



Type of the Paper (Editorial)

Bioceramics in endodontics

Tamer M. Hamdy ^{1,*}

¹ Restorative and Dental Materials Department, Oral and Dental Research Institute, National Research Centre (NRC), Giza, Dokki, 12622, Egypt

* Corresponding author e-mail: dr_tamer_hamdy@yahoo.com

Abstract: Bioceramics are materials which comprise alumina, bioglass, glass ceramics, zirconia, hydroxyapatite and other calcium phosphates. They have been used in dental field as bone filling materials, root repair materials, root-end filling materials, and as endodontic sealers. They have certain advantages as being biological compatible, inert, non-toxicity, dimensionally stable. They have a similarity to the natural minerals part hydroxyapatite which is the main component of hard dental tissues. Bioceramics are characterized by osteoconductive activity bioactivity. In endodontics, they can be generally classified into calcium phosphate; tricalcium; hydroxyapatite based; calcium silicate based or mixtures of both calcium silicate and phosphates. The shift from previously established bioceramics to newly advance formulations is too slow, and there is an urgent demand to boost clinical research.

Keywords: Ceramics; bioceramics; endodontics.

Ceramics are defined as inorganic, non-metallic materials produced by the heating of raw minerals at higher degree of temperatures. Bioceramics are biocompatible ceramic materials or metal oxides with improved sealing capability, antibacterial and antifungal element is added to induce anti-microbial activity.

The mechanism of action of bioceramics depends on direct replacement of human tissues or being biodegraded to encourage the regeneration of natural tissues. They include alumina and, bioglass, glass ceramics, zirconia, calcium silicates, hydroxyapatite and other calcium phosphates.

Ceramics have been used in dental field as bone filling materials, root repair materials, root-end filling materials, and as endodontic sealers. They have certain advantages as being biological compatible, inert, non-toxic, dimensionally stable. They have a similarity to the natural minerals part hydroxyapatite which is the main component of hard dental tissues.

Bioceramics are characterized by osteoconductive activity bioactivity. In endodontics, they can be generally classified into calcium phosphate; tricalcium; hydroxyapatite based; calcium silicate based or mixtures of both calcium silicate and phosphates. Bioceramics utilized in endodontics mainly includes; calcium silicates; Portland cement; mineral trioxide aggregate (MTA). Mixtures of calcium phosphates, tricalcium phosphate and hydroxyapatite.

However, MTA was the gold standard endodontic bioceramic materials, enhancement in material should be done to overcome their disadvantages specially their physical properties and handling characteristics. Bioceramics now have a wide array of

Citation: Tamer M. Hamdy. *Bioceramics in endodontics*. *Biomat. J.*, 1 (7),1 – 2 (2022).

<https://doi.org/10.5281/znodo.5829408>

Received: 30 June 2022

Accepted: 31 July 2022

Published: 31 July 2022



Copyright: © 2022 by the authors. Submitted for possible open access publication under the terms and conditions of the Creative Commons Attribution (CC BY) license (<https://creativecommons.org/licenses/by/4.0/>).

applications both in endodontics and restorative dentistry. A novel bioactive material is essential to ensure the selection of the most appropriate material in different clinical circumstances.

In conclusion, There is a need for extensive research to identify new bioceramics or changing the existing one to improve their beneficial properties. The development should be focused to provide a bioceramics easily to be handle, have excellent antimicrobial activity and alkaline pH. Bioactive property to be able to release calcium and phosphorus ions, promoting marginal adaptation and sealing ability, shorter setting time, biocompatibility, not cytotoxic, promote dentin remineralization. They can also be utilized in humid environment and are easily removed in cases of retreatment, have maximum adhesion to dentin, improved mechanical properties, not encourage tooth discoloration.