

## ***From Our Office to Yours...***

*Custom milled final implant abutments are becoming increasingly popular because they offer a better contour which more closely resembles the actual shape of root to tooth thereby resulting in improved functional and esthetic benefits.*

*Custom milled abutments are also easier to place, thus reducing chair time and making treatment more convenient for the patient.*

*In this current issue of **The PerioDontaLetter**, we review the advantages of the patient-specific, custom milled implant abutment over conventional abutments.*

*As always, we invite your comments and suggestions.*

## **The Advantages of Custom Milled Implant Abutments**

**S**electing and fitting the restorative abutment is one of the most important and challenging steps in implant prosthodontics.

Choosing the appropriate abutment depends on the restorative objective, the position and angulation of the implant(s), the amount of interarch space, the soft tissue dimensions, and the esthetic demands of the case.

In the past, there have been two main types of abutments

available for restoring implants: stock or prefabricated abutments and custom cast abutments.

### **Stock Abutments**

Standard prefabricated titanium abutments are traditionally supplied by dental implant manufacturers to match their implants. Also known as “preparable” or “direct,” they are available in a variety of shapes and sizes.



**Figure 1.**  
*Examination revealed two congenitally-missing maxillary lateral incisors. (See Figures 2, 3, 4 and 5 on page 2)*



*Figure 2. A soft tissue model was fabricated and two custom zirconium abutments created to facilitate tooth alignment, desired cervical contours and gingival health.*



*Figure 3. The custom abutments were evaluated in the oral cavity.*



*Figures 4 and 5. The final restorations were placed with ideal contours and gingival health.*

Angulations may be adjusted or modified manually either at the laboratory or in the office to adapt the shape according to the position of the implant and the patient's individual anatomy.

Implant companies have improved the design of these types of abutments over the years to allow for better emergence contours, pre-scalloped margins, and in some cases provide pre-fit impression copings for more

accurate transfer of the abutment positions. These improved designs mean less preparation time in the lab, better overall abutment and crown contours, and increased lab and clinical efficiency which results in a better final result for the patient.

When there is an inadequate volume of metal for proper reduction in order to establish margin definition, anti-rotation, or emergence profile due to patient differences

in tissue height and width, stock abutments offer less flexibility.

The use of stock abutments requires very accurate implant placement in order to minimize preparation of the abutment. Angled abutments are available to cover small discrepancies in implant angulation (i.e. up to about 15 degrees). Severe angulation problems may result in overreduction of prefabricated abutments. This may cause loss

of resistance and retention properties.

## Custom Cast Abutments

Custom Cast Abutments (CCA) or UCLA abutments have long been workhorses in implant dentistry.

An accurate impression identifies the implant position in all three planes of space. The impression is transferred directly to the laboratory where the technician fabricates a stone or plaster model and places in it an implant analog.

This model and analog precisely replicates the clinical orientation and position of the implant as obtained directly from the patient's mouth.

A prefabricated plastic waxing sleeve is placed in the analog and is then sculpted by the technician in wax to establish proper internal

fit and adaptation to the implant platform.

The technician then refines the wax pattern to permit the development of optimal contours and emergence profile of the abutment as well as the future implant restoration.

This method permits the technician to correct for imperfect implant positions and angulation, as well as controlling the alignment of multiple implant abutments. It also assists the clinician to achieve parallelism, which

facilitates the seating and the "draw" of the implant-supported restoration.

The UCLA abutment is most frequently used to overcome gross misalignment or malposition of the implant by incorporating a screw system to overcome angulation problems.

CCA and UCLA abutments have been wonderful restorative alternatives that have enabled clinicians to deliver excellent results. However, a custom cast abutment can be labor intensive, costly, and

*Figure 6. Following integration, this implant was ready for impression and the fabrication of a custom abutment.*



*Figure 7 and 8. A custom abutment was designed to create an ideal emergence profile for the final restoration while minimizing the subgingival depth of the cemented crown margin.*

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may contain porosities and other inaccuracies in the casting. Its success is directly related to the skill of the laboratory technician.

Given these challenges, it is not surprising that dentists and laboratory technicians are looking at and using technology-driven methods for delivering a better abutment.

## Custom Milled Abutments

Custom or Computer Milled Abutments (CMAs) are the next evolution in abutment fabrication.

CMAs are produced after the implant has been placed. CAD-CAM abutment systems allow both the dentist and the laboratory to request a site specific abutment for the patient in collaboration with a design/manufacture team.

State-of-the-art software and milling machines utilize scan data from the patient's dental casts to fabricate a computer-generated abutment milled to precisely match the depth, angle, and orientation of the implant.

These "new era" abutments are available for almost all implant platforms with extreme precision.

As with other abutment techniques, an impression which captures the top of the implant (fixture level) is required to locate the spatial and rotational position of

the implant. Once a working cast is fabricated with a soft tissue model, a custom milled abutment can be fabricated.

These abutments are milled from a block of titanium, gold-plated titanium, or zirconium, making them extremely strong, compatible with a specific implant, and without the inaccuracies inherent in the lost wax method. Site specific instructions detailing key design features such as margin levels and emergence contours are provided by the dentist, along with an opposing cast and bite record.

Some CMA systems provide lab duplicate abutments and delayed abutments reflecting changes requested by the doctor. These systems permit lab work to proceed while the patient is wearing a provisional restoration.

In the case of delayed abutments, the dentist may request alterations of the abutment based on tissue changes prior to the fabrication of the final restoration. Any altered abutments are simply changed at the delivery visit.

Computer milled abutments have been shown to have significant advantages over stock and custom cast abutments. These advantages include:

- overall simplicity; reduction in the number of impressions
- accuracy of fabrication; ability to create duplicate abutments

- ability for accelerated treatment protocols
- superior fit of copings to the abutment
- significant reduction in chair time associated with the restoration phase
- less use and expense of precious metals
- more ideal prep forms as a result of working from a full contour virtual wax-up compared to prepared stock abutments
- and a decrease in cost, especially with multiple abutments.

Some CMA systems currently on the market include Encode (3i), Procera (Nobel Biocare), Atlantis (Astra) and Ekton (Straumann.)

Unbelievable changes have occurred in dentistry in the last 30 years. The next 30 years will bring possibilities limited only by our imaginations and computing power.

Digital dentistry will allow dentists and laboratories to work smarter and more efficiently to provide patients with exceptional restorations and service.



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