Mathematical modelling of crack propagation in human bone

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The problem of crack propagation in human bone is studied. We formulate and solve the mathematical problem for pre-stressed cracked human bones, regarded as pre-stressed elastic composites. Using the theories of Guz and Muskhelishvili's formalism, we determine the incremental fields in an initially deformed orthotropic elastic composite with cracks. The presented 2D quasistatic mathematical model provides a means to find crack propagation angle for a crack in human bone, regarded as orthotropic materials with initial fields. Using generalized Sih's strain energy density generalized and maximum stress criteria we find the direction of the crack path, as well as the critical values which produces crack propagation. Future numerical results or experimental tests have to confirm or not that our study, in the case of small over great strains, regarding generalization of Sih's criteria is valid.

References


Tutti gli interessati sono invitati a partecipare.

Il seminario è organizzato dal gruppo di Scienza delle Costruzioni
(D. Bigoni, L. Deseri, N.Pugno, M. Gei, A. Piccolroaz, F. Dal Corso, M.F. Pantano, R. Springhetti)