Peri-implant biotype enhancement using interpositional connective tissue grafts

Following tooth extraction, physiologic wound healing leads to alterations in gingival architecture including alveolar bone resorption, gingival recession and papilla loss. This is especially common in patients with thin periodontal biotypes.¹

These alterations very often compromise tissue morphology and lead to esthetic challenges with implant restorations.

Numerous surgical techniques are available to reconstruct post extraction defects. However, the old cliché, ‘An ounce of prevention is worth a pound of cure’ very much applies to the extraction defect and all efforts should be made to minimize these morphologic changes.

It is technically easier and less costly to preserve the alveolus at the time of tooth extraction as opposed to enhancing it following physiologic remodeling.

Therefore, various procedures and materials have been recom-

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Patient 1

Fig. 1a: Clinical presentation of failing restoration with recurrent decay tooth No. 8.

Fig. 1b: Failing post and core with peri-apical radiolucency.

Fig. 1c: Connective tissue graft draped over the crest, demonstrating large size required for vascularisation prior to placement beneath tunnel flaps.

Fig. 1d: Interpositional connective tissue graft placed over socket graft and secured with sutures.

Fig. 1e: Periodontal biotype enhancement with favorable gingival margin and papilla preservation.

Fig. 1f: A flapless surgical approach was used to minimise tissue trauma.

Fig. 1g: Ideal soft tissue esthetics achieved (restoration by Dr. Glenn Bickert).

Fig. 1h: Radiograph of final screw-retained, UCLA restoration.

Fig. 1i: One year post-op demonstrating stable results.

Fig. 1j: One year post-op demonstrating stable results.
mended to preserve, maintain and re-establish ideal gingival architecture. The most common include placement of bone grafts within the extraction sockets, the use of membranes and connective tissue grafts as well as placement of immediate implants. In addition, patients who seek dental implants to replace failing teeth often present with pre-existing hard and soft tissue defects, which can potentially lead toesthetic disasters if not managed appropriately. These types of clinical conditions are extremely challenging to treat and require ancillary procedures either prior to or concurrent with implant placement to improve the final esthetic result. Strategies to manage the extraction defect have been previously published, which provide algorithms to help guide implant treatment procedures immediately following tooth extraction. This article presents three clinical case reports using these guidelines and demonstrates the benefits of using large, thick interpositional connective tissue grafts in conjunction with tooth extraction and site preservation as well as during immediate implant placement to enhance the peri-implant biology and improve soft tissue architecture.

Patient 1 A 52-year-old female patient presents with recurrent decay and a failing post and core restoration on tooth No. 8 (Figs. 1a, b). A thin periodontal biotype was recognised as noted by the tapered tooth form and long slender papilla and a high smile line further challenges esthetic management.

Immediately following extraction, the socket was categorized as an EDS Type II defect due to the thin periodontal biopsy even though the buccal socket was completely intact. Therefore, a staged implant approach was chosen. The extraction defect was grafted with a composite anorganic bovine bone matrix (Bio-Oss, Ossteo Health) and a demineralized bone allograft. A flapless surgical technique utilising a surgical template is then used to place the implant including the healing abutment in order to minimise soft tissue recession often accompanied with a conventional incision and flap exposure. The implant is allowed to heal for an additional six months and restored with a screw-retained, single-tooth porcelain fused to metal restoration (Fig. 1g-i). An ideal restorative outcome was achieved by the maintenance of the gingival margin and papilla. (Restoration by Dr. Glenn Bickert, Laguna Hills, Calif.).

Patient 2 A 54-year-old male patient presents with a hard and soft tissue defect associated with a periodontal abscess secondary to root resorption on tooth No. 9 (Fig. 2a). An identical treatment approach was followed as with the previous clinical situation. Immediately following extraction, the socket was categorised as an EDS Type III defect due to the more severe buccal bone loss, and therefore a staged implant approach was necessary. The extraction defect was grafted with a composite anorganic bovine bone matrix (Bio-Oss, Ossteo Health) and a demineralised bone allograft (Fig. 2b). A large, thick connective tissue graft was harvested from the palate and placed beneath the full thickness buccal and palatal tunnels adjacent to the socket. The great majority of the soft tissue graft is beneath the full thickness tunnel flaps. In order to promote graft vascularisation, the soft tissue graft is positioned and secured as previously described (Fig. 2d).

A removable partial denture was used as a provisional appliance (Fig. 2e) and the bone and soft tissue graft complex was allowed to heal for approximately four months prior to implant placement. The site preservation procedure in conjunction with the interpositional connective tissue graft results in improved soft tissue architecture with complete repair of the extraction defect grafted with a composite anorganic bovine bone matrix (Bio-Oss, Ossteo Health) and a demineralised bone allograft. A flapless surgical technique utilising a surgical template is then utilised to place the implant (Fig. 2g). The implant is allowed to heal for an additional six months and restored with a porcelain fused to metal restoration cemented onto a custom lab fabricated abutment.

Patient 3 A 42-year-old female patient presents with a chronic endodontic abscess and buccal fistula involving tooth No. 10. A thin periodontal biotype was noted along with an AD high smile line including pre-existing papilla loss and therefore the defect appeared amenable for immediate implant placement in conjunction with ancillary procedures. Following implant placement the residual socket defect was grafted with a composite anorganic bovine bone matrix (Bio-Oss, Ossteo Health) and a demineralised bone allograft. Similar to the previous two patients, a large, thick anorganic connective tissue graft was harvested and placed beneath the full thickness buccal and palatal tunnels adjacent to the socket as well as over the implant (Fig. 5e).

Once again, vascularity to the soft tissue graft is achieved given the greater graft dimension beneath the tunnel flaps, and therefore primary closure is unnecessary. The soft tissue graft is positioned and secured using the previously described technique. The bone and soft tissue graft complex is allowed to heal for approximately six months prior to uncovering. The final restoration of the implant was
achieved using a custom gold abutment (Fig. 3d, e) and porcelain veneers were placed on the maxillary anterior teeth (Fig. 3f). An excellent esthetic outcome was achieved. (Restorations by Dr. Jon Marashi, San Clemente, Calif.).

These three clinical situations demonstrate the clinical benefits of incorporating large, thick interpositional autologous connective tissue grafts during site preservation and immediate implant placement surgery. When used appropriately, these grafts vascularise completely, even without complete primary closure. The grafts seem to improve the soft tissue biotype and enhance soft tissue esthetics adjacent to implant restorations by minimising gingival recession and interproximal papillae loss.

Live surgical demonstration of this technique as well as many others will be showcased during the American Academy of Implant Dentistry’s 57th annual meeting on Oct. 29–Nov. 1 in San Diego. For more information, see www.aaid.com.

References

About the author
Dr. Nick Caplanis
is an assistant professor and part-time faculty within the Graduate Program in Implant Dentistry, at Loma Linda University School of Dentistry. Dr. Caplanis has an extremely unique background with formal residency training in the interrelated fields of Implant surgery, Prosthodontics and Periodontics. He is board certified and a diplomate of both the American Board of Periodontology, and the American Board of Oral Implantology and is a Fellow of the American Academy of Implant Dentistry. He is also the general meeting chairman for the 57th Annual Meeting of the American Academy of Implant Dentistry, to be held in San Diego from Oct. 29–Nov. 1.