

Comparison of five impression techniques for post space

Original Article

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ABSTRACT

Aim: This study tries to determine the right technique for an accurate impression of post space in all dimensions.

Materials and Methods: Five freshly extracted maxillary central incisors are embedded in a plaster block. The post space is prepared up to five number peeso reamer leaving four-mm gutta-percha at the apex. Then we use light and medium polyvinylsiloxane; five different techniques to impress post space with and without 24-gauge anesthetic needle vent and 26-gauge reinforcement wire. In all techniques except the one which uses lentulo spiral disposable tips are used to express light polyvinylsiloxane impression material into post space.

Result: We evaluate 125 samples, 25 from each technique, for the presence of voids and completeness of impressions using a magnifying lens of three-and-a-half magnification. Impression techniques produce void-free and complete impressions when anesthetic needle vent and reinforcement wires are used. The technique which uses lentulo spiral to express impression material into the post space produces complete impressions. However, as there is no provision for escape of air at the time of impression material injection into the post space, voids incorporated into the impressions produced inaccurate impressions.

Conclusion: Use of anesthetic needle vent and reinforcement wire is recommended to produce accurate and void-free impressions of post space while use of lentulo spirals to express impression material into the post space is not recommended.

KEY WORDS: Anesthetic needle vent, lentulo spiral, Post space impression, reinforcement wire

INTRODUCTION

An extensive tooth structure loss from caries, fracture and previous restorations significantly weakens the remaining tooth, making post, core and crown necessary.^[1] Custom made post has some advantages - it often needs very little preparation, has high strength and better fit than pre-fabricated post. The major problem while taking post space impression is incorporation of voids which produce inaccurate impressions. The objective of this study is to determine an impression technique of post space with polyvinylsiloxane impression material and produce void-free and complete impressions in all dimensions using anesthetic needle vent and reinforcement wire.

MATERIAL AND METHODS

Five freshly extracted maxillary central incisors are sterilized with glutaraldehyde solution and mounted on a plaster block. All central incisors are prepared for

complete porcelain fused to metal crown. Access to root canal is made. Pulp is extirpated and biomechanical preparation done up to K file number 80. Obturation is performed with Schilder's vertical condensation of gutta-percha method.

The post space is prepared in the root canal with a number three peeso reamer leaving four-mm of gutta-percha at the apex and enlarged up to the five number peeso reamer. Custom trays to carry medium body polyvinylsiloxane impression materials are made to recover post space impressions.

Five different techniques are used to obtain the impression of post space using light body polyvinylsiloxane impression material.

Technique 1

In this technique we insert a 24-gauge anesthetic needle which acts as a vent held in post space with

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the help of a tweezer. Then we inject light body polyvinylsiloxane impression materials into the post space using disposable tips. The anesthetic needle is removed and a 26-gauge orthodontic reinforcement wire inserted into the post space filled with the light body impression material to prevent distortion of the impression. The custom tray filled with medium body polyvinylsiloxane impression material is placed over the light body impression material and the whole impression of post space is recovered.

The basic procedure for the other four impression techniques is kept same as technique 1; some alterations are made as mentioned in respective techniques.

Technique 2

A 24-gauge anesthetic needle vent is used but reinforcement wire is not used.

Technique 3

Anesthetic needle vent is not used but reinforcement wire is used.

Technique 4

Neither 24-gauge anesthetic needle vent nor reinforcement wire is used.

Technique 5

Light body polyvinylsiloxane impression material is injected into post space with lentulo spiral help and slow speed contra angle handpiece. Reinforcement wire is inserted into post space and impression is recovered as in technique 1.

RESULTS

We used five techniques and studied 25 samples for each. This gave us 125 samples which were evaluated for accuracy using magnifying lens of three-and-a-half magnifications based on the following criteria –

1. Presence of voids
2. Completeness of impression

The maximum number of impressions without voids was in technique 1 - 24 out of 25 samples and minimum number of impressions without voids was in technique 5 - five of 25 samples. The number of impressions without voids, made by each of the technique, was in decreasing order of -

Technique 1 > Technique 2 > Technique 4 > Technique 3 >

Technique 5 [Table 1, Histogram 1]

The total length of prepared post space was 8 mm. Completeness of impressions (maximum length of post space covered) was maximum in technique 1 and minimum length of post space covered by impression material was in technique 4.

Technique 1 > Technique 5 > Technique 2 > Technique 3 > Technique 4 [Table 2, histogram 2]

DISCUSSION

There are very few studies on comparison of technique application in accurate post space impression. Regardless of the technique employed, the impression of post space must record surface details along the entire length of post space. During impression, insufficient escape of air causes voids leading to to inaccurate fit of the cast post. This study aims to compare techniques using polyvinylsiloxane impression material to determine which technique produces accurate impression of the post space in all dimensions. Polyvinylsiloxane impression material, chosen to make the impression with surface details recorded as minutely as 0.02 mm, exhibits the best recovery from deformation during removal from post space and has better wettability.^[4]

Table 1: Number of Samples without Voids

	Specimen 1	Specimen 2	Specimen 3	Specimen 4	Specimen 5	Total no. of samples without voids out of 25
Technique 1	5	5	4	5	5	24
Technique 2	5	5	3	4	3	20
Technique 3	2	3	2	1	2	10
Technique 4	3	2	2	3	5	15
Technique 5	2	1	0	0	2	5

Table 2: Completeness of Impression (in mm.) in Each Impression Technique

	Specimen 1	Specimen 2	Specimen 3	Specimen 4	Specimen 5
Technique 1	8	8	7	8	8
Technique 2	7	7	6.5	8	7.3
Technique 3	6	7	7.5	7.3	7
Technique 4	6	6	7	6.5	8
Technique 5	8	7	7	7	

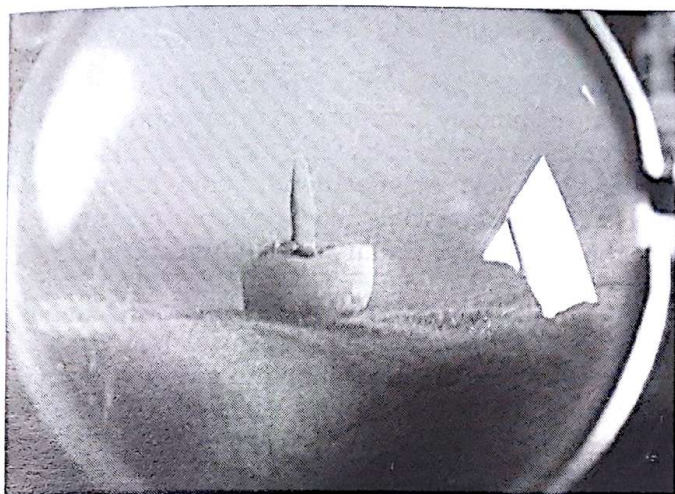


Figure 1: Complete and void-free post space impression

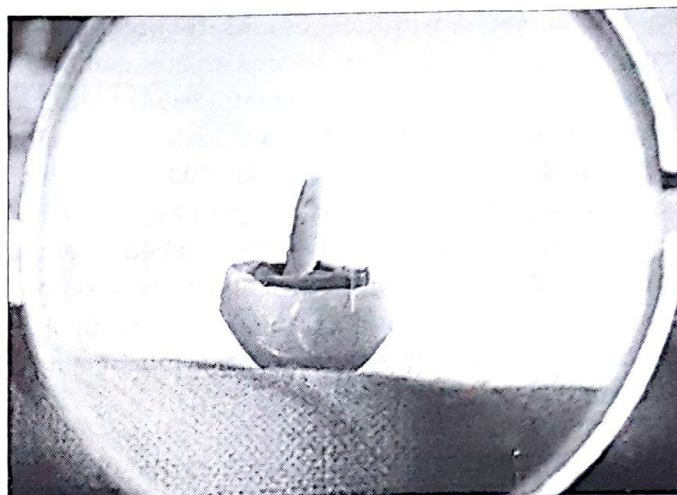
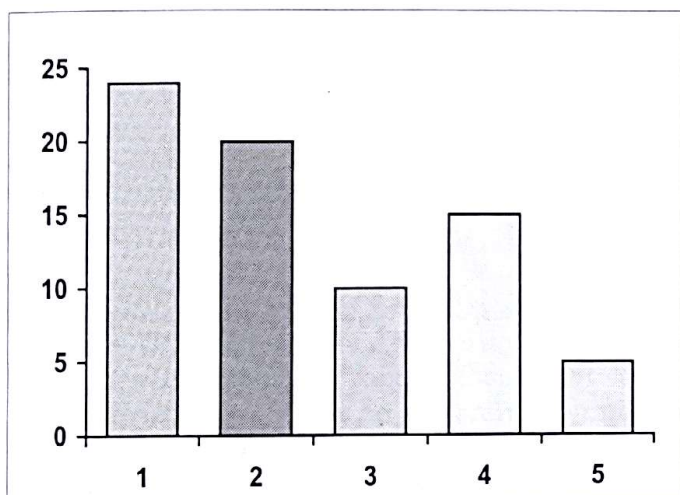
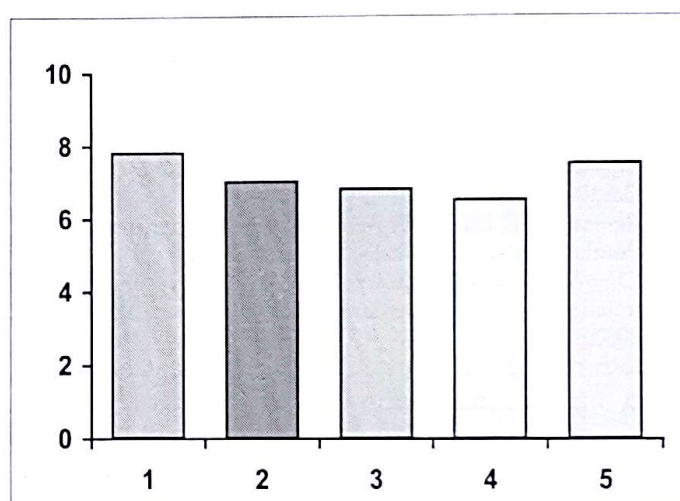


Figure 2: Incomplete post space impression with void



Histogram 1: Impressions without Voids



Histogram 2: Completeness of Impressions (in mm)

Che, Cho, Marzola (2000) demonstrated that venting post space with anesthetic needle while injecting impression material into the post space is an easy technique to predictably make void-free post space impression.^[3] Von Notwick, Gettleman (1981) and Wilson (1996) have demonstrated occlusal vents that can be used to reduce hydraulic pressure during crown cementation, thereby reducing seating discrepancies. Rosensteil, Land and Fujimoto (2001) showed how all elastomeric impression materials require some form of reinforcement while making a post space impression that prevents distortion of the impression, leading to accurate fit of the cast post.^[2]

This study uses a 25-gauge anesthetic needle as vent and 26-gauge orthodontic wire to reinforce the impression of the post space. Technique 1 gave highest number of void free impressions [Figure 1 and 2, Table 1, Histogram 1] using both anesthetic needle

vent and reinforcement wire. This can be attributed to the fact that anesthetic needle allowed air to escape while injecting impression material into the post space leading to void free impressions.

Technique 5 gave minimum number of void-free impressions [Table 1, Histogram 1] using lentulo spiral to express impression material into post space. The voids in this technique were primarily due to air entrapment at the time of injecting impression material into post space. Air entrapment occurred because there was no provision for escape of air at the time of injecting impression material and due to the rotation of the lentulo spiral.

Completeness of impressions along post space length is seen in technique 1 [Table 2, Histogram 2] as air is allowed to escape through the vent; the impression material is thus able to occupy whole of the prepared

post space and produce complete post space impressions. Technique 5 produces greater number of complete impressions because lentulo spiral rotation is clockwise pushing the impression material apically; hence, material is able to cover maximum length of post space. This technique leaves highest number of voids in the impressions as anesthetic needle vent is not used. Minimum number of complete impressions are obtained in technique 4 [Table 2, Histogram 2] as neither the anesthetic needle vent nor reinforcement wire are used in this technique.

Technique 1, which uses anesthetic needle vent and reinforcement wire, must be the preferred choice of prosthodontists - for accurate and void-free impression of post space.

CONCLUSION

Generally, while impression of post space is being made, voids are commonly incorporated in the impression due to insufficient escape of air. This leads to an inaccurate fit of the cast post. An anesthetic needle used as vent allows air to escape while injecting impression material into the post space, leading to void-free and complete post space impressions.

The impression technique, which uses lentulo spiral to express impression material into post space, gives greater number of complete post space impressions because lentulo spiral rotates clockwise and pushes the impression material apically. This technique also produces maximum number of voids in impressions due to entrapment of air when anesthetic needle vent is not used.

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