

Ceramic Artistry Returns to Fixed Hybrids

Patient History and Expectations

A longtime patient maintained her maxillary teeth as long as she could, but we knew she had some teeth that were non-restorable and she was facing some decisions (**Fig. 1a**). Her maxillary fixed bridge was fractured and had been re-cemented numerous times. The patient did not want a removeable prosthesis. In addition, her extreme gag reflex took other options, such as anything with a palate, off the table. She eventually chose to do a fixed full arch implant supported prosthesis and was adamant that she did not want denture type esthetics. Our diagnostic workup, including digital smile design, led to the fabrication of the provisional prosthesis. Six Dentsply Ankylos implants were placed. Straight and 15-degree Dentsply SmartFix restorative abutments were placed as the restorative platform (**Fig. 1b**).

Figure 1a
Pre-op

Figure 1b
Smartfix abutment level
restorative platform

They were immediately loaded with a chairside converted provisional same day of surgery. The patient healed for three months before we began our process of fabricating the final prosthesis.

Because of its strength and esthetics, a cobalt chrome frame with layered ceramics was our prosthetic choice. In conjunction with the fabrication of the final prosthesis, we worked with our lab to get a

more idealized lower plane of occlusion. This involved replacing a lower bridge and completing the porcelain work simultaneously to the fabrication of the maxillary arch once the wax try-in was approved. The patient was thrilled with the final result (**Fig. 2a**). The leveled occlusal plane, improved function and esthetics, and the peace of mind with a fixed restoration all created a very nice result for this wonderful lady (**Fig. 2b**).



Introduction

For too long, restorative teams have been struggling with limited screw-retained options. This was especially true in the maxillary anterior zone where screw access posed a true esthetic challenge. These solutions, even though very functional and retrievable, soon fell out of favor because of these issues. In the early 2000's, with the introduction of CAD abutment software, supported by milling facilities like Atlantis, we noticed a dramatic decline in the number of screw-retained restorations. Just as CAD abutments became an efficient way to restore, research regarding peri-implantitis started appearing. This research identified cement as the main culprit and it was subsequently identified as the biggest reason most implants failed. This, once again, caused a demand to find a more efficient screw-retained solution.

Amidst all of this, a new protocol, "all on four" was launched by Nobel Biocare. This concept revolutionized restoring the edentulous arch. Initially questioned by many clinicians, the placement of these implants in a tri-pod configuration has proven to be an extremely efficient way to restore edentulous patients.

Although surgically and technically a sound protocol, final prosthetic solutions fabricated with wrapped acrylic over a milled titanium sub-structure shows early wear, discoloration and subsequent acrylic failure. Even though touted as "easily" repairable, these failures still cause patients to question the integrity of this solution as a sound long-term option.

The introduction of zirconia materials for hybrid substructures allowed for a stronger monolithic solution. Unfortunately, the application of this material is often limited by the lack of occlusal clearance. Furthermore, concerns over post-delivery sub-structure failures and monochromatic high value esthetics have many clinicians questioning the application of this in certain patients.

In today's competitive laboratory marketplace, it is vital to have a comprehensive range of predictable restorative options. ATLANTIS suprastructures in CoCr (Fig. 3a) offer the restorative team a strong and esthetic prosthesis combined with a predictable technical process. It is also a valuable resource in cases with reduced vertical clearance or bruxism where acrylic or zirconia sub-structures would not hold up to the occlusal forces.

Most edentulous patients are restored at abutment level while partial bridges are more often restored at implant level. In many cases screw access



Figure 2a
Final ceramic layered
CoCr suprastructure

Figure 2b
Facial Profile

Figure 3a
ATLANTIS CoCr
suprastructure

Figure 3b
ASA Technology

remains a challenge and having control over this access position offers a distinct functional as well as esthetic advantage.

ATLANTIS suprastructures offers a solution to control this access. Angulated Screw Access (ASA) (Fig. 3b) can be requested when milling a



Figure 4A
ASA CoCr bridge for partial application

Figure 4B
PFM ceramics layered over CoCr for partial application

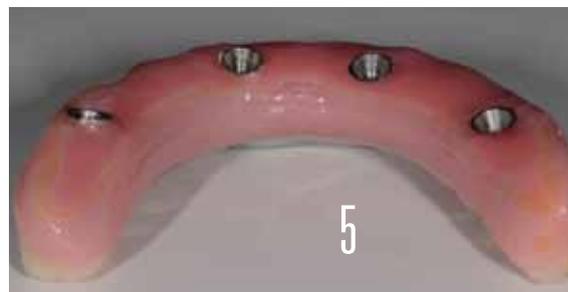
Figure 5
Convex temporary fitting surface

Figure 6
Diagnostic wax tooth try-in

suprastructure and allows for exact screw access placement. ASA can correct screw-access up to 30 degrees without the use of correction abutments. This technology allows us to predictably fabricate ceramic layered one-piece screw retained CoCr bridges ranging from three units to full arch (Figs. 4a-b).

RESTORATIVE WORKFLOW

In most cases, the patient will return from the surgeon with either an immediate tissue-borne or surgically converted implant-retained prosthesis used during the healing phase. Care is taken to create a completely convex fitting surface in the temporary as well as final prosthetic phases (Fig. 5).



THE FIRST APPOINTMENT

is an impression appointment.

A supporting bridge is built between the impression copings to tie them together. This helps to stabilize the impression copings inside the PVS material and facilitate a more accurate impression. Multiple techniques prove to be effective i.e. Floss with Duralay, Triad Dualine (DENTSPLY) etc.

Lab Rx:

- Implant supported wax rim for bite registration
- Model verification jig

THE SECOND APPOINTMENT

is a model verification and bite registration appointment.

Place the model verification on the abutments in the mouth to verify model/impression accuracy.

The bite-rim is used to register a bite using traditional protocols for removable dentures.

Shade expectations as well as tooth mold and size are discussed with the patient.

Lab Rx:

- Tooth set up for traditional wax try-in
- This tooth set-up must be performed on the actual implant model

The tooth try-in is stabilized by engaging one or more implants. To ensure a predictable final delivery it is important to create a wax try-in that mimics the final prosthesis.

THE THIRD APPOINTMENT

is a tooth try-in and patient expectation appointment. At this appointment, it is our goal to establish, manage and satisfy all realistic patient expectations (Fig. 6). Any adjustments to the bite, incisal edge position, tooth shape etc. will warrant a second wax tooth try-in before proceeding to fabrication of the suprastructure.



To ensure long-term success, precisely positioned support structures are crucial (Fig. 7a). The CoCr ATLANTIS suprastructure is designed based on the patient approved tooth positions and cannot be changed after suprastructure fabrication (Figs. 7b – 7c).

If any adjustments are needed, the patient should be scheduled for a second tooth try-in. The final prosthesis will copy the approved tooth try-in exactly (Fig. 8).

Lab Rx:

- Final shade selection, if any
- Request final processing of suprastructure with frame try-in
- Request final delivery if no frame try-in is required

*Because the model is verified and the suprastructure is milled (in lieu of casted) a metal try-in is optional

Lab Procedure:

The laboratory will ship the tooth try-in and implant soft tissue model to Atlantis for suprastructure processing. ASA is requested to position the screw access (Fig. 9).

Dental CoCr used by most manufacturers fall well within the acceptable CTE range of 14.0 to 14.9 $\mu\text{m}/\text{m.K}$. This allows for very predictable application of most dental ceramics. Absolute Dental Lab has processed hundreds of CoCr cases. Our lead ceramist processes most of these large hybrids; he and other Absolute technicians are very comfortable to process ceramics over CoCr. Achieving spectacular results has become predictable if not expected.

VARIATIONS

- Metal occlusal can be used in reduced vertical application. This allows for fabrication in cases with only 3mm from tissue to opposing dentition (Fig. 10).



Figure 7a
Precise metal support

Figure 7b
ATLANTIS suprastructures design file for support

Figure 7c
Approved file for milling

Figure 8
Final mimics approved try-in exactly

Figure 9
Screw access positioned using ASA technology

Figure 10
Metal occlusal and lingual for strength and reduced vertical

- Pink tissue can be applied and customized for every patient (Fig. 11).
- Effective treatment protocol for partially edentulous patients. 510K approved for a minimum of 3-units splinted (Figs. 4a-b).

THE FOURTH APPOINTMENT

is a final delivery appointment (Figs. 12a-c) **JDT**



Figure 11

Pink tissue is customized to satisfy the most discerning patient

Figure 12a

Pre-op smile

Figure 12b

Final ceramics - Post-op smile

Figure 12c

Final ceramics - Lateral view



About the Author

Conrad J. Rensburg, ND, NHD, graduated under full scholarship with a 4-year Baccalaureate degree from Pretoria Tech in 1992. He is certified with an ND in technology and NHD in fixed prosthetics. He is the president and co-owner of Absolute Dental Services headquartered in the Research Triangle of North Carolina. He is a member of the prestigious PEERS group and is certified by the SADTC. He has specialized in fixed dental prosthetics with an emphasis on dental implants since the 90's. As a CE-accredited speaker since 2002, he has lectured at more than 700 events across the USA, including the Academy of Osseointegration, Global and US symposiums and World Summit Tour. His lectures and published articles focus on CAD implant design protocols and fixed as well as removable hybrid implant supported techniques.



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