

**BASAL IMPLANTS- A REMEDY FOR RESORBED RIDGES****Dr. Grishmi Niswade* and Dr. Mitul Mishra**

Swargiya Dadasaheb Kalmegh Smruti Dental College and Hospital, Nagpur.

Article Received on 01/01/2017

Article Revised on 21/01/2017

Article Accepted on 12/02/2017

Corresponding Author*Dr. Grishmi Niswade**Swargiya Dadasaheb
Kalmegh Smruti Dental
College and Hospital,
Nagpur**ABSTRACT**

For many years, Osseointegration had been applied in both maxilla as well as mandible. In recent years, many applications have been developed for compromised patients with resorbed alveolar ridges. There are certain restrictions in dental implant placement such as lack of sufficient bone volume which can be due to bone resorption or

pneumatization in case of posterior maxillae. In such cases, implant placement becomes very unpredictable. Basal implants were primarily developed for use in atrophied jawbone. Basal implants are also known as lateral implants or disk implants.

KEYWORDS: basal implants, osseointegration, alveolar bone, resorption, lateral basal implants, screw basal implants.

INTRODUCTION

Awareness over the years in Dental Implants has increased. Research on newer materials and invention of newer techniques has certainly widened the scope of dental implants. However there are still some lacunae when questions are asked for atrophic ridges.^[1] Conventional Implantology do offer good choices when it comes to replacement of teeth but its horizon is limited when it comes to replacement of multiple teeth in worn out ridges. Basal Implant is the answer to all such questions. Basal Implantology is an innovative implantology system which employs the basal – cortical portion of the jaw bones for retaining dental implants. The exclusively designed implants are static in the basal – cortical bone areas. The basal bone provides excellent quality cortical bone for the retention of these unique and highly advanced implants. Basal implants were mainly developed by French and German dentists in a number of stages. The first single piece implant was technologically advanced by Dr. Jean Marc-

Julliet in 1972 which was offered in two sizes and is still available for practice. However, homologous cutting tools were not available for this system, which makes its use fairly demanding. In the mid-1980s, a French dentist Dr. Gerard Sorctecchi, developed a basal implant system with homologous cutting tools. In 1997, Dr. Stefan Ihde developed lateral basal implants which were available in round shape with roughened surface.^[2]



Basal implants designed by Dr.Ihde Dental AG, Switzerland

Basal implants with certain advances were developed by Dr. Stefan Ihde after these lateral basal implants were introduced. The previously made round base plates got edges which disallowed early rotation of implants in the alveolar bone before osseointegration. In 2002, base plate with a fracture proof design was developed and patented in Europe and United States. Also, bending zones in the vertical implant shaft were presented. Screwable designs were developed in 2005.^[2]

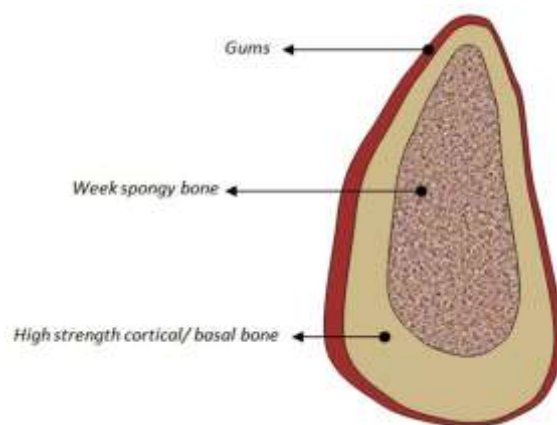


Single piece Basal compression screw (BCS)

Downsides with Conventional Root Form Implants

A good bone quality and quantity is criterion for accomplishment of root form implants. Broader crestal bone is vital to lodge the neck of conventional implants which is mostly

resorbed in majority of the cases. These cases are indicated for bone augmentation which upsurges the cost, total number of surgeries and length of treatment. Many a times enormous volume of bone augmentation is essential when maxillary sinus lift is done or presence of lingual never in close juxtaposition. A traditional healing period of 3-6 months is prerequisite for these types of implants as its major part is rooted in cancellous bone. Most of the root form implants are 2 piece implants where in commonly met problem is screw slackening and fracture at the interface. Rough surfaced crestal implants are more prone to infections and bone loss if placed in disease-ridden tooth sockets. Compromised patients such as smokers or diabetics have a higher rate of implant failure as probabilities of infection are augmented in case of conventional implants.^[3]



Cross section of the lower jaw bone

RATIONALE OF USING BASAL IMPLANTS

The alveolar wall is enclosed by the supporting bone with which it forms an anatomical entity. The supporting bone embraces the buccal and oral cortical plates and the septa. The cortical plates are in continuity with the cortices of the body of the jaws. Cancellous bone is interpolated between the alveolar wall and the cortical plates.^[4] Basal bone is defined as the osseous tissue of the mandible and maxilla except the alveolar processes.^[5] Basal bone is comparatively static, not subject to any alteration in the morphology of the framework and relatively resistant to bone resorption and infection due to its dense structure. Also, the load bearing capacity of basal bone is comparatively higher than crestal bone. The crestal alveolar bone is a bone of less quality and is more prone to bone resorption. Therefore basal implants taking sustenance from the basal bone provides a long lasting key for tooth loss.^[3]

TYPES OF BASAL IMPLANTS

There are two types of Basal implants- BOI (Basal Osseo Integrated) and BCS (Basal Cortical Screw). Screwable Basal implants (BCS) are developed for placement in immediate extraction socket.^[6]

BOI (LATERAL BASAL IMPLANTS):- is inserted from the lateral aspect of the jaw bone and it requires minimum bone height of 3 mm and that means:

1. Virtually every patient can be treated without bone grafting.
2. Because bone grafting is avoided, risk groups, such as smokers and diabetics, can successfully receive these implants.
3. Wide basal disk of the implant is stabilized into both facial as well as lingual strong cortices deep into the resorption and infection resistant zone (well deep from the crest) which guarantees safe load transmission and osseointegration.
4. Its iso-elastic (flexible) design make it possible to connect its prosthesis to the firm and healthy natural teeth in selective cases which avoid the necessity of extraction of healthy teeth and also save the cost of the treatment.
5. The neck of this implant can be bended to make multiple implant heads parallel for passive seating of the prosthesis and also to seat the prosthesis in the most suitable occlusion line. Masticatory load transmission is confined to the horizontal implant segments and, essentially, to the cortical bone structures.^[6]

ANTERIOR IMPLANTS

If sufficient vertical space is available, the implants used are usually the ones with two disks. The basal disk has a diameter of 9 or 10 mm, whereas the crestal disk is 7 mm in diameter. The crestal and basal plate (disc) of multi-disc implants used for basal osseointegrated implants has different functions. The main purpose of the crestal plate is to provide additional stabilization of the implant. The crestal plate loses its importance once the basal plate has ossified to full load bearing capacity. If the insertion of double disks fails due to the lack of available bone, a single BOI with a 7- to 9- mm diameter and shafts between 8 and 13.5 mm can be used instead.^[6]

POSTERIOR IMPLANTS

The implants used here are usually of a square shape, having a disk of 9 to 12 mm or 10 to 14 mm with shafts of 10 to 13.5 mm in length, depending on the desired vertical dimension and the available horizontal bone. If the vertical bone available above the mandibular nerve is, 2

mm, infranerve implant insertion (infranerve implant insertion: The disk is introduced below the mandibular nerve; the threaded carrier is located at the side of the nerve.) is indicated.^[6]

BCS (SCREW BASAL IMPLANT): - is inserted like a conventional implant, but it transmits loads only into the opposing deep cortical bone that means:

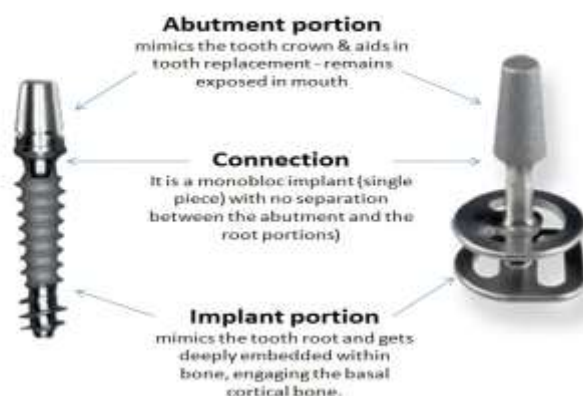
1. Virtually every patient can be treated without bone grafting.
2. Because bone grafting is avoided, also risk groups, such as smokers and diabetics, can successfully receive these implants.
3. Strictly cortical anchorage of the implant guarantees for safe load transmission and osseointegration.
4. Minimal invasive implant placement (Mostly without any flap and suture)
5. The neck of this implant can be bended to make multiple implant heads parallel for passive seating of the prosthesis and also to seat the prosthesis in the most suitable occlusion line.

These screwable basal implants are flapless implants and are inserted through gum, without giving a single cut, inserted like a conventional implant. Bicortical screws (BCS) are also considered basal implants, because they transmit masticatory loads deep into the bone, usually into the opposite cortical bone, while full osseointegration along the axis of the implant is not a prerequisite. BCS provide at least initially some elasticity and they are not prone to peri-implantitis due to their polished surface and their thin mucosal penetration diameter.^[7]

PARTS OF BASAL IMPLANTS

Basal implants are available as single piece implants. The implant and the abutment are available as one unit. This avoids future problems related to implant- abutment interface. The implant surface is polished which prevents adherence of plaque on the implant. The implant body is thin with wide thread turns which enhance the implant bone contact with more vascularity. The implant neck can be bent up to 15-25 degrees depending upon the length of implant.^[8]

Single Piece (Monobloc) Basal Implants



SURGICAL PROCEDURE FOR BASAL IMPLANT PLACEMENT

Lateral basal implants are placed from the lateral aspect of jaw bone after proper lateral flap reflection under adequate anaesthesia. Two precision slots are cut, one horizontal and one vertical for implant placement. BOI implants are inserted horizontally and transosseously that is the disk is designed to touch inner and outer cortical plate. Screwable basal implants are placed flaplessly without flap reflection.^[2]

INDICATIONS FOR BASAL IMPLANTS^[9]

- Conditions where many teeth are missing or have to be extracted either due to caries or periodontal disease.
- Conditions where alveolar ridge augmentation or two staged implants cannot be placed.
- In cases of severe bone deficiency either horizontal or vertical.

CONTRAINDICATIONS FOR BASAL IMPLANTS^[10]

- Cases where bilateral equal mastication cannot be arranged
- Medical conditions like recent myocardial infarction, valvular prosthesis, severe renal disorder, severe diabetes which does not respond to proper treatment, osteoporosis, treatment resistant osteomalacia, radiotherapy in progress, severe hormone deficiency, drug addiction.
- Chronic or severe alcoholism
- Heavy smoking habit (more than 20 cigarettes per day)
- AIDS and seropositive cases
- Prolonged use of corticosteroids
- Blood dyscrasias

ADVANTAGES OF BASAL IMPLANTS^[7]

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. Less 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

DISADVANTAGES WITH BASAL IMPLANTS^[10]

1. Compromised aesthetics with single tooth replacement.
2. Skilled surgeon with sound anatomic knowledge is important to carry out successful surgery.
3. Excess sound bone reduction in cases of good bone support.
4. A phenomenon called as overload osteolysis can be seen if load distribution is not done properly.

CONCLUSION

More than 90% of the available Implant system all around the world follows system of crestal Implants. Advocates of Basal Implant systems call it to be a better alternative to Crestal Implants in terms of ability to restore almost any type of case, shortened treatment time, less chances of failure and many. However, the long term results are yet to be proven. The whole concept is based upon the fact that basal bone is the most stable of all the bones available for Implants and that its resorption rate is virtually nil. Also to add is the chances of failure due to infection is also greatly reduced since the Implant takes its primary retention from the site

which is very far from the surgical area. Technique of placing Basal Implants definitely requires a skilful operator with a sound knowledge of anatomy. Complications are rare but can be fatal if the procedure is not performed properly.

REFERENCES

1. Chantal Malevez et al. Use of zygomatic implants to deal with resorbed posterior maxillae. *Periodontology*, 2000; Vol. 33: 2003, 82–89.
2. IHDE Dental. [Online]. Cited 2015 February 2; Available from: URL:<http://www.boi.ch/index.php/en/>.
3. Aghabeigi, B., and V. A. Bousdras. "Rehabilitation of severe maxillary atrophy with zygomatic implants. Clinical report of four cases." *British dental journal*, 202.11 (2007): 669-675.
4. Jean-Louis Saffar et al. Alveolar bone and the alveolar process: the socket that is never stable. *Periodontology*, 2000; Vol. 13: 1997, 76-90.
5. Mosby's Medical Dictionary, 9th edition. © 2009, Elsevier.
6. Nair C, Bharathi S, Jawade R, Jain M. Basal implants - a panacea for atrophic ridges. *Journal of dental sciences & oral rehabilitation*, 2013; 1-4.
7. Ihde S. Comparison of basal and crestal implants and their modus of application. *Smile Dental Journal*, 2009; 4: 36-46.
8. Advantages of immediate loading basal implants. [Online]. Cited 2015 January 2; Available from: URL: <http://www.dentalimplantskerala.com>.
9. Available from: URL: <http://www.dentalimplantclinicindia.com/Myfiles/file/Basal%20Implants.pdf>.
10. Disadvantages of basal implants.[Online]. Cited 2015 January 30. Available from: URL:<http://drmurugavel.in/content/boi-dental-implants-india-basal-dental-implants-india>.