



Tendon grafts with peritendinous areolar tissue increase the survival of endotendinous tissues and diminish postoperative shrinkage

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Summary *Background:* We observed greater postoperative shrinkage of grafted fascia lata without peritendinous areolar tissue (PAT) than with PAT in blepharoptosis surgery. In this article, we sought to evaluate the influence of PAT on tendon grafts.

Methods: Pairs of anterior tibial tendons with or without PAT were grafted onto the backs of 12 adult Wistar rats. The cephalic and caudal ends of the tendons with or without PAT were fixed tightly on the fascia of the erector spinae muscles with 6/0 polypropylene sutures. A 7-mm distance was maintained between the sutures. Changes in the length between the sutures as well as changes in the histology of the tendons with or without PAT were evaluated at 1 and 5 months after grafting.

Results: The mean lengths of the grafted tendons with PAT at 1 and 5 months after grafting were significantly longer than those without PAT at 1 and 5 months after grafting, respectively (5.4 mm and 4.5 mm vs. 3.8 mm and 2.9 mm, respectively; Wilcoxon signed-rank test; $P < 0.05$). The grafted tendons without PAT displayed central necrosis and scar formation, whereas those with PAT displayed no alteration in the tissue properties.

Conclusions: At both 1 and 5 months after grafting, the grafted tendons with PAT were significantly longer and survived better than those without PAT. Tendon grafts with PAT had increased survival of the endotendinous tissue and diminished postoperative shrinkage, since the vascular network of the PAT potentially contributes to early revascularisation of the graft.

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The frontalis suspension for correcting severe, congenital blepharoptosis is performed using autogenous fascia lata between the caudal end of the frontalis muscle at the upper margin of the eyebrow and the tarsus.^{1–10} The fascia lata is always grafted as long as possible. The length is calculated as the distance between the upper margin of the eyebrow and the tarsus, with the upper eyelid pulled to contact the lower eyelid, according to our algorithm.¹⁰ However, we observed greater postoperative shrinkage of the grafted fascia lata without peritendinous areolar tissue (PAT) than that with PAT for blepharoptosis surgery. Since the PAT that surrounds the fascia lata is highly vascular, it may induce revascularisation of the grafted fascia lata and prevent the grafted fascia lata from severe shrinkage. In this article, we evaluated the importance of PAT in tendon graft through experiments with Wistar rats.

Materials and methods

Twelve adult male Wistar rats weighing 350–460 g were used in this study, which was performed in a temperature-controlled room ($24 \pm 1.5^\circ\text{C}$). All animals were treated humanely and in compliance with the recommendations of the Animal Care Local Committee. No rats died during the course of the study. Animals were anaesthetised with an intraabdominal dose of sodium pentobarbitone (50 mg kg^{-1}) and sacrificed by intracardiac administration of ketamine (150 mg kg^{-1}) at each time point.

Due to its length and manipulability, the anterior tibial tendon was chosen as the tendon graft material. Approximately 10 mm of the anterior tibial tendon was excised through an incision in the skin anterior to each of the hind paws (Figure 1). Two types of tissues were grafted: tendons with or without PAT. A transverse incision was made at the third

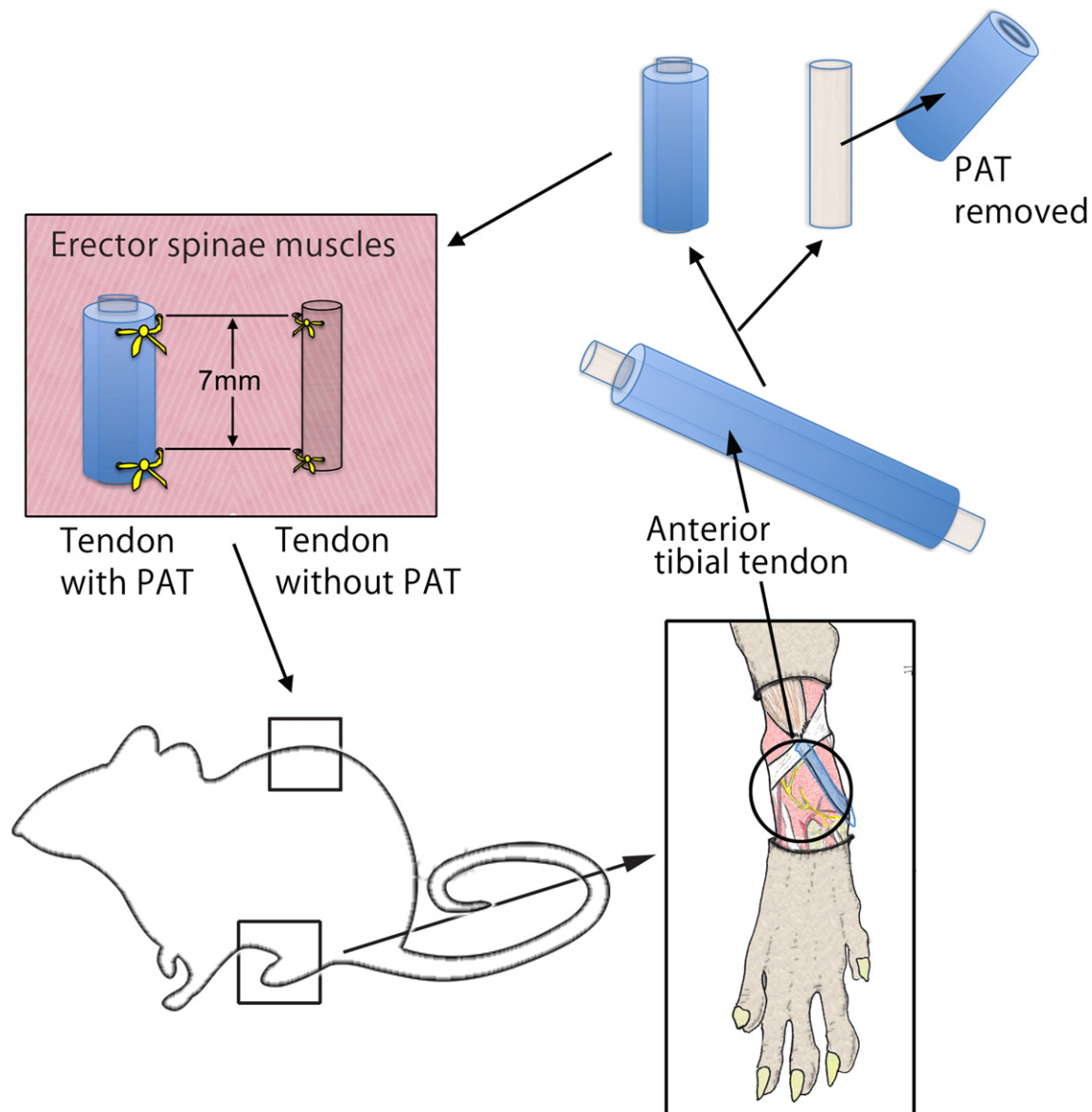


Figure 1 Experimental design.

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