

Brazilian Dental Journal (2023) 34(6): 50-66
<http://dx.doi.org/10.1590/0103-6440202305549>

Chemical analysis of mineral trioxide agregate mixed with hyaluronic acids as an accelerant

Abstract

Mineral trioxide aggregate (MTA) has many clinical applications in dentistry; the main drawback is the long setting. The main objective is to investigate and compare the chemical effect of using two commercially available hyaluronic acid hydrogels (HA) instead of distilled water for mixing MTA as an accelerant of setting time. Materials and method: Test materials were divided into three groups; Group 1: (control) mixing MTA with distilled water supplied by the manufacturer; Group 2: mixing MTA with a hybrid cooperative complex of high and low molecular weight HA (Profhilo®); Group 3: mixing MTA with High molecular weight / non-cross-linked HA (Jalupro®). Mixing time, and setting time (initial and final) were determined, Fourier-transform infrared spectroscopy, Energy-dispersive X-ray spectroscopy, Field emission Scanning Electron Microscopy, and X-ray diffraction were performed. Results: mixing time, initial, and final setting time for (MTA + HA) groups were significantly different and lower in comparison to the control group ($p < 0.05$). This study revealed higher expression of calcium silicate hydrate and calcium hydroxide expression with higher Ca release in the MTA + HA group than the control group. Conclusion: commercially available HA demonstrated better chemical properties when used as a mixing medium for MTA. The Mixing and setting time for MTA + HA group were significantly shorter than those of the control group were. Thus, commercially available HA can be used as a mixing medium for MTA.