

## INTISARI

Perkembangan perawatan periodontal saat ini dilakukan menggunakan strategi *guided tissue/bone regeneration* (GTR/GBR) dengan melibatkan penggunaan perancah (*scaffold*). Keberhasilan perawatan periodontal bergantung pada biomaterial *scaffold* yang memiliki karakteristik *swelling* dan degradasi yang dapat mendukung migrasi sel, difusi nutrisi, dan pembentukan jaringan baru. Salah satu biomaterial yang memiliki potensi sebagai *scaffold* adalah hidrogel kolagen-kitosan. *Scaffold* berupa hidrogel kolagen-kitosan diperlukan untuk meniru komponen matriks ekstraseluler, sehingga perlu untuk menambahkan *growth factor* yang berperan dalam regenerasi jaringan, salah satunya dengan penambahan konsentrasi platelet berupa *Injectable Platelet-Rich Fibrin* (I-PRF). Tujuan penelitian ini untuk menganalisis pengaruh kombinasi hidrogel kolagen-kitosan dan I-PRF terhadap *swelling* dan degradasi *scaffold* periodontal regeneratif.

Penelitian *swelling* dan degradasi dilakukan dengan metode gravimetri dan dihitung menggunakan rumus. Masing-masing dibagi menjadi 3 kelompok uji, yaitu: hidrogel kolagen-kitosan, I-PRF serta kombinasi hidrogel kolagen-kitosan dan I-PRF. *Swelling* diamati pada 30 menit, 1 jam, 3 jam, 6 jam dan 24 jam, sedangkan degradasi diamati pada 1 hari, 7 hari, 14 hari, 21 hari dan 28 hari. Data dianalisis menggunakan *Two-way ANOVA* dilanjutkan dengan uji *Post-Hoc Tukey HSD*.

Hasil penelitian menunjukkan adanya perbedaan signifikan ( $p < 0,05$ ) pada *swelling* dan degradasi antar kelompok dan waktu pengamatan. Hidrogel kolagen-kitosan menunjukkan *swelling* paling tinggi dibandingkan kombinasi hidrogel kolagen-kitosan dan I-PRF, sedangkan I-PRF langsung terlarut ketika diaplikasikan PBS sehingga tidak dapat diuji statistik karena tidak dilakukan pengukuran. Degradasi pada hidrogel kolagen-kitosan lebih rendah dibandingkan kombinasi hidrogel kolagen-kitosan dan I-PRF. Tidak terdapat perbedaan signifikan ( $p > 0,05$ ) pada interaksi antar kelompok dengan waktu pengamatan. Kesimpulan dari penelitian ini adalah kombinasi hidrogel kolagen-kitosan dan I-PRF berpengaruh menurunkan *swelling* dan meningkatkan degradasi *scaffold* periodontal regeneratif.

Kata kunci: *scaffold*, hidrogel kolagen-kitosan, I-PRF, *swelling*, degradasi

## ABSTRACT

Current developments in periodontal therapy are carried out using guided tissue/bone regeneration (GTR/GBR) strategies involving the use of scaffolds. The success of periodontal treatment depends on scaffold biomaterials that possess appropriate swelling and degradation characteristics to support cell migration, nutrient diffusion, and new tissue formation. One biomaterial with potential as a scaffold is collagen–chitosan hydrogel. Collagen–chitosan hydrogel scaffolds are required to mimic extracellular matrix components; therefore, the addition of growth factors that play a role in tissue regeneration is necessary, one of which can be achieved by incorporating platelet concentrates such as Injectable Platelet-Rich Fibrin (I-PRF). This study aimed to analyze the effect of the combination of collagen–chitosan hydrogel and I-PRF on the swelling and degradation of regenerative periodontal scaffolds.

Swelling and degradation studies were conducted using the gravimetric method and calculated using specific formulas. The samples were divided into three test groups: collagen–chitosan hydrogel, I-PRF, and a combination of collagen–chitosan hydrogel and I-PRF. Swelling was observed at 30 minutes, 1 hour, 3 hours, 6 hours, and 24 hours, while degradation was observed at 1 day, 7 days, 14 days, 21 days, and 28 days. Data were analyzed using two-way ANOVA followed by Post-Hoc Tukey HSD.

The results showed significant differences ( $p < 0.05$ ) in swelling and degradation among groups and observation times. Collagen–chitosan hydrogel exhibited the highest swelling compared to the combination of collagen–chitosan hydrogel and I-PRF, whereas I-PRF dissolved immediately upon application in PBS and therefore could not be statistically analyzed due to the absence of measurable data. Degradation of collagen–chitosan hydrogel was lower than that of the combination of collagen–chitosan hydrogel and I-PRF. No significant differences ( $p > 0.05$ ) were found in the interaction between groups and observation times. This study concluded that the combination of collagen–chitosan hydrogel and I-PRF reduces swelling and increases degradation of regenerative periodontal scaffolds.

**Keywords:** scaffold, collagen–chitosan hydrogel, I-PRF, swelling, degradation