

Relationship Between Cervical Spine Injury and Helmet Use in Motorcycle Road Crashes - Abstract

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Abstract

Motorcycle helmets have been proven to prevent head injury and reduce fatality in road crashes. However, certain studies indicate that the helmet increases the mass to the head, and thus the potential of neck injury due to the flexion/extension of the head-neck segment in a road crash may increase. This study was conducted to evaluate the effects of motorcycle helmets and the ways in which the accidents that occurred affected the incidence of cervical spine injury. Nevertheless, it is not intended to and does not discredit the fact that helmet use prevents many motorcyclists from sustaining serious and fatal head injuries. A total of 76 cases were collected and analyzed based on the data collected from real-world crashes. The Abbreviated Injury Scale (AIS) was used to assess the severity of injury, whereas the statistical Pearson χ^2 correlation method was used for analysis. The results showed that motorcycle helmets did not affect the severity of cervical spine injury. However, when the samples were further subcategorized into different crash modes, it was found that helmets affect the incidence of a severe cervical spine injury. In frontal collisions, the use of helmets significantly reduces the severity of cervical spine injury, whereas in rear-end, side impact, and skidded accidents, the use of helmets increases the probability of a severe cervical spine injury. However, in the latter crash modes, a motorcyclist without a helmet will have to trade-off with head injury. A logistic regression model has been developed with respective crash modes and the probabilities of risk in having severe cervical spine injury have been calculated. Future designs in motorcycle helmets should therefore consider the significance of nonfrontal accidents and the interaction of helmet with other parts of the body by possibly considering the weight of the helmet.