Making a perfect ceramic crown on a titanium abutment in the esthetic zone

Overcoming a challenging situation step by step

By MDT Patrick Rutten, Belgium

For reasons of strength, a titanium abutment may be required in the esthetic zone. However, making the dark metal to achieve a natural-looking outcome will present a challenge. A ceramic crown with a zirconia coping should be used to mask the metal abutment. A layering protocol is used to create natural light and color and avoid a grayish-looking gingival tissue in the cervical area. In the following clinical report, MDT Patrick Rutten (Tessenderlo, Belgium) presents how to handle such a challenging situation and obtain predictable white and pink esthetics.

Clinical situation

More than 40 years after a sports injury, extensive caries was detected radiographically under a post crown on a maxillary right central incisor (Fig. 1 and 2). The tooth was determined to be nonrestorable and was extracted. After a healing period of eight weeks, an implant was placed (Fig. 3) together with a graft of allogenic bone augmentation and soft tissue regeneration with a free connective tissue graft harvested from the palate. A healing abutment was screwed onto the implant and a removable provisional denture provided. For strength reasons, a custom CAD/CAM-fabricated titanium abutment was chosen (Fig. 4). “I do not prefer using titanium in the front if possible, but in this case, function is more important than esthetics,” Rutten explains.

The challenge was now to veneer a zirconia coping with the fine structure of feldspar ceramic VITA VM 9 to reproduce the natural appearance of the adjacent teeth and to support and sculpt the soft tissue for optimal gingival management. “Working with a titanium abutment is very difficult. The gingiva can look grayish. We have to mask the grayish cervical part,” Rutten warns. Precise shade determination was the first essential for success.

To guarantee a perfect shade match, the VITA Linearguide 3D-MASTER was used (Fig. 5) to cover the whole three-dimensional tooth shade spectrum and to allow shade determination in three defined steps. In the first step, the shade value was verified, followed systematically by chroma and hue. The basic shade of the adjacent teeth was measured digitally with the VITA Easyshade V spectrophotometer independently of one another, the expert and the digital device both determined the tooth shade to be 3M2. For Rutten to achieve a shade match between the natural teeth and the restorations, the correct basic shade is highly important.

Layering procedure

The zirconia coping was virtually designed, milled, sintered, and fitted. An initial wash firing with VITA VM 9 EFFECT LINER was a crucial step in adding a fluorescent layer to the non-fluorescent zirconia coping. The liner also provided reliable bonding to the framework. The firing temperature should be 50 degrees higher than that of normal dentine firing.

VITA VM 9 BASE DENTINE 3M3 with a higher chroma was used in the cervical area to mask the critical area and to mask the lifeless and grayish appearance of the titanium abutment. Yellow EFFECT CHROMA 4 (EC4) was then applied with a deeper orange in the interdental areas with a mixture of EFFECT CHROMA 5 (golden rod) and 6 (sunflower) to enhance the masking effect. For the incisal third area, a higher value was selected with EFFECT CHROMA 5 (sunflower) to mask the dark metal to achieve a natural-looking outcome. For Rutten to achieve a shade match between the natural teeth and the restorations, the correct basic shade is highly important.

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EFF ECT ENAME L 9 (EE9) were layered to create a blush accentuation and replicate natural esthetics. In addi-
tion, VITA INTERNO 2 (sand) and 4 (orange) were added to replicate the characteristics found in the
contralateral tooth. VITA INTERNO ceramics played an important role in increasing fluorescence and natu-
ral warm color effects with internal characterization. These character-
izations should always be arranged irregularly for a natural appearance.

To achieve a contrast, BASE DENTINE was layered onto the palatal side of the
incisal edge. During contouring the ceramic moisture must remain
creamy and stable to achieve an ef-
ficient and successful layering proce-
dure. This layer was increased slightly to allow for intraoral adjustment. An
implant crown should be adjusted so
that functional loading is minimized.

**Fig. 7:** Shade assessment after first dentine firing. **Fig. 8:** Final layering and contouring. **Fig. 9:** Clinical evaluation.

**Fig. 10:** Evaluation before glaze firing. **Fig. 11 and 12:** Cemented maxillary right central incisor crown
intraorally and periapical radiograph. **Fig. 13:** Natural and esthetic smile.
Celtra® Press – All Ceramic Power

By Dentsply Sirona

Life’s getting easier! In today’s dental laboratory, selecting the right material has become a complex issue. Dental technicians are continually confronted with new materials whose development often paves the way for more advanced forms of dental rehabilitations. Celtra® Press Zirconia-Reinforced Lithium Silicate is a new material on the market that makes life for dental technicians easier. Its excellent optical properties open up new and better options in the area of high-strength glass ceramic restorations. Master dental technician Hans-Jürgen Joit discusses the ideal optical properties required from a material and illustrates how Celtra® Press meets the high aesthetic demands from both dentists and technicians today.

Conclusion

The material properties of Celtra® Press allow the dental technician to concentrate more on the morphological. The opalescent effect looks just great in the mouth, and the crown becomes simply – a tooth.

For more information please contact your local Dentsply Sirona representative.

www.dentsplysirona.com

Fig. 1: This image shows two rows of samples of polished opals for use in jewellery. The top row has been photographed with a flash from above; the opals appear as radiant blue in the incident light. The lower row has been photographed with a flash from below; the samples appear to be made of a completely different material. This interaction is a basic prerequisite for the optical introral acceptability of a dental material.

Fig. 2: Ultimately, our goal as dental technicians is to produce copies of natural teeth with exactly the same characteristics. One of the main aspects of the optical effect is the opalescence of the material. With Celtra® Press, in transillumination the teeth appear more orange, while in direct incident light they appear bluish.

Fig. 3: This image shows six Celtra® Press veneers, about 0.6 to 0.8mm thick, placed on the window sill in the laboratory and transilluminated by sunlight. The special microstructure, with its particularly fine crystalline structure and high glass-content, provides the material with outstanding light-optical properties. Thanks to this combination of high translucency and opalescence Celtra® Press exhibits an amazingly natural chameleon effect to surrounding teeth in the mouth. Restorations fabricated with it blend into the natural dentition extremely well and assure users maximum aesthetics for mimicking natural teeth.

Fig. 4: The same jewellery opaque as previously photographed in transillumination and in incident light, now in cross polarised light. An orange-blue flicker and a lively, playfully changing colour can be seen.

Fig. 5: Shows previously transilluminated Celtra® Press veneers in polarised light. Celtra® Press possesses the same characteristics as the polished opals, meaning it has an optimal balance of translucency and natural opalescence resulting in a game-changing chameleon effect (in vivo blending) that makes the restoration indistinguishable from the natural tooth.

Fig. 6: This image shows an extracted natural tooth with a Celtra® Press MT coping in A2. The coping was merely fitted on the tooth and manually polished. Note the conspicuous transition from the unprepared root to the Celtra® Press crown. The crown practically becomes a part of the tooth.

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