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Numerical study of the influence of ultra-thin veneer materials and its thickness on their biomechanical behavior

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Abstract

This study investigated the influence of ultra-thin veneer materials and its thickness on their biomechanical behavior using the 3D finite element method to find out which of all these models have a better performance. The distribution of stresses in the models was studied when composite resin and feldspathic porcelain were used in ultra-thin veneers with thickness of 0.2 mm and 0.3 mm under static loads. The results showed that the use of composite resin in the preparation of veneer of 0.2 mm in thickness reduces the maximum stresses by 65.24% at least compared to feldspathic porcelain, and it reduces the maximum stresses by 56.28% at least compared to feldspathic porcelain in veneer with thickness of 0.3 mm. The results showed also that the use of composite resin ultra-thin veneer with thickness of 0.2 mm reduces the maximum stresses by 49.48% at least compared to veneer with thickness of 0.3 mm, and the using of feldspathic porcelain ultra-thin veneer with thickness of 0.2 mm reduces the maximum stresses by 36.46% at least compared to veneer with thickness of 0.3 mm. Therefore, it is recommended to use composite resin ultra-thin veneer with thickness of 0.2 mm as it reduces induced stresses, which improves the stability and durability of veneers and prolong its lifespan.

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