

**Ministry Of Higher Education
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**Effects of the Addition of Oxygen Plasma Treated
Polyamide fibers on Some Properties of Room
Temperature Vulcanized Maxillofacial Silicon
Elastomers**

A Thesis

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Abstract

Restoration of maxillofacial defect is comprehensive process, variety of materials have been used but none of them have the ideal properties. Recently silicone elastomer become widely used as it possess desirable properties, many attempt to improve its mechanical properties by incorporation of different types of fillers into the polymeric matrix to overcome the undesirable properties.

The purpose of the study is to evaluate the effect of addition of (2mm) length oxygen plasma treated polyamide fibers on tear strength, tensile strength, elongation at break, hardness and surface roughness of VST-50F maxillofacial silicone elastomer

Oxygen plasma treatment was performed on polyamide fibers for 10 minutes then plasma treated 2mm length polyamide fibers with concentration of 1% and 1.5% by weight were added to the maxillofacial silicone which improve the tear strength of silicone on pilot study, silicone elastomer with 0% filler served as a control. One hundred and twenty specimens were fabricated and divided into 4 groups according to the tests conducted with 30 specimens for each test except for elongation percentage test which is measured concurrently with tensile strength test. Each group was then subdivided into three subgroups (A, B, and C) according to concentration of fibers (0%, 1% and 1.5%) by weight with 10 specimens for each.

SEM results of plasma treated fibers showed surface roughness while FTIR showed no chemical changes, SEM results of silicone elastomer showed well dispersion of fibers along with XRD results while FTIR results showed

no chemical change. All plasma treated 2mm polyamide fibers with (1% and 1.5%) concentrations showed significant increase of tear strength, shore A hardness and surface roughness. The concentration of 1.5% by weight group showed the highest mean values. Tensile strength showed no significant change among all groups. Elongation at break showed significant decrease with increase concentration

It was concluded that reinforcement of VST-50F maxillofacial silicone with 1.5% by weight (2mm) length plasma treated polyamide fibers can improve the mechanical properties