

A STUDY ON THE OSTEOPOROTIC BEHAVIOR OF HUMAN VERTEBRA USING FEM

M.Vineeth¹, S.L.Resmi², M.Shamnadh² and P.N.Dileep³

¹Under graduate student, ²Assistant Professor, ³Professor,

Department of Mechanical Engineering, TKM College of Engineering, Kollam, Kerala-691005

resmisaji@gmail.com

A finite element model of an isolated L3 vertebral body was developed to study the effect of Osteoporotic behavior on it. In order to predict the stress distribution within vertebra in different phases of osteoporosis, a gradual reduction in bone density was used to simulate osteoporotic changes within the vertebra. The present study gives detailed quantitative information on the biomechanical behavior of an osteoporotic vertebra which can be used in the evaluation of osteoporotic bone fracture. A cylindrical region is modeled in the vertebra to characterize the osteoporotic region in a bone. A reduction of 35% of bone density in the osteoporotic region increases maximum value of stress in the non-osteoporotic region by 25% and hence it may be concluded that presence of osteoporotic region in a healthy bone results in premature failure of the bone.