The Foundation of Knowledge

Consensus paper: Immediate loading of jaw implants

Planning for immediate loading of dental implants

I. Descriptive terminology

The categorization of implants as intended for immediate loading or intended for delayed loading is a fuzzy one, as there can be no completely non-loaded healing of implants in the living human body. From the very moment of insertion, implants will be exposed to loads in the areas where they contact the living tissue, since intraosseous pressure and a displacement of bone layers occur as a result of every movement. Immediate loading is therefore understood to mean immediate loading for prosthetic use (immediate functional loading).

II. History and current situation

In the field of orthopaedic surgery, force-locked immediate loading of implants has been the state of the art since the introduction of screw connections and osteosynthesis plates (at least since 1980). When treating fractures of the limbs, the screws for the osteosynthesis plates as well as the plates themselves are put in place simultaneously (one-stage). In traumatology, the patient's best interest and surgical practice are in harmony.

In dental implantology – depending on the type of implant used – a delayed (two-stage) procedure is still commonly practised. The argument of covered healing to provide a sterile environment to prevent infections has limited applicability on implants designed with wide diameters at the implant neck plus a surface structure that intentionally enlarges the surface area (such as Osseopore or Endopore implants). In the meantime, various implant systems have become available for oral implantologists that either permit immediate loading or were even developed especially for this treatment option.

III. Scientific evidence for immediate loading

Immediate functional loading of implants has long been proven adequate and generally validated scientifically [1]. This applies in particular to implant systems which, by their design and based the manufacturer's instructions, are intended to be used in one-stage procedures with immediate functional loading. Other implant systems that only offer this option to a limited extent (e.g. because they require several – including pre-implantological – procedures and longer time intervals following pre-implantological surgery), are to be assessed rather critically when planning for immediate loading.

There is no trustworthy scientific evidence that specific characteristics of the endosseous implant surface (etching, sandblasting) would favour or facilitate immediate loading. However, these surface characteristics can promote the development or persistence of the so-called peri-implantitis. The approach of treating surfaces for the express purpose of reducing healing times is unknown in traumatology.

On the other hand, there have been sufficient studies and extensive clinical experience from dental and orthopaedic surgery to the effect that macromechanically designed anchorage in cortical bone can facilitate immediate loading. As a rule, the first and second cortical bone layer are harnessed for this purpose.

IV. Planning for immediate loading in a specific patient case

Contemporary implant-prosthetic planning requires patients to be at least presented with the option of immediate functional loading. The decision in favour of or against this treatment option in a specific case would then be subject to the decision prerogative of the treatment provider in cooperation with a comprehensively informed patient. Experience has shown that patients generally do opt for immediate loading.

1.) Diagnostic findings and patient preferences govern the choice of implant system

However, an enumeration of individual indications for immediate functional loading according to treatment classes and, based on this, a generalised recommendation on the number of implants required does not, according to the assessment of the present Consensus, adequately reflect the patient's individual care needs [2]. Instead, the implant type selected by the dentist for the treatment in question becomes more important, so that – in view of the abundance of implant systems available – the planning of an immediate prosthetic restoration should only be dispensed with in exceptional cases. Treatment plans for immediate loading often require the rehabilitation of the entire dentition. If a given patient does not agree with this (e.g., by not consenting to the extractions necessary for a comprehensive treatment), bone augmentation and the use of two-part implants (with all their disadvantages) will often be necessary.

In particular, cortico-basally supported implants, lateral basal implants and implants that result in corticalization of the cancellous bone aspects by bone compression along the vertical implant axis, with often dramatic improvements in terms of the usable bone, now generally take precedence over large-lumen cylindrical systems that require considerable amounts of bone to be available preoperatively. We must not overlook the fact that an estimated 95% of the bone augmentation procedures performed today solely for the purpose of implant anchorage would be unnecessary if only the implants described above, matching the existing bone from the outset, were used. The planning objective of avoiding bone augmentation prior to implant placement also regularly corresponds to the informed patient's wishes. The selection of the type of implant to be placed (designs combined with surface textures, lengths, diameters) must be appropriate to the diagnostic findings and the treatment objective as defined by the patient. The cost advantage associated with avoiding bone augmentation and the avoidance of additional surgical risks are the main reasons why a fully informed patient will usually decide against augmentation.

The decision in favour of a one-piece system may be beneficial with regard to bone healing and maintenance because it avoids microgaps, especially since it does not make sense to attach screw connections and other susceptible joints that can be colonised by germs if the implant is loaded immediately anyway. The use of compression screws can promote the achievement of primary stability. Cortico-basal implants favour immediate loading as they do not depend on the vertical bone supply to the same extent as classical screw-type implants, thanks to their cortical anchorage. Unlike compression screws, cortico-basal screw implants do not compress the bone laterally, but rather vertically, and they

do not exhibit an enlarged surface. These implant types are primarily suitable for immediate loading. In the context of one-piece cortico-basal implant types intended for immediate loading, augmentation for the purpose of creating a force-transmitting bone bed makes little sense. Whether the transplantation of soft tissue to improve the volume and aesthetics is not a preferable treatment option must be decided on a case-by-case basis. The success of one-piece implants inserted in previously augmented bone areas may depend on whether the augmented bone was actually (completely) resorbed.

2.) Diagnostic findings and the implant system used govern the individual treatment plan

In planning implant-prosthetic restorations, on the one hand, the diagnostic findings must be taken into account – and in particular the strategic implant-positioning options, a sensible prosthetic objective and the loading capacity of the existing bony structures. On the other hand, the implantologist's individual treatment plan will be guided by the specific advantages of the implant type selected for a given situation. Treatment planning based on generalised specifications as to the number of implants depending on some treatment class, said to apply equally to all implant systems, would indicate that the treatment plan was not actually based on the diagnostic findings.

The individual treatment situation, the justifiability of the planning and the patient's desire for immediate prosthetic restoration regularly give the dentist sufficient cause to make use of the treatment option of immediate loading, unless at least one of the following – exceptional! – contraindications is present:

- insufficient bone quantity or quality with regard to all conventional implant types available on the market
- insufficient or inexistent splinting or stabilization options (e.g., secondary screw connections), especially in the anterior region and with single-tooth gaps
- Circumstances dictated by the patient's medical history or a lack of patient compliance
- Restricted range of indications for a specific implant system as per its manufacturer's instruction.

The patient should be made aware, as part of being informed about individual risk, that the concept of immediate loading was developed and scientifically proven for the edentulous jaw and that individual risks may be assigned the more weight, the smaller the gaps to be restored. When treating single-tooth gaps and partially edentulous jaws, it should be noted that instead of implant-supported restorations, a conventional bridge is can still be considered a valid a fixed-restoration option, provided a sufficient number of usable abutments are available [3].

In dentitions with comprehensive restorative needs – and especially if further tooth preservation is technically complicated and expensive, or if the retention of healthy teeth would prevent immediate loading – it is now appropriate to point out that restoration with cortico-basal implants and simultaneous extensive restoration is a much faster and cheaper process than tooth preservation. This advice should also be given by dentists who do not themselves master these or other methods of contemporary oral implantology.

3.) Disclosure of extraneous controlling mechanisms

If the implantologist is against immediate loading in principle or in the case of a specific patient, he or she may inform the patient that the associated issues have been debated in the past, whereas today, the use of implants with enlarged surfaces is viewed more critically.

If the implantologist has limited his or her own treatment range by favouring a specific implant system or certain pre-implantological measures independently of the diagnostic findings or the patient's wishes, the patient should receive full disclosure of this fact.

If the implantologist plans to use large-lumen, multi-part and enlarged-surface implant systems, the disadvantages of the resulting treatment plan must be clearly disclosed.

If the implantologist is aware that certain private health insurers renege on their obligation to pay for immediately loaded implant-supported dentures in certain diagnostic situations on grounds of lacking long-term studies, this should also be pointed out to the patient. However, a refusal to pay is at any rate inadmissible with regard to those implant systems whose use in an immediate-loading treatment regime has been expressly approved by the system manufacturer [4]. In any case, the placing on the market of implant systems and the determination of their scope of indications does not depend on the availability of such long-term studies but is solely based on manufacturer-initiated testing by a competent body [5].

[1] On the topic of medical necessity pursuant to § 1(2) of the German fee schedule for dentists treating private patients (GOZ), see Decision 3 O 267/03 of the regional court (Landgericht) Tübingen dated 11 May 2005. On the topic of medical necessity pursuant to § 1(2) of the Sample Terms and Conditions/Health Insurance (MB/KK), see Decision 23 O 458/04 of the regional court (Landgericht) Cologne dated 7 Feb 2007.

[2] See, although still without differentiation according to implant systems, the Guidelines of the BDIZ EDI European Consensus Conference on "Immediate Restauration and Immediate Loading" dated 26 Feb 2006.

[3] Superior Court (Oberlandesgericht) Brandenburg, Decision 12 U 241/07 of 29 May 2008.

[4] On the topic of medical necessity pursuant to § 1(2) of the German fee schedule for dentists treating private patients (GOZ), see Decision 3 O 267/03 of the regional court (Landgericht) Tübingen dated 11 May 2005. On the topic of medical necessity pursuant to § 1(2) of the Sample Terms and Conditions/Health Insurance (MB/KK), see Decision 23 O 458/04 of the regional court (Landgericht) Cologne dated 7 Feb 2007.

[5] § 6(1) of the Medical Devices Act, last amended 14 June (German Federal Gazette I p. 1066); EU Directive 93/42/EEC (OJ EC No. L 169/1 dated 12 July 1993).