

Fixed-Type Restoration for a Post-Traumatic Partially Edentulous Anterior Maxillary Area: A Case report

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Abstract

Management of post-traumatic injury in the anterior maxillary area presents a challenge to surgeons and prosthodontists. This case report presents a 25-year-old female with a severely resorbed partially edentulous anterior maxillary area and previously placed implants. A fixed-type restoration was fabricated for the missing soft and hard tissues. The framework design was divided into crown and gingival portions.

Keywords: Dental implant, esthetic zone, trauma.

Introduction

Trauma of the anterior maxillary region, which is popularly known as the “esthetic zone,” presents various and complicated cases. These cases greatly challenge surgeons and prosthodontists, especially when soft and hard tissues are lost following teeth loss. Treatment for these cases is multidisciplinary, requiring surgical, orthodontic, operative, and prosthetic compliance.

The buccal cortical plate of the anterior maxilla is thin and porous. After traumatic injury, the buccal plate always resorbs and migrates to a more palatal position, and may later require augmentation prior to implant placement. In the study of Schwartz, complications (e.g., fistula, inflammation, and swelling hematoma) were observed in 45.3% of trauma patients.¹ There was no difference in complication and postoperative incident rates with regard to implantation technique. When patients were divided into two groups, with and without inflammatory lesions, significantly lower complication and postoperative incident rates were found in the non-inflammatory group.

Screw-type implant restorations are considered to have good retrievability. However, implant placement is not always favorable for this kind of restorations. Sierraalta described the technique of fabricating implant frameworks and single units of crowns separately for solving this situation.^{2, 3}

This clinical report demonstrates the use of a one-piece casting framework with four single units of porcelain-fused-to-metal crowns for managing a patient with severe resorption of the hard and soft tissues over the anterior maxilla.

Case report

A 25-year-old female who underwent orthognathic surgery and with trauma history came to our prosthodontic department in August 2010. Her chief complaint was on the esthetics of her missing upper anterior teeth. She suffered from a car accident, and poor prognosis led to the extraction of her teeth 12, 11, 21, and 22. After ridge augmentation over the edentulous area, two 3.25x11.5 mm endosseous implants (Biomet 3i) were placed in the upper right and left lateral incisors in a two-stage procedure. Marginal bone loss to the fourth thread was noted over the mesial side of both implants after six months (Fig1). Other clinical problems, including soft tissue loss over the edentulous area with cover screw exposure, crossbite between the upper and lower canines, buccal gingival recession (Fig2), and periapical radiolucency over the tooth 23 area,

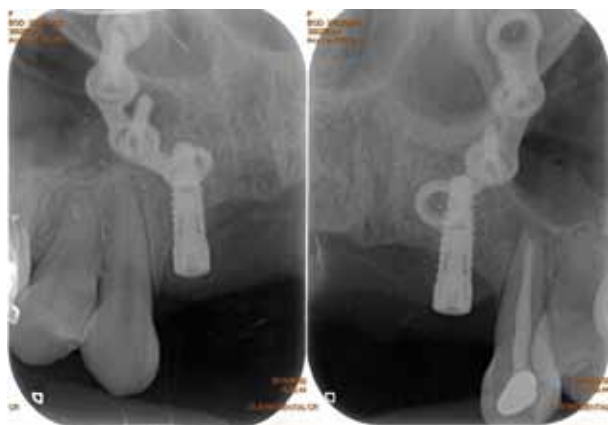


Fig12 Periapical film of after 6-month implants placement. Noted marginal bone loss to the forth thread of both mesial side of implants



Fig2 Soft tissue loss over edentulous area with cover screw exposure, Crossbite between upper and lower canines and Buccal gingival recession over 23 area are noted

were noted. Extraoral findings and esthetic analysis showed insufficient lip support (Fig3a), blunt naso-labial angle, and no gummy smile. A tentative treatment plan was drawn, which included interim removable dentures to meet urgent esthetic demands and endodontic retreatment for tooth 23. In October, the patient became pregnant and treatment was stopped.

In July 2011, the patient returned to finish treatment. After treatment plan discussion, the patient refused to remove existing implants and any augmentation procedure. She further refused orthodontic treatment for crossbite correction and chose a fixed-type restoration for the final prosthesis.

After checking the ISQ value of implants, the fabrication of the prosthesis began with the following procedures:

1. Implant-level impression was conducted with the open tray technique.
2. The definitive cast was fabricated with soft tissue moulage (Gingifast; Zhermack SpA, Badia Polesine, Italy).
3. The maxillomandibular relationship and facebow transfer records were obtained and transferred to a semi-adjustable articulator.
4. Diagnostic waxing was performed over the upper anterior region using a temporary removable denture as guide.
5. Temporary restoration was delivered.
6. The patient was instructed to use super floss for cleaning and maintaining oral hygiene after delivery. Phonation and profile (Fig3b) were checked between appointments.



Fig3a Insufficient lip support was noted without wearing prosthesis

Fig3b Soft tissue was improved with temporary fixed restoration

After six months of follow up, the bone level surrounding both implants became stable. Two non-engaged UCLA abutments were used for fabricating the implant-supported framework. The soft tissue profile of the pontic area was copied from the temporary restoration, and the prosthesis design was divided into crown and gingival portions. The laboratory and delivery procedures were as follows:

1. Full wax up was conducted (Fig4).
2. The gingival portion was cut back, and crown space was checked.
3. The gingival portion was cast by lost-wax technique (Fig5), and framework fitness was checked with the one-screw test.
4. The crown portion on the gingival portion of the framework was waxed up.
5. The crown portion was cut back, and porcelain space was checked.
6. Crown copings were tried on the gingival portion of the framework, and veneered porcelain was added.

7. Pink porcelain was added over the gingival portion of the framework.
 8. Staining and glazing was conducted. Access holes were marked on the palatal surface of the crown portion (Fig6).
 9. The prosthesis was delivered (Fig7-8).
- The insertion of the prosthesis involved



Fig4 Fully wax up



Fig5 Try in of the framework with gingival portion



Fig6 Marking access holes on palatal surfaces of the restorations



Fig7 Frontal view of the patient after restoration



Fig8 Intra oral view with maxillary anterior prosthesis

screwing the framework into place until 25-Ncm torque was achieved and covering the screw-access holes with gutta-purcha and composite resin. The crowns were then placed onto the framework, and the desired occlusal contacts were confirmed. The four crowns were cemented using zinc phosphate cement. Excess cement was removed, and occlusal contacts were once again verified prior to giving the patient postoperative instructions for care and maintenance. The patient was scheduled for recall every three months.

Discussion

Extensive soft and hard tissue loss was found in this case, indicating the complexity of post traumatic complications. The crossbite between the canines may have been caused by orthodontic relapse and loss of proximal contact. Because the patient wanted no more surgical intervention and preferred a fixed-type restoration, a treatment option was presented. There were several challenges to the recommended prosthesis design, including mechanical and esthetic concerns. First, there was possibly insufficient support for pink porcelain, especially in the embrasure area, which may cause porcelain fracture during crown cementation. Second, there were difficulties in mimicking “natural” gingival color by pink porcelain. Retrievability is the design's primary advantage; if there is ever a fracture of the veneering porcelain on the crown portion of the prosthesis, a new crown may be fabricated using conventional fixed prosthodontic techniques. The impression of the crown portion can be made without removing the entire prosthesis, and an interim restoration may be used while the crown is being fabricated.

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