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A Simplified Technique for Implant Impressions using A Customized Jig

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ABSTRACT

One of the most important determinants of the fit of an implant restoration is the accuracy of the impression. An accurate implant level impression would entail the correct three-dimensional recording of the implant position within the arch to the adjacent teeth and soft tissues and the transfer of this relation to the working cast. The complexity of the impression procedure is increased in cases involving multiple implants. Numerous techniques of impression making for multiple implants have been documented in the literature.

This paper describes a quick, simple and cost effective technique of impression making procedure for a clinical case involving multiple implants.

Key Words: Multiple implants, Customized jig, Impression procedure

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INTRODUCTION

An accurate reproduction of the implant positions onto the master cast is essential for a passive and accurate fit of the superstructure. Factors such as the impression technique, design of the impression copings, technique of pouring of the impression, and properties of the impression material, may contribute to discrepancies and thus misfit of the framework. Misfit of the restoration leads to unequal distribution of forces over some of the implants, which would manifest as crestal bone loss, screw loosening, fracture of the abutment screw, prosthesis or the fixture itself. [1-4]

Two types of impression techniques are commonly used for impressions of multiple implant situations – open tray (direct, pick-up) and closed tray (indirect, transfer) techniques. However, for cases involving multiple implants, the open tray technique is preferred.[5] The open tray technique allows the implants to be splinted and picked up with the impression, minimizing the error induced by repositioning of components in the closed tray technique.

Many techniques have been documented in the literatures that involve splinting of the implant impression copings to help transfer the copings accurately into the impression.

Materials like dental floss[6,7], orthodontic wire[6], impression plaster [4], autopolymerising [4,6,8], dual[4] and light[9] cured resins have been used in the past, all having their set of advantages and shortcomings.[4,10]

The accuracy of implant impressions has been reviewed in the past.[5] Lee in his review article evaluated different parameters like splinting of impression copings, types of impression techniques, impression material, coping modifications and the angulation of implants.[5] He concluded that, more studies reported greater accuracy with the splint technique than the non-splint technique for multiple implants (more than 4). Studies reported higher accuracy with pick-up impression technique and that Vinyl Polysiloxane and Polyether were the recommended materials for implant impressions. He also mentioned other factors like different connection levels (implant and abutment levels), different implant trays, implant depth and time delay for stone pouring play a role

in the accuracy of the impression, however studies done on these factors were inconclusive due to their number.[5,11]

The conventional method used includes autopolymerising resin to splint the open tray impression copings by adapting the resin around the copings within the mouth. The resin bars connecting the copings are then sectioned to release stresses that were induced due to the polymerization shrinkage. These segments are then rejoined with additional resin.[5]

The drawback with this technique is the increased amount of chair side time required to accurately place the resin around the implants carefully avoiding any or minimal contact with the oral mucosa.

This clinical tip demonstrates a simple technique of making a jig using Pattern resin (GC, Tokyo, Japan) that simplifies the impression technique, reduces chair side time, splints the impression copings and helps in transferring their relation accurately into the impression.

Figure 1: Impression posts reproduced in acrylic on the cast and spacer added

CASE

1. The case depicted here in this example was an impression of 6 implants placed in the edentulous mandible for fabrication of a screw retained hybrid denture. The implants placed were Biohorizons internal tapered (3.8mm diameter, length 12mm, BioHorizons, Birmingham, AL, U.S.A). The open tray impression copings (BioHorizons, Birmingham, AL, U.S.A) were placed onto the implants and an alginate impression (Vignette, Dentsply, U.S.A) was made. The negative replica of the impression copings in the retrieved impression was poured in self-cure acrylic resin (Acryln `R`, Asian Acrylates, India) and the rest of the cast was poured in dental stone (Kalabhai Karson Pvt. Ltd., India).
2. Spacer such as a thin layer of wax was added around the acrylic impression copings. This creates adequate space for easy retrieval of the jig and also blocks out undercuts present on the re-produced impression copings. The spacer is subsequently boiled out.
3. A Pattern resin (GC, Tokyo, Japan) was applied around the acrylic copings to create the jig. The spacer wax around the acrylic copings was boiled out. A 2mm spacer of modeling wax was adapted with the jig in place around the acrylic copings and a custom tray was fabricated. This allowed adequate space between the jig and custom tray for impression material.

Figure 2: Pattern resin jig fabricated

The open tray impression copings (direct pick-up hexed, BioHorizon, U.S.A) were screwed onto the implants after removing the healing abutments. The jig was tried intraorally and minor adjustments were made. The interface between the impression copings and the jig was filled in with pattern resin joining the jig to the impression copings. Care was taken to avoid any contact of the jig with the soft tissue.

Figure 3: Jig splinted for the impression procedure

4. The custom tray was adjusted intra orally and the fitting was verified. Polyether (Impregum, 3M ESPE) impression material was used for the impression. The custom tray was coated with a tray adhesive (3M ESPE) and left to dry for 3 minutes prior to impression making. The impression material was first syringed around

the impression copings using an impression syringe by the clinician. Concurrently, the assistant will load the tray with impression material and the tray is then seated over the impression copings and jig. The screws at the end of the impression copings must be visible during impression taking to allow access to unscrew after the impression material was set. Once all the impression copings were unscrewed, the impression was removed from the mouth.

Figure 4: Impression posts along with jig picked up in the final impression

DISCUSSION

Multiple implant impressions are very technique sensitive and require a greater level of precision and accuracy. Transferring the exact 3-dimensional position of implants as they are placed in the oral cavity to the working model requires a high level of clinical skill. The margin of error with such cases is also very less especially when a superstructure that connects all the implants to each other is placed. The previous techniques documented that used materials like dental floss, autopolymerising resin, orthodontic wire and other materials either require a lot of chairside time or need extra steps in the impression procedures and laboratory steps.[6-9,12]

This technique involves making a primary impression with the open tray impression copings in situ using alginate. Once the cast is poured and the impression copings were re-produced in acrylic, the next procedure of making a connecting jig on them is easy, as this is made in the laboratory. The use of a spacer between the jig and copings ensures an easy and quick adaptation of the jig around the copings in the mouth. It also eliminates the effect of shrinkage of alginate and cold cure acrylic resin from the preliminary impression.

Pattern resin (GC, Tokyo, Japan) is a low shrinkage modeling resin. It has a reduced setting shrinkage. The workability and adaptation of the resin on the cast is much easier because of the absence of saliva, reduced time and lesser inconvenience to the patient. An accurate custom tray can be fabricated using this impression technique saving time in making adjustments to a stock or custom tray chairside. An accurate custom tray also ensures minimal wastage of material, is more convenient for the operator and by ensuring a uniform thickness of material around the coping results in a more accurate impression. A prefabricated customized jig saves chair side time of the patient and the operator.

The jig is minimally adjusted in the mouth and joined to the impression copings using small quantities of additional resin. Hence the need for sectioning and rejoining intraorally is eliminated.

CONCLUSION

This technique is a simple yet accurate method that reduces chairside time and increases ease of impression making for clinical cases with multiple implants resulting in a well-fitting, passive superstructure.

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