

Impressions for Multiunit Implant Supported Prosthesis: A Simple and Innovative Technique

RAGHAVENDRA ADAKI¹, BANASHREE SANKESHWARI², DAYANAND HUDDAR³, TANISHA MISQUITTA⁴

(CC) BY-NC-ND

ABSTRACT

Making of impression is an integral part of fabrication of prosthesis. Quality of impression material and technique used to fabricate will influence fit of prosthesis. The precise transfer of the spatial relationships of implants from the mouth to the master cast with an impression is the first and crucial step to ensure passive fit of implant framework. As passivity of prosthesis is mandatory for implant supported fixed prosthesis, failure to achieve the same will lead to considerable stresses to screw retained prosthesis which leads to loosening of prostheses and screw fracture. Making of impression in multiple unit implant cases becomes even more crucial. To achieve accurate impression in previous study has emphasised on the importance of splinting impression copings together for multiunit implant impression. Various researches have been done regarding use of different splinting materials and impression materials. Use of die stone has never been attempted as impression material for implant impressions. In this article, authors have put forth an innovative technique of using rigid and non rigid impression material without any splinting technique or rather using die stone impression material itself as a splinting material to make impression in an implant supported prosthesis.

Keywords: Die stone, Misfit, Passive, Splinting

TECHNIQUE

A 57-year-old male reported to the Department of Prosthodontics with the chief complaint of missing teeth in upper and lower jaws and inability to chew past four years. On examination the patient was completely edentulous with severely resorbed mandibular ridge. Resorbed ridge poses challenges in retention of mandibular denture due to poor foundation [1]. To overcome this challenge, implant supported mandibular denture was planned. Three implants were placed in the mandibular interforaminal region and delayed prostheses were planned.

Alginate impressions were made with healing abutments in place. Spacer was adapted about 0.5-1.0 mm in edentulous region and about 4-5 mm in the region of abutments to provide space for transfer copings and the final impression material. Special tray was fabricated with dough technique covering spacer wax on buccal and lingual surfaces except occlusal area in implant region to make it as a separate compartment [Table/Fig-1]. It had a good vertical extension with occlusal opening in the edentulous area. The special tray covered the whole of edentulous region [Table/Fig-2,3]. Tray was removed from the model and final impression was made intraorally with light body elastomer only in the edentulous region. The impression in the edentulous region was recorded except the implant region with transfer copings. Any excess light body impression material entering the implant compartment must be removed.

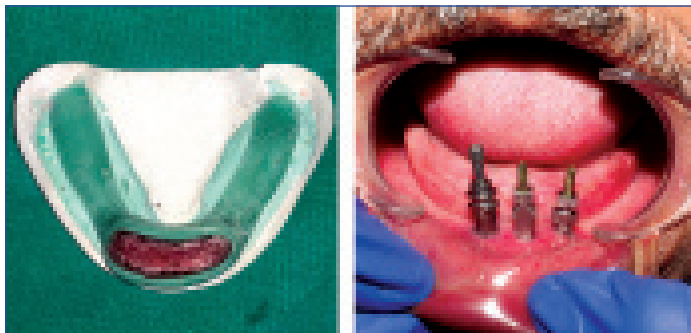
copings [Table/Fig-4]. The die stone here itself acts as a splinting material which will hold the transfer copings in place and maintain the spatial relationship between multiple abutments with minimal stress.



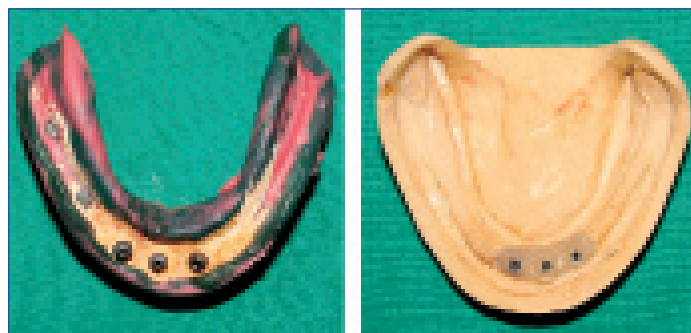
[Table/Fig-3]: Checking for the clearance. [Table/Fig-4]: Impression making with die stone. (Images from left to right)

After setting of the die stone, the screw holding the implant and transfer coping was removed and impression was retrieved [Table/Fig-5].

Implant analog was attached to transfer coping using screw of transfer coping. Soap solution was applied to die stone in the impression region and gingival mask poured at implant analog and transfer coping junction. Another layer of separating medium was applied to silicone soft liner and the cast was poured with die stone [Table/Fig-6]. A passive fitting implant prostheses was fabricated as



[Table/Fig-1]: Fabrication of special tray. [Table/Fig-2]: Transfer copings in place. (Images from left to right)



[Table/Fig-5]: Retrieval of the whole impression. [Table/Fig-6]: Master cast. (Images from left to right)

Die stone (ultrarock) was mixed as per manufacturer's instructions, loaded into syringe and the mix was injected into the region of transfer

the die stone has less expansion or contraction when compared to other splinting materials and the impression is retrieved as a single unit which reduces the deformation.

DISCUSSION

The impression must replicate accurately so that the clinical situation is precisely duplicated by the resulting master cast. For multiunit implant, impressions techniques advocated are direct, indirect, splinting and resplinting techniques. Indirect impression techniques were found to produce a greater mean distortion than the direct techniques [2]. Various splinting materials like acrylic resin, pattern resin, use of floss, bis-GMA (Pro-temp 4) etc have been used for direct techniques [3-5].

The conventional impression technique includes splinting of transfer coping with various materials like pattern resin, acrylic resin, composite resin etc. The disadvantages of using these materials include shrinkage for which the material has to cut and resplinted to reduce the stress [6]. To overcome this challenge an attempt was made to evaluate the reliability of die stone as impression material. The advantage of using die material as splinting material is that it has better strength, reduces stress and also the impression is retrieved as a single unit [7]. The die stone technique also ensures passive fit of the prosthesis which is a mandatory requirement [7,8].

The disadvantages included the prolonged setting time that can be overcome by use of anti-expansion solution containing 4% potassium sulphate can be added [9]. It leads to dryness of mucosa when comes in direct contact. This can be overcome by using the light body material in contact with the tissue surface and then using die stone over the light body to hold the transfer copings in place [10].

CONCLUSION(S)

In this particular technique, splinting method is eliminated, hence variables like contraction and variations in the setting of the material that occur due to splinting material too were eliminated. This particular technique of combination of rigid and non rigid impression materials, in completely edentulous patients, with die stone or modified die stone can be used for eliminating use of elastic impression material and splinting material in the region of implants. Passively fitting prosthesis was procured through this impression technique.

REFERENCES

- [1] Jacobson TE, Krol AJ. A contemporary review of the factors involved in complete denture retention, stability, and support. Part I: Retention. J Prosthet Dent. 1983;49(1):05-15.
- [2] Tarib NA, Seong TW, Chuen KM, Kun MS, Ahmad M, Kamarudin KH. Evaluation of splinting implant impression techniques: two dimensional analyses. Eur J Prosthodont Rest Dent. 2012;20(1):35-39.
- [3] Sorrento R, Gherlone EF, Calesini G, Zarone F. Effect of implant angulation, connection length and impression material on the dimensional accuracy of implant impressions: an in-vitro comparative study. Clin Implant Dent Relat Res. 2010;12:63-76.
- [4] Filho HG, Mazaro JV, Vedovatto E. Accuracy of impression techniques for implants, Part-2- Comparison of splinting techniques. J Prosthodont. 2009;18(2):172-76.
- [5] Lee SJ, Cho SB. Accuracy of five implant impression technique: effect of splinting materials and methods. J Adv Prosthodont. 2011;3:177-85.
- [6] Prithviraj DR, Malesh L, Pooja G, Shruthi DP. Accuracy of implant impression obtained from different impression materials and techniques: Review. J Clin Exp Dent. 2011;3:106-11.
- [7] Rajyalakshmi R, Bheemalingeshwar R, Sivagami G, Chandrashekar N. Linear dimensional accuracy of various gypsum materials - an invitro study. Int J Sci Res. 2018;7(10):81-85.
- [8] Ahmad M, Balakrishnan D, Narayan AI. A comparative evaluation of linear dimensional accuracy of the dies obtained using three conceptually different die systems in the fabrication of implant prosthesis: An in vitro study. Indian J Dent Res. 2014;25:197-203.
- [9] Ha YT, Nyan M. Effect of anti-expansion solution on setting expansion and setting time of dental plaster. Myanmar Dental Journal. 2021;27(1):60-64.
- [10] Kenneth Anusavice. Science of Dental Materials. 10th ed, United States, St. Lois, Mo:Elsevier/Saunders, c 1996.

PARTICULARS OF CONTRIBUTORS:

1. Professor and Head, Department of Prosthodontics, Bharati Vidyapeeth Dental College and Hospital, Sangli, Maharashtra, India.
2. Associate Professor, Department of Prosthodontics, Bharati Vidyapeeth Dental College and Hospital, Sangli, Maharashtra, India.
3. Professor, Department of Prosthodontics, Bharati Vidyapeeth Dental College and Hospital, Sangli, Maharashtra, India.
4. Postgraduate Student, Department of Prosthodontics, Bharati Vidyapeeth Dental College and Hospital, Sangli, Maharashtra, India.

NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:

Dr. Banashree Sankeshwari,
Associate Professor, Department of Prosthodontics, Bharati Vidyapeeth Dental College and Hospital, Wanlesswadi, Sangli-416414, Maharashtra, India.
E-mail: banashrees@gmail.com

AUTHOR DECLARATION:

- Financial or Other Competing Interests: None
- Was informed consent obtained from the subjects involved in the study? Yes
- For any images presented appropriate consent has been obtained from the subjects. Yes

PLAGIARISM CHECKING METHODS: [Jain H et al.]

- Plagiarism X-checker: Aug 04, 2021
- Manual Googling: Nov 23, 2021
- iThenticate Software: Nov 30, 2021 (7%)

ETYMOLOGY: Author Origin

Date of Submission: Aug 03, 2021
Date of Peer Review: Aug 24, 2021
Date of Acceptance: Nov 24, 2021
Date of Publishing: Dec 01, 2021