The efficacy of polyether-ether-ketone wire as a retainer following orthodontic treatment

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Abstract (300 word limit)

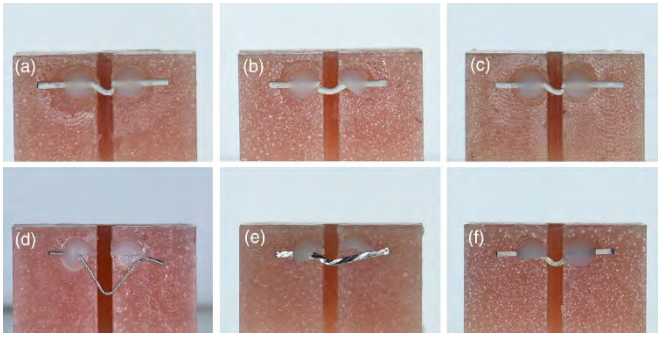
Objectives: To investigate the efficacy of polyether-ether-ketone (PEEK) wire as a fixed orthodontic retainer, by comparing its performance to other retainer wires and optimizing its adhesion to composite bonding materials.

Materials and methods: Retainer wires of 15 mm segments were used, PEEK wires were prepared in cylindrical form with 0.8 mm diameter, and had two surface treatmentsnamely air-abrasion and conditioning with adhesive system. Three different metallic retainer wires were used for comparison and three tests were performed; two tests measured debonding force and associated wire deflection from acrylic blocks and bovine teeth and one test for pull-out force. To test debonding force, a vertically directed compressive force was applied to the retainer wires bonded to the acrylic blocks and bovine teeth, while for pull-out test; a vertically directed tensile force detached the retainer wire.

Results: In both debonding tests, PEEK wires (regardless the surface treatment) had non-significant difference when compared to each other, or to the other metallic wires, except the dead-soft coaxial wire group. The dead-soft coaxial wire group had significant difference when compared to other groups regarding both the force magnitude and maximum deflection, the only exception was the debonding force of the flat braided retainer wires bonded to bovine teeth. In pull-out test PEEK wires conditioned with adhesive system and the air-abraded recorded the second and third highest readings respectively.

Conclusions: Within the limitations of this study, the 0.8 mm round PEEK wires have comparable performance -in terms of debonding and pull-out forces- to conventional retainers when bonded with 4 mm composite bonding spots; using air-abrasion for 10 s at 3.5 MPa provided sufficient adhesion of the composite to the wire, and conditioning with adhesive system may provide no further clinical benefit.

Image



Debonding force measurement performed on retainer wires bonded to acrylic blocks. PEEK wires (a) no treatment, (b) air-abraded, (c) airabraded with Visio.Link. Metal wires (d) Respond, (e) Braidedretainer, (f) Flat dead titanium

Recent Publications (minimum 5)

1. Kadhum AS, Alhuwaizi AF (2021) The efficacy of polyether-ether-ketone wire as a retainer following orthodontic treatment. Clinical and experimental dental research 7 (3), 302-312.
2. Kadhum AS, Alhuwaizi AF (2021) The effect of composite bonding spot size and location on the performance of poly-ether-ether-ketone (PEEK) retainer wires. Journal of Baghdad College of Dentistry 33 (2), 1-9.
3. YA Yassir, AS Kadhum, HF Saloom, GT McIntyre, DR Bearn (2021) Development of patient information leaflets for fixed, removable, and functional appliances for Arabic-speaking orthodontic patients. The Saudi dental journal 33(3), 143-9.
4. Kadhum AS, Al-Groosh DH, Aldabagh DJ, Alhuwaizi AF (2020) Evaluation of selection criteria for patients indicated for fixed orthodontic appliance treatment. Journal of International Dental and Medical Research 13 (1), 301-5.
5. Ahmed HMA, Kadhum AS, Nahidh M (2019) Evaluating the Efficacy of Bio-Sanitizer S1 in Disinfecting Contaminated Elastomeric Chains. Journal of Global Pharma Technology 11 (03), 575-578.

Photograph



Biography (150-word limit)

Dr Ammar has been teaching at the Orthodontic Department at the College of Dentistry, University of Baghdad since 2007. He had several researches in different branches related to orthodontics.

Dr. Akram is a Professor in Orthodontics, he has been teaching at the Orthodontic Department at the College of Dentistry, University of Baghdad over three decades now, during which he had supervised many M.Sc. and Ph.D. students. Email: ammar.ortho@codental.uobaghdad.edu.iq

Notes/Comments: