

# **Evaluation of The Effect of Poly Vinyl Pyrrolidone Addition on Some Physical Properties of Heat Cured Acrylic Resin Denture Base Material**

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## Abstract

The most common materials used for fabrication of denture bases are poly methyl methacrylate (PMMA). Preparation of modified heat cured denture base acrylic resin was carried out by preparing of (PMMA) (80%) and poly vinyl pyrrolidone (PVP) (20%) and the liquid part composed of methyl methacrylate (MMA) monomer. The total (280) specimens, (10) specimens for each experimental or control group were tested. All specimens were cured by using short curing cycle (90 min. at 74C° followed by 30 min. at 100C° ). Evaluation was made by measuring dimensional stability and accuracy, shear bond strength (SBS) of artificial acrylic teeth to denture bases and color stability of the prepared denture base material in comparison with the control denture base material.

The dimensional accuracy of acrylic resin denture base is the main necessity, where it effects the retention and stability of the denture. A silicon mold was used to prepare a (20) type VI stone maxillary master casts( control & experimental ). Acrylic dough was prepared and packed for processing, the flasks were closed with pressure technique and placed in clamps after final closure. Distances were measured between (3) points marked on denture bases before and after thermocycling for both control & experimental groups. For AB & BC distances the PVP had improved the dimensional stability and accuracy before thermocycling while for AC distance the control material before and after thermocycling improved the dimensional stability and accuracy.

Fracture or debonding of plastic teeth from denture base are common clinical problems which are facing both the patient and the dentist. Sixty artificial acrylic teeth were prepared and cured by control and experimental denture base acrylic resin, then teeth were divided into three groups and treated with different surface treatment; first group received no further treatment ( control ), second group treated with acetone and third group treated with thinner. The denture teeth were flaked and wax was eliminated with running hot water. Denture resin was packed

and cured according to manufacturer's instructions and specimens were deflasked upon the completion of resin processing. Then half of specimens from all surface treatments were tested by using Instron machine and subjected to shear force until failure. The other half of specimens which also include the surface treatments groups were thermocycled. Teeth surfaces after treatment and fracture sites were examined and photographed visually and under reflecting light microscope. The results showed that all surface treatments produced significantly high improvement in (SBS). Control group had shown significantly lower (SBS) than experimental group bonded to artificial acrylic teeth. On the other hand, experimental denture base resin bonded to artificial acrylic teeth were affected more significantly by thermocycling than the same teeth bonded to control denture base resin. Results indicated that thinner treatment for acrylic teeth is recommended prior to denture base processing.

The maintenance of clean, esthetic and odor free denture prostheses is important for the health of the patient, this can be obtained by the regular use of an appropriate denture cleansers. Two hundred acrylic specimens were prepared in two major groups ( control and experimental ). We used three types of prepared denture cleansers which are: 4% citric acid, 4% oxalic acid and 4% tartaric acid in addition to alkaline peroxide which is a commercially available denture cleanser and observed their effects on the color stability of both control and experimental groups after immersion of specimens in tea and cola; also to compare those prepared denture cleanser solutions to alkaline peroxide to see if the prepared denture cleansers were safe to work properly as cleanser solutions with no damaging effect to denture base material. The results showed highly significant differences between experimental and control groups which were immersed in the prepared denture cleanser solutions as well as alkaline peroxide for both tea and cola groups; while there was a non-significant differences between experimental and control groups which were immersed in distilled water for both tea and cola groups. Finally, we conclude that the prepared denture cleanser solutions are good and satisfactory cleanser materials for the control and experimental denture bases.