

## Case Report

### Bicortical Implants: An Alternative Treatment Modality for the Hopeless: A Case Report

<sup>1</sup>Tarannum Alam Shaikh, <sup>2</sup>Deeksha Bhanotia, <sup>3</sup>Ajay Pravin Pacharne

<sup>1</sup>Post Graduate Resident III Year, Department of Prosthodontics and Crown & Bridge, National Institute of Medical Science Dental College & Hospital, Jaipur, India;

<sup>2</sup>Post Graduate Resident III Year, Department of Orthodontics and Dentofacial Orthopaedics, National Institute of Medical Science Dental College & Hospital, Jaipur, India;

<sup>3</sup>Post Graduate Student, Department of Prosthodontics, Rama Dental College Hospital and Research Centre, Kanpur, Uttar Pradesh, India

#### ABSTRACT:

Basal implants are dental implants that employ the basal cortical portion of the jaw for implant retention. These implants are specially designed for gaining anchorage from basal cortical bone. Aesthetically emerging profiles can also be achieved using basal implants for single and multiple teeth replacement immediately after the extraction. In the present case report - A 38 year old female reported with the chief complaint of missing left upper front tooth which she wants to be removed and replaced. After careful examination and treatment planning immediate implant treatment was initiated. The tooth was extracted and the implant was placed into the extraction socket. Basal implants are used for single and multiple teeth replacement. They can be placed immediately into the extraction socket and also in the healed site. These implants can be used as a better alternative for conventional implants to achieve good aesthetics.

**Keywords:** Basal Implants, Aesthetic Smile Correction, Emerging Profile, Gingival Aesthetics, Single Tooth Replacement

Received: 13 July 2022

Revised: 16 August 2022

Accepted: 30 September 2022

**Corresponding author:** Tarannum Alam Shaikh, Post Graduate Resident III Year, Department of Prosthodontics and Crown & Bridge, National Institute of Medical Science Dental College & Hospital, Jaipur, India

**This article may be cited as:** Shaikh TA, Bhanotia D, Pacharne AP. Bicortical Implants: An Alternative Treatment Modality for the Hopeless: A Case Report. J Adv Med Dent Sci Res 2022;10(11):23-27.

#### INTRODUCTION

Implant placement in severely atrophic jaws is especially challenging because of the poor quality and quantity of the future implant bed. Although various bone augmentation procedure like ridge augmentation, sinus lift these procedures are possible today, but it may lead to surgical morbidity they increase the risks and costs of dental implant treatment as well as the number of necessary operations. Also, sometimes the patient is not agreeing for such extensive surgical procedures, according to the well-known implantological rules for dental restorations, crestal implants are indicated in situations when an adequate vertical bone supply is given but single piece dental implant (basal implants) is a viable treatment option derives support from the basal bone area which usually remains free from the infection and less prone to resorption.<sup>1</sup> Rehabilitation the edentulous maxilla or mandible with implants has become a normal predictable treatment today but

successful implant placement needs sufficient bone to be available (at least 13 - 15 mm length and 5 - 7 mm width). Implant placement in severely atrophic jaws is especially challenging because of the poor quality and quantity of the future implant bed. Calvarial or iliac bone grafts, mental nerve displacement, all on four, nerve bypass and sinus lift procedures are often used to overcome the initially unfavourable anatomical and mechanical conditions.<sup>2</sup> Despite acceptable success rates, these approaches involve unpredictable degrees of morbidity at the donor and/or recipient sites. Furthermore, patients are sometimes reluctant to undergo such procedures.<sup>3</sup> The conventional crestal implants are indicated in situations when an adequate vertical and horizontal bone must be available if not the prognosis is not good as soon as augmentation become part of the treatment plan. Augmentation procedures tend to increase the risks and costs of dental implant treatment as well as the number of necessary operations.<sup>4</sup> To avoid these procedures the

other viable option for replacement in atrophic jaws is to change the implant design. Two very successful implant designs and protocols have been demonstrated in the past few decades for replacement in atrophic jaws which are Mini Dental Implants and Basal Implants. Basal implant (single piece dental implant) also known as bicortical implant or just cortical implant is a modern implant system which utilizes the basal cortical portion of the jaw bones for retention of the dental implants which are uniquely designed to be accommodated in the basal cortical bone areas.<sup>5</sup> The basal bone provides excellent quality cortical bone for retention of these unique and highly advanced implants. Because basal implant includes the application of the rules of orthopaedic surgery, the basal implants are also called as “orthopaedic implant.” Dental implants when placed in this bone can also be loaded with teeth immediately. This science is already proved in orthopaedic implants (Hip/Knee replacements). Once the patient is fitted with the artificial joint patient is asked to start using it immediately.

#### **RATIONALE OF USING BASAL IMPLANTS**

Alveolar bone (crestal bone) of the jaw less dense gradually starts getting resorbed and recedes once the teeth are lost. The bone which ultimately remains after regression of the alveolar bone following loss of teeth is the basal bone which lies below the alveolar bone. This basal bone is less prone to bone resorption and infections. It is highly dense, corticalized and offers excellent support to implants. The conventional implants are placed in the crestal alveolar bone which comprises of bone of less quality and is more prone to resorption. The basal bone is less prone to bone resorption because of its highly dense structure. The implants which take support from the basal bone offer excellent and long lasting solution for tooth loss. At the same time, load bearing capacities of the cortical bone are many times higher than those of the spongy bone. This rationale stems from orthopaedic surgery and from the experience that cortical areas are essential, since, they are resistant to resorption.

#### **ADVANTAGES OF BASAL IMPLANTS**

1. Safe load transmission in basal bone—Load transmission is deep in the infection free basal bone. In conventional root form implant, load transmission is near the area of bacterial attack. Cortical bone is resorption resistant due to higher mineralisation.
2. Low incidence of peri-implant infections—Implant surface is polished in basal implants and also the mucosal penetration diameter is less as compared to conventional dental implants.
3. Patient’s own alveolar bone is required—Basal implants require the patient’s own alveolar bone and no bone augmentations are required. All patients have sufficient basal bone horizontally

even if vertically height is reduced. Also the duration of treatment is reduced as bone augmentations require certain amount of time for healing.

4. Immediate loading—Extremely good patient acceptance is obtained with basal implants as immediate loading is possible. There is no edentulous phase and immediate dentures are not required.
5. One stage procedure—Extractions and implant placement can be carried out in one appointment even if the teeth are periodontally infected.
6. Low demand for patient compliance.

The purpose of the present case report is to present full mouth rehabilitation of a case reported with highly resorbed/ atrophic ridges with basal Osseo integrated implants without any ridge augmentation procedures and immediate loading of the same with fixed hybrid prosthesis, thus restoring patient’s aesthetics, phonetics and efficient masticatory function. Basal implantology is an advanced and reliable treatment option for rehabilitation of highly atrophic ridges without subjecting the patient to extensive and expensive additional surgical procedures. Basal implants confines the masticatory load to the cortical bone structures and horizontal implant segments. On the other hand, screw basal implants transmit load into the bone usually onto the opposing cortical bone. Implant-supported prosthesis has become a widely accepted treatment option for the rehabilitation of partially or completely edentulous patients. Seldom patients opt for a removable form of oral rehabilitation. Conventional Branemark’s delayed loading protocol is often not acceptable to patients nowadays. With digitalization, recent advances in medical sciences, imaging modalities and the introduction of new implant systems, a variety of treatment options are available for the patients. Today, most of the edentulous patients are opting for fixed implant therapy instead of removable dentures. However, residual ridge resorption after the loss of teeth often leaves the patient with severely atrophied maxilla and mandible. Basal bone generally left after resorption is often challenging for the placement of conventional implants. Ridge augmentation procedures have their own risks, increases the treatment cost, require multiple numbers of surgeries and are psychologically not motivating enough for the patients.

- Basal implants are specifically designed to allow fixed rehabilitation in severely atrophic jaw.
- Basal implants are specifically designed to utilize strong cortical bone of the jaw.
- Basal implants are designed such that they can utilize the support from stronger and infection free area that is cortical bone or basal bone.
- Starting with background of the subject area
- As we know basal bone is relatively fixed and unchangeable framework of maxilla & mandible

- Basal bone is present throughout the life and less prone to resorption due to its high dense structure of cortical bone which provides excellent support for retention of implants
- Conventional branemark delayed loading protocol is often not acceptable in highly resorption ridges, atrophic ridges and require ridge augmentation procedures which have their own risks, increase treatment cost, requires multiple stage surgeries .which eventually are psychologically not motivating enough to the pt.
- Basal implants rehabilitates the edentulous arches. When conventional implants cannot solve the purpose esp. in moderate to severe atrophic ridges without extensive surgical procedures.
- Modern basal implant has been modified into a comparatively simple deign, easy to follow surgical protocol and is prosthetic friendly system and can be placed in challenging scenarios.

### CASE REPORT

- A 38 yr old female patient reported to dept of prosthodontics, crown and bridge & implantology at nims dental college, Jaipur with a chief complain of pain & missing tooth in upper front tooth region since 3yrs and she wanted replacement for same.
- On further examination it was revealed there was no significant medical history, routine blood investigation was done & the results found to be within normal limits.
- On intra oral examination no pathology was diagnosed.
- Further, diff treatment modalities for replacement of tooth were discussed, however the best alternative for replacement suggested was dental implants.
- On further radiographic examination an incidental finding was revealed that impacted canine was present horizontally in the region between 22-26.
- On further evaluation with 3D imaging with CBCT, we could find out that the bone height was around 6.8 mm approx. widths around 5.2mm.
- Defect was diagnosed with the help of CBCT.
- His case highlights the treatment to manage the placement of implant in the region with sufficient bone width and height that seems tricky.
- Insufficient bone would make the placement of conventional tedious and risky with higher failure chances.
- So with the help of our team of oral surgeon we could manage to dis-impact the canine with ease and next step was to start up with our rehabilitation phase
- So after carefully examination various treatment options we decided on placing a basal implant that would engage the cortical bone which would

provide excellent support to the implant minimizing failure chance with the help of our team we managed placement of bi cortical implant in the edentulous region

- Post surgical radiographic showing successfully placed implant which is seen with the help of 3D imaging
- 3D imaging has been useless and reliable diagnostic aid for providing a best and successful treatment outcome for the patient
- Helped by enabling the measurement of distance between the alveolar crest which would avoid perforation or impingement to the nerve, avoid perforation and quality of bone.
- Closure with non absorbable black braided silk suture
- Full arch impression using addition silicon impression material (dual stage impression technique)
- Bipod support was taken form lateral extension on cingulum area of lateral incisors to prevent rotation of canine.
- 6 month follow up showing post operative radiograph showing successful osseointegration of implant was quite evident in this post operative radiograph.
- Prosthetic delivered within 72 hrs.
- Stability of implant is excellent.
- No post operative complications.
- Evaluation of basal implants have given positive hope to the patient with atrophic ridges which can be rehabilitated not only by avoiding augmentation procedure, time, cost , but also by immediately loading prosthesis making the patient more confident & and socialize normally (Figure 1-9).

**Figure 1: Pre-operative frontal view showing missing teeth**



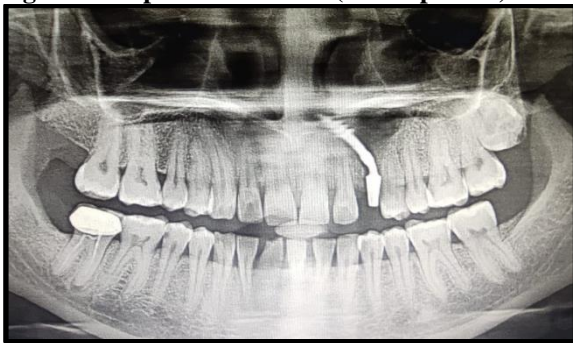
**Figure 2: Radiographic investigations (Pre Op OPG)**



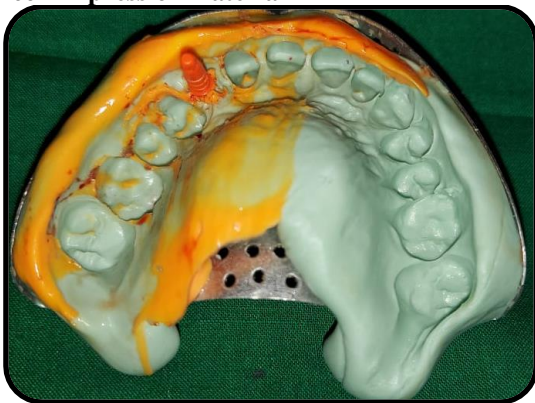
**Figure 3: Disimpaction of canine**



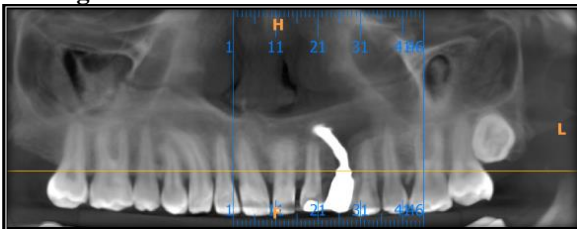
**Figure 4: Implant Placement (Post Op OPG)**



**Figure 5: Full arch impression using addition silicon impression material**



**Figure 6: Post operative radiographic investigations**



**Figure 7: Review CBCT**



**Figure 8: Post-rehabilitation intraoral view**



**Figure 9: Post-rehabilitation extraoral view**



## DISCUSSION

Dental aesthetics has gained importance in the practice of modern dentistry. It influences to a large extent the social acceptance & well-being of the individual. Basal implants are used for single and multiple teeth replacement.<sup>6,7</sup> They follow the protocol of Osseo fixation followed by secondary osseointegration. They can be placed immediately into the extraction socket and also in the healed site for the replacement of single and multiple missing teeth.<sup>8,9</sup> Immediate loading of the basal implants can be done when they are placed in the dense cortical bone, as they attain primary stability there.<sup>10,11</sup> Since the prognosis of the fractured tooth was poor and the patient was willing to extract the tooth, the treatment plan was done accordingly. Root canal treated 25 was extracted and the basal implant was placed engaging the 2nd cortical bone and suturing was done on the labial aspect of the gingiva to obtain gingival aesthetics. Temporary crown was given for the aesthetic concern of the patient. The trial for the permanent crown was done; corrections were noted and after the final finishing and polishing the crown were cemented in 25 after 3 days of the placement of the implant. Review was done after a week and the suture was removed. After 6 months, OPG was taken and there was notable improvement in the bone healing around the basal implant and the emerging profile was well maintained in 25. Hence, basal implants can be used as a better alternative for conventional implants to achieve good aesthetics.

## CONCLUSION

Basal implants can be used to support single and multiple unit restorations in the upper and lower jaws. They can be placed in the extraction sockets and also in the healed bone. They are designed in such a way that allows placement in the bone which is deficient in height and width. The technique of basal implantology solves all problems connected with conventional implantology.

## REFERENCES

1. Idhe S. Restoration of the atrophic mandible using basal osseointegrated implants and fixed prosthetic superstructure. *Implant Dent* 2001;10:41-45.
2. Ali SM, Mahmud PK, Othman KS, Samad AA. Single Piece Dental Implant: A Remedy for Atrophic Ridges. *Int J Otolaryngol Head & Neck Surgery*. 2019 Nov 22;8(06):271.
3. Kumar HA, Kaur S, Raj R and Sunda S. Basal Implants: An Alternate Treatment Modality for The Hopeless- A Review Article. *Int J Current Adv Res* 2018;7:1-8.
4. Yadav RS, Sangur R, Mahajan T, Rajanikant AV, Singh N, Singh R. An alternative to conventional dental implants: Basal implants. *Rama Univ J Dent Sci*. 2015;2(2):22-8.
5. Gupta AD, Verma A, Dubey T, Thakur S. Basal Osseo integrated implants: classification and review. *International Journal Contemp. Med Res*. 2017;4(11):2329-35.
6. Shahed SS, Nagaral SC, Mujawar AM. Basal Implants: a breakthrough for atrophic ridges. *J Appl Dent Med Sci*. 2018; 4:50-4.
7. Kumar K, Kumar S, Singh R, Vaibhav V, Kedia NB, Singh AK. Basal implants-A new era of prosthodontic dentistry. *IP Annals of Prosthodontics and Restorative Dentistry*. 2020 15;6(1):1-3.
8. Awadalkreem F, Khalifa N, Satti A, Suleiman AM. The influence of immediately loaded basal implant treatment on patient satisfaction. *Int J Dent*. 2020;14:1-5.
9. Jadhav P, Limaye M, Jadhavar M, Shinde S. Basal implants: A new solution to old problem to Residual Ridge Resorption- A review. *Int J Sci Res*. 2020;9(7):1-4.
10. Aleksandar Lazarov, Immediate Functional Loading: Results for the Concept of the Strategic Implant, *Annals of Maxillofacial Surgery* January 2, 2021.
11. Ali SM, Othman KS, Samad AA, Mahmud PK., Comparison between basal and conventional implants as a treatment modality in atrophied ridges. *Journal of Dental Implant Research*. 2019 Sep 30;38(2):48-54.