



Mechanical & Industrial Engineering  
UNIVERSITY OF TORONTO

## Whiplash Trauma

Neck sprains and strain, commonly known as whiplash, is caused by a rear vehicle collision, where the unsupported head lags behind the torso forcing the neck into extension and flexion [**Error! Reference source not found.**]. Studies have shown that the impulse resulting from a low speed (10 km/h) rear vehicle collision may be as high as '9g' within 25 milliseconds and the associated head acceleration can be up to '20g'. Clinically, whiplash could result in neck, shoulder or back pain, headache, nausea, paresthesias or cognitive/psychological symptoms. Whiplash injuries are the most common motor vehicles injuries treated in emergency units in hospitals. Reports by the Insurance Bureau of Canada (IBC) and the Insurance Institute for Highway Safety (IIHS) in the USA indicate that whiplash injuries typically cost North America over \$12 billion dollars annually. It is the objective of this project to carry out finite element modeling of whiplash and conduct inclined sled impact tests to validate the FE model.

Supervisor: Director: Dr. S. A. Meguid  
meguid@mie.utoronto.ca  
[www.mie.utoronto.ca/labs/madl](http://www.mie.utoronto.ca/labs/madl)