Natural frequency analysis of periodontal conditions in human anterior teeth.

李勝揚; 林哲堂
Huang H-W; Lee S-Y; Yeh C-Y; Wang M-S; Chang W-J; Lin C-T

Abstract

The purpose of this study was to evaluate the possibility of using natural frequency (NF) analysis to detect the attachment loss of periodontal tissue. In this study, 698 anterior teeth were examined by a conventional probing method and also by NF analysis. The teeth were triggered to vibrate with an impulse hammer, and the vibrational response was detected by an acoustic sensor. Our results demonstrate no significant difference in NF values between the upper-lower/left-right quadrants of the tested teeth, although the mean natural frequency value of central incisors with periodontal disease was found to be 1.24 +/- 0.11 kHz which is significantly lower than that of teeth in a healthy condition (1.34 +/- 0.20kHz; $p < 0.01$). On the other hand, the mean frequency for periodontal disease involving canines (1.28 +/- 0.09 kHz) was also significantly lower than the corresponding value for healthy analogs (1.35 +/- 0.17 kHz; $p < 0.05$). These results suggest that NF analysis appears to be an effective method for assessing the periodontal condition of anterior teeth. Moreover, since this method is noninvasive, nondestructive, and necessitates minimal tooth contact, it can serve as an effective method for the early quantifiable testing and prevention of periodontal disease.