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## 两种下颌骨三维有限元建模方法的对比研究(PDF)

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Title: Comparison of 2 methods to establish mandibular three-dimensional finite element model

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摘要: 目的 探讨直接建模和间接建模方法在下颌骨三维有限元建模中的应用。 方法 使用相同的序列CT图像,应用直接建模和间接建模方法分别建立下颌骨的三维有限元模型,采用相同边界条件和载荷进行计算,对计算结果进行分析和比较。 结果 两模型在峰值载荷时的von Mises应力分布情况一致,直接法模型应力集中区域von Mises应力为87~195 MPa,间接法模型为101~153 MPa;应力集中节点时间-应力曲线近似;两模型下颌骨体部、磨牙后区、髁突颈对应节点应力值差异无统计学意义( $P>0.05$ )。 结论 两种建模方法各有优势,所建模型都能从整体上反映下颌骨的生物力学特性。

Abstract: Objective To apply direct modeling and indirect modeling in the establishment of a three-dimensional finite element model of mandible and temporomandibular joint with high biomechanical similarity. Methods The magnitude and distribution of Von Mises stress in mandibular three-dimensional finite element model established by the direct modeling and indirect modeling was compared and analyzed. Same boundary conditions were adopted. The same level of anterior-posterior impact load at the mental symphysis was analyzed. The results were analyzed and compared. Results In the peak of load, the von Mises stress distributions of these 2 models were similar. The value of von Mises stress in stress concentration area of direct modeling ranged from 87 to 195 MPa,

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and from 101 to 153 MPa in Model B. Paired student' s t test was used to analyze the value of each node on 3 corresponding areas of each model, and the results showed that the differences between the 2 modeling had no significant difference ( $P>0.05$ ). Conclusion These 2 three-dimensional finite element models of mandible established by direct and indirect modeling are of highly biomechanical similarity.

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#### 参考文献/REFERENCES

刘珉懿, 张劲. 两种下颌骨三维有限元建模方法的对比研究[J]. 第三军医大学学报, 2013, 35(6): 532-535.

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