

# dental dialogue

The International Journal of Dental Technology



## Reprint

- **Crystal Type**  
The positive effect of leucite crystals  
on the properties of a zirconium oxide  
veneering ceramic

An article by Ztm. Christian Berg,  
Frick/Switzerland

Kindly offered by

**WILLI GELLER**  
*Creation*

Creation Willi Geller International GmbH  
Koblacherstraße 3, 6812 Meiningen, Austria  
Tel. +43 5522 76784, Fax +43 5522 76784-59  
[info@creation-willigeller.com](mailto:info@creation-willigeller.com)  
[www.creation-willigeller.com](http://www.creation-willigeller.com)

The positive effect of leucite crystals on the properties of a zirconium oxide veneering ceramic

# Crystal Type

An article by Ztm. Christian Berg, Frick/Switzerland

Everything was better in the olden days! This standard phrase of eternal yesterday is true to some extent but progress also brings along developments every now and then that promise real added value. For example when zircon oxide entered everyday dental care as a framework material 18 years ago, there was initially no suitable veneering ceramic. In order to match the CTE of the veneering material to that of the oxide ceramic framework material the leucite content was reduced. The finished results were convincing on the models, however in the mouth they really "sank". Here, the leucite containing Creation ZI-CT comes into play, which Ztm. Christian Berg was able to put through its paces before its market launch. In the following he would like to share some results with you which he has solved with this zirconium oxide veneering ceramic.

For a long time the world of VMK technology was all right. Then along came zirconium oxide, the ultimate framework material. More translucent than metal, unbreakable, white and modern. However, there was initially no adequate veneering ceramic, the beginning was experimental.

In order to get to grips with the CTE, leucites were replaced and the glass phase successively increased. Glass is see-through, whereas light refracts when it hits leucite crystals. The zirconium oxide based full ceramic crowns therefore seemed very solid, had depth. The restorations looked great on the model, however quite a number of dental technician's hearts sank when the implanted restorations regularly "sank" in the patients' mouths. A real blessing and a curse of the glass. Now Creation is bringing a leucite ceramic for zirconium oxide onto the market: Creation ZI-CT (CT stands for Crystal Type, therefore the ceramic has a crystalline character). Ztm. Christian Berg is one of the first people who was allowed to test this ceramic. He would like to express his enthusiasm with this article.

Don't worry, I won't beat about the bush; the ceramic is great. Amongst the  $\beta$  users

who were able to test the ceramic before, sentences such as "This is like the Creation Classic!" – what an accolade for a zirconium oxide veneering ceramic.

Indeed instead of boring you with molecular formulae, materials science and chemistry, we want to let the facts speak for themselves. The oral designer Ztm. Christian Berg has picked out a few real patient cases which he has solved with the new Creation Crystal Type – almost arbitrarily as he already has a large number of Creation ZI-CT cases. These show the various different ways this ceramic can be used.

## 1. Case – Tooth 12 and 22

Both laterals of the 32-year old patient had grown as conical teeth and therefore had been built up with composite (Fig. 1). Because the composite had become strongly discoloured over time, the patient wanted a permanent aesthetic solution. When removing the composite structures the practitioner, Dr. Heidi Meier (Basel/Switzerland) discovered that the conical teeth had suffered so much that she unfortunately couldn't avoid a preparation. Dr. Meier had to prepare down to the dentine, which is why the treatments could no longer be fixed



Fig. 1 Both laterals of the patient had grown as conical teeth and therefore had been built up with composite

### Indices

- Aesthetics
- Feldspar
- Glass
- Implant prosthetics
- Ceramics
- Leucite
- Light
- Layering technique
- Full ceramics
- Zirconium oxide

### Category

Product-related specialist article



Fig. 2 After removing the structures it was apparent that the teeth would need to be prepared down to the dentine. Therefore, only framework supported (here zirconium oxide) crowns were considered for treatment. But where is the crown?

#### Literature

- [1] Happe A, Schulte-Mattler V, Strassert C, Naumann M, Stimmelmayer M, Zoller JE, Rothamel D. In vitro color changes of soft tissues caused by dyed fluorescent zirconia and nondyed, nonfluorescent zirconia in thin mucosa. *Int J Periodontics Restorative Dent.* 2013 Jan;33(1):e1-8.

with adhesive. With this zirconium oxide based full ceramic crowns were planned as treatment for the now weakened teeth. For veneering of the zirconium oxide framework fitted with a labial shoulder the new Creation ZI-CT was used.

Both final pictures show the conventionally fixed full ceramic crowns on 21 and 22. The harmonious transition to the gum was achieved by the around 1 mm wide labial ceramic shoulders (Fig. 2 and 3).

#### 2. Case – Implant crown in region 12

The solution to the second patient case is a lot more difficult. The loss of tooth 12 had led to a horizontal and vertical reduction of the bone and soft tissue loss (Fig. 4). Therefore, the practitioner Dr. Thomas Bolliger (Basel/Switzerland) inserted the implant somewhat offset towards the palate (Fig. 5 and 6).

In order not to have a disaster with the dental technical restoration in such an aesthetically sensitive situation, the im-

plant abutment has an important role. The essential requirement for this is an impression which shows the gums perfectly. For this Christian Berg customised the standard impression posts so that the soft tissue status conditioned with the temporarily arranged or the individual healing cap could be directly transferred to the implant model.

In situations such as these\* (individual tooth restoration at the front, thinner biotype, lost hard and soft tissue etc.) the author likes to fall back on customised implant secondary parts made from zirconium oxide (Fig. 7). This will affect the preparation of requirements – the gingival line, the placing of the adhesive line etc. – accordingly. However, in Figure 7 the discrepancy between the current situation and the desired emergence profile is already clear. This difference was to be balanced out by an individually modelled and firmly pressed shoulder. Because the one-piece Staumann Anatomic IPS e.max abutment should be fitted circularly with press ceramic in the area of the adhesive line, the line must naturally be laid further subgingivally during grinding of the abutment (Fig. 8).



Fig. 3 The zirconium framework on 12 and 22 had been fitted vestibularly with an approximately 1 mm wide shoulder and veneering with the new Creation ZI-CT

\* The modification of the abutment has been presented on tooth 11 as an example and not on tooth 12 of this case.

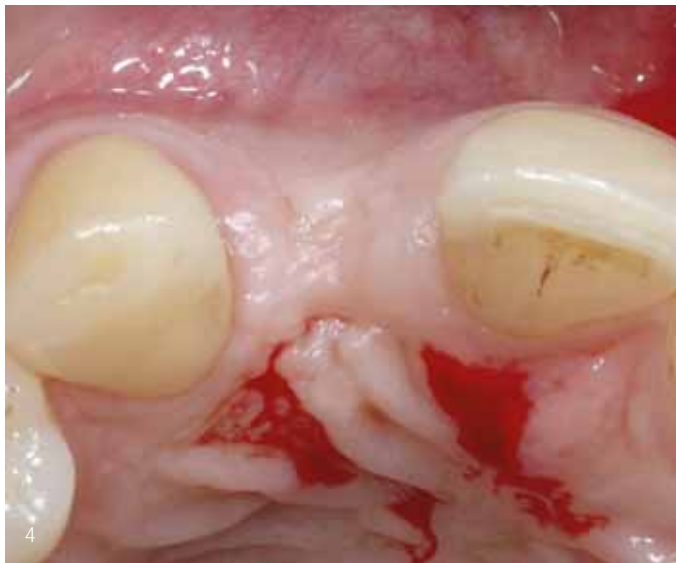


Fig. 4 In this patient the loss of tooth 12 has led to a horizontal and vertical reduction of the bone and loss of soft tissue



Fig. 5 and 6 The practitioner Dr. Thomas Bolliger therefore inserted the implant somewhat further towards the palate



Fig. 7 and 8 To customise the standard Straumann Anatomic IPS e.max abutment, this was ground in preparation



Fig. 9 On the basis of the ground abutment then the backward planning starts, this means the crown contour is waxed up. In the process the cervical edge of the crown builds the red-white border (epigingival)

Then, the crown is waxed up in terms of backward planning (Fig. 9). A removable gingival mask is essential in the process as only then can the biological and aesthetic factors be taken into account. In our case, the crown margin can be exactly epigingivally placed with removed gingival mask – and with the patient's abutment wax try-in (Fig. 10). The wax crown was basally prepared and isolated (Fig. 11). The cervical area between the waxed crown contour and the "prepara-

tion border" of the zirconium oxide abutment can be modelled with a special cervical wax as a result – completely in terms of an ideal emergence profile (Fig. 12). This cervical part can then be pressed with press ceramic (Fig. 13 to 16) – however, before the parts in question of the zirconium oxide abutment were fitted with a fluorescent liner. It has been shown in studies namely that the design/conditioning of the abutment

has a positive influence on the colour of the peri-implant soft tissue and therefore the overall effect of the restoration [1].

An abutment modified in this way also has the advantage that the dentist can fix the crown with adhesive. And if the gum were to recede, it would be the press ceramic that would be exposed and not the abutment material.

Finally, the implant crown was also made with Creation ZI-CT.





Fig. 10 With a removed gingival mask the area of the abutment which needs to be supplemented is then shown



Fig. 11 and 12 The modelled crown is basally prepared and isolated for this. Then we supplement the crown contour with cervical wax.



Fig. 13  
In this way we create a boundary to the abutment which lies exactly epigingivally. The zirconium oxide abutment is fitted supragingivally with a fluorescent liner and prepared for the pressing of the "shoulder"



14a



14b



15



16

Fig. 14 to 16 The fluorescent liner in combination with the press ceramic ensures that the subgingival area of the abutment does not negatively influence the colour effect.



Fig. 17 to 19 An abutment laid with press ceramic on the epigingival level has the advantage that the crown can be fixed with adhesive. And if the gum were to recede, it would be the press ceramic that would be exposed and not the white zirconium oxide abutment.



Fig. 20 The enormous aesthetic advantage can already be seen on the screwed in customised abutment

Fig. 21 Together with the zirconium oxide framework (with ceramic shoulder) veneered with Creation ZI-CT a harmonious end results ensues

For this a zirconium oxide framework reduced to approximately 1 mm for the circular veneering ceramic shoulder was ceramically veneered in the normal way (Fig. 17).

Both parts: the zirconium oxide based full ceramic crown and modified zirconium oxide abutment are prepared in the lab for adhesion and delivered to the practice for the placement appointment (Fig. 18 and 19).

After screwing in the individualised abutment the enormous optic advantage can already be seen: the peri-implant tissue cannot be distinguished from the natural neighbouring teeth (Fig. 20). In this way the implant crown has it easy because when the red aesthetic fits it then just lies in the hands of the ceramist (Fig. 21).

### 3. Case – implant crown in region 13 and veneers from 14 to 24

The last case was solved together with Dr. Sven Egger (Basel/Switzerland). The almost 1.80 m tall patient was very unhappy with the gaps between her teeth. Tooth 13 of the permanent teeth had not come down so that here the remaining milk tooth was still present (Fig. 22 to 24). In comparison to her body size the childish teeth seemed very unsuitable.

The practitioner therefore decided to achieve an orthodontic diastema in correlation to the middle line (Fig. 25 to 27). The milk tooth 13 was removed after then end of the orthodontics, the extraction socket prepared for the im-

plant and immediately provided with an implant and provisional crown (Fig. 28 to 30). Since vestibular perforation was present in the root tip, the mucus membrane was opened apically and the site augmented with bone replacement material (Fig. 31). As a result the impression posts was screwed in (Fig. 32) and an impression taken of the situation. Directly after the impression the definitive abutment was shaped in zirconium oxide, a laboratory produced plastic temporary item was put on it, and both were fitted two weeks later (Fig. 33).

After twelve weeks healing time the front teeth were prepared for fitting the veneers. The cut model with held up silicon key of the wax up is represented in Figure 34. The implant in region 13 is

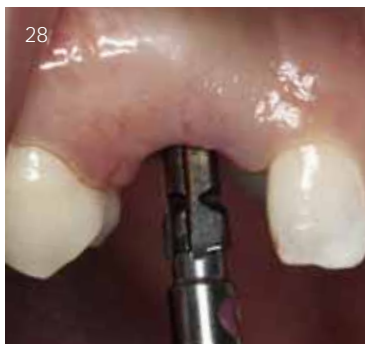
Fig 22 to 24  
These very gappy "child's teeth" just did not suit the very tall patient. Understandably she wanted an aesthetic correction.



Fig. 25 to 27  
Initially through orthodontics the ones and twos were medialised so that the front teeth including the canines could be veneered. In addition the gap was widened between 12 and 14 for the implant in region 13 (diastema in correlation to the middle line)



Fig. 28 to 30  
Since tooth 13 was still a milk tooth and could not be included in the treatment, it was extracted and the extraction socket immediately treated with an implant and provisional solution (immediate loading)



still only temporary. The abutment was modified in the same way as the previous case. The difficulty in this case was providing an upper front with one and the same ceramic mass in such a way that the wafer-thin veneers and the implant crown consisting of many components

create an aesthetic unit. This worked out very well for me with the excellent to handle Creation ZI-CT. I completed the veneers on the teeth 14, 12, 11 as well as 21 to 24 using the platinum leaf technique – in order to be independent from the CTE of the zirconium oxide veneer-

ing ceramic. For the implant crown I veneered a zirconium oxide framework with the same ceramic (here too with a circular ceramic shoulder). The result creates a harmonious optical unit and doesn't only give the patient a smile on their face (Fig. 35 to 41).





Fig. 31 and 32 In order to close the apical perforation bone replacement material was applied from vestibular and the wound closed.

Fig. 33 Two weeks after the impression the definitive abutment and a lab produced temporary item was fitted



Fig. 34 The saw cut model of the prepared upper front situation with held up matrix of the wax up. The veneers were produced using the platinum leaf technique.

### Conclusion

With the new leucite ceramic Creation ZI-CT (Crystal Type) the user has a zirconium oxide veneering ceramic at their disposal that allows results with an incredibly beautiful chroma and simultaneous natural brilliance. Essentially you could say that it's a "back to the roots" ceramic. The higher leucite content means that the ceramic behaves in a similar way to the approved Creation Classic. For example, with this ceramic the difficult layer techniques can also be reproduced due to very opaque bleach colours. A "sinking" of the crowns as seen with previous veneer ceramics for zirconium oxide is a thing of the past with this ceramic. However the

Creation ZI-CT is also a real "Geller product". That means that when firing good temperature control is offered otherwise you counteract the phenomenal properties. You should therefore work with the

material a little before, calibrate your oven and prepare firing samples. If you stick to this you'll be able to have a lot of enjoyment from zirconium oxide veneering ceramic. ■

### Product list

Product	Name	Manufacturer/distributor
Abutment - Case 2	Straumann Anatomic IPS e.max Abutment	Straumann
- Case 3	Individual abutment made from zirconia	Nobel Biocare
Liner, fluorescent Press ceramic	FS-NT/ZI-CT	Creation Willi Geller/Amann Girrbach
Veneering ceramic	Creation P&P-Z	Creation Willi Geller/Amann Girrbach
Zirconium oxide framework	Creation ZI-CT ICE zirconium	Creation Willi Geller/Amann Girrbach Zirkonzahn



Fig. 35 to 38  
The implant structure in region 13 was modified as before as described in the second case. The veneers on 14, 12 and 11 as well as on 21 to 23 were layered exactly as the implant crown with Creation ZI-CT



Fig. 39 and 40  
The result convinces. The zirconium oxide veneering ceramic has a wonderful chroma. This means "sinking" of ceramic restorations is a thing of the past



Fig. 41  
The patient is now "complete". If you didn't know what she looked like before you wouldn't think she could look any different.



### Biographical details

Christian Berg – born in 1962 – is a master dental technician from Wuppertal with a large affinity for perfect ceramic veneering. Already as a junior technician he had an influence on the product management and the training and course at a large ceramic mass manufacturer. He has been running his own oral design laboratory in Switzerland for the past 10 years alongside his friend and associate Peter Hammer. Christian Berg is an experienced and valued course lecturer. The critical user is familiar with many systems and always aims to achieve perfection. This endeavour coupled with his pragmatic nature have already created one or two clever innovations.

### Contact address

Ztm. Christian Berg • Dental Art AG • Platanenweg 2 • 5070 Frick/Switzerland  
Fon +41 62 8715802 • [info@dentalart-frick.ch](mailto:info@dentalart-frick.ch) [www.dentalart-frick.ch](http://www.dentalart-frick.ch)

