Comparison of the wound healing efficacy of polyglycolic acid sheets with fibrin glue and gelatin sponge dressings in a rat cranial periosteal defect model.

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Abstract:

Oral surgical procedures occasionally require removal of the periosteum due to lesions, and these raw bone surfaces are prone not only to infection but also to scar formation during secondary healing. The objective of this study was to identify successful methods for reconstruction using periosteal defect dressings. We created 1-cm² defects in the skin and cranial periosteum of 10-weekold male Wistar rats under isoflurane anesthesia. The animals were assigned to three defect treatment groups: (1) polyglycolic acid sheets with fibrin glue dressing (PGA-FG), (2) Spongel gelatin sponge dressing (GS), and (3) open wound (control). Postoperative wound healing was histologically evaluated at 2, 4, and 6 weeks. The moist conditions maintained by the GS and PGA-FG treatments protected the bone surface from the destructive effects of drying and infection. Complete wound healing was observed in the GS group but not for all animals in the PGA-FG and control groups. Histologically, osteoblast proliferation on bone surfaces and complete epithelialization with adnexa were observed in the GS group at 6 weeks after surgery. In contrast, PGA sheets that had not been absorbed inhibited osteoblast proliferation and delayed wound healing in the PGA-FG group. Wound surface dressings maintain a moist environment that promotes wound healing, but PGA materials may not be suitable for cases involving exposed periosteum or bone surfaces due to the observed scar formation and foreign-body reaction.