



Correlation of Atraumatic Pain with Acetabular Chondromalacia in Athletes

¹David C Holst MD, ²Allston J Stubbs MD, ³Phillip R Mason MD, ⁴Adam Anx MD, ⁵Brad Perry MS, ⁶Elizabeth A Howse MD

ABSTRACT

This study investigates the relationship of atraumatic, prearthritic hip pain to the severity of acetabular chondromalacia (CSI) documented at the time of hip arthroscopy in a group of athletes. Our hypothesis is that hip pain duration is positively correlated with acetabular cartilage damage. Forty-six consecutive patients with atraumatic, prearthritic hip pain underwent hip arthroscopy. The severity of chondral damage was compared to duration of symptoms, age, and Wiberg's lateral center edge angle. For the cohort of male patients, the Pearson's correlation coefficient was $r = 0.43$ for age ($p = 0.049$), $r = 0.85$ for pain duration ($p < 0.001$), and $r = 0.13$ for Wiberg angle ($p = 0.573$). These findings in the athletic, male cohort supports a positive correlation between duration of hip pain symptoms and degree of acetabular chondromalacia.

Keywords: Hip arthroscopy, Chondromalacia, Athlete, Atraumatic pain.

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INTRODUCTION

Chondral damage of the hip joint is a source of hip pain in the athlete, and associated with other hip conditions, such as labral tears and subsequent degeneration of the articular surface.¹⁻³ Damage to the hip articular surface may be atraumatic and insidious in origin.⁴ As the treatment of degenerative hip joint disease in young, athletic patients is especially challenging, there is a need for earlier detection and intervention of cartilage disease of the hip.

The purpose of this study is to determine the correlation between the parameters of age, duration of hip pain, gender, and Wiberg's lateral center edge angle with the severity of arthroscopically documented acetabular chondromalacia in a select cohort of athletes with atraumatic symptoms. We hypothesized that increasing patient age, longer duration of pain symptoms, and a lower Wiberg angle would correlate with greater acetabular chondromalacia at the time of surgery.

MATERIALS AND METHODS

Forty-six consecutive subjects (total 48 hips) 18 to 40 years old, consisting of 20 males and 26 females, all recreational athletes, with a chief complaint of hip pain were identified in a retrospective chart review. Inclusion criteria included a Tonnis score of 0 or 1, no history of trauma to the hip joint, and hip arthroscopy by the senior author. A chart review was conducted and data including age, duration of symptoms, and Wiberg's lateral center edge angle was recorded. Wiberg angle was measured by the senior surgeon on a supine AP pelvis radiograph. Additionally, intraoperative data consisting of acetabular chondromalacia grade (Outerbridge grade I-IV) and lesion surface area, measured in mm^2 , were reviewed. The severity of acetabular chondromalacia [chondromalacia severity index, (CSI)] was determined as a product of the surface area of the acetabular lesion and the outerbridge grade of chondromalacia. Statistical analysis was performed with Pearson's correlation coefficient testing (MS Excel, Microsoft, Inc, Redmond, WA, USA). A p-value of < 0.05 was considered statistically significant.

RESULTS

The male cohort had a mean age of 26.8 years (18-39 years), pain duration of 32.5 months (2-156 months), Wiberg angle of 30.5 (22-41), and a CSI of 453.4 (40-2040). The female cohort had a mean age of 26.5 years (19-40), pain duration of 19.1 months (2-63 months), Wiberg angle of 28.8 (19-40), and a CSI of 180.1 (40-930). The Pearson's correlation coefficient for the male cohort was $r = 0.43$ for age ($p = 0.049$), $r = 0.85$ for pain duration ($p < 0.001$) and $r = 0.13$ for Wiberg angle ($p = 0.573$). The Pearson's correlation coefficient for the female cohort was $r = 0.34$ for age ($p = 0.083$), $r = 0.02$ for pain duration ($p = 0.941$), and $r = 0.10$ for Wiberg angle ($p = 0.619$). Graph 1 displays the results

^{1,6}Resident Physician, ^{2,4}Attending Physician, ³Fellow Physician
⁵Medical Student

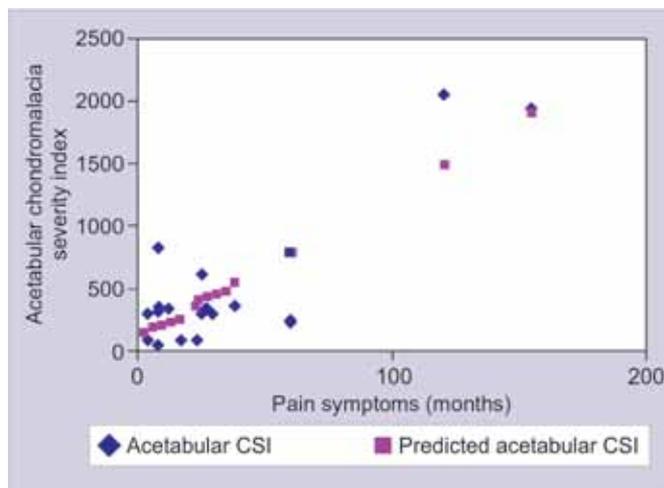
^{1,2,5}Department of Orthopaedics, Wake Forest University School of Medicine, NC, USA

³Department of Orthopaedics, Vanderbilt University School of Medicine, TN, USA

⁴Department of Orthopaedic Surgery, Andrews Institute, FL, USA

⁶Department of Emergency Medicine, Long Island Jewish Medical Center, NY, USA

Corresponding Author: David C Holst, Resident Physician
Department of Orthopaedics, Wake Forest University School of Medicine, NC, USA, e-mail: david.holst@gmail.com



Graph 1: Acetabular chondromalacia severity index vs hip pain symptoms duration in male athletes

of the correlation between duration of hip pain with CSI of acetabular chondromalacia for the male cohort.

DISCUSSION

Chondral lesions of the hip joint are a common pathology of the young athlete, but they present diagnostic and treatment challenges. There are a number of ways chondral damage develops in the hip. While chondral damage can be the result of lateral impact or other injury, many occur without any history of prior trauma.⁴ Chondral lesions are associated with a number of simultaneous hip pathologies, including labral tears and FAI.^{5,6} One study postulated that some significant chondral lesions owe their etiology to cam-type femoroacetabular impingement (FAI).⁷ Interestingly, cam-type FAI is more common in the young, athletic male population, and has more associated chondral damage than pincer-type FAI.⁵ When chondral damage is present, the patient is more likely to undergo a process of degeneration of the hip joint. In addition, damaged cartilage is notorious for healing poorly on its own, and is therefore better treated earlier in its course to avoid development into more serious pathology.⁸

There is evidence connecting prearthritic lesions of the hip joint with future joint degeneration, and the development of significant arthritis.^{1,3,9} There is also a growing body of literature demonstrating the utility of hip arthroscopy in treating the young athletic population prior to their development of serious arthritis of the hip.^{4,10-12} Byrd et al showed that, in general, hip arthroscopy outcomes are more favorable in younger patients and in those patients with shorter duration of symptoms.¹¹ In this same study, he found that there was substantial improvement from early hip arthroscopic intervention in the patient with chondral damage. Phillippon et al reported that patients with full thickness

chondral lesions showed significant improvement an average of 20 months following hip arthroscopy.¹³

In young athletic patients who go on to develop premature arthritis, outcomes with traditional interventions are poorer. This portends more aggressive interventions, such as total hip arthroplasty procedures, which present difficulties for the young, active patient.¹⁰ At least one study documented that the extent of damage to the articular surface seen at the time hip arthroscopy was inversely correlated with the success of surgical intervention.³

There are several limitations of this study. First, the study population was limited in number, and only represents one surgeon's patient population and surgical observations of chondromalacia. Moreover, the chondromalacia severity index used to quantify the severity of the chondral lesions is novel and necessitates further validation. Finally, the dataset is based on a single surgical practice with duration of hip symptoms being skewed to early rather than late diagnosis.

CONCLUSION

This study supports the hypothesis that in the male athlete with atraumatic hip pain, both age and duration of symptoms are positively correlated with severity of acetabular chondromalacia found at the time of hip arthroscopy. Further, in the female cohort, the severity of acetabular chondromalacia seems unrelated to both the duration of symptoms and the Wiberg angle. While not statistically significant, there was a trend toward a positive correlation between age and degree of chondromalacia noted at time of hip arthroscopy in the female athlete cohort. This manuscript supports a greater clinical awareness and early identification of hip pain of the male athlete to limit acetabular chondromalacia overtime.

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