

## Mechanisms of Injury in Vehicular Trauma

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Modern passenger cars have a high level of crash protection built into them for reducing the injuries sustained by their occupants in a crash. The structure of the car is important in controlling the forces of a crash and preventing intrusion into the occupant's survival space. The interior of the vehicle is designed to minimize the injurious effects of occupant contact while the restraint systems in the vehicle, both passive and active, control the motions of the occupants and limit loads acting on the occupant in a crash.

A key factor in the effective design of occupant protection systems is an understanding of the mechanisms whereby injuries occur to the body. This field of study is known as trauma biomechanics. While the treatment of injuries is a medical issue, the understanding how injuries occur due to mechanical force is an engineering issue. This places the automotive safety engineer in the role of

a public health specialist preventing the disease of crash injury. Engineers need information on the mechanical factors that result in various forms of injury to the body. Such information is known as injury mechanisms and is related to injury criteria, which are mechanical quantities that can be measured in a crash test dummy and then related to the risk of a particular type of injury occurring to an organ or structural feature of the human body.

This presentation will discuss the current state of knowledge in automotive trauma biomechanics with respect to the injury mechanisms of the head, neck, chest, abdomen and lower extremities in car crashes. Emphasis will be placed upon frontal and side impact crashes.

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