



### D56 They Would Have Survived With Fastened Seat Belts! Should Restraint Systems be Installed in Minibuses and Coaches?

Véronique Henn, MD\*, and Manfred Kleiber, PhD, Institute of Forensic Medicine, Franzosenweg 1, Halle, Sachsen-Anhalt 06112, Germany

Attendees will be presented with results of the examination of this accident in question as well as the studies of Schuller, who examined the injuries caused by passengers who were thrown against victims sitting in front of them. This presentation will emphasise the demand for restraint systems in minibuses and coaches.

Every year, especially during winter or summer holiday, bus accidents are the subject of newspaper headlines in Europe. Although bus accidents are rare, they attract the interest of many people because often many victims are to be deplored.

Year by year security standards of minibuses and coaches as well as the qualification of bus drivers are discussed. In the European community the absence of standardization of technical equipment in busses and training of bus drivers are deplorable. For this reason the *Commission of the European Communities* presented a "Proposal for a directive of the European Parliament and of the Council" to increase the security of minibuses and coaches. In all member states of the European Community, passenger cars have to be provided with restraint systems, whereas, the installation of these systems in minibuses and coaches is only required by law in a few member states.

The requirement for obligatory use of safety belts in all vehicles is based on studies of "ECBOS" (*ECBOS, Enhanced coach and Bus Occupant Safety* - <http://www.dsd.at/data/home.htm>). ECBOS found out, that "annually, an average of 150 passengers travelling in coaches and minibuses are killed and more than 30,000 persons are injured in road accidents throughout the European Union."

The majority of mechanisms leading to fatal injuries were:

- Passengers were thrown around within the confines of the vehicle.
- Passengers were ejected from the vehicle through broken windows. In summer 2003 the circumstances of a bus accident on the "Autobahn" near Halle were examined. In the early morning in August 2003 the bus drifted slowly to the right side, broke the guardrail of the autobahn, overturned on the side and slipped 200m. Although the confine of the bus was not seriously distorted five passengers (two teenagers and three senior citizens) died at the scene of the accident and 19 victims (including the bus driver) were seriously injured.

The autopsy performed in the Institute of Forensic Medicine lead to the following results:

- Three passengers died of suffocation caused by thorax compression, two passengers died of intrathoracic hemorrhage, one in combination with rupture of the brain stem.
- Damage to the clothes as well as abrasions of the skin of the victims proved, that the victims were ejected from the vehicle and overrun by the sliding bus.
- They all could have survived this accident with fastened seat belts. These results as well as the studies of Schuller place emphasis on the demand for restraint systems in minibuses and coaches.

#### **Restraint Systems, Busses, Thorax Compression**