A49 Airbags as Sources of DNA Evidence for Motor Vehicle Incident Reconstructions

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After attending this presentation, attendees will gain an understanding of the utility of deployed drivers' airbags as potential sources of DNA evidence for motor vehicle incident (MVI) reconstruction investigators.

This presentation will impact the forensic science community by highlighting that careful evidence collection techniques and the application of sensitive STR technologies can provide investigators with the capability of associating an individual with a deployed airbag to allow inferences to be drawn with respect to occupant position during a crash.

After attending this presentation, attendees will gain an understanding of the utility of deployed drivers' airbags as potential sources of DNA evidence for motor vehicle incident (MVI) reconstruction investigators. With careful evidence collection techniques and the application of sensitive STR technologies, investigators have the capability of associating an individual with a deployed airbag to allow inferences to be drawn with respect to occupant position during a crash. Based on the investigators' experiences, the majority of drivers involved in MVI investigations are the registered owners (RO) themselves. Because they are potentially regular users of the vehicle precautions must,

therefore, be taken to ensure that any DNA associations found relate to the incident in question and not to innocent secondary transfer events.

In the first phase of this study, driver's airbag cassettes were removed from Japanese and North American automobiles and deployed under controlled laboratory conditions while secured to a custom rack. Airbags deployed in such a manner allowed the investigators to assess the "background" trace evidence associated with the bag prior to crash- related human contact. The bags were carefully searched under ambient and ultraviolet lighting and the numerous visible and fluorescent markings were photographed. The airbags were sampled for background DNA by cutting out areas of fluorescence and swabbing select areas on the front of the airbag that would be expected to contact a driver. All DNA samples were subjected to a standard organic extraction method (plus micro-concentrator device) and quantification with Applied Biosystems *Quantifiler™*.

In the second phase of this study, driver's airbag cassettes were reinstalled in their respective steering wheels and mounted on the rack. Red paint was applied to each wheel and cassette and the airbags deployed. Under these conditions it was clear where contact was made with the airbag during deployment and deflation and how potential secondary transfer mechanisms may come into play. These results highlight the importance of careful airbag collection and packaging techniques.

In the final phase of this study, the potential for secondary transfer of biological evidence to the airbag was assessed. Driver's airbag cassettes were reinstalled in their respective steering wheels, thoroughly cleaned to remove any biological material and then vigorously handled by a known individual to simulate driver contact. These airbags were then deployed, collected, searched and analyzed for DNA as previously described. Where applicable, standard and mini-STR analysis was performed using Applied Biosystems *AmpFLSTR Profiler Plus™* and *MiniFiler™*, respectively.

The results from this study add to the knowledge and experience of forensic scientists and accident investigators that wish to utilize deployed airbags from motor vehicle incidents as part of a reconstruction. With proper evidence collection and analysis, such evidence can add important information to the investigation but should be applied with the particular case circumstances in mind.

DNA, Airbag, MVI

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