

International Society of Arthroscopy, Knee Surgery and Orthopaedic Sports Medicine

10th Biennial ISAKOS Congress • June 7-11, 2015 • Lyon, France

Paper #182

Radiographic Femoral Condyle Width Correlates to ACL Insertion Site Size

Antonia F. Chen, MD, MBA, USA Christopher D. Murawski, BS, USA Freddie H. Fu, MD, USA

University of Pittsburgh Pittsburgh, PA, USA

Summary:

A simple radiographic measurement of femoral condyle width can predict tibial and femoral insertion site sizes for ACL reconstruction.

Abstract:

INTRODUCTION

Femoral condyle size measurements have been debated in the orthopaedic literature. Femoral condyle volume can be measured by three-dimensional (3D) computed tomography (CT), but the points of acquisition are controversial. Additionally, access to 3D CT scans is limited, but radiographs of the knee are more easily performed and have the widest clinical application. The purpose of this study was to determine whether radiographic femoral condyle width correlated to intra-operative ACL insertion site sizes, thereby facilitating this simple measurement as one potential pre-operative planning tool in individualized ACL reconstruction.

METHODS & MATERIALS

A retrospective study was conducted on 73 consecutive patients undergoing ACL reconstruction under the care of a single surgeon. There were 39 males and 34 females, and the average age was 25.2 years ± 10.2. Surgery was performed on 40 right and 33 left knees.

Radiographic data was collected from AP radiographs of the operative knee. A line was drawn through the anatomic axis of the femur and a perpendicular line was drawn through the condyles. The condyle width was measured as the maximum width across both the medial and lateral femoral condyles utilizing this perpendicular line. The ACL insertion site lengths (in the AP direction) of both the tibia and the femur were measured intra-operatively using a commercially available arthroscopic ruler.

Statistical analysis was performed correlating continuous variables with Pearson's correlation tests, and continuous variables were compared with Student's t-tests. Statistical significance was defined as a p-value < 0.05.

RESULTS

The average condyle width was significantly smaller (p<0.0001) for females (83.5 mm \pm 6.1) compared to males (93.5 mm \pm 7.5). Moreover, the average tibial insertion site size was significantly smaller (p=0.03) for females (16.6 mm \pm 2.2) compared to males (17.6 mm \pm 1.7); the same was true for average femoral insertion site size (p=0.005) of females (15.1 mm \pm 2.7) compared to males (16.7 mm \pm 1.9).

Femoral condyle width of the overall population correlated to both tibial (p=0.001) and femoral (p=0.016) insertion site size intra-operatively. Regression analysis predicted tibial and femoral insertion site sizes based on femoral condyle width measurements, with a femoral condyle width of 70-80mm corresponding to a tibial insertion site of 15-16mm and a femoral insertion site of 14-15mm. This increased in a consistent, stepwise manner such that each 10 mm increase in femoral condyle width of 11-120mm corresponding to a tibial insertion site of 19-20mm



International Society of Arthroscopy, Knee Surgery and Orthopaedic Sports Medicine

10th Biennial ISAKOS Congress • June 7-11, 2015 • Lyon, France

Paper #182

and a femoral insertion site of 18-19mm.

DISCUSSION

The results of this study demonstrate that a simple radiographic measurement of femoral condyle width can predict tibial and femoral insertion site sizes. As such, this represents one potential pre-operative planning tool that surgeons can use to make a decision with regards to single- versus double-bundle reconstruction, graft type and graft size in male and female patients. Further work should be done to determine similar predictive factors for notch width and height, among other intraoperative variables.