

## Serial Changes in Magnetic Resonance Imaging of Reconstructed Double-Bundle Anterior Cruciate Ligament 5 Years Postoperatively

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### Summary:

The purpose of this study was to evaluate serial changes in MRI and clinical outcomes of reconstructed double-bundle ACL using hamstrings tendon autograft 5 years postoperatively and our results indicate it needs more than 1.5 years for AMB and PLB on MRI to mature sufficiently and PLB might have inferior graft maturity than AMB in ACLR until 2 years postoperatively.

### Abstract:

#### OBJECTIVES

The purpose of this study was to evaluate serial changes in MRI and clinical outcomes of reconstructed double-bundle ACL using hamstrings tendon autograft a minimum 5 years postoperatively.

#### METHODS

From October 2007 to September 2009, 435 patients underwent primary double-bundle ACL reconstruction (ACLR) using hamstrings tendon autograft and 51 patients (33 women and 18 men) with average age of 27 at time of ACLR who were followed up more than 5 years were evaluated by MRI (0.3T-proton density-weighted images) at 3 weeks, 3, 6, 9, 12 months, 1, 1.5, 2, 3, 4 and 5 years after surgery. The MRI evaluation focused on single intensity of the ACL graft by axial images. To quantitatively determine normalized single intensity of ACL graft, the single/noise quotient (SNQ) was calculated. Circular 3.3mm (8.5mm<sup>2</sup>) regions of interest were evaluated and each measurement was performed three times and the averages was recorded. We evaluated the difference of intensity between AM bundle (AMB) and PL bundle (PLB). Clinical examination was performed on the same day when the MRI examination was performed, including subjective functional examinations (International Knee Documentation Committee [IKDC] and Tegner Lysholm Knee Scoring Scale [TLKS]) and physical examinations (anterior drawer test and Lachman test).

#### RESULTS

The mean SNQ value of the AMB continued to increase until 9 months and subsequently decrease gradually and became well established by 1.5 years and remained unchanged postoperatively. On the other hand, that of the PLB continued to increase until 9 months and subsequently decrease gradually and became well established by 2 years postoperatively. The SNQ value of PLB was significantly higher than that of AMB between 3 months to 1.5 years.

Clinical outcome did not correlate with serial changes in magnetic resonance imaging.

#### CONCLUSIONS

Our results indicate it needs more than 1.5 years for AMB and PLB on MRI to mature sufficiently after ACLR. Signal density of PLB on MRI was significantly higher than that of AMB between 3 months and 1.5 years in this study, indicating that PLB might have inferior graft maturity than AMB in ACLR until 1.5 years postoperatively.