

## INTISARI

*Fiber Reinforced Composite* (FRC) menggunakan *E-glass fiber* dental dalam bidang kedokteran gigi telah banyak di aplikasikan secara klinis, salah satunya dalam aplikasi splinting periodontal. Ketersediaan *E-glass fiber* dental di Indonesia masih terbatas dengan harga relatif mahal. Terdapat *glass fiber non dental* di Indonesia yang banyak digunakan bidang teknik, dengan harga terjangkau. Tujuan dari penelitian ini untuk mengetahui pengaruh orientasi dan volumetrik *glass fiber non dental* terhadap kekuatan perlekatan geser FRC pada *splinting* periodontal.

Bahan penelitian berupa *glass fiber non dental* yang terdiri dari tiga jenis yaitu *glass fiber mats* (LT, China), *glass fiber roving* (CMAX, China), dan *glass fiber woven roving* (HJ, China), serta *E-glass fiber* dental (*Fiber-Splint*, Polidentia SA, Switzerland). Objek penelitian terdiri dari tiga puluh dua gigi Premolar pertama rahang atas yang ditanam dalam resin akrilik berbentuk kubus berukuran 15 x 15 x 15 mm. Sampel FRC dibuat dari pelat kuningan berukuran 3,2 x 2,2 x 1,5 mm, yang akan dilekatkan pada permukaan bukal gigi Premolar. Objek dibagi menjadi 8 kelompok, masing-masing kelompok terdiri atas 4 sampel. Kelompok I (kontrol) tanpa penambahan *glass fiber non dental*, kelompok II *E-glass fiber* dental 2,8 vol%, dan kelompok III - VIII terdiri dari *glass fiber non dental mats*, *glass fiber non dental roving*, dan *glass fiber non dental woven roving*, dengan fraksi volumetrik 2,8 dan 5,4 vol%. Seluruh sampel direndam dalam air destilasi selama 24 jam pada suhu 37° C. Pengujian kekuatan perlekatan geser menggunakan *Universal Testing Machine*. Data dianalisis menggunakan ANAVA dua jalur, uji *t* dan *LSD*.

Hasil penelitian menunjukkan rerata kekuatan perlekatan geser (MPa) terendah pada kelompok tanpa *fiber* (kontrol) ( $8,95 \pm 0,95$ ) dan tertinggi pada 5,4 vol% *glass fiber non dental woven roving* ( $14,11 \pm 0,35$ ). Hasil analisis ANAVA dua jalur menunjukkan variabel orientasi dan volumetrik *glass fiber non dental* memberikan pengaruh signifikan ( $p < 0,05$ ). Uji post hoc *LSD* dan uji *t* menunjukkan perbedaan signifikan ( $p < 0,05$ ) pada seluruh kelompok perlakuan untuk variabel orientasi dan volumetrik. Kesimpulan penelitian ini adalah orientasi dan volumetrik *glass fiber non dental* memberikan pengaruh terhadap peningkatan kekuatan perlekatan geser FRC.

Kata Kunci: *glass fiber non dental*, orientasi *fiber*, volumetrik *fiber*, kekuatan perlekatan geser, *splinting* periodontal

## ABSTRACT

Fiber Reinforced Composite (FRC) using E-glass fiber dental in the field of Dentistry has been widely applied clinically, one of them in the application of periodontal splinting. The availability of E-glass fiber dental is limited in Indonesia with relatively high cost. Glass fiber non dental is widely available in Indonesia with lower cost, usually used in engineering. The purpose of this research was to evaluate the effect of the orientation and volumetric glass fiber non dental on shear bond strength of the FRC on periodontal splinting.

Research material in the form of glass fiber non dental consisted of three types, namely glass fiber mats (LT, China), glass fiber roving (CMAX, China), glass fiber woven roving (HJ, China) and E-glass fiber dental (Fiber-Splint, Polidentia SA, Switzerland). The experiment involved of thirty two teeth of maxillary first Premolars were embedded in a cube acrylic resin with the dimensions of 15 x 15 x 15 mm. Samples of the FRC made of brass plate with the dimensions of 3.2 x 2.2 x 1.5 mm, which will be bonded on the surface of the buccal of Premolars. Objects were divided into 8 groups, each group contains of 4 samples. Group I (control) without the addition of glass fiber non dental, group II E-glass fiber dental with 2.8 vol%, group III-VIII consists of glass fiber non dental mats, glass fiber non dental roving, and glass fiber non dental woven roving, with volumetric fraction of 2.8 and 5.4 vol%. All samples were soaked in distillation water for 24 hours at 37° C temperature. Samples were tested for shear bond strength of FRC using the Universal Testing Machine. The data was analyzed using two way of ANOVA, t\_test and LSD.

The results showed that the mean of shear bonding strength (MPa) the lowest on group without fiber (control) ( $8.95 \pm 0.95$ ) and the highest on 5,4 vol% glass fiber non dental woven roving ( $14.11 \pm 0.35$ ). Two way of ANOVA analysis showed that the orientation and volumetric glass fiber non dental had significant effect ( $p < 0.05$ ). LSD post hoc test and t\_test showed significant difference ( $p < 0.05$ ) on the whole group treatment for orientation and volumetric variable. The conclusion of this research that was the orientation and volumetric of the glass fiber non dental could increase the shear bond strength of FRC.

**Keywords:** Glass fiber non dental, fiber orientation, fiber volumetric , shear bond strength, periodontal splinting