DO PRE-OPERATIVE KNEE DYNAMIC LAXITY VALUES INFLUENCE POST-OPERATIVE ONES AFTER ANTERIOR CRUCIATE LIGAMENT RECONSTRUCTION?

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Introduction

Controversy exists regarding the importance of pre-reconstruction knee laxity - and above all the dynamic laxity - as potential risk factor for the ACL reconstruction outcome failure [Kim, 2010].

Methods

The study retrospectively analyzes the dynamic laxity data during Pivot-Shift (PS) test of 57 patients who undergoing ACL reconstruction. For the kinematics acquisition we used a navigation system (Orthokey LLC, USA), we analyzed the maximal anterior displacement of the lateral tibial compartment (Ant_D) and the area included by the translation during PS phenomenon with respect to flexion/extension angle (A) [Lopomo, 2010], and additionally the posterior acceleration reached by the lateral compartment during tibial reduction (Acc_P). According to Bonanzinga et al. [ESSKA Congress. 2012] for each laxity parameters we calculated the least-squares (LS) estimators of the line slope obtained from a simple linear regression analysis between pre-reconstruction laxity values and post-reconstruction ones. The slope lets us establish if a high preoperative value implies a high laxity level even postoperatively. Moreover, we supposed the global level of laxity defined in a 3-dimensional space with. Indeed, we identified the knee joint global level of laxity as the 3-dimensional vector Lax = [Ant_D, A, Acc_P], where each laxity parameter represents a spatial coordinates. The effect of the ACL reconstruction is defined as the distance between the pre- and post-reconstruction points and the global laxity reduction results to be the difference between $|Lax^{PRE}|$ and $|Lax^{POST}|$. Wilcoxon signed-rank test (with significance set at 0.05) was performed for each laxity parameters to identify a significant improvement of laxity following ACL reconstruction.

Results

Comparison between pre- and post-surgery condition shown significant differences ($P<0.0001$) at any considered laxity parameters. Concerning the laxity parameters *A* and *Acc_P* we found a low influence of the initial laxity on the post-reconstruction dynamic laxity outcome. This is proved by the slope values (confidence interval) of 0.1 (0.4) and 0.2 (0.2), respectively. Regarding the anterior tibial displacement (Ant_D) we found a greater influence of the initial dynamic laxity on the surgery outcome (figure 1). The slope value was 0.6 (0.2). Considering the preoperative knee joint global laxity level and the corresponding reduction, with a slope of 0.8 (0.2) we found that, the surgery success reducing the global dynamic laxity is not related to the initial laxity.

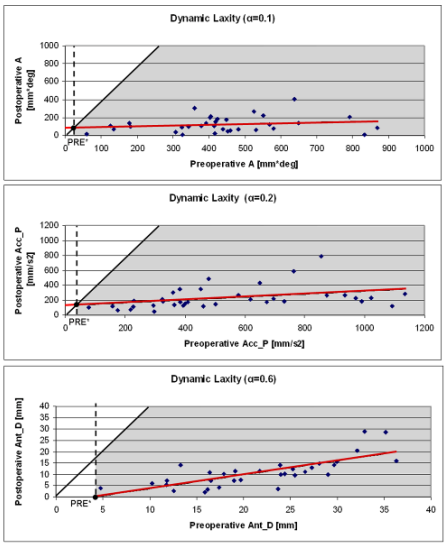

Figure 1. Dynamic Laxity Parameter: A, Acc_P and Ant_D. On the x-axis we report the preoperative laxity value, on the y-axis the postoperative one.

Discussion

The most important finding of the present study is that patients presenting higher pre-reconstruction dynamic laxity do not maintained such values even after the surgery. These findings imply that the ACL reconstruction proved to be effective in controlling the dynamic knee joint laxity.

References

Bonanzinga *et al.* 15th ESSKA Congress. 2012.
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