



RESEARCH ARTICLE

EFFECT OF ROOM TEMPERATURE RELINE MATERIAL ON RETENTION OF COMPLETE DENTURES-
AN IN VIVO STUDY

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ABSTRACT

Statement of problem: Direct relining of complete removable dental prosthesis made with hard chairside reline resin is faster than laboratory- processed reline system. However, the decision to use these materials must be made with regard to their efficiency in enhancing retention of complete removable dentures.

Materials and Methods: 50 edentulous patients (25 maxillary and 25 mandibular) with chief complaint of ill-fitting dentures with adequate vertical and horizontal relation and teeth arrangement were relined with Hard Permanent Chairside Reline Resin (Ufi Gel hard, VOCO GmbH.) and the retention checked in anterior and posterior region.

Statistical Analysis Used: Chi Square Test ($p \leq 0.05$ as significant value considered).

Results: 1. Statistical difference was observed between before relining and after relining for relined dentures in maxillary anterior and posterior and mandibular posterior region

2. No statistical differences were observed post relining in mandibular posterior region

Conclusion

- Hard permanent chairside reliners are effective alternative to time consuming laboratory processing technique of relining removable dental prosthesis.
- Hard permanent chairside reliners significantly enhance the retention in anterior, posterior region of maxilla and posterior region of mandibular edentulous ridges. However, their use is limited when relining of mandibular anterior region is considered.

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INTRODUCTION

In day to day practice we experienced the problem of dealing patients with loose dentures. Possible reasons for this may be faulty border molding, excessive trimming of border area during finishing – polishing and/ or due to residual ridge resorption or physical damage/ breakage. Chairside denture relining or repairing broken areas can correct many of these problems. The adaptation of the denture base however depends on many factors which include the method and the material used for its construction. It is axiomatic that the more dimensionally accurate and stable a material is, the more retentive and stable the denture will be (Zissis, 1991). However, due to continuous topographic changing nature of residual ridges, relining is frequently advised. Relining with heat cure denture base resin is time-consuming, and the patient

has to remain without dentures within this period, and it depends up on quality laboratory support. Recently, some autopolymerizing resins, available as hard chairside reline systems with low exothermic heat, allow the dentists to reline prosthesis directly in the mouth. Although improvements in retention, stability and occlusion do not always improve chewing efficiency, (Perez, 1985). Garret and others found that "almost all patients perceived improvement in chewing comfort, chewing ability, less difficulty eating hard foods, and eating enjoyment (Garrett, 1996).

Direct relining of complete removable dental prosthesis made with hard chairside reline resins is faster than laboratory-processed reline systems and the patient is not required to be without the prosthesis for the time necessary to perform the laboratory procedures, saving time and appointments. However, the decision to use these materials must be made with regard to their efficiency in enhancing retention of complete removable dentures.

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MATERIALS AND METHODS

50 edentulous patients with chief complaint of ill-fitting denture participated in current study divided in two groups-

Group I-Ill-fitting maxillary dentures – 25 patients

Group II- Ill-fitting mandibular dentures – 25 patients

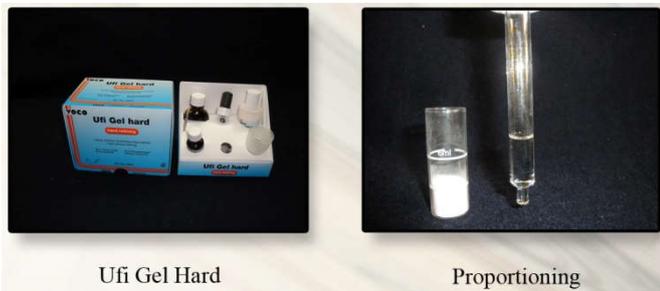


Fig. 1.



Fig. 2.

After obtaining clearance from protocol, ethical committee and informed consent from patients, Patients were advised for the treatment of ill-fitting denture with chairside hard permanent denture reliners. The retention of denture was checked for anterior and posterior region using conventional technique. Then the borders of the denture to be relined were adjusted and overextended borders were trimmed, the remaining borders were roughened and retention grooves were made and then cleaned and dried thoroughly (Fig. 3). Petroleum jelly was applied on artificial teeth, labial and buccal surfaces of the denture with cotton swab except within area of 3mm (1/8 inch) of the peripheral border to protect them from the reline material adhering to the finished surface. Relining material was mixed (Fig. 2) by pouring the liquid into the mixing cup and adding the powder slowly in a ratio of 3 ml powder to 1 ml liquid (2 graduation marks of the dropper for liquid to 1 graduation mark of the glass cylinder for powder) (Fig. 1). Mixing was done homogeneously with the plastic spatula and the working consistency was achieved in less than 1.5 minutes. The material was adapted on the borders (Fig. 3) of the denture after muscle trimming and kept in warm water at 40⁰ C for 2-3 minutes as per manufacturer’s instructions, which accompany the package. Again the relined denture was checked for retention in anterior and posterior region. The readings were recorded as per the patients and operators tactile sensation for retention and peripheral seal. The data obtained was subjected to statistical analysis. Finishing and polishing were performed after 24 hours on follow up appointment.

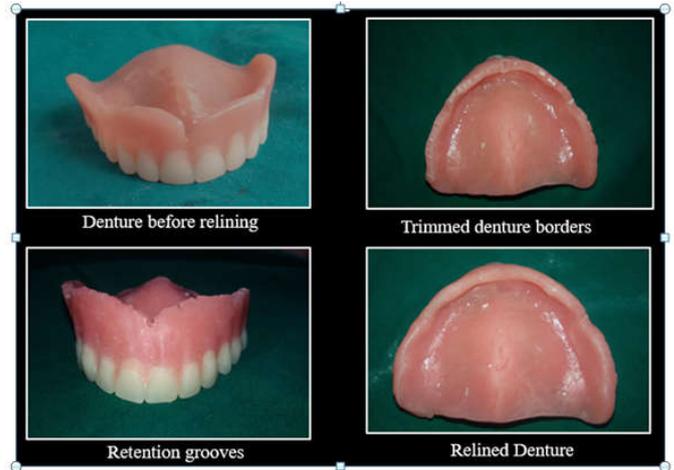


Fig.3 Procedure of Relining

RESULTS

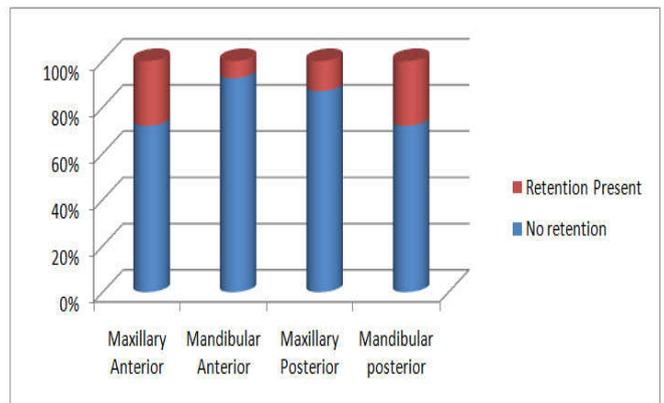
Table 1 Showing Gender distribution among the study Total 50 (38 males and 12 females) denture patients were treated and evaluated. Table 2 Frequency distribution for retention at various areas among 4 groups before relining and after relining (%). Retention in maxillary anterior region was improved from 28% to 80%.Maxillary posterior region 13% to 82.6%, Mandibular posterior region from 28to 80%.

Table 1. Showing Gender distribution among the study

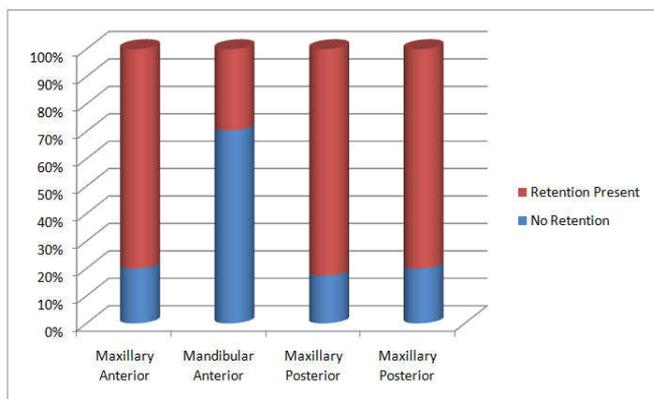
Group		Frequency	Percent	
Maxillary	Anterior /posterior	Male	21	84.0
		Female	4	16.0
		Total	25	100.0
Mandibular	Anterior/ posterior	Male	16	64.0
		Female	9	36.0
		Total	25	100.0

Table 2. Frequency distribution for retention at various areas among 4 groups before relining and after relining (%)

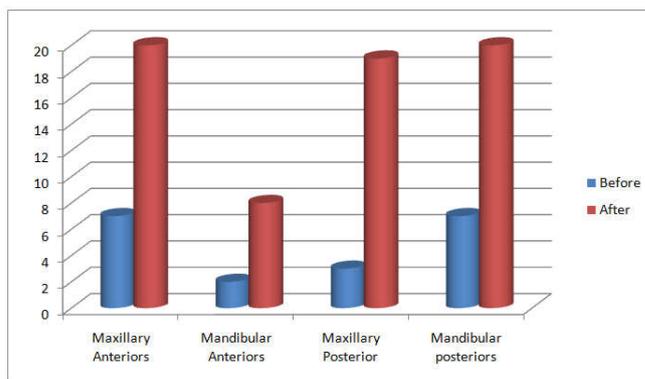
Fourgroups	Retention at various region (%)			
	Before relining		After relining	
	Present	Absent	Present	Absent
Maxillary anterior	28.0	72.0	80.0	20.0
Mandibular anterior	7.4	92.6	29.6	70.4
Maxillary posterior	13.0	87.0	82.6	17.4
Mandiular posterior	28.0	72.0	80.0	20.0



Graph 1. Frequency distribution for retention among 4 groups before relining



Graph 2. Showing Frequency distributions for retention among 4 groups after relining



Before and after comparison for retention among two groups (maxillary/mandibular)

Graph 3. Showing Retention cases before and after relining among four groups

Table 3. Association between retention and group by Chi Square Test between four groups before relining

Count		Before relining		Total	Chi square value	P value
		No retention	Retention present			
Fourgroups	Maxillary anterior	18	7	25	5.520	0.137
	Mandibular anterior	23	2	25		
	Maxillary posterior	20	3	23		
	Mandibular posterior	18	7	25		
Total		81	19	100		

Chi-Square Tests			
	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	5.520 ^a	3	.137
Likelihood Ratio	5.879	3	.118
Linear-by-Linear Association	.040	1	.842
N of Valid Cases	100		

a. 3 cells (37.5%) have expected count less than 5. The minimum expected count is 4.37.

Table 4. Fourgroups * After Relining

Count		After relining		Total	Chi square value	P value
		No retention	Retention present			
Fourgroups	Maxillary anterior	5	20	25	24.410	<0.001
	Mandibular anterior	19	8	27		
	Maxillary posterior	4	19	23		
	Mandibular posterior	5	20	25		
Total		33	67	100		

Chi-Square Tests			
	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	23.410 ^a	3	.000
Likelihood Ratio	22.726	3	.000
Linear-by-Linear Association	1.676	1	.195
N of Valid Cases	100		

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 7.59.

Minimal improvement was observed in mandibular anterior region from 7.4 to 29.6%. Table 3 and table 4 shows comparison of retention between before and after relining using Chi Square Test among four sites i.e. maxillary anterior and posterior, mandibular anterior and posterior region. The results show statistically significant ($p < 0.05$) rise in the retention in maxillary anterior, posterior region and mandibular posterior region. In case of mandibular anterior region minimum increase in retention was observed. However such small increase in retention was not found to be statistically significant ($p < 0.05$).

DISCUSSION

Removable dentures have been used extensively for the rehabilitation of the completely and partially edentulous patients and the success of these restorations greatly depends on retention, support and stability. The major objective in the fabrication of complete denture is to attain a denture base that conforms to the supporting tissues with a high degree of accuracy. With greater accuracy of the base in relation to the underlying tissues, the prosthesis becomes more stable (Barco, 1979). The relining of complete dentures involves solving all

these problems encountered in the dentures, except positioning individual teeth in vertical dimension (Boucher, 2004). Hard direct autopolymerizing relining resins are similar in composition, surface reproduction, and dimensional change to autopolymerizing denture base acrylic resins (McCabe, 1974). Ill-fitting dentures causes trauma to both underlying hard and soft tissue as well as psychological stress. In this condition, patient does not accept treatment plan of fabrication of new denture because it requires 4-5 more visits, more money and questionable results. The conventional relining procedure also requires 2-3 visits, and the long laboratory procedure and poor esthetics. In chairside permanent relining patient gets satisfied due to quick result, single appointment, and esthetic superior to conventional relining. Autopolymerizing chairside relining resins are found to be more dimensionally accurate than conventional laboratory heat polymerizing relining resins (Tewary, 2014). Wyatt et al. (1986), and Bunch et al. (1987) reported that chairside hard relining material showed the lowest peak polymerization temperature than the other autopolymerizing acrylic resins tested, being more favorable to perform denture base relining directly in the mouth (Wyatt, 1986).

The results from study done by CR Leles (2001) indicated that the bond strength of the hard chairside relining resin can vary when using different surface treatments of the acrylic denture base material. Treating the surface with Lucitone 550 monomer or chloroform improves the sites for bonding, and promoted the highest transverse bond mean values (Leles, 2001). Kooliner and Ufi Gel Hard exhibited less dimensional change in comparison Trevalon, and DPI Heat Cure (Craig, 1985). Denture relining materials Ufi Gel hard and all the hard lining materials tested in a study showed high cell viability and good biocompatibility at all incubation periods, indicating that they were safe for clinical use (Ayse, 2012). Whereas both direct relining resins revealed cytotoxicity to human fibroblasts: Kooliner specimens showed to be severely cytotoxic and Ufi Gel Hard specimens slightly cytotoxic. In Ufi Gel Hard, the most effective post-polymerization treatment on removing RM was the 20% ethanol solution at $55 \pm 2^\circ\text{C}$, without compromising their mechanical properties.

Effect of Salivary Acetylcholinesterase on the Degradation of Acrylic Relining Resins

In present study 50 maxillary dentures of 38 males and 12 females with mean age of 58.6 years (Table 1) were relined. Table 1 Shows Gender distribution among the study Total 50 denture patients (25 maxillary and 25 mandibular) were participated in the study. Table 2 shows frequency distribution for percentage of change retention at various areas among 4 groups before relining and after relining. Retention in maxillary anterior region was improved from 28.0 % to 80% cases. Maxillary posterior region 13% to 82.6%, Mandibular posterior region from 28.0 to 80.0% cases. No significant improvement seen in mandibular anterior region which was from 7.4% to 29.6%. Table 3 and table 4 shows comparison of retention between before and after relining was done using Chi Square Test among four sites i.e. maxillary anterior and posterior, mandibular anterior and posterior region. The results shows statistically significant rise in the retention in maxillary anterior, posterior region and mandibular posterior region. In case of mandibular anterior region no rise in retention seen statically. The possible same could be decreased surface area of edentulous mandibular anterior region and increased

amount of horizontal and vertical resorption of the ridges. Absence of inclined planes contribute to decreased retention. The procedure is faster than the conventional relining method and does not result in any clinically significant dimensional change or warpage in the denture base (Seo, 2007).

Conclusion

Within the limitation of this study, following could be concluded,

- Hard permanent chairside reliners are effective alternative to time consuming laboratory processing technique of relining removable dental prosthesis.
- Hard permanent chairside reliners significantly enhance the retention in anterior, posterior region of maxilla and posterior region of mandibular edentulous ridges. However, their use is limited when relining of mandibular anterior region is considered.

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