

A Novel Technique to Fabricate a Customized Jig using Light Cured Resin Tray Material

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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 is a clinical report which describes a quick, simple and cost effective technique of splinting the implant impression copings to help transfer the coping accurately in the impression procedure for a case involving multiple implants.

Keywords : Customized Jig, Splinting, Implant Impression Copings.

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 literature 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} resins have been used in

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the past, all having their set of advantages and shortcomings.^{4,10}

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 light cured acrylic resin tray material that simplifies the impression technique, reduces chair side time,

splints the impression copings and helps in transferring their relation accurately into the impression.

Case Report

A 70 year old male patient was referred by his general practitioner to Department of Prosthodontics and Implantology, M.A.Rangoonwala Dental College and Hospital, for specialist treatment regarding his prosthodontic rehabilitation. The patient reported that he had been provided with a set of complete denture, which he described as 'loose'. This was patient's second set of complete denture since being rendered edentulous for five years and he had found both unsatisfactory. Upon oral examination the patient was found to be completely edentulous with 4 implants along with gingival formers placed in the mandible in the region of 33, 35, 43, 45 (Fig. 1) The implants were 3.7mm in diameter and varied between 10 and 13mm in length. (Uniti implants, Equinox Medical Technology, The Netherlands). Following discussion with the patient a treatment plan of a bar supported overdenture for the patient was considered.



Fig. 1 : Pre treatment presentation.

Procedure

1. The gingival formers were removed and open tray impression copings (Uniti, Equinox Medical Technology, The

Netherlands) were placed onto the implants and an alginate impression (Vignette, Dentsply, U.S.A) was made (Fig.2). 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 (Fig. 3) (Kalabhai Karson Pvt.Ltd., India).



Fig. 2 : Primary impression



Fig. 3 : Cast with impression coping replicas poured in self cure acrylic

2. Spacer such as a thin layer of wax was added around the acrylic impression copings and on the crest of the ridge of the mandibular cast. This creates adequate space for easy retrieval of the jig and also blocks out undercuts present on the reproduced impression copings.
3. A custom tray was fabricated using tray compound material and upon retrieval the

wax was boiled out. Following which the custom tray was trimmed 2mm short of the sulcus.

4. The open tray impression copings were screwed onto the implants after removing the healing abutments. The light cure resin (Profibase-VOCO, Germany) was adapted around the impression posts and cured intraorally using a halogen lamp (3M Curing light 2500, 3M ESPE, USA) for 10 seconds and minor adjustments were made (Fig. 4). Care was taken to avoid any contact of the jig with the soft tissue.



Fig. 4 : Splinting of the impression copings with light cured resin tray material in situ.

5. The custom tray was adjusted intra orally and the fitting was verified. The custom tray was coated with tray adhesive (3M ESPE) and left to dry for 3 minutes prior to impression making. Single step border molding was done using Polyvinylsiloxane putty (Express, 3M ESPE, Seoul Korea). Thereafter, Polyvinylsiloxane monophase impression material (3M ESPE, Seoul Korea) impression material was used for the impression. The impression material was first syringed around the impression copings using an impression syringe by the clinician and the tray loaded with the same material was seated onto the

mandibular arch. Care was taken to ensure that the impression coping screws were visible during impression taking to allow access to them once impression material was set. Once all the impression copings were unscrewed, the impression was removed from the mouth (Fig. 5).



Fig. 5 : Final impression

Discussion

The technique described here is a simple yet accurate technique for making an open tray impression for multiple implants. The light cured tray material used here is easily adaptable to the impression posts in the mouth and can be easily cured with a simple halogen light. It results in a rigid splinting of the impression copings which prevent any movements between them during the impression procedure and subsequently during connection of laboratory analogs. It eliminates the need of cumbersome procedures of using dental floss and pattern resin within the oral cavity for splinting of impression copings.

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