

Pseudoscience in the Courtroom: Blight at the End of the Tunnel?

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More and more in the courtrooms of America the "big lie" is being acted out with studied precision and stunning effectiveness. The defense strategy in low speed rear impact motor vehicle accidents (MVAs) has reached a state of art and is now being catalyzed by the misuse of scientific research and self-serving experiments designed to reach favorable conclusions for the buyer. The buyers of this (often contrived) research are insurance companies and automobile manufacturers who often do not allow the results to be published, a practice that is an anathema to the very ethos of science and one that conveniently removes an important safety valve in science/peer review.

Aside from issues of liability, the defendants' strategy usually follows this pattern: first, using a defense expert (DC or MD), they show that there are no objective findings of significance. If there are objective findings, they argue that these were pre-existing or are not likely to be the cause of any symptoms, citing as an example, the frequently mischaracterized statistic that "50% of all asymptomatic people have herniated disks ..." Then, using an accident reconstructionist (AR) or physicist, they show how the forces of the collision would have been equivalent to some relatively benign everyday event, such as sitting in a chair (a popular analogy) or stepping off a curb. The TMJ analog to this would be "vigorous flossing." If such were the case, how could anybody be injured, they argue? To reinforce this burlesque, the defense attorney produces a blown-up photograph of the rear of the plaintiff's car illustrating the lack of major damage and tacitly appealing to the jurors' intuitive (but incorrect) assumption that property damage equates to injury potential. Usually for good measure, and to ensure that the jury is thoroughly impressed with the scientific derivation of these conclusions, the AR will regale the audience with a prodigious demonstration of irrelevant engineering principles and algebraic derring-do, supplementing a healthy dose of imagination for the unknown variables of the equations. If nothing else, this serves to add verisimilitude to the fiction and conceal the fact that the figures in the equations might only charitably be described as estimations.

If all goes well, and too often it does, most jurors will conclude: 1) The impact was too minor to have caused any injury; 2) there's no real evidence for injury to the plaintiff; 3) the plaintiff therefore is out to rip off the system (along with the lawyer and chiropractor); and finally, 4) a verdict for the defense.

Attorneys seem to be succumbing to the ongoing inculcation which is bankrolled by a seemingly bottomless source. The intended message is clear -- soft tissue cases are not worth the trouble. Ultimately this will lead to a time where plaintiffs and their treating clinicians will find themselves entirely at the mercy of the payers, and accepting an indigent patient will equate essentially to a humanitarian act on your part.

Now the Facts

1. Defense experts don't usually look very hard for objective evidence of injury. How many orthopaedic surgeons' reports have you read where they described fixations or trigger points? Treating clinicians should be able to point out all of the objective findings -- including

those on radiographs considered normal by defense experts. Remember, the real experts, like White and Panjabi, do consider those subtle findings abnormal.

2. ARs and physicists are usually only modestly trained and their background in the physics of rear impact crashes is often nil. These shortcomings are important and can be used to wipe away the lofty veneer of physics. Many hold themselves out as experts in biomechanics. As such they should be held accountable for a good working knowledge of the joint physiology, anatomy, and neuroanatomy of the areas involved. Further, it can usually be demonstrated that their conclusions are based largely on assumptions since they are generally hired long after cars have been repaired and skid marks have faded. In fact, many cars today can withstand rear impacts of up to 10 mph without appreciable visible damage, leaving analysis by photograph as the chief substrate for guesswork. The range of accuracy, if given honestly, would cover an order of magnitude, say from 1 to 10 g.

Bumper isolators may show some travel but this is rarely measured. They may also be nonfunctional but ARs rarely check. Other shock-attenuating bumper systems (polystyrene or polyurethane) won't give any clues as to the forces imparted to them and internal bumper damage is not visible in photographs taken from behind, and bolt and washer slip marks, permanently deformed seatbacks, minor variations in fit and finish, and misaligned frames won't offer clues. Body and fender people are great sources for this information.

If ARs could arrive at an accurate estimate of collision speed and g forces imparted to the struck car, another quantum step down the precision ladder comes when this figure is translated into g forces received by the occupant of the vehicle. Then, even if that figure were known, nobody can predict with any certainty whether those forces would have been of sufficient magnitude to damage soft tissues in any particular case. Clinicians have long known that in any given accident one occupant may be markedly injured while another may escape unscathed. Yet this is where ARs frequently overstep the boundaries of their training and expertise and predict that no injuries would have occurred in a given MVA. Such predictions are utter fallacy and should be exposed as such. ARs can sometimes be very helpful in piecing together the facts in complicated cases but their role in low speed impact accidents should be anything but valedictory.

The Nation Accident Sampling System (NASS) tells us that most injury rear impact MVAs occur between 8 and 15 mph. The cut-off speed of the most recent (published) industry-sponsored full scale crash testing was 4.87 mph.¹ The most recent work by the same authors pushed this to just under 7 mph.² Incidentally, the authors of the study concluded that 5 mph was the threshold for cervical strain. I have discussed the limitations of this important work elsewhere³ but one point that is obvious here is that we have not observed full scale crashes at the speeds of most real world injury-related collisions. Therefore we must resist the temptation to extrapolate beyond our scientific observations. I recently spoke with Whit McConnell (the principal investigator of this research) at the SAE conference in Los Angeles and he openly admits that the dynamics of these crashes at higher speeds is likely to be different than that observed at lower speeds.

Finally, plaintiffs should rely on the overwhelming pool of literature that clearly reveals the true landscape of CAD trauma from crash testing to experiments with humans, animals, cadavers, and anthropometric dummies, to the many mathematical models that have been shown to agree with observed crash results, to the large body of epidemiological data available today. And let's not forget the most important single piece of "evidence" available to us -- the patient. An injured person should be entitled to proper care regardless of the issues of liability or predictions of engineers and

ARs. Hopefully, rather than blight at the end of the tunnel, the pseudoscience foisted on us in the courtrooms will be exposed for what it is, and will auger the doom of this charade.

References

1. McConnell WH, Howard RP, Guzman HM, et al. Analysis of human test subject kinematic responses to low velocity rear end impacts. SAE Technical Paper Series 9308889, Society of Automotive Engineers, 21-31, 1993.
2. Personal conversation with Whit McConnell. Paper has not been submitted yet.
3. Foreman SM, Croft AC. Whiplash Injuries: The Cervical Acceleration/Deceleration Syndrome. (Second Edition), Baltimore, Williams and Wilkins, 1995 (Due out in December).

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