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Propolis and Bone Graft Induced Alveolar Bone Enhancement Through SMAD3 Expression

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ABSTRACT

Objective of Investigation: Socket preservation is performed to maintain alveolar bone dimension after tooth extraction. The materials such as Bovine Bone Graft (BBG) are commonly used and in combination with propolis extract, it's hoped can accelerate the bone remodeling to increase the success of prosthodontics treatment. This study aimed to determine the capability of the combination of propolis extract and BBG in alveolar bone regeneration in terms of SMAD3 expression and the area of woven bone. **Experimental methods used:** This study used 84 Cavia cobaya which were divided into 4 groups for the 3rd, 7th, and 30th day, each group consist of 7 subjects. The propolis extraction performed a maceration method, while BBG was manufactured by The Tissue Bank of Dr. Soetomo Hospital, Surabaya. The combination was performed in a gel form. The first mandibular incisor of the subject was extracted then the socket for each group was filled with PEG (K1), propolis extract (K2), BBG (K3), and a combination of propolis extract and BBG (K4). After the duration was reached, the experimental animals were terminated and the specimen was processed to evaluate the expression of SMAD3 and calculate the area of the woven bone. Data were analyzed using Analysis of Variance (ANOVA) and Tukey HSD post-hoc test. **Essential results, including data, where appropriate, statistic:** All groups expressed SMAD3 and demonstrated the presence of woven bone. The highest expression of SMAD3 and the area of woven bone were found in the K4 group on the 3rd, 7th, and 30th days. There were significant differences in each group ($p = 0.00$; $p < 0.05$) both on the SMAD3 expression and the area of the woven bone. **Conclusion:** The combination of propolis extract and BBG supports enhancement bone formation by increasing SMAD3 expression and woven bone area.

Keywords: propolis, bovine bone graft, SMAD3, woven bone, socket preservation