize the corresponding articular cartilage injury patterns in the hip, as found in elite and professional athletes.

METHODS: Elite athletes 18 years old, defined as those competing in college or professionally, who underwent arthroscopy for symptomatic FAI by a single surgeon between January 2005 and November 2018 were considered for inclusion. A review of records was performed of all the patients' operative information was reviewed from the patient records database, including operative reports, operative photos, and extensive operative details. Exclusion criteria consisted of prior ipsilateral hip surgery, presence of osteoarthritis (joint space < 2 mm), history of confounding injury or prior hip conditions. Patients were then classified by their sport using a novel classification system based on 'at-risk' hip motions (rotational, repetitive loading, extreme range-of-motion, contact, and high-speed). Prevalence, size, severity (Outerbridge grade), and location of chondral defects were compared. RESULTS:

The cohort consisted of a total of 431 hips (107 female, 324 male, mean age 26.8 ± 5.1) of elite athletes, representing 24 sports at various elite levels of play. Chondral defects (grade I-IV) were found in 408 (95%) of cases. Severe chondral defects (grade III/IV) were seen in 218 (51%) of cases and most commonly found in football, soccer, and baseball players. Microfracture was performed in 72 (17%) of total cases. There was significantly higher prevalence of acetabular (p=.046), femoral head (p=.038), and combined (p=.035) grade III/IV lesions in the rotational versus non-rotational group, as well as acetabular (p=<.001) and combined (p=.018) grade III/IV lesions in the contact sport group versus non-contact group. Non-high speed sports (p=0.029) had significantly higher percentages of femoral head grade III/IV lesions compared to non-high speed, and non-extreme ranges of motion sports (p=0.002) had higher rates of grade III/IV lesions compared to extreme range of motion sports.

DISCUSSION AND CONCLUSION:

In elite athletes, the prevalence of chondral defects was high when undergoing hip arthroscopy. The severity, size, and location varied based on type of motion and stress on the hip that was determined by the sport. The more severe (grade III/IV) defects were more common in the rotational and contact athletes according to the motion classification system. The nature of high speed and extreme range of motion sports may be somewhat protective or select-out for athletes with hip chondral defects. This classification system can be used to identify athletes at risk of chondral damage for close monitoring and injury prevention. This information can also be used to pre-operatively counsel these athletes on the likely findings and to set expectations. This can also inform the discussion as to timing of surgery for rehabilitative purposes and athletic career management. Further work is needed to determine how these specific chondral injuries translate to career longevity in within the motion classifications.







