Assessment of Xenogenic Bone Plate and Screw Using Finite Element Analysis

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Purpose: The aim of this study was to evaluate the biomechanical behavior of xenogenic bone plate system (equine bone) by finite element (FE) in ulna fracture model.
Materials and Methods: A three-dimensional finite element model was used to calculate the Von Mises stress and stress distribution in fracture healing periods with metallic bone plate system and xenogenic bone plate system, which is caused while the canine patient stands up.
Results: Bone healing rate (BHR) (0%), Maximum Von Miese stress of xenogenic plate was similar to Yield strength of equine bone (125 MPa). The Von Miese stresses at ulna and fracture zone are higher stress with xenogenic bone plate than that metallic bone plate at BHR (0% and 1%). Stress distributions in fracture zone are higher stresses with xenogenic bone plate than that metallic bone plate.
Conclusions: This study results from Finite element analysis showed that xenogenic bone plate may be considered as more beneficial for callus formation and bone healing compared to metallic bon plate. Xeonogenic bone plate and screw applied clinical treatment and offer reduced stress shielding of fracture healing periods of canine.

Key words: finite element analysis, xenogenic bone plate, xenogenic bone plate screw, Von Mises stress, ulna fracture model

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