

Holding Power of Bioabsorbable Polylactide/Polyglycolide Screws (Biosorb and Lactosorb) and Tacks to Human Cadaver Parietal Bone

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The aim of this study was to compare the pull-out forces of bioabsorbable polylactide/glycolide (PLGA) tacks and screws in human cadaver parietal bones. Parietal bone pieces (c. 6 cm x 20 cm) were collected from five human male cadavers (age 47 to 75 years). Forty-nine BioSorbPDX® self-reinforced (SR-PLGA 80/20) tacks (diameter 1.5 mm, length 4.0 mm), 47 BioSorbPDX® (SR-PLGA 80/20) screws (diameter 1.5 mm, length 4.0 mm) and 46 LactoSorb® (PLGA 82/18) screws (diameter 1.5 mm, length 4.0 mm) were applied. The tacks were applied to drill holes using a special applicator gun (no tapping or tightening). The screws were applied to drill holes in the traditional way using tapping, and tightening with a screwdriver. A tensile testing machine was used. All the implants were tested thus: the head of the implant was held by an aluminum jig and the jig was pulled with wire until implant failure. The testing pull speed was 10 mm/min. Means and standard deviations (SDs) were calculated and the data analyzed using ANOVA. The pull-out force of the tacks was 115.9 ± 8.3 N, that of Lactosorb® screws was 112.9 ± 12.1 N and that of Biosorb® screws was 110.4 ± 8.9 N (statistically insignificant difference between the three groups). The most common reason for failure in the case of tacks was barb breakage (55.1%); it was thread breakage in the case of Biosorb® screws (66%) and stem split in the case of Lactosorb® screws (56%). Tacks seem to have a similar, perhaps even a little better holding power to cranial bone as screws and can hence be recommended for clinical application, as the procedure saves time and, consequently, costs.

Keywords

Applicator gun, bioabsorbable, screw, SR-PLGA, tack

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