Original Article

Accuracy Of The One-Stage And Two-Stage Impression Techniques

Dr Sheetal Grover[1], Dr. HITESHI SHARMA[2], Dr Ankit Sharma[3], Dr Sarang Sharma[4], Dr Esha Bali[5], Dr. Drishti Palwankar[6]

[1]Reader, MDS conservative dentistry and endodontics, Seema dental college and hospital Rishikesh.
[2]BDS private practitioner India.
[3]Associate Professor, Department of Prosthodontics, ESIC Dental College, Gulbarga (Karnataka)
[4]Professor, Department of Conservative Dentistry and Endodontics, ESIC Dental College, Gulbarga, Karnataka
[5]Reader and Head, Department of Public Health Dentistry, Institute of Dental Sciences,Sehora Jammu.
[6]Senior lecturer, Department of Conservative Dentistry and Endodontics, Faculty of Dental Sciences, SGT University.

Corresponding author
Dr Sheetal Grover, Reader, MDS conservative dentistry and endodontics , Seema dental college and hospital Rishikesh.
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Abstract

Background: To study accuracy of one- stage and two- stage impression techniques.

Materials & methods: A resin laboratory-made model with the first molar was prepared by standard method for full crowns with processed preparation finish line of 1 mm depth and convergence angle of 3-4°. Independent t- test was done. The result was analysed using SPSS software.

Results: The mean value of the marginal gap obtained by one-stage impression technique was higher than that of two-stage impression technique. A significant difference was reported between the two impression techniques in mid mesial, distal, and lingual regions and average of all surfaces ($p < 0.05$).

Conclusion: There is higher accuracy for two-stage impression technique than for the one-stage impression technique.

Keywords: one-stage, two- stage, impression.

Introduction

The goal of dental science is to conserve health, function and integrity of the dental arch of an individual as long as possible. With the trend towards conservation of the remaining teeth and patient's awareness about fixed prosthodontic work, dentists have resorted more to fixed restorations to satisfy their patients. Making an impression is an integral part of fixed prosthodontic treatment. Addition silicone impression has become the impression material of choice in many clinical situations. [1-3] They possess excellent physical properties and handling characteristics. Although they are the most expensive materials, they are used in wide variety of clinical situations, in fixed prosthodontics, conservative dentistry; removable prosthodontics complete denture prosthodontics and implant dentistry. The factors affecting dimensional change in of the impression are thermal contraction, polymerization shrinkage and contraction due to volatile byproducts.

The impression process includes careful transfer of the patient's soft and hard tissues to laboratory and is a major part of fixed prosthetic treatments. Since the patient's soft and hard tissues are transferred, having anatomic knowledge about periodontal tissues, making an accurate impression especially in the finish line, and using proper impression materials and an appropriate impression technique are important in making a suitable and accurate impression. [4] The impression technique determines the restoration of finish line. Moreover, the significance of margin in the longevity of restoration and the effect of impression technique on marginal

adaptation of restoration indicate the necessity of applying an accurate impression technique. The accuracy of impression techniques is revealed when restoration with suitable marginal adaptation and minimum gap is obtained. [5] Nowadays, there are various impression materials for casting restorations that are accurate enough. In general, the common impression materials include hydrocolloid and elastomeric impression materials. They have special properties of their own and their selection depends on the existing factors and conditions. [6] In cases where there is not enough time for pouring the impression, polyether and additional silicone are used because these materials have high dimensional stability and their impression can be kept for a long time. [7] Additional-polymerization silicone, also known as polyvinyl siloxane, was first introduced as an impression material in the 1970s. Additional silicones are very much similar to condensation silicone, except that additional silicone has higher dimensional stability (its dimensional stability is the same as polyether). The working time of additional silicone is greatly influenced by the ambient temperature and the hardened material has lower rigidity than polyether. Additional silicone is one of the most accurate and stable impression materials, which is used as single-paste, double-paste, and putty-wash systems. [7,8] Hence, this study was conducted to study accuracy of one- stage and two- stage impression techniques.

Materials & methods

A resin laboratory-made model with the first molar was prepared by standard method for full crowns with processed preparation finish line of 1 mm depth and convergence angle of 3-4°. Impression was made 10 times with one-stage technique and 10 times with two-stage technique using an appropriate tray. To measure the marginal gap, the distance between the restoration margin and preparation finish line of plaster dies was vertically determined in mid mesial, distal, buccal, and lingual (MDBL) regions by a stereomicroscope using a standard method. Independent t- test was done. The result was analysed using SPSS software.

Results

An impression was made with two techniques as one- stage and two- stage. The mean marginal gap in both the techniques was noted. The p- value for mesial was 0.02. The mean value of the marginal gap obtained by one-stage impression technique was higher than that of two-stage impression technique. A significant difference was reported between the two impression techniques in mid mesial, distal, and lingual regions and average of all surfaces ($p < 0.05$).

Table 1: Descriptive statistics

Marginal gap	Mesial	Lingual	Distal	Buccal
One stage Mean	115.6	97.85	92.12	104.25
Two stage Mean	93.45	75.36	68.46	95.79
P - value	0.02	0.005	0.005	0.4

Discussion

Making impression for oral restoration and dental morphology is an integral part of prosthodontics, and accurate impression is undoubtedly one of the most important stages of fixed prosthetic treatments. Ignoring this treatment stage will result in inaccurate impression and consequently a prosthesis with improper adaptation. Lack of accuracy in impression making leads to repeated impression making, which is costly and time-consuming for the patient. Thus, selecting the best and most accurate impression technique seems to be necessary for a successful treatment. [4,5] One- and two-stage impression techniques are acceptable for many clinicians, and no significant difference has been reported in most of the studies. [5]

In the present study, an impression was made with two techniques as one- stage and two- stage. The mean marginal gap in both the techniques was noted. The p- value for mesial was 0.02. A study by Jamshidy L et al,

aimed to analyze and compare the accuracy of one- and two-stage impression techniques. A resin laboratory-made model, as the first molar, was prepared by standard method for full crowns with processed preparation finish line of 1 mm depth and convergence angle of 3-4°. To measure the marginal gap, the distance between the restoration margin and preparation finish line of plaster dies was vertically determined in mid mesial, distal, buccal, and lingual (MDBL) regions by a stereomicroscope using a standard method. The results of independent test showed that the mean value of the marginal gap obtained by one-stage impression technique was higher than that of two-stage impression technique. Further, there was no significant difference between one- and two-stage impression techniques in mid buccal region, but a significant difference was reported between the two impression techniques in MDL regions and in general. [9]

In the present study, the mean value of the marginal gap obtained by one-stage impression technique was higher than that of two-stage impression technique. A significant difference was reported between the two impression techniques in mid mesial, distal, and lingual regions and average of all surfaces ($p < 0.05$). Another study by Levartovsky S et al, evaluated the effect of two putty-wash impression techniques on the long-term accuracy and dimensional stability of poly(vinyl siloxane) (PVS) in the gingival sulcus area. Impressions were taken from a master cast to simulate molar crown preparation. A space around the abutment served as the gingival sulcus. The differences when different materials and impression techniques were used were significant ($p < 0.001$) for LD, SD, and PL, as was the interaction between the material, time, and technique ($p < 0.001$). SD discrepancies were higher than those of LD for all materials and times. The two-step impression technique was more accurate, with smaller discrepancies than the one-step impression technique. For all materials, the PL discrepancy was deemed acceptable (less than 0.5%) for all tested times. President had higher discrepancies than the other materials. [10] In their studies, Franco et al. reported no significant difference between one-stage impression technique and impression technique with a spacer. [11] Vitti et al. evaluated the dimensional accuracy of stone casts based on the impression material and three impression techniques. They found that stone casts had high dimensional accuracy, and one-stage and two-stage putty-wash impression techniques and monophase light-body impression technique were not significantly different for marginal gap. [12]

Conclusion

There is higher accuracy for two-stage impression technique than for the one-stage impression technique.

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