The Foundation of Knowledge

Consensus on Corticobasal® implants
(Ver 5.1: January 2021)

Due to the fact that medical devices and methods of their application are developing, also taking into account new developments in the nomenclature and possible applications, the International Implant Foundation (Munich/Germany) first published the "Consensus on BOI" in 2006 in its own name and continued later developed. (The first edition of this document was first published by Besch KJ: Besch KJ (1999): Konsensus zu BOI; Schweiz Monatsschr Zahnm, 109: 971–972).

The present document contains binding instructions for the assessment and use of basal and Corticobasal® jaw implants, which are implemented taking into account the respective national legal provisions.

1. Definition

- Lateral basal jaw implants transfer the chewing forces over and under horizontal base plates or rings into the cortical bone. The implants show a "dual integration" and in immediate loading protocols they enable the chewing loads to be reliably transferred to cortical bone areas even before the "osseointegration". Lateral basal implants enable intrusive and extrusive forces to be transferred into the bone.
- Corticobasal® screw implants (e.g. BCS®, BECES®, Strategic Implant®) also belong to the group of basal implants if they are anchored laterally and medially bicortically (using Method 6) or in the second or third cortex. Resorption-stable cortical areas should preferably be used for anchoring. Screwable Corticobasal® implants enable the transfer of intrusive and extrusive forces into the second or third cortex, as well as into other cortical bone areas.
- Implants which, due to their design, offer the possibility of bone compression along their vertical axis and which are also anchored in the second or third cortex (combination implants), also belong to the group of Corticobasal® implants.

Active biological osseointegration along the vertical axis of these implants is not required for Corticobasal® implants to function. In the case of the lateral and screwable basal implant, the vertical implant part only has the task of connecting load transfer areas to the abutments. That is why these parts are kept as thin as possible and they remain polished. The primary stability achieved by osseous fixation of the apical thread is decisive for successful insertion and, in particular, for immediate loading. Later on, other parts of the implants can also „osseointegrate"; even those parts that were not previously fixed in place.

2. Classification of Corticobasal® 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	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, cutting apically wide threads; thin, polished vertical implant parts. Elastic implant design.	1. Osseofixation of the force transferring thread. 2. Gradual integration along the other vertical implant sections	Crestal, trans-cortical
Combination implants	Polished, sharp cutting apical threads; compression threads along the vertical axis of the implant. Stiff implant design.	1. Osseofixation of the force transferring thread. 2. Compression of the cancellous bone along the vertical axis of the implant.	Crestal, trans-cortical

3. Indications

Lateral basal implants

Availability of a sufficiently stable and usable first and second cortex as a horizontally aligned support. Jaw bone quality and quantity according to Lekholm & Zarb (D1 - D4) and Paraskievich (D5 and D6).

Screwable lateral implants

Availability of at least one stable and accessible second or third cortex for basal anchoring. Or: availability of a lateral and lingual/palatal cortical anchorage according to IF method no. 6. Or according to IF method 14. Jawbone quality and quantity according to Lekholm & Zarb (D1 - D4) and Paraskievich (D5 and D6).

Combination implants

Compressible bone of quality D2 or D3, availability and engagement in at least a second or third cortex.

4. Aim of the treatment

The aim of every treatment with a Corticobasal® implant is to restore or maintain the ability to chew bilaterally evenly with the maximum possible aesthetics and support of the perioral soft tissues. The preservation of "natural teeth" (in whatever condition) is not the aim of the treatment, as teeth are not absolutely (or not at all) necessary in order to be able to achieve the treatment aim. The inclusion of teeth is generally more disadvantageous.

5. Authorisation/Training/Re-training

Even extensive experience with crestal implant systems (2-phase/standard implants) is insufficient to understand the principles of Corticobasal® implantology or to be able to work with such implants. Therefore, extensive technology training (leading to implant manufacturer approval for use) and regular refresher training are required for safe and optimal use of these medical devices. The International Implant Foundation supports this sensible demand, which in many countries is also based on national laws and regulations.

Leading government organizations (e.g. Swissmedic/Bern) that deal with the monitoring of medical devices support this view of the International Implant Foundation and the relevant manufacturers. Requests for authorization (instruction) and other precautionary measures were taken with a view to maintaining the patient's health (patient protection) and because the technology used differs very significantly and not obviously from other "dental implant" products on the market. The validity of the briefing is monitored by the local health authorities. If there is no authorization to use the products, the doctor works virtually "without a license". "Use of the product" includes: patient information, surgical therapy, prosthetic therapy, maintenance therapy, troubleshooting, removal and replacement of implants.

6. Training

The training for the Corticobasal® technology is carried out exclusively by teachers/trainers with a valid teaching certificate or by the manufacturer himself. Teachers/trainers can also be associated with government institutions such as universities[1].

7. Expert evaluators

Expert experts who assess patient cases in which Corticobasal® implants are involved (reimbursement cases, liability cases) must have a multi-year approval for the use of

1 A job for a university alone, even a completed "doctorate", a "professorship" or the appointment as a "privy councilor" are not enough to be able to use the product without in-depth product training or without regular refresher training.

the relevant lateral/Corticobasal® implants and have 50 fully completed treatment cases, 25 of which are at least three years or must be older. The German Federal Court of Justice has generally confirmed the requirement of personal experience for experts in III ZB 98/18 (06.06.2019).

(The Federal Court of Justice writes: When selecting dental experts, the courts are required to use experts who have the necessary medical expertise and thus special training and experience in the relevant field).

8. The preparation of the implant bed

Lateral basal implants:

Both turbine and high-speed contra-angle handpieces are used for lateral basal implants. Contra-angle handpieces with a 1: 1 ratio can also be used with at least 4,000 rpm and good cooling. Contra-angle instruments with a transmission of 1:10 or even 1: 248 are unsuitable for bone preparation for lateral basal implants, unless the surgical motor delivers at least 20,000 rpm.

Screwable basal implants and combination forms:

Straight handpieces or contra-angles are used with at least 5000 rpm. For better tactility, low-speed processing is also indicated in border areas. Surgical turbines can be used in any case, especially to prepare a first drilling and to model the first cortex. Each implantation takes place with local intra-oral disinfection, e.g. with Betadine 5%. Oral antibiotics are only an option, unless common medical conditions call for such a drug.

9. Combinations of implants with natural teeth and crestal implants

Lateral basal implants (as well as long screw implants/BCS®) have considerable structural elasticity and can be used with stable teeth in the same prosthetic construction. A disadvantage of this combination is the typically shorter lifespan of the affected teeth compared to the implants. Patients should be informed about the disadvantages of this combination and about the risks. In addition, it must be taken into account that failing teeth create undesirable levers on the bridge structure.

The International Implant Foundation supports treatments with constructions that are only attached to implants. Whenever possible, cases should be handled according to the standards; i. e. with circular bridges or standard segments, without the inclusion of teeth.

Combinations with two-phase crestal implants are possible. However, the different elasticity between (lateral) basal implants and crestal implants should be taken into account.

If such a combination is planned, the result must be a rigid construction to avoid overloading, fractures and decementation on the rigid, two-phase pillars. When planning the combination of Corticobasal® implants with two-piece, crestal implants, a thorough assessment (X-ray and clinical inspection) of the crestal implants should be performed to define their prognosis for the presence or future occurrence of periimplantitis. If in doubt, two-stage implants should be removed.

10. Indications for tooth removal to enable the use of the Strategic Implant®

The development of reliable methods of replacing teeth with basal implants/Technology of the Strategic Implant® has changed the therapy plan for treatments in almost the entire field of dentistry tremendously. The indications for tooth extraction are broader today than ever before in the history of dentistry.

Dental implant placement is an elective intervention. Patients today are considering implants (instead of teeth) for a variety of reasons. The aim of the insertion of dental implants is to create bilateral even chewing and to support a harmonious facial profile in the patient. Since modern Corticobasal® implantology requires almost no vertical bone, even severe atrophy is rarely a contraindication for treatment.

The International Implant Foundation recognizes the following indications for tooth removal when this is done with a view to overall treatment planning aimed at reinstalling the ability to chew bilaterally on solid occlusal surfaces and when aesthetics call for removal. **Dental implantology is both a medical discipline and applied cosmetics.**

In general, all wisdom teeth should be removed in patients receiving dental implants. Elongated teeth (with or without elongation of the alveolar bone), periodontally damaged teeth with a root surface loss of 20% or more, teeth with mobility L1 and more should be removed. Teeth that would require a second or third crown should be removed. Teeth whose position in the jawbone prevents resorption-stable bone areas from being reached and/or used for cortical anchoring of implants in order to avoid bone transplants, bone augmentations and sinus lifts should be removed.

Teeth (including „healthy teeth“) that the patient (for reasonable reasons) wishes to extract can be removed. If teeth are positioned in the oral cavity in such a way that the transition zone to the mucous membrane becomes visible when the lip moves, when laughing or smiling, removal is indicated for aesthetic reasons at the patient‘s request. In such cases, soft and hard tissue are also typically corrected vertically. If the sum of the necessary dental treatments seems unbearable or unaffordable for the patient, teeth can be extracted if this avoids suffering and then a cheaper or better replacement can be made.

With regard to the follow-up costs of a dental treatment, especially if the expected shelf life of less than six years can be assumed, the teeth should be removed. To avoid removable dentures, the treatment plan can include the removal of additional teeth in order to install a standard solution with high predictability (segment, circular bridge, full restoration of both jaws). In order to achieve a faster treatment result, not to interrupt stabilizing transverse bracing and to shorten healing times, extractions are generally indicated. Likewise, if future elongations are expected to pose a threat to the outcome of the treatment.

The International Implant Foundation supports patients in their rights of self-determination when they have made a decision and apply for the extraction of natural teeth in order to receive a comprehensive therapy with implant-supported (fixed) teeth as a result. This also expressly refers to patients and cases in which the removal of teeth is requested even though these teeth are healthy or have been "saved" by one or more disciplines of dentistry (e.g. endodontics, periodontics, surgery, prosthetic and conservative dentistry) „ could become. Even if a private or national health insurance company would pay for the individual dental treatments in order to „save" these teeth.

Patients typically make the decision to have their teeth and parts of the jawbone removed under the following circumstances: Treatment with dental implants is cheaper than continually repairing teeth and making repairs („re-dentistry"). Treatments with the Strategic Implant® technology can be carried out much faster than conventional implant treatments, as many appointments, potential risks, collateral damage and healing times are avoided. If you opt for the Strategic Implant® and do without natural teeth, the treatment that would otherwise take many months or years can be completed within a few days. By extracting a few healthy teeth, the cortical bone areas are made accessible and thus extensive, expensive and risky bone replacement procedures are avoided.

Due to the delicate design and the smooth surface configuration, significantly lower demands are placed on the oral hygiene of the patient when Corticobasal® implants are chosen. This is true in comparison to teeth and in comparison to two-phase implants. The cost of renewing the bridge after years is reasonable for many patients and they can be calculated in advance.

A significant improvement in aesthetics is possible if the vertical bone reduction in the visible zone is combined with tooth removal. The ability to position dental arches independently of the jawbone in an aesthetically and functionally desired position enables significant improvements in aesthetics, even with fixed restorations. Quite a few patients want to switch to implant-supported dentures at a time when they have a good income. This is especially true when the remaining useful life for the teeth is low and when the patient expects the income to be significantly lower during the retirement periods.

11. Loading protocols and immediate loading

Lateral and screwable basal implants are usually used in immediate loading protocols. This means that the prosthetic splinting through the bridge or bar takes place before the third postoperative day. Stable temporary bridges, bridges with a metal frame or internal rigid reinforcement, direct laser welding and various veneers are used for splinting. Recently, successfully milled composite frameworks (or PMMA frameworks) have also been used without a metal framework. There are no long-term results on this yet. Bridges made of PEEK or PEEK compound without metal reinforcement are not recommended unless the design of the bridge provides sufficient stability. If there is very little bone available, immediate restoration (splinting) is necessary on the day of the operation, i. e. the 3-day rule will not apply. When combined with compression screws and there is enough bone around the lateral basal implant, the prosthetic construction with permanent cement can be inserted on the fifth postoperative day at the latest. Whenever possible, support in the distal upper jaw should be in the third cortex. This consensus does not include treatment modalities for maxillo-facial applications.

12. Methods/Disciplines

In 2018 the International Implant Foundation published an S3 consensus document on the 16 methods of strategic implantology. Earlier versions of this document have been implemented in practice and teaching since 2014. This document describes the tried and tested and scientifically validated applications of Corticobasal® implants in the various areas of the mandible and maxillary facial skeleton.

13. X-ray assessments and implant loosening

Implant placement in periodontally or endodontically infected areas: The insertion of large (cartridge-shaped), roughened crestal implant bodies into infected areas of the mucous membrane or bone areas in which an 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 shows the following differences to the conventional crestal implant bodies: Polished Corticobasal® implants in periodontally affected oral cavities are promising (statistically often even more promising than implant insertions in healed jaw regions), as long as they are soft tissues that have changed due to inflammation are removed at the same time and all affected teeth are also removed. Combination forms, on the other hand, should not be used immediately after tooth extraction if the case shows advanced periodontal involvement.

Treatments with Corticobasal® implants can be carried out immediately after tooth extraction, provided that a stable second cortex is available for anchoring and when it is actually used. The principle of conventional implantology “no implant insertion in an

infected area" does not apply to the Strategic Implant® technology.

Local disinfection of soft and hard tissue, e.g. with Betadine® is urgent, while the general oral or intravenous antibiotic therapy is only indicated in individual cases (this statement only applies to completely healthy patients). The advantages and disadvantages of antibiotic therapy can be discussed with the patient in order to make a decision.

14. Incorrect loading due to laterotrusion and pre-contacts

Lateral forces and vertical overload caused by chewing can lead to a sterile loosening of the apical thread of the Corticobasal® implant or the base plate of the lateral basal implant. This condition is potentially reversible if the overload is corrected early and the bony interface to the power transmission areas is not infected.

15. Planning of the corrective intervention

In addition to assessing the prognosis of the individual implant, the prognosis of the overall statics of the prosthesis platform made from teeth, dental bridges and implant-supported structures must also be analyzed. The assessment of the previous course of treatment and the function of the prosthetic chewing element is an indispensable basis for any planning for corrective interventions. Therefore, really qualified decisions about the necessary corrective measures can only be made by the first treating physician.

After about two years, the postoperative secondary mineralization (ossification) should be complete, and information from the first surgical procedure becomes less important for corrective interventions. If Corticobasal® implants are removed, immediate replacement must be considered, especially during a period of two years after initial treatment. Typically, a removed implant is replaced with two new implants if the situation permits. Replacing implants without removing the prosthetic structure is the method of choice when only single implants are involved.

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

- Radiographically, a sharp, circumferential demineralization zone is visible all around the base disc or the apical thread of the implant.
- The implant can be moved vertically.
- Retrograde osteolysis is shown and recognizable on the X-ray, and osteolysis is visible around the entire apical thread.
- When osteolysis is visible on a first X-ray and its size increases on a second radiographic image after more than six to eight weeks. Removing implants after just one X-ray is sometimes premature.
- When vertical bone defects larger than 5 mm occur between the shafts of two adjacent implants in the area of the first cortex and below. In this case, the im-

plant with the poorer prognosis or higher mobility is removed.

- With combination implants, the vertical portions of the implant surfaces show a loss of osseointegration. If the X-ray shows crater-shaped bone loss, early removal of the implant should be considered (as in all other cases of periimplantitis).

17. There is no indication for (immediate) removal of the implant if one or more of the following observations can be made:

- A black line between the implant and the surrounding bone only affects the vertical implant surface (and not the threads or baseplate) for basal implants. Swelling and/or abscesses are present in the vestibular, lingual, or palatal mucosa.
- The implant is painful to chew, but there is no sharply defined black area around the basal disc or apical thread.
- In the presence of crater-shaped bone loss around lateral basal implants, as long as the basal discs are not affected.
- Only parts of the bone around the basal plate show blackening in the X-ray image; i. e. the plate or ring is still in contact with bone, even if its mineralization has decreased and/or in some places is not visible at all on the X-ray.
- Only the bone around the crestal discs is affected radiologically by demineralization.
- There is only lateral mobility. (The reason for this movement can be: lack of integration of vertical implant sections; elasticity of the long and thin implant axis or in the area of the second or third cortex).
- Screwable basal implants rotate in the bone.

18. Resistance to periimplantitis

Long-term observation of treatments with the Strategic Implant® (which has a completely smooth surface and a thin vertical mucosal penetration site) has shown that this implant is resistant to the development of periimplantitis. No periimplantitis is observed around the smooth and thin implant neck. However, in some cases, peri-implant mucositis can occur. Usually this is due to the prosthetic components, including when cement is left in close proximity to the gums. This is NOT an indication for removal of the implant; instead, some adjustments could be made to the bridge and/or a gum resection performed.

19. The transition area between the head of the implant and the denture

Unless the treatment provider chooses open surgical cementation as a form of therapy for the cementation of metal-ceramic bridges in cases in which the abutments were deliberately inserted deeper into the socket, the length of the crown is chosen so that there is no risk of cement residue be dislocated under the mucous membrane or into the empty alveoli. The transition zone between the abutment of the implant and the

crown margins should therefore not be subgingival. It is therefore not a goal of prosthetic treatment in Corticobasal® implantology that the lower edges of the crowns match the maximum diameter of the polished abutment, and therefore the “fit” of the crown cannot be assessed using this parameter. If the edges of the crowns are above the gingival level, there is no need for a special or precise fit as long as the cementation is stable.

Approved by the Board of Directors and the Scientific Advisory Board of the International Implant Foundation: Ver 5.1 EN, January 8th 2021 (with minor approved differences to Ver 5.0 EN).