

## Functional Rehabilitation using Single Piece Basal Implants in a Patient with Trismus

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### Abstract

The use of single piece basal implants in replacing missing teeth has many advantages over the conventional multiunit dental implants. A good primary stability with minimal accumulation of plaque and/or bacteria around them is one among many others. Here, we present a case report of full mouth rehabilitation using single piece basal implants in a patient with OSMF. Clinical limitations like reduced pliability of the mucosa and burning sensation limit fabricating a removable denture. Hence full mouth rehabilitation was done using implants in both the jaws. The implants were immediately loaded with zirconia framework within three consecutive working days.

**Key words:** Basal implants, OSMF, chronic periodontitis, laser fibrotomy, full mouth rehabilitation.

### Background:

The use of implant supported fixed prosthesis in partially or completely edentulous patients have gained popularity and many newer techniques have been made to overcome the disadvantages of the conventional Branemark system of implant placements. [1,2] Basal implants or bicortical implants utilize the concept of engaging the highly dense basal bone, which offers a greater primary stability and therefore favors immediate loading without any bone augmentation procedures[2].

Oral submucous fibrosis is a chronic progressive potentially malignant disorder of the oral mucosa with the main etiological factor being areca nut chewing. The disease is characterized by a gradual reduction in mouth opening, stiffening of the oral mucosa, fibrous band formation along the buccal and labial mucosa and burning sensation on taking food. Chronic periodontitis, on the other hand is most commonly seen in middle and older age groups, resulting in gradual loss of teeth, which further leads to compromised functional and esthetic components of an individual.[3,4,5]

In this case report, the patient had a very poor periodontal condition with severely compromised functional ability and placement of any kind of dental instruments was challenging because of reduced mouth opening.[3] Hence the main objective of her treatment was to increase the mouth opening for which, bilateral fibrotomy was done along with intralesional corticosteroid injections therapy. Physiotherapy was strictly followed before and after the treatment to enhance the pliability of mucosa and mouth opening. Once the mouth opening was optimum, a total of twenty-two single piece basal implants have been placed in the maxillary and mandibular arches with minimal intervention. The implants were immediately loaded with zirconia framework within three consecutive day.

### Case report:

A 50-year-old female patient, partially edentulous, came to the clinic with a history of loss of teeth, loosening of remaining teeth and difficulty in chewing along with burning sensation on taking hot and spicy food since 2 years. Her personal history revealed a habit of chewing supari for around 20 years and has stopped using it in the last 1 year. On thorough clinical examination, the patient was partially edentulous with missing teeth in relation to 15, 13, 12, 22, 23 and 25, supra-erupted teeth in relation to 16, 17, 11, 21, 26. The oral hygiene was poor with gingival inflammation and the periodontal status of remaining teeth was very poor. Generalized pallor and blanching was seen on the palate, buccal mucosa and the labial mucosa with vertical fibrous bands palpable on both sides. The mouth opening was reduced with an interincisal distance of 24mm.

Haematological investigations were made to rule out anemia or any other abnormalities. A provisional diagnosis of OSMF and chronic generalized periodontitis was given and the patient was thoroughly explained about the management of OSMF and various treatment options for replacement of her teeth. The patient wanted to get a fixed prosthesis in minimal amount of time. Since there was a generalized bone loss in both of the arches, and the prognosis was poor, extraction of the remaining teeth followed by full mouth rehabilitation with implants was suggested.

### Management of OSMF:

The patient had stage III OSMF with a reduced mouth opening of 24mm. this made it slightly difficult for placing any kind of dental instrument in her mouth. Hence the primary aim was to increase the mouth opening to an optimum level. To achieve that, the patient was initially counseled to strictly stop chewing any kind of tobacco products. Antioxidants (SM fibro- twice daily) and Intralesional injections consisting of 2ml dexamethasone, 1000IU hyaluronidase and placenterex has been given twice weekly for two weeks. She was advised to do physiotherapy using wooden spatulas and blowing balloons (for at least an hour under a dentist supervision during the initial 2 weeks) 5-6 times a day until she experiences any discomfort. After this initial treatment, there was a slight improvement of 2mm in the mouth opening.

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**Citation:** \*Dr.Irfan Ali Motiwala. Functional Rehabilitation using Single Piece Basal Implants in a Patient with Trismus. *Jourl of Clin Stud and Med Imag, Cas Rep.* 2023; 1(1): 1001.

### Fibrotomy

Since the conventional treatment showed very little improvement in mouth opening, surgical intervention was planned after taking consent from the patient. Fibrotomy was performed with a in pulse mode for initial demarcation of the bands followed by continuous mode to cut the bands[4]. Precise care was taken to include only the mucosal and submucosal areas without affecting the deeper layers. The procedure was performed starting from the pterygomandibular raphe and faucial pillars, continuing through the buccal mucosa at the level of occlusal plane. Primary closure of the surgical area was not done so as to allow the mucosa to epithelise on its own. An interincisal distance of 30mm was achieved immediately after the treatment and the patient was advised to continue physiotherapy. The mouth opening decreased to 25mm on the second postoperative day, as the patient did not do any jaw stretching exercise. Hence the patient was again counseled to strictly continue physiotherapy and topical corticosteroid (kenocart 0.1% cream thrice daily) was given. The mouth opening gradually increased to 28mm within the next 14 days and surgical intervention for implant placement was done on the following day.

### Full mouth rehabilitation with basal implants:

A total of 16 teeth were present with fixed prosthesis between 13 to 23 and 33 to 43. Remaining teeth were mobile with compromised periodontal status and hence were advised for extraction. Panoramic radiograph and CBCT scan were taken to identify suitable sites for implant placement. Extractions of the teeth have been done under local anesthesia followed by complete curettage of the sockets. Immediately after extraction, 12 maxillary (2pterygoid) and 10 mandibular single piece basal implants were placed with minimal intervention using flapless technique. Single stage impressions of both the arches

were made using 3MESPE monophasic polyether impression material. Tentative intermaxillary records were made using high viscosity polyvinylsiloxane (coltene jetbite) and temporization was done.

Casts were poured and the models have been mounted on the articulator. The casts were scanned using 3 shape CAD CAM and zirconia framework was designed according to the intermaxillary relation. Following day, abutments were trimmed, accordingly and definitive intermaxillary records were taken. The overall length and buccolingual widths of the crowns were reduced to increase the space between the maxillary and the mandibular teeth and also to lessen the trauma, which will be implicated on the cheeks otherwise. The implants were functionally loaded with final framework of glazed zirconia crowns using 3MESPE resin cement.

The patient was advised to continue physiotherapy and use antioxidants and multivitamins and is under follow up. There has been a good improvement in the overall functional ability of the patient and no recurrence of trismus was noted.

### Discussion

Using dental implants to replace missing teeth has become the most acceptable treatment modality because of its various advantages over the traditional removable and fixed tooth supported prosthesis. However, the conventional system of crestal implant placement has many disadvantages among which the design of multiunit implants, with many interconnecting screws, delayed loading and the requirement of enough bone density and volume for the placement of an implant are the most common. This led to the improvement of the basic design of a dental implant to a single piece, which was initially developed by Dr.Gerard Scortecchi in the year 1980 followed by sev-

Pre-Operative and Post-operative pictures of the patient



Preoperative clinical picture



Increased mouth opening after fibrotomy



post-operative clinical picture



Post-operative images after full mouth rehabilitation



Pre-operative OPG



Post-operative OPG

eral modifications[5].

The conventional Branemark technique of implant placement utilizes the alveolar bone of the jaws that are more prone to resorb and/or lost as the teeth are removed or as the function reduces. Basal implants on the other hand are inserted into the basal bone. Unlike the alveolar bone, it is less likely to resorb, gives an excellent support for the implants and the low vascularity makes it less prone to infections[6].

As the implants are engaged into the highly corticated basal bone, primary stability is easily achieved and hence immediate loading of the implants can be done with a high success rate. In this case, the patient had stage III osmf with burning sensation and fibrous bands palpable on both sides of the buccal mucosa[5,6].

Removable prosthetic complete dentures may also serve the purpose of maintaining the functional ability of the patient. However, chronic mucosal irritation in patients with osmf that can be caused by sharp teeth, dentures and/or the conventional implants with its multi-unit design, increases the risk of malignant transformation, which is around 3% to 16%. [7,8]

Rehabilitation using dental implants can be challenging when there is reduced mouth opening. Patients with certain potentially malignant disorders like OSMF, tend to neglect their oral hygiene due to discomfort caused during performing general oral hygiene measures like brushing. This leads to increased occurrence of gum diseases, which gradually reduces their functional ability [9].

Replacing teeth with conventional multiunit implants in such patients might worsen the condition as they may cause physical trauma to the surrounding mucosal structures. These patients also have difficulty in maintaining good oral hygiene with accumulation of plaque and bacteria between the minute gaps. Hence single piece implants were chosen for this patient as they have a long neck and a smooth surface, which is less prone to bacterial attack and reduce bacterial colonization in patients who are prone to gum diseases[10]. Twelve implants engaging the basal bone were placed in the maxillary jaw using flapless technique out of which two were placed in the pterygoid region to avoid the sinus margin and ten basal implants were placed in the mandibular arch.

The framework of teeth was fabricated using monolith anatomical zirconium. The overall size of the fabricated teeth was also reduced with only a little change in the vertical dimension to enhance the functional ability of the patient. Use of monolith zirconia have an advantage of being the most biocompatible material with good mechanical properties[11]. Their good mechanical properties make them less prone to chip off when chewing hard food. They are highly esthetic mimicking the natural teeth.

## Conclusion

The concept of single piece basal implants remains the very first option with many advantages, whenever there is a need of augmentation procedures. Single piece implants with long polished neck remains to be the best mode of replacing teeth in patients with potentially malignant conditions like osmf who generally have difficulty in maintaining oral hygiene status and are prone to have gum diseases.

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