HARD AND SOFT TISSUE MANAGEMENT IN THE AESTHETIC ZONE IN DENTAL IMPLANT THERAPY: A CASE REPORT

Abstract

Implant survival is now predictable in most of the cases, while implant success remains a challenge due to its subjective criteria. Aesthetic outcome is one such criterion in achieving the latter. Achieving aesthetics with implant restoration is significantly more challenging than with conventional restorations, more so for anterior restorations. This clinical case shows how grafting of an extraction socket, low trauma and primary closure of the surgical site were critical for minimisation of ridge resorption. Use of a patient's natural tooth crown as a temporary ovate pontic has also been demonstrated. The result was pleasing and highly acceptable to the patient.

Keywords: Ridge preservation, atraumatic extraction, natural tooth crown, ovate pontic, dental implant

Introduction

Placement of dental implants in the aesthetic zone is an advanced to complex procedure requiring comprehensive planning and precise surgical execution\(^1\). Any defects in this zone will introduce obvious disharmony with the perioral facial structures leading to poor restorative and aesthetic results.

There is convincing evidence that implants placed in non-ideal positions are subjected to non-axial loading which may lead to high failure whether mechanical or aesthetic\(^2,3\). To obtain optimal function and aesthetics, the position of the implant in the arch has to be in a biologically acceptable and prosthetically driven location\(^4,5\). One of the challenges is that the alveolar process is a tooth dependent tissue\(^6\) that will invariably undergo loss in height and width after extraction of the tooth. This leads to a narrower and shorter residual ridge, which may complicate ideal implant positioning \(^7,8\). Here, we report a clinical case where hard and soft tissue therapy was used during and following extraction of a maxillary right central incisor to achieve optimal esthetic results.

CASE PRESENTATION

23-years-old, otherwise, healthy man presented with a transverse fracture of a root-treated, heavily restored upper right central incisor (11). He had both a medium smile line and aesthetic expectations (Fig. 1). A periapical radiograph revealed that the fracture was subosseous and thus unrestorable. Further, there was minimal periapical radiolucency around the 11 but no pathology of the adjacent teeth which tested vital (Fig. 2). The treatment objective in this case was restoration of function and aesthetics. To achieve this objective, an implant-supported crown was proposed which the patient accepted and consented to. The treatment plan was formulated as follows: flap elevation, atraumatic extraction of 11, simultaneous grafting of the extraction socket, delayed implant placement followed by conventional restoration and loading.

Clinical Procedure

A muco-periosteal flap of curvilinear design was raised buccal to the 11 extending to the distal aspect of 12 and 21, but preserving the papilla in the respective areas. A size 15c surgical blade used to divide periodontal ligaments all around the root before gently pulling out the tooth using upper anterior forceps with no elevation. Half a gram (0.5g) of a xenograft bone material (Gen Oss, Technoss s.r.l, P.za Papa Giovanni XXIII, 2 Giaveno (TO) Italy) was lightly packed into the extraction socket after thorough debridement. Primary closure was achieved by advancing the flap. No barrier membrane was used in this case. A periapical radiograph was taken as a baseline record of the bone filled socket (Fig. 3). The patient's own crown was modified.
and utilized as an ovate pontic, which was then splinted to the adjacent teeth using resin composite. Wide contact areas were created by extending the splint apically (Fig. 4).

After six months of healing, a periapical radiograph showed slight vertical bone loss when compared with the baseline radiograph. A radiographic stent was fabricated and later converted into a surgical stent upon verification of the correct planned implant position. Based on the information collected from the clinical and radiographic examination, a 3.75 mm diameter by 13mm length implant was chosen as ideal for the available space.

Under aseptic technique, sequential drilling of the implant site was done. A horizontal bone deficiency was present resulting in less than 2mm thickness of bone on the buccal aspect of the implant, and some threads were exposed (Fig. 5). This necessity additional contour argumentation simultaneously with implant placement. A healing collar was placed and the implant submerged to ensure undisturbed healing. The patient's natural tooth crown (ovate pontic) was splinted back to the adjacent teeth after suturing. Re-entry was done after a healing period of seven (7) months and the definite restoration (porcelain-fused-to-metal) was cemented after one month of soft tissue maturation. The prolonged phases of treatment in this case were due to the patient's unavailability.

**Treatment outcome**
At the 1-year follow-up, the implant was still in place with no prosthetic failure noted. The patient's oral hygiene was found to have been impressive and no peri-implantitis (Fig. 6) or perimucositis was detected. Both mesial and distal papilla were found to have filled the entire embrasure areas (Fig. 7) and were in harmony with those of the adjacent teeth and thus a good aesthetic outcome had been achieved. However, there were two undesirable outcomes. These were the scarred gingival tissue and the less than perfect shade of the porcelain-fused-to-metal crown.

**Discussion**
Tissue preservation is central to the achievement of an aesthetic outcome. Since tissue dimensional loss is an inevitable occurrence following tooth loss, aesthetic treatment planning should start as soon as the decision to extract the tooth is made. In this case, several measures were taken to ameliorate tissue dimensional loss and contour the soft tissues. These were (1) low trauma extraction (2) grafting of the extraction socket and (3) the use of the patient's natural tooth crown as an ovate pontic. Although modeling and remodeling will inadvertently occur after tooth extraction, ridge preservation procedures have been shown to significantly reduce vertical and horizontal contraction of the alveolar bone crest but not completely prevented it[10,11]. In this case, minimal-to-moderate bone resorption was seen even after grafting the site and thus validates the previous findings. However, it is not possible to judge if using a barrier membrane would have further improved the outcome.

A traumatic extraction using periodontes or piezosurgery as documented before[12,13] forms an important part of a tissue preservation technique. That said, the equipment needed for its ideal
execution are expensive and not readily available in most developing countries. However, one should not shy away from attempting a traumatic extraction in the absence of these advanced instruments. As it turned out in this case, simple measures such as gentle forceps extraction, non-elevation and preservation of the buccal plate can sometimes do just as well.

Provisional crowns have successfully been used by implant practitioners for temporary function and aesthetics. Utilization of the patient’s natural crown as a provisional restoration in dental implant therapy is scantily documented. This clinical case demonstrates the use of the patient’s natural tooth crown as an affordable and efficient temporization strategy. Papilla-fill was achieved in both embrasure spaces with a pleasing natural emergence profile outcome, which was in harmony with the existing peri oral tissues. The patient was quite pleased with the outcome at the end of the treatment. The above notwithstanding, it was also noted that the medium smile line, thick lips and gingival biotype in addition to a moderate aesthetic expectation contributed to the success of the treatment.

Clinical relevance
Implant restorations done in the aesthetic zone require a thoughtful treatment planning and precise execution of the plan. Although grafting of the extraction socket on its own does not preclude ridge resorption, it together with low trauma extraction and primary closure of the surgical site, as demonstrated in this case, is critical if ridge resorption is to be minimized. Additionally, the patient’s own extracted crown, if modified, can serve as a suitable provisional restoration for soft tissue contouring, temporary function and aesthetics.

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REFERENCES

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