

Basal implants- A new era of prosthodontic dentistry

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Abstract

Implant dentistry has a long historical perspective. Its practical implementation started decades ago. Since ancient times, search begins for the rehabilitation of edentulous arches. With continuous development and advancements in all aspects of dentistry a new era of implant dentistry has just begun. An adequate knowledge of bone physiology, implant placement protocol, implant design, single-stage implant surgery, and immediate loading of implants with analytical approach is must for the success of basal implants as treatment modality. The present review article discusses about how basal implants emerged as a treatment option for edentulous arches.

Keywords: Basal, Dentistry, Implants, Prosthodontic, Single stage.

Introduction

Implantology is a distinctive branch of dentistry deals with rehabilitation of edentulous arches in an idealistic manner regardless of atrophy or injury to stomatognathic system. Evolution of implant dentistry has occur in innumerable manner since last few decades and also gained vast demand in the field of dental reclamation. However, more devastation of oral tissues will definitely lead to difficulty in managing the outcome of such cases. But there has been significantly increasing the compliance of patients towards opting the osseointegrated supported prosthesis as a treatment option.^{1,2} Restoring the edentulous arch with the use of implants has a certain amount of predictable success. However to perform hassle free and affluent implant surgery, the critical requirement is sufficient bone should be available i.e minimum 13-15mm length and 5-7 mm width. If the criteria is not fulfilled than conventional implants might not be very successful, and we need an alternative treatment plan which restoring the lost alveolar dimensions.³

To overcome the hurdles in restoring atrophied jaw bones, "Basal Implants" were developed and successfully placed. Basal implant also known as lateral implants or disk Implants, works on the principle of utilizing basal cortical bone areas which is exempt from infection and resorption. The reason being for engaging cortical bone is that its load bearing tolerance is much higher than that of the spongy bone.⁴

Conventional implants use the alveolar bone which generally shows resorption after teeth being removed and reduces continuously as the function ceases. Using the basal bone which is stress bearing part of our skeleton system and present throughout the life, implantologist can now place implants in regions where conventional implants would not be possible. In this bone dental implants can also be loaded with teeth immediately.⁵

History

German and French dentists primarily involved in evolving the concept of basal implants since many years. Dr. Jean-

Marc Julliet in 1972 first developed and also used a single piece implant with two designs, which is being used even today. The only disadvantage was the lack of surgical kit. In mid 1980's a French dentist Dr. Gerard Scortecchi worked further on this drawback and presented the world an improved basal implant system with complementing surgical tools. Two sorts of implants were evolved by him and named them "Diskimplants" which were available with internal and external connectors attached to the prosthetic superstructure.^{3,5}

In mid 1990's several German dentists developed new implants with proper surgical tools and accessories based on diskimplant system. In 1997, Basal Osseointegrated Implant (BOI) system also known as lateral basal implants were introduced by Dr Stefan Ihde. These implants were round in shape and with roughened surface. These implants were designed to enable masticatory load transmission in the vertical as well as its basal part. Soon Dr. Ihde modified the basal implant as the introduction of edges on round base plates which prevents early rotation of the implants in the bone before integration.^{4,5}

In 2002 fracture-proof base plate was fabricated and patented by Europe and United States. Shortly, bending zones were introduced in the vertical implant shaft. In 2005, with the advancement stages screw able designs (BCS, GBC) were launched. Regarding the modifications in surface structure of vertical implant part which were polished initially in 1990's, from 2003 onwards the whole basal implant was produced with polished surface. The polished surfaces having the advantage of showing no tendency to mucositis, peri-implantitis and reintegration of the implants was feasible in case of unfastening of implants. Initially two- piece basal implants were introduced followed by the advancement towards one- piece system.³⁻⁷

Rationale for basal implants

According to the concept of basal implantology, basal bone is chosen for implant placement over crestal bone as basal bone is highly dense, provides excellent support to implants

and less prone to bone resorption and infections. On the other hand, tooth bearing alveolus i.e. crestal bone is lesser dense (spongy) and load bearing capacity is much lower than cortical basal bone.⁵⁻⁶

Types of basal implants³⁻⁵

BOI (Basal Osseo Integrated) and BCS (Basal Cortical Screw) are two groups of basal implants specifically designed to utilize dense cortical jaw bones. Screwable basal implants (type of BCS) have been evolved with up to 12 mm thread diameter which can be inserted immediately in the socket after extraction.

Type 1- BOI (Basal Osseo Integrated)

BOI also known as lateral basal implants as they are placed from the lateral aspect of the jaw bone. Cortical bone bears the load of masticatory force transmission along with the horizontal implant segments. Basal implants are region specific.

Anterior implants

For anterior segment, if ample vertical space is obtainable, implants with two disks- crestal and basal disk are used. The crestal disk has a diameter of 7 mm and the basal implant disks have a diameter of 9 or 10 mm. These two discs have unique function to perform. Here, the main purpose of crestal disk is to administer additional stabilization of the implant. Once the basal disk is ossified to its complete load bearing capacity, the role of crestal disk is ended. If there is prediction of failure of double disk implant placement due to lack of sufficient bone, a single BOI with a 7- 9 mm diameter and shafts between 8 - 13.5 mm can be used.

Posterior implants

For posterior segments of jaws, square shaped basal implants are used. Depending on the available horizontal bone and desired vertical dimension a disk of 9 - 12 mm or 10 - 14 mm diameter with shafts of 10 - 13.5 mm length can be used appropriately. Infraneve implant insertion is done, if the vertical bone available above the mandibular nerve is just 2 mm. In this procedure, the disk is introduced below the mandibular nerve and the threaded carrier is located at the side of the nerve.

Type 2- BCS (Basal Cortical Screw)

BCS also known as screwable basal implants positioned like a conventional implant i.e. these are flapless implants which are inserted through gingival without introducing any cut. Screwable implants are also considered as basal implants because they transmit masticatory forces deep into the bone, customarily onto the opposing cortical bone. This type contributes some elasticity to the implants and by virtue of highly polished surface and thin mucosal penetration diameter they are generally not prone to peri- implantitis.

Parts of basal implants³⁻⁵

Considering failure of conventional 2 and 3 piece implants which occurs due to connection interface complications, the

idea of basal implants came into existence. To overcome the problems with conventional implants the basal implants are designed as single section implants where the implant body and abutment are fused. These have 3 parts as body, neck and surface.

Implant body

It is thin with wide thread turns which increases the mechanical bone implant contact area and also amplify the vascularity around the implant.

Implant neck

It is basically the connecting part of implant and abutment. Depending on the length of the implant the abutment can be inclined from 15 – 25 degrees at neck.

Implant surface

Implant surface is generally polished which protects the implant neck or body from bacterial and plaque attachment.

Indications of basal implants³⁻⁹

1. In cases where multiple teeth are absent or to be extracted in future.
2. When the conventional implants or bone augmentation procedure have failed.
3. In cases where either bone height or bone thickness is not sufficient.

Contraindications of basal implants

1. Several medical conditions where this procedure should be avoided like recent history of myocardial infarction (heart attack), cerebrovascular stroke, or any Immunocompromised conditions due to compromised immune system.
2. Medications taken by patients should also be taken care of like the drugs that inhibit blood clotting, bisphosphonate and drugs used for treating cancer.

Advantages of basal implants³⁻⁹

1. **Immediate loading:** The prosthesis is positioned within 72 hours of surgery which cuts the treatment cost and also saves the time.
2. **Single section implants:** These implants are designed in one piece that further minimizes the failure which generally occurs due to interface connection problems.
3. **Basal cortical bone support:** Basal bone is more stable, dense and resistant to resorption and infections.
4. **Minimal invasive:** Surgery is minimally invasive with less postoperative complications and fast healing.
5. **Atrophied ridges:** It works well even in compromised bone situations.
6. **Masticatory forces:** They are embedded in high quality basal bone therefore; the masticatory forces get well distributed to areas that are highly resistant to resorption.

Disadvantages of basal implants

Apart from surgical and prosthetic part of treatment planning this technique also requires a thorough fundamental knowledge in the fields of biomechanics and bone physiology. Proper training is must to avoid any complications.

Basal implants are used for rehabilitation of any form of edentulous arches even the atrophied one; and can be placed in both extraction socket and healed bone. Depending on the situation flap or flapless technique can be performed. A substantial knowledge and understanding is recommended. Recent advances with respect to the materials used in implant manufacturing, surface modifications, immediate loading and custom implants have improved the success rate of implants.⁵⁻⁷

Conclusion

Dental implants placement is the trending restorative therapy among dentist now-a-days and it has become a routine dental procedure. Basal implants for its advantages like time saving and better support from basal cortical bone gaining lots of attention.

Source of Funding

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Conflict of Interest

None.

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