CASE REPORT
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COLLAPSED BITE REHABILITATION WITH IMMEDIATE LOADING BASAL COMPRESSIVE SCREW IMPLANTS – A CASE REPORT

Dental Science

Dr. Apoorva Mowar* Professor, Department of Oral & Maxillofacial Surgery, Subharti Dental, College and Hospital, Swami Vivekanand Subharti University, Meerut. *Corresponding Author

Dr. Anshul Trivedi Assistant Professor, Department of Prosthodontics and Crown & Bridge, Subharti Dental College and Hospital, Swami Vivekanand Subharti University, Meerut.

Dr. Vishal Bansal Professor & Head, Department of Oral & Maxillofacial Surgery, Subharti Dental College and Hospital, Swami Vivekanand Subharti University, Meerut.

Dr. Shama Praveen P.G. 3rd Year, Department of Prosthodontics and Crown & Bridge, Subharti Dental College and Hospital, Swami Vivekanand Subharti University, Meerut.

Dr. Aditya Verma P.G. 3rd Year, Department of Oral & Maxillofacial Surgery, Subharti Dental College and Hospital, Swami Vivekanand Subharti University, Meerut.

ABSTRACT

Severe wear and/or loss of anterior and posterior teeth results in the loss of anterior guidance, normal occlusal plane and the reduction of vertical dimension, consequential to it overclosure and loss in esthetics. Rehabilitation of such conditions require reestablishment of vertical dimension, followed by rehabilitation with fixed or conventional removable prosthesis. Fixed restoration of lost posterior teeth is accomplished by implants. Often because of longstanding edentulous conditions, additional procedures are required to correct/ manage the compromised ridge conditions so created, for placement of conventional implants, which increases the duration, number of surgeries and cost of treatment. Rehabilitation with basal implants in such conditions can be accomplished in 72 hours and thus reduce these additional procedures, involved cost, discomfort to the patient and extended treatment duration. This case report describes a 38 year old female patient who reported with multiple missing mandibular teeth and attrited and partially edentulous maxillary teeth with a reduced vertical dimension who was treated with basal implants thus achieving functional rehabilitation in 72 hours.

KEYWORDS

Full mouth rehabilitation; Basal implants, Vertical dimension; Compromised ridge; Dental Implants

INTRODUCTION

The gradual wear of dentition is a physiological process but when excessive wear of teeth occurs it may result in reduced facial height, esthetic impairment, pain in temporomandibular joints, periapical pathology, occlusal disharmony and masticatory inefficiency. Various modalities, used to rehabilitate such patients includes removable and fixed prosthesis.[1] Since the advent of implants, rehabilitation with implant supported prosthesis has become a widely accepted treatment modality. Branemark advocated, implant loading after 4 or 6 months of implant placement but this waiting period before final rehabilitation made the patient anxious besides delaying functional and esthetic restoration.[2] The conventional implants work on the principle of osseointegration, which prerequisites presence of adequate alveolar bone width so that at least 1.0 mm of bone is present on buccal and lingual/palatal aspects of the implant; adequate alveolar bone height of good quality bone and favorable conditions. In patients with compromised bone conditions, conventional implants require additional procedures and the duration from implant placement to loading is often extended. On the other hand Basal implants work primarily on the principle of osseofixation, obtained by engagement of basal bone and can be placed even in compromised bone conditions without any additional procedures as well as it is functionally loaded within 72 hrs. Unlike the alveolar bone, the basal bone does not resorb and is primarily cortical in nature.[3] Basal implants are of two types i.e. the lateral basal implants e.g. BOI and basal compressive screw implants or axial basal implants e.g. KOS and BCS.[4] This case report presents and discusses role of immediate functionally loaded basal implants in a patient requiring full mouth rehabilitation.

CASE REPORT

A 38 years old female patient reported to the department of prosthodontic crown & bridge with chief complaint of inability to eat and unpleasant esthetics. Patient had multiple missing teeth in both the arches and decreased lower facial height due to loss of vertical dimension. On radiographic examination the remaining mandibular teeth were periodontally compromised (Fig. 1).

The treatment plan consisted of raising the vertical height in accordance with masticatory function, restoration of maxillary teeth at the increased height by porcelain fused to metal crowns and extraction of all mandibular teeth followed by their rehabilitation, for which the available three options were of 1) removable prosthesis, 2) conventional implant supported fixed prosthesis or 3) a basal implant supported fixed prosthesis. The CBCT revealed reduced alveolar bone height in the region of mandibular posteriors (less than 8mm from crest to 2 mm short of the inferior alveolar canal) Fig. 2 and Fig. 3.

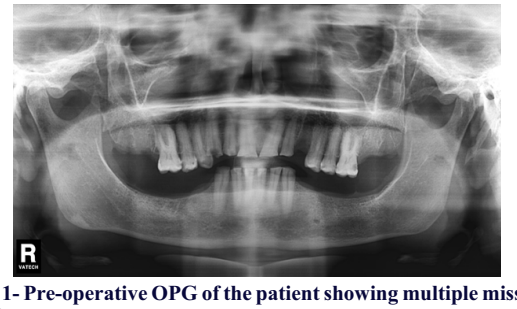

Fig. 1- Pre-operative OPG of the patient showing multiple missing teeth.

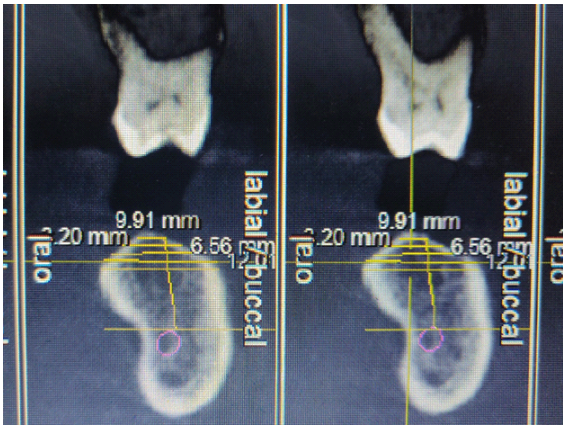

Fig. 2 – Pre-operative CBCT depicting available alveolar height in left mandibular 1st molar region.

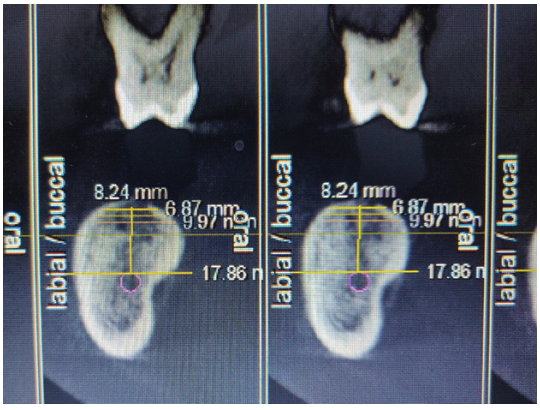

Fig. 3 – Pre-operative CBCT depicting available alveolar height in right mandibular 1st molar region

In the present condition, rehabilitation with conventional implants would have required bone grafting for alveolar ridge height augmentation and/or inferior alveolar nerve lateralization or placement of short wide implants. Therefore patient was also given the option of Basal implants which had the added advantages of: 1. No additional surgical procedures and bone grafting 2. No second stage surgery and 3. Functional loading within 72 hours. The patient decided for basal implants supported immediately loaded fixed prosthesis, as it was less time consuming, no bone augmentation was needed thus function could be restored in minimum time.

After the diagnostic mounting the existing vertical was evaluated and it was decided to raise the bite by 3mm. A provisional interim prosthesis with a raised vertical for both the arches was given to the patient. Total of 8 basal implants were planned for the mandibular arch after extracting the remaining mandibular teeth.

Lignocaine 2% with 1:200,000 adrenaline was used for achieving anesthesia. Maxillary right lateral incisor, canine and 1st premolar were extracted and also the anterior six teeth of the mandible. Following extraction of mandibular teeth 8 basal implants were placed in the mandible at strategic locations and three basal implants in the region of the extracted maxillary teeth. A basal implant was also placed in the region of the missing left maxillary canine. Implants were bent at the region of their necks to achieve favorable angulation, harmonious occlusion, esthetics and ease of prosthesis insertion. 3-0 black braided silk sutures were placed to achieve gingival approximation around the implants (Fig 4).

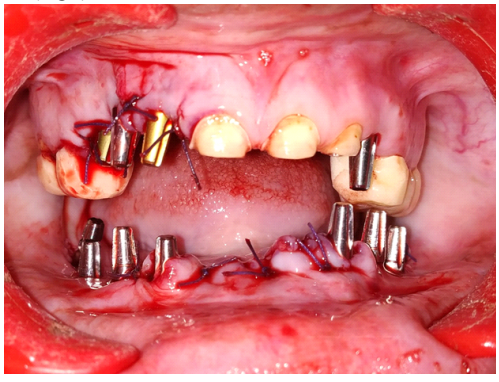

Fig. 4 – Intra-oral photograph after placement of basal implants.

Antibiotic Amoxicillin 500mg with 125 mg clavulanic acid and analgesic 100mg Aceclofenac + 325 mg Acetaminophen and 15mg Serratiopeptidase, were prescribed for 5 days to the patient on a thrice daily dose. Impressions were made using addition silicone impression material and tentative jaw relations were recorded by wax impregnated with aluminum.

On second day the metal tryin of the framework was done along with the necessary adjustment of the framework. The occlusal wax rims were made over the framework and vertical dimension at rest and at occlusion were established. Semianatomic cusp form were used for the teeth arrangement extending posteriorly uptil the first molar in accordance with the occlusal plane of "supporting polygon" of strategic implantology. Final wax tryin was done with an increased overjet and shallow overbite so that the anteriors were not in contact during any mandibular excursions according to the principles of strategic implantology and was acrylized. On the third day the sutures were removed and hybrid prosthesis was functionally loaded on implants (Fig. 5).

Fig. 5 – Intra-oral photograph on 3rd day after cementation of the prosthesis

The occlusion was checked on specific points on canines and premolars conducive to supporting polygon. Post insertion instructions was given and the patient was recalled after 7 days for follow up. On recall visits the occlusion was checked using the Bausch articulating paper of two different colors to establish the occlusion points at canines, premolars and molars. Thereafter patient was recalled for check-up at regular intervals. Clinical evaluation at follow-up of 6 months revealed no pain or discomfort, stable implants and a satisfactory occlusion. Her radiographic examination (Fig. 6) showed well integrated implants and bone formation around implants placed in extraction sockets, though no bone graft was placed in these sockets.

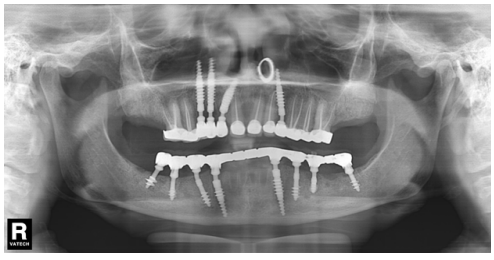

Fig. 6 – 6 month Post-operative OPG of the patient showing well integrated basal implants with bone formation around implants placed in immediate extraction sockets.

DISCUSSION

Edentulism whether partially or fully can be rehabilitated by dental implants successfully if the quantity and quality of bone is adequate. The success rate is reduced if the bone present is compromised, and may need other adjuvant procedures like bone augmentation, inferior alveolar nerve lateralization and sinus lift procedures to functionally rehabilitate.[5,6] Further the time for rehabilitation is also increased. To avoid extensive adjuvant procedures and to rehabilitate the atrophied bone, immediate functional loading of implants by the engagement of basal bone is the treatment preferred in this decade.[7] However a different treatment modality which is "All On Four" can also be used for the rehabilitation of atrophied bone but it has few inherent disadvantages like, cantilever load on the prosthesis. As the tilted implants are placed in the canine or premolar region and the occlusion which is given is till the first molar it results in load on the prosthesis distally which leads to a hinging effect causing stress on the implants which is deleterious.[8] This cantilever leads to various other complications like prosthetic screw fracture, fracture of acrylic teeth or the fracture of the metal framework. To worsen the situation it may also lead to the fracture of the implant collar.[9] Overcoming these inherent problems associated with rehabilitation of atrophied bone, the science of strategic implantology has proved its mettle.[3,4]

The philosophy of this treatment differs from alveolar, conventional or axial approach in implantology. In basal implantology implants are

engaged into the dense basal bone and at the buttresses achieving high mechanical stability and the alveolar bone height and width do not or if at all minimally affects implant stability. The load bearing capacity of cortical bone is many times higher than that of cancellous bone. Screwable basal and cortical implants (BECES, BCS & KOC) have been developed with the idea of engagement into this strong bone overlooking the amount of cancellous bone present at the insertion site.[10] These implants are first osseofixated and later they osseointegrate.

Basal Implants (BECES, KOS and BCS) are easily inserted in flapless procedure in the cortical and basal bone either through extraction socket or completely healed sockets till the basal bone yielding a very high primary stability. Trans mucosal thin shaft does not allow bacteria to grow on it and hence, peri implant diseases are largely prevented.[11]

Crestal bone loss is one of the factors which is associated with conventional implants due to their rough surface. Although studies conducted by Tomas Albrektsson et al.[12], Jie Qian et al[13] have shown an alternative way to look at crestal bone resorption. According to these authors there can be many reasons for the loss of crestal bone one of which, the authors advocate is the result of the body's response to presence of the foreign body. Albrektsson et al, in their study state that the rough surface implants may harbor the bacterial colonization which is reduced when smooth surface implants are used.[12]

In posteriormandible region these implants (basal implants) are placed at the distal most extension of the prosthesis thus avoiding the cantilever and its deleterious effects.[14]As basal implants are single piece implants, complications like screw loosening, screw fracture, implant collar fracture are not encountered. Further BECES and BCS implants have bendable necks which can be bent to give favorable abutment angulations, therefore obviates the need for surgical stents which are needed especially when multiple implants are to be placed in an arch.[15] At the same time this feature also makes basal implants more vulnerable to failure if they are not properly engaged in the basal bone or are subjected to deleterious occlusal forces as the same get transmitted directly to the engaging basal bone resulting in stress osteolysis and if not timely managed then the loss of the implant.[16]

CONCLUSION:

Basal implants thus can specially be of benefit in patients having compromised alveolar ridges where placement of conventional implants otherwise would take extended period for rehabilitation, additional expenditure, multiple surgeries and may have a distal cantilevered prosthesis. However with basal implants without all these complications within a span of 3 days from the placement of implants functional rehabilitation can be achieved.

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