

Comparison of Surgically Repaired Achilles Tendon Tears Using Platelet-Rich Fibrin Matrices

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Background: Platelet-rich fibrin matrices release a natural mixture of growth factors that play central roles in the complex processes of tendon healing.

Hypothesis: Application of autologous platelet-rich matrices during Achilles tendon surgery may promote healing and functional recovery.

Study Design: Case-control study and descriptive laboratory study; Level of evidence, 3.

Methods: Twelve athletes underwent open suture repair after complete Achilles tendon tear. Open suture repair in conjunction with a preparation rich in growth factors (PRGF) was performed in 6 athletes and retrospectively compared with a matched group that followed conventional surgical procedure. The outcomes were evaluated on the basis of range of motion, functional recovery, and complications. Achilles tendons were examined by ultrasound at 50 ± 11 months in retrospective controls and 32 ± 10 months in the PRGF group. In the laboratory portion of the study, PRGF treatment was characterized by the number of platelets and concentration of insulin (IGF-I), transformed (TGF- β 1), platelet-derived (PDGF-AB), vascular endothelial (VEGF), hepatocyte (HGF), and epidermal (EGF) growth factors in patients affected by musculoskeletal traumatic injuries.

Results: Athletes receiving PRGF recovered their range of motion earlier (7 ± 2 weeks vs 11 ± 3 weeks, $P = .025$), showed no wound complication, and took less time to take up gentle running (11 ± 1 weeks vs 18 ± 3 weeks, $P = .042$) and to resume training activities (14 ± 0.8 weeks vs 21 ± 3 weeks, $P = .004$). The cross-sectional area of the PRGF-treated tendons increased less ($t = 3.44$, $P = .009$). TGF- β 1 (74.99 ± 32.84 ng/mL), PDGF-AB (35.62 ± 14.57 ng/mL), VEGF (383.9 ± 374.9 pg/mL), EGF (481.5 ± 187.5 pg/mL), and HGF (593.87 ± 155.76 pg/mL) significantly correlated with the number of platelets (677 ± 217 platelets/ μ L, $P < .05$).

Conclusion: The operative management of tendons combined with the application of autologous PRGF may present new possibilities for enhanced healing and functional recovery. This needs to be evaluated in a randomized clinical trial.

Keywords: sports; platelets; growth factors; surgical repair; Achilles tendon
