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Basal Implants in the Mandibular Esthetic Zone: A Case Series

Dr. Kamala Kannan R[1],
[1]Professor and Head of the Department, Department of Prosthodontics and Crown Bridge,
Karpaga Vinayaga Institute of Dental Science,
Chengalpattu, India.

Dr. Abinaya Baskaran[2],
[2]CRRI Department of Prosthodontics and Crown Bridge,
Karpaga Vinayaga Institute of Dental Science,
Chengalpattu, India.

Dr. Abinaya R[3],
[3]CRRI Department of Prosthodontics and Crown Bridge,
Karpaga Vinayaga Institute of Dental Science,
Chengalpattu, India.

Dr. Afrah Anjum D[4],
[4]CRRI Department of Prosthodontics and Crown Bridge,
Karpaga Vinayaga Institute of Dental Science,
Chengalpattu, India.

Dr. Akila Roshini[5],
[5]CRRI Department of Prosthodontics and Crown Bridge,
Karpaga Vinayaga Institute of Dental Science,
Chengalpattu, India,

Dr. Vinoth Kumar S[6].
[6]Senior Lecturer, Department of Prosthodontics and Crown Bridge,
Karpaga Vinayaga Institute of Dental Science,
Chengalpattu, India.

Abstract:- Basal implants are the recent trend in replacing missing tooth. They are more useful in establishing occlusion in thin resorbed and flat ridges. They are more superior to conventional implant in many ways. It has less implant failure than conventional implant.

Keywords: *Basal Implant, Missing Tooth, Drills.*

I. INTRODUCTION

Our dentition plays an important role in mastication, phonation, esthetics and psychological well-being. Loss of one or more teeth can take a toll on the above-mentioned functions. One of the most common reasons cited by patients for approaching a Prosthodontist is the loss anterior teeth.

The 3 basic approaches to replace missing teeth include: removable dental prosthesis, fixed dental prosthesis and dental implants.

Dental implants are the most recent advancement used to replicate the natural tooth with no damage to adjacent teeth. Conventional implants are an extensive procedure which involve bone expansion and/or bone grafts and may take unto 8-12 months for completion. Basal implants on the other hand were developed to overcome the shortcomings of conventional implants.[1]

This case series discusses the placement of basal implants in 4 patients in the mandibular anterior region. Ideal case selection was the most important criteria. The patients were assessed preoperatively using previous medical and dental records, thorough case history and preoperative radiographical examination. The patients were explained about the various treatment options and why basal implant would be the best option. After the patients agreed for the procedure, consent was obtained. A total of 8 implants were placed in the mandibular anterior region of 4 patients.

- *Basal Implants:*

Fig 1 Types of Basal Implants

Conventional implants have great limitations in case of atrophic maxilla and mandible. [2] Basal implants were developed to overcome these limitations. They utilize the basal cortical portion of the jaw for retention, as they are less prone to resorption and are mostly infection free. The basal bone acts as the basic framework of the maxilla and mandible. It is always present throughout life, it is very strong and forms the stress-bearing part of the bone. Utilizing the basal bone, we can now place implants in regions where traditional implants would not be possible.[3]

Basal implants have a unique design. They are available in various types. The term “osseointegration” is called “osseoadaptation” by basal implantologists, this

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stems from the fact that the bone with continuous functional loads remodels and adapts over the implant surface over time.[4]

Wolff's Law, developed by the German anatomist and surgeon Julius Wolff in the 19th century, states that bone in a healthy person or animal will adapt to the loads under which it is placed.[5] Wolff's law states that there is a direct link between the mechanical loading and bone morphology and increased stress act as a stimulus to new bone formation, while reduced stress tends to produce a bone loss.[5]

Basal implants present themselves with a number of advantages. They can be placed in very narrow, resorbed regions such as cortical bone of mandibular anterior region (such as the 4 cases discussed in our case report). The treatment duration is relatively shorter when compared to conventional implants. Basal implants also eliminate the need for bone grafting or bone expansion. They can be placed immediately into extraction sockets and can also be immediately loaded, these features come in handy when aesthetics and time are important factors to be taken into consideration.[7]

Basal implants being produced today have a smooth and polished surface as it was found that polished surfaces are less prone to inflammation (mucositis, periimplantitis) than rough surfaces.[6]

II. CASE SERIES

➢ *Case 1:*

A 25-year-old patient undergoing Orthodontic treatment in the maxilla came to the Department of Prosthodontics with a chief complaint of missing teeth in the lower front teeth region for the past 6 months.

On clinical examination, it was found that 31 and 41 were missing and Grade 2 mobility in 32 and 42 (Fig 2). Patient had previously undergone removable prosthetic treatment in relation to 31 and 41 as she was not willing for extraction of 32 and 42. Patient now requested a fixed prosthesis for improved aesthetics.

Preoperative panoramic radiographs revealed poor prognosis in relation to 32 and 42. Patient was made aware of the poor condition of those teeth and agreed for extraction followed by fixed prosthesis. She was explained about all treatment options and their possible drawbacks. Patient agreed for immediate basal implant placement following extraction of 32 and 42.

The treatment plan included oral prophylaxis, extraction of 32 and 42 followed by immediate implant placement in extraction sockets and immediate loading of provisional restoration.

2% lignocaine was administered in the labial and lingual regions of 32 and 42. Both the teeth were extracted atraumatically. The extraction sockets were thoroughly debrided.

Osteotomy sites were prepared in sequential order of drills. 2 Single piece basal implants were placed in the prepared sites in relation to 32 and 42 (Fig 3). Adequate primary stability was achieved. Postoperative panoramic radiographs confirmed accurate placement of implants. Provisional restoration using self-cure-acrylic was given. Provisional was relieved from occlusion. Antibiotics and analgesics were prescribed and postoperative instructions were given.

After a 3-month period, the provisional restoration was removed and final impression was made using putty and light body (Fig 4). A 4-unit zirconia bridge was fabricated and cemented to the implants (Fig 5 and Fig 6). Follow-up was done after 3 months.

Fig 2 Preoperative Intraoral Photograph

Fig 3 Intraoral Photograph after Immediate Implant Placement

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Fig 4 Final Impression Made Using Putty and Light Body


Fig 5 Intraoral Photograph after Permanent Bridge Cementation


Fig 6 Postoperative Panoramic Radiograph

➢ *Case 2:*

A 55-year-old patient came with a chief complaint of missing lower anterior teeth for the past 6 months. Clinical examination revealed missing 31,32,41 and 42 (Fig 7). Radiographic examination revealed bone loss in lower anterior region (Fig 2.2). Patient was explained about the treatment options and their drawbacks. Patient agreed for implant treatment and her consent was obtained.

The treatment plan included oral prophylaxis, single piece basal implant placement in 32 and 42 regions.

Osteotomy sites were prepared with sequential order of drills under local anaesthesia. 2 single piece basal implants were placed in the prepared sites and primary stability was achieved (Fig 9). Postoperative panoramic radiographs confirmed the accuracy of placement of implants (Fig 10). Provisionalization was done using self-cure-acrylic. Analgesic and antibiotic medications were prescribed and postoperative instructions were given to the patient.

The patient was recalled after a period of 3 months and the provisional restoration was removed. Final impression was made using putty and light body. A 4-unit fpd bridge was fabricated and cemented to the implants (Fig 11 and Fig 12). Follow-up was done after 3 months.


Fig 7 Preoperative Intraoral Photograph

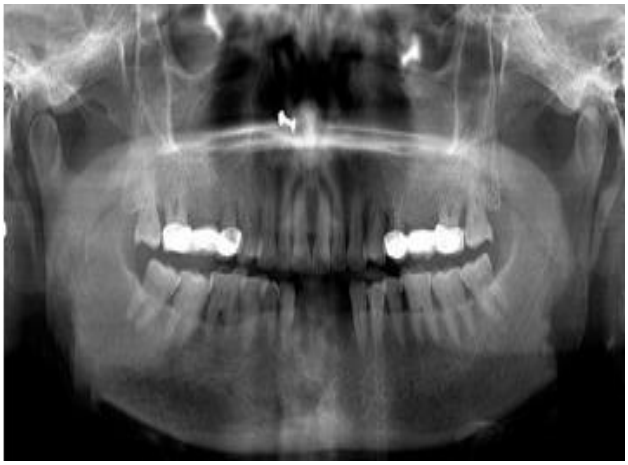
Fig 8 Preoperative Panoramic Radiograph

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Fig 9 Intraoral Photograph after Implant Screws Place


Fig 10 Postoperative Panoramic Radiograph


Fig 11 Intraoral Photograph after Cementation of Prosthesis


Fig 12 Post- Cementation Panoramic

➢ *Case 3:*

A patient came with a chief complaint of missing teeth in the lower front teeth region for the past 1 year. Clinical examination revealed missing 31,32,41 and 42 (Fig 13). Radiographic examination revealed bone loss in lower anterior region. Patient was explained about the treatment options and their drawbacks. Patient agreed for implant treatment and his consent was obtained.

The treatment plan included oral prophylaxis, single piece basal implant placement in 32 and 42 region considering bone loss. The implant placement will be followed by immediate loading of a CAD-CAM milled PMMA hybrid denture.

Osteotomy sites were prepared with sequential order of drills under local anaesthesia. 2 single piece basal implants were placed in the prepared sites and primary stability was achieved (Fig 14). Postoperative panoramic radiographs confirmed the accuracy of placement of implants. A CAD-CAM milled hybrid denture (3 unit) was secured over the implant screws (Fig 15 and Fig 16). Analgesic and antibiotic medications were prescribed and postoperative instructions were given to the patient. Follow-up was done after 3 months to ensure success of treatment.


Fig 13 Preoperative Intraoral Photograph


Fig 14 Intraoral Photograph after Implant Screws Placement

Fig 15 Intraoral Photograph after Hybrid Denture Placement

Fig 16 Postoperative Panoramic Radiograph

➢ *Case 4:*

A patient came with a chief complaint of missing teeth in the lower front teeth region for the past 6 months. Clinical examination revealed missing 31,32 and 41 (Fig 17). Patient was explained about all the treatment options and their possible drawbacks. Patient agreed for implant treatment and his consent was obtained. Preoperative panoramic radiograph revealed sufficient bone quantity for implant placement.

The treatment plan included oral prophylaxis, 2 single piece basal implant placement in 32 and 41 regions. The implant placement will be followed by immediate loading of a FP1 type fixed prosthesis.

Osteotomy sites were prepared with sequential order of drills under local anaesthesia. 2 single piece basal implants were placed in the prepared sites and primary stability was achieved (Fig 18). Postoperative panoramic radiographs confirmed the accuracy of placement of implants. Implant placement was followed by immediate loading of a 3-unit FP1 type of fixed prosthesis (Fig 19 and Fig 20). Analgesic and antibiotic medications were prescribed and postoperative instructions were given to the patient. Follow-up was done after 3 months to ensure success of treatment.

Fig 17 Preoperative Intraoral Photograph

Fig 18 Intraoral Photograph after Implant Placement

Fig 19 Intraoral Photograph after Prosthesis Placement

Fig 20 Postoperative Panoramic Radiograph

III. DISCUSSION

Residual ridge is a term used to describe the shape of the clinical alveolar ridge after healing of bone and soft tissues after tooth extraction. It consists of the denture-bearing mucosa, submucosa, periosteum and the underlying residual alveolar bone. The size of the residual ridge is reduced most rapidly in the first 6 months, but the bone resorption activity continues throughout life at a slower rate, resulting in removal of a large amount of jaw structure. This unique phenomenon has been described as **Residual Ridge Resorption (RRR).**

According to Boucher, during the first year after tooth extraction, the reduction in residual ridge height in the mid sagittal plane is: 2-3mm for maxilla and 4-5mm for mandible. Annual rate of reduction in height is 0.1-0.2mm for mandible which is 4 times more compared to maxilla. RRR is generally more in mandible than in maxilla. Hence, in such situations, basal implants are a viable treatment option.

Because bone grafting is avoided, risk groups, such as diabetics and smokers, can successfully receive these implants.[6]

The mandibular anterior region is the most comfortable operating area for the implantologist. The main contributing factors for this include: good access and a good view of the operation site and less functional stress on the implants.

The placement of basal implants is usually a minimally invasive procedure, with many patients experiencing less discomfort and a faster recovery time than traditional implant procedures. The success rate of basal implants is high, with long-term results comparable to traditional implants.[1]

Basal implants use a different approach than traditional implants and are placed in the basal bone of the jaw rather than the alveolar bone which makes them a viable option for patients with bone loss or low bone density.[1]

The placement of basal implants in the mandibular anterior region can provide stable support for the prosthetic teeth, which can improve a patient's oral function and quality of life. Basal implants can also be placed without the need for bone grafting or bone expansion, which can be a more invasive and time-consuming procedure.[7]

Basal implants can also be placed immediately following extraction of a tooth in the extraction socket followed by immediate loading of the prosthesis.[7]

There is also less incidence of peri-implant infections as the implant surface is polished in basal implants and also the mucosal penetration diameter is less when compared to conventional implants.[7]

IV. CONCLUSION

Based on the results of the case reports where we achieved 100% success rates after a 3 month follow-up period, it can be concluded that the lower anterior segment implants is a quick and highly successful treatment option for patients with missing lower anterior teeth compared to fixed or removable partial dentures. This technique is highly sensitive and requires the expertise of a dental implant team for proper execution. Proper case selection, treatment plan, follow-up and proper prosthetic protocols are the keys for success.

REFERENCES

[1]. Singh M, Kumar L, Anwar M, Chand P. Immediate dental implant placement with immediate loading following extraction of natural teeth. Natl J Maxillofac Surg. 2015 Jul-Dec;6(2):252-5. doi: 10.4103/0975-5950.183864. PMID: 27390509; PMCID: PMC4922245.

[2]. Patel K, Madan S, Mehta D, Shah SP, Trivedi V, Seta H. Basal Implants: An Asset for Rehabilitation of Atrophied Resorbed Maxillary and Mandibular Jaw - A Prospective Study. Ann Maxillofac Surg. 2021 Jan-Jun;11(1):64-69. doi: 10.4103/ams.ams_446_20. Epub 2021 Jul 24. PMID: 34522656; PMCID: PMC8407620.

[3]. 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; 2:22–8.

[4]. Gupta A, Madan B, Bakshi M, Garg M. Full mouth rehabilitation with immediate loading basal implants. *Int J Prev Clin Dent Res.* 2017; 4:159–61.

[5]. Frost HM. Wolff's Law and bone's structural adaptations to mechanical usage: An overview for clinicians. *Angle Orthod.* 1994; 64:175–88.

[6]. Ali, Shakhawan & Othman, Kawan & Samad, Abduljaleel & Mahmud, Payman. (2019). Comparison between basal and conventional implants as a treatment modality in atrophied ridges. 38. 48-54.

[7]. Advantages of immediate loading basal implants. [Online]. Cited 2015 January 2; Available from: URL: http://www. dentalimplantskerala.com.

[8]. Ihde S. Restoration of the Atrophied Mandible Using Basal Osseointegrated Implants and Fixed Prosthetic Superstructures. Implant Dent. 2001;10(1):41–5.doi:10.1097/00008505-200101000 - 00011.

[9]. Sharma R, P J, Dhruv A, Hasti A. Basal Implants-An Alternate Treatment Modality for Atrophied Ridges. IJRID. 2016; 6:60–72.

[10]. Ihde S. Comparison of basal and crestal implants and their modus of application. Smile Dent J. 2009; 4:36–46.