

“Sneeze” versus Low Speed Rear Impact Collision: Is it a fair comparison?

Respectfully submitted by Dr. Ronald J. Farabaugh

Can one compare the effects of an ordinary daily activity like a sneeze to a low speed rear impact collision (LOSRIIC)? The short answer: NO.

The argument goes something like this; “The “G” forces of an ordinary sneeze is greater than that experienced in a LOSRIIC, yet people sneeze everyday and don’t get hurt. How do you explain that?” In college speech 101, the professor referred to that erroneous logic as the art of the faulty analogy. One cannot compare the forces experienced during a sneeze to that of a LOSRIIC. The rational basis behind this faulty logic is related to a paper written by: **Murray E. Allen; Iain Weir-Jones; P Eng, et al. (1994).** *“Acceleration perturbations of daily living; A comparison to ‘whiplash’”*. **Spine: 1994 19(11): 1285-92.**

These Canadian and Australian authors took eight healthy volunteers (four men and four women, ages 19-50 years), wearing helmets instrumented with accelerometers, and subjected them to common daily activities, none of which caused any hint of injury. These included:

1. Looking to the left,
2. Unexpected startle by discharge of a starter pistol behind the subject,
3. Standing up suddenly from a kitchen chair,
4. Passively dropping the head backwards as if falling asleep from a seated position,
5. Routine sitting into a kitchen chair from standing,
6. Sneeze from sniffing pepper into nostrils,
7. A simulated cough,
8. An unexpected bump against the left shoulder as would occur in a crowd,
9. An anticipated hardy slap on the back greeting,
10. Kicked hard from behind while sitting in a wheeled office chair,
11. Hopping off a 20 cm (8 inch) step and land on both feet,
12. Plopping backwards into a low-backed office chair.

The minimum average peak acceleration of .6 G occurred with the “look left” perturbation. The “plop in the chair” gave the maximum average peak at 10.1 G. Hopping off a step gave the second highest average peak at 8.1 G.

The flaws of this study are too numerous to mention, but several points of interest merit discussion. Simply stated, one cannot ignore well-researched risk factors associated with LOSRIIC and focus solely on the forces associated common daily activities. The faults of this study include:

- Artifact movement between the head and helmet (simply held on a by a strap under the chin), making any measurements suspect.

- ❑ No two persons are alike, and no two crashes are alike. Therefore it would be scientifically inappropriate to extrapolate the findings in this study to the unique factors in any particular car crash. A trivial perturbation to one person may, for another, appear to cause injury. Interestingly, as a clinician, I have examined dozens of patients injured after a sneeze.
- ❑ The forces applied to the body are not the same for different individuals who appear to perform similarly.
- ❑ This study was limited in the number of volunteers. The full spectrum of the population, with a presumed wide variance in physical and psychological profiles, was not tested.
- ❑ The authors did not consider the influence of “awareness factor” during their two highest peak average measured accelerations of 10.1 G (plop in chair) and 8.1 G (hop off step).
- ❑ The authors did not take into account other well researched risk factors associated with LOSRIC, and compare them to common activities like a sneeze. (An extensive and well researched list of risk factors can be obtained from the Ohio State Chiropractic Association’s website or by calling Dr. Farabaugh at 614-898-0787.)
- ❑ The applied forces in a LOSRIC are external. The force generated during a sneeze is internal.
- ❑ A short list of risk factors important to consider in LOSRICs that were not considered by the authors include:
 - Poor head geometry (1, 2)
 - Rear impact versus frontal impact collision (3, 4, 5,)
 - Front versus rear seat position (7)
 - Out of position occupant (8, 9)
 - Height, mass, or age of patient (10, 12, 13)
 - Injury threshold of patient (14)
 - Position of head rest (15)
 - Mass of bullet vehicle versus mass of target vehicle (16)
 - Non-failure of seat back and influence of head rest (17)
 - Pre-existing conditions (18)

In summary, the Allen paper represents poor science and an invalid application of knowledge in my opinion. One cannot rationally compare or extrapolate the findings of this study (the forces associated with common activities of daily living (ADL)) against the complex forces and kinematics associated with LOSRIC. Remember, risk factors are much more important than accident reconstruction alone. Additionally, the determination of injury is based on the correlation of history and physical/examination, not the repair bill. There remains scant legitimacy to the erroneous belief that common ADL’s can be compared to the forces experienced in a car crash. Further information can be obtained by reading Freeman MD, Croft AC, Rossignol AM, Weaver DS, Reiser M: A review and methodologic critique of the literature refuting whiplash syndrome. Spine 24(1):86-98, 1999. (19)

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About Dr. Farabaugh: Dr. Farabaugh has been in practice since 1982. He is certified in LOW SPEED REAR IMPACT CRASH RECONSTRUCTION through the Spine Research Institute of San Diego (SRISD), and holds a subspecialty as a Certified Chiropractic Sports Physician. He is also Past President of the Ohio State Chiropractic Association where he now serves as Treatment Guideline Chairman (2001-2003).

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