A METHODOLOGY TO EVALUATE WHIPLASH INJURIES FROM COMPUTATIONAL ACCIDENT RECONSTRUCTION

Ana Ferreira*, Paulo Francisco*, João M. P. Dias *

* LAETA, IDMEC, Instituto Superior Técnico, Universidade de Lisboa, Portugal, e-mail: jdias@dem.ist.utl.pt,

Abstract – Whiplash injuries are characterized by the high variability of its symptoms and by the subjectivity of its diagnosis, which sometimes leads to frauds perpetrated by victims of rear-end impacts. It is estimated that whiplash injuries cost annually about 10.000 million Euros in Europe. Therefore, the aim of this study was to investigate the influence of the dynamics of the accident in which the victim was involved in the probability of development of whiplash associated injuries. In the presented methodology, first an accident reconstruction is performed where the dynamics of the accident is determined. This is carried out using the software PC-Crash, police and insurance companies' data. Then biomechanical injuries criteria related with whiplash injuries are evaluated. For the evaluation of the probability of having whiplash injuries, the Neck Injury Criterion (NIC) of the victim and the mean acceleration of the vehicle were evaluated. Then, with medical reports, the results of the accident reconstruction are correlated with the reported injuries. Some examples are presented. The results obtained indicate that the study of the dynamics of the road accidents in which the victims were involved could be used as an auxiliary of the prognosis of whiplash injuries and is important for a precise diagnosis of this type of injuries.

The whiplash injuries are characterized by the high variability of its symptoms and by the subjectivity of its diagnosis, which sometimes leads to frauds perpetrated by the victims of rear-end impacts. Currently, there are no specific neuropsychological studies or electrophysiological tests that can be performed to diagnose a whiplash injury on the victim (Yadla, Ratliff, & Harrop, 2008) . Therefore, the aim of this study was to investigate the influence of the dynamic of the accident in which the victim was involved in the probability of development of whiplash associated injuries. Thus, computational simulations for three of the road accidents studied were performed, with the Pc-Crash software, to verify the influence of the dynamic of the impact on the development of whiplash. For the evaluation of the probability of having whiplash injuries, the Neck Injury Criterion (NIC) of the victim was implemented and the mean acceleration of the vehicle was also computed. The results obtained indicate that the study of the dynamic of the road accidents in which the victims were involved could be used as an auxiliary of the prognosis of whiplash injuries and is important for a precise diagnosis of this type of injuries.