

New Simulated Plasma for Assessing Solubility of Mineral Trioxide Aggregate

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Abstract

Introduction: Solubility of mineral trioxide aggregate (MTA) is one of its important characteristics which affects other properties such as microleakage and biocompatibility. Distilled water has previously been used for solubility tests. This study was aimed to compare the solubility of MTA in distilled water (DW), synthetic tissue fluid (STF) and new simulated plasma (NSP). **Materials and Methods:** In this experimental study, 36 samples of WMTA were prepared and divided into three groups (n=12) to be immersed in three different solutions (DW, STF, and NSP). Solubility studies were conducted at 2-, 5-, 9-, 14-, 21-, 30-, 50-, and 78-day intervals. Welch statistics was utilized to determine the effect of solubility media and Games-Howell approach was used for pair-wise comparisons. Repeated-measures ANOVA was used to assess the importance of immersion duration. **Results:** Unequal variance F-test (Welch test) showed significant differences in solubility rates of samples between all the different solubility media at all the study intervals ($P < 0.05$) except at 14-day interval ($P = 0.094$). Mixed repeated-measures ANOVA revealed a significant difference in solubility rate of MTA in three different solutions at all the study intervals ($P = 0.000$). Games-Howell post-hoc test revealed that all pair-wise comparisons were statistically significant at all the study intervals ($P = 0.000$). **Conclusions:** Based on the findings of this study, the solubility rate of MTA in simulated plasma was less than that in synthetic tissue fluid and distilled water in the long term.