D36 A Fatal Injury Caused by a Scissor Jack in a Rear-End Collision

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Learning Overview: The goal of this presentation is to discuss a crash in which a seat belt-restrained occupant in a Sports Utility Vehicle (SUV) was fatally injured in rear-end collision. The physical evidence and the interior configuration of the vehicle will be detailed, and the mechanism of the fatal injury will be clearly explained.

Impact on the Forensic Science Community: This presentation will impact the forensic science community by illustrating the process of examining the physical and photographic evidence, and the vehicle interior configuration, that lead to the conclusion that vehicle occupants may be exposed to unwanted injury in foreseeable collisions.

Vehicle traffic had stopped for several minutes due to a previous traffic collision ahead. The three lane Interstate with a posted speed limit of 70mph had become a parking lot. Near the back of the line of cars, the operator of a long-haul tractor-trailer switched on his rig's four-way emergency lights. Stopped right behind his trailer was an SUV. Tragically, the driver of the SUV had no way to avoid the impending rear-end collision.

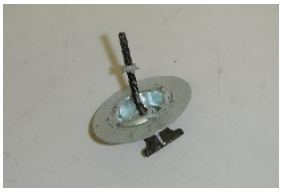
The SUV was struck by a small sedan, the driver of which claims to have fallen asleep. His speed control was set to 70mph–75mph. Contrary to his statement, he attempted to avoid the impact by steering left, evidenced by an approximately 31-foot-long angled tire friction mark. The right front area of the sedan struck the left rear area of the SUV in the offset rear-end collision. The maximum penetration to the SUV centerline was approximately 28in.

Upon impact, the sedan continued forward and entered the natural desert terrain of the center median, where it slowed to a rest. The SUV rotated clockwise and was pushed into the left rear corner of the trailer, evidenced by hinge hardware impressions to the SUV's left side. The frontal and left side curtain shield and torso airbags had deployed. The slack webbing confirmed the driver's seat belt was fastened at the time of collision. Vehicle rotation continued until the SUV's left rear corner struct the trailer's left side.

The SUV driver was extricated and flown by air ambulance to the local trauma center with a Glasgow coma scale of 3, and radiological findings of subdural and subarachnoid hemorrhages. A brain flow study showed the absence of circulation and death was pronounced. In the county coroner's opinion, the driver of the SUV died as a result of blunt force head trauma. The coroner's report noted a defect to the superior aspect of the occipital region of the head, at the superior point of the lambdoid suture. The report also noted multiple emanating linear skull fractures from this defect.

The SUV was examined, and it was discovered the rear damage profile involved the bumper reinforcement beam, lower edge of the liftgate, suspension components, and tire assemblies. Intrusion at the floor level compromised the convenience spare tire well located in the rear cargo area.

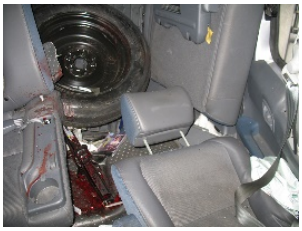
Collision forces overwhelmed the wing bolt and thrust the spare tire into the vehicle compartment. This fact was supported by finding the deformed wing bolt and a corresponding hole in the spare tire support.



Additionally, numerous rubber transfers were observed to the front of the spare tire well.

An eye-witness stated they had moved the spare tire from the driver's head and neck area to open the airway. However, the head injury is inconsistent with impact solely by the spare tire.

Investigator photographs taken at the collision scene show the driver's seat back reclined.



However, it is unknown if the seat back was reclined to facilitate extrication or if the recline mechanism failed as a result of the collision. On the floor behind the driver's seat is the spare tire, and next to the seat back is a blood-covered scissor jack.

An exemplar vehicle was examined to evaluate the spare tire storage hardware. It was determined that the scissor jack was secured beneath the spare tire.

The rear seats of the SUV permit full reclining, and additional cargo space may be created by folding each rear seat to each side wall separately. In this case, the left rear seat assembly was stowed along the side wall, whereas the right rear assembly remained upright.

This rear seat configuration allowed a clear path for the scissor jack to be propelled directly into the head, killing the driver.

SUV, Scissor Jack, Blunt Force Head Trauma