

Effect of nanoparticles on hardness, tear strength and permanent deformation of facial silicone.

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The goal of this research was to assess the influence of nanoparticles addition to the facial silicone Silastic MDX4-4210 regarding tear strength, hardness and permanent deformation. 560 silicon specimens were made, 280 for the tear strength test, 140 for the hardness test and 140 for the permanent deformation test. The nanoparticles used were zinc oxide (ZnO), barium sulphate (BaSO_4) and titanium dioxide (TiO_2). For each test (except tear strength, for which specimens were duplicated) 40 specimens were made for each nanoparticle, varying the nanoparticle concentration (1% or 2%) and the addition or not of oil painting, and another 20 specimens were made as control group, 10 with oil painting and no nanoparticles and 10 with only silicone. The specimens were submitted to the tests before and after 1008 hours of accelerated aging and the data acquired were put through statistical analysis, by the nested ANOVA and Tukey tests. All nanoparticles reduced the hardness before the accelerated aging, and the oil painting did not influenced the results except for the TiO_2 at 2% group. The best tear strength results were provided by the group with BaSO_4 . The permanent deformation reduced after the accelerated aging in all groups, and the ZnO at 1% presented the lowest values for this test. It was proved that the addition of nanoparticles influenced the hardness, tear strength and permanent deformation tests, the TiO_2 group was the only nanoparticle that presented clinically unacceptable hardness values.

Keywords: Maxillofacial Prosthesis; Silicone Elastomers; Hardness.



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