MECHANICAL PROPERTIES ON NANOSTRUCTURED HYDOXYAPATITE AND TITANIUM DIOXIDE ENRICHING PENTA ADHESIVE AS COATING FOR TOOTH ENAMEL

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The aim of this research was to investigate the influence of the nanostructured hydroxyapatite (NHAP) and Nano-sized titanium dioxide (NTiO\textsubscript{2}) on dispersion in an adhesive mainly containing monomers of Dipenta erythritol penta-acrylate monophosphate (PENTA) and Urethane dimethacrylate (UDMA), also determine the aesthetic and mechanical properties of the coating solution. From different powders combinations, NHAP 75\%W-NTiO\textsubscript{2} 25\%W with an average length of \textasciitilde 20 \textmu m, at (10wt \%) into the dental adhesive, manifested the most aesthetic appearance. Scanning/Transmission electron microscopy (SEM), (TEM) images showed that nano sized HAP/NTiO\textsubscript{2} mixed by the process of high-energy achieve the powders homogenization with a uniform dispersion. Nanoindentation studios and atomic force microscopy AFM developed the enhancement of mechanical properties such as, hardness H, elastic modulus E and scratching resistance on the enriched adhesive respect to the pure adhesive. In summary, the enrichment of methacrylate co-monomers adhesives PENTA/UDMA with mixtures of hydroxyapatite and titanium dioxide nanostructures may be considerate as a mechanical toughened, also a god option to modified shade qualities for dental aesthetic applications.

\textbf{Keywords:} Nanostructured hydroxyapatite, Mechanical properties, Nanoindentation

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