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INDIRECT BONDING METHOD: SHEAR BOND STRENGTHS OF METAL BRACKETS CEMENTED TO PORCELAIN

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Background: Orthodontists will be required to work on restored tooth surfaces as more adults seek orthodontic treatments. Bond strength at the metal-ceramic interface of auto-polymerizing resins used for orthodontic indirect bonding has yet been evaluated.

Objective: 1) Compare shear bond strength (SBS) between metal brackets and differently treated porcelain surfaces. 2) Suggest a practical and predictable literature-based clinical protocol.

Method: 90 leucite discs (6 groups; n=15/group) were prepared following 6 combinations of mechanical (+/- bur roughening) and chemical (hydrofluoric acid, primer, silane) treatments according to manufacturers' recommendations. SPEED brackets with custom Transbond XT composite bases were bonded with Sondhi A+B Rapid Set. Samples were stored (distilled H₂O, 24hrs), thermocycled (distilled H₂O, 500 cycles, 5° and 55° Celcius) and tested in compression with the Instron testing machine. Maximum SBS was recorded for each sample and examined under scanning electronic microscope to evaluate the adhesive remnant index (ARI). Statistics were performed on ranks since data was not normally distributed.

Results: Group medians ranged from 17 MPa (-bur+HFA) to 27 MPa (+bur+HFA+silane). Only (-bur+HFA) showed a significantly lower SBS ($p<0.04$) and ARI ($p<0.001$) while all other surface treatment combinations showed no significant differences in their SBS and ARI.

Conclusion: All suggested surface preparations provided clinically acceptable bond strength for orthodontic tooth movement. Primer followed by silane treatment is clinically attractive as it is safe and easy to apply. Patients should be warned about the risk of unesthetic porcelain fractures at time of bracket removal.