

# Resilient Liners: A Review

**Dr. Gurleen Kaur**

Reader, Department of Prosthodontics,  
Subharti dental college and hospital, Meerut.

**Dr Prerna Kataria**

Department of Periodontics,  
Krishna Dental College,U.P., India.

**Dr. Mudit Uppal**

Reader, Dept. of Conservative Dentistry & Endodontics,  
I.T.S. Dental college & research centre,  
47, knowledge park III, Greater Noida, (U.P.) India.

## Abstract

Prosthodontics is greatly concerned with the prevention and treatment of chronic soreness from dentures and the preservation of the supporting structures. To alleviate the possibility of discomfort arising from denture base force transfer to oral mucosa, manufacturers have developed soft denture base liners. They act as a cushion for the denture bearing mucosa through the absorption and redistribution of forces transmitted to the stress bearing areas of the edentulous ridges. This review covers in detail about the characteristics of short and long term soft denture liners and their future in prosthodontics.

## Introduction

To be able to place a denture bearing area in a physiologically sound condition so that they will be able best to withstand the force and motion acting on them by the thrust of dentures has always been an ideal of a conscientious prosthodontists.<sup>1</sup>

Acrylic resin denture bases provide an artificial substructure that maintains the position of the denture teeth and an interfacial area of the oral mucosa over which the forces of occlusion are borne. The modulus of elasticity of acrylic resin denture (2400 Mpa) is significantly higher than that of the tissue on which they rest (1.25 to 5 M pa).<sup>2</sup> Because of the friable nature of the supporting mucosa, areas of force concentration, or misfit of the denture base, can result in tissue trauma and sore spots. Denture soft materials provide a cushion between the hard denture base and supporting tissue and are used to relieve the pressures transmitted by the denture on the mucosa.

Soft denture liners have a key role in

modern prosthodontics because of their capability of restoring health to inflamed and distorted mucosa.

## Classification of Soft Liners

These can be broadly divided into two categories:

- i) Chemically activated/ Short term soft liners/ tissue conditioners
- ii) Permanent soft lining materials or long term soft liners.<sup>3</sup>

The ISO categorizes a short term liner as one used intraorally upto 30 days. A long term liner is categorized as one that maintains softness and elasticity for more than 30 days.

Short term liners can further be categorized as: tissue conditioners and temporary soft liners used for upto one month following surgical procedures, diagnostic procedures, immediate placement of transitional dentures, immediate transitional dentures and other temporary situations.

Liners used from 1-6 months are categorized as intermediate liners. Although the ISO categorizes a long term liner as one used for one year or longer, these liners are commonly referred to as permanent soft liners because of their relative longevity.

The use of resilient denture liners began as early as 1943, but only in the last 30 years, they have become truly effective. Various materials that have been used from the past as soft liners can be classified as:<sup>4</sup>

- 1) natural rubber
- 2) polyvinyl chloride
- 3) polyvinyl acetate
- 4) methylmethacrylate copolymer
- 5) silicone products

## Tissue Conditioners

Tissue conditioners are soft denture

liners that are used to provide a temporary cushion which prevents masticatory loads from being transferred to the underlying hard and soft tissues.

## Composition & Character

Tissue conditioners are composed of:

POLYMER-Polyethylmethacrylate, poly(ethylacrylate) or Butyl (methacrylate)

MONOMER-25% ethanol phthalate plasticizer-(Dibutyl phthalate or butyl phthalate-butyl glycolate)

The distribution of large plasticizer molecules minimizes entanglement of polymer chains and thereby permit individual chains to slip past one another. This slipping motion permits rapid changes in the shape of the tissue conditioner and provides a cushioning effect for the underlying tissues. When mixed it is a purely physical process.

Consequently, the resilient liners are considered short term soft liners/tissue conditioners. Although plasticizers impart flexibility they also present certain difficulties. Plasticizers are not bound within the resin mass and therefore may be "leached out" of soft liners. As this occurs soft liners become more rigid.

## Uses of tissue conditioners<sup>5</sup>

1. Adjuncts In Tissue Conditioning
2. Temporary Obturators:
3. Stabilizers Of Base Plates:
4. Adjuncts In The Impression Making or as a Final Impression Material.

## Problems Associated With Tissue Conditioning Materials:

Tissue conditioning is a meticulous procedure that demands care and knowledge. Its use will lead to abuse if the basic principles of prosthodontics are violated. Some problems associated are:

1. Their longevity in wear is very

The advertisement features a central image of a modern dental chair with various adjustable components. To the left, there is a logo for 'Olsen' with the tagline 'The Innovation has this brand'. To the right, there is a logo for 'dentomed healthcare' with the website 'www.dentomedhc.com' and a phone number '+91-9654350641, 9560223355'. Text in the advertisement includes 'QUALITY CROSS FLEX', 'Dentomed', 'Smiles', and 'The Innovation has this brand'.

limited, they harden and roughen because of loss of plasticizer.

2. It has been observed that when patients have been wearing dentures with tissue conditioning materials, small whitish elevation of fungal growth appear on this material. This phenomenon has previously been reported by GIBBONS.

3. Patients complain about the burning sensation which occurs during the processing of self curing liners when directly done in the mouth. The life of a temporary liner can be greatly enhanced and the surface kept clean and smooth by the use of a sealer coat of **monopoly**.

**Permanent/long Term Soft Liners:**

Long term soft denture linings are most commonly indicated for patients who appear unable to withstand functional loads and who complain of persistent soreness beneath their dentures. Without a resilient liner, surface hardness of PMMA may lead to chronic soreness, due to pressure on the mental foramina, sharp bony spicules, then atrophic mucosa, bony undercuts, irregular bony resorption, poor fit of the denture base, incorrect occlusal relationship, bruxism and/or debilitating disease.<sup>6</sup>

Resilient liners can be divided into two main types:

- Plasticized acrylic resins
- Silicone elastomers.

Both material types are available in auto and heat polymerized forms.

**Composition & Character:** The materials used for resilient liners have been velum rubber, vinyl and vinyl acrylic polymers, acrylic polymers and silicone elastomers.

Acrylic resin materials generally consist of powder and liquid compositions. The composition of powders and liquids are not well known, but are generally thought to be acrylic polymers and co-polymers along with a liquid containing an acrylic monomer and plasticizer (ethyl alcohol/ethyl acetate). It has been suggested that the initial softness

of the plasticized acrylics is due to the large quantity of plasticizer in the liquid. The purpose of the plasticizer is to lower the glass transition temperature of the polymer to a value below mouth temperature so that the amount of permanent deformation of the resilient material is reduced to a satisfactory level. Leaching out of the plasticizer is responsible for hardening of the acrylic resin over time.

Silicone resilient lining materials are similar in composition to silicone impression materials. These products are Dimethylsiloxane polymers (supplied as single paste). Polydimethylsiloxane is a viscous liquid that can be cross-linked to form a rubber with good elastic properties. The liquid polymer is formulated into a paste by adding inert fillers such as silica. The paste also contains a free radical initiator such as peroxide which breaks down on heating to initiate a cross-linking reaction.

The cold cure silicone products are supplied as a paste and liquid. The paste contains a hydroxyl terminated polydimethylsiloxane liquid polymer and inert filler. The liquid contains a mixture of cross-linking agent, such as, tetra-ethyl silicate and a catalyst which is normally an organotin compound such as dibutyl tin dilaurate. On mixing the paste and liquid a condensation cross-linking reaction takes place. Alcohol is produced as a by product in this reaction. Cross linking causes the paste to be converted to a rubber.

**Desirable Properties In A Soft Denture Resin**

1. Ease Of Processing
2. Dimensional Stability During Processing
3. Water Absorption
4. Bond Strength Of The Resilient To Rigid Resin
5. Abrasion Resistance
6. Permanency Of Resiliency

**Use Of Resilient Liners**

**1) Ridge atrophy or resorption :** A resilient liner can be used when the patient has an atrophic mandibular ridge with bilateral dehiscence mental foramina or mandibular canals. Excessive pressure by the denture on the mandibular and mental nerves and blood vessels should be avoided, since paraesthesia of the lower lip and chin region and pain and irritation of the mucosa may result. Knife edged mandibular ridges resulting from excessive resorption may also be included.

**2) Contraindicated surgery:** Flexible materials may be used in instances in which surgical correction of tissue undercuts is contraindicated. When bilateral opposing undercuts, as in retromylohyoid regions or maxillary tuberosities, exist, the treatment of choice may be surgical reduction. However many patients cannot afford such a treatment, or may not agree and the general health of some may not permit such a procedure. A flexible material in the region of the undercut can solve the problem.

**3) Relief Areas :** Resilient plastics have also been used to prevent irritation and relieve pressure on a median palatal raphe. A layer of soft material is placed on the region of raphe to provide relief. Thus, a relief chamber on the maxillary denture and the possibility of development of hyperplastic tissue reaction are avoided.<sup>67</sup>

**4) Restoration of congenital or acquired oral defects:** Flexible materials are used in the fabrication of prosthetic restorations for congenital or acquired oral defects. Soft materials afford maximal retention by permitting the use of deep undercuts regions without irritating or traumatizing the soft, often sensitive, or easily irritated tissues.

**5) Postirradiation:** As a means of preventing excessive irritation, soft plastics can be used in dentures for patients who have received irradiation.

**6) Bruxomania:** Unfortunately, many

**QUALITY FLEX (OLSEN-BRAZIL)**  
 Dental Chair Over The Head Delivery Unit With 3 Programmable Working Positions & Zero Position

- All the chairs are made of steel with chrome
- 3 Free leg position
- Adjustable to 60° position
- Control console flex arm with pneumatic lock
- Original Hilti/Bosch delivery system with 20,000
- Chair height with 3 intensity (14,300 / 18,000 / 24,000 mm)
- Monitor screen
- Automatic back rest
- 90° monitor, 17.5" diagonal screen level
- Spectacular execution of Back rest & Seat
- Lamp & High Pressure section
- Six speed for operation

**dentomed healthcare**  
 www.dentomedhc.com  
 +91-9654350641, 9560223355

patients have the habit of bruxing their teeth. The habit is very detrimental to the supporting tissues of the mouth. The constant idle grinding, clenching and rubbing of the occlusal surfaces of the denture transmit an intermittent shearing stresses to the basal seat which results in mucosal irritation and subsequent bone loss. These habits seem to be quite common in the highly tense and anxious patients. The use of a resilient liner helps protect the supporting tissues from this excessive stress.

**7) Xerostomia:** In patients with dry mouth due to a systemic disease such as diabetes, it is particularly important to protect oral tissues from chronic soreness and osteoradionecrosis. The use of a resilient liner can be very helpful in these situations. But caution should be observed in their use for patients with severe xerostomia, because resilient materials can be as much of an irritant as the hard denture base.

**Home Reline Materials : The Significance Of Problems**

Home reliner materials are those materials manufactured for sale through retail outlets, usually drug stores, to denture wearers who hope to improve the comfort of their dentures. These materials are produced as wax and gauze pads in the basic shape of the dentures, as soft plastic sheets to be adapted to the denture on the tissue surface and then trimmed, as a plastic capable of flowing to conform to the shape of the arch when applied to the tissue surface of the denture, or as a powder and monomer to be mixed by the customer.<sup>7</sup>

The promoters of home reliner materials sold to the public for the correction of denture problems fail to adequately advise the uses of the very temporary nature of the product. The customer believes the material can be used indefinitely, understanding only that new applications or changes must be made periodically.

The oral tissues of every denture patient undergo physiologic and pathologic changes. Home relined dentures are ill fitting dentures and likewise contribute to the pathological changes in the oral tissues.

When the home reliner material is applied to the denture and the denture is placed in the mouth, there is noticeable immediate increase in the VDO with a concomitant decrease in the vertical dimension of interocclusal distance. As the subject closes the jaws, the soft tissues under the basal seat of the dentures contribute to changes in the relative position of the bones to each other, when varying pressures are applied. The vertical movement of the denture bases, when closing pressures are applied<sup>8</sup> changes not only the relation of the bases to the bone, but it also changes the vertical and horizontal relations of the mandible and the maxilla. These changes in the vertical and horizontal relations of the bones produce a malocclusion of the denture which further results in the hyperplasia of soft tissues beneath or resorption of alveolar bone or both.

Another study<sup>8</sup> conducted in which three duplicate dentures for each of five patients were constructed. Three different reliners used to record directly the contour of the mounted specimen. The contour tracings show that these do it yourself reline materials do not adapt well to the basal seat under dentures. Instead, they create contours that may cause severe and irreparable tissue damage. These materials cause vertical and horizontal dimensional changes at the tooth surfaces which alter occlusal relationships that may perpetuate damage to the opposing arch.

**Summary & Conclusion**

Soft lining materials when used judiciously and in combination with sound principles, can be an invaluable tool in dentistry. However too much credit must not be given to them for their ability to

rejuvenate traumatized oral tissues.

These materials have been used in dentistry for more than a century and since then materials have created an unusual interest. A lengthy period of clinical as well as laboratory research on these materials have been conducted but none of the materials can be considered ideal.

Thus it appears that soft liners will have a place in denture prosthetics in the future, but improved strength, adhesion to denture base and growth of micro organisms are problems that need to be solved before these materials will be considered permanent. This may be just a dream to find all these qualities in a single material, but without a dream there is no idea, without an idea there is no research and without a research there is no progress.

Although not a panacea, soft liner materials provide the practitioner with a valuable tool in providing excellent clinical care for patients.

**References**

- 1) Earl pound. Conditioning of denture patients. J Prosthet dent; 1967,18; 116-121
- 2) Kydd WL, Mandley J. The stiffness of palatal mucoperiosteum of denture patients. JADA April, 1962; 64: 461-475.
- 3) John F. McCabe. Applied dental materials. 7<sup>th</sup> edition. Pg 97-103
- 4) G.A. Lammie. Aging changes and the complete lower denture. JProsthet Dent; 6: 450-464, 1956.
- 5) Blanca Liliana Torres Leon, Altair Antoninha Del Bel Cury and Rana Cunha Matheus Rodrigues Garcia. Water sorption, solubility, and tensile bond strength of resilient denture lining materials polymerized by different methods after thermal cycling. J Prosthet Dent March; 2005; 93: 282-287.
- 6) Julian B. Woelfel and George C. Paffenbarger. Evaluation of complete dentures lined with resilient silicone rubber. JADA, vol.76, march 1968: 582-590.
- 7) Craig R. Means. A study of the use of home reliners in dentures. J Prosthet Dent; July-Aug, 1964; 14: 623-634.
- 8) Joan B. Gonzalez and William R. Laney. Resilient materials for denture prostheses. J Prosthet Dent; May-june, 1966; 16: 438-444.

The advertisement is divided into three main sections. On the left, the GoodDrs logo is displayed with the website URL <http://www.gooddrs.com>. The middle section features three dental curing light models: AT (GOODDRS), DURA LC PLUS, and DURA LC PENGUINE. Each model is accompanied by a list of technical specifications such as power, wavelength, and curing time. On the right, the Dentomed healthcare logo is shown with the website [www.dentomedhc.com](http://www.dentomedhc.com) and a phone number: +91-9654350641, 9560223355.