

## QUIZ

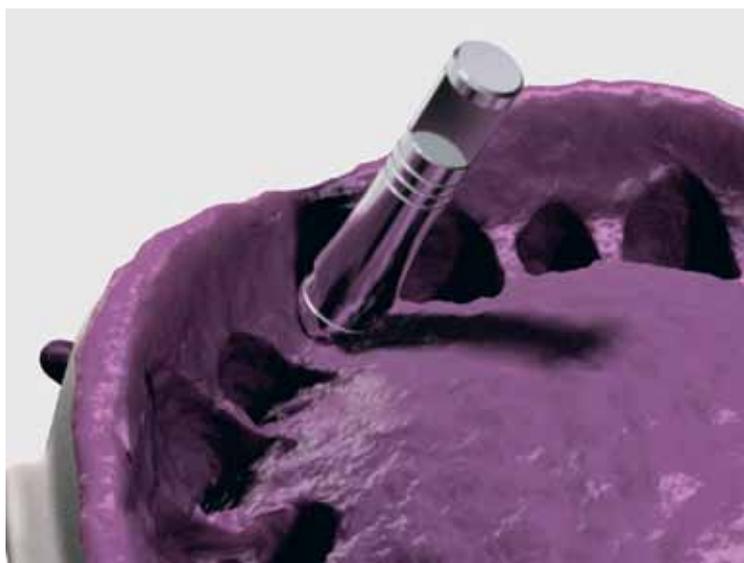
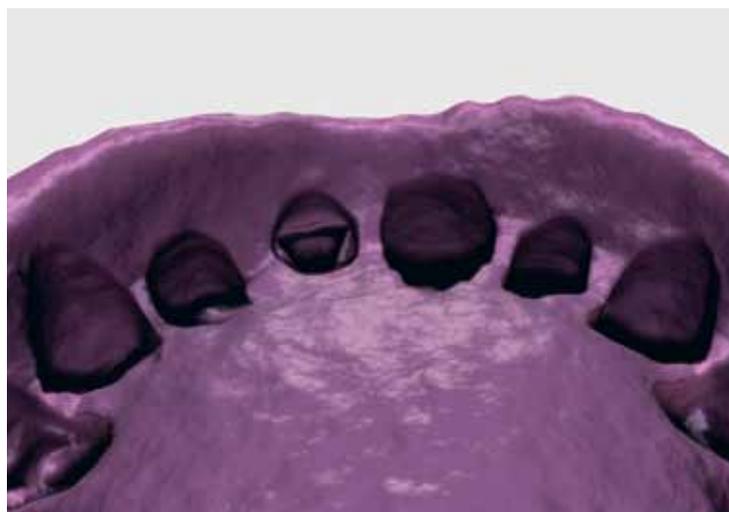
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# Implants in Your Laboratory

## Part 2

### The Impression Technique

*By Leon Hermanides*



**Figure 1.**

The closed tray impression system showing the transfer coping, the impression after removal from the patient's mouth and the coping and abutment replica assembly replaced in the impression. (Images courtesy of Astra-Tech.)

**A**fter the implants are placed, an osseointegration (healing) period follows during which the implant and surrounding hard and soft tissues mature. By this time, as discussed in the first part of this article series published in the August/September 2009 issue of JDT, the predictors for complete esthetic integration are:

1. The anatomical limitations of the patient.
2. The position of the implant.

If the implant is shallow or facially positioned, the ability of any technician to create excellent esthetic integration is severely restricted regardless of abutment material or design and restoration material or design.

After the healing has occurred and the surgeon is confident the implant is ready for restoration, it is time to make an impression and begin the restorative phases of treatment. As with any indirect restorative procedure, the first step is to create an accurate model to reproduce the patient's dentition.

## Impression Techniques

The first phase in the final restorative sequence of implant therapy is the impression and relating key information from the patient to the master cast. It is vital to accurately transfer the following to the master cast:

- The implant placement in relation to the proximal teeth and ridge.
- The rotation of the implant.
- The profile of the soft tissue from the head of the implant fixture to the gingival margin.

There are two main impression techniques for a fixture level (implant platform) impression: the closed tray and open tray techniques. Most, if not all, the companies commercially producing restorative dental implant systems provide at least two different types of implant impression copings. These allow the dentist the ability to capture the relationship of the implant to the related dental structures with one of two impression techniques.

## Transfer Coping (Closed Tray) Impression

The first impression technique is the transfer coping, or closed tray, technique. This technique is characterized by the use of a tapered coping with some retentive grooves. With the transfer coping screwed into place, the dentist will take an impression without the need to modify the impression tray. After the impression is removed from the patient's mouth, the coping is then unscrewed from the implant.

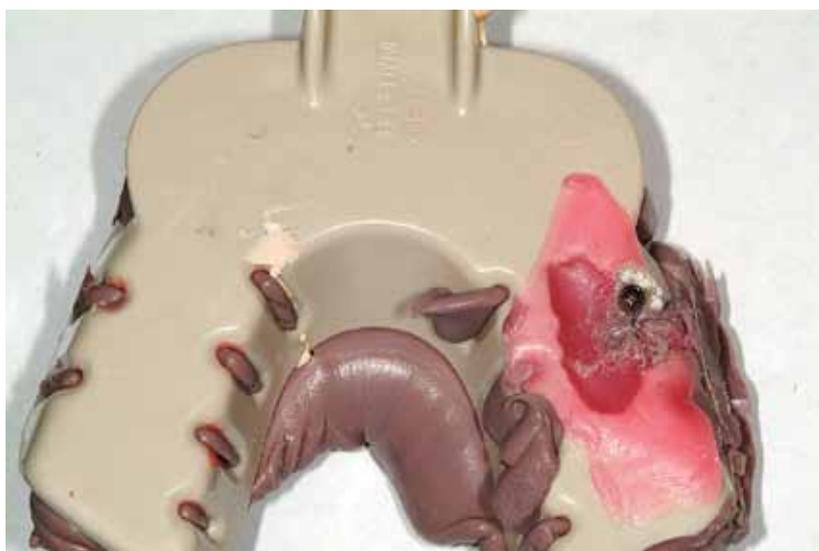
The implant replica, or analog, is screwed to place on the coping and the assembly is replaced in the impression (**Figure 1**).

In a study completed at the University of Washington, researchers found that after the impression was retrieved the individual transfer copings could not be accurately and consistently replaced into the impressions by all five operators tested<sup>6</sup>. There was additionally no significant difference in distortion values found between two impression materials (Impregum F from 3M ESPE and Extrude from Kerr Corp.)<sup>6</sup>.

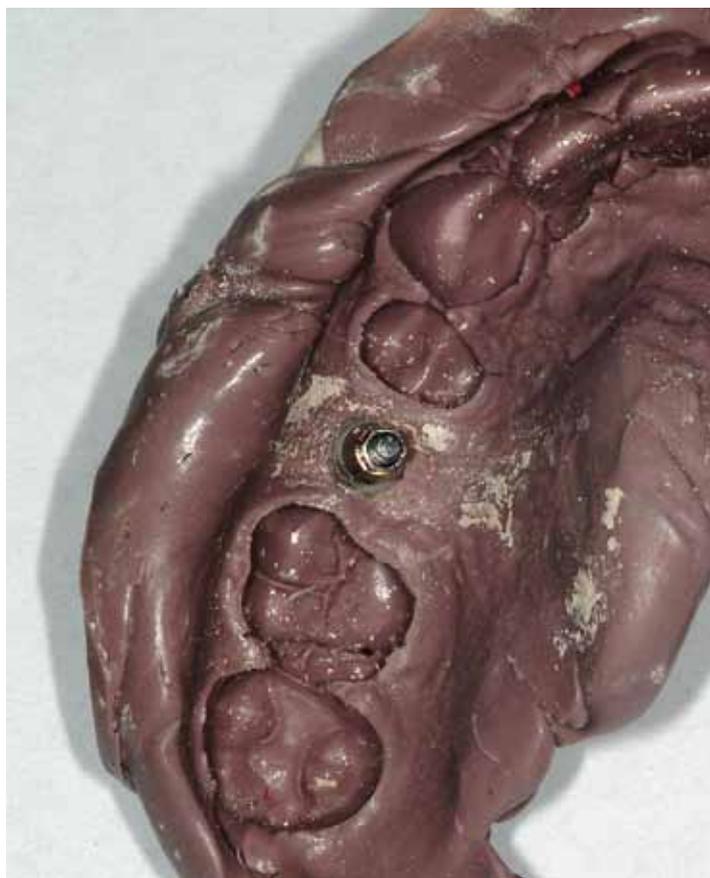
It is therefore reasonable to conclude that the inaccuracies incorporated in this impression technique are due to the difficulties in correctly replacing the transfer coping and are not related to impression materials. The shape of the transfer copings and the amount of undercuts incorporated may have some impact as there were significant differences in the distortion values for the copings made by three different manufacturers tested (**Figure 2**).



**Figure 2.** Closed tray transfer copings from Astra (Image courtesy of Astra-Tech.) and Nobel Biocare systems demonstrating the various shapes incorporated into the design.



**Figure 3.** When an open tray style coping is used, the screw is accessed through a hole in the impression tray which can be covered in denture wax as shown. When the impression is removed, the coping remains in the impression.



## Open Tray (Square Coping) Impression Technique

The open-tray technique is slightly different. After the square impression coping is torqued into position, the impression tray is modified with a hole to allow access to the screw. When the impression material has set, the screw is loosened, the coping is retrieved in the impression and then the implant replica is screwed into place (Figure 3). With this technique, the coping is never removed from and replaced into the impression, therefore the copings are shaped to create more undercuts and lock solidly into the impression (Figure 4).

In a follow up to their earlier study, researchers at the University of Washington found the distortion values measured for the square copings (open-tray technique) were significantly less than the measured values for the tapered copings (transfer impression technique)<sup>7</sup>. The square coping (without acrylic resin splinting) measured distortion values on the working cast that were not significantly different from the machining tolerances for the components which has been reported at 22-100 $\mu\text{m}$ <sup>7,8</sup>. These results have been substantiated in other similar research papers although there seems to be a difference in the results for resin splinting<sup>12</sup>. The results would therefore indicate that the shape of the impression copings and the fact that they do not require replacement in the impression minimizes distortions in the master cast.

## Recommendations

The research quoted earlier appears to conclusively demonstrate the open-tray (square coping) technique is the most predictable impression technique to recommend for dentists restoring implants.

There does not appear to be an elastomeric impression material with significantly better distortion values to recommend, however, it is worthwhile noting:

- For multiple unit cases, particularly with divergent angled implants, a more rigid

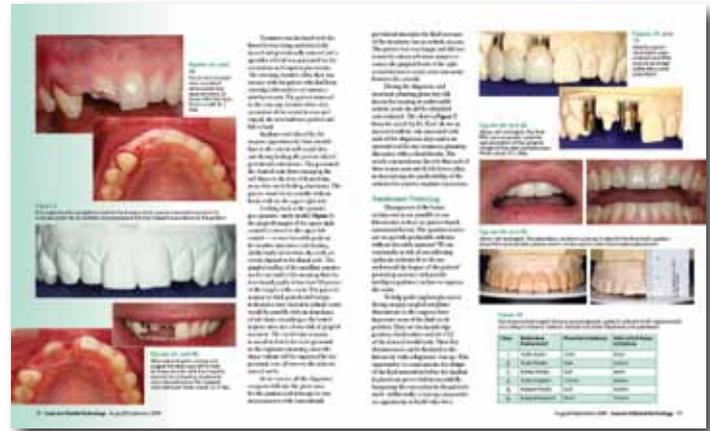
impression material is advised (such as Impregum F).

- All impression materials require sufficient bulk of material to maintain their low distortion values. Take care with impression copings that are not adequately supported in the impression material and consider requesting the dentist retake any inadequate impression.

For commercial dental laboratories to deliver the most consistent restoration possible, minimizing inaccuracies in the master cast is essential. Remaking abutments and restorations due to inaccurate impressions is time consuming, creates undue stress on the patient, dentist and laboratory, and becomes a financial burden for the dentist and the laboratory<sup>9</sup>. **JDT**



**Figure 4.** As this Nobel Biocare open tray impression coping demonstrates, the shapes of these copings have more undercuts to lock them into the impression.



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Hermanides graduated from college in South Africa with a national higher diploma in dental technology, the equivalent of a bachelor's degree in the U.S. He has worked in South Africa, London and Seattle laboratories specializing in all stages of advanced reconstructions and anterior esthetics. Hermanides is a mentor of Dr. John Kois' Kois Center programs and a member of study clubs around the Puget Sound area. Additionally, he currently serves on the board of directors of the Washington State Dental Laboratory Association as vice president.



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