

Introducing a Method to facilitate making Acrylic Resin Bars for Splinting Multiple Implant Impression Copings

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ABSTRACT

Introduction: With the growth in implant application and observing complications associated with nonpassively fit prostheses, various techniques have been proposed to enhance the accuracy of transferring implants' position from the patient mouth to laboratory worktable. The present article introduces an applicable method for the same purpose.

Aim: The present study aims to introduce an easy and applicable method to achieve a precise impression of multiple implants in the logical timeframe with minimal effort.

Technique: Acrylic resin bars were fabricated in different widths and kept to be adapted to the position of implant impression copings for accurate impression.

Conclusion: The explained method could facilitate precise transferring of implants' position from the mouth to laboratory in a practical and predictable manner.

Clinical significance: Introduction of a method providing an accurate impression of the implants with accessible equipment will significantly improve the treatment quality and prognosis.

Keywords: Accuracy, Clinical technique, Dental implant, Dimensional stability, Implant impression, Splinting.

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INTRODUCTION

Successfully osseointegrated dental implants are ankylosed to the surrounding bone; however, lack of periodontal ligament as a helping factor to accommodate existing pressures makes them weak structures against any prosthesis misfit.¹ The main cause of misfit is inaccurate transfer of implant's spatial position from patient mouth to laboratory cast.² Dimensional changes of impression

materials and cast stone during polymerization as well as the movement of impression copings during tightening of laboratory analogs are the probable causes of this positional instability. The absence of passive fit could predispose the implant to biomechanical complications, such as screw loosening and/or fracture, prosthetic component fracture, implant fracture,³ or biologic complications, such as bone loss, and even implant failure. The literature has suggested splinting of impression copings as a practical way to increase the accuracy in both partially and completely edentulous cases.⁴ Several materials and methods have been proposed for intraoral splinting of transfer copings to prevent any change in their spatial relationship. The suggested methods include application of acrylic resin on a matrix of dental floss⁵ or orthodontic wire,^{5,6} prefabricated acrylic resin rings around gold copings,⁷ preformed acrylic resin bar,² photopolymerizing acrylic resin,⁸ dual-cured composite resin,⁹ bite registration materials (additional silicone or polyether),¹⁰ splinting transfer copings with acrylic resin (which is sectioned and rejoined to reduce the effects of polymerization shrinkage),¹¹ connecting prefabricated thermoplastic bar¹² or used burs to implants by acrylic resin, and fabrication of a metal-acrylic bar.¹³

Some of the suggested methods imply special requirements, some are time consuming, or could be affected by setting time limitation of acrylic resin. Assif et al⁸ recommended the autopolymerizing acrylic resin or impression plaster as splinting material for more accurate results. However, application of a large volume of acrylic resin for intraoral splinting increases the chair-side time and the polymerization shrinkage in direct relation to the mass volume.¹⁴ The total shrinkage of acrylic resin is reported between 6.5 and 7.9% in the first 24 hours, most of which (80%) occurs in the first 17 minutes after mixing at room temperature.¹⁵ The present article tries to introduce an applicable method for splinting the impression copings. The advantages include lack of special equipment need, simplicity of fabrication and application, and minimizing the dimensional changes by decreasing the amount of fresh acrylic resin.

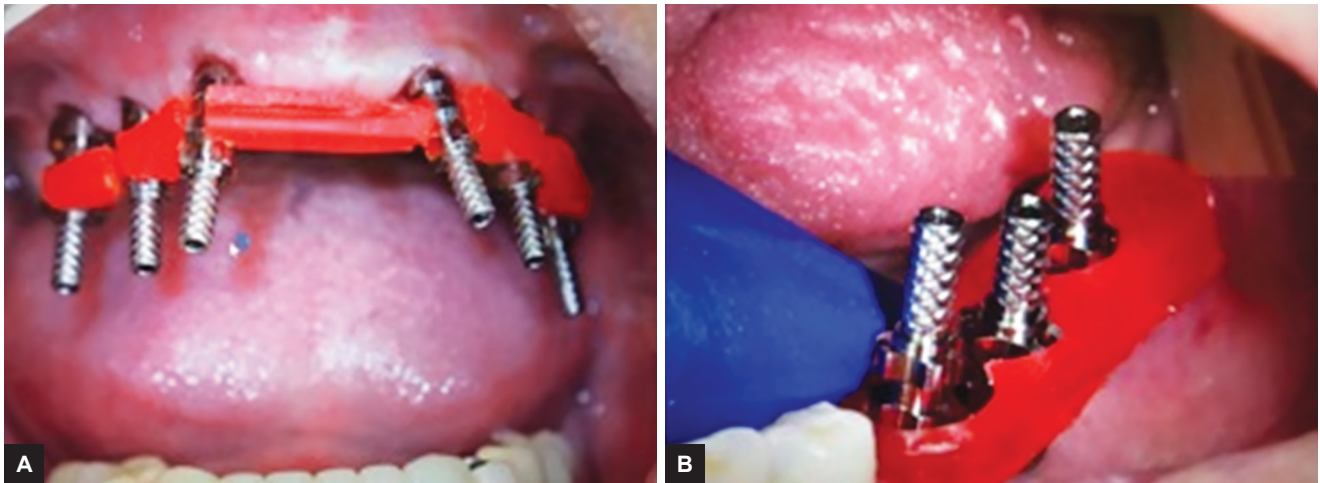
TECHNIQUE

The preformed acrylic resin bars could be fabricated in two different widths: The thicker bar provides this possibility

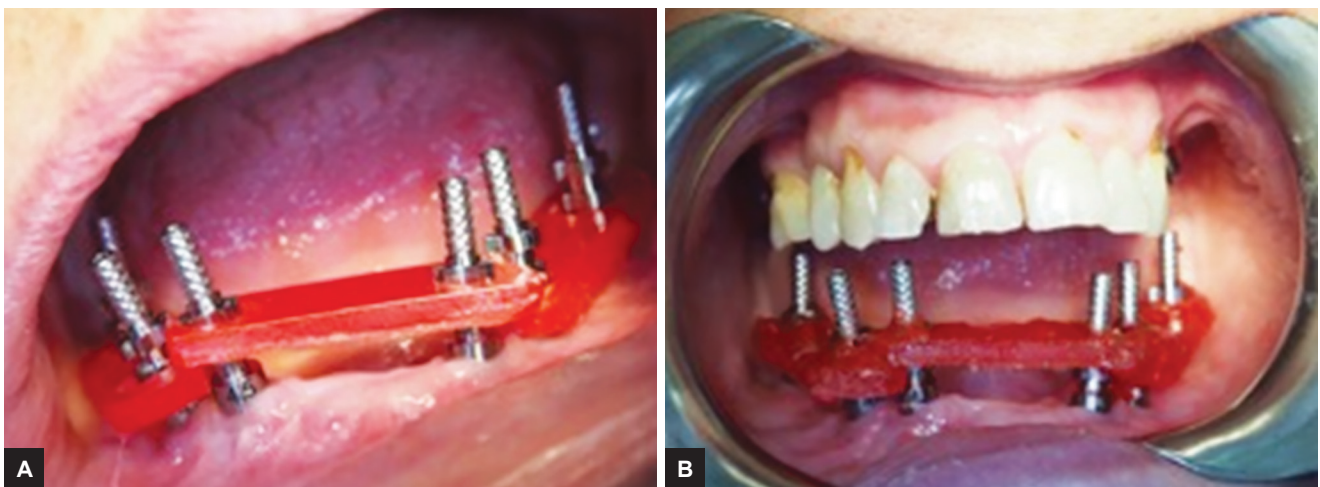
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Figs 1A and B: (A) Thin bar was cut; and (B) thick bar was perforated according to impression coping distance



Figs 2A and B: Bar pieces were connected to impression copings (A) adjacent bars (B) with a small amount of fresh acrylic resin

to be perforated in corresponding position and accommodate impression copings; the thinner type bar could be used in the form of prefabricated rod between impression copings. It is possible to fabricate several bars using the following steps and keep them for future applications.

- Silicon index was made from a wire (4–5 mm diameter) or solid piece (9–10 mm width).
- The index was poured with acrylic resin (pattern resin; GC Corp, Tokyo, Japan).
- For applicability of the fabricated bar, it is required to pass at least 17 minutes after mixing.
- The bar was released from silicone index.
- The bar was cut using a disk according to the distance between adjacent impression copings secured in the patient's mouth. It was also possible to perforate the thick bar corresponding to the center of each impression coping (Fig. 1).
- Fresh mix of acrylic resin and bead brush technique was used to connect the bar to impression copings (Fig. 2).

- The new resin was allowed to set (Fig. 3).
- Final impression was made using a tray perforated in corresponding positions and open tray technique. The selected impression material was applied around impression copings and bar, as well as underneath the bar to capture all the details precisely.
- Laboratory analogs were hand tightened, and the impression was poured in dental stone.

DISCUSSION

Splinting of impression copings is an approved method to ensure precise transfer of their relationship to laboratory. The importance of this procedure increases as the number of implants increases, as well as in full-mouth implant rehabilitations, screw-retained prostheses, or angulated implants restorations.^{16,17} Different methods have been proposed; all have their own advantages and disadvantages. A suitable splinting method should be accurate, easy to use, have accessible equipment and materials, not waste chair-side time, not have much laborious work



Fig. 3: Splinted impression copings are ready for open tray impression

involved, and provide the required positional stability to transfer impression coping interrelationship precisely and regardless of the type of impression material. Passively fit prostheses will be obtained predictably by eliminating or reducing various distorting factors, and passive adaptation of a restoration eliminates complications related to harmful and undesirable chronic forces. The present article described a procedure of splinting transfer copings, which tries to comply with the aforementioned purposes closely. The goal was to achieve an accurate and positional stable impression of multiple implants in a rational timeframe and with minimum effort.

CONCLUSION

Using a splinting method with office facilities could make it possible to restore implants in an easier, more predictable, and more successful manner, without wasting valuable chair time.

CLINICAL SIGNIFICANCE

The introduced method could provide accurate impressions of the implants in a short duration with accessible equipment; accurate transfer of implants' position will significantly improve the treatment quality and prognosis.

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