ACTA SCIENTIFIC DENTAL SCIENCES (ISSN: 2581-4893)

Volume 2 Issue 12 December 2018

Case Study

Full Mouth Rehabilitation in Severe Atrophic Jaws with Screwed Retained Hybrid Denture Using Pterygoid Implants: A Case Report

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Received: September 26, 2018; **Published:** November 21, 2018

Abstract

A 44 years female of high esthetic demand rehabilitated with full fixed screw retained hybrid prosthesis which is eventually a challenge for prosthodontics. Due to periodontal problem and absence of teeth for long time there was severe bone deficit. To avoid grafting procedure and extensive surgeries and maximum use of buttresses of maxilla, pterygoid implants were placed instead of sinus lift procedure. Inter-arch space is 28mm and anterior maxilla is having outward emerging profile. Patient is advice for immediate extraction and implant placement helps to protect hard and soft tissue contour. After placing cover screws and suturing, denture is installed for immediate and progressive loading which helps in faster soft tissue healing. Two months after surgery, impression was made, and milled bar tried for fit and screw retained hybrid denture made.

Keywords: Hybrid Dentures; Pterygoid Implants; Inter-Arch Space

Introduction

Sufficient bone volume and density is required for successful implant placement and its osseointegration [1,7]. However, reduced bone volume due to the loss of maxillary teeth and pneumatization of the maxillary sinus leads to severe bone atrophy and requires sinus lift and bone grafting. Pterygoid buttresses can be utilized for implant placement to reduce treatment time as sinus lift [2,3] Pterygoid implants were tilted which helps in abutment utilization for bar milling and also benefits in placement of longer implant for better load distribution by increasing bone-implant contact area [4-6,15]. Resorption pattern in mandible (from lingual to buccal) leads to increase bone width and reduced bone height. Therefore, larger diameter and short height can be used in severely atrophic posterior mandible to prevent inferior alveolar nerve damage. Wider implants have better load distribution [8-10].

The purpose of this report is to describe stepwise all clinical and laboratory procedures in case of severe atrophic ridges without augmentation by utilizing pterygoid implants in hybrid dentures.

Case Presentation

A 44 year old female reported to Department of Prosthodontics, Faculty of Dental Sciences IMS BHU with a chief complaint of loose teeth, poor appearance and chewing difficulty. On clinical examination, there was no allergy to any drug, local anesthetics or latex. No abnormality found in medical history, and on psychological assessment patient found to be of high expectation. Extra oral examination revealed facial symmetry, no TMJ abnormalities, and mouth opening of 45 mm. On Intra-oral examination there was recession in 14,13,11,24. All four teeth were periodontally compromised (hopeless). Inter-arch space was 28 mm with completely edentulous mandibular ridge. Class I arch relation with tapering arch form. Occlusal plane was irregular. Various prosthesis options were proposed to the patient and patient accepted simple and less time taking procedure.

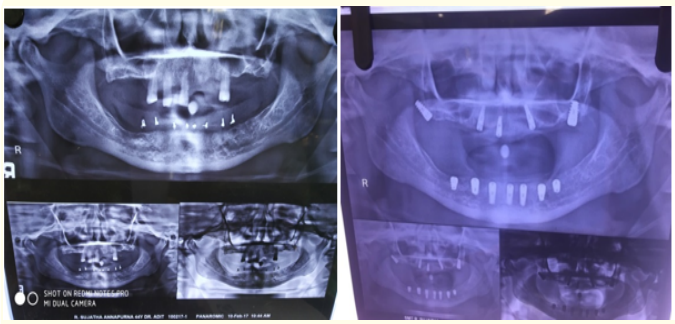

Figure 1: a) OPG before implant placement.
b) OPG after implant placement.

Step I: Diagnostic Impressions were made for fabrication of immediate dentures by rim-lock tray (Dentsply USA) with irreversible hydrocolloid. Impressions were poured with type III dental stone. Jaw relation was recorded and transferred to semi-adjustable articulator with the help of facebow. All the teeth present in the cast were trimmed. Record base were made by self-cure acrylic by sprinkle method. 'Acry-rock' teeth were used.

Anterior teeth setting was done and checked by phonetics and aesthetics. Posterior teeth were placed with balanced occlusion. Dentures were acrylized with heat cured acrylic and polished and finished in conventional manner.

Figure 2: Vertical dimension at rest.

Step II: Extraction of 11,13,14,24 and placement of implant in bilateral pterygoid and canine and central incisor. As bone was very less in molar area and patient didn't want to undergo for bone augmentation and long surgical procedure. In mandibular area seven implants were placed, including bilaterally canine area, premolar,

Figure 3: Vertical dimension at rest.

Figure 4: Trial denture installed.

molar, one in central incisor area with cover screw. 3-0 silk suture done, and immediate denture installed. Patient was asked to take care of surgical area, oral hygiene, soft diet, and chlorhexidine mouthwash thrice daily. Occlusal adjustment was done for immediate denture after 24 hours. After two weeks of surgery denture relining was done and occlusal adjustments were made.

Six weeks after implant placement, second stage surgery was done, and healing caps were placed again relining were done. Three months after implant placement, light body impression material (GC flexceed) used upon intaglio surface of the denture for making final impression and cast.

Individual impression trays were fabricated with triple spacer and modeling wax and opening corresponding to individual implants were made. 2 mm tray borders were shortened and checked in the mouth. Open tray impression coping was attached, and all impression copings were splinted with floss and pattern resin (GC). Light body impression materials were syringed all around coping and putty materials (GC flexceed) were placed in the tray. Impres-

sions were removed from the mouth and lab analogs were attached to the coping. Gingival mask was applied around lab analog before pouring the impression. It is poured with type IV dental stone.

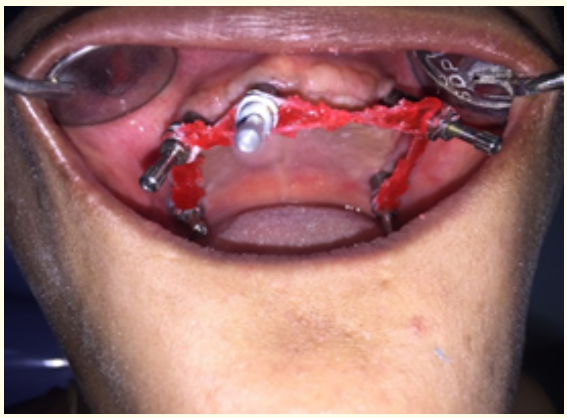

Figure 5: Impression coping splinted.

Figure 6: Wax rim fabricated.

Zig trials were made for getting proper orientation. Acrylic base plate was made over which wax rim prepared and opening were made for castable abutment placement and tightened the screws with prosthetic hex (14). Maxillary and mandibular occlusal rims were checked in patient's mouth for speech, aesthetics and function. This is transferred to the articulator with the help of facebow record bite was made in centric relation and mounted.

Figure 7: Hybrid denture trial done.

Anterior Teeth settings were done and checked for phonetics, and esthetics. Posterior teeth settings were done in implant protected occlusion, and occlusal corrections made. Hybrid denture is finally acrylized and fitted in patient's mouth.

Figure 8: Hybrid denture installation.

Discussion

Implant surgery, immediate complete denture installation and laboratory procedures involved in the construction of a full arch maxillary and mandibular hybrid prosthesis using titanium framework is described. In severe bone atrophy, both hard and soft tissue loss is excessive interarch space is 28 mm, can't be managed by conventional cement or screw retained fixed prosthesis. Minimum four to eight implants are required are required to support a fixed superstructure. The number of implants required depends on bone quality and quantity, vital structures position, implant length and its position and the length of the cantilever [12]. In this case we want to avoid any kind of cumbersome procedure like sinus lift and nerve lateralization. Passive fit between implant and mesostructure decreases the risks of biomechanical stress development that may negatively influence implant survival as they are Osseo

integrated [11]. Meso-structure to be fabricated requires good trial denture, and its evaluation also used as radiographic stent after its duplication. Diagnostic casts articulated in centric relation after face bow record, gives the exact idea of interring arch space. Evaluation of prosthetic space is very important for severe atrophic ridge cases planned for hybrid denture. It should be at least 20 mm, (in implant case it must be 2 mm plus because of mucosal thickness), and benefits in deciding aesthetic (anterior teeth position and labial fullness), approximate implant position, definitive abutment length, comparison of the position of the healing abutments in relation to adjusted complete dentures. It is always beneficial to use flanged prosthesis for lip support in severe atrophic cases. The implant position should be in accordance with teeth position so that occlusion can be maintained without leverage [13]. Angulation of impression copings benefits in deciding the definitive abutment position and orientation of the implants in cast. All the impression copings were connected with floss and pattern resin and impressions were made with stiff elastomeric material. An open tray impression technique is considered most accurate for full mouth rehabilitation, as implant angulation is fixed with respect to each other, unscrewing and removal can be done without distortion. Generally closed tray is used for posterior regions or when there was little mouth opening. Closed trays were not used because there were sufficient mouth opening to record the pterygoid area [13]. Plastic abutments connected to the lab analog were milled in CAD-CAM processor. This framework is precise and passively fitted without any contact with alveolar mucosa for easy hygiene maintenance [11]. Almost no tissue irritation due to prosthesis movement because prosthesis is solely implant supported [14]. A few complications may arise like denture teeth fracture and wear, screw loosening and prosthesis fracture.

After 1 year one pterygoid implant of right side got failed, it was removed. Without it there was a long cantilever which would be deleterious to mesial implant.

Now the treatment plan changed to over denture because patient was not ready for surgical procedure again. Bar was milled, and bar supported over denture was installed.

Conclusion

Patients should be motivated for implants supported prosthesis as it improves patient's own perception towards function and esthetics. Pterygoid implants are good alternative to replace direct sinus lift in case of severe atrophic ridges and reduces treatment time. Use of milled titanium framework (meso-structure) is a good alternative to restore excessive prosthesis space between ridge crest is indicated for screw retained hybrid denture. A tentative occlusal plane is established to accommodate a zone for hygiene as well as the meso-structure. Proper care at home, regular follow up and maintenance of oral hygiene by the patient is mandatory for the long-term success of the restoration.

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