題名:A Study of Mild trauma Injury in Taiwan
作者:謝屈平; 蔡卓城; 邱文達; 蔡龍文; 蔡行瀚; 劉邦旭
貢獻者:一般醫學學科
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摘要:STUDY DESIGN: In vitro biomechanical study using human spine specimens. OBJECTIVE: To find the biomechanical consequences of prophylactic vertebroplasty post fatigue loading. SUMMARY OF BACKGROUND DATA: Percutaneous vertebroplasty man be an effective treatment for osteoporotic vertebral compression fracture. One frequently observed complication post surgery is the adjacent vertebral failure (AVF). The prophylactic vertebroplasty was proposed to prevent the AVF. The vertebroplasty is, nevertheless, an invasive intervention. More scientific proves are needed for the application of this surgery on a still intact vertebra. METHODS: Fourteen 5-level fresh human cadaveric thoracic motion segments were divided into standard and prophylactic group. Both ends of the specimen were mounted, leaving the center 3 vertebrae free. The lower level of free vertebrae was artificially injured and cement augmented. The center level vertebra of standard group remained intact and nonaugmented. The center level vertebra of prophylactic group also remained intact, but augmented with bone cement. The specimen was applied with a 2-hour, 5-Hz, 630-N (mean) compressive fatigue loading. Impulse test and CT scanning were conducted both before and after fatigue loading to find the variance of strain compliance of cortical shell and height of vertebral body. RESULTS: The strain compliance of cortical shell is generally not statistically significantly affected by the fatigue loading, cement augmentation and vertebral level (All P > 0.05). The only exception is that the cortical strain compliance of augmented vertebrae tentatively decreased post fatigue loading (P = 0.012 for tensile strain compliance, and P

= 0.049 for compressive strain compliance). The height loss of intact vertebra adjacent to a 2-level augmented (or intact-augmented) vertebra is significantly lower than the one adjacent to a 1-level augmented (or injury-augmented) vertebra (P = 0.014). For an osteoporotic vertebra, neither cortical strain compliance nor vertebral height loss is connected with bone mineral density (all P > 0.05). CONCLUSION: The strain compliance of cortical shell is generally not a sensitive indicator to predict risk of fatigue injury if the fatigue loading is mild. The prophylactic augmentation strengthens the osteoporotic vertebrae, decreases the progression of vertebral height loss, reduces the anterior body shift, and hence protects the adjacent intact vertebra from elevated flexion bending. It can be cautiously suggested that if the vertebra is osteoporotic and adjacent level is located at pivot or lordotic level of spinal column, the prophylactic augmentation may be an option to prevent the AVF.