

Research Article

A Comparison between Two Ways of Relining With Soft Denture Lining Materials (An *in-vitro* Study)

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Abstract: This study was done to compare two ways of relining with permanent soft denture lining materials. In this study, two types of specimens group-A and group-B were used. Group-A was made by using vacuum formed spacer and Group-B was made without using vacuum spacer [simple conventional method]. After converting, polishing and finishing the specimens, selected tooth areas were relined i.e.11,12,21,22,26,27,31,32,36,37,41,42 for both groups. First, selected tooth areas were cut to maintain 2mm thickness in respected tooth areas. For relining permanent soft denture lining material Molloplast-B was used which was placed on cut tooth region. After relining, completed relined portions were measured with measuring tool (digital calliper) in mm and comparison between two groups was done. Group-A specimens were made using vacuum formed spacer and relined with soft denture lining materials at 11, 12, 21, 22, 26, 27, 31, 32, 36, 37, 41, 42. When thickness was measured with measuring tool, Group-A specimens were less in thickness than Group-B. Within the limitation of this study, it can be concluded that when vacuum formed spacer with permanent soft denture lining material was used, results were more accurate.

Keywords: Vacuum-formed spacer, Lining materials, Relining, Molloplast-B

INTRODUCTION

Most of the patients tolerate modern denture base materials quite well, but there is large number of patients who have difficulty with hard denture bases to create prosthodontic problems. Patients showing senile atrophy of the residual ridge with a thin, non-resilient mucosal covering, frequently complain of chronic soreness. This problem is even more pronounced for those patients having diabetes or other debilitating diseases and geriatric patients [1-3]. A differential diagnosis between physiologic or anatomic problems or both and functional deficiencies in the patient's present dentures must be made. The functional deficiencies can often be eliminated easily, whereas physiologic and anatomic problems may be more difficult to correct. If the functional deficiencies in the patient's dentures have been corrected and surgical procedures are not a viable alternative, placement of soft denture liners provide a cushion for the denture bearing mucosa providing comfort to the patient. Relining can be defined as the procedure used to resurface the tissue side of a denture with new base material, thus producing an accurate adaptation to the denture foundation (GPT-8). There is at times a certain amount of confusion as to the precise function of a soft lining material. Because of its compliant nature, it will of course lead to a more uniform distribution of stresses at the mucosa-liner

interface. It will however, not reduce transmitted force. The soft liner and oral mucosa are in essence of two compression springs in series, so, if the stiffness of the soft liner is less than the stiffness of oral mucosa, it will absorb most of the energy applied and result in a smaller displacement of the oral mucosa [4].

Soft liners are also valuable in the following clinical conditions: when treating patients with bony undercuts, bruxing tendencies, congenital or acquired defects of palate requiring obturation, Xerostomia, relief for tori/exostoses, persistent denture sore mouth, free end saddles in partially edentulous cases, dentures opposing natural dentition, and over implants during healing period. Though the use of soft denture lining materials have been recognized for years and a number of materials suggested and used, none of them fulfill all the requirements of an effective soft denture liner. However to achieve best result, the dentist must carefully evaluate the patient before choosing the permanent soft lining materials. Relining method with different techniques is effective and dependable, but problems arise because of poor case selection and techniques.

The purpose of this study is to investigate a comparison between two ways of relining with soft

denture lining materials. Aims and objectives of this study were:

- To measure the thickness of permanent soft denture lining material at tooth area 11,12,21,22,26,27,31,32,36,37,41,42,on Group-A [made by using spacer]
- To measure the thickness of permanent soft denture lining material at tooth area 11,12,21,22,26,27,31,32,36,37,41,42,on Group-B [made without using spacer].

MATERIAL AND METHODS

The soft lining materials used in this study, include commercially available product, heat cure permanent soft resilient liner Molloplast-B (DETAX KERL,Gmbh &Co.KG, GERMANY). All the materials were proportioned and processed according to manufacturer's instruction and specimens for the test were prepared from heat cured resin material. For this study, 60 specimens from denture base acrylic resin were made. Half were made with vacuum formed spacer and half without spacer i.e.conventional dentures.

For making denture using vacuum formed spacer pour upper and lower ideal moulds with dental stone (Fig. 1). After stone has set, retrieve upper and lower cast. Temporary denture base was prepared by using shellac denture base material. After that rims were made on denture base (width-5mm in ant. region and 8-10mm in molar region). Properly marked midline,

canine line were drawn and both rims were sealed. After that sealed casts were mounted on articulators. Teeth setting were done using COSMO HXL SHADE/MOULD: A1/91[T4/3L]. After teeth setting was completed, carving, wax up, sealing was done. Flasking of dentures with suitable flasks was done. Suitable flask holder was placed in boiling water for approximately 5-10 minutes. Before flasking, we form a thermoplastic vacuum spacer on master cast using vacuum machine and then remove it (Fig. 2, 3). After the denture has been flasked and boiled out in the usual manner, place the vacuum- formed spacer (0.5mm thickness) in position on the master casts (both upper and lower) with a thin sheet of packing plastic between the spacer and mixed acrylic resin. Tighten the flask placed in acrylizer at 60 degree Celsius for 90 minutes. Open the flask and remove the sheet of packing plastic and spacer. Open the flask and polish dentures in usual way. Other half of dentures were converted using conventional method. After above described method we got two types of dentures with and without vacuum formed spacer. Later, dentures were cut in both centrals and laterals, first and second molar area(Fig.4), maintaining thickness of 2 mm all over cutting area(Fig. 5& 6). Pre-mixed dough of Molloplast –B was placed on cut area of the denture and then denture was put on master cast again and curing done (Fig.7). When the processing of denture was completed, denture was removed and polished. The thickness was measured with the help of caliper. Statistical analysis was done to evaluate the thickness of permanent soft denture lining material which is used in Group A & Group B.



Fig. 1: Ideal moulds for making models



Fig. 2: Vacuum formed spacer on master cast



Fig. 3: Vacuum machine using for making vaccum formed spacer



Fig. 4: Marking and cutting on dentures



Fig-5 & 6: Thickness of 2mm is maintained on the cutting area



Fig- 7: Using permanent soft liner on cutting site [tissue side of denture]

RESULTS

The dentures were divided into two groups as Group A (prepared by using vacuum formed spacer during converting) and Group B (prepared without using spacer). Each groups had 30 specimens). The thickness of permanent soft denture lining material on dentures at 11,12,21,22,26,27,31,32,36,37,41,42 tooth area were same for Group A & B. Thickness of denture borders on master model at decided tooth area are same for group-A and group-B (Table 1). Mean difference of Group-A & Group -B was obtained by independent t- test for measurement of thickness of relining material at 0.05

level of significance. Mean difference of group-A with master model and Group-B with master model was statistically significant. Mean deviation of thickness of denture relining material between Group-A was 1.67 (+-0.029) and Group-B was 1.91(+0.026). Mean cut thickness of denture relining material between Group-A was 3.66 (+-0.028) and Group-B was 3.88 (+-0.25). Mean of cut thickness after relining at given tooth area 11,12,21,22,26,27,31,32,36,37,41,42, for group-A was 0.026 which was statistically analyzed by independent t- test with group-B which was 0.029 and the results were statistically significant (Table 2).

Table 1: Thickness of Dentures Border on Master Model At Decided Tooth Area

Ideal Group		
Specimen- 1 (Upper Denture)		
Sl. No.	Tooth No.	Ideal Thickness
1	11	4.96mm
2	12	4.84mm
3	21	4.89mm
4	22	4.39mm
5	26	3.78mm
6	27	3.80mm
Specimen- 2 (Lower Denture)		
1	31	4.3mm
2	32	4.14mm
3	36	4.66mm
4	37	4.56mm
5	41	4.49mm
6	42	4.4mm

Table 2: Showing Mean of Cut Thickness and Deviation Values of Relining Materials Used in Both the Groups- A&B ,Obtained by Independent Sample T Test

	GROUP	N	Mean	Std. Deviation	Std. Error Mean	Mean Difference	t value	p value	Results
Cut area-tooth	A	360	28.17	9.887	0.521	0.000	0.000	1.000	non significant
	B	360	28.17	9.887	0.521				
Cut thickness mm	B	360	3.66	0.535	0.028	-0.225	5.963	0.004	significant
	A	360	3.88	0.478	0.025				
Deviation mm	B	360	1.67	0.544	0.029	-0.245	6.342	<0.0001	Significant
	A	360	1.91	0.491	0.026				

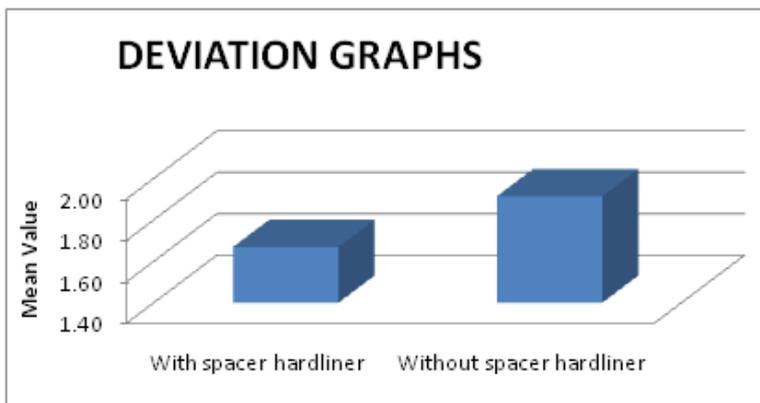


Fig.1: Graphical presentation showing mean and SD for Group A&B

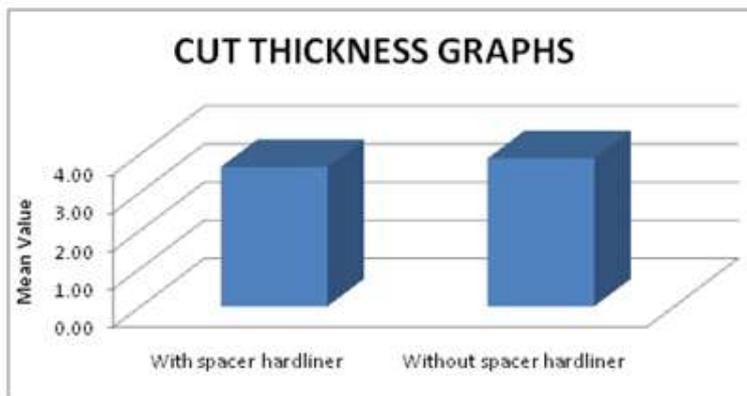


Fig. 2: Graphical presentations showing mean and SD for cut thickness area Group –A & B

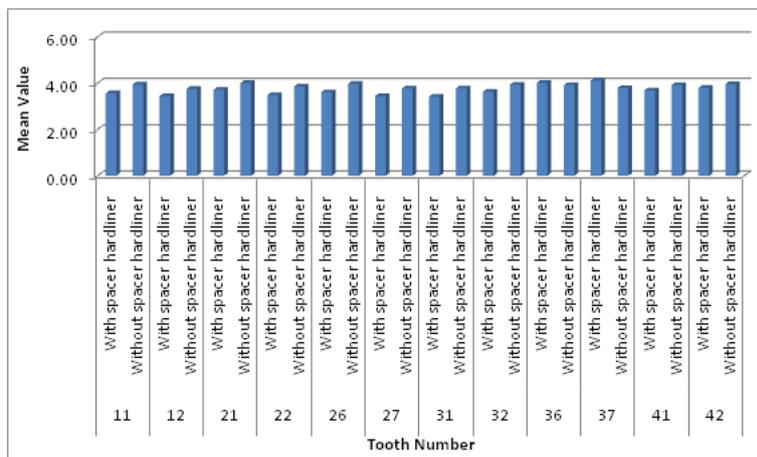


Fig. 3: Graphical presentation showing mean values of Group-A with master model & Group-B with master model

DISCUSSION

PAVLOV stated that using spacer in relining method during flasking has following advantages: Spacer can be made very fast and easily, at the same time the distance between teeth and mold can easily be determined, because spacer is totally transparent and finally fracturing such denture is very much unlikely because the thickness is previously determined and equal in given area [3]. According to Winkler, for successful relining it should have all ideal requirements. Use of resilient liners in the prevention and treatment of chronic tissue irritation from denture is an excellent alternative to use of hard resin and beneficial in preserving the health of remaining denture base supporting tissues [5]. Although soft denture liners have been in use for a long time, the ideal materials have yet to be developed. It is not possible to estimate accurately the useful function life of any complete denture prosthesis because of large variation in clinical factors which may necessitate its replacement. Laney however considers that those that serve for more than two years can be classified as essentially adequate, presumably on the basis that replacement on every two years is not an expensive to the patient or the dental surgeon.

Storer has proposed that the greatest need for the resilient liner is in treatment of edentulous patient demonstrating senile or pre-senile atrophy of the supporting tissues [6]. The apparent softness of the liner depends upon its thickness as well as its hardness and elastic modulus. A liner thickness of 2-3mm is generally recommended. A further increase in thickness would have less effect in increasing apparent softness. For many dentures this is physically impossible. The soft liner decreases the denture base thickness by solvent action of silicon adhesive and the soft acrylic monomer. The "permanent" soft denture liner perhaps has greatest disadvantage that it peels more rapidly than hard denture base resin, and it cannot clean effectively [7].

In this study, it was noted that when denture was made by using spacer, it shows reduced thickness of borders at given tooth site. This finding is in favor of studies done by Boyan Pavlov [3]. According to him, using spacer in denture making will reduce overall denture thickness in predefined areas and so fracturing such denture is very much unlikely because the thickness is previously determined and equals everywhere. This study follows Pavlov study that Group-A reduced thickness as compared to group-B and Master Model. Mean difference indicates that significant changes in thickness of relining materials at given tooth region are there than Group-B.

According to Jagger and Harrison, they gave some limitation in using soft relining material. In order for the soft lining materials to act as a cushion it must be of adequate thickness, normally at least 2-3mm [2]. This often means that thickness of the denture base

material must be reduced to compensate. For denture bases of limited thickness, possibly due to limited inter ridge space, fracture is frequent problem. Even patients with dentures which have soft lining often complain of persistent pain. This is usually because the lining is of inadequate thickness.

However to achieve best result, the dentist must carefully evaluate the patient before choosing the permanent soft lining materials. Relining method with different techniques is effective and dependable, but problems arise because of poor case selection and techniques.

Possible limitations of this study

- Permanent soft lining are difficult to trim polish, finish, often producing a roughened surface which can traumatize the oral mucosa or hasten the accumulation of plaque.
- A common finding is failure of adhesion between the silicon soft liner and denture base resulting in "peeling off" the soft liner. A poor laboratory procedure may be the cause, although rough handling at unsupported junction is common culprit.

CONCLUSIONS

There are different methods of obtaining and controlling the thickness of the relining materials. The present in-vitro study was conducted to compare two techniques of relining with permanent soft denture lining materials.

- Group-A was made by using vacuum formed spacer and relined with soft denture lining materials at 11, 12, 21, 22, 26, 27, 31, 32, 36, 37, 41, 42. When thickness was measured with measuring tool it is less than the thickness of Group-B.
- Group-B are made without using vacuum spacer and relined with permanent soft denture lining material at tooth area 11, 12, 21, 22, 26, 27, 31, 32, 36, 37, 41, 42.

Within the limitations of this study, it can be concluded that when using vacuum formed spacer and permanent soft denture lining materials, more accurate and reduced denture thickness at given sites is obtained.

REFERENCES

1. Waters MG, Williams DW, Jagger RG, Lewis MA; Adherence of *Candida albicans* to experimental denture soft lining materials. J Prosthet Dent., 1997; 77(3): 306-312.
2. Jagger DC, Harrison A; Complete denture-soft option: An update for general dental practice. Br Dent J., 1997; 182(8): 313-317.
3. Pavlov B, Hristov I, Slavchev D, Grozev L; A comparison between two way techniques of relining with soft denture lining materials. Journal of IMAB, 2006; 12(2): 20-21.

4. Schmidt WF Jr, Smith DE; A six year retrospective study of Molloplast –B lined dentures. Part I: Patient response. J Prosthet Dent., 1983; 50(3): 308-313.
5. Winkler S; Essentials of complete denture prosthodontics. 2nd edition, A.I.T.B.S. Publishers & Distributors (India), 2009.
6. Lammie GA, Storer R; A preliminary report on. Denture or resilient plastics. J Prosthet Dent., 1958; 8(3): 411-424.
7. Braden M, Wright PS; Water absorption and water solubility of soft lining materials for acrylic denture. J Dent Res., 1983; 62(6): 764-768.