牙本質表面狀況與複合樹脂之間抗張鍵結力的關係

The effect of various dentin surface condition on tensile bond

中文摘要

牙本質表面的塗抹層及潤濕程度會影響複合樹脂與牙本質之間的鍵結力，酸蝕牙本質去除塗抹層，使樹脂底劑能與牙本質小管接觸，底劑中的親水性樹脂－HEMA 就能夠順利的深入牙本質小管，是增加鍵結強度的主要因素．90 顆成人第三大臼齒牙根切除，並清除牙髓，髓腔充滿生理食鹽水，以雙面膠及自聚性樹脂封閉．頰側牙本質經由#320 及#600 砂紙研磨，產生塗抹層，再以 6%檸檬酸，10%蘋果酸，25%鞣酸，10%磷酸等，處理列表面．經酸處理過的酸蝕組與對照組，分別在髓腔加壓 25mmHG 及不加壓的條件下，依底劑，黏著劑，複合樹脂之順序充填，充填後分成兩組為立即做 37℃水浴，及置於恒溫箱 37℃，24 小時後才做水浴，水浴 24 小時後取出做拉力試驗．酸蝕可將牙本質塗抹層清除，除鞣酸以外，牙本質小管開口有擴大的現象，而鞣酸則有栓塞物在管內．在沒有髓腔壓力下其抗張鍵結強度，磷酸、檸檬酸、蘋果酸，三組之間無顯著差異($p>0.05$)，而鞣酸與其它三種酸蝕組則有顯著的差異($p<0.05$)．對照組與酸蝕組之間都有顯著的差異($p<0.05$)．酸蝕組在無髓腔壓力下其鍵結強度大於有髓腔壓力．而儲存 24 小時後再水浴，其鍵結強度也比立即水浴較大．鞣酸不使牙本質小管開口擴大，且有部份栓塞，因而在無髓腔壓力的情況下，比其它酸處理過後的鍵結強度較小，但在有壓力的情況則呈現相反的結果．對照組的鍵結強度在所有的實驗項目中都遠比酸蝕組小($p<0.05$)．酸蝕組及對照組之內，不論髓腔是否加壓，及 37℃儲存 24 小時，它們之間的比較，其結果都有顯著的差異($p<0.05$).結論顯示：牙本質表面塗抹層及過多的水份，會降低牙本質與複合樹脂之間的鍵結．要完成理想的複合樹脂充填，局部乾燥牙齒表層的水膜及去除塗抹層是必要的步驟．

英文摘要

Conditioning dentin surface may affect its bonding strength with composite resin. Acid etching can remove the smear layer, let the tubular orifice direct contact with dentin primer, hydrophilic resin-HEMA can easily penetrate into dentinal tubule, increase the bonding strength. Ninety adult 3rd molar after cutting off the root, cleaned the pulp chamber wall, filled with normal saline, sealed the chamber with tape and blocked with translucent self-cure resin. #320 and #600 sand paper abrade the buccal dentin surface. 6% citric acid, 10% phosphoric acid, 25% tannic acid, 10% maleic acid, as etching solution were used for removing smear layer on dentin surface. 25mmHg hydrostatic pressure was applied to the pulp chamber in pressure group. Control group with none acid treatment was included in this experiment. After restoration the samples were stored in 37℃, 100% humidity

closed chamber for 24 hours (storaged group), then soaked in 37℃ water for 24 hours; or immediate soaking after restoration. In the results, acid treated groups show cleaning dentin surface and wide opened tubule orifice, except tannic acid, there were smear plugs obstructing the tubule opening. In control group, smear layer cnanot be removed by water irrigation. Result from TBS test, with ANOVA and Scheffes posteri comparison, in storaged groups, there was no significant difference ($p > 0.05$) between citric, maleic and phosphoric acid treated groups, tannic acid treated group gives significant difference with others acid treated groups ($p < 0.05$). Nonhydrostatic pressure groups showed higher bonding strength than pressure group ($p < 0.05$). Storaged group shows more bonding strength than immediated soaking group ($p < 0.05$). In the control group, ther are significant difference ($p < 0.05$) between pressure, storaged, and immediated soaking groups. Compared with experiment groups, control group shows lower bonding strength than acid treated groups ($p < 0.05$). All of the experiment groups and control group show significant difference ($p < 0.05$) between storaged, immediate soaking and pressure within their group. The conclusion was: Both smear layer and excess water that presents on dentin surface will decrease bonding strength between dentin surface and composite resin complex. Therefore, it is necessary to remove excess water and smear layer on dentin surface for a successful composite resin bonding.