

Novel Multifunctional Tacks: Pull-Out Strength of Ciprofloxacin-Releasing Tacks

Kaisa Knuutila¹, Johanna Tiainen², Minna Veiranto¹, Esa Suokas³, Timo Waris², Pertti Törmälä¹, Outi Kaarela², Nureddin Ashammakhi^{1,2}

1. Institute of Biomaterials, Tampere University of Technology, Tampere, Finland.
2. Department of Surgery, Oulu University Hospital, Oulu, Finland.
3. Linvatec Biomaterials, Tampere, Finland.

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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