

# 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.

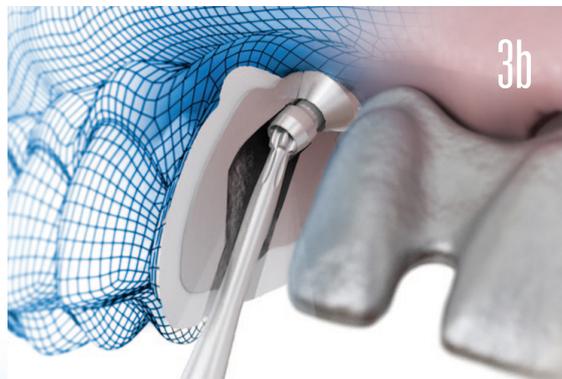
Amidst all of this, a new protocol, "all on four" was launched by Nobel Biocare. This concept revolutionized restoring the edentulous arch. Initially questioned by many clinicians, the placement of these implants in a tri-pod configuration has proven to be an extremely efficient way to restore edentulous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

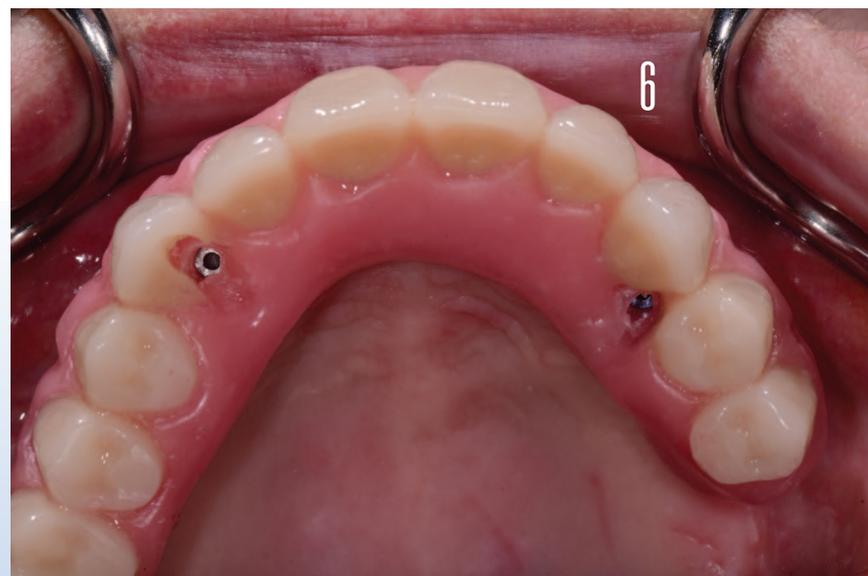
**Figure 5**  
Convex temporary fitting surface

**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

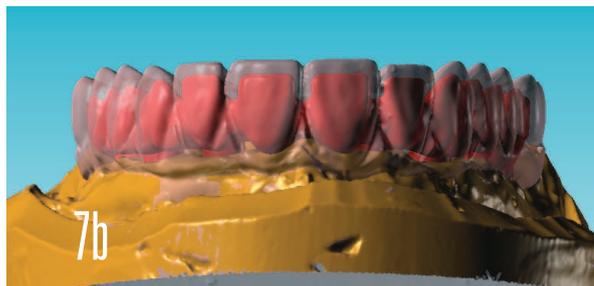
#### Lab Procedure:

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 12a**

Pre-op smile

**Figure 12b**

Final ceramics - Post-op smile

**Figure 12c**

Final ceramics - Lateral view



**Figure 11**

Pink tissue is customized to satisfy the most discerning patient

## 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.



QUIZ

Receive .5 point documented scientific credit for passing a quiz about this article. To get the quiz go to [www.nadl.org/jdt](http://www.nadl.org/jdt). You can enter your answers to this quiz (course code #35936) at [www.nadl.org/members/JDT/quizzes/index.cfm](http://www.nadl.org/members/JDT/quizzes/index.cfm) or fax the completed quiz to (850) 222-0053. This quiz is provided to test the technician's comprehension of the article's content and does not necessarily serve as an endorsement of the content by NADL or NBC.



*The author would like to acknowledge the contributions of:*



**Yunsoo Kim, CDT**  
**– Absolute Master Ceramist**

Mr. Kim graduated with a degree in dental technology and started his career as dental ceramist in Busan, South Korea under the close mentorship of Master Park. He relocated to the U.S. in 2011 and subsequently became Master Ceramist at Absolute Dental in the Triangle area of North Carolina. His work has been featured in multiple national publications and shown on stage at some of the most prestigious meetings across the U.S.



**David Hedgecoe, DDS**  
**– Restorative Dentist**

Dr. David Hedgecoe graduated from Wake Forest University and The University of North Carolina School of Dentistry. He completed a General Practice Residency at Palmetto Richland Memorial Hospital in Columbia, S.C. He practices with his father, Dr. Joel Hedgecoe, and Dr. Chessica Logue in Fayetteville, N.C. He is a Fellow in both the Academy of General Dentistry and the International College of Dentists.



**Gary Jones, DMD**  
**– Oral Surgeon**

Dr. Jones completed his doctorate at the University of Pittsburgh School of Dental Medicine and residency at the Medical College of Virginia. He served as a staff surgeon at Womack Army Medical Center. He is in private practice in North Carolina with a primary focus of dental implant placement

and reconstructive surgery. He also enjoys lecturing and is the founder and director of the Fayetteville Implant Dentistry Study Club and the Central Carolina Dental Continuum, a Seattle Study Club. He is an adjunct professor at VCU/MCV.

**References**

1. Peri-implant disease: what we know and what we need to know. Nicola Alberto Valente, 1 Sebastiano Andreana2 J Periodontal Implant Sci.2016 Jun; 46(3): 136–151.
2. Prosthodontic Perspective to All-On-4® Concept for Dental Implants M Taruna, 1 B Chittaranjan,2 N Sudheer,3 Suchita Tella,4 and Md. Abusaad5J Clin Diagn Res. 2014 Oct; 8(10): ZE16–ZE19. Published online 2014 Oct 20. doi: 10.7860/JCDR/2014/9648.5020
3. Prevalence of complications after the oral rehabilitation with implant-supported hybrid prostheses. Júlia Real-Osuna, 1 Nieves Almendros-Marqués,2 and Cosme Gay-Escoda3Med Oral Patol Oral Cir Bucal. 2012 Jan; 17(1): e116–e121. Published online 2011 Jul 15. doi:
4. The zirconia ceramic: strengths and weaknesses. Daou EE. Open Dent J. 2014 Apr 18;8:33-42. doi: 10.2174/1874210601408010033. eCollection 2014.
5. Zirconium dioxide based dental restorations. Studies on clinical performance and fracture behavior. Larsson C. Swed Dent J Suppl. 2011;(213):9-84.
6. The Effect of two Shading Techniques on Value of Zirconia-Based Crowns Ahmad Hassan Ahangari,1 Kianoosh Torabi Ardakani,1 Farideh Mahdavi,2 and Mahshid Torabi Ardakani J Dent (Shiraz). 2015 Jun; 16(2): 129–133.
7. The State of the Dental Lab Industry Norm Weinstock, ZAHN Dental Report, May 8th, 2015
8. Dental implant suprastructures using cobalt-chromium alloy compared with gold alloy framework veneered with ceramic or acrylic resin: a retrospective cohort study up to 18 years. Teigen K1, Jokstad A. Clin Oral Implants Res. 2012 Jul;23(7):853-60. doi: 10.1111/j.1600-0501.2011.02211.x. Epub 2011 Jun 21

ACCESS ISSUES OF THE

**JDT Digital Edition**

AT

**www.nadl.org/jdt**

