Ridge augmentation of dental implant sites

By Amit Patel

Dental aesthetics has now become a key issue in implant dentistry. This ascension of dental aesthetics means that the quality and quantity of the soft tissue surrounding the implant, not just the shape and shade of the final prosthesis, are all very important.

The bone volume of an implant site, both buccolingually and apicocoronally, can affect the implant's final position and thus the aesthetics of the end result. It is suggested, especially in the aesthetic zone, that the minimum amount of buccal bone should be at least 2mm from the implant shoulder[1].

Deficiencies in bone and tissue volume often require augmentation, such as Guided Bone Regeneration (GBR)2. This is a proven technique, placing a barrier membrane over a bone graft material, which creates sufficient tissue volume to put an implant into the ideal restorative position[3,4]. One of GBR's main aims is to increase the buccal bone volume, to at least 2-3mm, so long lasting bone support for the buccal tissues is achieved.

It is also possible to improve the appearance of soft tissue by placing a soft tissue graft simultaneously with GBR5. Patients who have a thin biotype can be modified to a thicker biotype by placing a connective tissue graft under the buccal flap.

Harvesting a connective tissue graft from the palate can be difficult due to the large number of factors involved: the shape of the palatal vault; position of the palatal artery; the amount of connective tissue needed for the primary site; and the amount of adipose tissue on the graft. Connective tissue grafts also involve two surgical sites for the patient, doubling the possibility of poor healing.

However, when Alloderm is used as an alternative to connective tissue grafts, it eliminates the need for a second surgical site. Alloderm is an acellular dermal matrix allograft; a product that was originally used in burns surgery.

It is highly processed de-epithelialised human skin dermal allograft composed of a basement membrane and an extracellular

Figure 1a and 1b (above and right): LL6 site showing a reduced amount of keratinised tissue

Figure 2: Gingival tissue at 3 months after implant placement. Note the increase in gingival volume

Figure 3: Abutment LL6 note the increased amount of keratinized tissue around the abutment

Figure 4: Definitive cement retained crown LL6

matrix with collagen bundles and elastin fibres. The implant product acts like a biological scaffold, from which fibroblasts can migrate and adhere to. It has also been used for gingival root coverage[6], augmentation of attached gingiva[7], and ridge augmentation[8].

Included in this article are two case reports. One shows how Alloderm was used to increase the amount of keratinised tissue around an implant, and the other where it was used to increase the gingival volume in the aesthetic zone.

CASE 1: Increasing the amount of keratinised tissue around an implant site.

A 45-year-old patient wanted to replace the LL6 site with a dental implant. On examination, it was noted that there was sufficient bone height and width for the placement of a Biohorizons Tapered Internal Implant with Laser-lok 3.8mm diameter by 10.5mm.

Placing Alloderm into the site to increase the amount of keratinised tissue around the future implant (Figure 1) was discussed with the patient and agreed. The Laser-Lok implant was placed using the two-stage protocol, with the Alloderm sutured into the flap.

The Laser-Lok implant was uncovered at ten-weeks and a healing abutment placed. At 12 weeks, the gingival tissues around the implant have increased in volume (Figure 2). Fixture head impressions were taken at 12-weeks and the final abutment (Figure 3) and definitive crown were fitted two-weeks later (Figure 4)

CASE 2: Increasing the amount of gingival volume in the aesthetic zone

A 40-year-old patient presented with a fractured post crown UR1. The UR1 root was extracted atraumatically and left for a period of eight weeks, for the soft tissue to heal, before a dental implant was placed (Figure 5).

A three-sided flap was raised, with facial line angle relieving incisions, to allow for sufficient access to the future implant site (Figure 6 and 7). It was also necessary to augment the site with a GBR technique (Figure 7); a periosteal relieving incision was made to allow for tension free wound closure and coronal mobilisation of the buccal flap.

The dental implant was placed into the site 2-3mm below the CEJ of the adjacent teeth. The patient's own bone was harvested and placed over the exposed threads and a layer of Laddec bovine bone was placed over the autograft (Figure 8 and 9). A cross-linked bovine membrane Memlok was placed over the xenograft using the principles of GBR (Figure 10).

The Alloderm was rehydrated in a saline bath (Figure 11) and then sutured to the buccal flap (Figure 12) to increase the gingival volume for the future implant crown. A tension-free flap was closed using 5/0 polypropylene sutures.

Figure 5: UR1 site

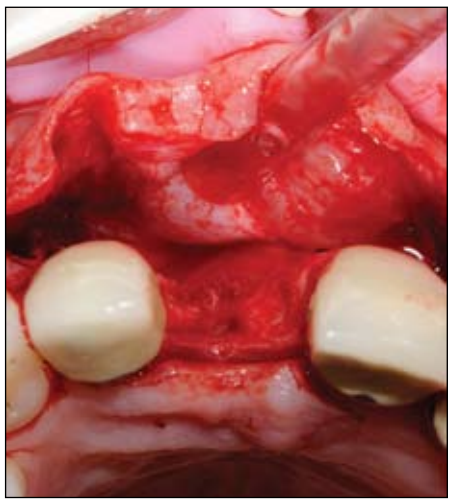

Figure 6: Note the deficient buccal bone volume

Figure 7: Implant placed in the correct restorative position for a screw retained crown. Buccal dehisence present

Figure 8: Placement of Laddec Bovine Bone

Figure 9: Occlusal view of Laddec bone volume

Figure 10: Placement of Memlok porcine membrane over Laddec bone

Conclusion

At the three-month review the gingival volume of the UR1 site was very good, allowing the correct emergence profile of the implant crown (Figure 13 and 14). A fixture level impression was taken for a screw-retained crown. The patient was happy with the shade and shape of the new implant crown (Figure 14 and 15).

Figure 11: Alloderm the connective tissue side up

Figure 12: Alloderm sutured to the buccal flap

Figures 13a and 13b (above left and above right): UR1 at 3 months buccal view

Figure 14: UR1 at 3 months occlusal view. Note the increase in buccal volume

Figure 15: Definitive screw retained crown UR1

Figure 16: Definitive crown UR1 with good emergence profile from the augmented site

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