

**ABSTRACT**

**Background:** Jaw resection and congenital abnormalities can cause defects in jaw bone. The surgical procedure for bone reconstruction currently performed is bone regeneration graft. Unfortunately, this procedure still has many disadvantages. Thus, tissue engineering approach is necessary to be conducted. The main component used in this tissue engineering is scaffolds. Scaffolds used in bone regeneration such as Freeze Dried Bovine Bone Xenograft (FDBBX), Demineralized Freeze Dried Bone Xenograft (DFDBBX) and bovine hydroxyapatite (BHA) are expected to have appropriate characteristics with bone.

**Objective:** The aim of this study is observed the difference in bone healing processes between FDBX and the combination of DFDBBX and BHA.

**Materials and Methods:** Bicortical bone defects were created in the angle of mandible 45 New Zealand White Rabbits. The groups were divided into 3 groups which the first group was treated with FDBBX, second group was treated with FDBBX and the control group was left perforated. All group were evaluated after second, fourth, and eighth weeks to count the number of osteoblast, Collagen-1 (Coll-1) and RUNX2 expression. **Results:** The FDBBX and DFDBBX-BHA was significantly higher compared to control ( $p < 0.05$ ) in the number of osteoblast, Collagen-1 (Coll-1) and RUNX2 expression. The number of osteoblast, Collagen-1 (Coll-1) and RUNX2 expression in FDBBX compared to DFDBBX-BHA was not significant ( $p > 0.05$ ). **Conclusion:** FDBBX and DFDBBX-BHA has the high osteoblast cell proliferation, Collagen-1 (Coll-1) and RUNX2 expression, meaning have a good potential as future source of bone graft. FDBBX and DFDBBX-BHA has the same potential.

**Keywords:** bone graft, FDBBX, DFDBBX, BHA, osteoblast, Collagen-1, RUNX2