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PRELIMINARY SYNTHESIS OF CALCIUM CARBONATE USING CO2 BUBBLING METHOD FOR BIOMEDICAL APPLICATION
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A New Calcium Silicate-Based Cement (Biodentine) Use In Apexification Treatment (Literature Study Article)

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ABSTRACT

Biodentine is a calcium-silicate based material that has drawn attention in recent years and has been advocated to be used in various clinical applications, such as root perforations, apexification, resorptions, retrograde fillings, pulp capping procedures, and dentine replacement. Calcium hydroxide and MTA have become the material of choice for immature permanent teeth apexification but Biodentine promising as an alternative material for treatment apexification. The material is claimed to possess better physical and biological properties compared to other tricalcium silicate cements such as mineral trioxide aggregate (MTA) and Bioaggregate (Bioaggregate). This article literature study will review the composition, physical properties, biocompatibility and clinical outcomes Biodentine on apexification. Objective: to review the composition, physical properties, biocompatibility and clinical outcomes Biodentine on apexification. Discussion: The biggest challenge in treating the root canals with open apex is formed apical barrier. Apexification treatment of immature permanent teeth with pulp necrosis is endodontic procedure to achieve induce apical closure through the formation of mineralized tissue and repair of periapical tissue. Biodentine has been developed as a permanent dentine substitute material whenever original dentine is damaged. The other main advantages of Biodentine over MTA are its greater viscosity, shorter setting time (about 12 min), better handling, and higher compressive strength. Conversely, the radiopacity of Biodentine was significantly lower compared to other materials. Ions of calcium silicate cement in contact with mesenchymal stem cells that will differentiate into osteoblasts, causing deposition of apatite into the surface of the roots cement. Furthermore, the Hertwig’s epithelial root is involved in regulating differentiation of periodontal ligament stem cells and forming cementum-like tissue. In conclusion, Biodentine material can be used efficient for apexification procedures. Methods of Biodentine apical plug can be an effective method but necessary clinical trials and further investigations.

Keywords: Biodentine, biokompatibilitas, apexification