Commentary
Volume 13:12, 2022

Journal of Cytology & Histology

ISSN: 2157-7099

Open Access

Bioactive Materials for Potential Dentistry

Gaskona Ibarretxe*

Department of Cell Biology and Histology, University of the Basque Country, 48940 Leioa, Spain

Introduction

Teeth were among the first organs whose function was effectively restored by inert filling materials that have become widely known to the general public; examples include amalgams, polymeric resin composites, and gutta-percha. These materials have improved the health of millions of patients around the world. In recent decades, there has been tremendous progress in the field of dental materials. Even though dental diseases such as caries and periodontitis are still extremely common in people of all ages, modern techniques of hard and soft dental tissue restoration have largely avoided many of the practical consequences and discomfort associated with dental and periodontal decay [1].

Description

However, current dental filling procedures are far from perfect; despite their long-term stability, amalgams have been gradually phased out due to mercury release, practitioner risk, and waste management issues, and the polymeric resin composites that eventually replaced them are known to favour bacterial adherence and biofilm formation. Endodontic procedures used today leave the refilled tooth much more fragile and prone to fracture than natural teeth. Even the widespread use of dental implants for complete tooth replacement has not been without complications, because the dental implant root is directly anchored to the alveolar bone, resulting in inadequate mastication impact cushioning and the long-term development of conditions such as marginal bone loss and peri-implantitis [2].

Furthermore, these materials degrade over time, resulting in the appearance of fractures and the need for multiple interventions, which further weaken the teeth. Some issues associated with dental restoration failure could be addressed by incorporating contact-killing compounds into the resin composite, such as Quaternary Ammonium or metal oxide nanoparticles and nanotubes, which would effectively inhibit the growth of biofilm-forming bacteria. These strategies have already been tested in clinical pilot studies, such as the one reported by Melo et al., in which bis (2-methacryloyloxyethyl) dimethylammonium bromide was copolymerized with dental composite resins to produce a wearable palatal device capable of effectively reducing the growth of cariogenic bacteria [3].

Other strategies include the incorporation of amorphous calcium phosphate nanoparticles, which result in the long-term release of calcium and phosphate ions that regenerate hydroxyapatite crystals and thus promote natural tooth remineralization. Finally, the incorporation of natural polyphenols in dental filling materials should be viewed as a highly innovative, safe, and low-cost strategy for improving dental restoration materials. Some polyphenolic compounds have been shown to significantly improve the adhesion of composite resins to dentin, a phenomenon that can be attributed in part to cross-linking with dentin collagen. Furthermore, these natural polyphenols have anti-inflammatory and anti-bacterial properties that are beneficial for the enhanced stability of dental restorations and improved oral health with minimal side effects.

Endodontic procedures and root canal sealing with inert materials (such as gutta-percha) are the current treatments of choice for irreversible dental pulpitis. The main issue with modern endodontics is that the tooth pulp is removed completely, depriving it of its endogenous maintenance and mineralization capacity. The absence of a functional dental pulp containing dentin-producing odontoblasts leaves the tooth vulnerable to fracture and secondary complications. The problems associated with dental pulp removal could be avoided entirely by replacing the currently used inert refilling materials with bioactive materials, which could also be functionalized with cells and/or growth factors to promote effective regeneration of the dental pulp tissue [4,5].

Conclusion

The main issue with traditional bioscaffolds, such as collagen or fibrin-related products, is that they promote mineralization and bone deposition on the implant surface. While these scaffolds are excellent alternatives for the reconstruction of periodontal bone defects, an effective PDL reconstruction strategy should ideally include a mineralization-resistant biomaterial. We recently described a potential role for human Decellularized Adipose Tissue in this context, demonstrating that this biomaterial has a significantly lower capacity to be mineralized by osteogenic stem cells than other conventional scaffolds such as collagen.We are seeing an increase in the amount of research being done in the fields of tissue engineering and bioactive materials for dental applications. Unlike previous generations of dental materials, which were chosen primarily for their inert nature and lack of adverse reactions, next-generation dental materials are expected to exert true biological effects in the surrounding oral and dental tissues to promote better and more functional integration.

Acknowledgement

None.

Conflict of Interest

There are no conflicts of interest by author.

References

1. Rathore, Monika, Archana Singh and Vandana A. Pant. "The dental amalgam toxicity fear: A myth or actuality." Toxicol Int 19 (2012): 81.
2. Ferracane, J. L. "Models of caries formation around dental composite restorations." *J Dent Res* 96 (2017): 364-371.
3. Azar, Marwan M and Chadi A. Hage. "Laboratory diagnostics for histoplasmosis." *J Clin Microbiol* 55 (2017): 1612-1620.

***Address for Correspondence:** Gaskona Ibarretxe, Department of Cell Biology and Histology, University of the Basque Country, 48940 Leioa, Spain, E-mail: gaskonatxe@gmail.com*

Received: 02 December, 2022, Manuscript No. jch-23-86527; **Editor Assigned:** 05 December, 2022, PreQC No. P- 86527 December; **Reviewed:** 18 December, 2022, QC No. Q- 86527; **Revised:** 23 December, 2022, Manuscript No. R- 86527 December; **Published:** 30 December, 2022, DOI: 10.37421/2157-7099.2022.13.669

4. Galindo-Moreno, Pablo, Ana León-Cano, Inmaculada Ortega-Oller and Alberto Monje, et al. "Marginal bone loss as success criterion in implant dentistry: Beyond 2 mm." *Clin Oral Implants Res* 26 (2015): e28-e34.

5. Samayoa, B., L. Aguirre, O. Bonilla and N. Medina, et al. "The diagnostic laboratory hub: A new health care system reveals the incidence and mortality of tuberculosis, histoplasmosis, and cryptococcosis of PWH in Guatemala." *Forum Infect Dis* 7(2020).

How to cite this article: Ibarretxe, Gaskona. "Bioactive Materials for Potential Dentistry." *J Cytol Histol* 13 (2022): 669.