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REGARDING LOW SPEED COLLISIONS:

Generally, a collision below 10 mph may be considered low speed and the threshold of bodily injury. The literature reports this threshold to be actually from 2.5 mph (1) to 5 mph (2-5). And it is important to realize that, despite the popularity of this notion, no such threshold for human tolerance is known, nor can it be established from crash testing (6, 7). Nor do these authors I have referenced actually suggest that their results can be taken as a proxy for injury risk or surrogate for tolerance. These have been the interpretations of others. In fact, rather severe injuries can occur at lower level accelerations that are typically recorded in even 5 mph delta V collisions (7). By the time the crash speed is as high as 15-20 mph delta V, fractures, dislocations, and spinal cord injuries are not uncommon (8).

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References:

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- 7 Freeman MD, Nicodemus CN, Croft AC, Centeno C. Significant spinal injury resulting from low-level accelerations: a case series of roller coaster injuries. . *Cervical Spine Research Society, 29th Annual Meeting*. Monterey, CA, 2001.
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So Sylvia, if you tell this to an attorney or provide it to them, they will say. “So what? Just because it’s possible they were injured doesn’t mean that they actually were injured. The Biomechanist hired on the other side said that there wasn’t enough force to cause an injury. He said that the force was about the same as you get by plopping down in a sofa.

That puts the burden on you to PROVE IT!
CAN YOU DO IT?

The studies above all use Delta V’s, changes in velocity, not collision velocities. Thanks to accident simulation computer programs, Delta V’s are easy to find. Not only are Delta V’s easy to find but if you take it a step further so are G forces to the occupant.



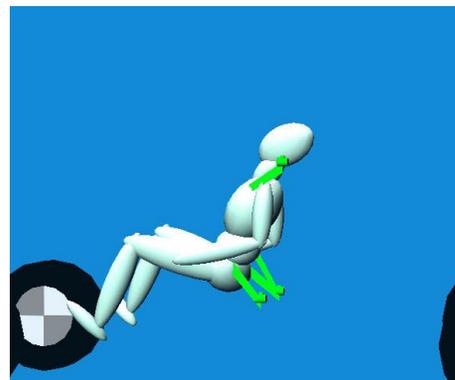
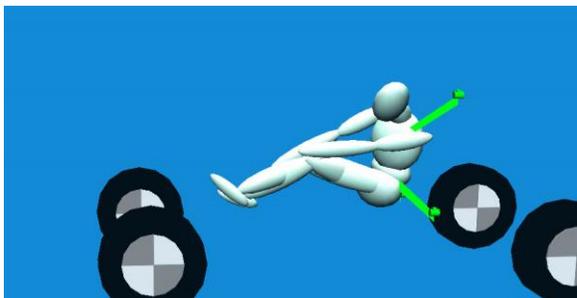
Delta v calculations:

-EDSMAC4, Hyundai rear 13-15 and 16-18

NOTE: '*' indicates J-point

Vehicle Name: Sunfire/Baron 3100/3100/92/95								- Peak Accel -	
Beginning of Range	End of Range	Midpoint				DELTA-V	TIME	VALUE	
RHOB (in)	PSIB (deg)	RHOB (in)	PSIB (deg)	PSIM (deg)	CDC	(deg)	(sec)	(g)	
109.5	164.0	109.5	196.0	180.0	06BDEW1	-180.0	5.7	0.0640	6.2
Vehicle Name: Honda/Hyundai 2040/2040/94/91								- Peak Accel -	
Beginning of Range	End of Range	Midpoint				DELTA-V	TIME	VALUE	
RHOB (in)	PSIB (deg)	RHOB (in)	PSIB (deg)	PSIM (deg)	CDC	(deg)	(sec)	(g)	
72.2	334.0	72.2	26.0	0.0	12FDEW1	-0.1	8.7	0.0640	9.4

G-force calculations:



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Injury Data-GATB, 1-3
Time Duration for HIC calculations (sec)
0.036

HIC, HSI and CSI Results
Body Number 1 HIC Results

Head Injury Criterion

HIC = 62.1026 Time duration = 40.000 TO 59.000 msec
with head resultants = 16.031 and 14.020 G's

Average head resultant for time duration = 25.453 G'S

Head Severity Index

HSI = 82.1910

Max head resultant = 31.681 G's at 50.000 msec

Chest Severity Index

CSI = 90.6766

Max chest resultant = 37.480 G's at 103.000 msec
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With that information, the treating physician can make the determination of whether they were injured or not. Low speed collisions don't injure everybody, but they do injure certain occupants with weak spines or were out of position at the time of impact.

Now, instead of just saying that the occupant was injured because it's possible, your saying the occupant was injured because his neck sustained 31 G's of force in 50/1000 of a second. Popping in a sofa might produce 31 G's but the time would be more like 1 or 2 seconds, enough time for the neck to prepare for it. Now as treating physician, based on your knowledge of the crash, your exam findings and your familiarity with the literature, your patient's response to treatment, you can state that the injury was, with a reasonable degree of medical certainty, caused by the crash.

As the treating physician you trump the biomechanist.