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In vivo cytotoxicity analysis of bioceramic root canal sealers on zebrafish embryo
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Abstract

Background. This study evaluated the cytotoxicity of four bioceramic root canal sealers (RCSs) in vivo. The embryonic zebrafish characteristics, such as mortality, survival, hatching, and general morphology, served as the parameters for assessing cytotoxicity. Methods. The RCSs, namely GuttaFlow Bioseal, MTA Fillapex, CeraSeal Bioceramic, and iRoot SP, were mixed according to the manufacturer's guidelines. The extract solution was prepared by immersing the set RCS into 1X dilution of E3 solution. Then, the extract solution was delivered into a Petri dish where zebrafish embryos were allowed to develop. Cytotoxicity was evaluated 24, 48, 72, and 96 hours after fertilization. Results. The Kruskal-Wallis test showed that except for GuttaFlow Bioseal, the mortality, survival, and hatching of zebrafish embryos for the remaining three bioceramic RCSs were significantly different from the negative controls ($P < 0.05$). Significant differences were also evident in the mortality, survival, and hatching of zebrafish embryos between GuttaFlow Bioseal and three other RCSs ($P < 0.05$). Conclusion. GuttaFlow Bioseal was less cytotoxic than other bioceramics RCSs; MTA Fillapex, CeraSeal Bioceramic root canal sealer, and iRoot SP root canal sealer exhibited comparable cytotoxicity. © 2023 The Author(s).

Author Keywords

Bioceramic root canal sealers; Cytotoxicity; Endodontics; In vivo; Zebrafish embryos

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