牙齒自然頻率特性之臨床探討

Dynamic Behavior Assessment of Human Teeth: An In Vivo Study

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摘要

由於有關自然牙的動態特性，至目前爲止仍沒有被有系統的討論過，因此本研究利用模態測試實驗，於口內量測門齒、犬齒、第一小臼齒、及第一大臼齒共 1007 顆，並依牙齒的解剖型態、所在的位置、年齡及性別分類，探討各項生理因素對牙齒的自然頻率的影響。本研究結果顯示，牙齒的自然頻率在上、下、左、右四個象限間沒有明顯的差異，而牙齒的解剖型態、年齡及性別則會影響牙齒自然頻率。其中不論解剖型態爲何，女性牙齒的自然頻率均明顯的比男性高約 100 Hz ($p<0.01$)。此外，男性牙齒的自然頻率在不同年齡間會有明顯的不同($p<0.05$)，其中門齒、犬齒與第一小臼齒的自然頻率值高峰均出現在 40-49 歲的年齡層，而女性的門齒、犬齒與第一小臼齒的自然頻率值則與年齡無關。但不論是男性還是女性，其第一大臼齒的自然頻率均會隨年齡的增加而增加($p<0.05$)。而不論男女，在 50 歲以前，其大臼齒的自然頻率均明顯的比其他三顆牙齒小約 100-150 Hz ($p<0.01$)，但在 50 歲以後大臼齒的自然頻率值雖然仍較低，但並無統計上之差異。

Abstract

Due to the fact that studies regarding the dynamic features of natural frequency (NF) have not yet been systematically discussed up to the present time, therefore, modal analysis was carried out in this study to test the frequencies of incisors, canies, first premolar and first molar. A total number of 1007 teeth were tested based on tooth morphology, location, age and gender to analyze the effects of the above mentioned physiological factors to the natural frequency of the sample teeth. Our results showed that no significant difference in the natural frequency was found among teeth in four different quadrants. However, tooth anatomy, age and gender imposed an effect on the NF value of teeth. Regardless of teeth anatomy, NF value of teeth in female subjects was found to be apparently higher than the male counterpart by approximately 100Hz ($p<0.1$). Moreover, the NF value of teeth in males subjects vary with age ($p<0.05$). The highest mean frequency of incisors, canines and first premolars in the male population was found between ages 40 to 49. On the other hand , the same set of teeth in the female population was in no way shown to be associated with age ($p<0.05$)but still lower in value compared with the three other types of teeth by approximately 100-150 Hz ($p<0.01$)

before age 50. Although the NF value of first molars remained comparably low after 50, no significant difference was found statistically.