INTISARI

Pasak endodontik yang beredar di pasaran saat ini, baik paduan logam, *fiber* maupun komposit mempunyai komposisi dan struktur yang homogen dari ujung yang satu, pada daerah koronal, sampai ujung yang lain, pada daerah apikal. Dalam penelitian ini dicoba ditambahkan bahan biokeramik secara gradual pada campuran bahan komposit diharapkan dapat memperbaiki sifat fisis dan mekanis pada pasak endodontik. Penelitian ini bertujuan untuk mengidentifikasi kekuatan *flexural*, kekuatan tarik, dan densitas dari komposit berpenguat serat gelas dan biokeramik, serta mengidentifikasi pengaruh penambahan serbuk biokeramik terhadap sifat fisis dan mekanis komposit diperkuat-serat gelas.

Material yang digunakan dalam penelitian ini adalah resin poliester, serat gelas *E-glass*, dan serbuk biokeramik *Hydroxiapatite* (HA). Pembuatan sampel dilakukan dengan metode *hand lay-up*. Sampel komposit dibedakan berdasarkan jumlah penambahan serbuk biokeramik HA antara lain Sampel tanpa penambahan serbuk biokeramik HA, 1% HA, 2% HA, 3% HA, 4% HA, dan 5% HA. Pengujian yang dilakukan meliputi uji tarik, uji tekuk (*three-point bending test)*, uji densitas pengamatan struktur mikro, *SEM*, dan *EDX*.

Dari hasil pengujian mekanik yang telah dilakukan menunjukkan kekuatan *flexural* terbesar dimiliki komposit dengan penambahan 3% serbuk biokeramik (1501.599 ± 226.526 MPA) dan yang terkecil dimiliki komposit dengan penambahan 4% serbuk biokeramik (1231.839 ± 104.218 MPA). Kekuatan tarik terbesar dimiliki komposit dengan penambahan 1% serbuk biokeramik (184.128 ± 35.935 MPA) dan yang terkecil dimiliki komposit tanpa penambahan serbuk biokeramik (149.802 ± 32.650 MPA). Densitas terbesar dimiliki komposit dengan penambahan 2% serbuk biokeramik (1,520 gram/cm^3) dan yang terkecil dimiliki komposit dengan penambahan 3% serbuk biokeramik (1,344 gram/cm^3).

Penambahan serbuk biokeramik HA pada komposit berpenguat serat gelas tidak berpengaruh signifikan pada kekuatan mekanis komposit Pengaruh fisis dari serbuk biokeramik HA yang dapat dilihat dari hasil pengujian SEM dan EDX yaitu teridentifikasinya unsur P dan Ca yang terdapat pada sampel komposit dengan penambahan 5% serbuk biokeramik HA, unsur P dan Ca ini menunjukkan bertambahnya sifat biokompabilitas dari komposit berpenguat serat gelas.

Kata kunci: Pasak endodontik, serat gelas *E-glass*, komposit, kekuatan *flexural*, tarik, densitas, sifat fisis, sifat mekanis.

ABSTRACT

Endodontic posts on the market today, both metal alloys, and composite fiber having a homogeneous composition and structure from one end to the coronal area, to the other end, in the apical region. This study attempted bioceramics material gradually added to the mixture of composite materials is expected to improve the physical and mechanical properties in endodontic posts. This study aims to identify the flexural strength, tensile strength, and density of glass fiber-reinforced composites and bioceramics, and identify the effect of the addition of bioceramics powder against the physical and mechanical properties of glass fiber-reinforced composites.

The material used in this study is the polyester resin, glass fiber E-glass, and the bioceramics filler Hydroxiapatite (HA). Sample preparation is done by hand lay-up methods. Composite samples differentiated by the amount of addition of HA bioceramics filler Composite samples differentiated by the amount of addition of HA bioceramics powder which is samples without the addition of HA, HA 1%, HA 2%, HA 3%, HA 4%, and HA 5%. Testing was conducted on the tensile test, bending test (three-point bending test), density test, microstructure observation, SEM, and EDX.

From the results of mechanical tests that have been done showed that the largest flexural strength is owned by the composite with the addition of 3% bioceramics filler (1501.599 ± 226 526 MPA) and the smallest owned by the composite with the addition of 4% bioceramics filler (1231.839 ± 104 218 MPA). The largest tensile strength is owned by the composite with the addition of 1% bioceramics filler (± 35 935 184 128 MPA) and the smallest is owned by the composite without the addition of bioceramics filler (± 32 650 149 802 MPA). The largest density is owned by the composite with the addition of 2% bioceramics filler (1.520 g/cm^3) and the smallest is owned by the composite with the addition of bioceramics 3% filler (1.344 g/cm^3).

It can be seen that the addition of HA bioceramics filler in the glass fiber reinforced composites has no significant effect on the mechanical strength of the composite. The physical influence of HA bioceramics filler which can be seen from the results of SEM and EDX testing identification of P and Ca contained in the composite sample with the addition of 5% HA bioceramics filler, P and Ca showed increasing the biocompatibility of fiber glass reinforced composites.

Keywords: Endodontic post, E-glass fiber, Composites, Hydroxiapatite, flexural strength, tensile strength, density, Mechanical properties, Physical properties.