

Abstract

Exploring Copper Sulfide Penetration in Mandibular Anterior Teeth

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Abstract: This study aimed to assess the dynamics of copper sulfide penetration during electrophoresis within the root canal system of mandibular anterior teeth. We included twenty intact mandibular anterior teeth, which were extracted for prosthetic reasons from patients aged between 40 and 65 years. The research consisted of two distinct phases: macroscopic and histological analysis. **A significant number of root canals presented obstructions due to the presence of calcareous deposits and dentin cement, also verified by simple radiographic images.** In the first phase, involving eight teeth, electrophoresis was performed using a copper-calcium hydroxide-based compound known as Cupral[®]. This compound was administered in two separate sessions with a 7-day interval between them. The second group, also comprising eight teeth, received a combination paste consisting of Cupral[®] and highly dispersed Ca(OH)₂. A third group, consisting of four teeth, served as a comparative control. During electrophoresis, teeth with open endodontic cavities were immersed in a plastic container filled with a 0.9% saline solution. Following the completion of the endodontic sessions, the teeth were fixed in a 10% neutral buffered formalin solution to prepare them for histological examination. Macroscopically, the first group displayed an aesthetically undesirable turquoise blue staining of both the crown and root, while the second group exhibited significantly lower staining intensity. Histological examination revealed notable copper sulfide penetration in the first group, whereas the second group showed only slight impregnation. **In conclusion, this preliminary *ex vivo* study provides the foundation for upcoming *in vitro* and clinical investigations involving larger sample sizes, focusing on addressing complex or obstructed root canals, guided by the observation of copper sulfide permeating the root canal system. Therefore, these efforts may pave the way for innovative techniques and materials that enhance the success of endodontic treatments and reduce their failure rate.**

Keywords: copper sulfide; mandibular anterior teeth; macroscopic data; histological data; root canals; endodontics.

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