H91 Tire Marks: Don't Tread on Me

Dennis J. Chute, MD, Dutchess County MEO, 168 Washington Street, Poughkeepsie, NY 12601; and Robert J. Bready, MS, Dutchess County MEO, 168 Washington Street, Poughkeepsie, NY 12601*

The goal of this presentation is to examine tire impressions identified on bodies of motor vehicle fatalities.

This presentation will impact the forensic science community by illustrating that tire marks identified on clothing and bodies may assist investigators in the reconstruction of motor vehicle fatalities.

Introduction: Identification of patterned injuries by forensic investigators can be helpful in the reconstruction of the sequence of events in non-natural violent deaths. Although casting tire tread impressions is often described by crime scene investigators, there have been relatively few recent forensic medicine publications of tire marks or tire tread patterns identified on victims of motor vehicle fatalities. Yet a previous report suggested such observations may contribute to one's ability to determine whether a body was erect or lying down at the time of contact with a motor vehicle.[1] Recently, Pircher et al. describes an interesting pattern of blister formation due to tire tread mark.[2] Injuries produced by vehicle tires running over feet have been fairly well described.[3,4] This study seeks to add to the tire pattern literature by describing experiences with roll-over fatalities and tire mark injuries.

Methods: This study reviewed pedestrian versus motor vehicle fatalities in Dutchess County over a ten-year period (2005-2015, n=37) from the records of the Dutchess County Medical Examiner's Office (DCMEO) . All such violent deaths are referred to the MEO per statutes defined by the county's medical examiner code. This study specifically searched for those cases where there was a possibility that a vehicle may have rolled over the victim or contacted the victim during the collision such that the vehicle wheel(s) potentially left a mark on the clothing or body (n=10) . This research did not include cases where it was known that the victim had been struck by one vehicle, then run over by another and almost all of the cases included in this report (nine out of ten) were low-speed encounters. As part of the DCMEO investigation of pedestrian fatalities, police investigators are asked to retrieve for inspection any clothing that may have been worn and/or subsequently removed from the remains in the emergency department or by paramedics during resuscitation attempts. In nine out of ten cases, clothing was inspected as part of the postmortem examination. Photographs taken of the scene, the autopsy, the vehicle wheels, and the undercarriage by police, crime scene technicians, and medicolegal investigators were reviewed.

Results and Discussion: During this period of study, ten cases were identified that suggested the victim may have either gone under the vehicle or come in contact with a wheel based on investigation and/or postmortem findings. Two cases involved a single hit-and-run vehicular manslaughter incident: it was later concluded that one victim was thrown away from the vehicle and did not come in contact with a tire. In six out of remaining nine cases (67%), tire marks were identified on the clothing or body of the deceased. In one of the nine cases, this study concluded that a tire went over the upper forehead/scalp producing an avulsion. Although a tread mark was not identified, such a pattern may have been obscured by the scalp hair. One of the nine cases occurred during winter and heavy clothing, never examined, may have prevented transfer of a tire mark to the body. In six of nine cases (67%), victims went under the vehicle from the side and two victims were run over while the vehicle backed up. In four out of nine (44%) cases, the conclusion was that the pattern identified was a match with the proposed vehicle tire and in the other five (56%) cases that there was not enough detail to reach such a definitive conclusion. Review of the cases suggested the following: (1) fatalities with tire mark transfer typically occur in vehicles (e.g., a truck or tractor) that are higher off the ground than typical passenger/sedan cars (eight out of nine cases or 89%); (2) in low speed roll-over cases, going under from the side of the vehicle is common; (3) tire tread patterns are frequently recognizable but emphasis is placed on recovering articles of clothing in pedestrian versus motor vehicle deaths; and, (4) although tire marks can be identified, this does not mean the pattern found can be definitively matched to the vehicle in question, viz., although supportive, other evidence may be necessary to draw such a conclusion.

*Presenting Author

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Tire Tread, Tire Mark, Pedestrian