

عنوان مقاله:

Load Capacity Assessment of a Braided Textile Composite Bone Plate under Combined Loading Using 3D-Finite Element

محل انتشار:

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خلاصه مقاله:

In sever load bearing condition, braided textile composites are most attractive because of their high load capacity. When this structure used in a bone plate design it is subjected to multi-axial stresses. However their mechanical behavior under this load conditions have been rarely ever studied. In this study, a six-hole bone plate was modeled based on DCP plate manufactured by the Synthesis Company using the commercial software ANSYS Ver. 10. The modeled plate was assumed made up of 4 single layers of bioactive glass/poly L-lactic acid (BG/PLLA). Material properties of the single layer obtained from our previous work were introduced into the model assuming an orthotropic mechanical behavior for the model. Combined loading including tension-bending, torsion-bending, and tension/bending/torsion were affected in the model. The maximum principal stress theory was used to predict damage onset due to the specific loading condition. Results from linear static analysis on the model showed that bending force can decreased load capacity of the plate. However the composite was able to properly fix the fractured site under physiological loading conditions. Therefore, under multiple loading conditions (real-life situation), it is necessary to control the level of the applied loads until healing.

کلمات کلیدی:

Finite element analysis, Braided textile composites, Combined loading

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