Editorial

Dental Ceramics

Dr. Mohsen Mhadhbi*

***Corresponding Author: Dr. Mohsen Mhadhbi,** Laboratory of Useful Materials, National Institute of Research and Physical-chemical Analysis, Technopole Sidi Thabet 2020 Ariana, Tunisia.

Received Date: November 19, 2020.
Publication Date: December 01, 2020.

This editorial provides an outline of the dental ceramics including their types, their characteristics and the processing methods.

Ceramic materials are widely employed in the field of dentistry because of their good optical, thermal, chemical, and mechanical properties which are related to their biocompatibility. Thus, over the past decades, the employment of dental ceramics has expanded.

1- Classification of dental ceramics

We can classify the ceramics into two main groups:

Metals ceramics

Metal ceramics are used in restorative dentistry because of their excellent biocompatibility. They include cast metal systems and non-cast metal systems.

Metal ceramic crown is more durable and stable than a regular jacket crown. The disadvantages of the metal ceramics are mainly the low flexure strength and the high coast. Despite these disadvantages, metal ceramics belong to the most regular treatments with fixed prostheses. Moreover, metal-ceramic restorations have a lower risk of fracture compared with all-ceramics. For this reason, 95 % of these materials are present in the oral cavity.

All ceramics

All-ceramic systems have been widely used for dental restorations. In the last two decades, these materials have undergone a remarkable evolution due to their excellent mechanical properties related to the existence of a significantly greater amount of crystalline phase, which is one of several intrinsic factors. This class of ceramics includes leucite, leucite, lithium disilicate, alumina, alumina, spinel, alumina-zirconia (12Ce-TZP), alumina, alumina-zirconia (12Ce-TZP), alumina, zirconia (3Y-TZP), zirconia/fluorapatite-leucite glass-ceramic, sanidine, leucite, and lithium disilicate.

All ceramics have several advantages like good translucency, moderate flexural strength, high strength, etc. These disadvantages are fracture in posterior teeth, marginal inaccuracy, the high abrasive effect on opposing teeth, etc.

However, the choice of all ceramics depends on several factors such as patient, clinician, selected dental material, laboratory, etc.

2- Properties of dental ceramics

Dental ceramics present good biocompatibility with the oral soft tissue and are chemically inert in the oral cavity due to their ability to withstand the damaging effects of oxygen, acids, and chemicals. Also, they possess excellent resistance to the compressive stresses, but they are very poor under shear and tensile stresses (exhibits low tensile strength and little plastic deformation). They have a high electrical and thermal resistance.

3- Processing methods

Dental ceramics are processed by several methods including slip casting, hot pressing, powder/liquid building, sintering, additive and subtractive computer-aided design/computer-aided manufacturing (CAD/CAM). Each of these methods is described briefly in the following text.

CAD/CAM technology

CAD/CAM technology is a powerful manufacturing process based on computers, which is used to collect information, design, and fabrication of a wide range of products in the desired shape such as veneers, crowns, and inlays from various materials like infiltration ceramics, oxide high-performance ceramics, and silica-based ceramics.

Heat pressing

Heat pressing is a simple process employed to fabricate dense ceramics from powder materials by the effect of temperature and pressure. It developed to fabricate ceramic restorations like veneers and crowns. Hence, this technique has been applied to the pressing of veneer ceramics on zirconia core materials.

Sintering

Sintering is a powerful manufacturing process which allows fabricating nearly dense ceramics from powders. This technique is based on the heating of ceramics to ensure densification, which occurs by viscous flow when the filling temperature is achieved. However, several studies have been found on the fabrication of dental ceramics by sintering process to improve their properties.

Slip casting

Slip casting of dental ceramics was introduced in the 1990s. This technique consists of preparing stable suspensions, the slip, and manufacturing structures by building a solid layer on the surface of a porous substrate which able to absorbs the liquid phase by capillary forces.

The objectives for the future in the field of dental ceramics are not limited to only material development but also processing and machining development.

Volume 1 Issue 6 October 2020