

# CONTEMPORARY IMPRESSION TECHNIQUES IN IMPLANT PROSTHODONTICS

Anil Sharma <sup>1</sup>, Dr. Anuj Chhabra <sup>2</sup>, Dr. Neeraj Madan <sup>3</sup>, Dr. Natasha Madan <sup>4</sup>

<sup>1</sup> Professor & HOD  
<sup>2</sup> Assistant Professor  
 Dept of Prosthodontics  
 ITS Dental College  
 Hospital & Research Centre  
 Greater Noida, U.P.  
<sup>3</sup> Prof & HOD  
 Dept Of Prosthodontics  
<sup>4</sup> Prof & HOD  
 Dept Of Conservative Dentistry  
 PDM Dental College & Research  
 Institute, Sarai Aurangabad,  
 Bahadurgarh, Haryana

## Abstract

The objective of an impression making in implant dentistry is to accurately relate the implant analogue or implant abutment analogue to the other related structures in the dental arch. This is influenced by use of an impression transfer coping which is attached to the implant or implant abutment. With appropriate technique selection and manipulation, accurate impressions can be obtained by the contemporary restorative dentist for fabrication of implant-supported restorations. This article critically outlines the clinical efficacy of impression techniques used in implant dentistry.

## Key words

Impression Techniques, Implants, Transfer, Coping, Pick Up

## INTRODUCTION

Simulating the working conditions in the mouth to a laboratory setting for implant dentistry is technique sensitive but critical to the success of implant therapy. The literature is rife with articles on the pros and cons of various impression techniques, impression materials, impression trays etc. The aim of this article is to describe and evaluate the clinical efficacy of impression techniques in implant therapy for transferring information to the laboratory.

### Transfer of abutment position

#### 1. Direct Conventional impression

Direct conventional impressions made by clinicians for crown and bridge work with retraction cords can be used for implant therapy as well.

#### *Advantages and disadvantages*

The obvious advantages being the familiarity and ease of the technique. These impressions can be taken for multiple units and full mouth restorations as well. The size and shape of the abutment can be modified and soft tissue anatomy is reproduced well.

The disadvantages are the use of local anaesthesia for the placement of retraction cords.

#### 2. Transfer type impression (Abutment transfer)

This technique requires making impression of an abutment using Abutment Impression Copings. To create a restoration for an abutment, the laboratory model needs to include an abutment replica. The coping is picked up with the impression and the suitable abutment is placed in the coping and the technician fabricates the prosthesis. Abutments have to be fitted onto the coping and errors can be introduced at this stage.

### Transfer of implant position to the lab

#### 1. Implant-level direct transfers for open-tray, pick-up impression technique

Designed to transfer the soft tissue profile as well as the implant's position and hex orientation. This transfer procedure requires a custom tray or modified stock tray with screw access holes in the areas occlusal to the implants. The transfer coping is screwed onto the implant body and sticks out of the impression. The central transfer screw must be removed before the impression can be released from the mouth. Unlike the Indirect technique, direct transfers are held firmly within the open-tray impression as it is removed from the mouth. The Implant analog is connected to the transfer coping embedded within the impression, the impression is poured in dental stone to fabricate a working cast containing a replica of the implant in the patient's mouth.

#### *Advantages and disadvantages*

This technique allows direct access to the screws that hold the transfer copings correctly positioned against each implant.

The principal advantage of this technique is that the transfer coping remains in the impression and the inaccuracies of transferring are avoided.

When multiple implants are present and there is a non-parallel configuration this technique is ideal as one the impression is easily retrievable and secondly there is minimum distortion of impression material.

#### *Disadvantages:*

More parts to manipulate in fastening, some horizontal range of fastening, blind fastening of

#### Address For Correspondence:

Dr. Anil Sharma  
 Prof & HOD  
 Dept Of Prosthodontics  
 ITS Dental College  
 Hospital & Research Centre  
 Greater Noida, U.P.

analog (1). These listed disadvantages may not be so in the hands of well trained clinicians  
A custom tray with access to the impression coping screws is required or a metal tray with windows is needed.

## **2. Implant-level indirect transfers for closed-tray, transfer impression technique**

Designed to transfer the soft tissue profile as well as the implant's position and hex orientation, Indirect Transfers remain attached to the implants when the closed-tray impression is removed from the mouth. The transfer copings with this technique are parallel sided or slightly tapered for ease of removal of impression. The transfer is then retrieved from the implant, mated to the corresponding Implant Analog, and placed into its corresponding impression hole. To fabricate a working cast containing a replica of the implant in the patient's mouth, the impression is poured in dental stone.

### *Advantages and disadvantages*

Advantages are that local anaesthesia and custom trays are not required. Additionally when there is limited opening they can be used as there may not be sufficient space for access to the screws retaining pick up type impression. Patients with gag reflex when the impression has to be removed quickly (2). This is controversial the setting time of a polyvinyl siloxane impression material itself is approximately four minutes which is enough to induce a gag reflex.

The disadvantage is the lack of predictability with the possibility of coping dislodgement during impression making. Additionally abutments have to be fitted onto the copings and errors maybe introduced at this stage. Further soft tissue anatomy transfer is not very accurate and the size and shape of the abutment cannot be modified. Sometimes it is very difficult to remove the impressions from the mouth of the patient.

### **Accuracy of transfer**

A number of factors determine the accuracy of an impression.

Number of implants - Impression making for Single implants is technically less demanding than multiple implants. For single tooth implant Daoudi MF et al found that positional errors in the restorative stages are unlikely to affect passive fit with the implant but rotational or dimensional discrepancy in the impression is likely to affect the appearance, contact points and occlusal requirements(3). Their study used only one system (Nobel pharma) which is a limitation additionally they did not consider component tolerances.

Position of implants - parallel implants will limit the distortion in the impression. Carr AB found the direct transfer method to provide the most accurate working cast additionally he attributed the inaccuracy of the indirect method to nonparallel abutment relationship and deformation of impression material (1). His study however did not evaluate the inaccuracy for single tooth implants.

Impression material - When implants copings have undercuts a material with good flexure strength is needed. Vinyl polysiloxane is best suited for the same.

Type of impression tray - Carotte et al in their study found that metal and rigid plastic trays gave greater accuracy of impressions than flexible plastic ones(4). Though their study was directed to conventional crown and bridge prosthesis, the principle for implant dentistry prosthodontics remains the same.

Splinting transfer copings - Assif D et al in their study found that

splinting the transfer copings with Duralay resulted in more accurate impressions(5). **Daoudi MF** arrived at the same conclusion in their study. Both studies were however limited by the fact that was based on only one system (Nobelpharma).

Clinician training - Clinician errors could be attributed to lack of formal training, limited understanding of the techniques involved.

### **Clinical applications**

Errors in impression making for implant prosthesis can severely compromise the final prosthesis. These errors are more obvious when compared to conventional fixed prosthodontics due to the precise machine fit of implant components and to the rigid connection of implant to bone (2). The selection of the impression technique and henceforth the tray depends upon the coping design. A square coping requires an open tray and the technique is therefore the direct technique. A tapered coping facilitates the use of a closed tray or indirect technique.

Multiple implants bring along with them the problem of non-parallelism and the use of the indirect technique has shown to cause errors in the fitting of the framework. Bone loss and even loss of integration has been attributed to this misfit (2). Pressure on the abutments causing them to tilt or splay apart causes the rigid implant body in the bone to be subject to stress.

To increase the accuracy of the impression technique for multiple implants using the direct technique the direct transfers are connected with acrylic. The shrinkage of acrylic however can introduce errors by causing the implants to move closer.

The literature seems to be having inconsistencies in the acceptance of a superior technique. Further studies with a spread of different implant systems for both multiple units and single tooth implants is required to identify the better technique for different clinical scenarios faced by the implantologist.

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