By MDT Patrick Rutten, Belgium

For reasons of strength, a titanium abutment may be required in the esthetic zone. However, masking 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 greyish-looking gingival tissue in the cervical area. In the following clinical report, MDT Patrick Rutten (Tissendonk, 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 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 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 greyish. We have to mask the greyish 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 translucent 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 this critical area and to mask the lifeless and greyish 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 6 (sunflower) to enhance the appearance of the titanium abutment.

To create the ridges, the bluish area, a higher value was selected with EFFECT CHROMA 5 (golden rod). For Rutten to achieve a shade match between the natural teeth and the restorations, the correct basic shade is highly important.

Fig. 1 and 2: Initial situation, clinically and radiographically, before extraction of right maxillary central incisor.
Fig. 3: Radiograph after implant placement.
Fig. 4: Titanium abutment screwed onto implant.
Fig. 5: Determination of basic shade with VITA Linearguide 3D-MASTER.
Fig. 6a: MDT Patrick Rutten at work.
Fig. 6b: Layering dentine core.
Fig. 6c: Creation of mamelons.
Fig. 6d: Layering of enamel.
Fig. 6e: Characterization with INTERNO.
Fig. 6f: Result after first dentine firing.
VITA VM 9 ENAMEL LIGHT and EFFECT ENAMEL 9 (EE9) were layered to create a blush accentuation and replicate natural esthetics. In addition, VITA INTERNO 2 (sand) and 4 (orange) were added to replicate the characteristics found in the intraradicular tooth. VITA INTERNO ceramics played an important role in increasing fluorescence and natural warm color effects with internal characterization. These characterizations 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 mixture must remain creamy and stable to achieve an efficient and successful layering procedure. This layer was increased slightly to allow for intraoral adjustment. An implant crown should be adjusted so that functional loading is minimized. Perform the fine-structure feldspathic ceramic layering, to accomplish pink esthetics. The crown supported the gingival architecture, the shape of the gingival papilla was contoured and polished with a rubber wheel to create a smooth and compatible environment for the surrounding soft tissue. A vertical crack line was accomplished with a fine tungsten carbide bur. As Rutten says: “You can place your cracks two or three millimeters away from the position on the corresponding neighboring tooth. We need an irregular crack line.” Final characterization was achieved with VITA AKZENT Plus EFFECT STAINS and then fired. “I try to create something soft without overdoing it,” says Rutten in describing this final step.

Using too much translucent enamel will always reduce value and chroma. Never be added since the addition will never be added since the addition will always reduce value and chroma. If the crown contour needs to be increased, translucent porcelain should never be added since the addition will always reduce value and chroma. Using too much translucent enamel is a common mistake, which will automatically lead to a greyish-looking tooth. BASE DENTINE should be used again to correct the deficient contour (Fig. 7 and 8). If the value has to be changed, the technician should go back two steps and correct the basic value. The basic value is the most important thing for me. You should play around with it,” is Rutten’s strategy. The palatal side was layered with EFFECT CHROMA 4 (lemon drop) and BASE DENTINE to mask the transition between coping and layering in these areas. This is Rutten’s general advice for finding the correct ceramic shade combination. “Getting the right mixture will sometimes take more time than the layering itself. Don’t start mixing thousands of powders.”

Finishing the restoration
Maintaining adequate healthy pink-colored gingiva is challenging for the dentist, especially around implant restorations. To accomplish optimal gingival architecture, the shape of the neighboring lateral incisor was replicated and the gingival papilla supported to avoid creating black triangles. The distal and mesial marginal ridges were created with a fine diamond instrument to produce a fluent curvature toward the apex. After the fine-structure feldspathic ceramic was fired, the subgingival areas were contoured and polished with a rubber wheel to create a smooth and compatible environment for the surrounding soft tissue. The chipped adjacent tooth was matched in the restoration, although in a different location for a more natural outcome. A vertical crack line was accomplished with a fine tungsten carbide bur. As Rutten says: “You can place your cracks two or three millimeters away from the position on the corresponding neighboring tooth. We need an irregular crack line.” Final characterization was achieved with VITA AKZENT Plus EFFECT STAINS and then fired. “I try to create something soft without overdoing it,” says Rutten in describing this final step.

"Make the best, but keep it simple!" The goal should be to keep the technique straightforward and to know when a restoration is finished so that time is not wasted and economic goals are met. Consequently, every veneering procedure should be consistently ended at some point. The crown was clinically evaluated before the final glaze firing (Fig. 9 - 14). After evaluating the esthetics, function and occlusion, the restoration was finalized in the dental laboratory and definitively cemented (Fig. 11 - 14). The restoration looked exceptionally natural and integrated harmoniously in the esthetic zone. Texture and ceramic layering created a highly esthetic combination of contour and color. The crowns supported the gingival architecture and were thereby able to accomplish pink esthetics. The patient was delighted with his new restoration and appreciated the outcome. Thanks to know-how, technical skills, interdisciplinary teamwork, and outstanding ceramics, a challenging clinical case was solved in a highly esthetic manner.

Source
This case has been previously published in dental dialogue 5/16, teamwork media GmbH, Germany.

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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 continuously 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 aspects of the dental structure of the material. With Celtra® Press, in transillumination the teeth appear more orange, while in direct incident light they appear bluish.

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14th CAD/CAM & Digital Dentistry Conference & Exhibition