

Influence of Ligature Tightening on Bone Fracture Risk in Interspinous Process Surgery

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Abstract : The interspinous process devices have been recently used due to its advantages such as minimal invasiveness and less subsidence of the implant to the osteoporotic bone. In this paper, we have analyzed the influences of ligature tightening of several interspinous process devices using finite element analysis. Four types of interspinous process implants were inserted to the L3-4 spinal motion segment based on their surgical protocols. Inferior plane of L4 vertebra was fixed and 7.5 Nm of extension moment were applied on superior plane of L3 vertebra with 400N of compressive load along follower load direction and pretension of the ligature. The stability of the spinal unit was high enough than that of intact model. The higher value of pretension in the ligature led the decrease of dynamic stabilization effect in cases of the Wallis™, Diam™, Viking, and Spear®. The results of present study could be used to evaluate surgical option and validate the biomechanical characteristics of the spinal implants.

Keywords : interspinous process device, bone fracture risk, lumbar spine, finite element analysis

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