Occupant norm in vehicle safety

Astrid Linder, PhD
Associated Professor
Research Director, Traffic Safety
Swedish National Road and Transport Research Institute

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BioRID: Biofidelic Rear Impact Dummy

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Chalmers University of Technology, Sweden

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DENTON ATD, INC.
Whiplash Injuries

- App. 70% of the costs of all injuries leading to permanent medical impairment for the insurance companies

- Europe: 800,000 injuries annually, 40,000 result in long term suffering

- Costs: > 10 billion € in Europe
Whiplash Injuries

Most common in rear impacts

Different level of protection in different car models and seat designs

Based on Krafft (1998)
Neck motion during a rear impact

The hypotheses of injury mechanisms: In the retraction motion
Whiplash – Injury risk

The relative whiplash injury risk for females

- Females

Males (normalized to 1)

- O'Neil et al. (1972)
- Thomas et al. (1982)
- Otremski et al. (1989)
- Mäggi et al. (1993)
- Morris & Thomas (1996)
- Dolins (1997)
- Temming & Zobel (1998)
- Ricke et al. (2000)
- Chapland et al. (2000)
- Krafft et al. (2003)
- Jakobson et al. (2004)
- Storvik et al. (2009)
Whiplash protection systems

Injury Statistics – Folksam (Kullgren & Krafft 2010)

Whiplash protection systems less effective for females than for males

Data based on:
- permanent medical impairments
- all whiplash protection systems
Aims

- Reduce the risk of whiplash injuries by enhanced understanding of injury criteria and development of seat evaluation tools.

- Budget: 3.45 million Euros, 2.5 million Euros from the European Commission, FP7.
- 12 partners
- Duration: 42 months, 2009-2013
EvaRiD
Platform for implementing research findings ADSEAT

Real World Data
- Size selection

Biological Tests
- Anthropometry
- Response corridors

Assessment Criteria & Thresholds
- Threshold values

Seat design
- Use model in evaluation studies
BioRID
Height 1.77 m
Weight: 78 kg

EvaRID
Height: 1.66 m
Weight: 62 kg
Illustrator and Seat Evaluation

www.adseat.eu
Kullgren et al. (2013) Development of Whiplash Associated Disorders for Male and Female Car Occupants in Cars Launched Since the 80s in Different Impact Directions, IRCOBI Conference
Summary

• Improved evaluation of safety performances in order to identify and promote best designed systems in consumer testing programmes, such as NCAP.

• Occupant diversity should be addressed in the area of crash testing.
Thank you for your attention!
astrid.linder@vti.se