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Evaluation of effect of wash space thickness on the accuracy of stone casts in two step controlled putty wash technique

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Abstract
Background: A precise impression is the preliminary requirement for the accurately fitting indirect dental restorations. The commonly used technique in making impression with silicone elastomer is putty- wash technique.
Aims and objectives: This study was conducted to evaluate the effect of thickness of the spacer used in putty-reline technique on the accuracy of the stone casts.
Materials and methods: The master model consisted of dentate mandibular arch acrylic typodont (Nissin) in which right mandibular first premolar was prepared to receive porcelain fused to metal fixed dental prosthesis. The sharply defined notches were prepared on the middle of buccocclusal and linguocclusal line angles of the abutment and in the middle of facial margins of the abutment. The width, height and interabutment distances were measured on the master model.
Results: The average height of the abutment on the group I, II and III stone casts are 5.618mm, 5.746mm and 5.778mm with standard deviation of 0.0764, 0.024 and 0.027 respectively as shown in table 1. Abutment height on group I, II and III stone casts deviated from that of master model by -1.25%, 1% and 1% respectively as is given in table 1. The abutment height measurements when subjected to one way ANOVA, p-Value was 0.0095 that is highly significant.
Conclusion: The clinical implication of this study is that desired wash bulk can create by the use of temporary crowns of desired thickness in the two step controlled putty reline technique.
Further investigation is needed to determine the exact amount and technique of achieving wash space that is essential for accuracy in using two-step putty/wash impression techniques in conjunction with impression polyvinyl siloxane materials.

Keywords: Wash Space, impression polyvinyl siloxane

Introduction
A precise impression is the preliminary requirement for the accurately fitting indirect dental restorations. The commonly used technique in making impression with silicone elastomer is putty- wash technique. It consists of polymerizing low viscosity elastomer (light body or wash) against the heavy viscosity elastomer (putty). The putty in the perforated stock tray simulates the custom tray.
The accuracy of stone casts with respect to horizontal and vertical dimensions is latent within the accuracy of impression.

Aims and objectives
This study was conducted to evaluate the effect of thickness of the spacer used in putty-reline technique on the accuracy of the stone casts.

Materials and methods
The master model consisted of dentate mandibular arch acrylic typodont (Nissin) in which right mandibular first premolar was prepared to receive porcelain fused to metal fixed dental prosthesis. The sharply defined notches were prepared on the middle of buccocclusal and linguocclusal line angles of the abutment and in the middle of facial margins of the abutment. The width, height and interabutment distances were measured on the master model.
2mm and 3mm copings are fabricated in acrylic (DPI-RR Cold Cure, Bombay Burmah Trading Corporation Ltd.) on the abutments to act as spacer in the controlled putty wash

technique. Then, ten impressions are made with each type of coping as spacer by controlled putty wash impression technique using addition type of polyvinyl siloxane (Affins Coltene Whaledent Pvt Ltd. Switzerland) polymerizing against light body (president, Coltene Whaledent Pvt Ltd. Switzerland). And ten impressions of the master model were made without spacer using the same technique. Then, the casts are poured in type IV dental stone high strength (Ultrarock, Kalabhai Karson Pvt. Ltd., India). The casts are then categorized into three groups as under:

Group I: the casts obtained from the impression without spacer.

Group II: the casts obtained from the impression with 2mm spacer thickness.

Group III: the casts obtained from the impression with 3mm spacer thickness.

Linear measurements between reference points on abutments on master model and thirty casts are measured with travelling microscope.

Results

The average height of the abutment on the group I, II and III stone casts are 5.618mm, 5.746mm and 5.778mm with standard deviation of 0.0764, 0.024 and 0.027 respectively as shown in table 1. Abutment height on group I, II and III stone casts deviated from that of master model by -1.25%, 1% and 1% respectively as is given in table 1. The abutment height measurements when subjected to one way ANOVA, p-Value was 0.0095 that is highly significant at $p < 0.05$.

The average width of the abutment on the group I, II and III stone casts are 4.304mm, 4.267mm and 4.286mm with standard deviation of 0.090, 0.041 and 0.067 respectively as shown in table 1. Abutment height on group I, II and III stone casts deviated from that of master model by 1.1%, 0.234% and 0.68% respectively as is given in table 1. The abutment width values when subjected to one way ANOVA, p-Value was 0.51 which is highly insignificant at $p<0.05$.

Table 1: Comparison of abutment height on master model with the height of abutment on group I, II and III stone casts.

	Master model(mm)	Group I(mm)	Group II(mm)	Group III(mm)
1.	5.753	5.512	5.742	5.712
2.		5.633	5.771	5.724
3.		5.624	5.744	5.777
4.		5.704	5.712	5.723
5.		5.695	5.795	5.781
6.		5.677	5.736	5.712
7.		5.759	5.723	5.756
8.		5.772	5.749	5.732
9.		5.713	5.762	5.743
10.		5.729	5.728	5.778
mean		5.681	5.746	5.743
St. dev		0.0764	0.024	0.027
%deviation		-1.25%	-1%	-1%

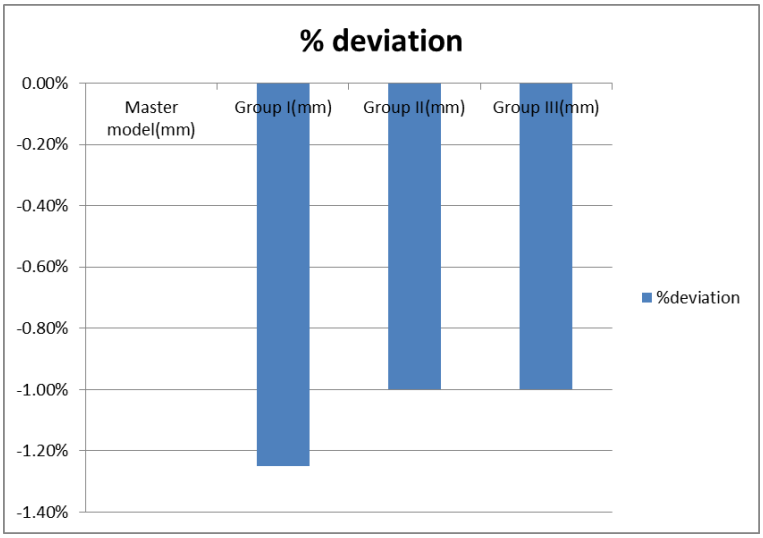

Fig 1: percentage deviation of abutment height of group I, II and III stone casts as compared to that of master model.

Table 2: Comparison of abutment width on master model with that of the abutment on group I, II and III stone casts.

	Master model(mm)	Group I(mm)	Group II(mm)	Group III(mm)
1.	4.257	4.317	4.234	4.247
2.		4.215	4.259	4.256
3.		4.424	4.277	4.257
4.		4.225	4.375	4.257
5.		4.247	4.249	4.275
6.		4.256	4.269	4.454
7.		4.247	4.271	4.257

8.		4.377	4.233	4.359
9.		4.261	4.245	4.249
10.		4.472	4.257	4.249
mean		4.304	4.267	4.286
St. dev		0.090	0.041	0.067
%deviation		1.1%	0.234%	0.68%

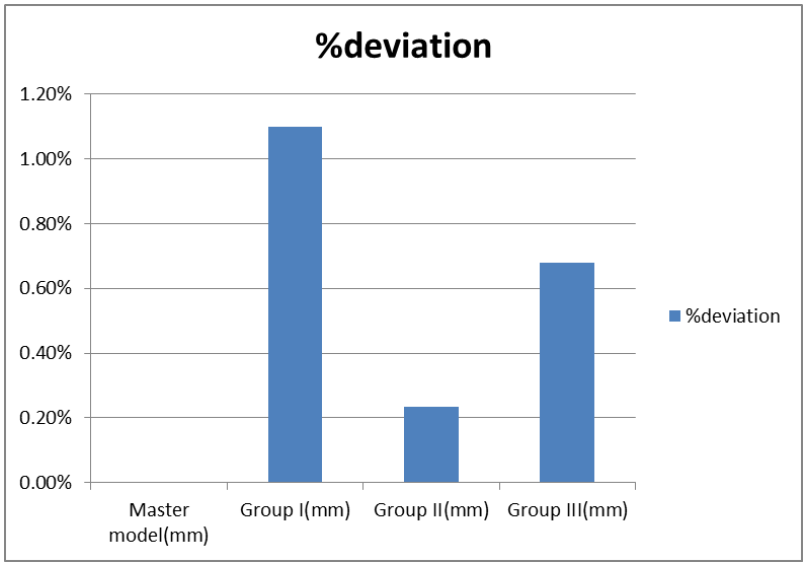

Fig 2: Percentage deviation of abutment width of group I, II and III stone casts as compared to that of master model.

Discussion

This study was conducted to evaluate the accuracy of the controlled putty wash impression technique using different spacer thickness.

The study showed that spacer thickness effects the accuracy of abutment on the stone cast both horizontally and vertically using controlled putty reline technique.

Abutment height: the abutment height reduced by 1.25% in group I casts without spacer. Polymerizing a thin layer of light body results in elastic deformation of the putty. The elastic rebound of the impression results in short dies in group I.

The uniform thickness 2-3mm of light body in group II and III casts increased accuracy of the abutments.

Abutment width: The polymerization shrinkage occurs to the flanges of tray that results in wider dies. Uniform bulk of wash maximized the accuracy of the abutment in group II and III casts (as compared to group I (1.1% wider dies compared to master die). Group II and III abutment dies only 0.234% and 0.68% wider compared to master dies.

Hung *et al* and Idris *et al* investigated the accuracy of impression techniques and proposed that technique is impression technique independent.

The two-step controlled putty-wash technique with 2 and 3 mm spacer thickness is more acceptable and very good alternative to obtain accurate impressions.

Conclusion

The clinical implication of this study is that desired wash bulk can created by the use of temporary crowns of desired thickness in the two step controlled putty reline technique.

Further investigation is needed to determine the exact amount and technique of achieving wash space that is essential for accuracy in using two-step putty/wash impression techniques in conjunction with polyvinyl siloxane impression materials

References

1. Amorrortu PJ, Brown D. The relative dimensional stability addition cuffed silicone and other elastomeric impression natural. J Dent Res. 1979; 58:1272.
2. Eames WB, Wallace SW, Suway NB, Rogers LB. Accuracy and dimensional stability of elastomeric impression materials. J Prosthet Dent. 1979; 42(2);159-162.
3. Eames WB, Sieweke JC, Wallace SW, Rogers LB. Elastomeric impression material: Effect of bulk on accuracy. J Prosthet Dent. 1979; 41(3):304-307.
4. Hung S, Purk JH, Tira DE, Eick JD. Accuracy of one-stepversus two-step putty-mash addition silicon impression technique. J Prosthet Dent. 1942; 67(5):583-589.
5. Idris B *et al*. Comparison of the dimensional accuracy of one and two-steptechnique with the use of putty-wash addition silicone impression materials. J Prosthet Dent. 1995; 74(5):535-41.
6. Johnson GH, Lepe X, Aw TC. The effect of moisture on detail reproduction of elastomeric impressions. J Prosthet Dent. 2003; 90(4):354-364.
7. Marcinak CF, Draughn RA. Linear dimensional changes in addition curing silicone impression materials. J Prosthet Dent. 1982; 47(4):411-413.
8. Reisbick MH. Effect of viscosity on the accuracy and stability of elastic impression materials. J Dent Res. 1973; 52(3):407-417.
9. Saunders WP, Sharkey SW, Smith GM, Taylor WG. Effect of impression tray design and impression technique upon the accuracy of stone casts produced from a putty-wash polyvinyl siloxane impression material. J Dent. 1991; 19(5):283-289.
10. Soh G, Chong YH. Defects in automixed addition silicone elastomers prepared by putty wash impression technique. J Oral Rehabilitation. 1991; 18:547-552.

11. Takahashi H, Finger WJ. Effects of the setting stage on the accuracy of double mix impression made with addition curing silicone. J Prosthet Dent. 1994; 72(1):78-84.
12. Tjan AH, Whang SB, Tjan AH, Sarkissian R. Clinically oriented evaluation of the accuracy of commonly used impression materials. J Prosthet Dent. 1986; 56(1):4-8.
13. Williams PT, Jackson DG, Bergman W. An evaluation of the time dependent dimensional stability of eleven elastomeric impression materials. J Prosthet Dent. 1984; 52(1):120-125.