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Oral Rehabilitation of Maxillofacial Trauma Using Early Loaded Dental Implants: A Case Report

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Abstract: *This clinical report described the oral rehabilitation of an adult female patient who had experienced significant maxillofacial trauma due to a motor vehicle accident resulting in the loss of multiple maxillary teeth. The specific objectives of this treatment were to restore aesthetics and masticatory function. Treatment included removal of fractured roots, placement of multiple endosseous implants. The successful oral rehabilitation was managed with placement of multiple maxillary endosseous implants. These osseous integrated implants were restored with multiple anterior metal-ceramic FPDs and anterior single metal-ceramic crown. The patient's esthetic and functional expectations were successfully achieved.*

Keywords: *oral rehabilitation, oral and maxillofacial trauma, dental implants, implant dentistry, early loaded implants*

I. Introduction

Osseo-integrated implants are the most advanced alternative in the treatment of patients who need oral rehabilitation. Loss of teeth in the esthetics zone is a traumatic experience for the patient as phonetics may also be affected in such cases. Hence implant prosthesis in the esthetic zone is the most challenging situation confronting the clinician.

According to the Branemark protocol, a healing period of more than 6 months has been recommended before implant placement thus extending the treatment period for several months [1]. Attempts to shorten the overall length of treatment period have focussed on approaches like early or immediate loading following implant placement , immediate implant placement in fresh extraction site and immediate or early loading [2,3] .

The concept of immediate implant loading has recently become popular due to less trauma, reduction in overall treatment time, reduction in hard and soft tissue resorption, increase in patients acceptance along with better function, esthetics and has a psychological benefit too [4, 5]. In this case report, the harmony of soft and hard tissue was preserved by immediate implant placement and early loading in the anterior maxilla.

II. Case Report

A 28 years old female patient, reported to Govt.Dental College Calicut with the chief complaint of difficulty in mouth opening and multiple missing front teeth. There was a history of trauma sustained about 3 months ago and attempted mandibular surgery after the trauma. A clinical and radiographic examination revealed mandibular fracture stabilized with open reduction and internal fixation (ORIF), avulsed 11, 12,22,24 and 25, extruded 21 with class 11 fracture (corrected with composite filling).Root stump was noted i.r.t 23.(Fig 1-3)

The patient's primary concern included limited mouth opening and need for replacement of the missing masticatory system. Of equal importance to her primary concern was to have highly esthetic replacement restorations. A detailed medical, dental, and social history did not reveal any contraindications to dental therapy. Patient presented with osseous ankylosis of TMJ with maximum mouth opening of 10 mm. Gap arthroplasty was done under general anaesthesia and moth opening was increased to 37 mms postoperatively (Fig 4, 5). There was no periapical lesion or periodontal bone loss appreciable on the X-ray or any soft tissue edema clinically. The patient's periotype was assessed and found to be a thick gingival type, with a high scallop and bone sounding for the labial plate revealed the crest of labial bone 3 mm apical to the gingival margin.

Maxillary and mandibular complete arch impressions were obtained using irreversible hydrocolloid (Jeltrate, Alginate, Fast Set, Dentsply International Inc.York, Pa) impression material. Diagnostic casts were fabricated from Type III dental stone (Silky Rock, Whip Mix Corporation, Louisville, Ky)

A treatment plan was developed along with various treatment alternatives and was presented to the patient. The treatment options included: (1) multiple implants and fixed restorations (ie, fixed partial dentures

[FPDs] and crowns); (2) multiple implants and removable partial dentures (RPDs); (3) conventional RPDs without implant support; (4) a combination of options 1, 2, and 3; and (5) no treatment. Risks, benefits, alternatives, and fees were explained to the patient, and all of the patient's questions were answered. Patient was very conscious about her aesthetics and was very keen for earliest possible restoration of her teeth. She opted for immediate implant placement and early loading procedure

The patient was scheduled for surgery and prescribed Amoxicillin 500 mg tid 1 day preoperatively. The extraction of root stump 23 was performed under local anesthesia using periotomes (Medesy, Italy) and luxators with appropriate precautions to ensure that the labial plate of bone was not traumatized. The extraction socket was carefully examined for dehiscences and fenestrations and debrided of residual periodontal fibers using curettes. Four self-tapping tapered implant of 3.5 mm diameter and 16 mm length (Adin, Israel) were placed after preparing osteotomy i.r.t 12, 11 and 22 and 24 ,without raising the flap and taking care not to fracture the labial bone plate (Fig. 6). All implants were determined to be clinically stable. Satisfactory primary stability was achieved with all the four implants and immediate orthopantomogram (OPG) showed good parallelism as well [Fig.7]. Antibiotics, anti-inflammatory agents and chlorhexidine mouth-rinse were prescribed following implant surgery.

The immediate postoperative period was uneventful and the patient returned after 4 weeks for second stage implant surgery. The soft tissue around the implant was healthy, with no signs of inflammation or recession. The radiograph at this stage revealed nothing untoward.

Healing cap was secured on the implants (Fig.8). Appropriate antibiotics and analgesics were prescribed and postoperative instructions were given. Endodontic treatment of 21 was done along with implant second stage surgery. Patient returned after 2 weeks for the definitive implant restoration .Tooth preparation was done on 21 and impression was made with open window tray technique using vinyl polysiloxane impression material (Aquasil, DENTSPLY) after connecting the transfer copings. Impression was poured with type 1V stone (Ultrarock, Kalabhai Karson Pvt. Lt, Mumbai) The master cast obtained was mounted on a semi-adjustable articulator using inter occlusal records . Abutment was prepared outside the mouth on working cast(Fig.9). The working cast was sent to laboratory for fabrication of implant crowns and jacket crown on 21. Splinted crown were fabricated on implants i.r.t 12and 11 and implant supported fixed partial denture on implants i.r.t 22 and 24. DMLS PFM crown was fabricated on tooth 21(Fig.10).

Oral hygiene instructions were emphasized, and the patient demonstrated he could clean around all of the prostheses and implants satisfactorily. Follow up was done on 3 months. The OPG taken 6 months postoperatively showed good healing at the implant–bone interface. The patient's functional and esthetic expectations were successfully achieved. (Fig.11)

III. Figures

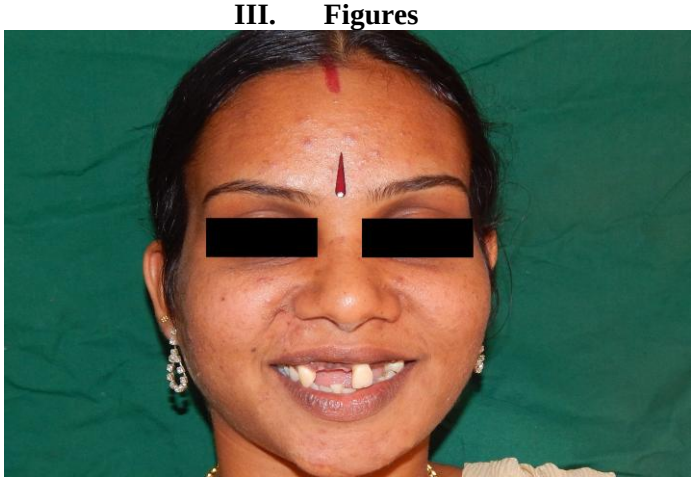

Fig. 1

Fig. 2

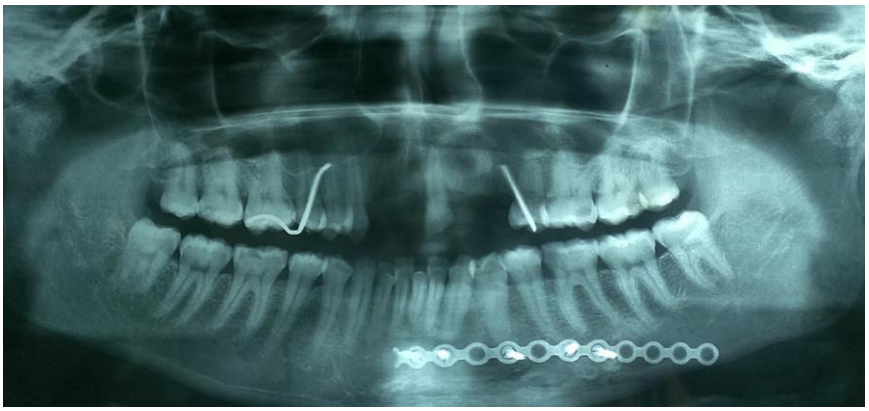

Fig. 3

Fig 4

Fig. 5

Fig. 6

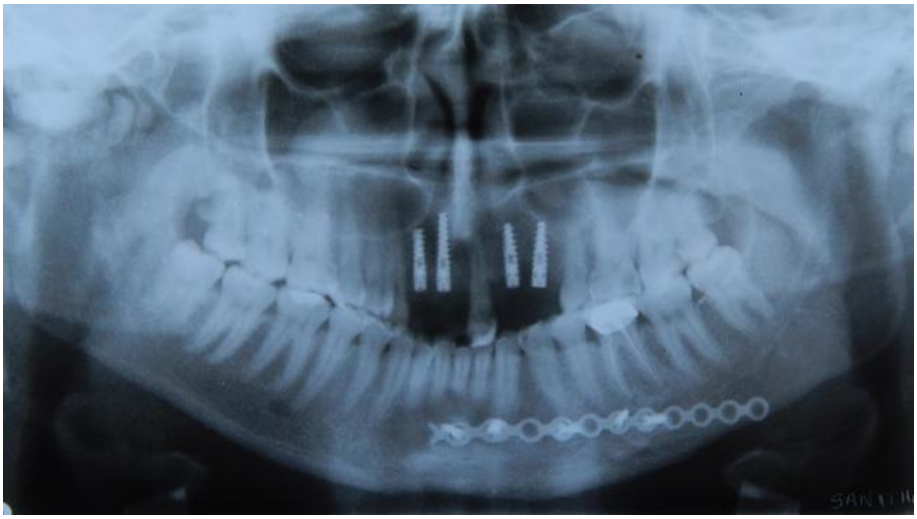

Fig. 7

Fig. 8

Fig. 9

Fig. 10

Fig. 11

IV. Discussion

The classical implantation process involves a healing period lasting six months for implants inserted into the maxilla and three months for mandible implants, using a titanium screw implant with a machined surface [6]. This ensures the needed immobility of the implant at the beginning of the healing period: necessary

for the development of secondary stability of the implant, which results in the long-life of the fully-loaded implant[7] .A shorter healing period, or its complete elimination, brings with it new demands on both the primary and secondary stability of the implant. Primary implant stability is mainly dependent on the mechanical characteristics of the bone (its local quality and quantity), the type of implant used (its geometry, diameter, length and surface) and the method of insertion. Secondary stability represents an enhancement of stability as a result of new bone formation and its 'remodelling' at the contact surface of bone/implant and within the implant's surroundings.

Surgeon may wish to consider loading the newly placed implant immediately or early when anyone of the following conditions may exist at implant site: when primary stability is obtained, bone is type 1 or type 11, site can accommodate implant with a length of 13mm or minimum 3 mm of apical bone present, no need for bone augmentation procedure, once placed implant can be completely protected from function and occlusal forces. [8, 9]

V. Conclusion

This clinical report described the oral rehabilitation of an adult female patient who had experienced significant maxillofacial trauma due to a motor vehicle accident resulting in the loss of multiple maxillary teeth. The specific objectives of this treatment were to restore aesthetics and masticatory function. Treatment included removal of fractured roots, placement of multiple endosseous implants. The successful oral rehabilitation was managed with placement of multiple maxillary endosseous implants. Implants can be successfully placed flapless and loaded immediately without compromising success rates; the procedure decreases treatment time and patient discomfort. These osseous integrated implants were restored with multiple anterior metal-ceramic FPDs and anterior single metal-ceramic crown

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