

Dear Editor,

We read the article entitled “Segond Fractures Are Not a Risk Factor for Anterior Cruciate Ligament Reconstruction Failure” by Gaunder, et al. with great interest and congratulate the authors on their work.⁴ Although the sequelae of Segond fractures in the anterior cruciate ligament (ACL) injured knee have not yet been fully elucidated this is an important topic for study because of the biomechanical consequences of this injury. Monaco, et al. demonstrated in a cadaveric navigation study that the presence of Segond fracture (SF) was associated with significantly greater anterior tibial translation and axial tibial rotation during the pivot shift test in ACL injured knees.⁸ These findings support the study hypothesis reported in the current study, “that patients undergoing revision ACL reconstruction would have a higher incidence of Segond fractures compared with those undergoing primary reconstruction.”

The authors demonstrated that osseous union occurs in the majority of SF's that can be identified on plain radiographs. This is a valuable finding. However, it is important to note that they only used plain radiographs and magnetic resonance imaging (MRI) to detect SF's, which they reported with an incidence of 5.6%.⁴ Although this rate is in keeping with other studies^{3,5}, it appears that a large proportion of SF's will not have been identified using these modalities. Klos, et al. reported a much higher rate of detection (30%) when using ultrasound (US).⁶ Cavaignac, et al. compared the rate of detection of SF using plain radiographs (3.3%), MRI (13%) and US (50%). They also demonstrated that almost 80% of patients with an US proven anterolateral ligament (ALL) injury had a SF, and importantly that an ALL that appeared injured on US was more often associated with a high grade pivot shift than was an uninjured ALL (75% vs 39%, χ^2 13.7, $P=0.03$).¹

Gaunder, et al. concluded that “patients with SF are at no greater risk to require revision ACLR than those without SF”⁴ but it should be highlighted that the study methodology does not lend credence to such a bold statement. This is due to the probability that the authors did not identify a large proportion of SF's, nor did they include any analysis of known risk factors for ACL graft rupture (e.g. level of sporting activity¹⁴, tunnel malposition¹¹, meniscal injury¹¹) or reliably identify the patients who underwent revision ACLR. The procedures were performed at a children's hospital and the authors reported that they may have gone to an adult hospital or another institution for re-operation.⁴ Although the authors reported that they had identified 47/552 (11.7%) revision ACL reconstructions, it is difficult to assess the meaningfulness of this number because adequate data regarding follow-up were not reported. It is clear that the rate of graft failure is time dependent¹² and more extensive follow-up data is required for the reader to draw appropriate conclusions. It is essential to report at least the minimum length of follow up and differences between the groups.

It would perhaps have been more appropriate to use a Kaplan-Meier analysis for evaluating this outcome. This would have allowed for analysis of graft survivorship in patients with differing lengths of follow up and would also help to address the limitations related to the fact that it is unknown how many revisions were undertaken in other centers. Therefore, the conclusion that “a SF can be ignored, if identified because it does not predispose to graft failure” should be interpreted carefully.⁴ In addition, although re-rupture rate is an important indicator for successful ACL surgery, there are many others. Variables such as the pivot shift grade, return to sport, success of meniscal preservation, re-operation rates and typical outcomes scores are very important gauges of successful ACL surgery. The authors do not include these factors in their analysis. In contrast, Ferretti et al. that showed good clinical

outcomes, restoration of rotational stability and no major complications after Segond fracture repair.²

Although we agree that there is insufficient published evidence to advocate routine fixation of SF, we would like to highlight a previous clinical report that repair of an ALL/capsular injury can abolish the pivot shift prior to ACL reconstruction.⁹ This supports the findings from the imaging and biomechanical studies, that a SF, to which the anterolateral ligament is demonstrated to attach, has a role in anterolateral instability.^{1,8}

The recommendation from Gaunder, et al. to advise against ALL reconstruction at the time of primary ACL reconstruction, on the basis of the results of this study⁴ is inappropriate given that this was not evaluated. With the absence of both the follow-up information for the two groups and the documentation of other variables that are considered crucial for successful ACL surgery, it is impossible to make such a statement. In contrast, in a comparative series of 502 patients with a minimum follow up of 38.4 months (range 24-54 months) it was demonstrated that the risk of graft failure with combined ACL and ALL grafts was 2.5 times less than with isolated bone-patellar tendon-bone grafts (hazard ratio [HR], 0.393; 95% CI, 0.153-0.953) and 3.1 times less than with isolated hamstring tendon grafts (HR, 0.327; 95% CI, 0.130-0.758) in a high risk population (young patients participating in pivoting sports) in multivariate analysis accounting for important risk factors of graft rupture.¹³

In closing, we would again like to congratulate Gaunder, et al. on their interesting study with the main finding that most SF's identified on plain radiographs appear to unite⁴. Of course, it is important to consider that bony union does not necessarily equate to normal subsequent function of its soft tissue attachments. It is possible that injury to the anterolateral ligament may occur during the process of SF¹, and this may result in its persistent laxity, similar to the consequences of interstitial injuries to the ACL that occur at the time of tibial spine avulsion fractures^{7,10}. Additional study is required to evaluate these concepts further and the current study has no doubt helped us to better understand the role of the SF in the ACL-injured knee.

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