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Comparison of Mechanical Properties Between Zirconia-reinforced Lithium Silicate Glass-ceramic and Lithium Disilicate Glass-ceramic: A Literature Review

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Abstract

Lithium disilicate glass-ceramic (LDS) is increasingly being adopted for use in therapeutic restorative procedures. Concurrently, zirconia-reinforced silicate glass-ceramics (ZRS) are becoming broadly utilized in dental applications. The purpose of this study was to evaluate and compare the mechanical properties of zirconia-reinforced lithium silicate glass-ceramics and lithium disilicate-based glass-ceramics, with a focus on their application in CAD/CAM technologies. In this review, the researchers conducted a search of the PubMed (MEDLINE) database to identify studies related to LDS and ZRS. This search was limited to articles published in English over a seven-year period, from January 1, 2015, to December 31, 2022. Additional studies were sourced from Google Scholar and through manual exploration. Key published works were identified and included in the literature review. The findings concluded that ZRS exhibits superior mechanical properties, including higher flexural strength, fracture toughness, and hardness, compared to LDS. Furthermore, ZRS combines desirable esthetic qualities with robust mechanical strength, rendering it an excellent material for single tooth aesthetic restorations such as inlays, onlays, crowns, and veneers, applicable to both tooth and implant supports. Currently, there is a notable scarcity of data concerning the mechanical properties and clinical efficacy of ZRS. Therefore, it is imperative to conduct long-term clinical studies to verify the optical and mechanical properties, clinical applications, limitations, and long-term effectiveness of ZRS.

Keywords: dental ceramic, lithium disilicate glass-ceramic, zirconia-reinforced silicate glass-ceramics