• 計畫中文名稱	阻尼性質變化對不同復形治療後牙齒抵抗挫傷外力之影響		
• 計畫英文名稱	--		
• 系統編號	PC9809-0021	• 研究性質	基礎研究
• 計畫編號	NSC98-2314-B038-029	• 研究方式	學術補助
• 主管機關	行政院國家科學委員會	• 研究期間	9808 ~ 9907
• 執行機構	臺北醫學大學牙醫學系		
• 年度	98 年	• 研究經費	850 千元
• 研究領域	牙醫學, 醫學工程		
• 研究人員	張維仁,黃豪銘		
• 中文關鍵字	--		
• 英文關鍵字	--		
• 中文摘要	過去研究顯示，復形後牙齒的抗斷裂性和復形材與牙齒間的鍵結強度，及剩餘牙齒 結構多寡有關。然而，牙科復形材影響牙齒抗斷裂性的確切因素尚未被完整討論。尤其 物體阻尼性質與物體受到衝擊力時所造成的破壞程度有密切關係，而此一性質在受復形 治療後牙齒的抗斷裂分析上並未被探討。由於牙體復形又可分爲兩大類，其一爲未侵犯 牙髓之復形，另一爲侵犯牙髓之復形。因此在本研究計畫中，我們測量並比較上述兩種 牙齒復形前後之阻尼性質，並據此評估復形材之阻尼性質。在實驗方法上選擇上顎正中 門齒、犬齒、第一小臼齒與第一大臼齒，在第一年我們將依布雷克氏第一級窩洞修形處理牙齒，並在填入銀粉、光聚合玻璃離子樹脂及光聚合複合樹脂的情形下量測並比較阻 尼比，並進行衝擊力學測試。第二年計畫則將利用相同技術偵測牙齒接受過根管治療、 鑄釘、牙冠等療程過程中與治療後，牙齒阻尼係數的改變情形，並進行衝擊力學測試。 第三年則將以前兩年之研究結果進行有限元素分析，並將結果與前兩年之結果做一比 較。預期計畫完成後將可對牙齒黏彈特性作一更深入的了解，並可作爲未來牙科材料在 研發時之重要參考資料。		
• 英文摘要	In previous studies, fracture resistance of restored teeth correlates to bonding strength of restorative materials and the amount of remained tooth structure. However, the exact effect of the restorative materials on the fracture resistance was still not known completely. Especially, damping effect of a structure is associated with the degree of damage when the structure was sustained to a sudden impact. To avoid teeth fractured due to excessive sudden impact force, damping effects should be took into account when		

	choosing restorative materials. However, the issue regarding to the effects of damping property of tooth on the anti-fracture property was not fully investigated. Based on the damage involved pulp or not, the restored treatment can be roughly divided into two catalogues. Therefore, in this proposal, we try to design experiments to test the effects of damping property changes on the teeth including maxillary central incisor, canine, first premolar and first molar. In the first year, damping ratios of the teeth with and without restoration will be detected and compared. The effects of restorative materials on damping properties are evaluated. The teeth will be prepared as Black's Class I cavity (with geometry of 4x4x4 mm). They were divided into three catalogues which restored with amalgam, glass ionomer, and composite resin, respectively. Modal testing was used to measure the damping ratios of the teeth before and after restorations. Then, fracture tests using dynamic force on these teeth will be performed. In the second year, similar testes will be performed on the teeth pretreated with endodontic and post treatment. In the third year, according to the results obtained from the first two years, dynamic finite element models will be established and used for simulation. The changes in peak value and distribution of the induced stresswhen the teeth has various damping properties will be compared to the findings observed in the past two years. After finish all the tests of this proposal, we will provide more insight into the mechanism of dental fracture, and the results of this study will be a useful guide and reference for future dental material development.