



Immediate Loading with One Piece Implant Following Extraction in Anterior Esthetic Zone

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ABSTRACT:

It's understood that one - piece implant design is a stronger conception as there's no connection between implant and abutment. The absence of a microgap can lead to minimum peri- implant bone loss. Likewise, there's a reduction of mechanical complications similar as screw loosening and abutment fractures. These implants can be incontinently placed and can be put through instant function because of their high cortical stabilization. This immediate function protocol has advantages over two - stage surgical placement. Other benefits are smaller surgical movables, reduced treatment time, and minimum trauma. It's suggested that one - piece implant can be a volition to conventional implants for edentulous area where there's a resorbed bone in range and height. Proper treatment planning avoided co-morbidity associated with additional procedures and respectable esthetic result. Simplifying and increasing the effectiveness of treatment and providing greater comfort for the patient with one piece implant compared to conventional two piece implants.

Introduction

Tissue health and implant survival were the main concerns in the early years of contemporary implantology. But in the last few years, there has been a growing understanding that aesthetics is equally as crucial to the end restoration's success as health. Patients are calling for restorations that are both aesthetically pleasing and functional. The doctor faces difficulties when it comes to placing implants and restorations to replace one or more teeth in the aesthetic zone. Indeed, it is a technique sensitive process with minimal margin for error. It is hard and demanding to

preserve or develop a soft-tissue scaffold that gives the appearance of a real tooth. Compared to previous generations, single tooth replacements will probably make up a higher share of prosthetic dentistry in the future. When a posterior tooth is extracted, the dentist may prepare the neighboring tooth, but when an anterior normal looking tooth is to be prepared to serve as a fixed partial denture (FPD) abutment, the patient is more anxious and frequently searches for an alternative. In contrast to missing a posterior tooth, most patients have an emotional reaction to an anterior missing tooth, and financial considerations are less significant. Prospective anterior FPD restorations are never as



esthetic as natural teeth because these patients can only see the restorations that appear unnatural. One of the most difficult dental restorations is replacing an anterior tooth. Nevertheless, considering all the benefits of single implant longevity, bone preservation, decreased Single implants are now the preferred treatment for abutment tooth issues and improved neighboring tooth survival. Patient burden would be decreased by placing implants immediately after extraction, provided that the patient is properly examined and Diagnosed. Single stage and quick extraction implants have become more popular in recent years, particularly in the anterior region, where soft-tissue drape is present before the tooth extraction and the patients are more anxious to get a fixed replacement.

Case Report

A chief complaint of 64 year old male patient who came to the prosthetic dentistry department was a movable lower incisors (Figure.1). There are mobile lower incisors present, but #41 absent. The route and range of mandibular motions, the smiling lip line, and the adequate mouth opening were all found during the extraoral clinical examination. There were also no indications of temporomandibular joint dysfunction. Bilateral canine guided occlusion was associated with an intraoral Class I molar relationship. Teeth #31, #32 and #42 were mobile in the patient. When the implant site was examined, the neighboring teeth were found to be vital, normal in color and appearance, and free of any pathological mobility with other teeth. Cone beam computed tomography (CBCT) was done. The patient was informed of the advantages and drawbacks of the following prosthetic treatment choices for replacing the missing incisors: traditional FPD, removable partial denture, and implant-supported prosthesis. The patient chosen a fixed prosthesis supported by implants. On cone beam computed tomography (CBCT) evaluation, the mesiodistal width between #33 and #43 was 16.22 mm [Figure 2]. The buccolingual width with #32 region was 5.3mm, with depth of 11.5mm and buccolingual width with #42 was 5.9 mm with depth of 11.2 mm as per the cross-sectional view in CBCT (Figure 3). The average width of the mandibular incisors is 5.5 mm and 3.5 mm cervically. To accommodate missing incisors in limited space was challenging. The patient insisted for fixed replacement of teeth. All possible treatment options were explained that included teeth supported,

resin bonded, as well as Implant-retained Bridge. The patient's consent was taken for the treatment planned. The preference was for two implant with bridge of 4 teeth as the concept of preparation of adjacent teeth was not acceptable. However, space available was not enough for 4 wide two-piece implant which can carry custom abutments supporting 4small crowns. This may be a bad esthetic outcome as compared to two implant supported restorations. To overcome our problem of reduced length and width space for missing incisors, couple of narrow diameter one-piece implants were used for missing incisors (3.75mmx10mm).



Figure 1: Pre Operative

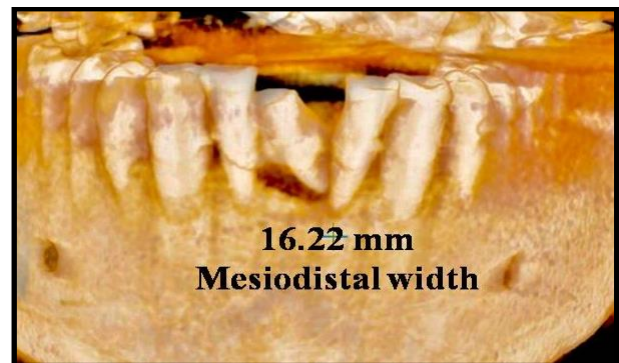


Figure 2: CBCT

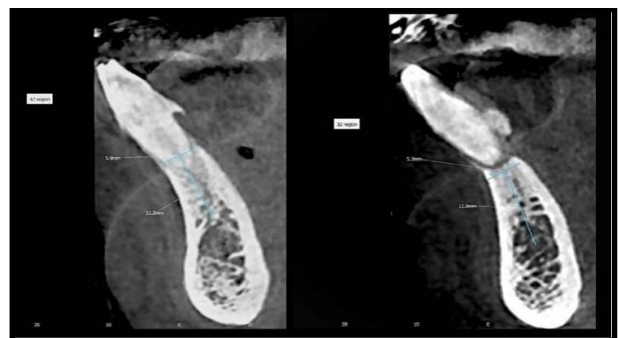


Figure 3: Cross sectional view

Surgical Protocol

Surgical protocol emphasized complete asepsis and infection control. Amoxicillin 1 g for 1 h before surgery. Before the surgical procedure, the patient was instructed to rinse with 0.2% chlorhexidine gluconate for 1 min. The anesthesia (lignocaine 2% with 1:80000 adrenaline, Lignox by Indico remedies ltd., India) was given near the mental foramens bilaterally in the vestibule and infiltration on lingual side. The teeth #31,#32,#42 was extracted. The partial edentulous ridge was exposed with a full thickness mucoperiosteal flap leaving the papilla of the adjacent teeth. The existing edge ridge was slightly flattened with crestal osteotomy. One-piece implant osteotomy is technique sensitive and strict manufacturer guidelines should be followed. Initial osteotomy was at 1000 rpm to the required depth (10 mm) with 2mm width drill. The second osteotomy was with 2.8 mm width drill at reduced rpm of 800 rpm for full depth. Third osteotomy drill of 3.2 mm width at 800 rpm was half length of the initial created depth (7 mm). Two one-piece implants (DMi, Israel; 3.75 mm × 10mm) with inter-distance of 5.5mm and 1.5 mm from the adjacent teeth were placed. The torque achieved during insertion was 40Newton. The wound was closed with crossed horizontal sling sutures with non-absorbable 3-0 Vicryl (Ethicon) (Figure 4). Postoperative IOPA (Figure 5) was taken immediately after surgery. Instructions included soft diet and not to bite from the anterior region for 3 weeks. Oral hygiene was maintained with regular use of fluoride toothpaste except on the surgical area, which was restricted for a week. After 7 days sutures were removed. Prescription included Amoxicillin 500 mg and Ibugesic plus three times daily for 5 days. The patient also used chlorhexidine 0.2% two times daily for 7 days. The implants have an integrated abutment with machined surface for perfect soft tissue bond.



Figure 4: Water tight suturing

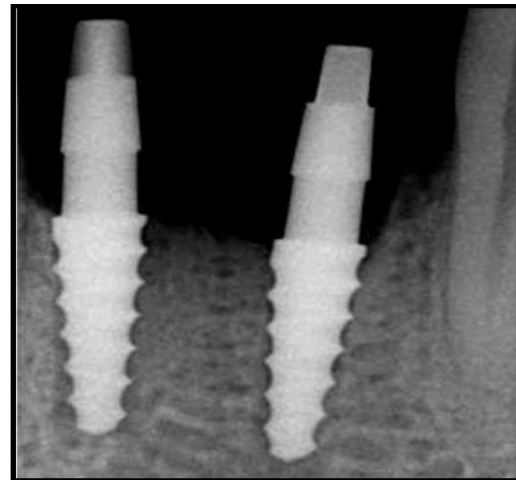


Figure 5: Immediate post operative IOPA

Prosthetic Replacement–Temporary followed by Permanent Prosthesis

Four unit temporary acrylic teeth were cemented with provisional cement (TempBond, Kerr Dental) on the abutments on the same day of implant placement (Figure 6). The intaglio surface of the temporary acrylic bridge was egg shaped which may put pressure on the healing tissues for papilla to grow coronally. The occlusion was kept without contact incentric and eccentric contacts. After 2months of healing (Figure 7), elastomeric impression with addition silicon and light body (Figure 8) (Hydrorise by zhermack) was taken. Final four unit bridge (IPS e.maxZir CAD) was cemented (Multilink Implant, Ivoclar Vivadent) [Figure 9]. The occlusion was kept with proper anterior guidance without posterior interferences. Oral hygiene instructions were strictly reinforced. The use of super floss around and beneath the prosthesis was explained. The patient was recalled every 6 months for next 1 year after delivery of prosthesis. At every visit, hard and soft tissue analysis was done.



Figure 6: Immediate Temporary Bridge



Figure 7: After 2 months



Figure 8: Putty + Light body impression



Figure 9: Final prosthesis

Soft Tissue Evaluation

The mean plaque score was better around implant restoration, there was no BOP, the pocket depth was ranging between 0.5 mm, and papillae surrounding the restorations were half the length.

Hard Tissue Evaluation

Radiographs were standardized through paralleling cone technique. The digital caliber measured the space between the bone crest and the fixture at the mesial and distal parts of the one-piece implants in periapical radiographs. The known distance between the two implant threads was used for calibration and determination of the exact magnification of the images. At recall of 1 year, the bone resorption was <0.2 mm from the crestal area [Figures 10 and 11].

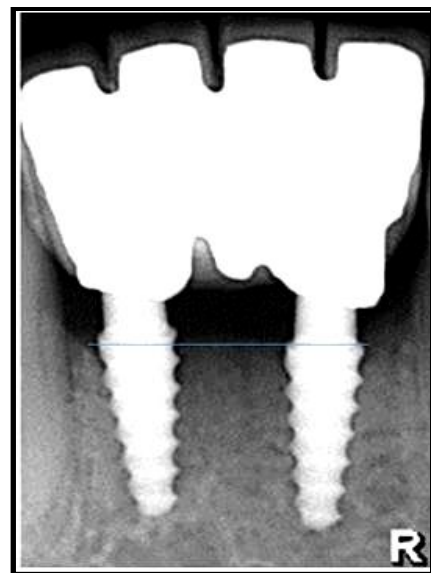


Figure 10: IOPAR with digital caliber measurement

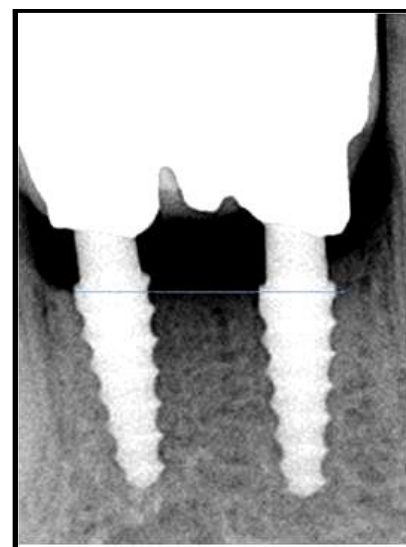


Figure 11: IOPAR After 1 year follow up with Digital caliber measurement



Discussion

A one-piece implant advantages are fast functional, rehabilitation with reduced operating time, less armamentarium, no damage to surrounding tissues, and better use of space limitations. Patient compliance is better with one-piece implants than two stage procedures, less inflammation, pain, and stress because of few prosthetic appointments. Other advantages are better osseointegration, lesser micro movements, and good soft tissue healing. The replacement of mandibular incisors needs special consideration. The challenges associated are limited space, complex surrounding anatomy, and potentially tough esthetic requirements. Missing lower incisors can be rehabilitated with fixed partial dentures, adhesive bridge, or implant retained crowns. In our patient with poor oral hygiene, one tooth was lost and three teeth were extracted but neighboring teeth remain unharmed. Their preparation as abutment teeth would be invasive and may further increase the risk of biological complications such as pulpitis. In gaps with more than one missing tooth, there may be unfavorable physics for a bridge in the anterior zone. A predictable alternative for the replacement of teeth in the said area in some cases is implant retained restoration. Loss of teeth brings resorption and remodeling of surrounding tissues with time. Several approaches like guided bone regeneration with autogenous bone, bone replacement materials in combination with membranes, cortical bone plate method and distraction technique have been described in literature for the defect like ours. A classification of tooth gaps can therefore relate to the bone level of the neighboring teeth and the number of teeth to be replaced: A Class I defect is with loss of a single tooth and a bone level of about 1 mm from the cemento-enamel junction of the neighboring teeth, while in a Class II defect, this distance is >1 mm. A Class III defect would have >1 missing tooth. In addition to available bone, there are other anatomical restrictions such as reduced interradicular space for single or multiple implants, proximity of neighboring teeth, and crowding. As the patient was not inclined for extensive augmentation procedures, the treatment done was evidence based and well accepted by the patient. The current scientific literature supports the concepts that the implants can be loaded early or immediately. Studies regarding different types of prosthesis have

shown that early loading of mandibular implants can provide treatment outcomes comparable to those achieved using standard healing periods before loading. The advantages of non-functional immediate teeth are as follows:

1. Patient has a fixed esthetic tooth replacement soon after Stage 1 surgery.
2. No Stage 2 surgery is necessary (eliminates discomfort for the patient and decreases overhead for the doctor)
3. Countersinking the implant below the crestal bone is eliminated, which reduces early crestal bone loss
4. The soft tissue emergence may be developed with the transitional prosthesis and the tissue was allowed to mature during the bone healing process
5. The soft tissue hemi-desmosome attachment on the implant body below the micro gap connection may heal with improved interface.

The disadvantages of non-functional immediate teeth are as follows:

1. Micro movement of implant that can cause crestal bone loss or implant failure is greater than that with two stage surgery
2. The dentist is less likely to reflect the tissue at Stage 2 surgery and can evaluate implant crestal bone directly
3. Para function from tongue or foreign habits (pen biting) may cause trauma and crestal bone loss or implant failure.
4. Bone that is too soft, small implant diameters or implant designs with less surface area may cause crestal stress contours and cause bone loss or implant failure.

Conclusion

Nowadays, most people agree that implant therapy is a dependable way to replace lost teeth. However, in order to achieve the best possible aesthetic outcome, the dental implant must be placed correctly during surgery. Determining the ideal implant location and quantity requires careful treatment planning. The time required for soft-tissue healing and implant integration, the development of the emerging profile, occlusal forces in



connection to progressive loading, and occlusal forces on the finished restoration are all factors that the physician must take into account.

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