

人工牙根之自然頻率與組織學分析

Natural Frequency and Histological Analysis

中文摘要

論 文 摘 要

論文名稱：人工牙根之自然頻率與組織學分析

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本研究乃利用自然頻率檢測法，從植入動物人工牙根實驗之骨癒合程度中量測自然頻率，並對照比較組織切片，用以分析人工植體自然頻率訊號改變與周邊骨癒合生成的關係，並建立資料庫，以期發展一套能客觀且非破壞性地連續監測人工植體骨整合工具。使用八隻成年 Beagle dog，體重在 9 公斤到 12 公斤，骨癒合觀察期分為 1,2,3,4,9,12,16 及 26 八個階段，每組一隻狗，每隻狗植入六支自製之純鈦人工牙根 10 mm 長度 x 4.0 mm 直徑，植體蓋 2.0 mm 長度 x 4.0 mm 直徑，手術完成後於每個階段進行自然頻率模態測試，測試完後作組織切片。實驗結果顯示第 9 週之人工牙根周邊骨組織發育成熟，完成骨整合，直至第 26 週骨組織均呈現穩定而無變化，此結果與自然頻率訊號呈現趨勢於統計分析上具一致性(亦即 12 週與 26 週無統計上差異)。成功骨整合的人工牙根其自然頻率數值為 7.0 kHz ~9.0 kHz 之間。本研究顯示自然頻率的檢測法為一快速且非破壞性的檢測工具，可有效輔助臨床上植體的評估，進而增加其成功率。

英文摘要

Abstract

Title of thesis : Natural Frequency and Histological Analysis
of Dental Implant

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The goal of this study is to use the natural frequency analytic test, measuring the natural frequency within the bone healing process after the implantation, than comparing the histological sections, so that we could analyze the correlations between the natural frequency signal changes and bone healing around the boundary condition for the dental implant, current study will also established a data base. In the end to develop a simple interment which is capable of providing a objective and noninvasive

quantitative assessment for the evaluation of the condition right after the implantation and in the following healing stages. This study uses 8 adult beagle dogs (weight from 9 to 12 kgs), bone healing observation stages divided in to 8 stags: 1, 2, 3, 4, 9, 12, 16, and 26 wks. Each stage has one dog. Every dog was implanted with 6 pure titanium implants: fixture (10 mm x 4.0 mm), .healing cap (2.0 mm x 4.0 mm)

We performed natural frequency model testing over each stage after operation. After that we made histological sections. The histological assessment indicates that the peri-implant bony structure becomes amateur and complete osseointegration in 9 weeks, and the bone structure appears stable without changes until 26 weeks. The trend of statistical analysis over natural frequency shows identical results. The natural frequency of a successful dental implant is 7.0 kHz ~ 9.0 kHz.

Natural frequency test is a useful non-invasive detective method that is capable of providing a noninvasive quantitative assessment for the evaluation of the condition right after the implantation and in the following healing stages for dental implants.

Key Words: dental implant, natural frequency, osseointegration