Background

Common Achilles tendon ruptures are usually not fexed by absorbable sutures due to limitations in their strength properties. Modern technology has made it possible to develop bioabsorbable sutures with prolonged strength retention.

Aim

To evaluate histologically tissue reactions and biodegradation of poly-L/D-lactide (PLDLA) sutures implanted in Achilles tendon of rabbits.

Material and methods

Fifteen rabbits were operated on and killed within a time schedule of 2, 6 and 12 weeks, with 5 rabbits in per period. PLDLA monofilament sutures (Tampere University of Technology, Tampere, Finland) were implanted inside the rabbit medial gastrocnemius tendon for biocompatibility testing. Polyglyconate (4.0) monofilament sutures (MaxonR, Cyanamid of Great Britain Ltd., Gosport, UK) with the same diameter were implanted in the contralateral tendon. The histolthogy was studied in hard-resin embedded samples and the thickness of the encapsule membrane was determined histomorphometrically.

Results

PLDLA have significantly smaller capsule formation around each fiber in tendon than MaxonR sutures. The mean capsule thicknesses in each follow-up period can be seen in TABLE 1.

Conclusions

In present study, by 12 weeks the PLDLA sutures implanted intratendineously formed thinner fibrous capsule than MaxonR sutures of same diameter. The suture materials were not degraded by 12 weeks.

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	2 weeks	6 weeks	12 weeks
PLDLA	5.26	11.66	10.63
Maxon^{R}	13.22	80.97	17.59

TABLE 1.

RESORBABLE MULTIFUNCTIONAL ANTIBIOTIC RELEASING TACKS

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Abstract

The aim of this study was to compare the pullout forces of recently developed bioabsorbable ciprofloxacin-releasing and plain self-reinforced polylactide/polyglycolide (SR-PLGA) 80/20 tacks in human cadaver parietal bones. Parietal bone pieces (approximately 6 x 20 cm) were collected from five human male cadavers (29-77 years of age). Fifty plain SR-PLGA 80/20 tacks (diameter = 2 mm, length = 6.0 mm) and 50 ciprofloxacin-releasing SR-PLGA 80/20 tacks of similar dimensions were applied to drill holes using a special tack-shooter without tapping the drill holes. The force needed to pull the tacks from human parietal cadaver bones was measured using a universal tensile testing machine. The tack pullout speed was 10 mm/min. Means and standard deviations (SDs) were calculated and analyzed using the Student t test (SPSS version 10.0 for Windows). The pullout forces of the ciprofloxacin-releasing and plain tacks were 147 +/- 10.3 N and 141.4 +/- 12.6 N respectively (insignificant difference, P<0.001). The main cause of failure was the breakage of tack barbs (95% in the both cases). Ciprofloxacin-releasing SR-PLGA tacks have a pullout strength similar to corresponding plain conventional SR-PLGA tacks and they can be applied in cranial bone fixation.

Keywords: *Bioabsorbable, ciprofloxacin, osteofixation, tack*

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