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1. J Manipulative Physiol Ther. 1998 Nov-Dec;21(9):629-39.

Rear-end impacts: vehicle and occupant response.

[Davis CG.](#)**Comment in**

- [Rear-end impacts: vehicle and occupant response.](#) [J Manipulative Physiol Ther. 2000]

Abstract**BACKGROUND:**

There is a controversy regarding the likelihood of injuries sustained when one car strikes another at a relatively low speed with little or no vehicle damage. Plaintiffs often claim injuries whereas defendants counterclaim that injuries could not have occurred with such a relatively minor impact.

OBJECTIVE:

To review the dynamics of low-speed rear-end collisions resulting in little or no visible damage and to decide whether occupant injury can occur; also, to discuss diagnostic examination and treatment that may be helpful to the clinical practitioner.

DATA SELECTION:

A Medline search for articles discussing low-speed rear-end collisions was conducted. Other articles and studies were reviewed that discussed low-speed rear-end collisions and factors impacting the neuromusculoskeletal system relevant to clinical practitioners. Articles included were human low-speed rear-end tests, lab tests on cadavers, automotive engineering articles, and peer-reviewed journal articles on

whiplash. A few live animal and simulation studies were considered for the background of possible injury mechanism and vehicular deformation. Excluded were non-rear-end collision and single case reports.

DATA SYNTHESIS:

The data were studied to find a relationship between the resultant vehicle dynamics and occupant movement, biological mechanisms of injury and the neurological mechanisms causing complaints. Data were also studied to investigate objective findings supporting subjective complaints.

CONCLUSION:

In low-impact collisions, there are usually no skid marks and minor or no visible damage to the vehicle. There is a lack of relationship between occupant injury, vehicle speed and/or damage. There does not seem to be an absolute speed or amount of damage a vehicle sustains for a person to experience injury. Crash tests indicate that a change of vehicle velocity of 4 km/hr (2.5 mph) may produce occupant symptoms. Vehicle damage may not occur until 14-15 km/hr (8.7 mph). Occupant soft tissue and joint injuries resulting from low-speed vehicle collisions respond positively to afferent stimulation of mechanoreceptors. The diagnosis of the occupant injuries relies on standard orthopedic neurological testing, autonomic concomitant signs and qualitative and quantitative testing.

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