

PRINCIPLES OF ESTHETIC IMPLANT RESTORATIONS

Before we get into the specifics on using a digital scanner, it is important to review some basic principles of restoring implants in the most esthetic way possible.

Achieving a natural looking soft tissue around an implant so that it mimics a natural tooth can be a challenge. Having the basic minimum amount of bone and gingiva is foundational. Therefore, nearly all implants, particularly in the anterior, receive bone and soft tissue grafting as part of the surgical procedure in my practice. If surgical means will fall short, as they sometimes can when papilla have been deficient before any treatment commences, orthodontic extrusion may also be part of the picture. This may also mean endodontic treatment if the tooth needs to be extruded significantly, or splinting to adjacent teeth if the roots are short. We all know nothing generally gets better with time or age, so starting with the best tissue dimensions possible is key.

Once the foundation of tissues are present, the contours of the restoration itself are critical. The goal is to duplicate a CEJ, and the cross section of the root in the sub-gingival contours of the restoration as shown adjacent.



Screw Retained Temporary with CEJ

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ANALOG TO DIGITAL

Our world is constantly making technological improvements aimed at reducing the time involved in a particular task, and improving the accuracy of the outcomes. There have been many advances in dentistry with regard to the digital workflow, from the most basic sterilization unit to our most advanced radiography techniques such as cone beam computed tomography.

One of the more exciting developments has been digital impression taking, namely because of the stigma most patients associate with impression materials running down their throats. About one year ago I invested in a TRIOS digital scanner, below. Perhaps a bit premature for a periodontist to have one of these relative to the general dentist, I had come to the end of my patience with flippers and Essix appliances that just did not fit. Regardless of having mechanical impression material mixers, and a vacuum mixer for stone, and all the gadgets and instructions for taking good impressions and pouring models, things were generally wrong. Although it is not inexpensive, I have to say that I LOVE my TRIOS scanner and things just fit! There is a learning curve, but once you get the feel, it works very quickly and patients love the lack of 'goo' and the instant image on the screen.



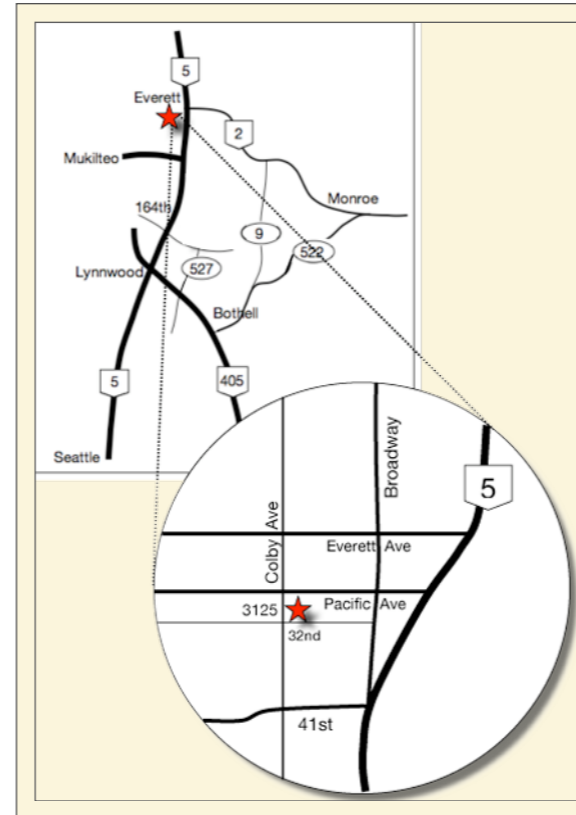
TRIOS by 3Shape

Beyond the Essix and flipper, we've been using the TRIOS to fabricate screw retained temporary implant crowns which shape tissues prior to final implant restorations.

This issue of ProbeTips will document an anterior implant case utilizing digital impression technology.

Pamela A Nicoara DDS MSD PLLC

PERIODONTOLOGY IMPLANTOLOGY ORAL MEDICINE



3125 Colby Avenue, Suite H
Everett WA 98201

T: 425-374-5380 F: 425-374-5382

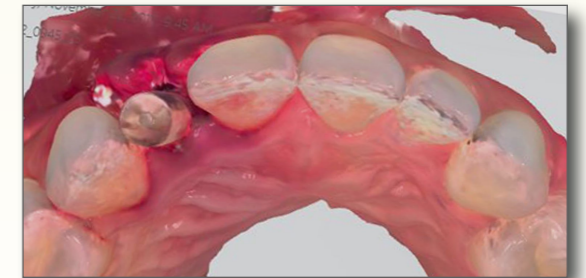
www.NICOARaperio.com
doctor@NICOARaperio.com

PROBE TIPS

A QUARTERLY PERIODONTAL
NEWSLETTER

BY PAMELA NICOARA DDS MSD

Digital Anterior Implants



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Digital Anterior Implants

GENERAL CONSIDERATIONS

One of the biggest differences when taking impressions of implants with a digital scanner is that a traditional impression coping is no longer useful. Impression copings in the digital world are called 'Scan Bodies'. There are various scan body sizes depending on the implant system used and the size of implant placed. They are designed to be easily read by the scanner. Some implant companies have their own scan bodies, while others rely on third parties to produce scan bodies for them as depicted below.



Elos Accurate Scan Body

In the workflow in this office, impressions of the implant for fabrication of a screw retained temporary implant crown occur at the time of implant uncovering, about 4 months after the implant is placed, to allow for osseointegration. This is because most upper anterior implants are placed at the time of tooth extraction, and the lack of bone in the socket space and proximity to nasal cavities or canine fossa prevents adequate implant stability to screw impression copings or scan bodies on and off without potentially displacing the implant position in some way.

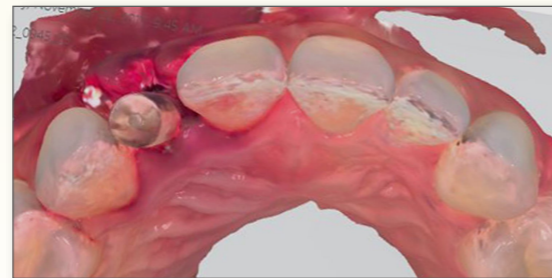
For the case adjacent, the tooth to be removed had a very short root, so the implant had very good bone stability and the impression could be taken on the day of implant placement.

TREATMENT PLANNING

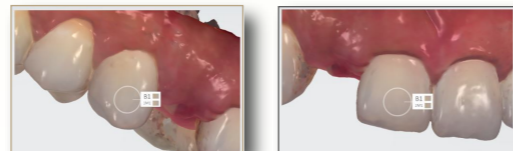
The case below shows a 37 year old female with a congenitally missing lateral incisor and a failing retained primary canine. Orthodontics was necessary to move the teeth posterior to #C as they had drifted forward.



Now the implant can be installed after extraction of #C, and the scan body can be placed without concern for possible change in implant position. The lab is instructed to fabricate an ideal crown and root form regardless of the soft tissue in the impression as the gingiva was flapped at the time of impression taking below. The software can also obtain shade matching.



TRIOS scan of Elos Scan Body with B1 shade match via the computer software

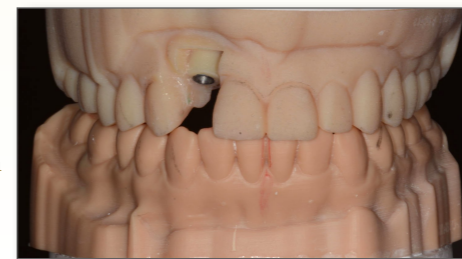


Here are images pre and post operatively, and at 2 weeks of healing.



LABORATORY WORK

In the meantime, the laboratory takes the digital scan that was electronically submitted and prints out a model from a 3D printer as shown below. The computer software at the laboratory can copy the shape of the contralateral tooth, mirror it, and fabricate a temporary out of PMMA. It is then cemented to the metal temporary cylinder which has been cut back and can be seen in the radiograph adjacent.



Printed Models

Below the temporary is placed and photographed on the day of seating, as well as 3 weeks postoperatively. You can see the bucco-lingual fullness in the tissues from an occlusal view, which will prevent shadows under the lip when smiling. You can also see tissues starting to shape around the temporary interproximally which will prevent food impaction making hygiene easier and significantly extend the life of the implant by preventing plaque induced inflammation or bone loss. Here, the temporary still has a grey cast despite opaquing the metal temporary cylinder.



Initial above, 3 weeks below

After an average of about 3 months total, the tissues are shaped enough to have the restorative dentist take final impressions. The underside of the temporary can be duplicated outside the mouth by the dentist for the laboratory with conventional impression material on an implant analog. In this way tissue contours can be maintained in the final restoration.