

## Development of Bioartificial Ligament for ACL Reconstruction

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### Abstract

Clinical and experimental studies demonstrate that severe injured anterior cruciate ligament (ACL) do not heal well and it can cause knee instability, meniscal damage, and osteoarthritis. Patellar tendon autografts and allografts are widely used but are not suited for ACL reconstruction<sup>1)</sup>. Problems associated with autograft include lengthy rehabilitation and persistent patellar pain. Allografts carry the risk of disease transmission, and their procurement is hard and costly. Permanent synthetic ACL prostheses may perform satisfactorily in the short term, but tend to break down and fail in the long term.

Recently, tissue engineering strategy has been tried for ACL reconstruction<sup>2)</sup>. Several groups have reported on potential ACL scaffold using collagen, silk, and biodegradable polymers.

In this study, we designed a three-dimensional fibrous collagen scaffold reinforced with PGA fiber. And we made ACL fibroblast seeded bioartificial ligament using above scaffold. As results, we could develop bioartificial ligament having properties of adequate porosity, degradability, mechanical behavior and cellular response.

### References

1. SKY Chang, DK Egami, AB Richardson *et al.*, Anterior cruciate ligament reconstruction : Allograft versus autograft(2003), *J. of Arthros. and Related Surg.*, **19**, 453.
2. G Vunjak-Novakovic, G Altman, DL Kaplan *et al.*, Tissue engineering of ligaments, *Annu. Rev. Biomed. Eng*(2004), **6**, 131.