

**Biomechanical Responses of
HY-III and BioRID II
Presented by Japan**

Part 1

**Informal GTR Meeting
at NHTSA (Washington DC, USA)**

Part 1

**Different Biomechanical Responses
of HY-III and BioRID II**

Objective

To verify different biomechanical responses of HY-III and BioRID II



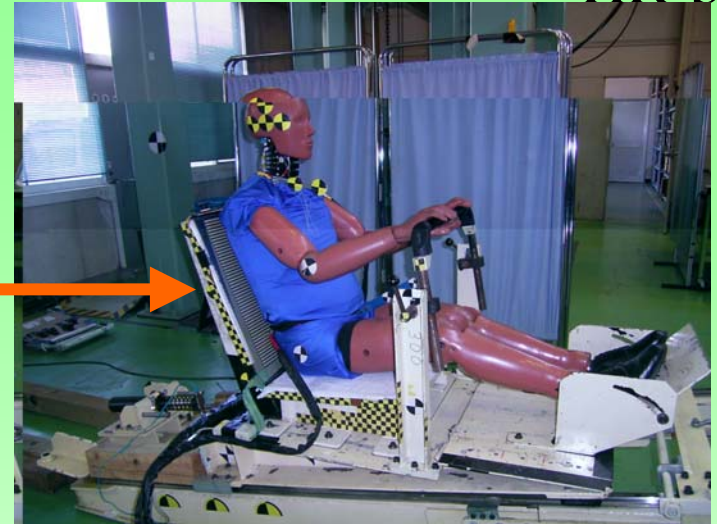
HY-III



BioRID II

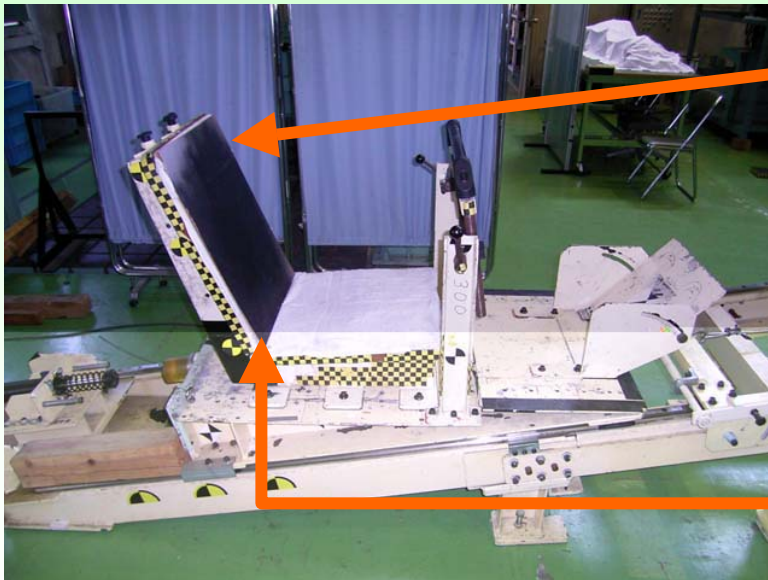
Test Methods

- Simulated rear-end impact tests using Mini-sled
- Impact velocity: 8 km/h
- High speed camera: motion of dummies



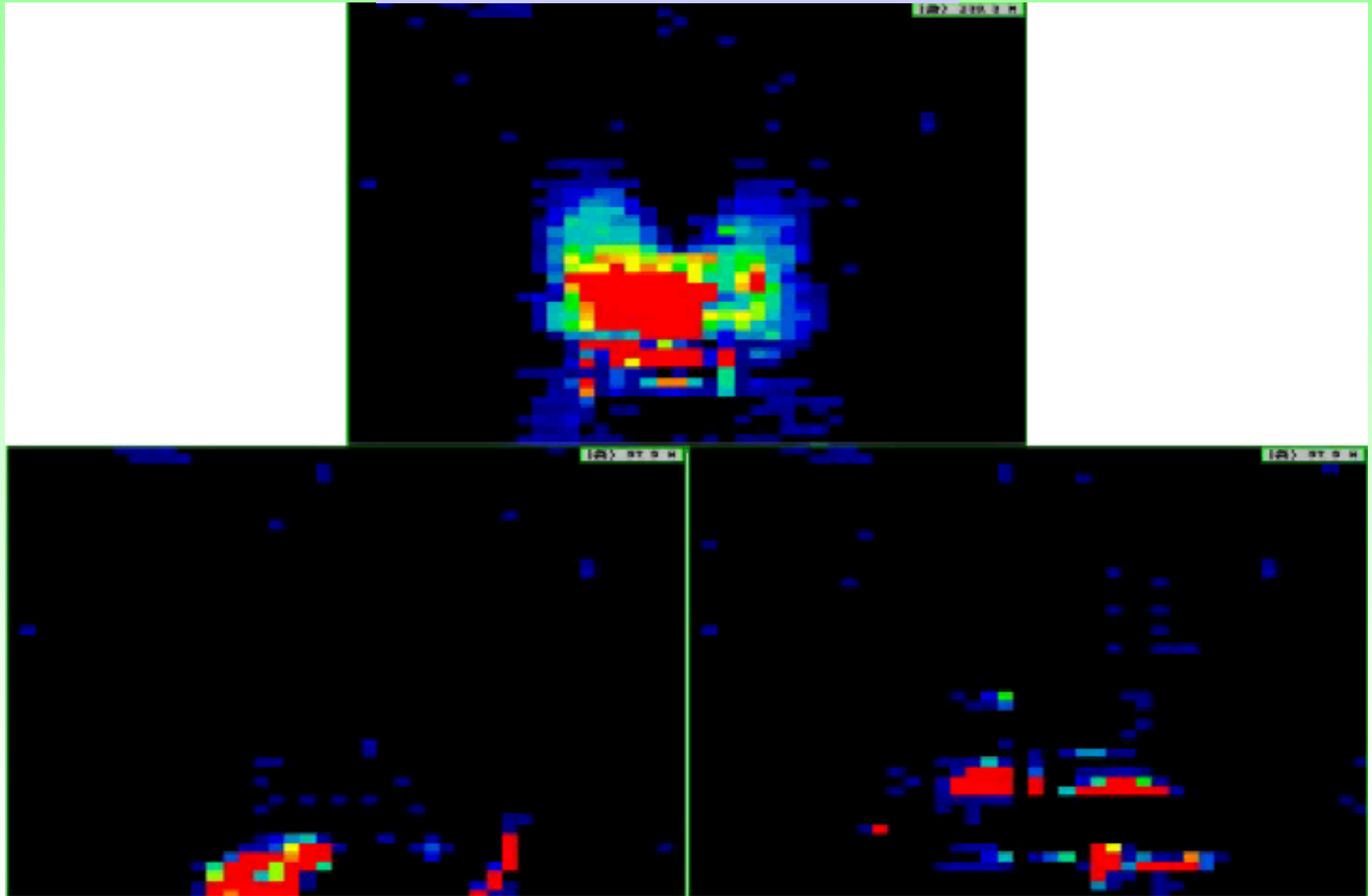
Test Set-up

Rigid seat



Use of back pressure distribution sensor in order to measure interaction pressure between the back and the seatback

Human Volunteer



HY-III

BioRID II

Distribution of back load pressure

HR-3-7

0 (ms)

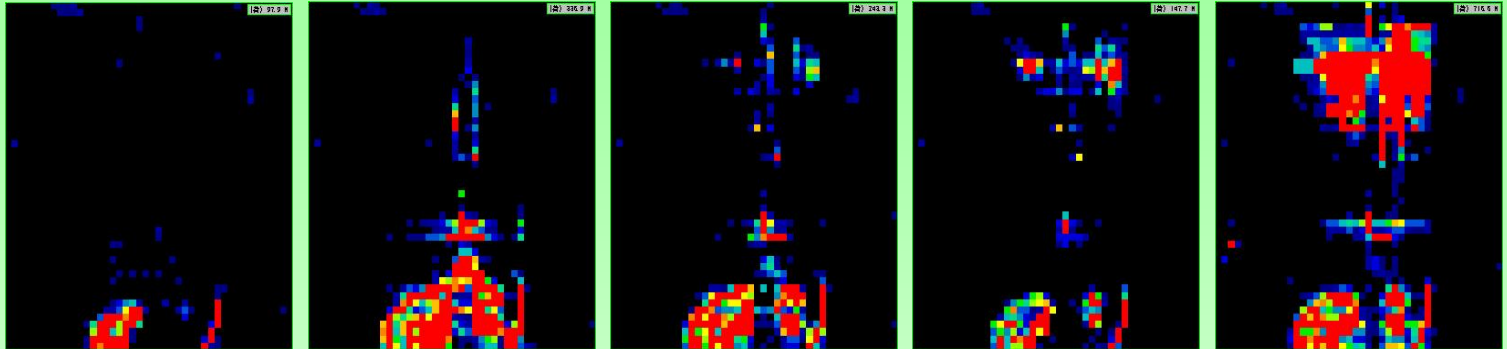
50 (ms)

70 (ms)

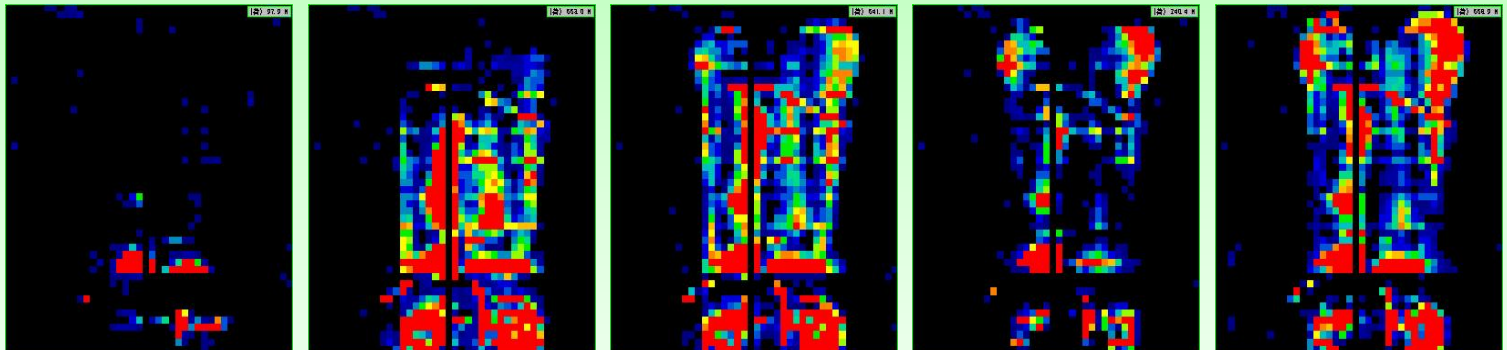
90 (ms)

150 (ms)

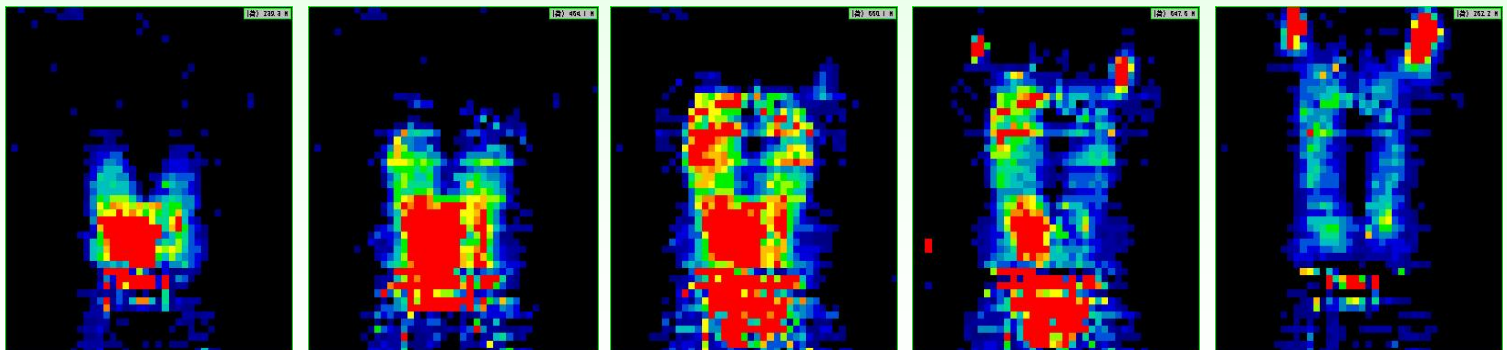
HY-III



BioRID II



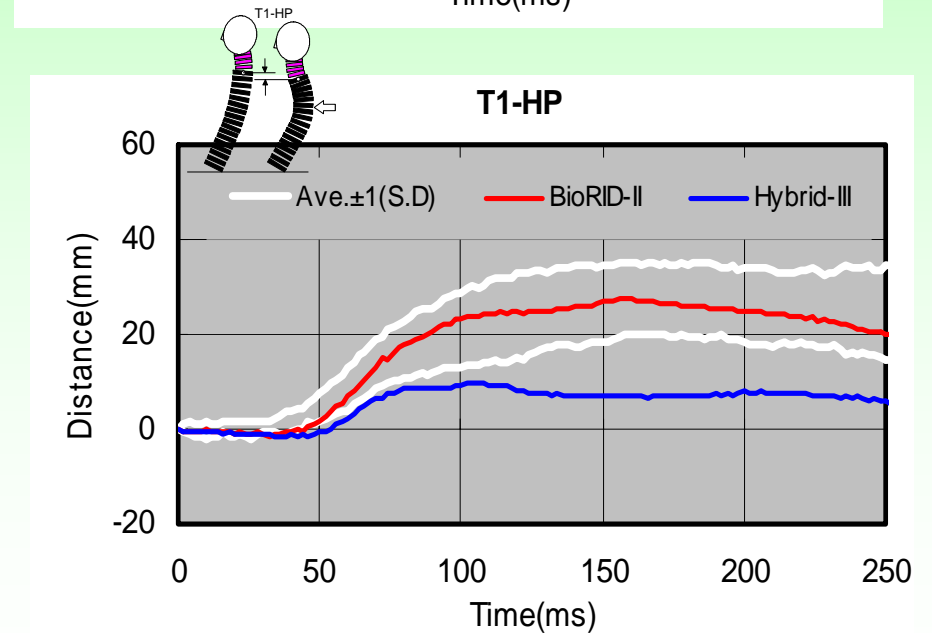
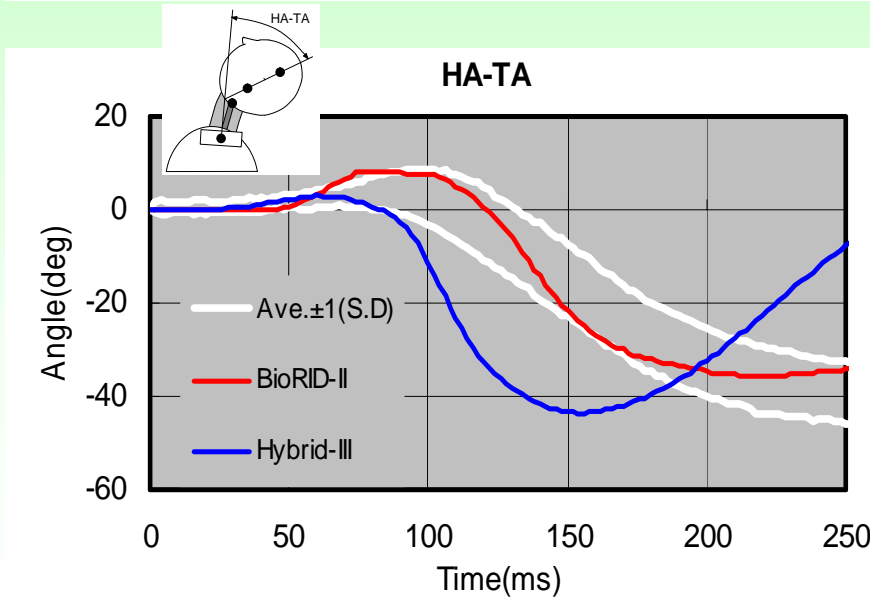
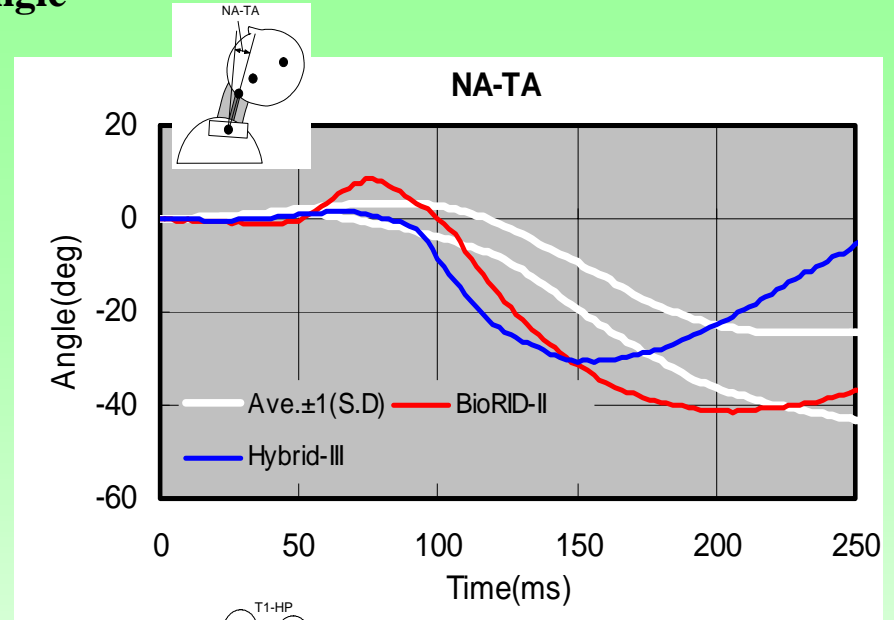
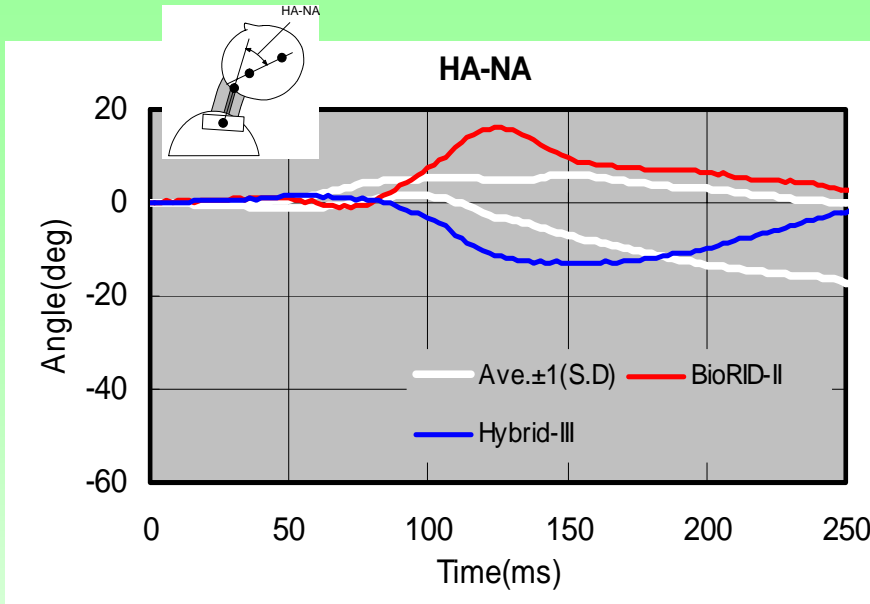
**Human
Volunteer**



Kinematics

HA: Head Angle
NA: Neck Angle
TA: Torso Angle

HR-3-7
T1-HP: Length change
between T1 and Hip point



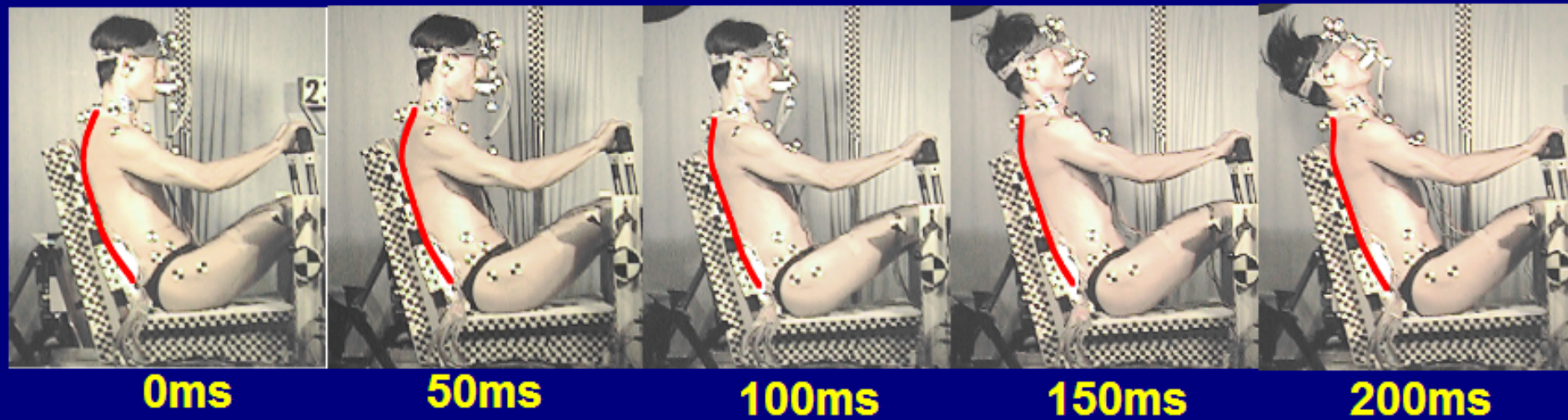
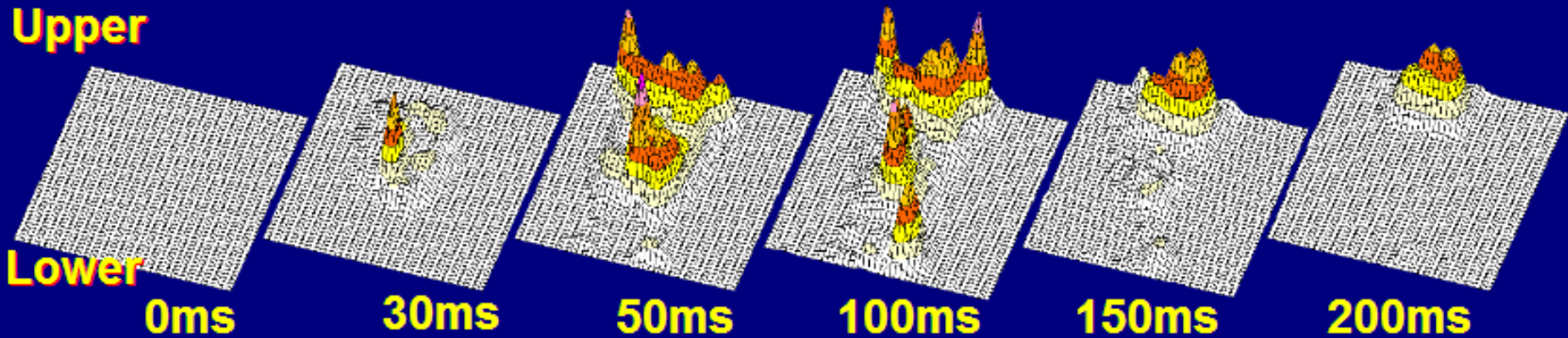
Conclusion

- **The pattern of the interaction pressure distribution between the seatback and the back of torso on the HY-III and BioRID II is different.**
- **In the case of HY-III, the localized back pressure is observed both at the top of the torso and at the lower lumber.**
- **The pattern of back pressure distribution of BioRID II is observed to be similar with that of human volunteer with transferred upward movement that is from the lower lumber to the top of the torso.**
- **The S-shape deformation of the neck which is proper causation of the whiplash associated disorder is characterized by the interaction pattern between the seatback and the back of the torso.**
- **BioRID II is closer in terms of S-shape deformation pattern of the neck and the head/neck angle relative to T1 of human volunteer than HY-III.**
- **It is pointed out that the head angle relative to the torso of BioRID II is better than that of HY-III as the evaluation index.**

Seatback pressure

Upper

Lower



Visual motion and Spine shapes (red line)