Splinting Open Tray Impression Copings Using Long Shank Carbide Burs during Definitive Impression: A Dental Technique

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Abstract

Aim: To splint implant impression copings using long shank carbide burs for definitive implant impressions.

Background: The accurate transfer of the orientation recorded by impression copings to a definitive cast is a challenging step in implant prosthodontics. For achieving a passive fit from the mouth to the cast may include some discrepancies. Traditional methods of splinting can be time-consuming and troublesome to handle. Technique: This article describes a technique by using long shank carbide burs for splinting implant impression copings.

Conclusion: The favored implant splinting, evidence was inconclusive, and the data supporting splint pickup was the better performing technique, especially with an increased number of implants.

Clinical significance: This technique causes minimal discomfort and is straightforward when compared to other techniques.

Keywords: Dimensional accuracy, Implant impression, Impression techniques, Metal splinting, Polymerization shrinkage, Splinting.

The Journal of Contemporary Dental Practice (2022): 10.5005/jp-journals-10024-3318

Introduction

Prosthetic reconstruction with osseointegrated implants induces stress to fixture components, thus it is important to accurately record impressions and fabricate a passively fitting prosthesis.[1–3] A "passive fit" is a significant factor in contributing to the fit of the implant prosthesis, as it is directly related to three-dimensional transfer position to the working cast.[2–4] Splinting implant impression copings before definitive impressions is favored when compared to non-splinted impressions.[3] Splinting is defined by the Glossary of Prosthodontic terms[5] as "a rigid or flexible device that maintains in position a displaced or movable part; also used to keep in place and protect an injured part" or "a rigid or flexible material used to protect, immobilize, or restrict motion in a part". The splinting of impression copings is the first critical step to ensure the positional accuracy to transfer along with the impression to the cast.[3,6,7] Therefore, clinicians should make greater efforts for improving to obtain an ideal transfer.[8]

However, the methods described by using acrylic pattern resin for splinting have adequate strength after the setting reaction is completed, but however these techniques have limiations.[9,10] Another drawback is the amount of space occupied by the thickness and the uncontrolled flow of the material which may be time-consuming to build and trim the resin bridge. During impression, if sufficient space is not provided below the splint, the tissue surface is not recorded accurately. Also, the toxicity of the material will increase with more material used.

Accurate impression making is a challenging procedure in implant dentistry, this technique overcomes these drawbacks by reducing the shrinkage to a negligible percent and also brings in an effortless procedure.[11] The similar idea for splinting is taken into consideration and is bought forward in a simpler technique.[12]

It is not possible to obtain a total inactive fit practically, thus reducing the misfit to keep away from possible complications is a general goal of prosthodontic implant procedures. Thus, the point of this article is to benefit the literature and to spread out understanding about splinting before impressions.

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How to cite this article: Fernandes DS, Anasane NS, Jagtap AK. Splinting Open Tray Impression Copings Using Long Shank Carbide Burs during Definitive Impression: A Dental Technique. J Contemp Dent Pract 2022;23(5):566–568.

Source of support: Nil

Conflict of interest: None

Technique

The patient was a 57-year-old male, completely edentulous undergoing an implant treatment plan to replace his missing teeth. He completed full mouth implant placement and second stage surgery for a complete rehabilitation. Further, in prosthetic rehabilitation, the first tender step is the impression making with implant impression copings. The technique consisted of the following steps as follows:

Step 1: Remove the transmucosal abutments and evaluate for peri-implant soft tissue healing. Place and verify, radiographically, the junction for a precise fit before splinting the open tray impression copings (Dentium Co., Seoul, Korea) for an accurate transfer.

Step 2: Using 1 mm thick wax (Boxing wax, Kerr, USA), temporarily stabilize the long shank carbide bur (Prima Dental Carbide Burs,

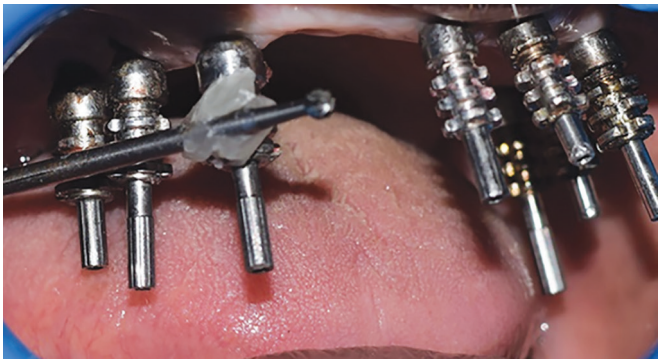

Fig. 1: Wax used to stabilize the carbide bur

Fig. 2: Pattern resin used to anchor the carbide bur with the impression coping

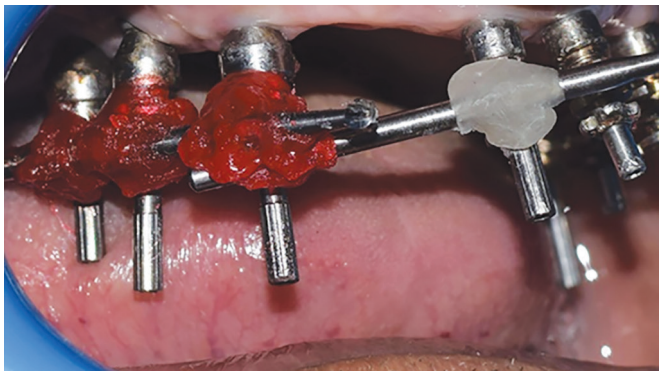

Fig. 3: The chain for splinting is continued similarly

Jalandhar, India) on any side of the impression coping (Fig. 1) to the required adjustment.

Step 3: Adapt the necessary amount of acrylic pattern resin (GC Pattern Resin LS, GC India Dental Private Limited, Medak) to anchor one part of the carbide bur (Fig. 2).

Step 4: After the polymerization on one side is completed, remove the wax and fixate the next carbide bur with wax onto the next impression coping for multiple splinting (Fig. 3).

Step 5: The junction between the two burs is fused with pattern resin and this chain is continued.

Step 6: After the final end is splinted, await the complete polymerization before making the definitive impression.

Step 7: Confirm the splinting by removing and examining to perform Sheffield's test, reattach the copings, and proceed for the final impression.

Discussion

Different techniques for splinting have been used to achieve a passive fit in the implant prosthesis. The accurate fit of the implant prosthesis is the result of processes that depend on the material properties and technical manipulation of the materials. The factors in making an accurate impression along with impression material shrinkage and fabrication of the master cast model are responsible for replicating the implant positions. Among studies, examining the effects of splinting and non-splinting studies supported splinting implant impressions over non-splinting impressions.[13–25] Techniques like using preformed bars, sectioning and luting self-cure acrylic resin, light polymerized resin, and metal bars with autopolymerizing resin had been used for splinting materials.[3] One study also compared that metal splinting was significantly more accurate than splinting self-cure acrylic resin.[26,27]

This technique was performed by using fractured, worn out, or blunt carbide burs which were to be discarded by the clinician, or even impression coping screws that can act similarly advantageous, where the arch curves and also when implants are placed close to each other. The technique goes without describing which side to start splinting as it can be the clinician's choice for accessibility. The amount of space under the splint allows easy flow of the material to record the tissue surface. The design of the bur is sufficient enough to make a rigid structure as well as compact enough to build them to avoid excessive bulk of acrylic. This technique is quick, simple, and doesn't require any additional steps to reduce shrinkage.[3,13]

For multiple implants usually, the acrylic splints are sectioned to release energies and reduce shrinkage.[1] Similarly, the use of metal carbide bur overcomes a few drawbacks when compared with acrylic splinting that is, the metal used won't accounts for the part of shrinkage, the gap between the impression coping and the bur is minimal for which shrinkage occurs is negligible and the consecutive splinting after polymerization of each end further reduces the shrinkage on all the components together.[28,29] This technique also helps in saving time for the clinician as on each junction, the previous splint between implants is completed, simultaneously splinting further is rigidly stabilized which is also almost complete. The long shank carbide bur has sufficient length to splint two, three, or four implants synchronously depending on the placement of implants in the arch. The accuracy of this technique will improve the fit of the laboratory jig trial to avoid repeat impressions and favor harmonious relation between mechanical and biological responses after the final prosthesis is delivered.[3,30–32] Drawbacks following this technique is when the clinician is splinting impression copings in the curved arch, a larger tray size might be needed which will be more difficult in making an impression when the patient shows a reduced mouth opening. The accuracy of the fit of the prosthesis is not only dependent on the impression techniques but the overall step-by-step process to fabricate the prosthesis.[33]

The impression done by the clinician is the first step towards the fabrication of the prosthesis, thus it should be kept in mind that minor errors, in the beginning, will multiply to create a further imbalance which can be frustrating to the clinician and can also lead early failure of the implant treatment.

Clinical Significance

The technique with carbide burs in a way fulfills expectations for supreme implant impression. This technique allows straightforward splinting, reduces chairside time, records accurately with minimal shrinkage, and reuses the burs instead of discarding them. This

technique should improve patient comfort and compliance with the preservation of the spatial relationship independent of the impression material consideration.

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