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粘固剂影响桩核冠修复上颌中切牙的应力分析

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Title: Effect of cement thickness on stress of maxillary central incisor after post and core restoration

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摘要: 目的 分析不同的粘固剂厚度对上颌中切牙桩核冠修复后剩余牙本质和粘固剂应力状况的影响。 方法 采用三维有限元分析方法,建立不同粘固剂厚度的上颌中切牙桩核冠修复的三维有限元模型,模拟前伸牙合和正中牙合加载,选取指标为Von Mises应力、最大主应力和剪切力,分析粘固剂层厚度变化对牙本质和粘固剂的应力分布以及应力峰值的影响。 结果 随着粘固剂层的增厚,各模型牙本质应力分布基本相似,前伸牙合加载时3个模型牙本质内Von Mises应力和最大主应力集中区均在根尖,正中牙合加载时两种应力的集中区同时出现在舌侧颈缘及根颈1/3;牙本质内Von Mises应力和最大主应力的峰值略有减小,而粘固剂层的Von Mises应力峰值、最大主应力峰值以及剪切应力峰值均明显减小,其中在前伸牙合加载、粘固剂厚度为100 μm时粘固剂层XY和YZ方向剪切应力峰值下降最为明显,分别达到了63.22%和51.46%。 结论 粘固剂的厚度变化对牙本质的应力影响较小,而对粘固剂本身影响较大,适当增加粘固剂的厚度可以降低粘固剂的应力峰值。

Abstract: Objective To investigate the effect of different thickness of

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cement on residual dentine and stress state in post and core restored maxillary central incisor. **Methods** The three dimensional finite element models of post and core restored maxillary central incisor with different thickness of cement were established by computer, with simulation of the protruding and oblique loads. The stress peak and distribution of dentine and cement of Von Mises, the maximum stress and shear stress were analyzed to investigate the effect of different thickness of cement in each model respectively. **Results** The stress distribution inside the dentine from different models was similar with the increase of thickness of cement. Under protruding load, Von Mises and the maximum stress on dentine in three models showed significant stress concentration at root apex, but for oblique load,