ABSTRACT. Soft denture liners are an important adjunct in the treatment of removable partial and complete denture patients particularly those who are medically compromised. In this study the surface topography of the heat cure denture base resin before and after surface pretreatment with methyl methacrylate is estimated using scanning electron microscope.

INTRODUCTION: Denture soreness with associated pain is one of the most alarming situations seen in complete denture wearers. Hard acrylic denture bases are liable to stress the mucosa beyond its physiological levels of tolerance leading to inflammation and resorption. Excessive resorption of the residual ridges may cause impairment of stability of the denture bases, which is accompanied by soreness, pain and discomfort to the patient masticatory system. Soft denture liners are an important adjunct in the treatment of removable partial and complete denture patients particularly those who are medically compromised.

The present study was conducted to evaluate the surface topography of the heat cure denture base resin and observe before and after surface pretreatment with methyl methacrylate by scanning electron microscope.

AIMS OF THE STUDY

To study the surface topography of the heat cure denture base resin before and after surface pretreatment with methyl methacrylate by scanning electron microscope.

COMPARISON OF THE SURFACE TOPOGRAPHY OF THE HEAT CURE DENTURE BASE RESIN BEFORE AND AFTER SURFACE PRETREATMENT WITH METHYL METHACRYLATE BY SCANNING ELECTRON MICROSCOPE. –AN INVITRO STUDY.

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PREPARATION OF THE TEST SAMPLES

DETAILS OF THE METAL DIES

PREPARATION OF HEAT CURED ACRYLIC BLOCKS:

Mold space was created from one steel die size of 40 x 10 x 10mm and one steel die for a size of 10 x 10 x 3mm were prepared and all these surfaces were smooth and flat with sharp edges. Theses steel dies are used to fabricate the acrylic blocks and soft liners blocks respectively.

PREPARATION OF MOLD SPACE FOR LINER PLACEMENT:

The two rectangular shaped steel dies 40 x 10 x 10mm and one steel die 10 x 10 x 3mm were flasked with type II gypsum. The size 10 x 10 x 3mm steel die placed in-between the two steel dies of 40 x 10 x 10mm. After the flasking procedure the dies were removed to create a mold space. The 40 x 10 x 10mm mold space was used for placement of acrylic blocks which are already fabricated and 10 x 10 x 3mm mold space was used for soft liner placement.

PREPARATION OF SAMPLES

The surfaces of the acrylic blocks to be bonded with soft liners were coated with primer R and dried with clean air, and auto polymerized silicone soft liners were packed into the mold space. After the packing procedure the flask was kept under bench press for 10 minutes, then the samples were removed.

PREPARATION OF THE TEST SAMPLES:

Two rectangular steel dies were prepared and it has two parts.

LID:

The dimension of the lid is 85mm length X 35mm width X 4mm thickness. The surfaces of the lid were smooth, flat and the corners were rounded.

BASE:

Base metal die has two sides. One side of the steel die, mold space was prepared for the dimension of 75mm length x 5mm depth x 25mm width.

MATERIALS USED:

<table>
<thead>
<tr>
<th>SL.No</th>
<th>Material Commercial Name</th>
<th>Type of polymerization</th>
<th>Form of the materials</th>
<th>Manufacturers Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>G.C RELINE TM SOFT (ELD)</td>
<td>Auto polymerized silicone soft liner</td>
<td>Powder &amp; Liquid</td>
<td>G.C corporation Tokyo Japan</td>
</tr>
<tr>
<td>2</td>
<td>COIL – SOFTIM RESILIENT EELA</td>
<td>Auto polymerized acryllic soft liner</td>
<td>Powder &amp; Liquid</td>
<td>G.C America Inc Made in U.S.A</td>
</tr>
<tr>
<td>3</td>
<td>ACRYLAN-R</td>
<td>Heat cure</td>
<td>Powder &amp; Liquid</td>
<td>Asia acylates</td>
</tr>
<tr>
<td>4</td>
<td>ACRYLAN-R</td>
<td>Heat cure</td>
<td>Powder &amp; Liquid</td>
<td>Asia acylates</td>
</tr>
</tbody>
</table>

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a. The surfaces of the steel die mold space were smooth, flat and with sharp edges. This mold space was used for soft liner attachment to the polymethyl methacrylate plate. Other side of the steel die has a rectangular shape elevation of 75mm length x 25mm width x 3mm height. This elevated side of the die was used for the preparation of acrylic plate.

**PREPARATION OF ACRYLIC PLATES:**

A modeling wax sheet was used to box the elevated side of the steel die. Die stone was mixed and poured to create a mold space. A total number of twenty-die stone mold space were prepared. Molten wax was poured into the mold space and processing was done by conventional technique.

The total surface area of the acrylic plate, the space having the dimensions of 50mm length x 25mm width was covered by polyethylene sheet and remaining portion of acrylic plate having the dimensions of 25mm length x 25mm width was left uncovered to facilitate the bonding of soft liner over this surface.

**PREPARATION OF SAMPLES:**

The surface of the acrylic plates to be bonded with soft liner were pretreated with methyl methacrylate for 180 seconds. The primer R was coated gently over the treated surfaces with a brush and then polymethylmethacrylate acrylic plate was placed in the mold space of steel die. The acrylic plates occupies the space of 75mm length x 25mm width x 3mm depth and the rest of the mold space was left for the auto polymerized silicone soft liner, which is packed and it was compressed for 10 minutes under the bench press.

**SAMPLES PREPARATION FOR SCANNING ELECTRON MICROSCOPE**

Mold space was created from one steel die having the dimension of 10mm length x 10mm width x 3mm thickness by using addition silicone putty material. Wax blocks were prepared by pouring the molten wax into the silicone mould space. A total of two wax patterns were prepared.

The wax patterns were then flasked by conventional technique. After dewaxing heat cure resin was packed into the mold space as per the manufacturer instruction to prepare acrylic resin blocks. These heat cure resin blocks were cured at 72°C to 80°C centigrade for a period of 9 hours and bench cooled. The polymethylmethacrylate acrylic blocks were then ground with 320-grit silicone carbide paper to remove surface irregularities and excess material.

One-heat cure resin block was treated by methyl methacrylate for 180 seconds; other one was not treated by methyl methacrylate. 

**PREPARATION OF SAMPLES FOR SCANNING ELECTRON MICROSCOPE**

Specimens requiring to be studied under scanning electron microscope should be made electro conductive. In order to make the specimen's electro conductive, the specimens were gold sputtered with the help of sputter coating machine before subjecting them to screening in a scanning electron microscope.

**SCANNING ELECTRON MICROSCOPE RESULTS**

The results of the present study reveal that treating the untreated surface of the denture base resin with methyl methacrylate shows different type of surface texture.

The untreated surface of the acrylic denture base that is abraded with 320-grit silicone carbide paper showed scratches, pores and depressions.

The pretreated surface of the acrylic denture base with methyl methacrylate for 180 seconds showed smoother surface texture.

The results of the present study reveal that treating the acrylic denture base with methyl methacrylate improved the efficiency of bonding between a silicone-based resilient lining material and denture base.

**DISCUSSION**

Resilient soft liners are widely used in prosthetic dentistry as an adjunct to removable prosthesis to restore the health of the inflamed and abused denture supporting tissues. These materials are commonly used for patients with resorbed mandibular alveolar ridge, thin and nonresilient mucosal tissue, maxillofacial defect, patients unable to tolerate the hardness of heat-polymerized acrylic resin denture base and medically compromised individuals.

Resilient soft liners are used to distribute functional loads and reduce the stress concentration on residual ridge and to make dentures more comfortable. The major drawbacks of soft liners is the lack of durable bond to the denture base.

The present study was undertaken to evaluate the surface topography of the heat cure acrylic denture base before and after surface pretreatment with methyl methacrylate for 180 seconds was evaluated with scanning electron microscope.

The scanning electron microscope study on the treated and untreated surface of the denture base resin shows different type of surface texture.

The untreated surface of the acrylic denture base that is abraded with 320-grit silicone carbide paper showed scratches, pores and depressions.

The pretreated surface of the acrylic denture base with methyl methacrylate for 180 seconds showed smoother surface texture.

The results of the present study reveal that treating the acrylic denture base with methyl methacrylate improved the efficiency of bonding between a silicone-based resilient lining material and denture base.

**CONCLUSION**

The results of scanning electron microscope shows wetting of the acrylic denture base with methyl methacrylate for 180 seconds, smoothened the acrylic denture base surface and the pores on the surface were found to be more prominent than the untreated surface of the acrylic denture base.

**REFERENCES**


