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Original Research

Assessment the bioactivity of zinc oxid eugenol sealer after the addition of different concentrations of nano hydroxyapatite-tyrosine amino acid - an *in vitro* study

Abstract:

Aim: Zinc oxide eugenol sealer has been used till now in endodontic obturation. However, despite many improvements in its formula, it still does not have, the essential root canal sealer's properties which is the apatite forming ability. The aim of the present study is to assess the effect of the incorporation of nano Hydroxyapatite- tyrosine amino acid at different concentrations in the zinc oxide eugenol sealer formula in terms of bioactivity analysis. **Methods:** The nano hydroxy apatite-tyrosine amino acid was incorporated into the original zinc oxide eugenol (endosell) at different concentrations starting from (10 – 20)%. The chemical changes in zinc oxide eugenol before and after addition were characterized using FTIR and XRD. The setting time test was done according to ADA specification no. 57. The bioactivity analysis for the zinc oxide eugenol before and after the addition was evaluated according to ISO/FDIS 23317:2007(E) by using 28 days of storage in phosphate buffer saline, and then the hydroxyapatite precipitation and Ca/P ratio was evaluated using FESEM/EDX. **Results:** The FTIR and XRD confirmed the setting reaction occurrence among the (original ZOE, nHAP, and Tyr). The XRD and FESEM/EDX analyses confirmed the HAP precipitation on the ZOE sample surfaces after the addition of (nHAP-Tyr a.a) and this precipitation was increased with increased concentrations of additions. **Conclusion:** Incorporated (20) % of equal amounts of "nHA-Tyr a.a" can convert the ZOE to bioactive sealer as confirmed by XRD and FESEM/EDX. However, other characteristic analyses like Nuclear magnetic resonance, atomic force microscopy, and in vivo animal study were needed to further confirm the results