

# The Influence of Locally Applied Platelet-Derived Growth Factor–BB on Free Tendon Graft Remodeling After Anterior Cruciate Ligament Reconstruction

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**Background:** Ligaments and tendons do not gain mechanical properties of the native tissue after injury or grafting.

**Purpose:** To determine the influence of platelet-derived growth factor on tendon graft remodeling.

**Study Design:** Laboratory animal study.

**Methods:** Forty-eight sheep underwent anterior cruciate ligament reconstruction and were sacrificed after 3, 6, 12, and 24 weeks. In 6 animals at each time point, platelet-derived growth factor was locally delivered via coated sutures. After mechanical testing, tissue samples were taken for histologic, immunohistochemical, and electron microscopy evaluations.

**Results:** With platelet-derived growth factor treatment, cross-sectional area was significantly lower at 3 and 12 weeks. Load to failure was significantly higher at 6 weeks. Tensile stress was significantly higher at 3 and 12 weeks. Crimp length was significantly higher at 3 and 6 weeks. Vascular density was significantly higher at 6 weeks. Electron microscopy showed a significantly higher collagen fibril amount at 12 weeks. Differences in these parameters at other time points were not significant.

**Conclusions:** There were alterations in several but not all time points. The local application of platelet-derived growth factor alters the tissue's mechanical properties during free tendon graft remodeling after anterior cruciate ligament reconstruction. Growth factors present a promising tool toward the complete mechanical restitution of a healing ligament substitute.

**Keywords:** anterior cruciate ligament (ACL); tendon graft; remodeling; growth factors; animal model

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