

下颌磨牙残冠纤维桩核冠修复的有限元应力分析

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【摘要】 目的 分析下颌第一磨牙残冠不同缺损壁数的情况下, 不同数目、不同部位的纤维桩核冠修复的应力分布情况和应力大小。方法 利用三维有限元法建立下颌第一磨牙残冠2壁和3壁缺损情况下, 不同数目和不同部位的纤维桩核冠修复模型, 施加225N垂直向的静态载荷及动态载荷。记录两种载荷下各部位牙本质 von Mises 应力最大值和最大主应力。结果 下颌磨牙2种缺损状态在动静态载荷下, 未植入纤维桩组最大 Von Mises 应力最大, 均高于植入纤维桩组, 近中植入2根纤维桩组和植入3根纤维桩组的应力分布最均匀。下颌磨牙3壁缺损在静态载荷下, 植入3根纤维桩组最大, Von Mises 应力明显小于其他2组。结论 2壁缺损情况下, 考虑选择植入1根纤维桩。3壁缺损情况下, 可以考虑通过增加纤维桩数量来分散应力, 减小牙体折裂风险。

【关键词】 磨牙 残冠 Von Mises 应力 有限元分析

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Finite element analysis of stress on residual crown of mandibular molar restored with fiber posts

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【Abstract】 Objective The purpose of this study was to analyze the stress magnitude and distribution of mandibular first molar with various residual crowns restored by different numbers of fiber post - core crowns. **Methods** Three-dimensional finite element models were created to simulate various residual crowns of two or three wall defects restored by different numbers and different parts of fiber post-core crowns. A static or dynamic load of 225N was respectively applied vertically to the occlusal surface. The maximum principal stress and Von-mises peak stress of various parts of dentin were recorded under static and dynamic loads. **Result** In the case of residual crowns with two wall defects, the Von-mises peak stress reached the largest value under static and dynamic loads in the group without fiber post treatment, and the stress distribution was the most uniform in 2 fiber posts group and 3 fiber posts group. In case of mandibular molars with 3 wall defects under static load, the Von Mises peak stress of 3 fiber posts group was significantly smaller than the other two groups. **Conclusions** One fiber post was recommended to restore the residual crowns with two wall defect. In case of residual crowns with 3 walls defect, the number of fiber post should be increased to disperse stress and thus reduce the risk of tooth fracture.

【Key words】 Molar Residual crown Von Mises stress Finite element analysis

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