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"A COMPARATIVE EVALUATION OF EFFECT OF CHEMICAL TREATMENT AND OXYGEN PLASMA TREATMENT ON THE BONDING OF A SOFT LINER TO AN ACRYLIC RESIN DENTURE MATERIAL - AN IN VITRO STUDY."

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ABSTRACT

BACKGROUND AND OBJECTIVES: Denture soft liners have become important in dental prosthetic treatment. They have been used to act as shock absorbers for denture bearing mucosa and to improve retention of the prosthesis and to provide an even distribution of functional load on the denture bearing area, avoiding local stress concentration.[1] In general, the most common drawbacks with regard to the use of soft liners are poor adhesion to the denture base and loss of softness over time. Consequently and inevitably, debonding of the soft liner from the denture base resin becomes one of the most serious problems that plagues their longevity.

To overcome this problem, researchers have considered modifying the acrylic resin surface before applying the soft liner. However, mechanical roughening of the denture base surface reportedly had a weakening effect on the bond strength between the soft liner and denture base due to the interfacial stresses introduced.[2] Chemical treatment using ethyl acetate was found to increase the repair strength of denture base resins.[3] Recent studies have indicated that plasma treatment could increase the bond strength between heat cured and self cured resins to a level exceeding that obtained with an adhesive primer.[4]

The aim of this study is to evaluate and compare the effect of chemical treatment and oxygen plasma treatment on increasing the bond strength between soft liner and denture base resin.

Materials and methods: In this study 72 rectangular acrylic resin blocks of 10mm×8mm×30mm were fabricated with heat cure denture base resin (DPI, Dental products of India Ltd. Mumbai, India). The rectangular block specimens were stored in distilled water for 24 hours prior to the surface pre-treatment .Out of 74 rectangular

blocks, 24 blocks were (untreated) kept as control, 24 were treated chemically using methyl methacrylate monomer and 24 were treated with oxygen plasma. The samples were divided into two main groups : Group 1 – Samples lined with Molloplast soft liner (n=36) and Group 2 – Samples lined with Permasoft soft liner (n=36). Each group was then subgrouped into : Subgroup A- no treatment (control)(n=6),Subgroup B -chemical (MMA) treated (n=6), Subgroup C-Oxygen plasma treated (n=6). Specimens for tensile bond strength test were made by processing the soft liner against the rectangular resin blocks. Resilient liners were processed between 2 poly (methyl methacrylate) surfaces; in the dimensions of 10×10×3 mm. Tensile strength was determined with Universal testing machine, at a crosshead speed of 5 mm/min.The data were analyzed using one-way ANOVA, followed by Tukey's post hoc test.

Conclusion: From the findings of the investigation and statistical comparison it was concluded that the surface pretreatments were effective in increasing the tensile bond strength of Group 1 whereas they were ineffective in increasing the tensile bond strength of Group 2. Although, chemical treatment showed greater increase in the tensile bond strength than oxygen plasma, it has been shown to decrease the flexural strength of denture base resin. Considering this, plasma oxygen treatment may prove to be a good alternative to chemical treatment.