

Basal vs. Conventional Implants: The Battle for Better Bone Integration

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Abstract

Dental implants are widely used to restore missing teeth, with conventional crestal implants being the most common. However, conventional implants require sufficient bone volume, often necessitating bone augmentation, which increases treatment complexity, risk, and cost. Basal implants, developed to address the limitations of conventional implants, are particularly effective in atrophied jaws with inadequate bone. Unlike conventional implants that rely on the crestal bone, basal implants utilize the basal cortical bone, which is more resistant to resorption and infection. Basal implants also allow for immediate loading, reducing treatment time and improving patient outcomes. Although basal implants offer several advantages, such as reduced surgical complications and suitability for compromised bone conditions, they also have limitations, including patient discomfort and technique sensitivity. Further clinical studies are necessary to validate the long-term efficacy and safety of basal implants as a viable alternative to conventional implantology.

Keywords: Basal Implants; Implants; Osseointegration; Inadequate Bone; BOI

Introduction

Osseointegration is the structural and functional connection between the bone and load carrying surface of an implant. Initially the term was associated with titanium metal implants but now it has been applied to all biomaterials that have ability to Osseo integrate [1].

Dental implants are devices that is inserted into jawbones which act as roots of the missing teeth. metallic implants are most commonly used implants but they have disadvantages of corrosion, and other toxicity. To overcome the problems associated with atrophied jaws [2].

The conventional crestal implants is used when sufficient vertical and horizontal bone is available and if not, this is not efficient and augmentation is carried out, Augmentation steps elevate the risk as well as cost of the implant treatment. in order to prevent this the

implant design is changed in atrophied jaws. Two very successful implant methods have been introduced in the past decade's mini dental implants and basal implants [3]. To overcome problems associated with atrophied "Basal Implants" are introduced. Basal implant also called lateral implants/disk Implants and it works by the principle utilizing basal cortical bone areas which is not infected or resorbed. cortical bone is used since its load bearing capacity is much greater than the spongy bone. Conventional implants engage the alveolar bone that shows resorption after tooth loss its size reduces as function reduce [4].

Conventional implants

These are used for single or multiple restoration over sufficient bone tissues. This works by osseointegration. and this type of implants have delayed loading up to 3 to 6 months. The surgical procedures are complex and requires 3 - 4 sittings with in the 6 months' time. The procedures include implant placement, healing of tissues, screw placing, and finally abutment is placed.

This is a two-piece system [3].

Disadvantages of conventional implants:

- Complex procedure.
- Expensive.
- Two-piece system: This two-piece system makes it unsuitable for diabetic patients, smokers, and patients with uncontrollable periodontitis.
- Low quality of crestal alveolar bone which may lead to resorption.
- Surgery requires more time [3].

Basal implants

This type of implants was developed to overcome the limitations of conventional implants. Primarily for the atrophied jaws and inadequate bone with immediate loading type protocol.

The concept of basal implantology of jaws has two parts: tooth bearing alveolus or crestal part and basal bone. crestal bone is less dense, is exposed to infections and is subjected to high rates of resorption whereas basal bone is heavily corticated rarely subjected to infections and resorption. So, the basal bone offers excellent support for implants because of corticated nature [5].

Based on morphology different types of basal implants are:

- I) Screw form
- II) Disk form
- III) Plate form
- IV) Other forms.

Implant morphology

Basal Osseo integrated implants (BOI) today it is modified to have smooth and polished surface as polished surface is less prone to cause inflammation (e.g. mucositis etc.) than the rough surface.

BOI is made of pure titanium or titanium molybdenum alloy which helps to enhance the strength of the implant [4].

Parts of basal implant

- Implant body: Increase the bone implant contact area and the vascularity surrounding the implant.
- Implant neck: Is the connecting portion of implant to the abutment.
- Implant surface: Polished surface that prevents neck or body from plaque or bacterial attachments [6].

Surgical technique of basal implants

This technique is simple and is easier. It does not involve much of the bone drilling; thus, it avoids thermal injury. “Single pilot osteotomy” with pathfinder drill is done. This technique does not involve raising flaps as it decreases blood supply and also due to the design of the implant.

For BOI, bone is approached by raising flaps laterally. Bone is cut by drilling for the required size laterally, to get “T shaped” osteotomy. then the implant is placed laterally and the flap is closed over that [3].

Advantages of basal implants:

- These implants provide support from basal bone so that it is highly resistant to resorption unlike conventional implants.
- Immediate loading of the implants where the implant prosthesis can be fixed within 72 hours of surgery so it saves time as well as cost unlike conventional implants which has bone augmentation and other procedures which could lag up to one year.
- It is less invasive and has less surgical complications.
- These implants are one-piece implants in which the implant and abutment are connected together to get a single piece.
- It is also used in compromised bone situations where it is made to use only the available bone to avoid bone augmentation procedures.
- It avoids periimplantitis incidence which is the main problem associated with conventional implants due to their rough implant surface [7].

Disadvantages of basal implants:

- Patient often complains of discomfort and pain.
- Mobility of implant usually in vertical direction [5].
- Open flap surgery required for BOI implants which necessitates incision on gums as well as suturing unlike BCS implants.
- Only trained prosthodontist can do these procedures without further complications.
- It is a technique sensitive procedure [7].

Conclusion

To prove that basal implants are a good substitute for traditional implants, further clinical case studies are required [8]. A novel approach to therapy, basal implantology has virtually no restrictions and new, broad indications. In contrast to conventional wisdom in oral implantology, the base building bone is not a part of implantology. The steps involved in implant implantation thereafter. It also has benefits such as the flapless method with modest mucosal penetration and little surgical effort decreased discomfort following surgery, prevent oedema, and decrease the pain [9]. The process of implanting basal implants unquestionably calls for a skilled practitioner with a solid understanding of anatomy. Additional investigation, advancement, and more specific information on clinical situations is needed to show their effectiveness and the rarity of their problems, but can be deadly if the treatment is not carried out appropriately [10].

Ethical Approval and Consent to Participate

Not applicable.

Consent for Publication

All authors have reviewed and approved the manuscript for publication.

Availability of Supporting Data

All relevant data supporting the findings of this study are included within the article and its references.

Competing Interests

The authors declare that there are no competing interests.

Authors Contribution

- Dr. Arjun Machingal Raveendran contributed to the study design.
- Dr. Anil Melath supervised the study and provided critical revisions.
- Dr. Subair Kayakool assisted with data interpretation and manuscript editing.
- Dr. Marjana Shukoor contributed to the literature review, data collection, manuscript drafting, and manuscript preparation.
- Zaina Kaliparambu Haris and Viswavinodini. R contributed to data collection and assisted in manuscript preparation.

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