

Use of Xenograft blocks to augment the deficient alveolar ridge prior to implant placement in trauma patients: A retrospective case series

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Introduction

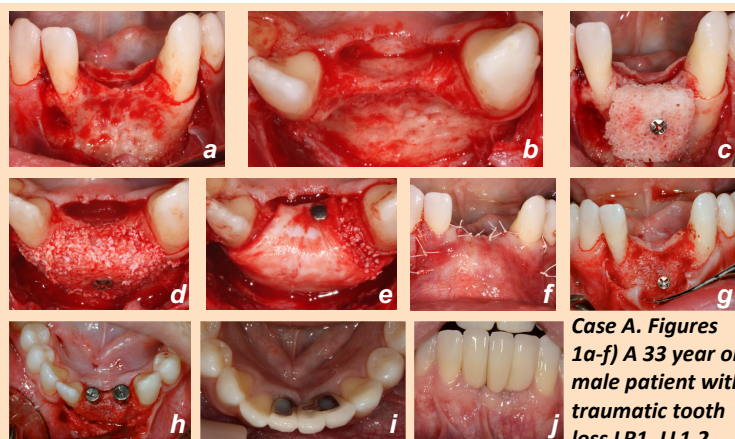
Following traumatic tooth loss there may be insufficient alveolar bone to provide primary stability for implant placement. Autogenous block bone grafts are often required which are harvested from intra-oral sites such as the ramus or symphysis, or from extra-oral sites such as the iliac crest.^{1,2} This involves a second surgical site with increased morbidity and may require a general anaesthetic. Xenograft block bone grafts have been proposed as an alternative. Multiple animal based studies demonstrate favorable success in horizontal augmentation,³⁻⁵ however, there are very few publications reporting clinical outcomes with one case series published.⁶ No study to date reports the outcomes of implants placed into such grafted sites. This poster reports the outcomes of seven patients that received an equine xenograft block bone graft to horizontal alveolar defects prior to implant placement.

Clinical procedure

Seven onlay block bone grafts were carried out with OsteoBiol Sp-Blocks (Tecnoss Dental), which consist of equine derived rigid cancellous bone (Figures 1a-f, 2a-d, 3a-d). The blocks were soaked in warm saline and shaped to fit the alveolar contour (Figures 1c, 2c, 3c). The crestal incisions were made lingual/palatal to avoid wound edges directly over the graft. The cortical bone was perforated to facilitate blood supply (Figure 1a). The block was secured with a bone screw and additional particulate xenograft packed around the block (Bio-oss, Geistlich) (Figures 1c-d). A resorbable collagen membrane of equine origin (Evolution, Tecnoss Dental) which has an estimated resorption time of 4 months, was placed over the augmented area (Figures 1e, 2d, 3d). Periosteal release was performed to allow tension free closure (Figure 1f). A single dose of prophylactic antibiotics was administered preoperatively.

CBCT imaging was repeated at 8 months following augmentation (Table 1). At 9 months a full mucoperiosteal flap was raised and the bone screw/tacks were removed. Osteotomy sites were prepared using a surgical guide (Figures 2f, 3e). Xive (Dentsply) implants were placed and implant stability was deemed good in all cases. Additional Guided Bone Regeneration (GBR) was carried out in the event of a buccal dehiscence with particulate deproteinised bovine bone mineral (Bio-Oss) and a porcine collagen membrane (Bio-Gide, Geistlich). (Table 1, Figure 3e).

Implant exposure was carried out at 6 months in cases requiring GBR (Table 1: Cases C - E, F) and provisional restorations placed for 3 months. The definitive restorations were placed at approximately 9 months following implant placement. One piece cast-to screw retained restorations were placed.

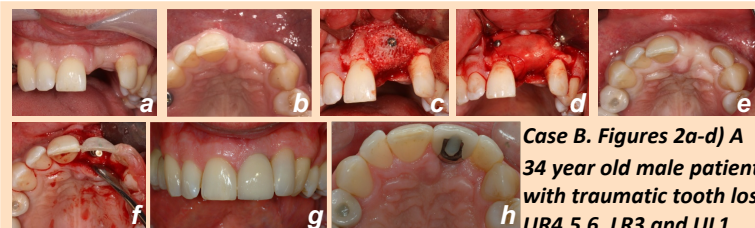


Case A. Figures 1a-f) A 33 year old male patient with traumatic tooth loss LR1, LL1,2

was treated with an equine xenograft block graft. 1g-h) Implant placement LR1 LL2 was carried out at 9 months post grafting and healing abutments placed. 1i-j) Implant restorations at 3 years following implant placement.

Outcomes

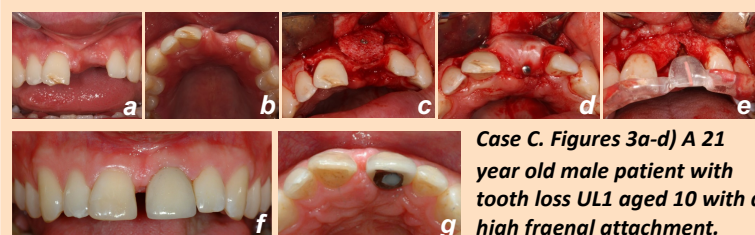
One graft failed to integrate and was removed. The radiographic outcomes of the other 6 cases are illustrated in Table 1. At implant placement the blocks appeared to have minimal resorption, were well integrated with surrounding bone and well vascularised. Post operative healing was uneventful in all implants placed. 1 of 8 implants placed into augmented sites failed at less than 1 year due to primary failure (Case E). All implants are associated with early marginal bone remodeling between 1-3mm (Table 1), which appeared to remain stable at further follow up (Cases A-C, D-F). This is more than would be expected in sites grafted with autogenous blocks from intra-oral and extra-oral iliac crest sites, with an average 0.09-0.17mm and 1.8mm marginal bone loss respectively over 10 years.^{1,2}



Case B. Figures 2a-d) A 34 year old male patient with traumatic tooth loss UR4,5,6, LR3 and UL1.

The UL1 site was augmented with an equine onlay block graft prior to implant placement. 2e) The increased ridge profile is demonstrated at 9 months post grafting. 2f) The use of a surgical guide to aid correct implant positioning.

2g-h) Screw retained implant restoration at 3 years post implant placement



Case C. Figures 3a-d) A 21 year old male patient with tooth loss UL1 aged 10 with a high fraenal attachment.

The UL1 site was augmented with an equine onlay block graft prior to implant placement. 3e) At 9 months implant placement undertaken with local GBR to augment the small buccal dehiscence. The implant is left covered. 3f-g) Screw retained implant restoration at 3 years post implant placement

Table 1: Radiographic outcomes

	Pre-implant CBCT	Baseline	Follow up (FU)	Notes
Case A				<ul style="list-style-type: none"> 1-stage implant placement FU at 3 year post implant placement Early marginal bone loss $\leq 1\text{mm}$ (0-1 year) Stable bone level 1-3 years
Case B				<ul style="list-style-type: none"> 1-stage implant placement FU at 3 year post implant placement Early marginal bone loss $\leq 2\text{mm}$ (0-1 year) Stable bone level 1-3 years
Case C				<ul style="list-style-type: none"> 2-stage implant placement FU at 3 year post implant placement Early marginal bone loss $\leq 3\text{mm}$ (0-2 years) Stable bone level 2-3 years
Case D				<ul style="list-style-type: none"> 2-stage implant placement FU at 18 month post implant placement Lost to further follow up Marginal bone loss $\leq 2\text{mm}$ (0-18 months) Additional GBR with BioOss/BioGide
Case E				<ul style="list-style-type: none"> 2-stage implant placement FU at 3 year post implant placement Implant failure UL1 Marginal bone loss $\leq 3\text{mm}$ (0-3 years)
Case F				<ul style="list-style-type: none"> 2-stage implant placement FU at 3 year post implant placement Early margin bone loss $\leq 2\text{mm}$ (0-1 year) Stable bone level 1-3 years GBR with BioOss/Titanium reinforced d-PTFE

Conclusion

The use of xenograft equine blocks to augment horizontally deficient alveolar ridges prior to implant placement is a viable option for a 1-2 tooth sized defect. It offers an alternative to extraoral and intraoral autogenous block grafts, however, the treatment duration is longer and there appears to be greater early peri-implant marginal bone loss than autogenous block grafts. The techniques illustrated are highly technique sensitive and careful case selection is required. The gold standard remains autogenous bone grafts and further clinical evidence is required to justify equine xenograft block grafts to augment the alveolar ridge prior to implant placement.

References – Full details available on request

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