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RESEARCH ARTICLE

SINGLE PIECE IMPLANT PLACEMENT WITH IMMEDIATE LOADING IN ESTHETIC ZONE - CASE SERIES

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ABSTRACT

Immediate implant placement and thereby loading the implant also immediately has been a desire to achieve for past few years. The most important aspect in immediate loading implant dentistry is to achieve both primary stability and adequate bone implant interface. The aim of implant dentistry is to provide prosthodontic rehabilitation, function, esthetic and comfort to the patient in limited time span. This article focuses on single piece immediate loading implant in esthetic zone, covering the criteria, advantages and disadvantages over conventional two piece implant placement. Immediate prosthesis of a single piece system enable with a better tissue healing and better adhesion of gingival mucosa to form a collar which is healthy and adherent to the implant, avoiding a second surgical procedure. Immediate implant also simplifies the technique and permits the reduction of the number of implant components and hence lower cost of treatment and at the same time maintaining acceptable aesthetic and functional outcomes. This article is a review of clinical cases successfully completed with the use of single piece dental implant in immediate extraction site in esthetic zone.

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INTRODUCTION

With a history of over 40 years, implant treatment is a standard modality of care for single or multiple missing teeth (Lang, 2012; Buser, 2008). The two stage surgical protocol which was standardized by Branemark et al to accomplish osseointegration of implants require a long course of treatment. Implants were submerged and left to heal for a period of 3 to 4 months in mandible and 6 to 8 months in maxilla (Brånemark, 1983). Patients had to wait a significant time before prosthesis placement and often had to wear provisional prostheses in this time period which is not comfortable for the patient. Initially, immediate loading of dental implant were associated with failure. But with the advances being made in the field of implantology, implant design and improved understanding of bone implants can now be successfully loaded early or immediately in selected cases. Predictability of immediate loading implants when followed with proper treatment protocol has been improving. More studies are required to establish long term success with these implants but as of now they look to be very promising and acceptable treatment plan provided the conditions are appropriate.

CASE REPORT 1

A 25 year old female patient Laxmi reported with fractured maxillary right lateral incisor.

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Figure 1(a) She wanted immediate replacement for the same as she was getting married. On examination it was observed that post and core was attempted in maxillary right lateral incisor which failed after 6 years also root resorption was evident with the X-ray leading to extraction being the only choice for the tooth.Figure 1(b) Also we saw missing left lateral incisor, for which again she wanted permanent fixed treatment. So extraction of right lateral incisor was planned followed by immediate implant placement and provisionalization and final prosthesis within 72 hrs. Same was planned for left lateral incisor also.

CASE REPORT 2

A 42 year old female patient Sheel pandey came with fractured maxillary 12. Figure 4(a).Patient was advised extraction and immediate restoration using single piece implant.

CASE REPORT 3

A 49 year old female patient Renu Nagpal reported with fractured maxillary first premolar to the center. Patient was evaluated with the help of X ray, OPG along with clinical examination. Failed root canal and fracture of the crown part led to the conclusion to extract right maxillary first premolar. As 14 being in the esthetic zone, patient wanted immediate restoration following extraction. Extraction of 14 was planned with placement of single piece compressive screw dental implant. All ceramic crown was planned as part of prosthetic rehabilitation.

Case report 1

FIGURE 1 (a) Preoperative clinical view-Fractured 12 and missing 22 (b) Preoperative OPG (c)Removal of crown along with post (d) Extracted tooth(e) Single piece implant inserted both in 12 and 22 region. (f) Transfer post for the impression making (g) Maxillary elastomeric impression (h) Post-operative radiograph-showing implant in 12 and 22 region with the provisional prostheses.

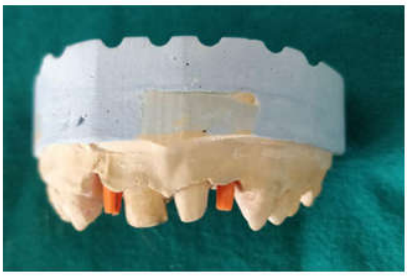

Figure 2. (a) Maxillary cast with

(b)Pfm crown on maxillary cast-occlusal view

(c) Pfm crown on maxillary cast- labial view

Figure 3 Final post-operative clinical view with cemented pfm crown in 12 and 22 region

CASE REPORT 2

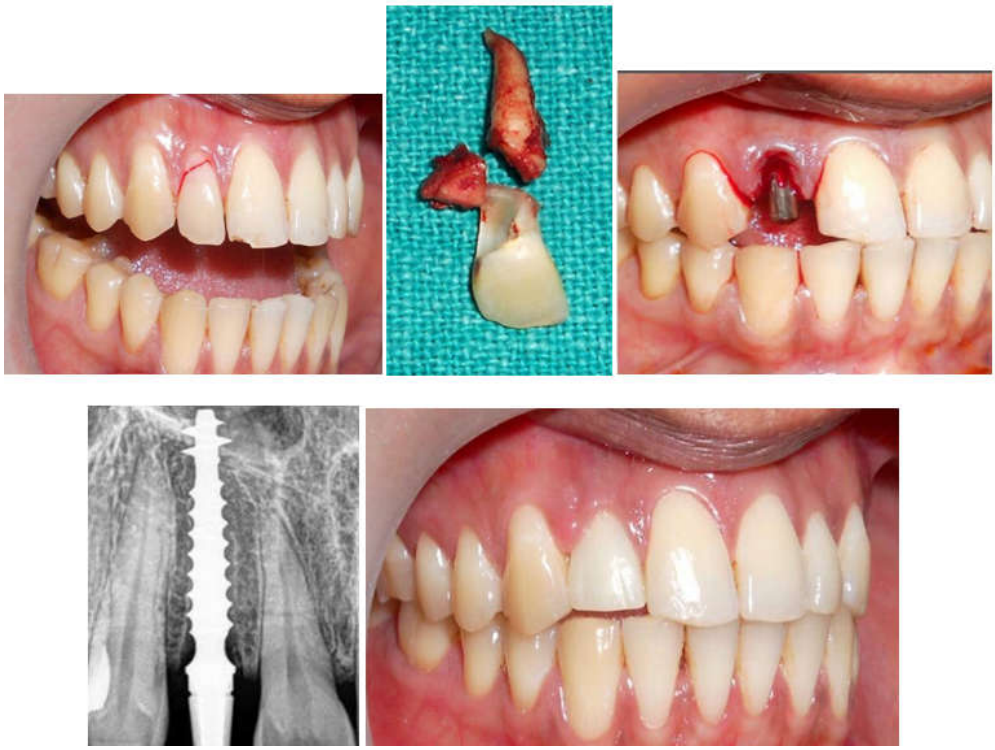

Figure 4(a)Preoperative view-Fractured 12 (b)Extracted tooth (c)Single piece implant inserted (d)Post operative radiograph (e) Post operative clinical view with the final prostheses.

CASE REPORT 3

Figure 5 (a) Extracted tooth (b) Single piece implant inserted in 14 region (c) Cemented final prostheses in 14 region

SURGERY

Surgical protocol emphasize complete asepsis and infection control. After anesthesia, atraumatic extraction was performed using periotome. Care was taken not to fracture the buccal bone as well as not to hamper the gingival width. After extraction compression of socket was not done to avoid trauma to the buccal bone. The osteotomy site was prepared with the initial and final drill protocol. Copious Irrigation of the implant site is maintained to avoid overheating of the implant site. Sterilization of the area should be maintained throughout the procedure. Implant was inserted and the final implant insertion torque of 45N was achieved manually suggesting good primary stability. After surgical intervention, impression was made with the elastomeric impression material. The provisional crown was fabricated within 2 hrs with the composite resin, without any occlusal contact in centric or eccentric movement. Final prosthesis is cemented to the implant abutment in 72 hrs with full occlusal loading. The premature contacts during lateral and protrusive movements were avoided. Follow up of implant survival was done up to 1 year.

DISCUSSION

Tooth loss in the esthetic zone most commonly results in the loss of bone volume in both the vertical and horizontal directions. To minimize the alveolar bone resorption and maintain the periodontal architecture, placement of implants immediately after tooth extraction has been practiced in the anterior region (Divya Sanjay Agarwal et al., 2018). The physiological process of healing of extraction sockets starts immediately after tooth extraction and eventually results in a reduction in height (vertical ridge resorption) and width (horizontal ridge resorption) of alveolar process, so the waiting period for healing socket for 6-12 months is avoided and immediate implant placement has been suggested to preserve the crestal bone (Mangano, 2013; Farmer, 2014; Tan, 2012). Without the delay of healing, if the implant is immediately placed along with temporary or final crown, soft tissue loss is minimum. The implant mimics the root and the crown mimics the coronal portion of the tooth supporting the soft tissue and reducing its chances of shrinkage, making these implant in esthetic zone highly viable.

On basis of the consensus obtained from International Congress of Oral Implantologists meeting at Naples (Italy) in May 2006. The terms non-functional immediate loading and immediate restoration are used when a prostheses is fixed to the implants within 72 hrs without achieving full occlusal contact with the opposing dentition, whereas in functional immediate loading full occlusal contact is achieved with care being taken to remove any eccentric contact in lateral and protrusive movements (Wang *et al.*). The importance of immediate implant placement and provisionalization and final restoration in the esthetic region includes reduced treatment time, immediate tooth replacement, and preservation of the existing osseous and gingival width. The success of these implants depends on the design of the implant which has highly aggressive threads. They are single piece implants with an apical compression thread and straight, flexible, angled solid abutment. Suitable for crowns, bridges and bar connectors. The compression screw design facilitates immediate prosthetic loading provided the surgical placement was carried out correctly, making these implants routinely used for immediate crowns and bridges.

Single piece implant reduces the requirement of multiple surgical and prosthetic component reducing the inventory and cost. Single piece implant have no microgap between the implant and abutment hence the loss of alveolar bone around the implant is minimized as it cannot harbour bacteria. Undisturbed healing of peri implant soft tissue and avoids disruption of soft tissue seal when placing definitive prosthetic restoration in one piece implant procedure compared to two piece procedure. One piece comes with an in built abutment also called friction fit healing abutment which prevents collapse of soft tissue which is not possible in 2 piece as soft tissue heal after 2 stage surgery.

Conclusion

Immediate loading with immediate placement of implants involves placement of final restoration within 48 to 72 hrs . It is applicable only if sufficient primary stability is achieved. The technique was developed in response to patients with growing demand for quicker treatment and reduced time for the treatment. Among the several long term study performed with 5-10 year follow up, survival rate around 97% have been reported for immediate implants. The long term success and relative advantages of single piece immediate implant placement in the esthetic zone have been well documented,howeve this apprpach cannot be applied to every immediate implant patient.Careful patient screening and selection is the most important criteria along with adequate primary stability and proper occlusal table.

Nevertheles single piece immediate loading implant offers simplified surgical work flow and subject the patient to one surgery instead of two. Single piece also improves patient post operative experience with cases of flapless procedure. It forms the integral part of marketing strategy ensuring the practice more attractive. The tapered implant body and aggressive threads actually condenses the bone as the drilling blades at the apex facilitate a smaller osteotomy, this enables the implant to achieve high primary stability required to perform immediate placement and immediate loading.

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