Immediate placement and loading of implants in anterior maxilla using an altered screw-retained implant fixed prosthesis

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ABSTRACT

This article describes the immediate placement and loading of implants in the aesthetic zone using an implant-retained, fixed prosthesis with a modified design. One section of the implant prosthesis has cemented crowns and the other section is the conventional screw-retained. This combined approach significantly offsets the unsuitable implant position, alignment or angulation, while ensuring the easy retrievability, repair and maintenance of the prosthesis at the same time.

Key words: Implant-retained fixed partial denture (FPD), immediate loading, fixed retrievable prosthesis, implant FPD design, immediate placement

High clinical success rates have been documented by various authors, with the use of immediate and early loaded implants supporting complete-arch fixed restorations in the maxilla and mandible.[1-3] However, inadequate data exists for the immediate loading of implants in the partially edentulous anterior maxilla.[4,5] There are few studies with good short-term, follow-up results for single-tooth implant replacement in the aesthetic zone,[6,7] but there is a dearth of literature documenting the immediate placement and loading of implants replacing multiple missing teeth in the anterior maxilla.[8]

This article presents the implant-based rehabilitation of a partially edentulous patient, using a technique employing simultaneous cement and screw-retention in the same prosthesis. The implants were immediately placed through a flapless surgical technique and loaded with a definitive prosthesis.

CLINICAL REPORT

A 53-year-old, partially edentulous male, reported to the clinic seeking treatment for broken anterior teeth and replacement of missing teeth. On clinical examination, the maxillary right central incisor, right lateral incisor, and left central incisor were found to have root caries. Citing poor restorative prognosis, these teeth were planned for extraction. As the maxillary left central incisor was broken with only a root stump remaining, there was migration of the maxillary left lateral incisor, causing malocclusion of the anterior teeth, with aesthetic imbalance and asymmetry between the right and left anterior segments. A diagnostic wax-up of the anterior teeth, as part of the treatment plan, revealed that the maxillary left lateral incisor caused hindrance toward creation of acceptable symmetry in the aesthetic zone (even with elective root-canal treatment and gross tooth reduction). Orthodontic correction was considered, but due to lack of patient motivation and time constraints, the maxillary left lateral incisor was also planned for elective extraction along with the other maxillary incisors. Radiological examination showed good alveolar bone support around the maxillary incisor teeth with no periapical lesions in relation to any of the teeth [Figure 1]. A conventional fixed partial denture was considered for replacement of the anterior teeth and deemed inappropriate due to the long span of the partially edentulous space and less-than-ideal periapical and periodontal health of the abutments (maxillary right canine and left first premolar). An implant-retained fixed prosthesis was then planned as a better alternative. The patient was presented the option of extraction, conventional implant placement, and second-stage loading. Alternatively, the option of immediate placement and immediate loading, subject to the initial primary stability of the implants, was also proposed. The patient opted for the latter option.

Three (Nobel Biocare Replace Select Tapered TiU, One WP, and Two RP) dental implants were placed immediately, post extraction of the maxillary incisors [Figure 2]. An insertion torque of 45 Ncm was achieved for all implants. Open-tray impressions were made of the maxillary arch using suitable impression copings (Nobel Biocare AB, Sweden) and master casts were poured (Type IV dental stone, Ultrarock) with

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implant replicas (NobRpl, Nobel Biocare AB, Sweden). A temporary acrylic resin screw-retained prosthesis, fabricated on the master cast, was issued for interim use. A full contour wax pattern was then fabricated on castable copings (Auradapt, Non-engaging, Nobel Biocare AB), cut-back was done and cast into a metal framework (Degudent U, Degudent GmbH, Hanau-Wolfgang, Germany). The framework try-in was performed on the patient to check for passivity of fit. Subsequently, a ceramic veneer (IPS d.SIGN, Ivoclar vivadent, Schann, Leichtenstein) was fired on one part of the screw-retained frame and the metal-ceramic single crowns were fabricated on the other

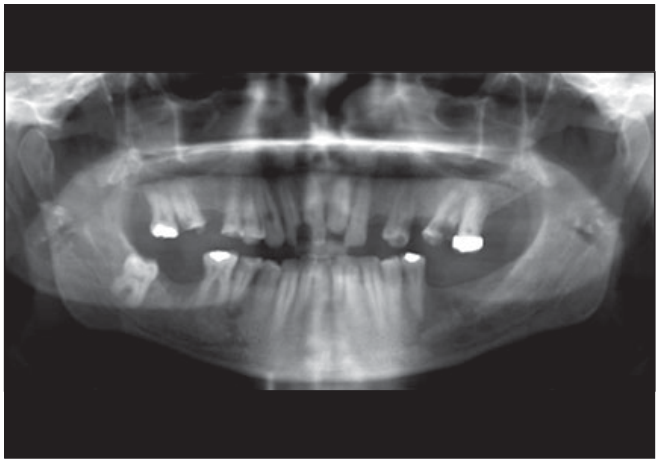

Figure 1: Pre-operative panoramic view of the maxillae and mandible

Figure 2: Occlusal view of the anterior maxilla post flapless immediate implant placement

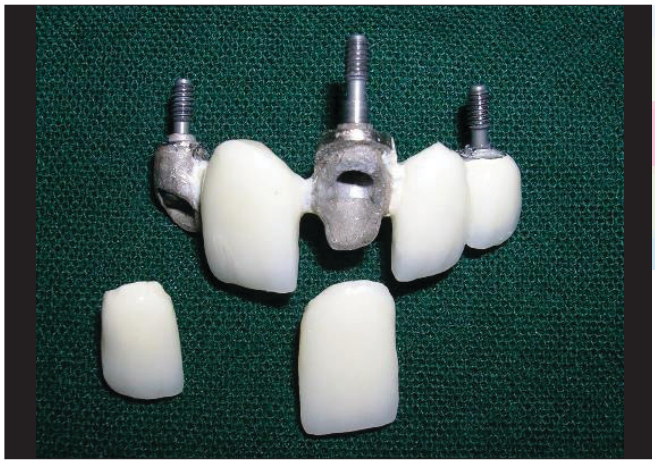

Figure 3: Screw-retained prosthesis with metal-ceramic crowns

Figure 4: Screw-retained framework torqued to the implants

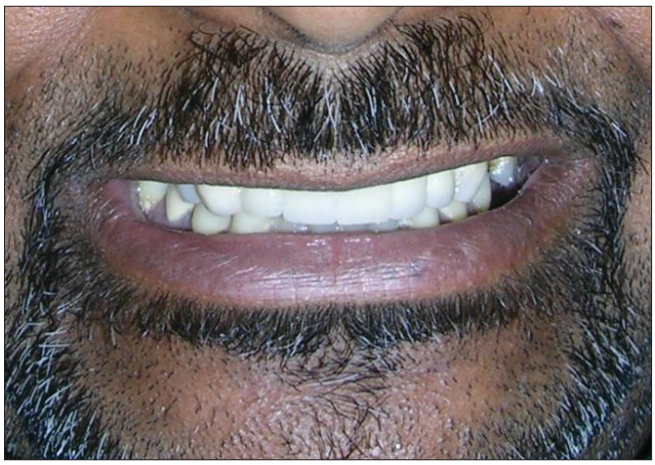

Figure 5: Post-operative view

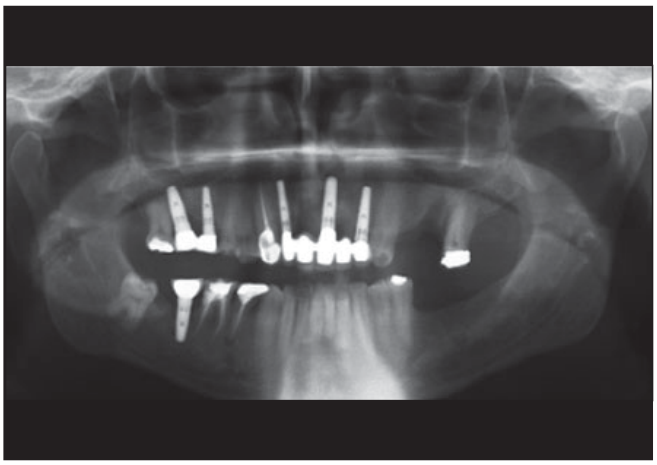

Figure 6: Post-operative panoramic view of the maxillae and mandible

[Figure 3]. One week after the implant placement, the screw-retained framework was secured to the implants at the 10 Ncm torque [Figure 4]. The crowns were cemented over the framework in the left central and right lateral incisor region using provisional cement (TempBond, Kerr Corp). The patient was then placed on a follow-up protocol [Figure 5]. Six months post issue of the prosthesis, the crowns were removed and the screws re-torqued to 35 Ncm. The crowns were luted back with provisional cement (Tempbond, Kerr Corp) [Figure 6]. Oral hygiene was reinforced and the patient placed on a maintenance protocol.

DISCUSSION

Immediate implant placement and restoration of single maxillary teeth has been predictably employed for the last few years, but inadequate data exists with regard to replacement of multiple anterior teeth. Potential advantages have been noted with immediate implants / loading, in that the alveolar bone is preserved to some extent following extraction and also the patient is not compromised aesthetically and functionally during the healing period. Fewer surgical procedures are involved, with completion of treatment in a shorter time frame. Nevertheless, an appropriate indication with a good surgical technique and prosthodontic protocol are essential for the success of immediate loading and immediate implantation. Patient-related factors such as smoking, thin gingival biotype, poor oral hygiene, and infections at the potential implant sites are cautionary signs when considering the immediate placement and loading protocol.

Immediate implants were chosen for this patient as there were no peri-apical lesions in relation to the extracted teeth and there was good bone support with healthy gingiva around these teeth. Splinted prosthesis design and reasonable implant primary stability achieved during the placement, were some criteria for selecting immediate loading in this case.

The technique employed in this article significantly negated the effect of fixture position or angulation, on the aesthetic outcome of the implant prosthesis. In areas (Left central incisor and right lateral incisor region) where the screw-access openings were bound to interfere with the reproduction of the desirable aesthetics and morphology, the crowns were individually cemented onto the cast framework. The remaining part of the implant prosthesis (where the implant fixture position / screw-access openings were ideal, and in the pontic area) had ceramic veneer material bonded to the cast framework through a conventional technique. The crowns on the cemented part of the prosthesis had only been luted with provisional cement, thereby, enabling easy retrievability, repair, and maintenance, without jeopardizing the entire framework.

Long-term clinical trials on flapless immediate placement / loading with definitive prosthesis in the anterior maxillary region are required to corroborate the outcome of this report and for establishment of the protocol, for use in routine clinical practice.

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