

Consensus on basal implants

[Ver 4.2: June 2018]

Due to the fact, that medical devices and methods of their application are developing, also considering new developments in the nomenclature, the International Implant Foundation had published the «Consensus on BOI» (Ver1:1999; Ver2: 2006; ver 3 Mai 2015, ver 4.1. April 2018). This consensus was revised recently again and it is now valid as ver 4.2, dated June 2018.

It makes binding specifications for basal/strategic dental implantology, which have to be implemented in consideration of the national legal provisions. Copyright: Internationale Implantatstiftung, München, 2018.

Definition

- Lateral basal jaw implants transfer the chewing forces into the cortical bone above and below one or more horizontal base plates or rings. The implants show a “dual integration” into bone, and they allow that masticatory loads are transmitted reliably already before “osseointegration” around the implant takes place (i.e. in immediate loading protocols)
- basal screw implants (e.g. Bi-Cortical screws, Strategic Implant®) belong also into the group of basal implants if they are anchored laterally bi-cortical, or in the 2nd or 3rd cortical. Anchorage should utilize preferably resorption-stable bone areas.
- Implants which provide by their design the possibility of bone compression along their vertical axis and are anchored in the 2nd or 3rd cortical (combination implants) are also considered to belong into the group of basal implants

Active biologic osseointegration along the vertical axis of these implants is not necessary for the functioning of these three types of implants. As in lateral and screwable basal implant the vertical implant part only connects the load transmission areas with the abutments, (i.e. they have no further function), they should be kept as thin as possible and polished.

Decisive for the successful insertion and especially for immediate loading is the primary stability achieved by osseofixation. Later also such implant parts may integrate, which are not osseofixated in the first place.

Classification of basal implants

Description	Design	Mode of integration	Type of osteotomy
Lateral basal implants	Force transfer surfaces are intended for transmission of force to the cortex.; thin, polished vertical implant sections. Elastic implant design	<ol style="list-style-type: none"> 1. Dual integration in the area of force transmitting discs 2. Gradual integration along the other vertical implant sections 	T-shaped, lateral, bicortical
Screwable basal implants	Polished, wide, cutting apical threads (typically cylindrical threads); thin, polished vertical implant sections. Elastic implant design.	<ol style="list-style-type: none"> 1. Osseofixation of the force transferring thread. <p>Gradual integration along the other vertical implant sections</p>	Crestal, trans-cortical
Combination implants	Polished, sharp cutting apical threads; compression threads along the vertical axis of the implant for positioning in the spongy bone. Stiff implant design.	<ol style="list-style-type: none"> 1. Osseofixation der kraftübertragenden Gewinde. 2. Kompression des spongiösen Knochens entlang der vertikalen Implantatachse. 	Crestal, trans-cortical

Indications

- Lateral anchorage
- availability of a sufficiently stable and usable 1st and 2nd cortical as a horizontal ly oriented support
- Jaw bone classified by Lekholm & Zarb D1 – D4 and by Paraskievich D5 and D6.

Basal (screwable) anchorage

- availability of at least one stable and accessible 2nd or 3rd cortical for basal anchorage.
- Or: availability of lateral and lingual/palatal cortical anchorage
- Jaw bone classified by Lekholm & Zarb D1 – D4 and by Paraskievich D5 and D6.

Combination implants

- compressible spongy bone in the quality D2 or D3
- availability and engagement in at least one 2nd or 3rd cortical

Authorisation / Training / Re-training

Generally even extensive experience with crestal implant systems (2-phase/stage implants) is insufficient in order to be able to work with basal implants. Therefore a sound product training (leading to the authorization of the implant manufacturer) and also re-training over years is required for the safe and optimal usage of these medical products. The International Implant Foundation supports this reasonable demand, which is also based in many countries on national laws and regulations.

Leading state organisations (e.g. Swissmedic / Berne) which are concerned with the supervision on medical devices support this statement of the International Implant Foundation and of the relevant manufacturers.

Education

The training of basal implantologists is carried through exclusively through teachers with a valid certificate for teaching. The teachers may be associated to government institutions, such as universities.

Expert evaluators

Experts, who have to evaluate patient cases in which basal implants are involved (reimbursement cases, liability cases), must have a multi-year authorisation for the relevant basal implants, and be able to prove at least 50 fully completed treatment cases, 25 of which must be at least 3 years or older.

The preparation of the implant bed

- Lateral basal implants:

For lateral implants both turbine as well as fast-runner contra-angle pieces are applied. Also contra-angle handpieces with 1:1 actuation may be used at with at least 25,000 RPM and good cooling. Most contra-angle pieces with gear reduction of 1:10 or even 1:248 are unsuitable for the bone preparation for lateral basal implants.

- Screwable basal implants and combination forms:

Angled or straight contra-angle pieces are used in a cycle count of not less than 5000 RPM. The usage of surgical turbines is possible in any case.

Any implantation is done under local disinfection, e.g. with Betadine 5%. To administer antibiotics orally is an option, unless general diseases are demanding such a medication.

Combinations of implants with natural teeth and crestal implants

Basal implants feature a constructive elasticity and could be used with stable teeth in the same prosthetic construction. One disadvantage of this combination is the typically shorter lifetime of the involved teeth compared to the implants. The patients must be informed about disadvantages of this combination and about the risks.

The International Implant Foundation supports treatments with constructions fixed only to implants. Cases should whenever possible be treated according to the standards, i.e. with circular bridges, standard segments, and without the inclusion of teeth.

Combinations with 2-stage/phase crestal implants is possible. The differences in elasticity between lateral basal implants and crestal implants should, however, be considered. If such a combination is planned, the result must be a rigid construction, in order to avoid overloading, fractures and de-cementations at rigid pillars.

Indications for the removal of teeth

The development of reliable methods to replace teeth through basal/strategic implants has made a tremendous change in the indications for treatments almost in the whole field of dentistry. Indications for tooth removal (instead of "tooth saving") are today broader than ever before in the history of dentistry.

Placements of dental implants are selective interventions and patients consider implants for various reasons. The aim of dental implant installation is the creation of a bilateral equal mastication and to protect and to support the aesthetic appearance of the patient. Since modern basal/strategic implantology requires almost no vertical bone, even severe atrophy is not a contra-indication for treatment with such implants any more.

The International Implant Foundation acknowledges the following indications for removal of teeth if this is with done regard to an overall treatment planning with the aim of the reinstallation of the ability to chew bilaterally equal on fixed chewing surfaces, and if aesthetics demands the removal. Dental implantology is both a medical discipline and cosmetics.

- in general all wisdom teeth should be removed in patients who receive dental implants.
- Elongated teeth (with or without the elongation of the alveolar bone)
- periodontally involved teeth with root surface loos of 20% or more.
- teeth showing mobility L1 and more.
- teeth which would require crowning with a 2nd or 3rd crown.
- teeth whose position in the jaw bone prevent that resorption stable bone areas for cortical anchorage of implants can be reached and/or utilized in order to avoid bone transplants, bone augmentations, and sinus lifts.
- Impacted teeth
- Teeth (including healthy teeth) which the patient (on reasonable grounds) requests to be extracted.
- If teeth are positioned within the oral cavity in a way, that during movements of the lip and during laughing or smiling the transition zone to the mucosa is visible. In such cases typically also soft- and hard tissue will be trimmed/removed.

- If the sum of the necessary treatments on individual teeth seems unbearable by or for the patient, especially if several or essential treatments carry risks, and if reaching the treatment result is faster and/or safer and/or cheaper on implants
- If expected future elongation could pose a danger to the result of the treatment.

The International Implant Foundation supports patients in their rights for self-determination, if they have made up their mind and request extraction of natural teeth in order to receive implant-supported (fixed) teeth as a result of a comprehensive therapy. This refers also explicitly such patients and cases, where the removal of teeth are requested although these teeth are healthy or could be “saved” by means of one or several disciplines in dentistry (e.g. endodontics, periodontology, surgery, prosthetic and conservative dentistry) as means for single-tooth treatments, and whose (private or national) health insurance would pay treatments to “save” these teeth.

Patients take the decision to remove their teeth typically under the following circumstances:

- the dental implant treatment is cheaper than continuous repair of teeth and repairs of the repair (“re-dentistry”)
- significantly lower requirements regarding oral hygiene if basal/strategic implants are chosen
- the costs for renewal of the bridge after years are bearable and can be calculated in advance, and this exchange can be potentially done without further surgery
- the improvement of aesthetics
- the improvement of aesthetics if vertical bone reduction in the visible zone is done in combination with tooth removal.
- On order to cover costs for an overall comprehensive treatment which is carried out while the patient has a good income, especially in combination with a future and which is planned to last into a time period when the income is going to be lower.

Loading protocols and immediate loading

Lateral and screwable basal implants are typically used in immediate loading protocols. This means that the prosthetic splinting must be done through prosthetics latest on the 3rd postoperative day.

For splinting bridges with metal framework, direct laser welding and different veneers are used. Most recently composite frameworks (or PMME frameworks) without metal are used. There are currently no long-term results for this treatment variant available. Frames made from PEEK or PEEK compounds without metal support are not recommended unless they provide enough stability by design.

In cases of strong atrophy immediate splinting is necessary, preferably on the day of surgery.

If combination implants are used (especially in combination with compression screws) the prosthetic construction should be fixed later than on the 5th post-operative day.

In the distal portion of the upper jaw, the retention should include anchorage in the 3rd cortical whenever possible.

Methods/Disciplines

In 2018, the International Implant Foundation plans to publish the consensus on the 16 methods in strategic implantology already introduced in 2014 in practice and in teaching. This consensus concerns the proven and scientifically validated applications of basal / strategic implants in the different areas of the maxillo-facial skeleton.

Implant placements in periodontally or endodontically infected areas: the introduction of large [bullet]-sized, roughened crestal implant bodies into infected mucosal areas or bone areas where infection is suspected is generally not recommended.

The long-term observation of treatments with the Strategic Implant[®] with a smooth surface and thin vertical implant components show the following differences to the conventional crestal implant bodies:

- Implants in periodontally involved jaw regions are promising (statistically even more promising than implantations not healed jaw regions), as long as soft tissue altered by inflammations are removed, and if all affected teeth are removed as well.
- treatments can be done instantly after tooth removal with the Strategic Implant[®], provided that a stable 2nd cortical is available for anchoring, and if it is really reached.
- The principle of conventional implantology „no implantation in an infected area“ does not apply to the technology of the Strategic Implant[®].
- Local disinfection of soft and hard tissues, e.g. with Betadine / Povidone-Iodine 5% -10% (aqueous solution) is essential, whereas the general oral or i.v. therapy with antibiotics is indicated only in single cases (depending on the medical history or the situation of the patient). The advantages and disadvantages of the antibiotic therapy should be discussed with the patients, whereby the known disadvantages of the administration of antibiotics should be sufficiently and drastically presented.

X-ray assessment implant loosening

Lateral dislocation and vertical overloading stemming from mastication can result in a sterile loosening. This condition is reversible, as long as the overload is corrected early and as long as the bony interface to the force transmission areas is not infected. In addition to assessing the individual implant, the prognosis and the statics of the overall design, the assessment of the previous course of treatment is also important.

Indications for the removal of screwable and lateral basal implants are given, if:

1. Radiographically a sharp, circumferential zone of demineralisation around the basal disc or the entire apical thread of the implant is visible.
2. The implant is vertically mobile.
3. A retrograde osteolysis is evident on the radiograph
4. If vertical bone defects of more than 5 mm is given between the shafts of two adjacent implants, in the area of the 1st cortical and below. In this case the implant with the worse prognosis is removed.

5. In around combination implants the vertical implant surface surface shows loss of osseointegration. In the presence of crater-like bone loss the removal of the implant should be evaluated.

There is no indication for removal of the implant, if one or several of the following observations can be made:

1. The bone around the basal plate appears not fully surrounded by the demineralization zone.
2. A black line between the implant and the surrounding bone affects only the vertical implant surface (and not the threads or the base plate) in basal implants.
3. Swelling and/or abscesses are present in the vestibular, lingual or palatal mucosa.
4. The implant hurts when biting, but there is no sharply defined black area around the basal disc or the basal thread (in screwable basal implants)
5. The presence of crater-shaped bone loss around basal implants as long as the crestal disks are not affected.
6. Only parts of the bone around the basal disc-plate show blackening in the X-ray
7. Only the bone around crestal disc-plate(s) is affected by the demineralization visible on the X-ray.
8. There is only lateral mobility. (The reason of this movement can be, inter alia: lack of integration of vertical implant sections; elasticity of the bone in the 2nd or 3rd cortical)
9. Screwable basal implants rotate in the bone.