

**Republic of Iraq  
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College of Dentistry**



**Acetal dimensional stability and accuracy after  
processing and immersion in artificial saliva  
in comparison with acrylic, with some other  
properties**

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# Abstract

**Back ground:** Nowadays there is an increasing of the emphasis on aesthetic, dentists have been concerned about providing aesthetics and functions while maintaining retentive, stable, and conservative to the health of supporting teeth and tissues. Thermal polymerized PMMA (heat cure acrylic) demonstrates high porosity, high water absorption, volumetric changes and residual monomer to overcome these limitations; other materials are used in prosthetic dentistry like acetal thermoplastic material.

**Aim of the study:** The present study was conducted to evaluate the linear dimensional changes and adaptation of heat cure acrylic denture base resin and compare it with acetal denture base resin in different periods of saliva immersion; other properties was performed.

**Material and method:** 80 specimens were divided into two main groups according to the type of material used (heat cure resin and acetal resin). Each main group was subdivided into four subdivisions according to the type of test used, for each test 10 specimens were used. (10 maxillary denture bases for linear dimensional change and adaptation test, 10 specimens for surface hadness, 10 specimens for surface roughness and 10 specimens for thermal conductivity) were prepared in this study.

**Results:** For linear dimensional change test; after processing T- test revealed a highly significant difference between acrylic and acetal groups in AB line, significant difference between the studied groups in CD line, and non significant difference between the studied groups in BC, DA lines. While after immersion in saliva for 24 hrs, 15 days, 30 days: T- test revealed no significant difference between acrylic and acetal groups. For adaptation test; T-test revealed a highly significant difference in the adaptation between the acrylic and acetal groups in each point after processing.

After immersion in saliva for 24 hrs: T- test revealed a highly significant difference between the acrylic and acetal groups in all points except point C showed non significant difference, also after immersion in saliva for 15 days: T- test revealed a

highly significant difference among the studied groups at all points except point E showed non significant difference and after immersion in saliva for 30 days: high significant difference between two materials at all points except point A shows non significant difference.

The acetal group exhibited higher surface hardness mean; while control group exhibited the lower mean value., also the acrylic group exhibited higher surface roughness. The acetal group exhibited the higher mean value of thermal conductivity.

**Conclusion:** Acetal (polyoxymethylene) is one of the materials that used to replace heat cure acrylic. In linear dimensional change there is no significant difference between acrylic and acetal groups ( $P > 0.05$ ) after immersion in saliva at three periods(24 hrs, 15 days,30 days).A highly significant difference at ( $P \leq 0.01$ ) in the adaptation between the acrylic and acetal groups after processing and after immersion in saliva at three periods(24 hrs, 15 days,30 days).

Acetal material had higher value in Rockwell hardness and thermal conductivity than that of heat cure acrylic, but lower value in surface roughness.