

Title: Dynamics of C1/2 rotation related to age, sex, and smoking- a population study of 308 patients

Background: Posterior C1/2 fixation is a popular and stable means of achieving C1/2 stability for traumatic and degenerative diseases of the cervicocranial junction. The main drawback of this technique is major limitation of cervical spine rotation, however the degree of this limitation has not been quantified for specific age groups.

Research question: How does age affect the degree of C1-C2 rotation?

Methods: A total of 308 patients undergoing head and neck CT performed maximal tolerable right and left head rotation. The degree of C0-C1, C1-C2 and total cervical spine rotation was measured. C1-C2 rotation, total cervical spine rotation and the percentage of C1-C2 rotation was compared between three age groups. The effect of sex and smoking on C1-C2 rotation was investigated.

Results: Statistically significant differences in C1-C2 rotation and total cervical spine rotation were discovered between patients in age groups <50, 50-69 and >70 years with a decreasing trend for both variables. Significant differences were found between C1-C2 rotation for both sexes. Smoking did not significantly affect C1-C2 rotation.

Discussion: The price of posterior C1/2 junction fixation is a major decrease in total cervical spine rotation. However, the degree of this decrease as well as its dynamics throughout the population have not yet been quantified. Results of this study have allowed us to quantify the degree of C1-C2 rotation at various ages for both sexes and thus allow us to improve our decision making for cases requiring C1/2 fixation.