

# Clinical Performance of Various Resilient Liners

Kankana Lahiri Banerjee<sup>1</sup>, Pratheek Shetty<sup>2</sup>

1- Senior Lecturer, Dept. of Prosthodontics, Awadh Dental College, Jamshedpur, Jharkhand India. 2- Professor & Head, Dept. of Prosthodontics, Jamshedpur, Jharkhand India.

Correspondence to:

Dr. Kankana Lahiri Banerjee, w/o Dr. Sudipto Banerjee,  
824, New Sitaram Dera, post- Agrico, Jamshedpur, Jharkhand.  
Contact Us: www.ijohmr.com

## ABSTRACT

Denture soft lining materials liner materials have been used to provide cushion between the denture base and the supporting tissues and allow for more uniform distribution of stresses at the mucosa/tissues interface, as well as it help in better distribution of the occlusal forces. Among the benefits of this material is more undercuts engagement, treatment of patients with residual ridge atrophy, relatively thin mucosa, xerostomia and when the denture opposes natural dentition. Till date, large numbers of products have been recommended as the ideal soft denture liner. Although those used rampantly in prosthetic dentistry, their properties are far from ideal. The following article compares and evaluates various resilient liners in terms of their clinical performance and determines their superiority based on their long term use.

**KEYWORDS:** Clinical Performance, Various Resilient Liners.

## INTRODUCTION

Relining is the procedure used to resurface the tissue side of the removable dental prosthesis with a new base material, thus; producing an accurate adaptations the denture foundation area. The contemporary prosthetics uses a great variety of lining materials which become hard after polymerization, and according to their chemical composition and physical properties, are very similar to the denture base materials, however, the materials which maintain soft after polymerization and are well recognized in the prosthetic dentistry as "Soft-Lining Materials". as soft polymers applied to the fitting surface of the denture for the purpose of reducing and more evenly distributing occlusal loading on the underlying mucosal tissues.<sup>1</sup> Tissue conditioners are soft, resilient materials whose function is for very short duration generally a matter of few days. They are commonly used as temporary liner and have been widely used in dentistry to manage a multitude of patient problems and for various clinical applications.

The viscoelastic and elastic property of tissue conditioners result in an even distribution of load on the underlying mucosa and the cushioning of the cyclic forces of mastication. This in turn allows the traumatized mucosa to recover particularly under an ill fitting denture. Long term soft liners (Permanent soft liners) are mostly used as therapeutic measures for patients who cannot tolerate the stresses induced by dentures. It is used in patients who suffer from chronic pain, soreness or discomfort due to prolonged contact between denture base material and to the underlying tissues. They are also indicated in patients with sharp, thin or heavily resorbed ridges or those with severe undercuts. The soft lining materials include:

1. Acrylic resins.<sup>1</sup>
  - Heat polymerized acrylic materials.
  - Room temperature polymerized soft acrylics.
- 2) Silicone elastomers.
  - Room temperature polymerized condensation silicone rubber.
  - Heat polymerized silicone rubber.
  - One paste silicone rubber.
  - Addition silicone rubber.
  - Fluorosilicone.
  - polyphosphazine elastomer system.
3. The experimental systems include
  - Natural rubber/PMMA graft copolymer system.
  - Powdered elastomer soft acrylic systems.
  - Fluoropolymers.

Silicone rubbers are not dependant on leachable plasticizers in contrast to plasticized acrylic resins and therefore, retain their elastic property for prolonged periods. Silicon liners undergo significant volume changes with gain and loss of water may lose adhesion to the underlying denture base.<sup>3,4</sup> Soft liners exert a significant effect on associated denture base thickness.

Most challenging in the use of long and short term is their tendency to support the growth of candida albicans and other micro organisms on or within the liner.<sup>7</sup>

Cleaning of soft liners can be carried out with a soft brush in conjunction with a mild detergent or non abrasive dentifrice. Recent development attempts include surface coating of liners and integration with an antifungal component. Based on these studies information resilient liners if used intelligently is an excellent adjunct in removable prosthodontics.

How to cite this article:

Banerjee KL, Shetty P. Clinical Performance of Various Resilient Liners. *Int J Oral Health Med Res* 2015;2(1):74-77.

## REVIEW OF LITERATURE

Numerous studies have been done regarding the clinical performance of resilient liners. McCabe JF (1998) evaluated a recently developed polyvinylsiloxane denture soft lining material, similar to that used in addition-curing silicone impression materials. They compared certain key properties (setting characteristics, resistance to penetration, elastic properties, water absorption, peel strength and contact angle with water) of the new materials with those of the commercially available materials. They concluded that in many respects the properties of the new material were noted to be similar to those of a heat cured silicone product.

Hiroshi et al, (1998) found the acrylic resin materials exhibited the greatest changes in viscoelastic properties over time when compared with silicone and fluoroethylene materials. They concluded that it is important to select denture liner materials according to clinical implications and its physical and chemical properties.

Anil N, Hekimoglu C, Sabim S (1999) investigated the colour stability of heat polymerized, and auto polymerized soft denture liners. Color measurements were recorded before and after the accelerated aging process and the changes observed. They concluded that heat polymerized soft liners were more color stable than auto polymerized soft liners. They found no significant differences among heat polymerized materials; but however differences in color change were found between the 2 auto polymerized liners.<sup>3</sup>

Kiat-Amnuay, S Khan Z, studied the over denture retention of four varieties of four resilient denture lining materials over an implant bar, after cyclic insertion and removal over a period of 18 months. They observed the silicon liners to be superior in retention than their acrylic counterparts.<sup>6</sup>

Canay S, Hersek N Tulunoglu, I UzunG (1999) evaluated both the colour stability and hardness changes of soft lining materials in food colourant solutions. Three commercially available materials were exposed to 3% erythrosine, tartrazine, and sunset yellow solutions respectively and evaluated after 1, 3 and 6 months. The results showed the silicon type of material shows more stability to color and hardness than their acrylic counter parts.<sup>5</sup>

Shim JS, Watts DC (2000) studied on the effect of a soft liner on stress distribution within a mandibular complete denture. They found out the control of excess lateral occlusal contact might be helpful to reduce the probability of a fracture in soft lined mandibular complete dentures.<sup>7</sup>

Murata H, Taguchi N et al, (2002) evaluated the dynamic visco-elasticity of soft liners and their masticatory function. This study shows the soft denture liners application in edentulous patients to cushion functional forces. They evaluated the masticatory function of ten subjects by measurements of maximum

bite forces and chewing times and frequencies for 2 food samples, and by the use of visual analogue scales. The acrylic materials exhibited viscoelastic behavior, while the silicones exhibited elastic behavior. The improvement in masticatory function compared with hard resin was found to be in the order:

Acrylic Permanent Materials > Silicone > Acrylic Temporary Materials.

Kulak-Ozkan Y, Sertgoz A, Gedik H, (2003) studied the effect of thermo cycling on the tensile bond strength of six silicon based resilient denture liners. They were (Ufigel C, Ufigel P, Molloplast-b, Permafix, and Permaflex. Among these only Ufigel C, and Mollosil bond strength was not found to decrease after thermo cycling, they also found the others to be suitable for clinical use.<sup>9</sup>

Hayakawa I, Keh E S, Morizawa M, Muraoka G, Hiramasa (2003) investigated some clinically relevant properties of a newly developed polyisoprene-based light cure lining material.<sup>8</sup> They concluded from their study that this material showed low water absorption and solubility, moderate softness, high staining resistance and satisfactory shear bond strength to denture base resin. It also provides the clinicians sufficient working time due to its light curing property, thus an attractive alternative as a relining material.

Ayşe Mese and Kahraman G. Guzel (2008) in their study on the effect of storage duration on the tensile bond strength and hardness of acrylic resin and silicone-based resilient liners that were either heat or auto polymerized onto denture base acrylic resin. They concluded that the specimens of resilient liners immersed in water demonstrated significantly lower bond strength values and higher hardness values over time.

Hyun-Suk Cha, Bin Yu, Yong-Keun Lee (2011) conducted a study to evaluate changes after cyclic loading in the stress relaxation property and the softness of commonly used soft lining materials. One was plasticized acrylic-based material and two silicone-based materials were studied. They found Soft lining materials exhibited changes in stress relaxation properties after the storage period regardless of the application of cyclic loading.<sup>11</sup>

## DISCUSSION

Soft liners are used for relining immediate or transitional dentures during the healing periods after tooth extraction and implant surgery. A soft liner is used to minimize direct pressure to the tissues. Before the application of a soft liner, the denture must be evaluated as clinically acceptable. The liner should not be used to compensate for a poorly made, ill-fitting prosthesis. A liner should be used only to improve a clinically acceptable prosthesis.

Dimensional stability and compliance of the denture liner is affected by the leaching out of the plasticizers from the

denture liner and the water absorption by the polymer. Some studies have been done to determine the rate of leaching of plasticizer from the lining material. The comparison was done in order to prevent the leaching out of the plasticizers from the lining materials, and to maintain the resiliency, some researchers have reported that the surface coating of temporary soft liners with semi set methyl methacrylate resin significantly increased the resiliency of these tests samples than their uncoated counterparts.

Mccabe JF (1998) reported the similar properties of poly vinyl siloxanes with the silicone soft lining material. Silicone materials, are used because of better handling properties and longer shelf life. Silicone soft liners often present problems with establishing a durable bond with the denture base, but this problem may be overcome by using a suitable solvent-based primer. According to a current clinical study, may offer some advantages which warrant its which warrants its clinical evaluation.

The physical and mechanical properties of many of the elastomeric resilient liners are affected by accelerated aging and no soft liners are proved to be superior to others.

It was found out that the bond strength between soft denture liners (HTV and RTV) topoly methyl methacrylate was better when polymerized in conventional water bath technique than microwave curing techniques. The resilient liners reduced the impact force to the ridge when compared with denture base resins.<sup>10</sup>

Studies have shown that the soft lining material had outlasted the acrylic teeth in many cases and occlusal wear was the most common reason cited for the need to replace the complete denture. Also after storage in water for six months, some silicone rubber materials were not stronger than irreversible hydrocolloid materials.

While comparing the serviceability of two soft linings viz silicon-based Molloplast-B and the heat-cured plasticized acrylic the denture fracture was the most common cause of lining failure for Molloplast-B and occurred more frequently than with plasticized acrylic. It has been found out that control of excess lateral occlusal contact might be helpful to reduce the probability of a fracture in soft lined mandibular complete dentures. Comparison between various resilient soft liners showed that improvement in masticatory function is in the order:

Acrylic permanent materials > silicone > acrylic temporary materials

A new polyisoprene- based light curing denture soft lining material has been studied by researchers. This material showed low water absorption and solubility, moderate softness, high staining resistance and satisfactory shear bond strength to the denture base resin. It also provided clinician's sufficient working time due to its light curing property. It would be an attractive alternate as relining material.

Kiat-Amnway S, Khan Z, et al<sup>5</sup> (1999) evaluated the over denture retention of four resilient liners over an implant bar and found that the silicon-based resilient liners retained the over dentures well. The plasticized acrylic was less retentive compared with silicon liners.

## CONCLUSION

Within the scope of the present review on the clinical performance of different resilient liners, following observations were made:

- Soft lining heat cure silicon materials have lasted acrylic teeth in many cases and occlusal wear was a common reason cited for the need to replace the complete denture.
- The silicon lining materials are more resistant to colour change and hardness than the acrylic type soft liners.
- The improvement in the masticatory function was found to be in the order: acrylic permanent materials > silicone > acrylic temporary materials.
- The serviceability of Molloplast-b- linings was significantly greater than that of heat cured plasticized acrylic. Denture fracture was the most common cause of lining failure for Molloplast-b and occurs more frequently than with plasticized acrylic.
- The silicone based silicon showed excellent shock absorption.
- The silicon based resilient liners, retain implant overdenture better than plasticized acrylic.
- The growth of C.albicans to soft lining materials was significantly less than that for an acrylic resin denture base.

The silicone rubbers when properly used may be the most appropriate of the various types available now.

## REFERENCES

1. Thomas C J, Mori T Resilient lining materials for dentures. *Aust Prosthodont J* 1993; 7:45-47.
2. Braden M, Wright PS, Parker S. Soft lining materials-A review. *Euro J Prosthodont Restor Dent*. 1995 June; 3(4):163-174.
3. Anil N, Hekimoglu C, Sabim S. Color stability of heat polymerized and autopolymerized soft denture liners. *J Prosthet Dent*. 1999 Apr; 81(4):481-484.
4. Anusavice: Philips' science of dental materials 10<sup>th</sup> edition. W.B. Saunders Philadelphia 2002. pg 264-266.
5. Canay S, Hersek N, Tulunoglu I, Uzun G; Evaluation of colour and hardness changes of soft lining materials in food colorant solutions. *J oral rehab*. 1999 Oct; 26(10):821-829.
6. Kiat-Amnuay S, Khan Z, Gettleman L Overdenture retention of four resilient liners over an implant bar. *J Prosthet Dent*. 1999 May; 81(5):568-573.
7. Shim JS, Watts DC. An examination of the stress distribution in a soft lined acrylic resin mandibular complete denture by finite element analysis. *Int J Prosthodont* 2000 Jan-Feb; 13(1):19-24.
8. Hayakawa I, Keh E S, Morizawa M, Muraoka G, Hiramasa. A new poly-isoprene based light curing denture soft lining material. *J Dent* 2003 May; 31 (4):269-274.

9. Kulak-Ozkan Y, Sertgoz A, Gedik H. Effect of thermocycling on tensile bond strength of six silicone-based resilient denture liners. *J Prosthet Dent*. 2002 Mar; 87(3):311-318.
10. Zarb-Golander: Prosthodontic treatment for edentulous patients 12<sup>th</sup> edition. Mosby 2004, 198-202.
11. Hyun-Suk C, Bin Yu, Young-Keun- Lee Changes in stress relaxation property and softness of soft denture lining materials after cyclic loading. *J Dental Materials* (2011) March; 27(3):291-7.

Source of Support: Nil  
Conflict of Interest: Nil