Improving Patient Care Through Cutting-Edge Science and Technology

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Introduction

The introduction of cutting-edge biologic and biomaterial advances into clinical products has allowed us to provide patients with treatment options not previously available and with stronger, more biocompatible and faster integration of dental implants.

Increased implant strength achieved through the incorporation of a titanium-zirconium alloy (Ti-Zr), as seen in the Straumann Roxolid dental implant, provides greater confidence and prosthetic flexibility, especially when faced with limited ridge width or patients who are not ideal candidates for grafting procedures. This high-tensile-strength alloy allows for placement of smaller-diameter implants without compromising full prosthetic options such as CAD/CAM zirconium abutments and overdenture attachments. Clinically, this can be appreciated posteriorly with full contour restorations in sites of limited buccal-lingual dimension that would previously not have been treatable without extensive grafting procedures. Anteriorly, it allows for ideal esthetic results – especially in the high smile line, thin-tissue-type scalloped architecture patient such as in the clinical situation shown in Figure 1. In this case, orthodontic treatment was first provided to correct the severe root convergence of adjacent teeth. Then, a CAD/CAM zirconia abutment was incorporated with a 3.3 mm-diameter implant (Straumann Bone Level NC). The increased implant strength provides greater security by allowing for increased abutment thickness at the implant-abutment connection level and uncompromised esthetics.

The temporary abutment and provisional restoration provided for "provisional guided tissue conditioning."

Greater implant stability is achieved more quickly by incorporating a hydrophilic, chemically active surface to the microroughened titanium-zirconium alloy implant. This has the potential to reduce postoperative risks during healing. Combining this with SLA-active surface technology for faster osseointegration not only shortens healing and treatment time but also improves predictability through risk reduction in critical healing periods (Fig. 2). The platform shift design provides a biologic advantage with the maintenance of crestal bone levels and blood supply to the peri-implant tissues, to ensure long-term soft-tissue stability (Fig. 3).

In terms of surgical and prosthetic simplicity, these biologic and material changes have been incorporated into an

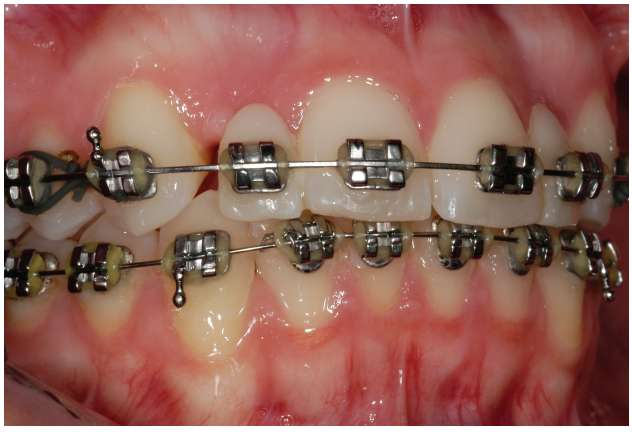

Figure 1. Healthy 18-year-old female with congenitally missing lateral incisor and limited space

Figure 2. Six weeks after implant placement

existing implant line so as not to require additional instrumentation, prosthetic components or laboratory procedures. This simplifies the surgical, restorative and laboratory routine for increased precision, productivity and profitability and allows more patients access to treatment.

Improvements in CAD/CAM technology have allowed greater flexibility in design, higher abutment strength, biocompatibility and improved esthetics (Fig. 4). When compared with stock abutments, CAD/CAM abutments allow for ideal margin placement for cementation, angulation correction and greater support to the restoration with the highest precision of fit (Fig. 5). When compared with a custom-cast gold abutment (UCLA), we see improvements in fit, biocompatibility and strength (lack of porosity from casting procedures) and significantly reduced cost. These factors leave no reason not to embrace this technology. The introduction of CAD/CAM zirconia abutments now provides not only the benefits of design, biocompatibility, strength and fit but also uncompromised esthetics (Fig. 6).

Placing these developments into clinical practice has simplified fixed prosthetic procedures such as the high-esthetic anterior restoration or the low-bone-volume posterior site, as well as removable procedures. Fully edentulous patients not previously able to have conventional implants placed due to inadequate bone, medical contraindications to grafting, or finances now have more conservative options. The ability to place 2 small-diameter implants with full prosthetic flexibility and long-term confidence for a mandibular overdenture is now a reality for more patients.

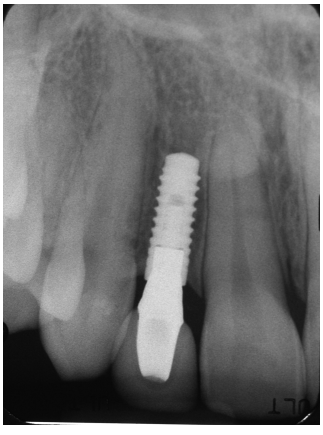

Figure 3. 26-month-postoperative radiograph with stable bone levels and a stable implant/abutment connection

In terms of clinical practice and patient benefits, the blending of scientific research and technology into dental implants provides decreased treatment time and cost as well as fewer and less aggressive surgical procedures. These benefits, along with improved bone and soft-tissue maintenance (Fig. 6) and expanded prosthetic options, provide greater patient access to implant treatment and increased treatment acceptance.

Figure 4. CAD/CAM zirconia abutment for bone-level narrow-diameter implant (3.3 mm Roxolid implant)

Figure 5. Abutment and lithium disilicate crown (e.max) on bone-level analog (Narrow CrossFit analog)

Figure 6. Final implant-supported e.max crown cemented on CARES CAD/CAM zirconia abutment (Straumann Roxolid bone level 3.3 mm narrow-diameter implant)