SEGOND FRACTURE: A RISK FACTOR FOR ANTERIOR CRUCIATE
LIGAMENT RECONSTRUCTION FAILURE?

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BACKGROUND
Segment fractures may be identified when an anterior cruciate ligament (ACL) tear is diagnosed and likely represent an avulsion of the anterolateral ligament. It is currently unclear whether these fractures can be ignored at the time of ACL reconstruction or if they should be addressed surgically. The purpose of this study was to compare the incidence of Segond fractures in patients undergoing a primary ACL reconstruction compared to those undergoing a revision ACL reconstruction in an attempt to determine if the presence of a Segond fracture predisposes to ACL reconstruction failure.

METHODS
A retrospective review of all patients undergoing a primary or revision ACL reconstruction between January 2007 and June 2014 was performed. Demographic data (age, gender, and BMI), injury variables (accident, mechanism of injury), and radiographic features (concomitant ligamentous injuries, growth plate status) were documented. Each Segond fracture was analyzed for its specific location, size, displacement, and healing using both radiographic images and MRI. Statistical analysis was performed using a p value of <0.05.

RESULTS
The incidence of Segond fractures was 6%. The fracture fragment averaged 6.6 mm in height, 2.3 mm in width, and was displaced 5.0 mm. The fracture fragment bed was localized at the tibial attachment site of the anterolateral ligament 21 mm posterior to Gerdy’s tubercle in nearly all cases. Post-ACL reconstruction, the Segond fracture healed in 90% of cases. The incidence of a Segond fracture was twice as common in male patients (p=0.02), otherwise its presence was not associated with any other demographic data, injury variables, or radiographic features (p>0.05) (Table 1). No patients undergoing a revision surgery had a Segond fracture and no patient with a Segond fracture had a graft failure.

CONCLUSION
Segond fractures are relatively uncommon in adolescent patients undergoing ACL surgery (6%). This injury occurs from an avulsion of the lateral joint capsule or the anterolateral ligament (ALL). Patients with a Segond fracture are at no higher risk to require a revision ACL reconstruction compared to patients without a Segond fracture. This may be attributable to its high union rate. At the time of primary ACL reconstruction, if a Segond fracture is identified, it can be ignored (not repaired or reconstructed) and this approach does not appear to predispose to ACL graft failure.

Table 1: 155 patients underwent a primary ACL reconstruction and 47 patients underwent a revision ACL reconstruction during the study period. The presence of a Segond fracture was more common in males. No cases of a Segond fracture were identified in the revision group.

Table 2: 31 Segond fractures were identified and nearly all of these fractures were in the typical location involving the anterolateral proximal tibia.

1A and 1B: MRI images depicting a Segond fracture in the anterolateral location of the ALL 18 mm posterior to Gerdy’s tubercle and 8 mm below the joint surface. MRI evaluations showed that 70% of acute knee injuries had bone oﬀsets within the anterolateral quadrant of the proximal tibia that differed from the typical post-erolateral oﬀsets seen with an isolated ACL tear.

2A and 2B: Post-operative radiographs were available in 81% of cases and union union was documented in 90% of patients with a Segond Fracture.