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Case Report

Achieving aesthetics in deficient anterior maxillary ridge with a modified screw retained prosthesis for Kennedy's Class III situation

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multiple teeth in the esthetic zone is a challenging task for the clinician particularly in sites with multiple missing teeth and with deficiencies in soft tissue or bone. Preservation or creation of a soft tissue scaffold needed to create the illusion of a natural tooth is often challenging and difficult to achieve.^{3,4} Treatment planning for placement of dental implant in the esthetic zone is technique sensitive procedure with little room for error. A subtle mistake in treatment planning, positioning of implant, size and type of implant chosen can lead to esthetic failure and patient dissatisfaction.^{5–7} This article describes the immediate non-functional loading of implants in the esthetic zone of anterior maxilla in a patient with deficient ridge width and length. Rehabilitation process was completed with the placement of two piece ball attachment implants and an intervening conventional two piece implant in between and insertion of modified screw retained prosthesis.

Introduction

Immediate and early loaded implant supported restorations in partially edentulous patients have been shown to be highly predictable in numerous studies.^{1,2} In the early years of Implantology the chief concern was tissue health and implant survival. Over the last few years there has been an increasing appreciation that aesthetics is just as important to the success of final restoration. The term esthetic means pertaining to beauty or to the improvement of appearance (Dorland's Medical Dictionary) and this is often a prime goal of the clinician and patient when replacing missing teeth in anterior maxilla. Implant placement and restoration to replace single or

Case report

A 21-year-old female patient reported to the dental centre with a chief complaint of ill-fitting denture in the maxillary anterior region. On clinical examination the patient had missing maxillary right central, lateral incisors and canine because of trauma. The patient was wearing an interim partial denture for the missing teeth since 5 years. Because of the psychological effect of the trauma the patient was reluctant in undergoing any kind of invasive surgical procedure and wanted

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replacement of the existing denture. Although patient's expectations of health and healthcare are key determinants for their satisfaction; at times the treating physician has to take initiative to remove the psychological fears of patient and motivate them for comprehensive long-term rehabilitation. In this case the patient was motivated for implant supported prosthesis with minimal invasive procedure and immediate rehabilitation. Taking guide of the diagnostic aids (study models, CT scan, OPG & IOPA X-Ray) the edentulous site was evaluated. The edentulous space dimensions were evaluated clinically and on the study models. The mesio-distal dimension was 16 mm with a width ranging from 3 to 6 mm buccopalatally at the crestal region. There was ridge deficiency noticed in the labial alveolar plate in the missing central and canine region. The CT scan confirmed bone density of D3 type (Misch Bone Density Classification). There was supraeruption of mandibular right central, lateral incisors and canine further compromising the situation and limiting the available treatment options. After thorough assessment of clinical and radiological parameters it was decided to place a two piece, one-stage conical implant with a replaceable ball attachment in the region of missing right canine and central incisor and a two piece, one-stage conical implant for missing lateral incisor. An immediate modified screw retained prosthesis was planned for the final prosthetic rehabilitation.

Treatment procedure

Armamentarium included surgical implant kit and implants (AB Superior Implant Technology, Israel). Following standard aseptic preparation, implant site was anesthetized by infiltration of lignocaine with adrenaline. Flapless technique was chosen for placement of implants in the region of missing right central, lateral incisors and canine. Tissue punch was made on the crest of the edentulous ridge at 3 points with a mesio-distal dimension of 3 mm in between the points. A series of width depth and width increasing drills were used to prepare the implant site. Two piece one-stage conical implant (3.2 mm × 13 mm) with a replaceable ball attachment in the region of missing canine and right central incisor region and a two piece one-stage conical implant (3.75 mm × 13 mm) for missing lateral incisor was placed. The ball attachments were secured on the implants in the region of canine and central incisor and an abutment with flat platform for screw retained restoration was secured onto the implant in the region of lateral incisor [Figs. 1 and 2]. Closed tray impression was made with polyvinylsiloxane putty and light body impression material [Express™ XT VPS impression material, 3M ESPE, Germany]. The surgical site was cleaned with betadine and a monophasic impression was made. The impression tray with set material was removed with a single jerk parallel to the long axis of implant. The abutments were unscrewed from the mouth, fixed to the lab analogues and placed into the impression. Periodontal pack was placed over the raw punched area around the implants. The impression was poured using Type V Diestone [Kalstone, Kalabhai, Karson Pvt Ltd, India]. Wax up and teeth arrangement (Cosmo HXL, Dentsply, UK) was done. Trial denture was placed in the mouth and checked for occlusion and aesthetics. The abutment with flat platform for screw retained restoration was

Fig. 1 – Implant placement.

roughened on the working cast to be incorporated into the final denture. The denture was acrylicized with high impact denture base material [Trevalon HI, Dentsply, UK]. The ball attachments were secured onto the implants in the region of canine and central incisor. Plastic sleeve attachments were placed on the ball attachments and picked up into the denture using autopolymerising resin [Fig. 3]. The patient was rehabilitated after 48 h with a modified screw retained prosthesis for esthetic and functional enhancement [Fig. 4]. Post operatively the patient was advised to gargle with 0.12% chlorhexidine twice daily for oral hygiene maintenance. There were no post operative complications. The patient was followed up every month for 2 years. The patient was advised to use interdental brush to maintain the hygiene in the embrasure area between the prosthesis and the alveolar ridge. The prosthesis was unscrewed every 6 months for oral hygiene maintenance of peri-implant tissues. The prosthesis and the implants were in proper function at the end of 2 years.

Discussion

Implant retained fixed partial denture have been the treatment of choice for multiple missing teeth in the anterior maxilla.⁸ However in cases of severe ridge deficiency and compromised ridge space alternative modality of treatment in

Fig. 2 – Post operative IOPA.

Fig. 3 – Finished Prosthesis.

the form of a removable screw retained or a removable implant retained restorations have to be planned.⁹ Two basic methods of treating compromised ridges are by either surgery or prosthetic rehabilitation.¹⁰ Surgical reconstruction of deficient bone and soft tissue may be achieved with guided bone regeneration, bone grafting, distraction osteogenesis and soft tissue grafting procedures. The reconstructive procedure should be predictable and the patient made aware of the risks involved, including the possibility that there may still be some deficiency and level of compromise.¹⁰ In the contrary sometimes the deformity has to be accepted and a compromise needs to be made in prosthetic reconstruction. In this situation there has to be sufficient bone to allow provision of an adequate number of implants to fulfil the bio-mechanical requirements, thereby assuring a good long-term prognosis.⁹ The patient should be aware and accept the compromised prosthesis. Whatever restoration is chosen to solve the esthetic problem it is axiomatic that it should not compromise the health of the remaining dentition or associated oral structures.

Fig. 4 – Prosthesis insertion.

A conventional screw retained or implant retained removable prosthesis can provide ideal aesthetics as it readily replaces missing gingival and the teeth can be placed in any desired arrangement without concern for the position of the residual ridge or implants. A labial flange on the denture also gives good lip support. The major disadvantage with a screw retained or implant retained removable prosthesis is its maintenance. The patient has to take additional care for oral hygiene maintenance.

Modified screw retained prosthesis was planned in this case. The female patient presented to us with a loose fitting denture replacing missing maxillary anterior teeth. The labial alveolus was deficient in the region of missing central and canine region with some amount of sound labial alveolar plate in the lateral incisor region. The patient was sceptical and reluctant for undergoing any kind of invasive procedures. In addition she wanted immediate prosthesis replacement. A thorough evaluation of the clinical situation was performed considering the limitations and the treatment plan was formulated. It was not possible to place wide diameter immediate loaded implants in the deficient ridge site of central incisor, canine region and rehabilitate with a fixed dental prosthesis. The second option was ridge augmentation of the edentulous site followed by implant placement, but the rehabilitation time was prolonged which was unacceptable for the patient. The third option was screw retained fixed restoration with placement of 2 implants in the lateral and central incisor and rehabilitation with a cantilevered prosthesis for missing canine, which was ruled out because of deficient edentulous ridge. After doing all permutation and combinations it was decided to place two implants with ball attachments and a two piece implant with flat abutment and load with a screw retained removable partial denture. The concept behind this design was because of adequate bone availability in the lateral incisor region for placement of a wide diameter implants to bear the maximum load and the other two ball retained abutments could equally share the load of the prosthesis and dissipate the occlusal forces. Concept of splinting of implants and favourable distribution of occlusal forces was taken into consideration for rehabilitation. The final prosthesis inserted provided good function and aesthetics for the patient with minimal limitations undermined.

Conclusion

Implant retained fixed partial denture have been first line of treatment of patients for restoration of aesthetics and function. However screw retained removable partial dentures should not be ruled out in patients with deficient edentulous ridges. Long-term studies have to be performed for comparison between implant retained fixed and removable dental prosthesis in the anterior maxilla with compromised bone to corroborate the outcome of the prosthesis and for establishment of the protocol for routine clinical use.

Conflicts of interest

All authors have none to declare.

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