عنوان مقاله:

Influence of Inlays/Onlays and Their Material on Stress Distribution in Mandibular Molars: Finite Element Analysis

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خلاصه مقاله:

Background: This study aimed to evaluate the influence of inlays/onlays and their material on stress distribution in mandibular molars with large cavities, using finite element analysis (FEA). Methods: ۳D models of the first mandibular molar were created. Then, a mesio-occluso-distal cavity was created, and cusps were reduced (۱.۵ mm for buccal cusps and ۱ mm for lingual cusps). The restorations were: inlay, onlay that covered buccal cusps (B models), and onlay that covered all cusps (LB models). Inlays and onlays were represented by two materials: nanofill composite resin and polymer-infiltrated ceramic network (PICN). Vertical load of ۶۰۰ N was applied and von Mises stresses were calculated. Results: Inlay models showed higher stress concentration in tooth structures than onlay models. Composite resin inlays and onlays transmitted most of the stress to adjacent structures. On the other hand, PICN inlays/onlays absorbed most of stress and transmitted less stress to dental structures than composite resin restorations. Moreover, stress concentrations in PICN onlay models (B-buccal cusps and LB-all cusps) were similar, while composite resin LB onlay showed higher stress concentration in dental structures than composite resin B onlay. Conclusions: Onlays showed better stress distribution than inlays. PICN might be a suitable choice as a restorative material of inlay/onlay for large cavities in molars, while the composite resin is unfavorable material for such restorations in terms of stress redistribution in dental structures.

کلمات کلیدی:

Ceramics, Composite resins, Inlays, Onlays, Finite element analysis