

Single-Bundle vs. Double-Bundle ACL Reconstruction: A Comparative 2 Year Follow-Up In Terms of Rotational Stability

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Summary:

In a prospective study after two years, the double bundle reconstruction of the ACL showed a significant better external rotation stability than the single bundle reconstruction.

Abstract:

INTRODUCTION

To date a lively debate is held about which surgical procedure should be preferred in ACL reconstruction: single-bundle (sb) or double-bundle (db) technique. Previous studies mainly compare clinical outcomes and measurements of a.p. translation without considering rotational stability. The aim of the presented study is a comparison between both surgical techniques in order to determine possible differences in rotational stability.

METHODS

In a prospective randomized study, 64 patients were divided into two equal groups. Anatomic ACL reconstruction took place by the same surgeon in all cases using hamstring tendons (sb: four-strand, db: double-strand per bundle). A follow-up examination 2 years after surgery comprised IKDC 2000, Lysholm and Tegner Score, Laxitester measurement of a.p. translation with regard to rotational stability and X-ray evaluation of osteoarthritic changes and tunnel widening. The t-test for independent and paired samples and the Pearson chi-square test were used for statistical analysis (p -value < 0.05).

RESULTS

61 patients were examined at a mean of 25.9 month (23.3-32.7) after surgery. The IKDC Subjective and Objective as well as Tegner and Lysholm Score showed no significant (n.s.) differences comparing both groups. The Laxitester measurements showed n.s. difference with regard to a.p. translation in all three rotation positions. However, there was a significant improvement in rotational stability in external rotation in the db group ($p = 0.02$). No differences were seen between the groups regarding osteoarthritic changes and tunnel widening.

DISCUSSION

In a Cochrane review (Tiamklang 2012) no sufficient evidence could be revealed in favor of db or sb ACL reconstruction in adults, although some limited evidence showed the db technique to have some superior results in objective measurements of knee stability and protection against ACL rerupture or a new meniscal injury. A meta-analysis (Xu 2013) revealed that db ACL reconstruction resulted in significantly better a.p. and rotational stability and higher IKDC objective scores.. However, n.s. differences in subjective outcome measures were detected and rotational stability was assessed by Pivot shift testing only. So far no other prospective study has objectively assessed rotational stability using an arthrometer to compare sb and db ACL reconstruction techniques.

CONCLUSION

To date no clear advantage is obvious for one or the other anatomic ACL reconstruction technique. However, rotational stability in external rotation appears significantly improved in the double-bundle group so that future investigations with regard to long-term outcome should be awaited.