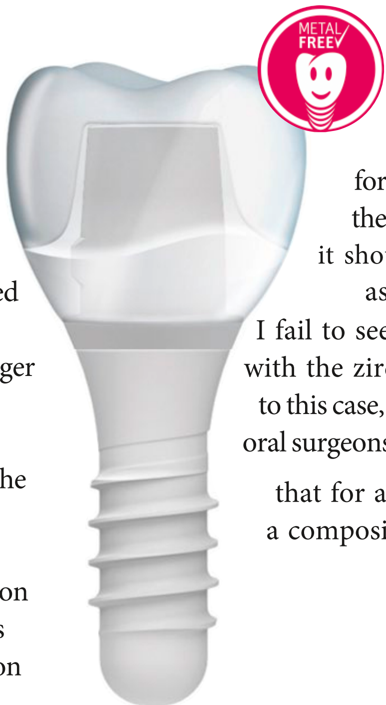
The time has come for ceramic implants

For quite some time now, one-piece and even two-piece ceramic implant systems have been discussed at conferences and in the media. Wolfgang Weisser has been engaged with the "metal-free" topic for five years already. In a two-part article, he presents an intriguing case that was addressed using a ceramic implant.

THE DEMAND FOR METAL-FREE SOLUTIONS is constantly increasing. Thus, it's not surprising that even at this year's ITI Congress in Bonn, the concept of a "white" future in the field of implants was discussed. I, myself, have been engaged with the "metal-free" topic for five years – inspired by interactions with Klaus Pettinger (Zeramex). The longstanding connection with my mentor and his training have advanced my expertise in this matter. At the sixth Zeramex Congress in Hamburg, I presented the following case in its initial phase. The focus of the presentation was on the prosthetic final restoration. There was consideration for the prosthetic restoration using a zirconia coping and ceramic veneering, and alternatively, a zirconia coping with composite veneering.



Ceramic implants are often discussed, with a metal screw forming the core. However, I am of the opinion that if it's metal-free, then it should be entirely so. Furthermore, as a trained precision mechanic, I fail to see how the metal screw interacts with the zirconia abutment. In the lead-up to this case, I had multiple conversations with oral surgeons and dentists. They all assured me that for a restoration, they would prefer a composite veneering.

They provided the following reasons:

- Composite can be adjusted at any time. Due to daily familiarity with the material, the practice staff is highly skilled in its handling.

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1 X-RAY

- Due to its "normal" hardness (similar to tooth enamel), composite acts as a kind of shock absorber that can protect the implant system.

Professor Gerwin Arnetzl from Graz repeatedly mentioned these aspects in his lectures. Afterwards, we often discussed the alternative Enamic (Vita), which he favored.

The procedure presented here was discussed in detail with the manufacturer, the practitioner and the patient. It's an attempt. An empirical investigation would be worthwhile.

Practice

The patient presented to the dental practice with the desire to close the tooth gap in region 16 in the maxilla. She wanted a ceramic implant because a zit-varion-z implant from Ziterion (1) had already been inserted in 2010 and she was very satisfied with it.

The Zeramex P6 (4,8 × 10 mm) (4 to 17) was inserted without complications in the practice of the maxillofacial surgeon. The ZERAMEX P6 system is 100 percent metal-free because its screw is made of carbon-fibre-reinforced high-performance plastic. ZERAMEX P6 is placed using a comparable surgical protocol to the Straumann Standard Plus implant. To prepare the implant bed, the position of the implant is first centered with a round bur. This is followed by the pilot drilling. Depth and axis are determined with the pilot drill. These are checked with a paralleling post. The diameter is increased with various form drills. Finally, the depth control follows with a depth gauge. In this case, a thread was pre-cut. The implant was then screwed in, the sealing cap placed on the implant and the gingiva sutured over it.

The ZERAMEX healing cap, gingiva former and the temporary help to achieve the desired shape of the peri-implant soft tissue after the healing phase.

2a and 2b Zeramex P6 Surgical Case

The gingiva formers are available in two heights. The secondary part made of PEEK enables an individual provisional restoration.

The hydrophilic ZERAFIL implant surface has been sandblasted and etched in such a way that osteoblasts grow directly onto the implant and a firm attachment to the implant surface can be achieved.

Drilling sequences for implant bed preparation

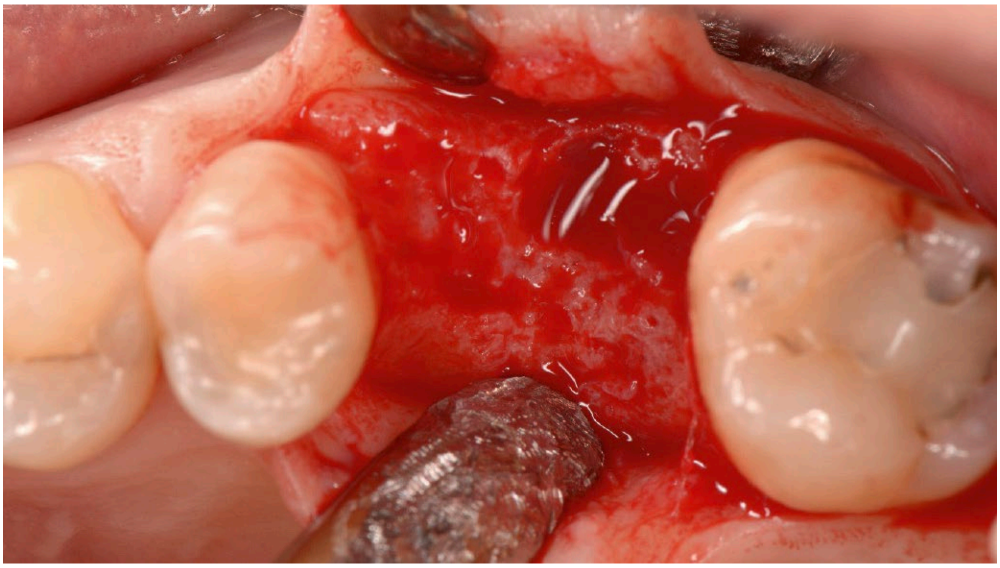
Drilling sequences for implant bed preparation:

- Punch/mark the desired implant position with the round bur ∅ 2.2 mm or with the pointed drill
- Deep drilling in prosthetic implant axis with the pilot drill ∅ 2.2 mm
- Check with the paralleling post with depth markings
- Form drilling with the form drills
- Check with depth gauge with tie window markings
- Probing the implant bed bore for nodular cere limitation
- Depending on the positioning of the implant, measurement of the bony implant neck bearing with the bone profile drill
- Cut thread[1]

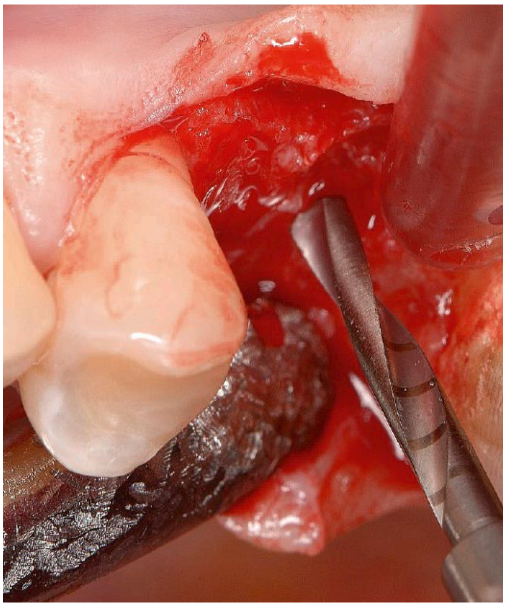
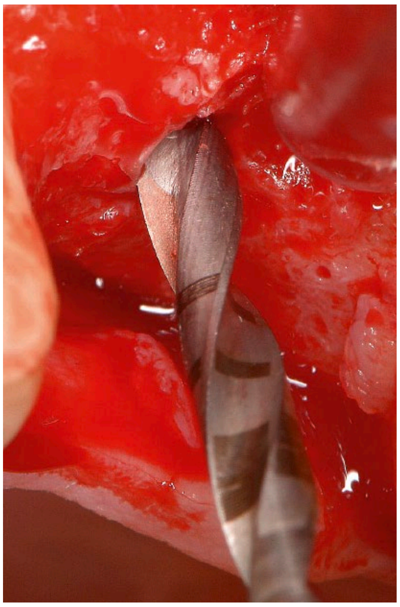
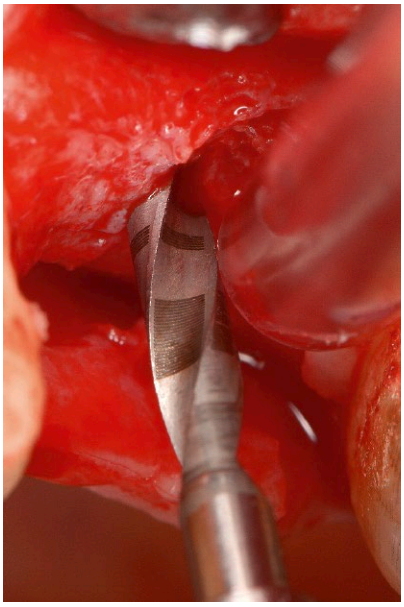
Depth Control

After drilling, the depth of the implant bed is checked with the depth gauge.

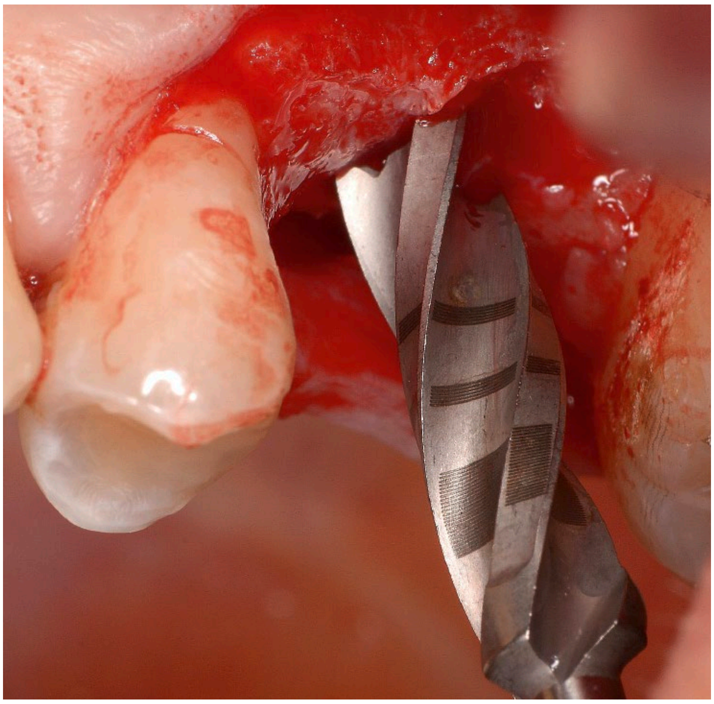
▶3 **Initial Situation**



▶4 **Opening**

▶5 to ▶7 **Pilot Hole 2,2 mm**



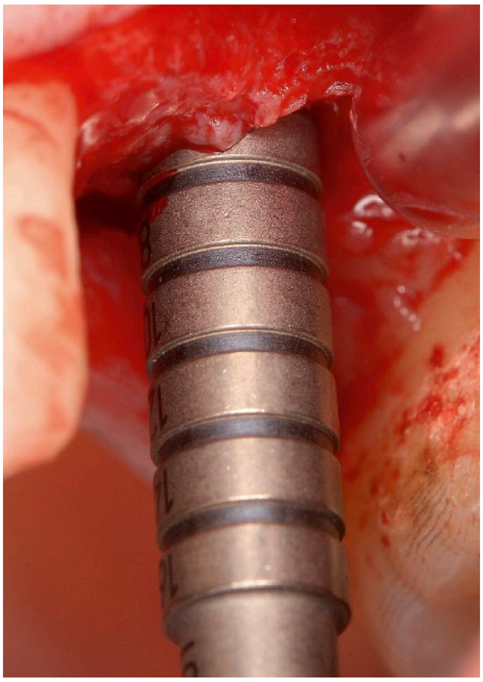
⊙8 Final Drilling 4,2 mm

If a thread has been pre-tapped, the positions of the thread bosses in the cortex must correspond to the implant. It is recommended to first carefully turn the driver with the implant to the left by hand until you can feel the start of the thread. The implant is then manually screwed in clockwise using the screw-in tool. Covered healing The sealing cap is then placed manually on the implant. After insertion, the gingiva can be sutured over the closure cap. After satisfactory osseointegration of the implant and healing of the peri-implant soft tissue, the mold for the definitive restoration can be taken.

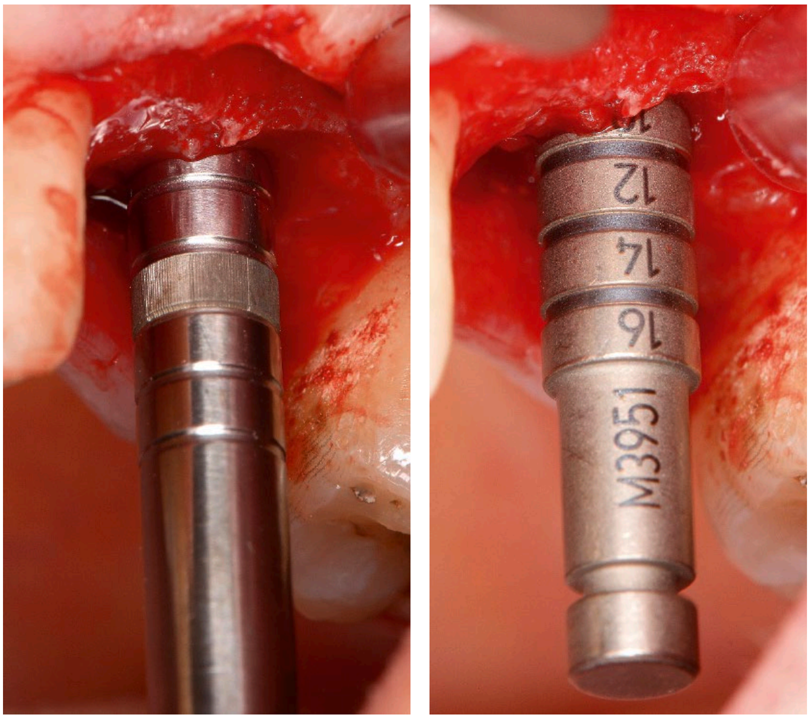
Exposing the Implant shoulder

During the healing phase, either the closure cap, the gingiva former or the closure screw were used.

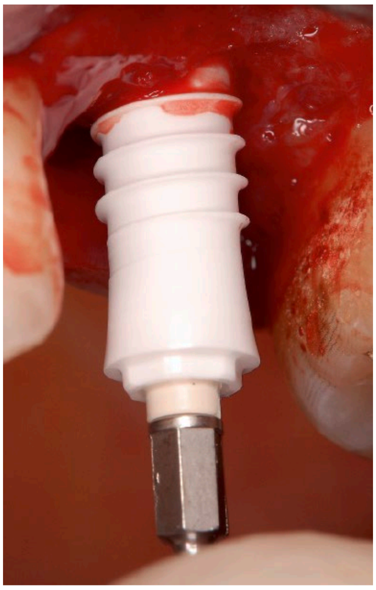
Implant exposure with soft tissue thickening:
In order to ensure the success of the implant treatment, we paid special attention to the soft tissue management when opening the implant. We use the modified rolled flap technique for soft tissue thickening. The roll-up flap was folded down,



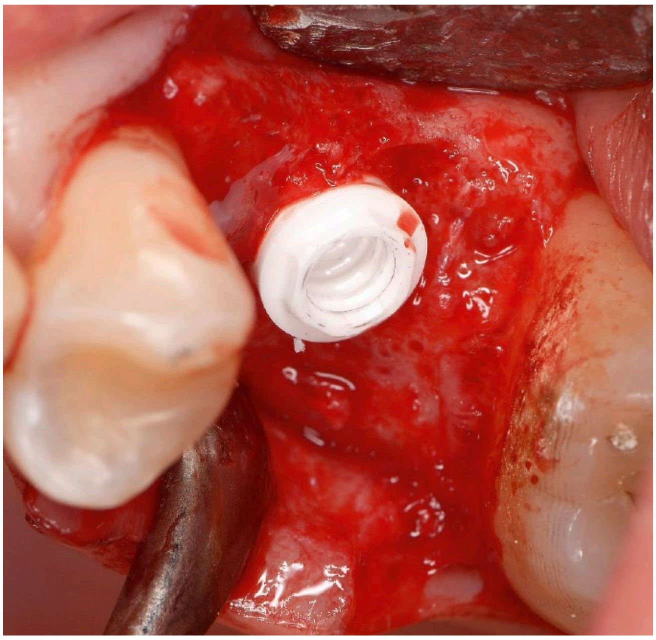
⊙9 Check with Depth Gauge

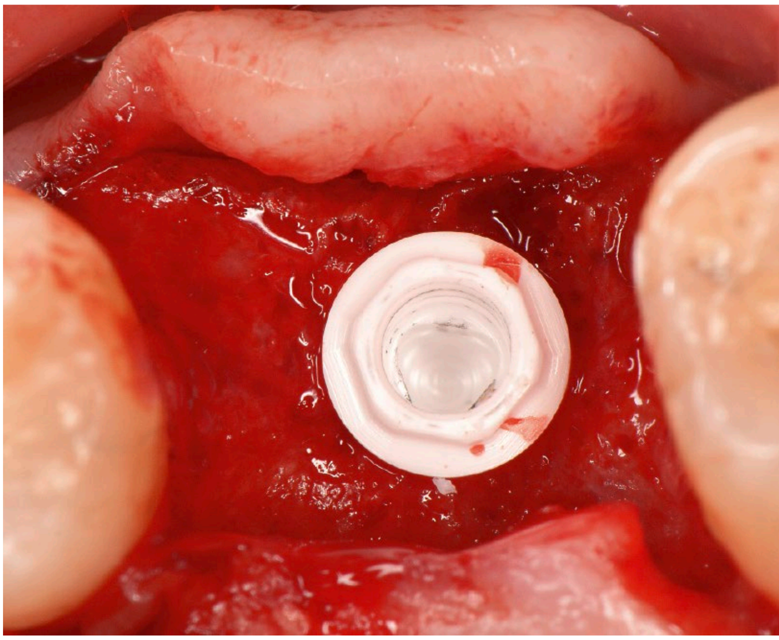


⊙10 and ⊙11 Thread Cutter

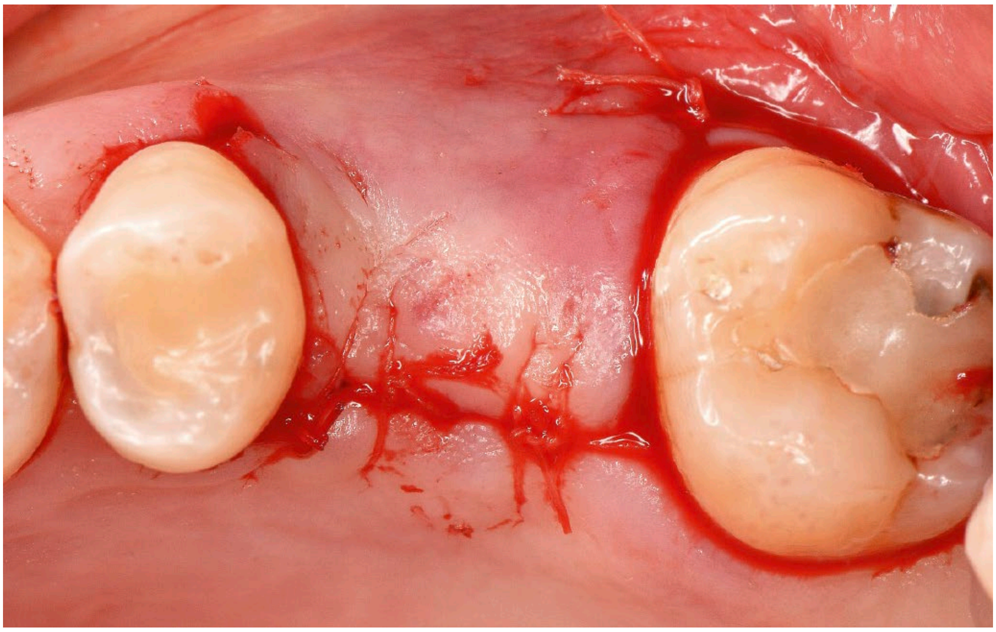


⊙12 to ⊙15 Bring in the Zeramex P 6, 4,8 × 10 mm



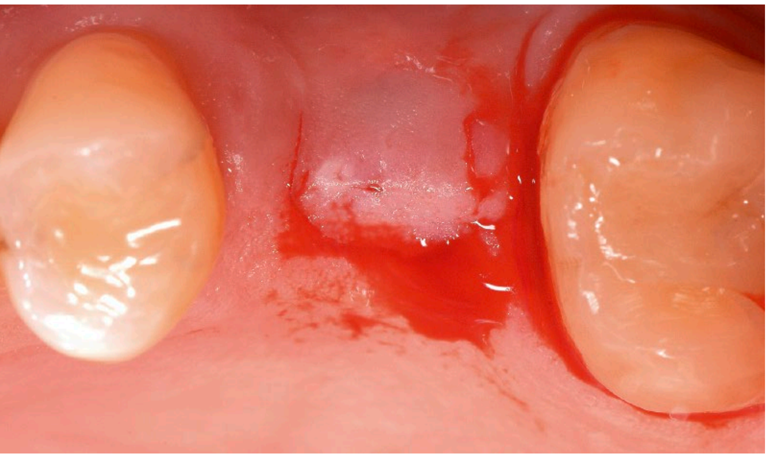


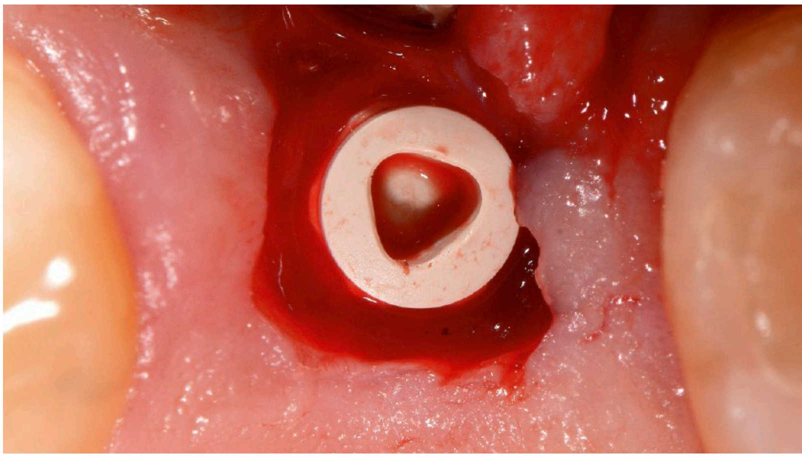
⊙16 and ⊙17a Wound closure implant closure with Healing Cap RN



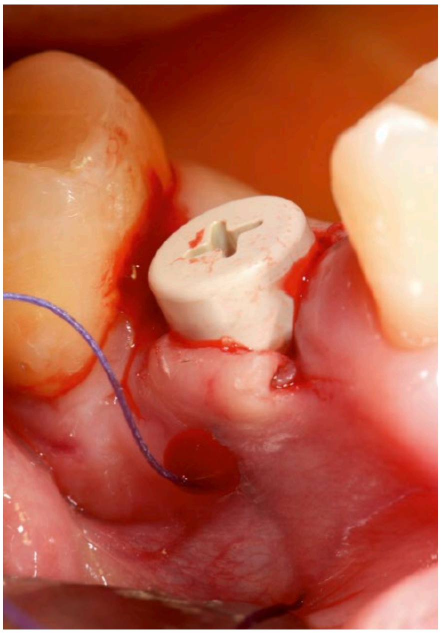
▶17b Sewn tension-free

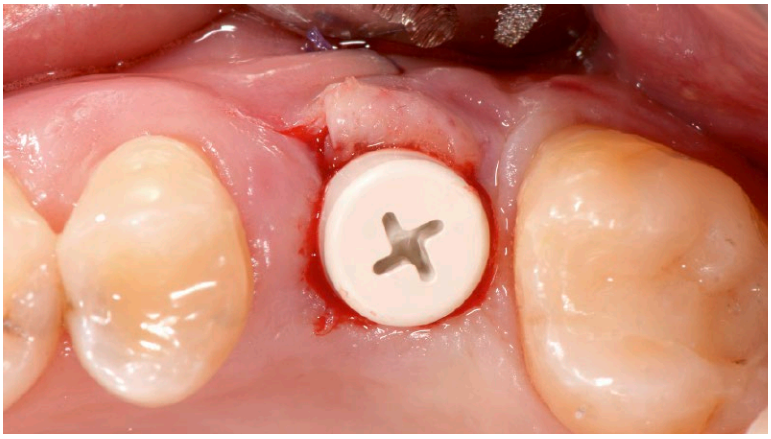
▶18 Situation after a six-month healing phase



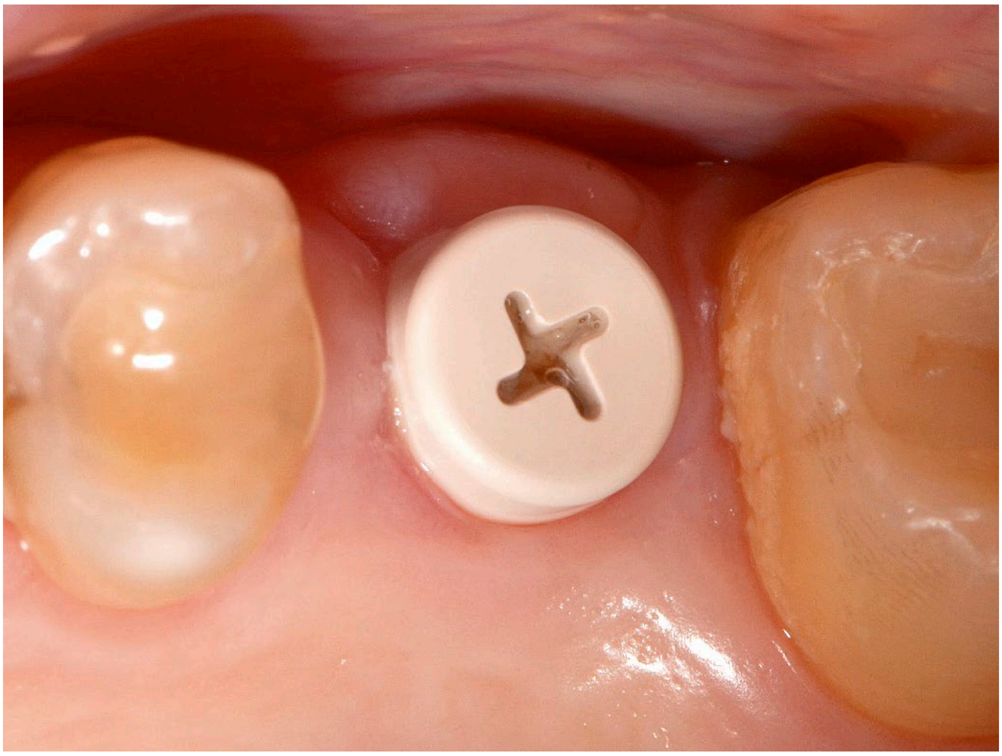


▶19 and ▶20 Opening implant closure, closure cap P36502 made of PEEK

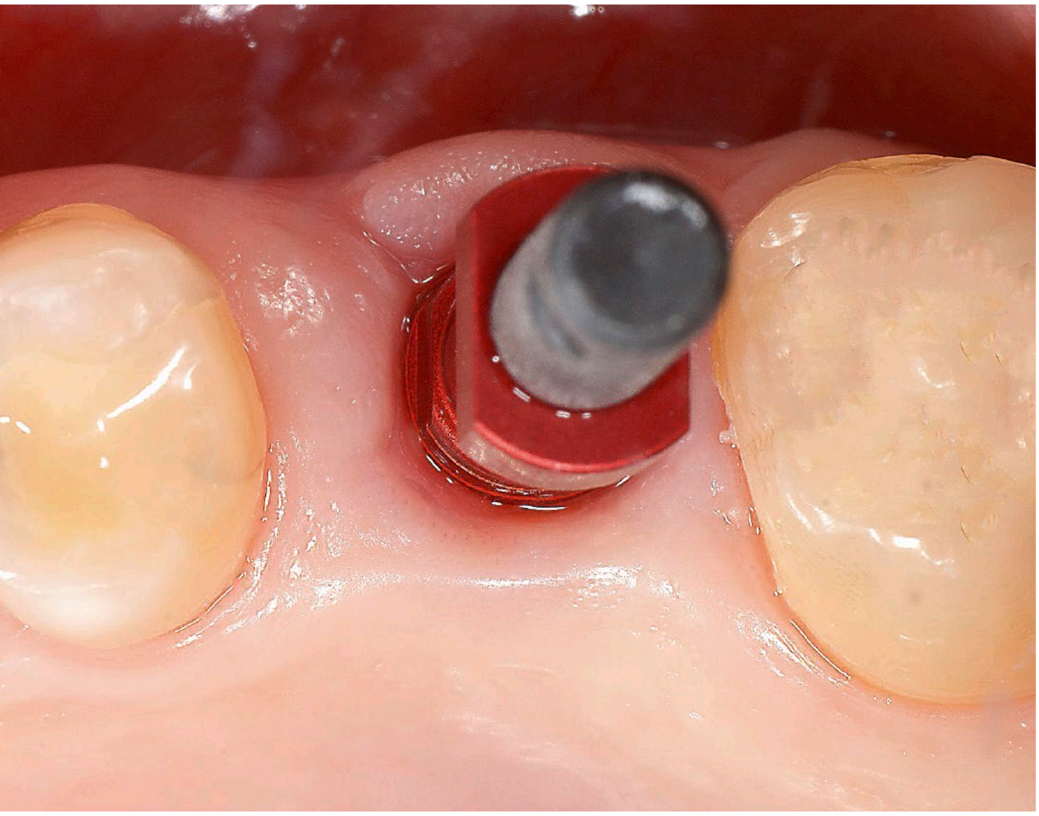
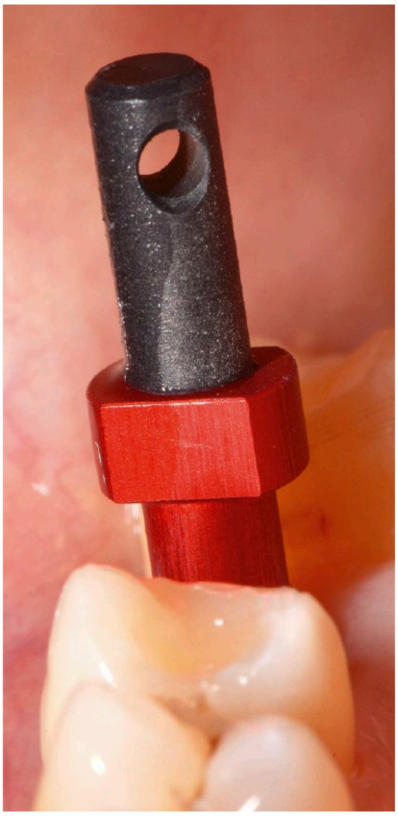




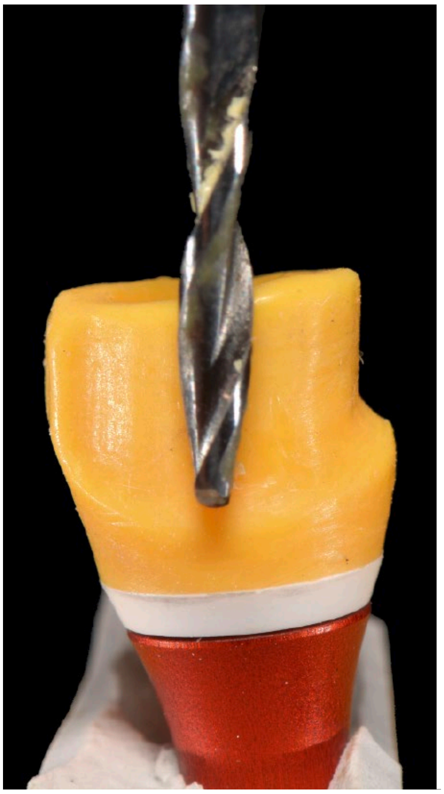
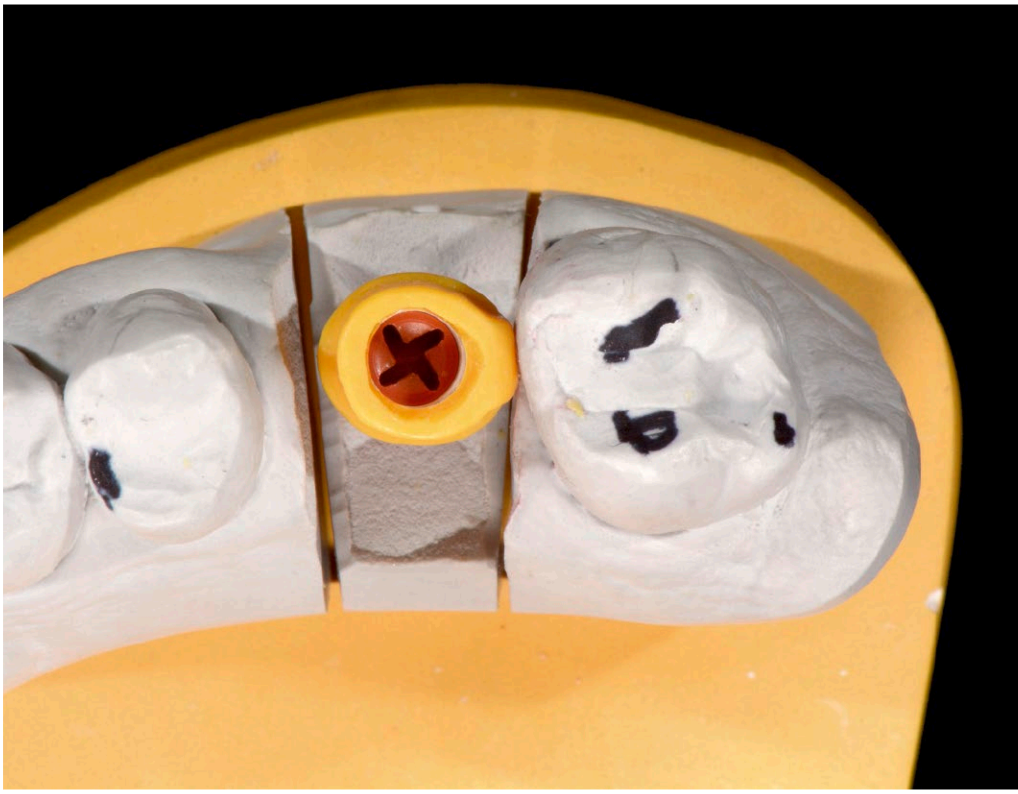
21 to 23 Rolled flaps with the start of the suture technique, gingiva former



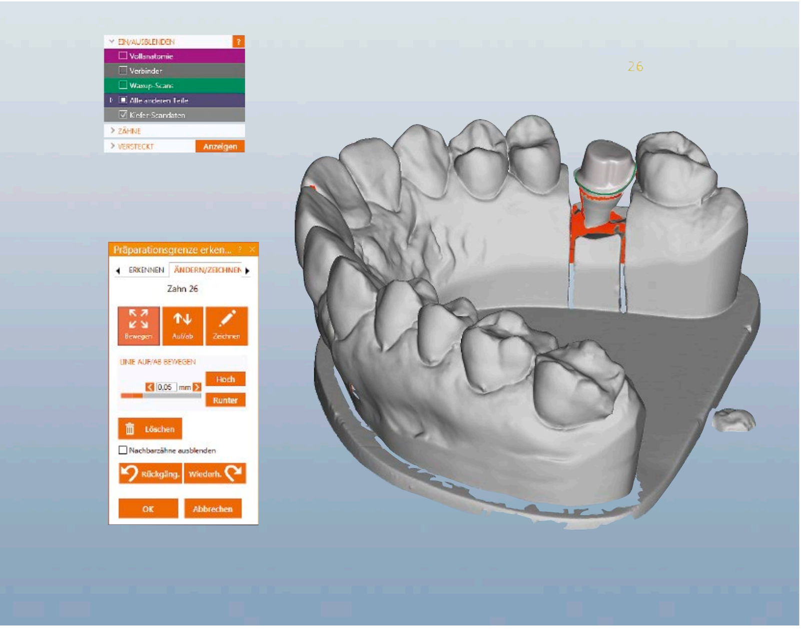
24 Situation after two weeks

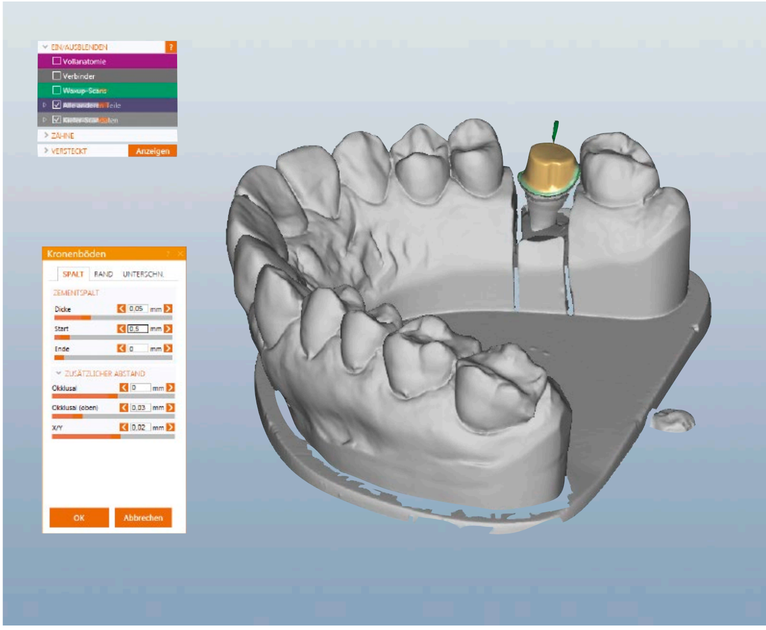



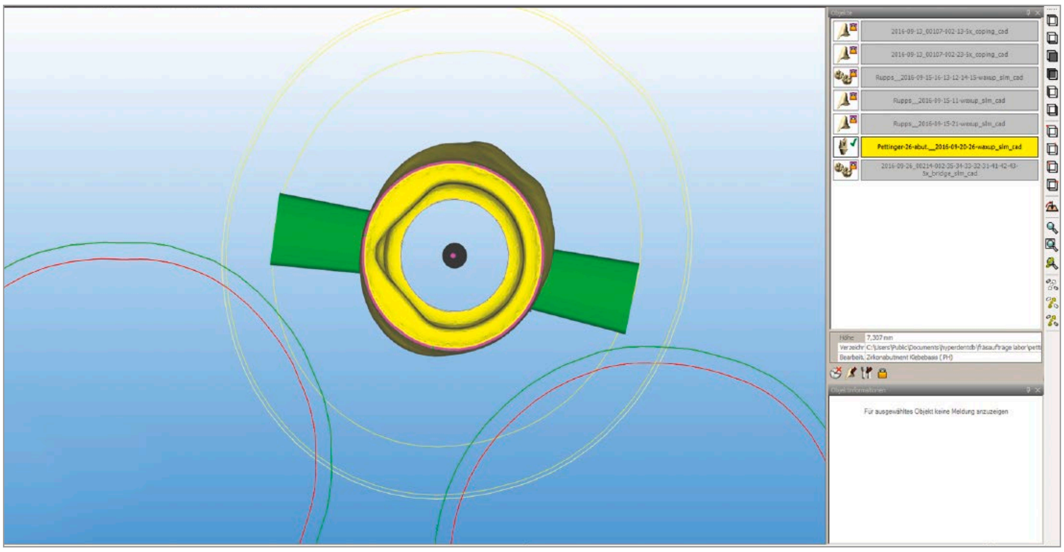
⊙25 and ⊙26 Impression with Zeramex P36510 Transfer Open Tray RN

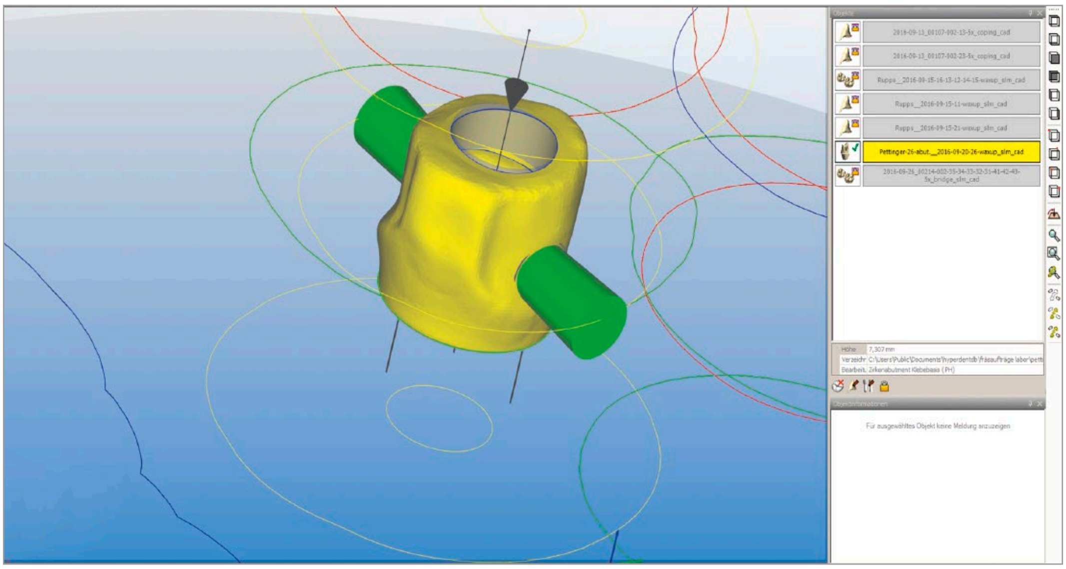



⊙27 and ⊙28 Laboratory steps: Production of an individual abutment. The analog preparatory work on the master model that has been made is very important in order to see the situation in three dimensions.





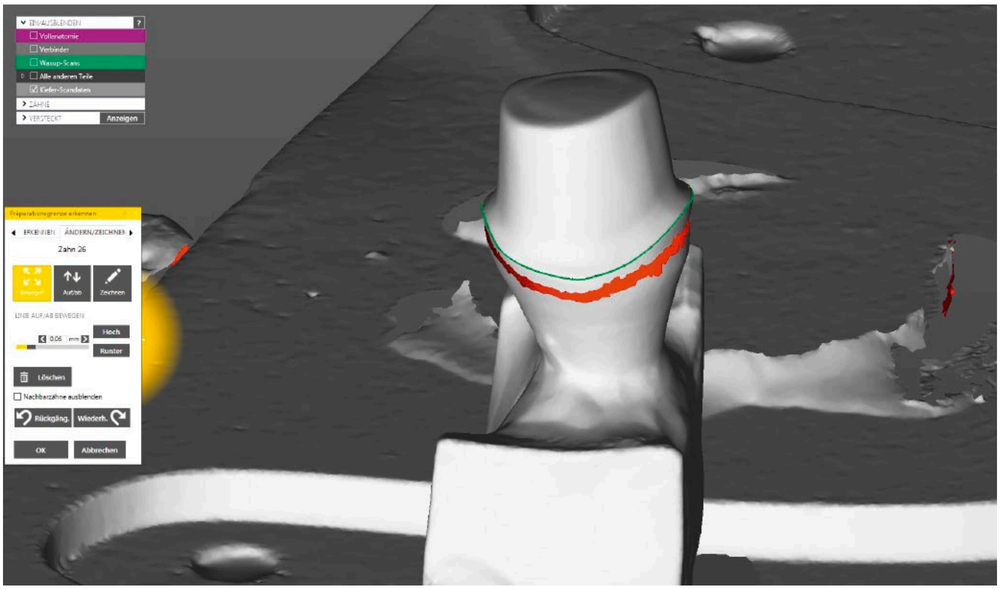


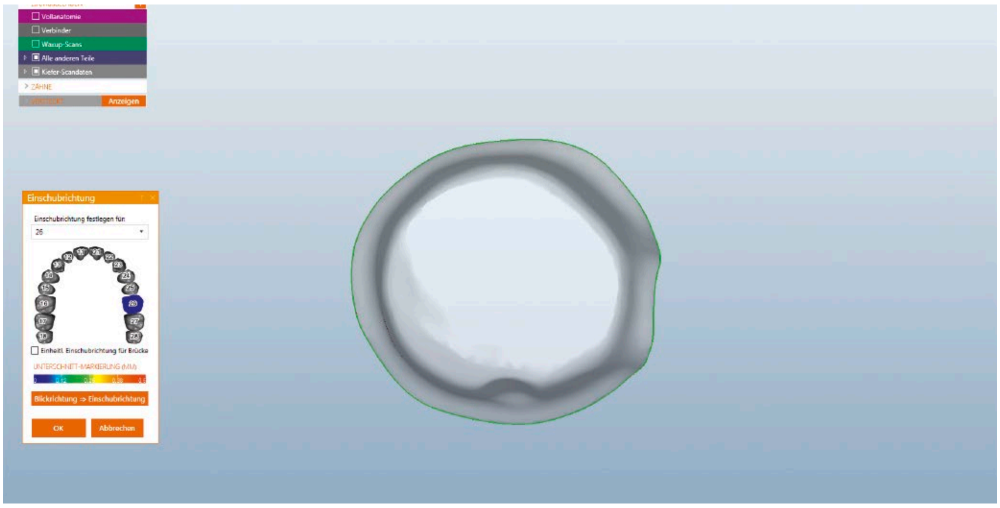


29 to 32
After the double scan, the digital workflow for creating the individual abutment begins

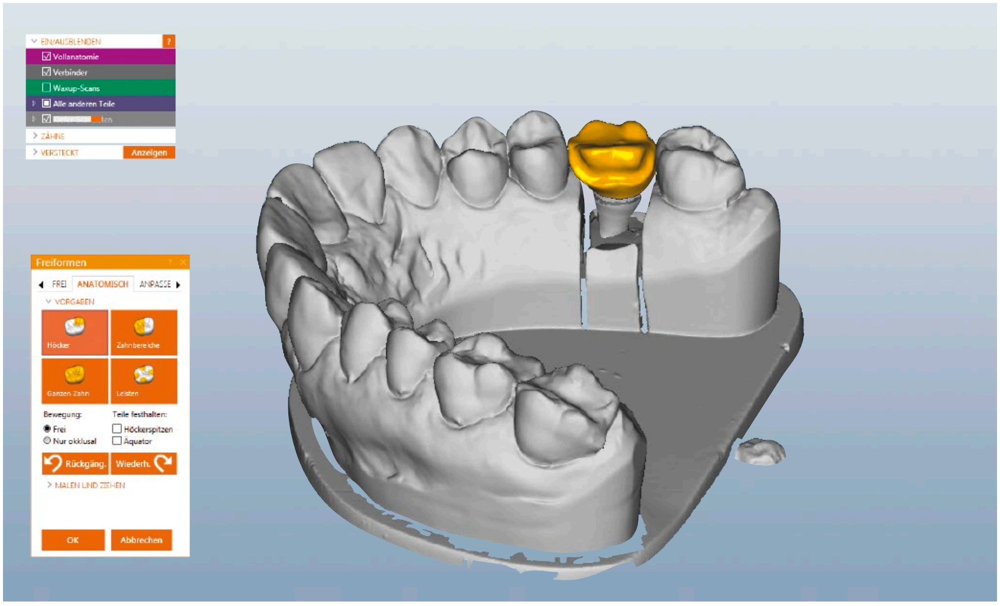
33 **Analogous preparatory work in wax to apply the correct stress breaker for the ceramic + composite veneer.**

34 **Another crucial cornerstone is the exact definition of the cusps in order to maintain the free space for the very important functional movement and to achieve an exact ceramic + composite layer thickness of 1.5 mm. This avoids chipping.**

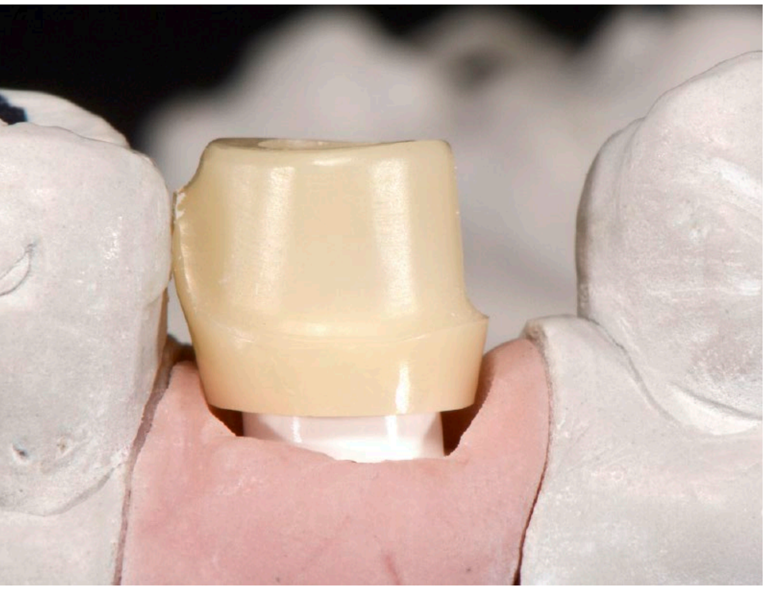


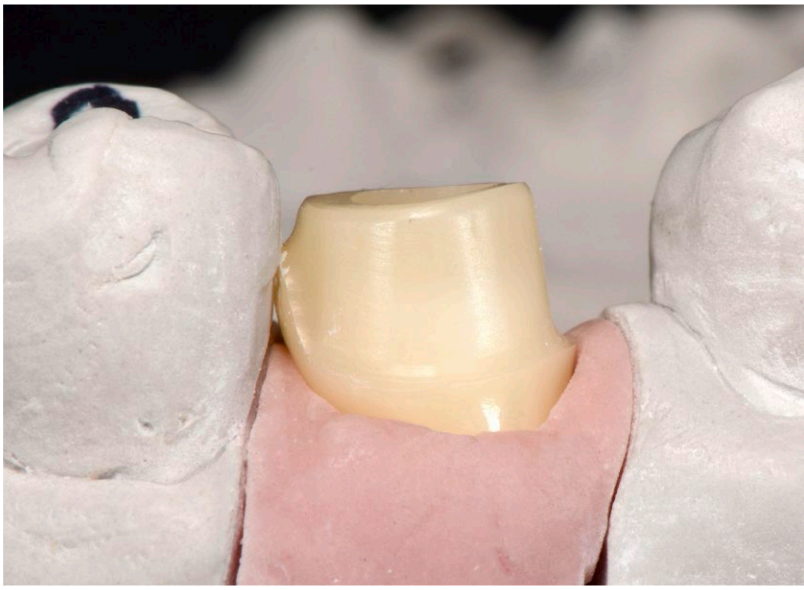


35 and 36 Scanned abutment

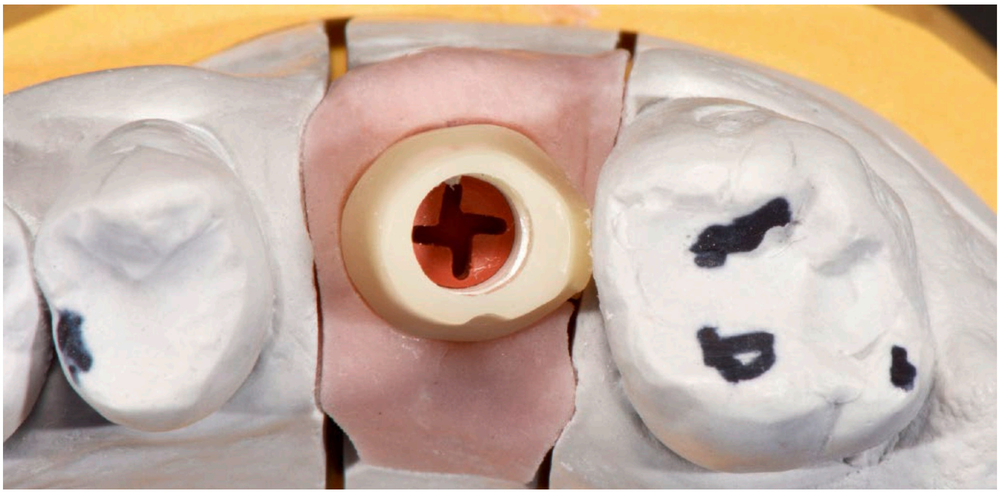


37 Double scan of the analog model of the coping





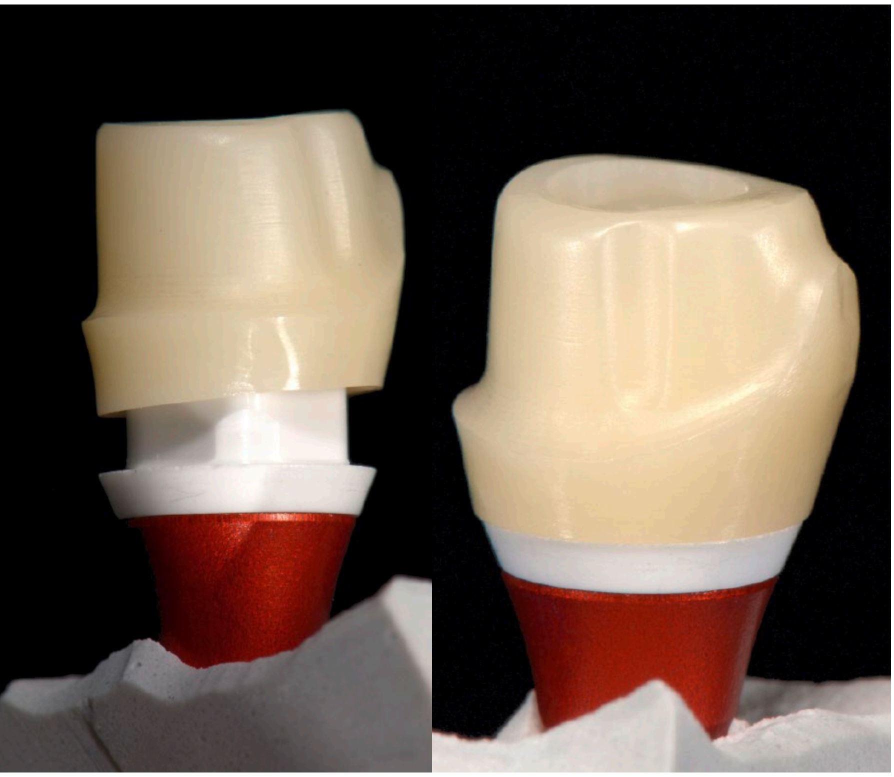
⊙38 and ⊙39 Result on the master model



⊙40 Master model and control of the important surface contact point, which was created by the distal inclination of the implant, preferably with the individual abutment. This ensures easy attachment of the crown for the dentist.

⊙41 Control with shimstock film

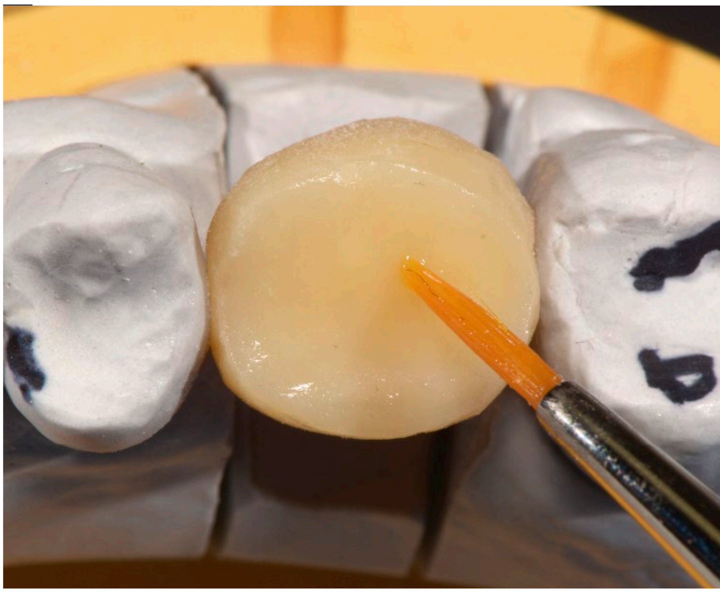
⊙42 Shortened Zerabase



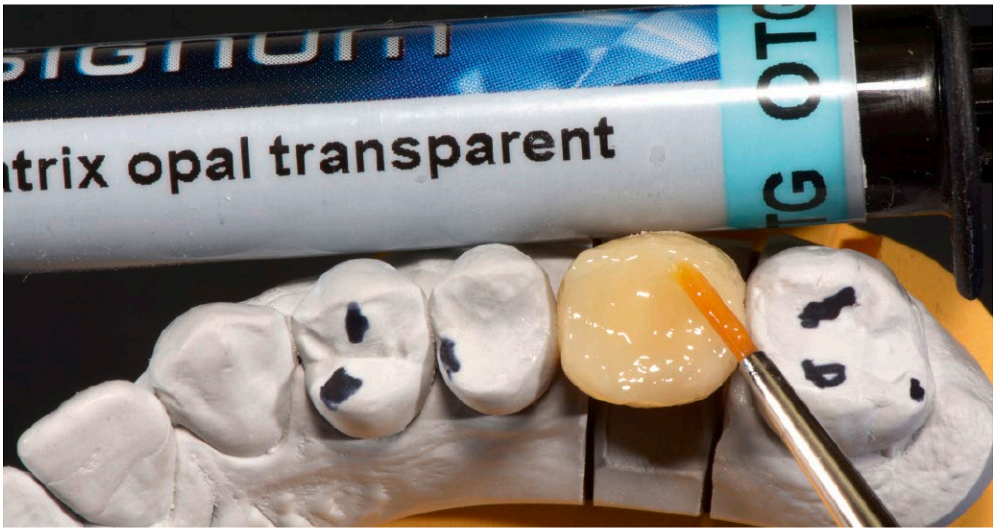
43 and 44 **Bonding of the Zerabase with the individual multicolor abutment**

45 **Preparation with zirconia bond II bonding agent from Zirkon for the signum/Kulzer acrylic veneer**

46 **It was agreed that the restoration of the occlusal surface should be created with two variants, one with a composite veneer and one with a ceramic veneer. The body is applied here with composite dentine A3.**

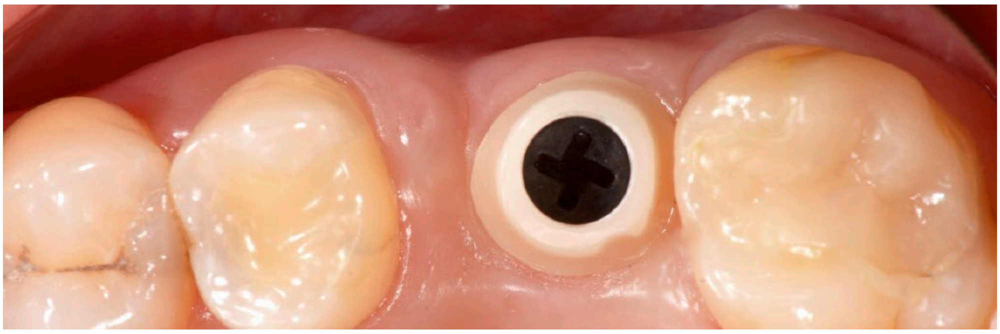


47 and 48 Matrix mamelon dentine occlusal



49 Finished with matrix opal transparent

50 Finished occlusal surface made in signum/Kulzer



⊙51 **View of the customized abutment**

⊙52 **Finished occlusal surface with signum/ Kulzer**

pushed into the prepared tunnel, and after removing the cover screw, a straight four millimeter high gingiva former was inserted into the implant.
The upper jaw master model has been digitized. The abutments were designed in the software. The design data was sent to the Be-go manufacturing center for the manufacture of the individual abutments.

After the master model and the laboratory set-up had been digitized with the laboratory scanner LabScan UHD from Bego (see page 77), we created a new patient case in the design software. The individual construction of the abutments in the upper jaw took place in a uniform direction of insertion (⊙11).

Laboratory Steps - Manufacturing an individual abutment

The analog preparatory work on the master model that has been made is very important in order to see the situation in three dimensions. After the double scan, the digital workflow for creating the individual abutment begins. The preparatory work is done in wax to apply the correct stress-breakers for the ceramic and composite veneer. This is the only way to guarantee long-term clinical success. Another crucial cornerstone is the exact definition of the cusps in order to maintain the freedom for the very important functional movement and to achieve an exact ceramic and composite layer thickness of 1.5 mm. This avoids chipping.

In memory
I dedicate this article to my friend, Uni.-Prof. dr Gerwin Arnetzl from Graz, who died on March 12, 2018.

You can read the second part in the next issue of the dental laboratory