

## ABSTRACT

*Deep caries that involves a lot of dentin structure requires a sandwich restorations. Sandwich restoration is a lamination restoration technique using base materials that have good biocompatibility and mechanical strength. Compressive strength is the mechanical properties of a material to be able to accept the force of mastication. This study aimed to determine the difference of compressive strength in sandwich restoration using GIC type II reinforced, Smart Dentin Replacement (SDR) and Flowable Composite Resin as base materials with a selective-etch adhesive system.*

*The design of this research was an experimental laboratory. The research material used GIC type II reinforced (GC Fuji IX GP EXTRA Capsule), SDR (Dentsply), and Flowable Composite Resin (Esthet-X Flow, Dentsply). The samples were maxillary permanent premolars teeth of class II cavity prepared with a cavity size of 4 mm depth. The total sample used was 27 teeth that divided into 3 groups. The first group was using GIC type II reinforced as a base material. The second group was using SDR as base material. The third group was using flowable composite resin as a base material, then restored with the packable composite resin material (Esthet-X HD, Dentsply). The sample was immersed in artificial saliva and incubated at 37 ° C for 24 hours, then tested using the Universal Testing Machine (UTM) to determine the compressive strength (MPa).*

*The result of the compressive strength obtained was analyzed statistically by one-way ANOVA test with the test results of  $p = 0,000$ . The result showed that mean value of GIC type II reinforced compressive strength was 66.03 MPa, SDR was 89.01 Mpa, and Flowable Composite Resin was 102.01 Mpa. These results indicate there is a significant effect ( $p < 0.05$ ). The conclusion of this study is the highest compressive strength value in the restoration group was using flowable composite resin as a base material.*

**Keywords:** *sandwich restoration, compressive strength, base material, glass ionomer cement type II reinforced, smart dentin replacement, flowable resin composite*

## INTISARI

Karies yang dalam banyak melibatkan struktur dentin sehingga memerlukan restorasi *sandwich*. Restorasi *sandwich* merupakan teknik restorasi laminasi menggunakan bahan basis yang memiliki sifat biokompatibilitas dan kekuatan mekanis yang baik. Kekuatan tekan merupakan sifat mekanis suatu bahan untuk mampu menerima beban pengunyahan. Penelitian ini bertujuan untuk mengetahui adanya perbedaan kekuatan tekan pada restorasi *sandwich* dengan menggunakan bahan basis GIC tipe II *reinforced*, *Smart Dentin Replacement* (SDR) dan Resin Komposit *Flowable* dengan sistem adhesif *selective-etch*.

Desain penelitian adalah eksperimental laboratorium. Bahan penelitian menggunakan GIC tipe II *reinforced* (GC Fuji IX GP EXTRA Capsule), SDR (Dentsply), dan Resin Komposit Flowable (Esthet-X Flow, Dentsply). Sampel berupa gigi premolar permanen rahang atas dipreparasi kavitas kelas II dengan ukuran kavitas kedalaman 4 mm. Total sampel sebanyak 27 gigi dibagi menjadi 3 kelompok. Kelompok 1 menggunakan bahan basis GIC tipe II *reinforced*, kelompok 2 menggunakan bahan basis SDR, dan kelompok 3 menggunakan bahan basis resin komposit *flowable* kemudian direstorasi dengan bahan resin komposit *packable* (Esthet-X HD, Dentsply). Sampel direndam dalam saliva buatan dan disimpan di dalam inkubator pada temperatur 37°C selama 24 jam, kemudian diuji menggunakan alat *Universal Testing Machine* (UTM) untuk mengetahui kekuatan tekan (MPa).

Hasil kekuatan tekan dianalisa secara statistik dengan uji *one way anova* dengan hasil uji ( $p=0,000$ ). Hasil menunjukkan nilai rerata kekuatan tekan GIC tipe II *reinforced* sebesar 66,03 MPa, SDR sebesar 89,01 Mpa dan Resin Komposit *Flowable* sebesar 102,01 Mpa sehingga menunjukkan terdapat pengaruh secara signifikan ( $p<0,05$ ). Kesimpulan penelitian ini adalah nilai kekuatan tekan tertinggi pada kelompok restorasi dengan menggunakan bahan basis resin komposit *flowable*.

Kata Kunci : Restorasi *sandwich*, kekuatan tekan, bahan basis, *glass ionomer cement* tipe II *reinforced*, *smart dentin replacement*, resin komposit *flowable*