Supplemental table 3. Atlanto-condyle and atlantoaxial facets movement in lateral sagittal section of kinematic CT

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| --- | --- | --- | --- |
|  | C0-1 D change※ (mm) | C0-1 TR change※ (°) | CXA change※ (°) |
| Left | Right | Left | Right |
| I-AOJ | 0.6 ± 0.2 | 0.5 ± 0.2 | 4.5 ± 3.2 | 5.6 ± 3.3 | 13.8 ± 7.0 |
| II-AOJ | 0.6 ± 0.3 | 0.6 ± 0.2 | 4.9 ± 4.8 | 5.8 ± 2.3 | 12.5 ± 6.5 |
| III-AOJ | 1.4 ± 0.4a,b | 1.3 ± 0.7c,d | 7.6 ± 4.0e,f | 8.1 ± 3.4g,h | 19.0 ± 6.4i,j |
| Significance | P < 0.001# | P < 0.001# | P = 0.034# | P = 0.034# | P = 0.004# |
| Total | 0.8 ± 0.5 | 0.8 ± 0.5 | 5.2 ± 3.9 | 6.2 ± 3.2 | 14.4 ± 7.1 |

C0-1D, distance between anterior margins of C0 condyle and C1 lateral mass; C0-1 TR, the atlanto-condyle tilt angle, the angle between the superior edge of occipital condyle and the inferior articular surface of atlas.

※The distance/angle change means the absolute value of data in Flexion CT minus data in Extension CT.

# III-AOJ was statistically different from the other two types, but there was no significant difference between II-AOJ and I-AOJ.

a. Left side C0-1 distance change of CM+II-BI vs Control, p < 0.001, 95% CI [0.66~-0.96];

b. Left side C0-1 distance change of CM+II-BI vs CM, p < 0.001, 95% CI [0.57~-0.89];

c. Right side C0-1 distance change of CM+II-BI vs Control, p < 0.001, 95% CI [0.62~-0.99];

d. Right side C0-1 distance change of CM+II-BI vs CM, p < 0.001, 95% CI [0.54~-0.92];

e. Left side C0-1 tilt angle change of CM+II-BI vs Control, p = 0.011, 95% CI [0.73~5.33];

f. Left side C0-1 tilt angle change of CM+II-BI vs CM, p = 0.048, 95% CI [0.19~5.27];

g. Right side C0-1 tilt angle change of CM+II-BI vs Control, p = 0.012, 95% CI [0.56~4.34];

h. Right side C0-1 tilt angle change of CM+II-BI vs CM, p = 0.036, 95% CI [0.16~4.46];

i. CXA change of CM+II-BI vs Control，P = 0.005，95%CI [1.59~-8.83];

j. Clivus length of CM+II-BI vs CM，P = 0.001，95%CI [2.64~10.34].