控轴矫治系统下颌尖牙及牙周组织三维有限元模型的建立

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【摘　要】目的　建立带尖牙控轴托槽的下颌尖牙及其支持组织的三维有限元模型，初步进行有限元力学分析。方法　CBCT 扫描获取下颌尖牙的断层图像，通过 Mimics 14.0 软件生成尖牙实体模型，并使用 Pro/ENGINEER 4.0 建模软件建立尖牙控轴托槽的实体模型，最后利用 Ansya l4.5 有限元分析软件建立有限元模型并进行分析。结果　建立了带控轴托槽的下颌尖牙及其支持组织的有限元模型，模型由 5 种材料属性、6 个实体组成，具有良好的几何相似性和力学相似性，符合有限元计算要求，并初步分析了远中牵引尖牙的有限元力学情况。结论　本研究所建立的模型与临床情况接近，能够满足生物力学分析的要求，为进一步力学研究奠定理论基础。

【关键词】正畸 尖牙　托槽　有限元　牙周组织

Construction of a three-dimensional finite eiement modle of mandibular canine with cannine adjustable-axis bracket

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【Abstract】 Objective　The present study aimed to construct three-dimensional finite element model of mandibular canine with adjustable-axis bracket. Methods　The tomographic image of mandibular canine was obtained by CBCT scanning. By using the Pro/ENGINEER 4.0, Mimics 14.0, Ansya 14.5 softwares, the three-dimensional finite element model of mandibular canine with adjustable-axis bracket was constructed. Results The three-dimensional finite element model of mandibular canine with adjustable-axis bracket was established successfully, which had 80905 elements and 148550 nodes in total. Conclusion　The three-dimensional finite element model of mandibular canine with adjustable-axis bracket can effectively guide the bracket modification and clinical application.

【Key words】 Orthodontics Canine Bracket Finite element method　Periodontal tissue

正畸矫治器根据矫正原理不同，大致被分为整体牙移动技术和差动牙移动技术两类，整体牙移动技术要求牙齿进行整体移动，这就要面对较大的摩擦力且移动速度会较慢，对支抗要求高[1]。差动牙移动技术的 Tip-Edge 托槽可以避免以上问