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EFFECTS OF SURFACE CONDITIONING AND STORAGE TIME ON THE BOND STRENGTH OF ORTHODONTIC BRACKETS TO LITHIUM DISILICATE CERAMIC

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The long term bracket bond strength of several lithium disilicate surface conditioning techniques was assessed, including various hydrofluoric acid (HF) etching times and non-thermal plasma (NTP). The efficacy of enamel bonding agents was also evaluated. Brackets were bonded to 300 IPS e.max samples (Ivoclar Vivadent). Five surface conditioning techniques were tested: 15 seconds 37% H_3PO_4 , 20 seconds 9.5% HF, 60 seconds 9.5% HF, 60 seconds 9.5% HF with an enamel bonding agent and 20 seconds NTP only. All samples were treated with a silane coupling agent prior to bonding with an orthodontic adhesive and were stored in distilled water at 37°C for 30 minutes, 24 hours and 6 months before testing the shear bond strength. Results showed that all surface treatment groups yielded clinically acceptable bond strengths at all water storage times. Bond strengths increased from 30 minutes to 24 hours and then decreased at 6 months, but this decrease was significant only for the H_3PO_4 group. At 24 hours, HF etching for 60 seconds followed by enamel bonding agent exhibited significantly higher bond strength than phosphoric acid or HF for 20 seconds. Etching with HF resulted in increased adhesive residue compared to treatment with NTP or H_3PO_4 . The results suggest that surface treatments with NTP or 20 to 60 second 9.5% HF etching times yield acceptable long-term bond strengths as the bond strengths did not significantly reduce after 6 months.