

论文

基于三维图像识别颅面部标志点的准确性及可靠性评价

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摘要:

目的 评价和分析利用三维计算机体层摄影(CT)可视化图像进行颅面部标志点识别的准确性和可靠性。方法 从山东大学口腔医学院正畸科拍摄CT的成年患者中随机选取20例, 通过计算机软件获得格式化三维可视化CT图像。本研究选取常用的19个颅面部标志点。由两名研究人员在一周内分别定点三次。每标记一点分别取相应的X、Y、Z三轴坐标值, 进行统计学分析。使用测量误差(ME)评价三维定点的准确性。使用组内相关系数(ICC)评价定点的可靠性。结果 观察者自身的ME分别为X轴: 0.36mm; Y轴: 0.30mm; Z轴: 0.25mm。观察者之间的ME分别为X轴: 0.78mm; Y轴: 0.55mm; Z轴: 0.43mm。70%标志点的ICC值大于0.9。结论 对于大多数标志点来说, 三维定点的准确性及可靠性均较好。同一观察者准确性较观察者之间高。利用三维可视化图像进行图像配准或者测量时应尽量选择可靠性高的标志点, 以减小测量误差, 提高可靠性。

关键词: 颅面部标志点; 三维图像; 准确性; 可靠性

Accuracy and reliability of craniofacial landmark identification based on three-dimensional images

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Abstract:

Objective To evaluate and analyze the accuracy and reliability of craniofacial landmark identification based on three-dimensional computerized tomography(CT) visualization images. Methods Twenty CT images were randomly selected from the Department of Orthodontic, School of Stomatology, Shandong University. Nineteen common craniofacial landmarks were chosen in our study. Landmark coordinates for each image were obtained three times within one week by two investigators. Measurement error (ME) was used to assess the accuracy. Intra-class correlation coefficients(ICC) for all landmark coordinates were obtained to evaluate intra-observer and inter-observer reliabilities. Results Intra-observer ME at X, Y and Z coordinate axes was 0.36, 0.30 and 0.25mm, respectively. Inter-observer ME at X, Y and Z coordinate axes was 0.78, 0.55 and 0.43mm, respectively. Intra-observer and inter-observer reliabilities of all coordinates for 70% of landmarks were greater than 0.9(ICC value). Conclusion Craniofacial landmark identification based on three-dimensional images has a high accuracy and reliability for most landmarks. Intra-observer ME is less than interobserver ME. Landmarks with high intra-observer and inter-observer reliabilities should be chosen for three-dimensional image registration and measurement, which can decrease the ME.

Keywords: Craniofacial landmarks; Three dimensional image; Accuracy; Reliability

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