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# Management of Hard and Soft Tissue in the Esthetic Zone in a Trauma Case

**R**eplacement of a single upper central incisor is one of the most challenging procedures in esthetic dentistry. The soft and hard tissue must be restored ideally to get the optimum outcome, especially in a trauma case. According to Davis et al., the emotional effect of tooth loss on an individual's life should not be underestimated (1). Adults with depression and anxiety are more likely to have tooth loss (2). Use of dental implants as a replacement for missing teeth is very prevalent (3). The successful replacement of the lost oral structure needs to be assessed using a variety of different parameters (4).

### Case report

A 26-year-old male presented with a missing central right incisor (Figures 1 and 2). The patient had been involved in a bar fight, resulting in losing tooth 11. The patient had been to the emergency department of the local hospital, where the facial soft tissue problem was taken care of but the dental issue had not been addressed. Holan and Shmuli found only four per cent of hospital physicians would provide an appropriate initial treatment for an avulsed tooth (5). The patient had seen another dentist before coming to our practice. No treatment was rendered by that dentist.



**Figure 1**



**Figure 2**

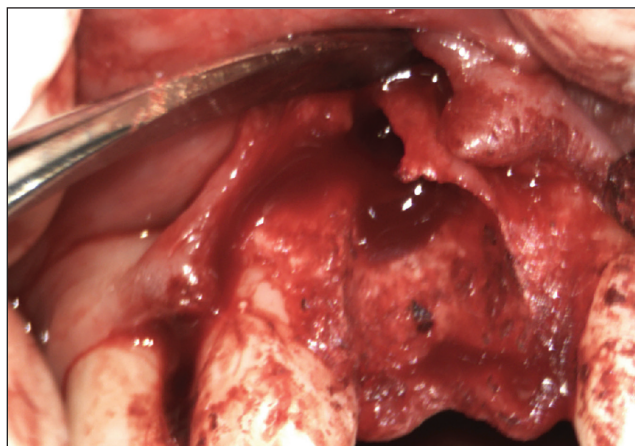
Medical history and dental history taking is imperative to the longevity of any dental treatment (6-8). The patient's medical and dental history was unremarkable; there was no medication allergy or contra-indication in doing a dental procedure.

Moule and Cohenca provide a comprehensive guide to emergency assessment and treatment planning for traumatic injury following the avulsed tooth (9). Time lapse of less than 60 minutes and a storage medium are particularly critical to the success of the replantation of an avulsed tooth (10). In a study by Müller et al., the survival rate of replantation was found to be 65 per cent in 3.5 years (11).

Clinical examination revealed an avulsed tooth 11. Teeth 12 and 21 had Grade 2 mobility and were very sensitive to percussion. Baseline data with periapical radiographs and percussion tests were recorded for teeth 13, 12, 21 and 22. Consistent with the patient's informed consent, the discussion of replantation, dental implant and fixed partial denture yielded dental implant as the choice of treatment.

Misch and Roknian present 11 factors to consider for predictable socket grafting (12). The patient was given 0.12 per cent chlorhexidine gluconate (Peridex) to rinse for 40 seconds (13,14). The teeth were pumiced, rinsed and flossed. The tongue was scraped and wiped with 0.12 per cent chlorhexidine gluconate; intra- and extraoral wipes followed.

After buccal and lingual infiltration using four per cent articaine with 1:200,000 epinephrine (Septodont), a sulcular incision was made on teeth 13, 12, 21 and 22. A full thickness flap was raised on the buccal with limited extension to preserve the blood supply to the tooth 11 site (15). The site was thoroughly rinsed with sterile saline solution. The buccal bone had fractured and there was a missing buccal plate (Figure 3).



**Figure 3**

Curettage of the site thoroughly and inducing bleeding initiates the regional acceleratory phenomenon (RAP) (16,17). The RAP is used mostly in implant dentistry but is becoming more prevalent in surgically facilitated orthodontic treatment (17). MinerOss (BioHorizons), an osteoconductive combination of cortical and cancellous particles rehydrated in sterile saline solution, was used as scaffolding in the tooth 11 site (18,19). Mem-Lok (BioHorizons) resorbable collagen membrane was used buccally to hold the soft tissue without disturbing the bone formation in the tooth 11 site (20).

Kois' five diagnostic keys can be used as a guide to predict the peri-implant esthetic outcome (21). The maintenance or regeneration of the papilla is predicated based on the distance between the crest of the bone and the contact point of 5.0 mm or less in natural teeth (22) and 3.4 mm between implants (23).

The patient's tooth 11 was used as the pontic to develop the soft tissue as per the concept of pontic site development (24). The avulsed tooth number 11 was prepped apically to 2 to 3 mm beyond the cemento-enamel junction. The apical end of the tooth was debrided, rinsed, etched with 32 per cent phosphoric acid etch (Bisco), bond was placed, (3M multi-purpose bond) and composite Estelite Omega EA2 (Tokuyama) was used to seal the apical end. The pontic 11 was placed over the site to ensure adaptability onto the socket site and any extra particulate graft was removed around the gingival area.

A rubber dam (Hygienic) was then placed over teeth 12 and 21 to isolate the graft site 11. The mesial surfaces of teeth 12 and 21 were air abraded (PrepStart) with 27-micron aluminium at 40 psi, etched with 32 per cent phosphoric acid (Bisco), rinsed and dried; the rubber dam was removed carefully without contaminating the surface. Multi-purpose bond (3M) was applied on the mesial of teeth 12 and 21.

The same treatment protocol was applied to the mesial and distal of pontic 11. Composite Estelite Omega EA2 (Tokuyama) was added to the mesial and distal of the pontic 11, just enough to hold the pontic 11 in place between teeth 12 and 21. This was light cured with Valo (Ultradent) for three seconds to hold the pontic 11 in place, and more composite was added to support the connector. A flexible retainer wire with close adaptation to the buccal of teeth 12, 11 and 21 was measured and cut. Using a cotton roll, the pontic 11 graft site was isolated. The buccal of tooth 12, pontic 11, and tooth 21 were air abraded (PrepStart), etched with 32 per cent phosphoric acid (Bisco), rinsed and dried; multi-purpose bond (3M) was placed. Estelite Omega EA2 (Tokuyama) was used to splint tooth 12, pontic 11, and tooth 21 (Figure 4). A 3-0 Cytoplast (Osteogenics) interrupted suture was used to adapt and close the flap.



**Figure 4**

The occlusion was checked with 200 micron (Bausch) and eight micron (Bausch) articulating paper and adjusted to ensure the stability of the splinted 12, 11 and 21, and consequently the graft on the 11 site (12).

Site 11 was allowed to heal for five months (24) (Figures 5-8); the site was evaluated clinically and with periapical radiographs for implant placement.



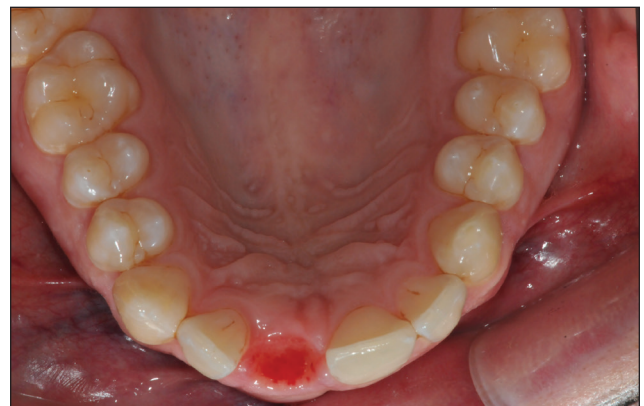
**Figure 5**



**Figure 6**



**Figure 7**



**Figure 8**

A crestal incision was made between the mesial of teeth 12 and 21. A sulcular incision was made from the mesial of tooth 13 to the mesial of tooth 12, and from the mesial of tooth 21 to the mesial of tooth 22. A full thickness flap was reflected on the buccal with limited reflection on the palate. An osteotomy site was prepared slightly palatal to the mid crestal and buccolingually to site 11. A BioHorizons Tapered Internal implant 3.8 x 12.0 mm was placed according to the BioHorizons protocol. A temporary peek abutment (BioHorizons) was placed over the implant, hand tightened, and Teflon was placed into the screw hole. A flowable light cured composite Revolution (Kerr) was used to fixate the laboratory fabricated temporary crown (Innovative Lab, Toronto) to the peek abutment. The temporary crown with the peek abutment was unscrewed and the rest of the void between the temporary crown and the peek abutment was filled in with the flowable light cure composite Revolution (Kerr). The excess composite was removed using a Sof-lex disc (3M). The crown was tried in; occlusion checked, adjusted and hand tightened (Figure 9).

Three months later, the temporary crown was removed. The impression coping (BioHorizons) was placed, a radio-



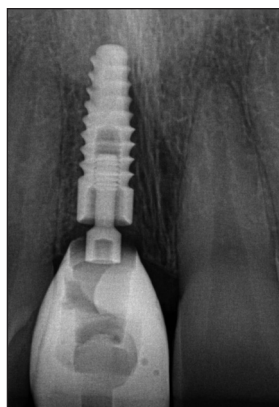


Figure 9

graph confirmed the seating of the impression coping, and a PVS impression Impressiv (Cosmedent) was taken. A lower alginate (Jeltrate) and the bite registration using Quick Bite (Clinician's Choice) were also taken. The shade was recorded using a Vita shade tab and SLR camera (Nikon). The temporary crown was placed back onto the implant.

Two weeks later, the final crown (Innovative Lab) was inserted following the BioHorizons protocol for crown cementation (Figures 10 and 11). The occlusion was checked and adjusted with 200 micron and eight micron articulating paper.



Figure 10

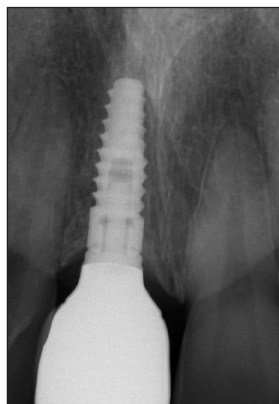


Figure 11

## Conclusion

Replacement of a single central incisor requires careful treatment planning. The hard and soft tissue must be developed and maintained to have a positive esthetic outcome as per a patient's expectation. The use of an avulsed tooth as a pontic can provide the proper contour needed to adapt the hard and soft tissue to achieve ideal form and esthetics for a single missing maxillary incisor (Figures 12 and 13). [OD](#)



Figure 12



Figure 13

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