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# Comparison of Clinical Outcome and Graft Maturation in Double-Bundle Anterior Cruciate Ligament Reconstruction between Young and Elder Patients.

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**Summary**:
Graft maturation and objective outcomes of double-bundle ACL reconstruction in elder patients was comparable to those of young patients. However, the subjective outcome was significantly lower in elder patients than young patients at 24 months postoperatively.

**Abstract**:

## Purpose

Recently, comparable clinical results of anterior cruciate ligament reconstruction (ACLR) in elder and young patients are reported. In the other hand, age-related change of the structures and mechanical properties of tendon which is used as an autograft are reported. However, the age-related change in graft maturation remains unknown. To assess the postoperative change of the graft, it is reported that signal intensity (SI) change on MRI reflects the structural and mechanical properties of the graft. Therefore, the purpose of this study is to compare the clinical outcomes and the graft maturation of double-bundle anterior cruciate ligament reconstruction (ACLR) in elder patients to young patients.

## Methods

We retrospectively evaluated 242 patients who underwent double-bundle ACL reconstruction with hamstring tendon autograft for primary ACL injury between January 2013 to December 2015. Patients over 40 years of age (group A, n=55) and under 20 years of age (group B, n=60) were selected. Clinical outcomes were evaluated with IKDC subjective score, Tegner activity scale, Lysholm score and the anterior translation using the side to side difference at 24 months after the surgery. In addition, graft maturation was evaluated by MRI performed with proton density-weighted images, in an oblique sagittal plane at 6, 12 and 24 months postoperatively. SI of the graft were measured at the mid-substance of anteromedial(AM) and posterolateral(PL) bundle graft and to normalize the SI, SI ratio was calculated by dividing the SI of the ACL by that of PCL. Clinical outcomes and SI ratio were compared between the two groups.

## Results

There was no significant difference in body height, weight and gender between the groups. IKDC score was significantly lower in group A (84.3± 13.5) than Group B (94.0±7.1)($p<0.01$). In the other hand, there was no significant difference in other clinical outcomes. The SI ratio of AM bundle increased from 6 months (Group A: 2.02 ±1.20, Group B: 2.44±1.25) to 12 months (Group A: 2.51±1.31, Group B: 2.62±1.44) and decreased at 24 months

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(Group A: 1.97±1.20, Group B: 2.13±1.25), showing the same tendency in both groups. There was no significant difference in SI ratio between the two groups at each time point. The SI ratio of PL bundle showed the same tendency as the AM bundle.

## Discussion

The most important finding of this study was that the SI ratio of both bundle showed no significant difference between the groups. This indicates that graft maturation of elder patients is comparable to that of younger patients. In the other hand, IKDC subjective score was significantly lower in elder group, although graft maturation and stability showed comparable results. This indicates that subjective outcomes of elder patients might depend on other factors than the graft maturation.

## Conclusion

Patients older than 40 years of age showed lower subjective score compared to young patients, although graft maturation and stability showed comparable results.