The Foundation of Knowledge

# Indications, Procedure and Application of Methods for Carrying Out Corrective Interventions with Corticobasal® Implants

**Creation of this 002-Version:** IF Board

**Applicable documents:** All IF Consensus Documents No. 1 – 7;
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**Scope:** Lateral and screwable oral and craniofacial implants according to IF Consensus Document No. 1

**Content**

## 1. Definitions

A ***„corrective intervention“*** serves to correct undesired developments or conditions in a BIPS. A distinction is made between surgical and prosthetic corrective interventions. Sometimes corrective interventions are supported by drug therapy to reduce the chewing force.

The need for corrective surgery does not imply that the basic treatment was defective or wrong.

**The incomplete or omitted implementation of a necessary corrective intervention is a treatment mistake.**

Whenever corrective prosthetic interventions are performed, the stability of all implants involved must be checked and authorized specialists must be available to carry out the surgical part of the necessary corrective intervention.

***Resting phase***: The period of time during which the prosthetic construction should not be removed due to the known bone remodeling and the associated bone weakness. This period is between 12 and 24 months after the first intervention. Earlier corrective interventions should be carried out only by the treatment provider who has performed the initial treatment.

***BIPS***: Bone-Implant-Prosthetic-System
(see IF Consensus Document No. 7, www.implantfoundation.org)

Surgical corrective interventions are carried out

a. if the stabilizing splint of a BIPS has been completely or partially lost (prosthetic loosening of crowns, fractures of the bridge, etc.)
b. if mobility of the implants has occurred.
c. when chipping of thin bone areas (Fig. 1) is diagnosed or suspected during or after surgery. Such chips also occur in the 2nd or 3rd cortex and can sometimes be difficult to diagnose.
d. in case of fragmentation of larger cortical areas of bone during insertion or bending of the implants. This occasionally occurs, for example, in the distal lower jaw when using method 5a.
   Chipping of thin crestal bone areas due to implant and bridge mobility in the usage phase of the BIPS.
e. in case of fracture and subsequent necrosis of cortical areas of an extraction socket preventing primary healing of the implant site.
f. in case of a “Retrograde osteolysis” which can occur due to pre-existing infections in the bone or embedding of foreign objects (splintering of ceramic, calculus, etc.) when screwing in the Corticobasal® implant, as well as (unrecognized) areas of necrotic bone around previously root-treated teeth. This condition occurs mainly in the lower jaw.

g. in case of necrosis of bone tissue due to overheating during drilling or in the event of brittle bone areas chipping off when screwing in implants.

Combined surgical and prosthetic corrective interventions are performed when an "overload osteolysis" is diagnosed. This osteolysis can be initially sterile. However, it can later be accompanied by an infection if it remains untreated for a longer period of time.

While peri-implantitis (PI; as associated with conventional, 2-phase dental implants) would affect the crestal parts of the implant, an overload osteolysis affects the load-bearing parts (threads or baseplates), predominantly when the threads are not, or only partially, anchored in the 2nd/3rd cortical. Such an overload osteolysis usually occurs within two years after implant placement and can progress/propagate over the arch to general instability of the construct of all or almost all implants (propagating overload). Initially a prosthetic corrective intervention can be assumed to be sufficient to solve the problem. If this intervention is not performed, the problem will exacerbate.

**2. Treatment principles, requirements, legal framework**

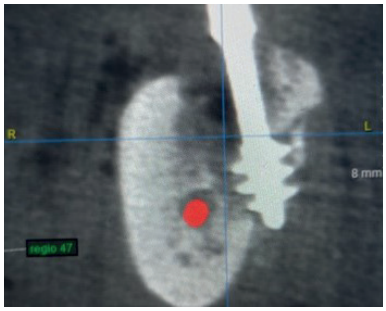
1. ***Indications for the removal*** of Corticobasal® implants are fully described in Consensus No.1 of the International Implant Foundation, www.implantfoundation.org.
2. ***Basic treatments*** with Corticobasal® implants may be carried out by all **authorized therapy providers** who have valid manufacturer **authorization**. The legal requirements for corrective interventions are basically the same, but it must be considered that there are **particularly high requirements** with regard to the equipment of the implantological treatment facility and the specific professional experience of the therapy provider with these interventions.
   ***Legal classification:*** The performance of corrective surgical interventions by surgeons with little or hardly any experience is therefore not recommended. Performing corrective surgical interventions by surgeons not authorized in writing for the medical device (except in the case of urgent medical emergencies) is illegal.
3. In addition to assessing the prognosis of the individual implant, the prognosis of the overall statics of the BIPS must be analyzed. The assessment of the previous course of treatment, the bone and mineralization situation during the basic treatment, as well as the mastication function as a whole are an indispensable basis for any planning of corrective interventions. Therefore, truly qualified decisions about the necessary and appropriate corrective measures can only be made by the authorized practitioner.
4. At least in the first 2 years after the end of the initial treatment, all corrective interventions should be carried out **exclusively by the practitioner who carried out the basic treatment**. Only he/she knows the conditions and results of the basic treatment, especially the bone quality and the prosthetic-functional starting point. About two years and more after the basic treatment, the circumstances of the basic treatment no longer play a significant role for the corrective intervention.
5. Corrective interventions must be carried out **immediately when indicated**.
6. If possible, and if necessary, single Corticobasal® implants should be removed wit-

hout removing the prosthetic construction.

7. New, additional implants should also be connected to the existing prosthetic construction without removing this construction.
8. Healed, non-elastic 2-phase implants are surrounded by a non-elastic horizontal and vertical cortical. In constructions together with freshly placed Corticobasal® implants, they form undesiredly rigid anchorage points which can lead to the failure of the whole treatment. The decision to include pre-existing 2-phase implants should be taken with care and the patients must agree with informed consent to this decision.
   Long-healed 2-phase implants shield (in the sense of a stress-shielding effect) the necessary functional stimuli originating from mastication from the freshly placed Corticobasal® implants by stiffening the BIPS from the start.
   On the other hand, elastic deformations in both jaws can be transferred so unfavorably to the cortically anchoured implants. As soon as the mouth is opened (while twisting forces occur) the rigidity of the long in the bridge integrated 2-phase implant can dominate the process or deformation, and all other implants can become mobile. The long lever of the bridge can sometimes cause very high forces in the area of the implant thread, which can cause the peri-implant cortical to be overloaded.
9. Chipped off bone and fragments of the alveolar process are surgically removed. Further therapy is usually „wait and see“, even if parts of the implant are located in the immediate area of the chipping.

For technical reasons, the occasional splintering off of parts of the cortical is unavoidable and usually goes unnoticed. The apical parts of the threads of Corticobasal® implants are larger than the drilling that is carried out before the implants are inserted. This problem is not limited to Corticobasal® implants, but affects all implants that are inserted into the bone with the aim of achieving great primary stability, i.e. all compression screws.

An orthograde infection of the bone after Greenstick fractures along the axis of Corticobasal® implants is possible and usually leads to sequestration. If these sequestra do not work their way through the mucous membrane of their own accord, they should be removed. A wait-and-see attitude is generally indicated.




**Greenstick fractures**

***Fig. 1*** *Unnoticed chipping of a bone fragment during the insertion of a Corticobasal® implant in IF Method 5a. The implant shown here is 100% stable, there were no clinical abnormalities at any time.*

**3. Indications for surgical-prosthetic corrective interventions**

Procedure: In the context of surgical corrective interventions, single, several or even all implants are replaced and in selected cases an immediate replacement of these implants may be tried (aim of treatment) by very experienced, authorized treatment providers.

Indications:

- Vertical mobility of at least part of the prosthetic construction
- Lateral mobility of the prosthetic construction
- The indication for removal (according to IF Consensus Document No. 1) is given for several implants of a BIPS.
- Fractures or iatrogenic separations of the prosthetic construct are found (as a result of prosthetic overload, unilateral or anterior chewing patterns, or maltreatment). This condition must always be corrected **immediately**, either by means of fixed bridges or by immediately re-manufacturing the fixed prosthesis. This treatment usually includes the replacement of implants.

**4. Indications for corrective prosthetic interventions**

It may be necessary to make changes to the prosthetic construction during the "resting phase" (i.e. the period when no removal of the prosthetic construction is to be made). Reasons for such prosthetic changes include the following circumstances:

- The patient's mandible has spontaneously shifted further posteriorly, with the contact between the upper and lower 1st premolars being lost. In such cases, the vertical dimension of the mandibular bridge usually has to be increased as well. The changed situation is usually noticed at the 3-month check-up. Corrective action is required immediately.
- There have been gaps between the prosthetic construction that are subjectively intolerable for the patient, although they improve the cleaning options for the patient and enable good self-cleaning. In such cases, the incorporation of an over-bridge on the existing metal-composite bridges is possible. It often allows extensive changes in the height of the bite and the position of the teeth, whereas gaps between the gums and the bridge cannot be treated with such bridges.
- For this purpose, the temporary incorporation of a palatal gingival epithesis can be considered, which can be inserted and removed by the patient for cleaning purposes.
- Almost at every check-up appointment, changes must be made with regard to the spatial relationships of the jaws and oral functions.
  - the "Occlusal centric" must be brought into agreement with the "Joint centric".
  - an AFMP that is identical on both sides must be set, i.e. changes with different causes must be corrected
  - an APPI which is identical on both sides must be set, i.e. changes with different causes must be corrected
  - it must be possible for the patient to reach a protrusion position without interference, either with no or with at least four equally strong anterior tooth contacts in the protrusion position.

It is not indicated to remove the bridge within the first 12-24 months after the basic treatment. In the case of prosthetic problems that cannot be solved by grinding or building up the occlusal surfaces, cemented over-bridges must be inserted. The first bridge must not be removed during the initial healing phase.

Simple separating bridges on Corticobasal® implants is a malpractice.

**5. Simple corrective surgical interventions**

A simple corrective procedure is carried out if one or more implants are removed while leaving the prosthetic construction intact. To do this, one or more implants are separated horizontally from the prosthetic construction with a carbide cutter and they are then unscrewed. The indication for such implant removal results from a blackening of the bone around the force-transmitting thread areas as described in IF Consensus Document No. 1.

Provided the construction is stable, individual implants can be removed without replacing them, as they have not been actively involved in the load-transmission of the BIPS for a long time. In this situation, the other implants have successively (and often for a long time) taken over the load transmission tasks of the no longer integrated implant. In any case, implants in strategic positions should be replaced.

**6. Complex corrective surgical interventions**

Corrective procedures are complex when the prosthetic construction and numerous implants in a jaw need to be removed and replaced.

The aim of this corrective intervention is the complete re-creation of an implant base for a BIPS with subsequent restoration with immediate loading.

**7. Multi-stage corrective surgical interventions planned with a view to permanently inserting as many newly placed implants as possible**

Multi-stage corrective interventions are to be planned if a sufficient number of stable implants could be inserted during the first corrective intervention, but it is to be expected that not all implants will retain stable bone-implant contact.

Reasons to believe that there is a loss of bone-implant contact can be:

- The assumption that intra-osseous infections can spread along the endosseous implant surface and especially in the thread area.
- The assumption that individual implants that were placed in bone areas with a low tendency to preserve bone (non resorption-stable bone areas) will not receive any bone-implant contact in the thread area.
- Endosseous pain is observed when inserting the new implants.

- Important (and especially strategic) bone areas cannot be treated with implants temporarily.

If there are reasons that lead to the assumption that one or more implants will have to be replaced again after a short healing phase, a milled plastic bridge is used as an interim restoration with a firm, definitive cement after the first corrective intervention. The usage of temporary cements is in general contra-indicated in all cases of such corrective interventions. Further treatment takes place after approx. 3 months.

As part of the 2nd corrective surgery, mobile implants are removed and replaced, and the total number of implants should be increased as much as possible. This approach is possible because the jawbone has been able to recover and consolidate in the meantime.

**8. Multi-stage corrective interventions planned with a view to temporarily incorporating a fixed provisional restoration with a few implants, even with unfavorable positioning and force distribution, in order to allow the recovery of the other bone areas of the affected jaws**

With this approach, the aim of the first corrective intervention is to achieve at least three-point-support that allows the insertion of a fixed bridge so that, during the bone's healing phase (i.e. until a sufficient number of implants can be placed in immediate loading protocol), a fixed restoration for the patients can be made possible.

The further treatment (2nd corrective operation after 2-4 months) usually includes the removal of some of the implants placed during the 1st corrective operation (which are usually loosened at this point anyway due to overloading) and the new treatment of the then healed bone areas as well as the actual creation of a new one BIPS.

Prior to this treatment option, patients must be informed that the (temporary) integration of removable dentures is also possible as an alternative to this procedure.

**9. Recommendations for corrective interventions on circular bridges in the mandible**

- After the removal of implants, the bone should be thoroughly flushed through the insertion slot/drill hole of the previous implant with Betadine 5%.
- Subsequent placement of a new implant in the area of the previous implant is **only recommended in the anterior** mandible, and then only if there is at least 5 mm of healthy, cancellous bone caudal to the previous threaded area **and** the new Corticobasal® implant, which penetrates this area, is anchored underneath in the 2nd cortical.
- The number of newly placed implants should exceed the number of implants removed.
- Leaving slightly loosened Corticobasal® implants should be considered critically. If several new implants are placed, the anchoring and the possibility of the new im-

plants to provide stability to the bridge, and the load distribution on these implants must estimated. The surgeon has to set up the BIPS in such a way that the newly placed implants on their own offer more than sufficient stability.
- The IF methods 6, 8a, 8b and 11 should be used alternatively to each other.

**10. Recommendations for corrective interventions on circular bridges in the maxilla**

If tuberopterygoid screws are loose, they should be removed a few days before the corrective surgery to allow the bone and endosseous (peri-implant) soft tissue to cope with the bacterial load.

Alternative procedure: the new tuberopterygoid screw(s) must not be inserted into the extraction alveoli of the previous tuberopterygoid screws but in nearby bone areas (usually parallel), hence anchoring in the same target cortical.

If it is not possible to anchor new implants in the pterygoid process, several Corticobasal® implants with a larger diameter can alternatively be used in the distal upper jaw.

**11. Recommendations for corrective interventions for segment constructions**

Since the implants are almost always positioned in a row in segment constructions (and cross-arch stabilization is not possible), the therapeutic options for treating mobility are very limited, especially when considering potential infections in the bone segment. All implants of the segment construction are typically replaced. The most distal implants in the maxilla and mandible have the greatest probability of surviving under these conditions.

## Revision index

| Revision No. | Document name / number | New version | Previous version | Modification | Date of approval | Release by |
|---|---|---|---|---|---|---|
| Rev 1 | 8_EN_Consensus_indications_procedure_corrective_surgery_04-22 | V002 | V001 | Version 2 revised in several areas, based on version 1 from 20.03.2017 | 25.04.2022 | IF Board, for consultation |
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