



application. Angular velocities were not significantly different between the two frontal-head collisions ( $p>0.05$ ). Muscle activation patterns for the sternocleidomastoid, splenius capitis and trapezius muscles were not significantly different between the two frontal-head collisions ( $p>0.05$ ).

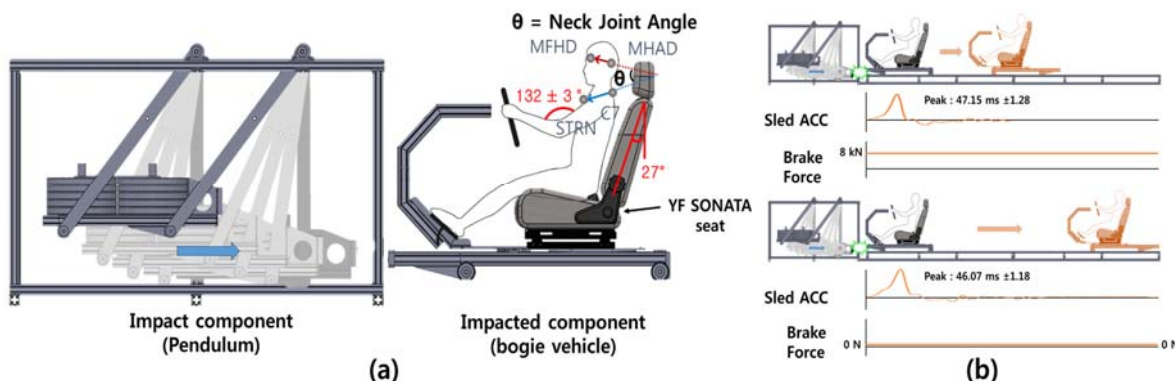


Fig. 1. (a) Frontal-head collision test platform and neck joint angle definition; (b) conditions for the subsequent frontal-head collision at stationary state following AB application (*Upper*) and without AB application (*Lower*).

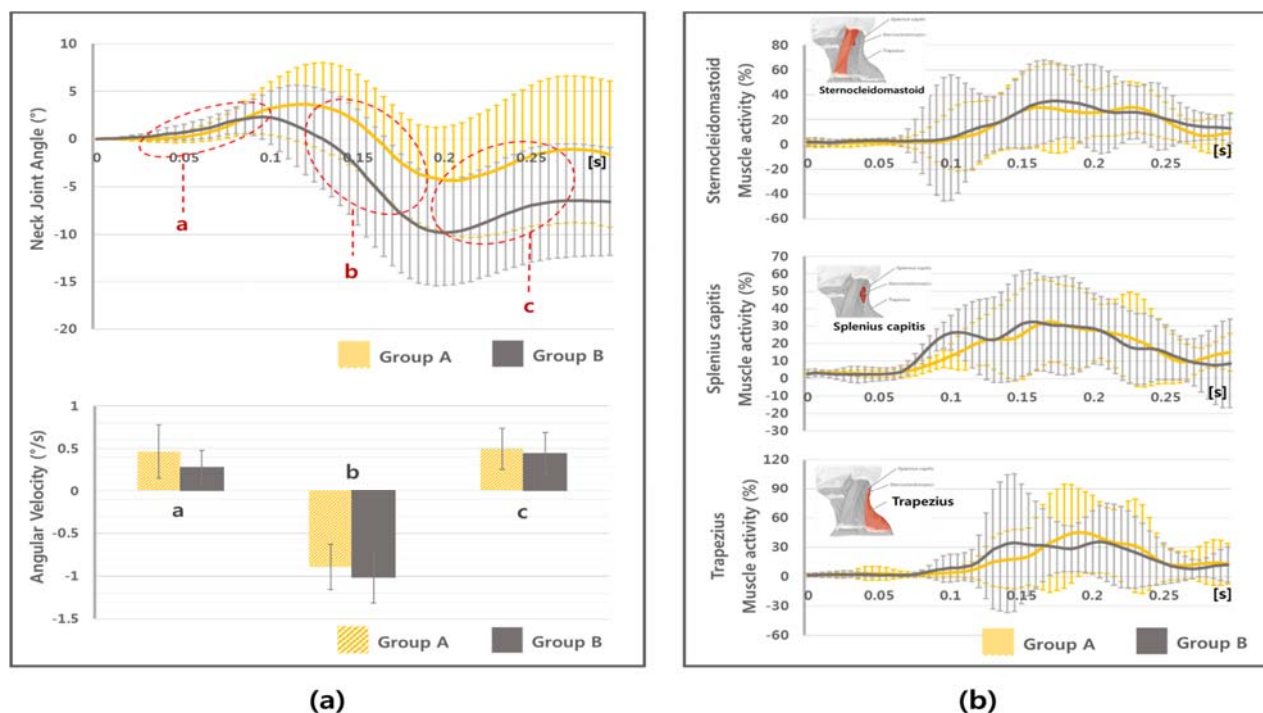


Fig. 2. (a) Neck joint angle and angular velocity; (b) muscle activation patterns for sternocleidomastoid, splenius capitis and trapezius muscles. Group A is the test group for a subsequent frontal-head collision at stationary state following AB application, and Group B is the control group for a frontal-head collision at a stationary state without AB application.

#### IV. DISCUSSION

The results may show that no causable injury risk possibility exists at neck joint as a result of the use of an AB system when a subsequent frontal-head collision at a stationary state has occurred following AB application. That is, the AB system in preventing collisions may have no effect on injury risk by the AB application.

#### V. REFERENCES

[1] Östh, J. et al., *Stapp Car Crash J*, 2013.  
 [2] Strandorth, J., *IRCOBI*, 2012.  
 [3] Ito, D. et al., *ESV*, 2012.