

Single-donor allogeneic platelet fibrin glue and osteoconductive scaffold in orbital floor fracture reconstruction.

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Abstract:

Commonly used materials for orbital floor fracture reconstruction include autologous cranial bone graft and titanium mesh. We have evaluated here a biomaterial combining biphasic calcium phosphate (hydroxyapatite [HA]/beta-tricalcium phosphate [TCP]) osteoconductive scaffold with single-donor allogeneic platelet fibrin glue. The study was conducted on 10 consecutive patients with a follow-up of up to 4 years. Platelet fibrin glue was prepared by mixing equal volumes of single-donor platelet-rich plasma and cryoprecipitate with HA/beta-TCP followed by activation with human thrombin prepared by plasma activation. Postoperative evaluations included serial photographs, repeated physical examination, and 3-dimensional computed tomography scan performed 2 years after surgery. The fibrin-rich platelet biomaterial was easy to mold and to apply on the surgical site allowing the surgeon to sculpt accurately the bone defect, providing mechanical stability while avoiding spillage of the scaffold. No infection of the orbit or extrusion of HA/beta-TCP was observed. Ocular motility was normal, and no diplopia or enophthalmos of the injured orbit was noted. Coronal computed tomography scans of the reconstructed orbits revealed good restoration of the orbital floor defect in all 10 patients. The use of single-donor platelet fibrin glue combined with an osteoconductive scaffold offers a valuable alternative to autologous cranial bone graft or titanium mesh in the reconstruction of orbital floor bone defect.