SDM
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"AN EVALUATION AND COMPARISON OF THE EFFECT OF BLOOD ON THE SURFACE HARDNESS AND SURFACE MICROSTRUCTURE OF MINERAL TRIOXIDE AGGREGATE (MTA) AND BIODENTINE - AN IN-VITRO STUDY"

by

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ABSTRACT

Background and objectives: Mineral Trioxide Aggregate (MTA) promises to be one of the most versatile materials in the field of dentistry. It is increasingly being used in a wide range of clinical treatments, such as a root-end filling material after root-end resection, apical barrier in immature teeth, as a pulp capping agent during vital pulp therapy, pulpotomy in primary and permanent teeth, repair material in tooth resorption, perforation repair and as a root canal filling material in the coronal section of horizontally fractured teeth. Biodentine is a newer material and is claimed to be used as a dentine restorative material in addition to endodontic indications similar to those of MTA. In these clinical applications, blood comes into contact with and often becomes incorporated into these materials during or after its placement, and this contamination might have a detrimental effect on their physical properties. This study was conducted to evaluate and compare the effect of blood on the surface hardness and surface microstructure of Mineral Trioxide Aggregate (MTA) and Biodentine.

Method:

20 samples each for ProRoot MTA and Biodentine were prepared and randomly allocated into four groups of 10 samples each.

Group 1 (n=10): MTA exposed to distilled water.

Group 2 (n=10): MTA exposed to fresh whole human blood.

Group 3 (n=10): Biodentine exposed to distilled water.

Group 4 (n=10): Biodentine exposed to fresh whole human blood.

All the samples were prepared and incubated at 37°C for 4 days and 6 months.

The surface hardness test was done using Mohs scale. One additional sample from each of the four groups was used to study the surface characteristics using Scanning Electron Microscope (SEM).

Results: There was statistical significant difference in hardness between Biodentine and MTA in the control groups (p-value < 0.05). Blood contamination caused a decrease in the surface hardness of MTA and Biodentine and there was no statistically significant difference between the experimental groups (p-value > 0.05). No statistical significant difference in values was found between the two time periods, for any group. Also, exposure to blood altered the surface microstructure of these materials.

Interpretation and Conclusion: The present study concluded that blood had a detrimental effect on the surface hardness and caused a change in the surface microstructure of both MTA and Biodentine.

Keywords: Mineral Trioxide Aggregate, Biodentine, blood contamination, hardness, microstructure.