

**Ministry Of Higher Education
& Scientific Research
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Collage of Dentistry**



**The Effect of Addition of Plasma Treated
Polyethylene Fibers and Salinized Nanoparticles
ZrO₂ to Heat Cured Polymethylmethacrylate
Denture Base Material on Some of It's Properties**

A Thesis

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Abstract

Statement of problem:

Acrylic resin poly (methyl methacrylate) has been widely utilized for fabrication of dentures for many years as it has a good advantages for examples accurate fit, good aesthetics, easy laboratory, and clinical manipulation, inexpensive equipment and stability in the oral environment but still have some inferior mechanical properties.

Aim of study

The goal of this study is to detect the influence of addition of 2.0% plasma treated of polyethylene fiber and different concentration addition salinized zirconium oxide nanoparticles (0.5%, 1.0%, 1.5% and 2.0%) on some mechanical properties of polymerized acrylic resin.

Materials and methods

In this study one hundred and twenty samples were made for group selected after conducting a pilot study (2.0% ultrahigh density polyethylene fibers and 1.5%salinized Zirconium oxide nanoparticles) which was chosen according to pilot study. Poly (methyl methacrylate) without enforcement was the control, enforcement of poly(methyl methacrylate) by 2.0% oxygen plasma treated polyethylene fibers and enforcement of Poly(methyl methacrylate by 2.0% oxygen plasma treated with 1.5% salinized Zirconium oxide nanoparticles group. These groups were subdivided into four groups according to the tests including in the study (transverse strength, impact strength, surface hardness, water sorption and water solubility).

Results

The results revealed that there was a highly significant difference between groups in transverse strength, where the highest mean value (96.17 N/mm²), significant increase in impact strength (7.69 kj/m²), surface hardness (92.35) and

highly significant decrease in water sorption (0.0016 mg/cm^2) and water solubility (0.0013 mg/cm^2) in 2.0% polyethylene fibers and 1.5% salinized Zirconium oxide nanoparticles group.

Conclusion

The addition of 2.0% plasma treated of polyethylene fiber with 1.5% salinized nanoparticles of zirconium oxide to heat polymerized acrylic resin will improve in the properties such as significant raise in flexural strength, impact strength and surface hardness, while reduced the water solubility and water sorption.