

# Osteoarthritis and Cartilage

## Brief Report

### Increased risk for radiographic osteoarthritis features in young active athletes: a cross-sectional matched case–control study



F.W. Roemer † ‡ § \*, M. Jarraya ‡, J. Niu ||, J.-R. Silva ‡, R. Frobell ¶, A. Guermazi † ‡

† Aspetar, Qatar Orthopaedic and Sports Medicine Hospital, Doha, Qatar

‡ Quantitative Imaging Center (QIC), Department of Radiology, Boston University School of Medicine, Boston, MA, USA

§ Department of Radiology, University of Erlangen–Nuremberg, Erlangen, Germany

|| Clinical Epidemiology and Training Unit, Department of Medicine, Boston University School of Medicine, Boston, MA, USA

¶ Department of Orthopaedics, Clinical Sciences Lund, Lund University, Lund, Sweden

#### ARTICLE INFO

##### Article history:

Received 25 May 2014

Accepted 7 November 2014

##### Keywords:

Athletes  
Sports  
Football  
Osteoarthritis  
Radiography  
Risk factors

#### SUMMARY

**Objective:** Prevalence data on radiographic osteoarthritis (ROA) in young active athletes is sparse. Aim was to assess in a matched case–control design the frequency of ROA in an athlete population and whether athlete status, gender, previous anterior cruciate ligament (ACL) surgery and age increase the odds for ROA.

**Design:** 135 consecutive athletes (82% soccer players) 18–36 years old and 550 non-athletes aged-matched controls had knee radiography (Lyon-Schuss protocol) for assessment of subacute or chronic knee complaints. Patients with acute trauma or fractures were excluded. Radiographs were graded according to the Kellgren–Lawrence and OARSI grading schemes. In addition, medial and lateral intercondylar notch osteophytes were scored. We used logistic regression model to assess the association of ROA and specific radiographic OA features with athlete status, prior ACL surgery, gender and age, adjusting for each other.

**Results:** 19.4% of patients were 18–22 years old, 26.4% were 23–27, 22.6% were 28–32, and 31.5% were 33–36 years old. 18.7% were female and 8.8% had previous ACL surgery. 8.5% had ROA and 6.0% had evidence of JSN. The adjusted odds ratios (aOR) for ROA were 2.8 (95% confidence interval 1.4, 5.5) for athletes, 7.0 (3.5, 13.9) for previous ACL surgery and 3.3 (1.2, 9.0) for age range 32–36. Athlete status significantly increased odds for tibiofemoral osteophytes [aOR 2.9 (1.6, 5.4)] and comparably for notch osteophytes [aOR 2.3 (1.1, 4.7)].

**Conclusions:** Athlete status, higher age and previous ACL surgery increase the risk of ROA with surgery being the strongest risk factor.

© 2014 Osteoarthritis Research Society International. Published by Elsevier Ltd. All rights reserved.

#### Introduction

Sports injury to the knee joint may lead to accelerated joint degeneration and has been observed especially as a long term sequelae of anterior cruciate ligament (ACL) tears<sup>1</sup>. The prevalence of knee osteoarthritis (OA) among former soccer players has been reported as 19–29%, long distance runners 14–20% and weight lifters 31%<sup>2–7</sup>. In a cohort of female soccer players that had suffered an ACL tear 12 years earlier, 82% had radiographic changes and 51%

fulfilled the criterion of knee radiographic OA (ROA)<sup>1</sup>. A recent publication on the 5-year outcome of a randomized trial on ACL treatment reported ROA in 12% (tibiofemoral) and 19% (patellofemoral) of participants without differences between the treatment groups<sup>8</sup>. Data on osteophyte presence and pre-ROA features prevalence in the general population are available for the elderly population and especially based on magnetic resonance imaging (MRI) datasets but has not been reported for a young at-risk group such as soccer players<sup>9,10</sup>. Given exposure to high loads to the knee joint and to minor repetitive trauma, increased subchondral and peripheral bone remodeling should be expected. These changes may be physiologic adaptations to stress or may represent signs of early OA. Recently early peripheral bone changes including osteophytes have been identified as a predictor of ROA incidence<sup>11</sup>.

\* Address correspondence and reprint requests to: F.W. Roemer, Department of Radiology, Aspetar, Qatar Orthopaedic and Sports Medicine Hospital, Doha, Qatar, Sports City Rd, Doha, Qatar.

E-mail address: frank.roemer@aspetar.com (F.W. Roemer).

Thus, we wished to compare frequencies of OA features on the weight-bearing radiograph in active athletes between 18 and 36 years of age and compare these findings with a reference group of non-athletes that were also 18–36 years of age. Further, we wished to evaluate whether athlete status, gender, previous ACL surgery and age increase the odds for ROA.

## Material and methods

### Study design and inclusion

The local institutional review board approved the study design and granted exempt status (Anti Doping Lab Qatar, IRB number EX2014000008). Written patient consent was waived for this retrospective analysis.

The study was based on a search within the hospital PACS system for knee radiography during a 2-year period between January 2011 and December 2012. Based on the referral forms we included consecutive patients between 18 and 36 years of age who presented to an outpatient clinic of a secondary referral center for sports medicine. Patients complained of chronic or subacute pain, but must not have suffered acute knee trauma within the last 4 weeks, as verified by the patients' clinical records. Patients with remote trauma and previous surgery were not excluded. Patients were either walk-ins to the mentioned sports medicine outpatient clinic, referred by a primary care physician or by an orthopaedic surgeon, or were registered athletes under the National Sports Medicine Program (NSMP) of the State of Qatar. The NSMP is a centralized institution that oversees medical diagnosis and treatment of athletes registered in sports clubs in Qatar with the large majority of these being soccer players. All persons who are registered with a sports club in Qatar are under the medical supervision of the NSMP, which was the basis for the definition of an athlete. However, other patients who are not members of a registered sports club but actively pursue sporting activities nonetheless may present to the sports medicine outpatient clinic. All imaging under the NSMP is performed at that single secondary referral center.

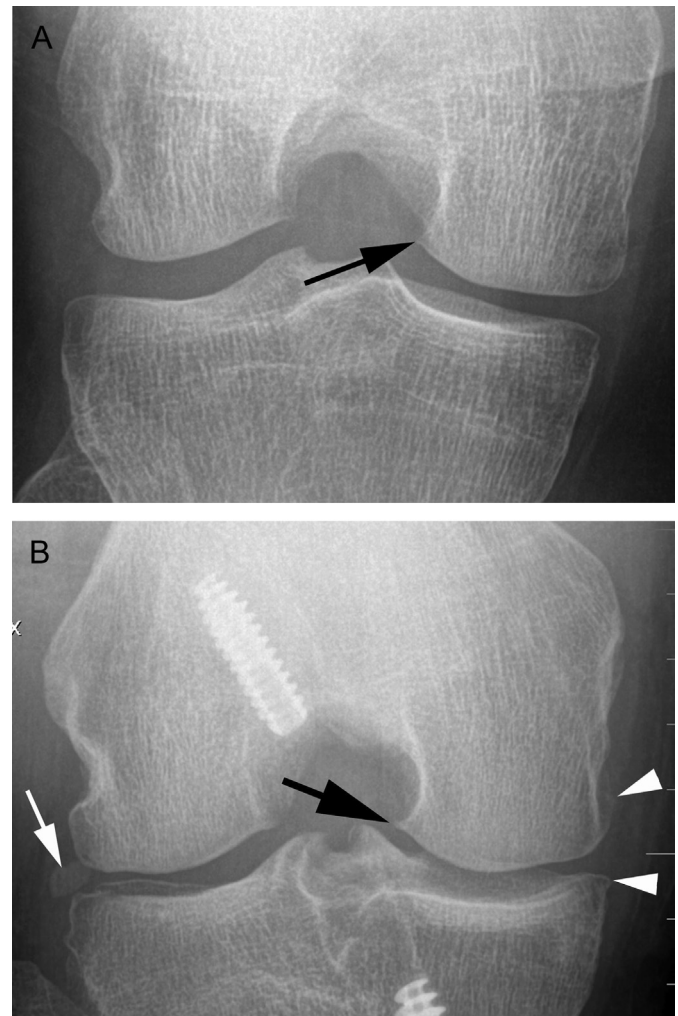
### Radiography

A posteroanterior (PA) view of the knee was acquired with the Lyon-Schuss fluoroscopy protocol. The knees are flexed to 20°–30° so that the patellae are in contact with the cassette. The patient leans forward to bring the thighs and hips against the table. The radiographic beam is angled caudally to a degree of inclination such that the medial tibial plateau is aligned with the radiographic beam and appears horizontal<sup>12</sup>. Images were acquired with a standard clinical fluoroscopy system and a film–focus distance of 180 cm.

### Radiographic assessment

One musculoskeletal radiologist with 4 years (JRS) of experience reading study radiographs, blinded to clinical data, independently graded all PA radiographs according to the Kellgren and Lawrence (K–L) scale from 0 to 4 and scored individual radiographic features including osteophyte size and joint space narrowing according to the OARSI atlas from 0 to 3. Intercondylar notch osteophytes are not part of the OARSI grading scheme and were scored in addition from 0 to 2 after previous definition through consensus reading (Fig. 1). Further, previous ACL surgery as visualized by tibial and femoral tunnels on the X-ray was defined as present or absent.

100 knees were randomly selected and re-read by the same observer after an interval of 4 weeks for intra-observer reliability. The images were also read by a second radiologist (FWR) with 14 years of experience in assessment of study radiographs for



**Fig. 1.** Grading of notch osteophytes. (A) 25-year-old soccer player. Arrow points to a small medial notch osseous protuberance representing a grade 1 notch osteophyte. (B) In a different, 33-year-old patient a moderate bony outgrowth at the medial notch representing a grade 2 notch osteophyte is visualized (black arrow). Note status post ACL surgery. *In situ* screws are visualized at the tibial and femoral tunnels. In addition, there is evidence of medial tibio-femoral OA with presence of medial tibial and femoral marginal osteophytes (arrowheads). A loose osseous body is seen at the lateral joint space (white arrow).

determining inter-observer reliability. Prior to the readings, a calibration session of 4 h was held using a different set of randomly selected 100 radiographs.

### Analytic approach

Patients were stratified into athletes and non-athletes (according to status of registration with the NSMP), and additional stratification was performed according to gender, ACL surgery status, and age. Descriptive statistics were applied to define frequencies of OA features for the different subgroups.

The association of a specific radiographic OA feature, i.e., maximum osteophyte size (grades  $\geq 1$ ) at any of the four marginal tibio-femoral locations, maximum osteophyte size at the medial and lateral notch (grades  $\geq 1$ ), maximum grade of joint space narrowing (grades  $\geq 1$ ) and ROA (i.e., KL grade  $\geq 2$ ) with athlete status, prior ACL surgery, gender and age was assessed using logistic regression models adjusting for each other. The respective reference groups were non-athletes, male gender, absence of previous

Download English Version:

<https://daneshyari.com/en/article/3379191>

Download Persian Version:

<https://daneshyari.com/article/3379191>

[Daneshyari.com](https://daneshyari.com)