Armin Nedjay discusses Flapless implants

According to valid scientific criteria for a successful implant treatment, bone loss after one-year loading is considered as inevitable. Thus, the implantation is designed as successful as possible. When the crestal bone loss does not exceed 2 mm after one-year loading time and 0.2 mm annually thereafter.

With more than 22,000 successful implantations with immediately restored and loaded implant systems, the author describes solutions that have been successful in preventing physiological bone loss. With respect to Tonrow's findings concerning bone loss, the author has suggested that the peri-implant periodontal tissue is an important factor to prevent physiological bone loss. Since bone loss can be evidenced if an implant is uncovered, it is also recommended to avoid implant exposure.

Implant Design & Physiological Bone Loss
Most traditional implant systems have a conventional platform-matched implant-abutment connection. External and internal connections can have an impact on the hard and soft tissue interface. Long-term studies have shown that the peri-implant bone level is established apically from this platform-switched implant-abutment connection (Bisson 1999). If the implant, surrounded by bone, heals with its cap screw in bone until its exposure and if the cap screw is removed by means of osteotomy and replaced with a healing cap, a bone remodeling process starts after exposure. This can lead to a peri-implant bone defect (Fig. 1, implant on the right).

Micro-gap
The micro-gap is located between the implant body and abutment. It has been considered as a disadvantage of two-piece implants. If the micro-gap is too big, the sensitive biological width are at risk of bacterial contamination. From the peri-implant bone tissue in the implant shoulder area, the biological width is shifted away from bone.

As a rule, an exposure of the micro-gap leads to an inflammatory reaction of the peri-implant bone tissue, which might risk being contaminated with bacteria, from the peri-implant bone tissue in the implant shoulder area, the biological width is shifted away from bone.

Platform Switching
Implants with a Platform-Switching concept have a proper potential to prevent bone loss. The diameter of the healing abutment is narrower than the diameter of the implant-platform/shoulder. In this way, the implant-abutment connection is not platform-matched. Dental implant systems such as the Champions (B)Evolution® and Astra Tech® have an integrated Platform-Switching design and an internal cone that is long enough and that has an optimal angle. In addition, the geometry of the implant-abutment connection is the same for all implant diameters, so there is a prosthetic line for all implant diameters. With the Platform Switching function, the central position of the micro-gap is moved to the implant axis. Through the separation of the micro-gap, which might risk being contaminated with bacteria, from the peri-implant bone tissue in the implant shoulder area, the biological width is shifted away from bone.

Conclusion
Conventional implantation methods have been increasingly questioned. MIMI® is the abbreviation for the Minimally Invasive Method of Dental Implantation. One-piece implants and also two-piece implant systems will be ideal for MIMI® if they can remain bacteria-resistant even if they are loaded with strong forces.
The Shuttle: The two-piece Champions (R)Evolution® implant system consists of an integrated bacteria-proof “Shuttle”/Insert, which remains in the implant for at least eight weeks post surgery until the final prosthetic restoration is fit. During the healing phase in the first weeks, the implant internal thread will not be contaminated with bacteria. During implantation, the Shuttle and micro-close connection protects the internal thread from contamination with bacteria, blood or saliva. With these two-piece implant systems and also one-piece implants, there is very little risk of bone loss. Sufficient primary stability at a torque of at least 35Ncm is a prerequisite for a successful implantation17. The implant with the Shuttle can be inserted at a torque of up to 70/80Ncm and achieve sufficient primary stability without deforming or breaking the outer part and inner thread and without loosening the abutment during the prosthetic phase.

Platform Switching & Optimised Cone Connection: It has been found that crestal bone loss can be prevented with implants with an integrated Platform-Switching design15,16. In addition, internal cone connections should have an angle of 5° to 10°, and the cone should be long enough in order to prevent bacterial migration even if, for example, a 3.5mm-diameter two-piece implant is loaded with a force of 200 N12. Since one-piece implant systems have no micro-gap at all, they are bacteria-proof as well. The one-piece implant system is particularly indicated for the rehabilitation of four or more implants/teeth. In order to compensate insertion divergences, Prep-Caps (zircon or titanium) can be cemented. The impression can be cast with super hard plaster (no Laboratory Analogs!) in the dental laboratory. If done correctly, the cement will not be pressed subgingivally so that there is no risk of periimplantitis because of cement remains in these one-piece implant Prep-Caps (“abutments”).

1) The Shuttle: The two-piece Champions (R)Evolution® implant system consists of an integrated bacteria-proof “Shuttle”/Insert, which remains in the implant for at least eight weeks post surgery until the final prosthetic restoration is fit. During the healing phase in the first weeks, the implant internal thread will not be contaminated with bacteria. During implantation, the Shuttle and micro-close connection protects the internal thread from contamination with bacteria, blood or saliva. With these two-piece implant systems and also one-piece implants, there is very little risk of bone loss. Sufficient primary stability at a torque of at least 55Ncm is a prerequisite for a successful implantation17. The implant with the Shuttle can be inserted at a torque of up to 70/80Ncm and achieve sufficient primary stability.

2) Platform Switching & Optimised Cone Connection: It has been found that crestal bone loss can be prevented with implants with an integrated Platform-Switching design15,16. In addition, internal cone connections should have an angle of 5° to 10°, and the cone should be long enough in order to prevent bacterial migration even if, for example, a 3.5mm-diameter two-piece implant is loaded with a force of 200 N12. Since one-piece implant systems have no micro-gap at all, they are bacteria-proof as well. The one-piece implant system is particularly indicated for the rehabilitation of four or more implants/teeth. In order to compensate insertion divergences, Prep-Caps (zircon or titanium) can be cemented. The impression can be cast with super hard plaster (no Laboratory Analogs!) in the dental laboratory. If done correctly, the cement will not be pressed subgingivally so that there is no risk of periimplantitis because of cement remains in these one-piece implant Prep-Caps (“abutments”).
intervention (exposure). During surgery, the peristeum, which nourishes peri-implant bone on the long-term, can be preserved. Peri-implant bone nourishment shall be ensured. The minimally invasive implantation method has proven beneficial to the periosteum\(^{18-23}\). In this way, the su- has proven beneficial to the peri-

invasive implantation method shall be ensured. The minimally Peri-implant bone nourishment nourishes peri-implant bone on surgery, the periosteum, which intervention (exposure). During bone is almost completely nour-

ished by the histological, double-

layered bone membrane, which is richly supplied with blood vessels and nerve fibres: the inner cell cambium layer (Stratum osteogenicum) is rich in cells. It is composed of stem cells (os- teoblasts)\(^{16}\), ensuring bone regen-

eration, as well as of nerves and blood vessels. The outer fibrous layer (Stratum fibrosum) is connective tissue, which is not cell-

rich but rich in collagen fibers. The Sharpey’s fibers, which pass from the outer layer through the inner layer, are embedded in the Substantia compacta of the bone and secure the peristeum to the bone. The intragenc detach-

ment of the peristomeum can lead to poorly nourished bone after weeks, months or years. Conse-

quently, an intrageneous muscoperi-

osteal flap is not recommended. However, if the gingival thickness is 4 mm or more, crestal incisions (also flapsless) can be performed.

The peri-implant, gingival structures and the peristomeum, which nourishes bone, remain intact. Physiological bone loss is very unlikely to occur. Current studies and clinical findings over 16 years have shown that the peristomeum preserving flapless MIMI\(^{\circ}\) method is very benefi-

cial\(^{16}\).

Drilling templates have not always shown to be particularly accurate.\(^{25-31}\) On the one hand, the diameter of the Champions\(^{\circ}\) implant is not con-

gruent with the diameter of the conical triangular drills.

On the other hand, studies have compared virtually planned \(DVT\)-based navigation-guided \(\) TEMplates with achieved implant positions, also involving the use of drills with diameters congruent with the implant diameters.

Apical deviations of 500 \(\mu\)m have been observed\(^{25}\). Implants for at least four implants/teeth that will be splinted (including fixed, pre-

pared teeth that are positioned mesially from the implants) can be immediately loaded with a final implant-supported restora-

tion within the first 14 days post surgery. Current studies have demonstrated good treatment outcome with regard to stable soft and hard tissue conditions after immediate restoration – also in conjunction with immediate implantation. This success rate is comparable to the one obtained in conventionally loaded im-

plants three to six months after implantation\(^{25-31}\). In addition, im-

mediately restored/loaded and delayed loaded implants showed similar bone-implant interface contact rates\(^{26}\). In addition, a biologically optimised surface enhances bone cell regenera-

tion\(^{28-31}\). With these techniques, the risk of physiological bone loss can be reduced or even elimi-

nated. Currently, Tarnows theory that there should be a distance between the implants of at least 5mm is controversial.\(^{26}\)

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When inserting the implants using the flapless and periosteum-preserving MIMI® method, we drill the bone cavity transgingivally at a rotation speed ranging from 50 – 250 rpm with the conical triangular drills, depending on the bone density. In most cases, this is done without water cooling. The cylindrical drills are additionally used to prepare the D1 and D2 bone. For preparing the soft D3/D4 bone, it is sufficient to use the conical triangular yellow drill and special bone condensers. After each step, the bone cavity must be checked with the thin BCC (Bone Cavity Check) probe. While avoiding bone overheating, a two-piece Champion® (Revolution®) with an Insert/Shuttle can be inserted at a torque ranging from 40-60 Ncm without deforming or breaking the inner thread and the thin titanium part (for instance, a 3.5 mm-diameter implant has an approx. 0.4 mm-thick outer part). Sufficient primary stability can be achieved.

The bacteria-proof platform-switched Shuttle (see Fig. 11 and “2”), which is set in the implant cone, is restored with a Gingiva-Clix. The Gingiva-Clix is made from white bio-compatible BION, and it is available in 6 combinations of heights and dimensions. During the bone remodeling phase within 8 weeks following surgery, the Gingiva-Clix stays on the Shuttle. After 8 weeks, the Gingiva-Clix is removed, and with this particular Clix type, the gingiva is shaped irritation-free. An impression post is transgingivally set in the Shuttle and manually screwed...

The Impression Coping is set. After making the impression and the supraconstruction, the Shuttle, which is connected to the implant, is removed with the Shuttle Extractor. The Shuttle is removed for the first time, while the screw remains uncontaminated. After removing the Shuttle, the Abutment (ICA zircon abutment) is screwed seal-tight, preventing bacterial migration. Finally, the crown is cemented and fit.


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Fig. 44 - 46: The patient was treated under anesthesia (LD5 forte). He was given 600 mg
Ibuprofen. With the yellow, black, white and blue drills, we drilled in the H/I2 bone at a
maximum rotation speed of 250 rpm. Then, we checked the bone cavity quality with the BCC
(Bone Cavity Check) probe. Then, we inserted the Champions (Filac/Abbot GmbH) implant with
the Insert/Shuttle, which had been fixed on the implant at a torque of only 10 Ncm Ex Works,
at torques ranging from 40 to 60 Ncm. In most cases, the Shuttles remain also here. Then, we
set Gingiva-Clix on the Champions®-Insert/Shuttle immediately after an X-ray check. The
Gingiva-Clix, which are made from biocompatible WIN!, serve as transgingival healing caps.
They are available in a combination of six widths and heights.

Fig. 47 - 49: After eight weeks, when – independent of bone type – the transition of all Champions® from Primary Osseointegration
Stability to Secondary Osseointegration Stability can be assured, we remove the Gingiva-Clix and the small screw from the Insert/ Shuttle and screw the metal impression posts in the Insert/Shuttle. In this case, we prepared Tooth 45, which was then provided with a crown. The impression can be made without removing the Insert/Shuttle from the implant and without contaminating the implant with saliva. The impression of this two-piece implant system is made transgingivally or supragingivally. Implant expos-
sure and anesthesia are usually not necessary.

Fig. 50 - 52: After taking X-rays, we fixed the white impression copings on the metal impression posts and made a
closed impression.