

BASAL OSSEOINTEGRATED IMPLANTS

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ABSTRACT:

Basal bone is that which is not absorbed in the course of a lifetime, because it is structurally necessary. The alveolar bone comes and goes with the teeth, but the basal bone remains stable, with its cortices. These are potentially strong anchors. This cortical anchorage is the key of this BOI philosophy. In BOI system, the fate of the alveolar ridge is not linked to the fate of the implant restoration complex. Such Basal implants have a better prognosis because they leave the blood supply of the bone intact, and become a skeletal enossal implant fixture. This paper is a systematic review of the Basal osseointegrated system, its advantages, and considerations and applications with case reports. A Medline indexed search was conducted along with a manual search for articles on basal osseointegrated implants and the articles were selected.

KEYWORDS: basal bone, immediate loading, anchorage

INTRODUCTION:

Implants are everywhere. Patients no longer ask us to replace missing teeth. They ask Doctor, can you please give me an implant and fix my tooth back? And our answer is 'we'll assess your bone, take a couple of radiographs and tell you if you are eligible. What if I told you, you could actually call back 10 patients, whom you had to regretfully tell, 'I am sorry sir, I just cannot place an implant. Your jaws are just worn out too far'. And place implants without a tedious ridge augmentation, in a single stage surgery, wouldn't that be great?? There is a new surgical practice and donor bone regions are always developed to match the patient's skull to the implant shape, instead of going the opposite way. Take all the technology of the crestal implants and instead of utilizing the vertical dimension of bone, why not exploit the horizontal dimension of the ridge?? Such Basal implants have a better prognosis because they leave the blood supply of the bone intact, and become a skeletal enossal implant fixture. This paper is a systematic review of the Basal osseointegrated system, its advantages, and considerations and applications with case reports. A Medline indexed search was conducted along with a manual search for articles on basal osseointegrated implants and the articles were selected.

A further aspect of the basal implantology - it is the use of the dense, highly mineralized cortical outer layer rather than

the inner cancellous region as done by the crestal implants, thus providing high primary stability. And the load transmission occurs in a deep infection safe jawbone area, rather than the whole lateral aspect. (Fig 1)

ADVANTAGES:

Re-union of bone to the implant is termed osseointegration. Roughening the surface of implants to give a textured, modified interface is practised far and wide. What we fail to appreciate is that one such rough surface can harbor as many bacteria as it can harbor osteoblasts. Surfaces that enhance osseointegration, promote bacterial colonization as well (Fig2). Bone is not just a three dimensional entity as our scans show. With time, they remodel. Placing an implant thus needs to permit this physiology as well. BOI implants become definitive stably incorporated into the functional processes inside the oral cavity after 1 or 2 years at the earliest¹. After that time, both the bone trajectories and the masticatory function will have approached a stable upper limit. Time determines whether stable bone conditions will be present at the site of implantation under long-term loading and functional patterns

And areas where stress and deformation occur, are potential entry sites for such pathogens. Now let's reassess what happens when we place a crestal implant. After loading, the implant causes stress in the crestal area. This provides an entry path, and a rough surface that is a conducive for such bacteria². Osseointegration occurs in the basal disk region whereas the stress, is limited to the vertical component of the implant as evidenced by FEA studies (Fig3)³. This separation means, texturing the surface is necessary only on the basal disk and the vertical rod is smooth. Hence the entry site of bacteria, the crest, is unfavorable for bacterial colonization

REVIEW OF LITERATURE

Year	Inventor	Development
1972	Jean Marc Julliet	One-piece implant was invented
Mid 1980s	Gerard Scortecci ⁴	Introduced basal implants with matching drills
Mid 1990s	German Dental surgeons	Practical instruments, accessories for basal implantology
1997	Stephan Ihde ⁵	Lateral basal implants- Disk implants (round shape with sandblasted surface)

2002	Stephan Ihde ⁶	Fracture resistant designs were made
2005	Stephan Ihde	Screw type basal implants (BCS, GBC)

PROCEDURE:

After reflection of flap, a lateral osteotomy cut is placed with a high speed headpiece conforming to the shape of the implant to produce an Inverted T shaped ditch, which may differ in the number of basal disks. Next the implant is placed and checked for stability, if necessary, screws are used. Bone substitute is placed into the lateral aspect of the cut and the flap is closed and sutured. The implant is then ready for immediate loading (Fig 4, fig 5)

VARIOUS STUDIES:

S.No	Author	Time period	No. of implants	Success	Failure	Success Rate
1	Tarnow	9-year	69	67	2	93
2	Gerald and Scortecchi	6 month post op	783			98
3	Noga Harel, Dana Piek	111 months	110	110	0	100
4	Kopp et al	30 months	410	401	9	97.8

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Duration	4.5yr (2003-2007)
Patients	24- 155 BOI implants
Mean Age	58.5
Implant success Rate	
Overall	96.8
IMMEDIATE	97.7
DELAYED	95.6

COMPLICATIONS OF BASAL IMPLANTS

- **Functional overload osteolysis:** Masticatory pattern need to be evenly balanced and symmetrical. Achieve Bilateral Balanced occlusion.
- **Infection spreading submucosally :** Gateway for suppuration sealed as the area of penetration is closed with scar tissue

OPENING NEW AVANTURES

- 1) Because of the advantages of BOI system of implants, it can be used in nasal implants, orbital prosthesis, where even a small amount of cortical bone can be used for anchorage for the prosthesis. Increasing numbers of extraoral applications are being developed (Fig 6)
- 2) In this case of a mandibular reconstruction following resection of a tumor, BOI implants were used. Utilizing the immediate loading capability of BOI implant and high primary stability, the prosthesis was immediately loaded onto the implant and the prosthetic framework served as an external fixator for the reconstructed segments(Fig 7)⁸
- 3) Here is another similar case of a resection of a Odontogenic keratocyst followed by reconstruction. Here again, the immediately loaded prosthesis served as an external fixator and aiding in the stability of the bone segments (Fig 8)⁹
- 4) .We report a case of total oral rehabilitation with basal implants (cortically anchored disk-design implants) on a patient who received a facial allograft 1 year earlier. Observation. A 31-year-old patient was suffering from a plexiform neurofibroma spread into the soft tissues of the oral cavity with huge deformations of the jaws. The operation consisted in pulling out numerous supernumerary impacted teeth, removing unnecessary

soft tissues, settling six basal implants in the maxilla and seven in the mandible. The following day, two resin bridges were adjusted and cemented onto the implant abutments. The permanent bridges were settled 2 months and half later. The outcome was still unremarkable 2 years after the implant procedure. This case report raises important issues, notably the relevance of an oral rehabilitation with implant-supported prostheses on an immunosuppressed patient. In this specific case, this was impossible to achieve using removable prostheses. A facial reconstruction with its plastic, functional, and social goals seemed inconsistent without an oral rehabilitation. This option has been motivated by the possibility to complete the case in one sole operation with provisional prostheses cemented the day after that act like orthopaedic external fixators providing an exceptional primary stability. The cortical anchorage, which was the only reliable on this patient, allowed to avoid bone grafting. Finally, the particular thinness of the implant emergence limits to the minimum the communications between bone and oral cavity.(Fig 9)¹⁰

CONCLUSION:

Placing implants is a surgical procedure, yet its prosthodontists who speak constantly of implants. This is because surgery causes a one-time trauma, whereas prosthetic restorations provide lifelong stimulation of the implant and in cases of errors, a constant trauma. Most of the implant failures are because of faulty loading. Hence we need to be thorough about the prosthetic superstructure and its loading. Yes, this technique is being practiced by some leading implantologists in India but the very thought of coming out of our comfort zone and trying a new system of implant makes many dentists hesitant.



Fig1

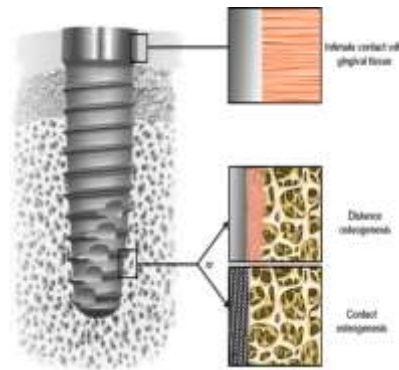


Fig 2

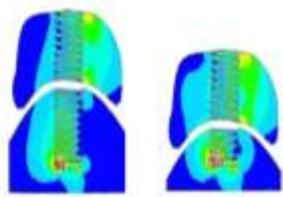


Fig 3



Fig 4



Fig 5



Fig6

Fig 7



Fig 8



Fig 9a



Fig 9b,c,d

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