This article presents the new titanium bonding base Viteo Base for implant-supported single tooth restorations. The prefabricated prosthetic components have been specially developed for use together with ceramic restorative materials. Viteo Base has various characteristics that simplify the path to aesthetic, long-lasting implant restorations. The prefabricated connecting surface geometries are compatible with various implant systems. Viteo Base can be processed using the press technique (IPS e.max Press) and, alternatively, with CAD/CAM technology (Telio CAD, IPS e.max CAD). In the present case, the working steps involved in producing a pressed implant crown and the advantages of the Viteo Base will be shown.

Implant prosthodontics is an ever-growing segment. It is becoming more and more popular to close single tooth gaps with an implant and the corresponding restoration in order to preserve the surrounding tooth substance. Modern prosthetic concepts and state-of-the-art materials enable the fabrication of functional and aesthetic restorations. Titanium bonding bases unite the advantages of a prefabricated component with those of a custom-made abutment. In a comparatively simple manner, the natural oval shaped emergence profile of the tooth is adapted to the round emergence profile of the implant. The design of the restoration and its connection to the underlying titanium bonding base are ultimate-ly the elements which are essential for the success of the restoration.

Many characteristics, specifically incorporated to enhance the restoration material

With the new Viteo Base, the dental technician is provided with a titanium bonding base which ideally complements press and CAD ceramic crowns (Fig. 1). This has numerous advantages, which will be discussed further throughout this article. The special soft edge design without sharp edges and protrusions, the recessed rotation protection and the precondi-
tioned bonding surface of the titanium bonding base are responsible for these benefits. The connection between the titanium bonding base and the implant is certified and coordinated with the most commonly used implant systems. Viteo Base is available in two diameters: MD (Me-
dium Design) and SD (Small Design). The chosen implant system determines the diameter to be used. Information on which implant system is suitable for which Viteo Base, which scan abutment is to be used, which restoration material can be applied and which Viteo Base components are available is provided in a special combination table. This is available on the Ivoclar Digital website.

Shortening from 6 to 4 mm

Depending on the prosthetic situation, the Viteo Base can be shortened from 6 mm to 4 mm. This is carried out easily using a separating disc. A special tool, the Viteo Base Trimmer, restores the soft edge design (rounded design for even force distribution) after the shortening process. The fol-
lowing case study illustrates this procedure: A hybrid abutment crown is produced using the press technique in the usual manner. The crown is created in wax on the titanium base according to the respective clinical situation, then converted into press ceramic and cemented to the Viteo Base before being screwed into the patient’s mouth.

Starting situation in the laboratory

An osseointegrated implant in region 46 required a full ceramic crown. The soft tissue was optimally shaped during the healing phase with a temporary restoration (Telio CAD). This was the ideal preparation method for an implant-supported crown made from IPS e.max Press. A screw-retained crown was selected in order to avoid any risk of marginal cement. The master model was produced from the implant impression. A gingival mask was created to allow an exact assessment of the soft tissue situation and the emergence profile. The press technique was selected for this case, which meant that the mod-
elled tooth shape and the occlusion could be transferred directly into the ceramic. In order to benefit from a high degree of material strength and good aesthetics, a monolithic resto-
ration was selected.

Preparation

The titanium bonding base Viteo Base was chosen according to the im-
plant system in size MD, then placed on top of the laboratory implant and screw-fixed with a torque of approx. 5 Ncm (Fig. 2). The recessed anti rotation protection (vertical groove) was positioned distally in the jaw for the production of the restoration. The Viteo Base can also be positioned in a mesial direction. The recessed anti-rotation protection is located vertically throughout the entire length of the shaft. It ensures that the titanium bonding base is situated correctly when it is cemented to the restora-
tion material and it acts as a “guide”. In addition, the minimum thickness of the restorative can be maintained, the cement gap is even throughout the restoration. Stress can therefore be avoided.

The space available in relation to the antagonist tooth was ideal for the full-ceramic crown supported by a 6-mm titanium bonding base (Fig. 3). In other cases, it may be necessary to reduce the height of the Viteo Base to 4 mm with a separating disc. The shaft height must be no less than 4 mm. This is laser-marked on the abutment shaft.

The Viteo Base Press Sleeve, a mod-
elling aid made from acrylic, is used to support the wax crown. The adhe-
sive surface of the titanium bonding base is preconditioned, which means it is too rough for the wax to be ap-
died directly. This is where the Viteo Base Press Sleeves come into play. As with the titanium bonding bases, they are available in two sizes (SD, MD). In this case the sleeve diameter was size MD, to suit the selected Vit-
eo Base (Fig. 4). The Viteo Base Press Sleeve was then shortened with a
diamond separating disc (Fig. 5). The fit of the press sleeves on the titanium base in the region of the screw channel and margin was thoroughly checked in order to ensure that the wax can be simply lifted off later on, the titanium bonding base was first isolated in the area of contact to the Press Sleeve.

Waxing-up the crown

The crown in region 46 was waxed-up according to the required shape, morphology and function. For this purpose, the screw channel had to be heightened in the occlusal area. A special pin (Viteo Screw Channel Pin) made of acrylic was inserted directly into the screw channel. This also protected the screw channel from contamination. After the crown had been waxed-up, the pin was simply removed. The detailed occlusal surface was left undamaged. The pin was isolated before being inserted into the screw channel and the crown was subsequently carved in wax (Figs 6 and 7).

The crown was waxed-up in the conventional manner, taking both dynamic function as well as static occlusion into consideration (Fig. 8). The wax crown was lifted easily from the titanium base (Fig. 9). Time and effort invested in this working step proves worthwhile after the pressing procedure. The more detailed the wax pattern is, the less rework is necessary on the pressed restoration.

Transferring the wax crown into ceramic

Lithium-disilicate glass ceramic IPS e.max Press is well proven for good press results in ceramic: High strength of 470 MPa, exceptional aesthetics and excellent light-optical properties ensure a life-like restoration. The polychromatic press ingot IPS e.max Press Multi, with lifelike graduating colour and translucency from the dentin structure to the incisal edge, gives monolithic restorations the desired aesthetic appearance. In general, after pressing, the restoration only requires glazing or it can be customized with the IPS Ivocolor stains.

The versatile Press Multi ingot

The IPS e.max Press Multi ingot has significantly more chroma in the lower region than in the upper third. A special spraying technique is used in order to ensure that the ingot’s colour layers are in the correct position on the crown after pressing. For this purpose, the waxed crown was connected to the side of the ring base. Instead of wax rods, a prefabricated precision wax pattern (IPS e.max Press Multi Wax Pattern) was used. The wax crown was positioned vertically centered to the wax pattern and attached at the osseobuccal side, so that an optimal colour graduation could be achieved in the visible area (Fig. 10). The crown was sprung onto the 200-g IPS Multi ring base. The occlusal surface of the wax crown was pointed towards the bottom of the ring base. The sprue position was checked with the IPS Multi Spray Guide 200 g (4 type of templates) (Fig. 11).

New investment material used

The object was invested using a new investment material: IPS PressVest Premium. After mixing, investing and setting, the ring was placed in a preheating furnace (850 °C) for 60 minutes. The press ingot (IPS e.max Press Multi, shade A 3.5), the disposable plunger and the aluminium oxide plunger (IPS e.max Press Multi One Way Plunger and IPS Alum Plunger) were then placed into the preheated furnace (Fig. 12). The ingot and the plungers were not preheated. After placing the assembled pressing into the preheated press furnace (Programat EP spine), the pressing program was started.

After pressing, the ring was removed from the furnace and allowed to cool slowly (Fig. 13). Using glass blasting beads, the ring was first divided (4 bar pressure) and then finely (2 bar pressure).

The ceramic structure was then placed correctly on the Viteo Base and the position was marked with a water-resistant pen. The two parts were then separated from each other and cleaned with the steam jet. Then the screw channel of the Viteo Base was closed with the Viteo Screw Channel Pin. The silicone (Vitrial Extra Light Body Fast Set) was applied to the adhesive surfaces of the Viteo Base and the pressed ceramic structure. Both objects were then reconnected into the correct, previously marked position (Figs 13 to 15). Excess material was carefully removed with an instrument after the silicone had set (Fig. 17).

Trying-in the hybrid abutment crown in the mouth

Before the ceramic crown was permanently cemented with the Viteo Base, there was a clinical try-in. The two parts were temporarily attached to each other with a thin flowing impression silicone (Virtual Extra Light Body Fast Set). The titanium bonding base was screwed to the laboratory implant. In this case, the Viteo Holder made handling easier.

The ceramic structure is still matt at this time as it is still unfinished. Secondly, the permanent luting composite (Multilink Hybrid Abutment) has different degrees of translucency, through which the Viteo Base visually “disappears”. Regardless of these limitations, it was apparent that IPS Ivocolor stains would be needed to optimally adjust the shade of the crown’s occlusal surfaces to adapt to and harmonize with the surrounding teeth.

The try-in confirmed the good fit

In the clinical try-in, the dentist checked the emergence profile, the proximal contacts and the occlusion of the crown. The try-in in the patient’s mouth confirmed the good fit of the restoration. Note: The light-optical properties cannot be assessed during the try-in. Firstly, the ceramic is still matt at this time as it is still unfinished. Secondly, the permanent luting composite (Multilink Hybrid Abutment) has different degrees of translucency, through which the Viteo Base visually “disappears”. Regardless of these limitations, it was apparent that IPS Ivocolor stains would be needed to optimally adjust the shade of the crown’s occlusal surfaces to adapt to and harmonize with the surrounding teeth.
Finishing the crown/individualization

The pressed IPS e.max crown was stained with the universal stain and glazed assortment of IPS Ivocolor (Fig. 18). A warm colour was applied to the central incisal to give the impression of depth. The cusp tips were accentuated with white (Fig. 19). A wash of blue stain was gently added to the incisal area to intensify the translucency of the crown. After the stains had been fired, the IPS Ivocolor Glaze Paste was applied to the crown and Glaze firing was carried out. The contacts were then checked again in the articulator.

Permanent cementation of the prosthetic implant restoration (Fig. 20)

The cementation process of a ceramic crown and titanium bonding base is a delicate working step, which requires high precision. Since the Viteo Base is already preconditined, it does not have to be sandblasted before cementation. This saves one working steps and therefore saves time. Nevertheless, this does not apply if the abutment is shortened.

The shortened surfaces have to be re-sanded in order to achieve an ideal bond and a good marginal seal. In this case, however, the Viteo Base was used with a 6-mm shaft height and was not shortened. The titanium bonding base was immediately cleaned in the ultrasonic bath and was not shortened. The titanium bonding base was cemented on the laboratory implant and placed in the Viteo Base for easy handling. The ceramic object had been previously marked with a water-resistant pen for correct positioning and subsequent bonding with the Viteo Base.

The universal primer Monobond Plus ensures optimal bonding to the metal. It was applied to the bonding surface of the Viteo Base and allowed to act for 60 seconds (Fig. 20). Any excess was dried with oil-free compressed air. Itching gel was applied to the bonding surface of the ceramic object (IPS Ceramic Itching Gel) (Fig. 21), then the area was thoroughly rinsed and dried. Next, Monobond Plus was applied to the ceramic surface and allowed to act for 60 seconds. Any excess was blown away. Alternatively, the innovative single-component primer Monobond Ench & Prime can be used here. It etches and silanizes the glass-ceramic surfaces in one working step. Before cementation, the screw channel had to be closed in order to prevent composite residues from falling into it. The Viteo Screw Channel Pin was used for this purpose. For easier handling, this was shortened and then inserted into the Viteo Base screw channel.

The IPS max Press ceramic structure was bonded to the Viteo Base using the MultiLink Hybrid Abutment self-curing luting composite, which is specified as the method for the permanent cementation of ceramic structures to titanium/titanium alloy bases. It is available in two levels of translucency. In this case we used the version with a higher degree of opacity (90% [c] Fig. 23). The MultiLink Hybrid Abutment composite was applied to the bonding surface of the Viteo Base and to the inner surfaces of the ceramic object. Thanks to the previously applied pen mark, both components could be easily placed in the correct end position. The restoration protection, which runs along the entire length of the shaft, acted as a guide.

Both components were firmly pressed together for five seconds. Any excess composite – a gel-like consistency – was removed with an instrument during the setting phase (Fig. 24). The application of Liquid Strip glycine gel on the joint prevented an inhibition layer from forming during setting. After seven minutes, the glycine gel was rinsed off with water and the Viteo Screw Channel Pin was removed from the screw channel. Finally, the joint was carefully smoothed over with a fine rubber polishing brush and the Viteo Screw Channel Pin was inserted into the correct end position. The screw was then screwed in place with water and the Viteo Screw was tightened according to the torque specified by the manufacturer. By screwing the crown in place instead of cementing it, the risk of cement residues in the peri-implant area could be excluded. The screw channel in the occlusal area was sealed with the light-curing esthetic composite IPS Impress Direct.

The restoration adapted harmoniously to the surroundings in the mouth in terms of its shape, shade and function. The emergence from the soft tissue corresponded to that of the natural dentition thanks to the prepared emergence profile and the individual design of the structure (basil).

Conclusion

Ideal coordination with ceramic materials

The Viteo Base is ideally suited for use with ceramic materials. It helps to avoid chipping problems, the lack of or weakness of a bond or inadequate force distribution. One of the advantages of the Viteo Base is the special soft edge design without sharp edges and protrusions, which on one hand strengthens the restoration material and on the other hand provides optimal force distribution under pressure.

The preconditioned, in other words sandblasted surface saves an additional working step and therefore saves time. In combination with the appropriate composite system, it ensures a secure connection of the ceramic crown to the Viteo Base crown. The temporary Telio CAD restoration in region 46 was removed by the dentist, the implant lumen was flushed (Cervitec Liquad) and the peri-implant tissue (emergence profile) was examined. The crown was screwed to the implant using the originally packed Viteo Screw. It was tightened according to the torque specified by the manufacturer. By screwing the crown in place instead of cementing it, the risk of cement

avoided. The restoration material is strengthened. In addition, the Viteo Base’s shaft height can be easily adjusted to suit the prosthetic restoration. It can be shortened from 6 mm to 4 mm. As a result, optimal support of the restoration material is achieved by the titanium bonding base. The restorative material and the Viteo Base together form a coordinated unit and are the basis for clinical success.

In the production of an implant-supported single-tooth restoration, the Viteo Base components enable a smooth manufacturing process. In this present case, a hybrid abutment crown was produced in IPS e.max Press using the press technique. The ceramic crown, produced in the conventional manner, was cemented to the Viteo Base. The recessed rotation protection acted as a guide. An ideal bond was achieved with the appropriate materials for conditioning and placement. The hybrid abutment crown was screwed in place in the mouth. It fits harmoniously into the overall appearance of the mouth.
The **NEW**

**EyeSpecial C-III**

is here **NOW**!

---

**Ultra-Light**

**SIMPLE**

**Compact**

**Accurate**

**Intuitive**

**Designed Exclusively for Dentistry**

For more information, simply contact your nearest SHOFU Dealer TODAY!

SHOFU DENTAL ASIA-PACIFIC PTE. LTD.
www.shofu.com.sg