NYSBA SUMMER 2010 | VOL. 39 | NO. 2

Torts, Insurance & Compensation Law Section Journal

A publication of the Torts, Insurance & Compensation Law Section of the New York State Bar Association

Misrepresentations, Mistakes and Omissions in the Insurance Application

Also Inside

- CPLR Article 16—Meaningful Limitation of Liability
- *Arons* Interviews
- TICL Class Action Committee Report
- The Use of Biomechanical Experts
- Independent Livery Driver Benefit Fund
- Limits to Insurers' Obligations Under NYIL §3420(d)
- The Managed Adjudication Path Program
- Effective Cross-Examination of Plaintiff's Treating Physician

The Use of the Biomechanical Expert: Fact or Friction?

By Robert A. Glick and Sean O'Loughlin

The use of the biomechanical expert in defending low impact automobile cases is, without surprise, a relatively new weapon in the arsenals of defense attorneys and the insurance industry alike. By and large, the biomechanical experts seek to determine whether plaintiffs involved in an automobile accident physically moved in such a manner that caused their body parts to exceed their natural physiological ranges of motion. Lately, the challenge mounted by plaintiffs to the biomechanical expert has been to attempt discredit their validity through challenging the very essence of biomechanical engineering as a whole. In this regard, certain Courts have not permitted the biomechanical expert to offer testimony at the time of trial. Defendants are now faced with the unique challenge of being required to convince the Courts as to the veracity of biomechanics as an established science and allowing the expert to proffer his or her opinion as to causal relationship at the time of trial.

What Is a Biomechanical Expert?

Biomechanical engineering is the application of mechanical engineering to the human anatomy and physiology. As such, a biomechanical engineering expert is an expert in both mechanical engineering and its application to the human anatomy and physiology. More specifically, a biomechanical expert is an expert in physics and the motions and forces of the human anatomy and physiology. But, a biomechanical expert is not a medical doctor and is not competent to render either a diagnosis or a prognosis.

Accident Reconstruction and Biomechanical Analysis

A biomechanical expert's analysis and findings relating to an automobile accident can be broken down into two parts—Accident Reconstruction and Biomechanical Analysis. The purpose of an Accident Reconstruction for a biomechanical expert is to figure out the changes in velocity of a vehicle and its occupants in both the longitudinal and lateral directions of travel. The purpose of a Biomechanical Analysis is to determine whether the changes in velocity of an occupant in both the longitudinal and lateral direction produced the forces and motions required for the alleged injured body parts to exceed their natural physiological ranges of motion. Velocity is a measurement in physics which includes both speed and direction. Acceleration is a change in velocity.

The significance of accident reconstruction for a biomechanical analysis is to determine the sudden changes in velocity of a vehicle, longitudinally and laterally, during a collision, so that its occupants' accelerations, longitudinally and laterally, can be figured out. More specifically, the sudden accelerations of a vehicle in either or both the longitudinal and lateral directions will cause the occupants inside the car to move in a direction opposite the vehicle's longitudinal and lateral accelerations. The explanation for this is addressed in the next paragraph.

In a car accident, what causes a vehicle to suddenly change its velocity in either or both the longitudinal or lateral directions of travel is the gain or loss of energy from making contact with another vehicle. For example, if two cars are travelling on a road one after another and the vehicle in the rear is travelling faster than the vehicle in the front. When the two cars make contact, the faster vehicle in the rear will transfer energy to the slower car in the front causing the slower car in the front to accelerate. When this happens, a discrepancy will be caused between the velocity of the front vehicle and its occupants because the occupants will initially continue to travel at their pre-impact velocity. So, when the vehicle suddenly accelerates, the occupants move toward the rear of the vehicle. The same logic applies to the rear car which lost energy during the collision. When the rear car decelerated, the occupants inside moved forward.

Moreover, the energy in a collision can be transferred laterally causing lateral accelerations of the vehicles and their occupants. For example, if a car that is travelling north makes contact with a car that is travelling west, both cars will decelerate on their respective longitudinal axis and each car will pick up energy on their respective lateral axis. The longitudinal deceleration is due to the fact that there is an obstacle blocking each vehicle's longitudinal path. The lateral acceleration is due to energy received from the other vehicle on the subject vehicle's lateral axis. More specifically, the north bound vehicle will pick up west bound energy causing that vehicle to accelerate west. The occupants inside this vehicle will accelerate east. The same logic applies to the west bound vehicle, which will accelerate north. Its occupants will accelerate south.

Calculating the Severity of the Impact

The magnitude of the accelerations of a vehicle and the loads sustained by their occupants can be figured out both mathematically and by analyzing the deformation to the accident vehicle. Mathematically, the engineer can figure out the accelerations of the vehicles and their occupants by figuring out unknown variables from known variables consistent with Newton's Laws, generally accepted principles of physics and generally accepted accident reconstruction formulas. In addition, the engineer can figure out how much energy was gained or lost in a

collision by analyzing and comparing the crush to the accident with the crush to a crash test vehicle that is similar in design and received the same type of impact. More specifically, if we have two cars built identically the same and we hit one vehicle in a certain manner with a certain force in a certain location and a dent is produced, then scientifically, the same dent should result, if we do the exact same thing to the other vehicle. This deformation is evidence of the amount of energy that the vehicle's material could not withstand. This deformation can be compared to similar crash test vehicles which sustained the same type of impact. The crash test vehicle was damaged under controlled conditions in which all of the necessary data was recorded.

Analyzing the Occupants

Let's now take a look at what is going on inside the vehicles with the occupants. Before we begin, we must understand that an engineer analyzes the human body the same way that he or she would analyze a machine. If something is broken, what type of force, stress or friction caused it to brake or tear. Was the material torn too far, did something hit it, did it rub against something else too hard? Since an engineer is not a medical doctor, our goal should be to prove at the very least that based upon the engineer's findings the alleged injured body parts were not compromised because they didn't stretch beyond their limits and nothing rubbed against them and nothing came into contact with them. Well if nothing caused a body part to break, then why is there a lawsuit? Did the medical doctors analyze the cause of the injuries in terms of the energy absorbed or lost by the host vehicle, the loads sustained by its occupants and the occupants' resulting motions inside the vehicle?

Overcoming the Junk Science Objection

Now that we have a basic understanding of what biomechanical experts do, let's now turn our focus on what do we need to prove to convince the courts to allow them to testify and what do we need to prove to convince the courts to give them the greatest latitude in their testimony.

In the State Courts in New York, the relevant hearing for determining the admissibility of a biomechanical experts is a Frye Hearing—see *Frye v. U.S.*, 293 F1013 (D.C. Cir. 1923) and *People v. Legrand*, 196 Misc. 2d 179. In order to satisfy the requirements of a Frye Hearing, the proponent of the expert must prove the following:

- that "the witness be competent in the field of expertise that he purports to address at trial" and
- that the "expert testimony [should] be based on scientific principle or procedure which has been sufficiently established to have gained general acceptance in the particular field in which it belongs" and
- that "the processes and methods employed by the expert in formulating his or her opinion adhere to accepted standards of reliability within the field" and
- that "the proffered testimony is beyond the ken of the jury" and
- that the expert's testimony be "relevant to the issues and facts of the individual case." See *Borzacchiello v. Bousbaci* (Supreme Court, Queens County 2006) on the internet at http://decisions.courts.state.ny.us/fcas/fcas_docs/2006mar/40000487520041sciv.pdf.

In order to satisfy the aforesaid requirements, the following must be established:

- the expert's education, experience and publishing in biomechanical engineering is such that he or she will be recognized by the Court as an expert witness in biomechanical engineering and
- that the expert's testimony is rooted in scientific principles or procedures that general acceptance in the biomechanical engineering community as evidenced by publication and peer review and
- that the processes and methods employed by the expert in arriving at his or her conclusions are methods or processes which are deemed reliable in the biomechanical engineering community as evidenced by extensive testing, publication and peer review and
- that the expert's testimony is probative as to whether or not the accident at issue caused the claimant's alleged injuries and
- that biomechanical engineering is beyond the "ken of the jury."

No matter how you approach this process, your goal should always be to prove everything—from general principles such as Newton's Laws to specific crash test studies cited as support for the engineer's findings. If the engineer used mathematical formulas to arrive at his or her conclusions, be prepared to show that these formulas have been tested, written about, peer reviewed and are deemed reliable in the biomechanical engineering community for the task for which they were employed.

Going Forward

The biomechanical debate is taking place every day in the state courts in New York. Defense lawyers are scrambling to learn this defense while plaintiffs' attorneys are trying to find ways to counter this. New York's highly educated and respected judiciary is constantly weighing what should be allowed and what should be precluded. Since biomechanical experts are not medical doctors,

they are not competent to render either a diagnosis or a prognosis. Some judges will not allow them to address the injury causation issue. Other judges allow them to testify to the maximum allowable limits. In approaching a case with a biomechanical expert on your witness list, be prepared to first prove that the motions and forces involved in the accident could not have caused the claimant's alleged injured body parts to exceed their natural physiological ranges of motion. Next, be prepared to address the biomechanical engineer's testimony with your medical experts. Finally, if the judge will allow the engineer to rule out causation of the injuries, be prepared to re-explain the engineer's logic to the jury on closing arguments.

In closing, the use of biomechanical experts in the defense of a suspect bodily injury claim is adding a new level of precision to the litigation process. The argument that the claimant was fine before the accident and is now symptomatic following the accident is eroding as a basis for establishing causation of the injuries. Expect to see biomechanical experts coming into court and testifying about the motions and forces involved in the accident and whether those motions and forces were of the type or severity to have caused the alleged injured body parts to exceed their natural physiological ranges of motion. Expert to see medical doctors being confronted on cross examination with issues relating to the amount of energy absorbed or lost by the host vehicle, what were the loads sustained by the occupants and did the occupants move in a way that would have caused their alleged injuries and why they didn't take all this into account when formulating their opinions.

Robert Glick, Esq. is a partner in the law firm of Brand, Glick and Brand, a New York-based litigation firm, www.BrandGlickBrand.com.

Sean O'Loughlin, Esq. is the president of Global Biomechanical Solutions, Inc., a New York-based Biomechanical Consulting Firm, www.BiomechanicalExperts.com.