INJURY CAUSATION IN PRODUCTS CASES

TEXAS TRIAL LAWYERS ASSOCIATION

PRODUCTS LIABILITY SEMINAR

Four Seasons Resort Las Colinas
December 4, 2003

James L. Mitchell
Brown, Sawicki & Mitchell, L.L.P.
2626 Cole Avenue, Suite 850
Dallas, Texas 75204
(214) 468-8844 Telephone
(214) 468-8845 Facsimile
jmitchell@bsmlawfirm.com

Table of Contents

I. INTRODUCTION 1

II. INJURY CAUSATION 1

III. EXPERT BIOMECHANICAL 1

IV. INITIAL INVESTIGATION 2
- A. Preserving the Evidence 2
- B. Photography 3
- C. Medical Records 3
- D. Medical Examiner 3
- E. Treating Physicians 3

V. INJURY RECONSTRUCTION: 4

VI. DAUBERT/ROBINSON 5

VII. CASE STUDIES 5
- A. Automobile Defect Case 5
- B. Football Helmet Case 6

INJURY CAUSATION IN PRODUCTS CASES

I. INTRODUCTION

Evaluating any potential product liability case necessarily involves a complete and thorough analysis of injury causation. The defense will often argue that even if their product was defective, it did not cause injury to the plaintiff. As a plaintiff lawyer, you can find yourself financially extended in a hopeless product liability case if you do not thoroughly analyze injury causation from the outset. Oftentimes, that means hiring an expert who primarily focuses on injury causation, such as a biomedical or biomechanical engineer. This paper will discuss the aspects of injury causation in product liability cases, and the use of certain types of experts to deal with these issues.

II. INJURY CAUSATION

To succeed in any product liability case, the plaintiff must prove that a defect existed, which was a producing cause of the personal injury or death for which the plaintiff seeks recovery. *See* TEX. CIV. PRAC. & REM. CODE § 82.005 (Vernon Supp. 1994); *Morgan v. Comugraphic Corp.*, 675 S.W.2d 729 (Tex. 1984). Producing cause is defined as "an efficient, exciting, contributing cause which in a natural sequence, produced the injuries complained of. *Rourke v. Garza*, 530 S.W.2d 794 (Tex. 1975). A party must show more than the mere fact that an accident occurred if they are to recover under the theory of strict product liability. *Selig v. BMW of North America, Inc.*, 832 S.W.2d 95 (Tex. App. – Houston [14th Dist.] 1992, no writ). To reach the jury in any product liability case, causation must be demonstrated in one of three ways:

1. When general experience and common sense will enable a layman to fairly determine the causal relationship between the event and the condition or injuries;

2. When there is a scientific principal, a sharp categorical natural law, which theorizes that a result is always directly traceable back to a particular cause; and

3. When the reasonable probability of a causal relationship is shown by expert testimony.

Merrill-Dow Pharmaceuticals, Inc. v. Havner, 907 S.W.2d 575 (Tex. App. – Corpus Christi 1995, *reversed on other grounds*), citing *Lenger v. Physicians General Hospital, Inc.*, 455 S.W.2d 703 (Tex. 1970). The third way to prove causation requires the use of expert testimony. This is the usual method a plaintiff lawyer will utilize to prove causation in most product liability cases.

III. EXPERT BIOMECHANICAL TESTIMONY

To prove that a defect in a product liability case is a producing cause of a claimant's injuries, expert testimony will usually be required. Before deciding whether or not to pursue such a case, the plaintiff lawyer may have to employ the services of a biomechanical expert to determine the manner in which the plaintiff sustained the injuries for which compensation is sought. The issue of injury causation is many times obvious and self-evident in certain types of cases; however, product liability cases often present unique problems and complexities in terms of proving that the actual product defect caused or enhanced the injury, rather than the accident itself. This is particularly true in automobile defect cases, helmet litigation, amusement part litigation and other cases involving products routinely involved in violent and traumatic accidents that are sometimes unrelated to a product defect. This will be true in any case involving any type of motor vehicle, such as an automobile, motorcycle, ATV, construction equipment, tractors, etc. Since catastrophic injury and death can occur during the use of these products absent a defect, injury causation will oftentimes be the main focus of the case. Accordingly, a biomechanical engineer is oftentimes essential in order to prove causation in these cases.

What is a Biomechanical Engineer?

A biomechanical engineer is a person trained to use traditional engineering expertise combined with biology and medicine to analyze forces and movement and its effects on the body. Biomechanics is a subspecialty within the field of biomedical engineering, which applies classical mechanics, including dynamics, movement, and statics to biological or medical problems. It includes the study of material deformation, flow within the body, and movement as it relates to injury. Biomechanical engineers are able to analyze the mechanics of movement of the body and how that movement can result or cause certain injuries. They analyze how the human body moved or reacted in relation to the mechanical movement and structure of the product to determine what caused the plaintiff's injury. Oftentimes, biomechanical engineers engage in the study of kinematics. Kinematics is that branch of mechanics that analyzes the forces that produce certain motions. This routinely becomes an issue in automobile defect cases when kinematics or occupant motion is a critical part of the analysis.

IV. INITIAL INVESTIGATION

The initial investigation which you conduct and the information you gather can be a decisive factor in whether you win a product liability case. In order for a biomechanical expert to properly evaluate injury causation, it is imperative that you conduct a thorough investigation and gather all pertinent information that your expert will need in order to perform a biomechanical evaluation of injury causation. You must gather, locate, and preserve all relevant evidence. The failure to do this from the very beginning can destroy any potential product liability case.

A. Preserving the Evidence

It is axiomatic that in any product liability case, the product must be preserved, be it an automobile, helmet, or any other type of product. In addition to preserving the product, other information must be preserved and/or gathered from the very outset. If you cannot secure the product and take possession of it, you should at a minimum photograph it exhaustively as soon as possible. You must at a minimum photograph the product before it is modified, changed or altered in any way, thus potentially destroying your ability to pursue a product liability case. The defendants in these cases will argue that any alteration, destruction, or modification of the product is grounds for dismissing your case or, at a minimum, will use it to cripple your expert testimony.

Once you have preserved the product, you must determine whether or not any other information exists which documents the product or accident scene. Find out if a news crew covered the accident and whether they took photographs, video, or film footage. In an automobile defect case, many times police or firemen will have photographed the vehicle at the site before it is removed. In a football helmet case, for example, the actual play in which the injury occurred may be on film, particularly if it happened during a game.

Another aspect in preserving evidence relating to injury causation is to interview and talk to anyone who saw the accident or was at the scene of the accident. You must talk to any and all witnesses to the accident to find out exactly what they saw. Sometimes witness testimony is critical to an injury causation analysis and can help your expert understand the movement of your client within a vehicle and can help you determine where your client's body ended up after the accident. Witnesses and passer-byers are critical because many times emergency personnel will move evidence, particularly injured persons, when they arrive at the scene. Once evidence is removed, it is difficult for the expert to be able to perform a proper biomechanical/kinematics analysis. The product itself should be well preserved and your file should sufficiently document who had access to it and what was done to it from the time of the accident until you obtained it and locked it up.

The next thing that needs to be preserved is the accident scene itself. This work should be done immediately, even before the product is obtained. It should be done as soon as you find out about the case. The reason is fairly obvious in that certain evidence, such as skid marks, debris, blood, etc. will disappear shortly after the accident, and, without proper documentation, that evidence will be lost forever. Have your investigator or expert fully

photograph the accident scene and document any and all evidence. Police officers or other emergency personnel sometimes keep field notes that must be obtained in addition to the official report created by the person investigating the accident. OSHA, for example, will maintain an exhaustive file on accidents it investigates. The complete OSHA file must be obtained in a work-related accident. Many times the OSHA investigation will be the only place where critical evidence is actually preserved, photographed, and documented.

B. Photography

What should you photograph? Photographs should be taken of anything that will change, disappear or otherwise become unavailable. This information can many times be critical to an injury causation analysis. Keep in mind, however, that every photograph, video, etc. will be potentially discoverable.

In an automobile defect case, photographs should not just be taken of the automobiles involved in the accident and the location of the event, but of your client both before and after the accident and after any surgery or hospital visit. Photographs should be taken of your client immediately upon your retention and as soon as possible. Bruises, cuts, abrasions, etc., oftentimes are invaluable evidence for an injury causation expert. Obviously, this type of evidence will disappear as your client heals. The location of a bruise, while seemingly insignificant to most people, can sometimes be the most valuable and critical piece of evidence to a biomechanical engineer when he is trying to pinpoint the exact cause of your client's injury.

C. Medical Records

Medical records can often be essential in performing an injury causation analysis. All EMT reports, ambulance run sheets, emergency room reports, and nursing notes for the first couple of days of treatment should be procured and analyzed in handling any product liability case. The EMT reports are oftentimes the most useful medical records for injury causation. EMT reports, as opposed to other medical records, will usually discuss the location of the patient when the EMTs arrived at the scene. Since the EMTs are the first medical personnel to arrive at the scene, they are in the best position to talk about what position the plaintiff's body was in at the scene of the accident. For example, EMT reports will sometimes discuss the removal of a seat belt, which is a critical issue in an automobile defect case.

Medical records such as this will usually describe cuts, bruises, and lacerations that will many times be gone by the time you are hired and are not discussed in subsequent medical records. No proper injury causation analysis can be performed without these critical medical records.

D. Medical Examiner

Autopsy reports should always be obtained in analyzing a product liability case. In Texas, medical examiner's reports, if properly authenticated, are admissible under the public records exception to the hearsay rule. Autopsy reports provide invaluable information in analyzing injury causation in wrongful death cases. Autopsy reports can be the only place certain information is found, particularly internal injuries and causes of death. If your client died at the scene of the accident, there may not be sufficient medical records in order to perform an injury causation analysis and the autopsy may be the only place this information can be found. Meeting with the medical examiner is often useful in analyzing causation in some product liability cases. Sometimes the medical examiner can elaborate or expound on things contained in the autopsy. Medical examiners can provide useful testimony and back-up information to be utilized by the biomechanical engineer in performing an injury causation analysis. In a case of limited value, you may consider attempting to utilize the medical examiner in place of a biomedical engineer in order to decrease the financing necessary for the case.

E. Treating Physicians

Treating physicians can make or break product liability cases, particularly in the area of injury causation. Treating physicians are critical for several reasons. First, they can provide insight and/or expound on things contained in the medical records that can be used by a biomechanical engineer. Sometimes the medical records do not tell the full story and medical

testimony from a treating physician will be essential. Second, treating physicians are medically trained and qualified to render testimony that the biomechanical engineer is not always qualified to do. For instance, biomechanical engineers may not be qualified to evaluate x-rays, CT scans and MRIs. The testimony of the treating physician and/or radiologist can provide valuable support for the testimony of a biomechanical engineer. Finally, non-retained treating physician testimony is just, plain and simple, more persuasive than the testimony of a retained or a hired-gun expert. Juries will place a great deal of weight on the testimony of non-retained treating physicians.

V. INJURY RECONSTRUCTION: THE BIOMECHANICAL ANALYSIS OF AN INJURY

Injury reconstruction is a process of injury analysis, which combines both medical and engineering technology to produce a composite picture of injury causation. Injury reconstruction from the use of a biomechanical analysis analyzes the accident and resulting injuries to produce a comprehensive description of the injuries in both medical and engineering terms, which reflect the injury and associated causative factors. The steps in this process are as follows:

1. Define the injury.

2. Define the body kinematics or movement which produces injury.

3. Define the product or vehicle kinematics (movement of product or vehicle).

4. Determine whether the product or vehicle kinematics are consistent with body kinematics.

5. Determine points of contact with product.

6. Determine whether points of contact are consistent with injury and kinematics analysis.

The sources of defining the injury are medical records, x-rays, patient photographs, and descriptions of the injuries by the patient and other observers. All of this information is needed in your initial investigation. The kinematics analysis of the vehicle and body are to determine the principal direction of force of both the vehicle (product) and the body and are derived from an analysis of the police report, accident scene, accident reconstruction, and observations of vehicle inspection and observations of witnesses. The occupant kinematics is further influenced by the movement of the vehicle. Confirmation of the body kinematics comes from correlation of injuries with the inspection of the vehicle.

In analyzing kinematics and performing a biomechanical injury causation analysis in an automobile crash, occupant contact marks are critical. In a crash, all bodies will continue to move with their pre-impact velocities (speed and direction relative to the ground) while the crash forces change the vehicle's velocity state. A relative velocity, therefore, develops between the occupant and the vehicle. This relative velocity results in what has been termed "the second impact," as the occupant strikes some part of the vehicle interior and his velocity is brought into conformity with that part of the vehicle. These forces often leave evidence of the second impact either on the occupant, the vehicle, or both. Information from medical records matched with markings on the vehicle interior surfaces can sometimes confirm occupant kinematics. The goal is to match known or suspected occupant contact marks with the occupant kinematics to determine what part of the vehicle or product caused the injury.

In performing the kinematics analysis in a vehicular accident, several rules of thumb are often used for predicting occupant motion. These methods are useful for estimating the general direction of the occupant moves with respect to the vehicle, and help locate occupant contact marks on the interior surfaces. They are typically used in a preliminary occupant kinematics analysis, for example, during initial vehicle inspections when the vehicle motion has not yet been established. Two of these methods in particular are discussed below.

<u>Occupant Moves Towards Vehicle Crush</u>

This method of predicting occupant motion simply assumes that all occupants move directly toward the area of the vehicle crush. For example, if the front end of the vehicle were

damaged, this rule would suggest that the occupant moved forward. If the rear of the vehicle were damaged, it would suggest that the occupant was rearward.

Occupant Moves Parallel to the PDOF

A second method of predicting occupant motion assumes that the occupant moves in a direction parallel to, but opposite of the principal direction of force (PDOF). For instance, if the occupant vehicle is struck in the front from a head-on collision, the body will move forward or opposite of the principal direction of force coming from the front of the vehicle.

The final step in the biomechanical analysis is the inspection of the product to determine any and all contact points. Early inspection of the vehicle should be done in order to carefully analyze any and all potential contact points consistent with the preliminary kinematics analysis. Vehicle inspection/contact analysis is used to match injuries with potential contact points on the vehicle. The vehicle should also be examined for evidence of these contact points. In a vehicular case, for example, evidence of blood and hair are often critical in determining what part of an occupant's head or face struck what interior part of the vehicle. Many times a small sliver of hair on a particular part of a vehicle can be the determining factor in identifying the contact point and completing the injury causation reconstruction.

VI. DAUBERT/ROBINSON CHALLENGES

Biomechanical engineering is a field where Daubert/Robinson challenges are not only possible, but are almost guaranteed. Some biomechanical engineers in Texas have been disqualified, particularly in the area of low impact collision cases. In order to survive a Daubert/Robinson challenge in a product liability case, it is imperative that you hire extremely well-qualified biomechanical engineers. These experts must be able to support their conclusions and opinions with literature and studies. Some of the more qualified biomechanical engineers have either worked in industry and/or worked for various universities where they participated in various types of biomechanical engineering studies, such as cadaver tests analyzing occupant kinematics and biomechanical engineering principles. This is not an area to cut corners and these experts are usually extremely expensive. Many product liability cases will require multiple expert witnesses. An automobile defect case, for example, will usually require a minimum of three experts -- an accident reconstructionist, a design expert, and a biomechanical engineer. Each of the experts brings a unique and specific area of expertise to the case. The biomechanical engineer essentially ties the reconstruction to the injuries or death suffered by the claimant.

VII. CASE STUDIES

The remainder of this paper will discuss two specific examples or case studies in which a biomechanical evaluation played a pivotal role in handling a particular product liability case. These case studies are meant to provide a practical glimpse at the application of the science of proving injury causation in product liability cases. One example is an automobile defect case and the other is a football helmet case.

A. Automobile Defect Case

The facts of this case are as follows:

> The claimant was driving down a farm-to-market road at 70 mph when he fell asleep and lost control of his truck, causing the truck to leave the road and roll three to four times. Although the claimant was properly wearing his seat belt, the roof catastrophically crushed into his head causing an incomplete spinal cord injury at C6-C7 resulting in permanent paraplegia. The claimant alleged that the roof was unreasonably dangerous in that it crushed down on his head causing a vertebrae in his neck to dislocate causing the severe spinal cord injury.

A design engineer expert testified that the design of the roof was unreasonably dangerous and that a safer alternative design existed, which would have resulted in a much stronger roof and would have provided a much larger occupant area for the claimant's head during a rollover accident. An accident

reconstruction expert analyzed the accident and the motion of the vehicle, including speeds, the actual amount of roof crush, etc. Finally, the biomechanical engineer was put to the task of having to determine exactly how the plaintiff's spinal cord was injured in this accident.

Rollover/roof crush cases like this almost invariably require a detailed occupant kinematics/biomechanical engineering analysis. Defendants in rollover cases routinely argue that once the vehicle rolls, the injury was inevitable. Specifically, the Defendants in this case argued that the plaintiff's spinal cord injury occurred from the violent whipping of his neck and head in the vehicle, not from a roof crushing down on his head. Alternatively, they argued that his head actually hit the ground during one of the rolls as it was expelled from the vehicle during the roll sequence. Essentially, anything and everything caused the injury except for the roof crushing on his head. Cases such as this present the challenging injury causation analysis due to the violent nature of these accidents. In a violent accident such as this involving a 70-mile-an-hour multiple roll sequence, the defendants can easily persuade the jury that its product cannot be blamed for this accident and that an injury such as this is unfortunate, but inevitable. A biomechanical/kinematics analysis is essentially a make or break point in a case such as this.

The following critical evidence was obtained through the investigation and prosecution of this case and was utilized in the injury causation analysis:

1. EMT report identified the claimant's head being pushed down by the roof in rest position after the accident.

2. Medical emergency room records identified various cuts and lacerations on claimant's scalp.

3. CT scans of the claimant's head revealed scalp swelling consistent with claimant's head being struck by roof.

4. Cervical spine MRIs showed vertebral dislocation consistent with kinematics analysis.

5. The claimant's treating neurosurgeon signed affidavit supporting biomechanical engineer's theory of injury causation.

6. Post-accident photographs of the vehicle showed roof crush.

7. Accident reconstructionist provided analysis of vehicle and roll sequence.

The biomechanical engineer performed a kinematics analysis using an accident reconstruction in order to determine the movements of the claimant's body relative to the vehicle, including which parts of the vehicle the claimant's body would have come in contact with. Next, the biomechanical engineer takes the evidence of the claimant's injury along with the crushed roof and other evidence set forth herein to reach the conclusion that the claimant's spinal cord injury was the result of the roof crushing down on the claimant's head. The radiographic evidence, as well as neurosurgeon's testimony offered further support that the injury occurred when the roof crushed down on the claimant's head, pushing the claimant's head forward and to the left causing his spinal cord injury. This motion of the claimant's head moving forward and to the left was consistent with both the radiographic data and the kinematics analysis showing the likely movement of the claimant's body given the direction of the roll sequence in the accident. This analysis was used to argue that the plaintiff's theory was more probable than the defendant's multiple theories based on the evidence and accompanying biomechanical analysis.

B. <u>Football Helmet Case</u>

The facts of this case are as follows:

16-year-old boy playing first year varsity football is practicing two-a-days in the August heat in South Texas. While playing on defense, the plaintiff engages in a helmet-to-helmet collision with a member of the offense. After the play, the claimant complains of being dizzy and feeling faint, walks over to the sideline, and shortly thereafter collapses and becomes unresponsive. The claimant

is rushed to the hospital where he has suffered a major hematoma, which requires evacuation and ultimately results in a catastrophic brain injury to the claimant. Plaintiff alleged that the football helmet he was wearing was unreasonably dangerous as designed and it did not provide adequate protection for the foreseeable contact encountered by football players in these instances.

Helmet cases are extremely difficult and require an exhaustive biomechanical analysis in order to prove injury causation. Defendants in these cases raise different theories as to what caused the claimant's injury. In this particular case, the defense claimed that a congenital defect may have caused the claimant's injury or that potentially, a heat stroke was the cause, which is understandable in the 100-degree temperature in South Texas. The defendant also claimed that the brain injury occurred from a shearing or rotational injury that cannot be prevented by the design of the helmet. In essence, the helmet defendant claimed that the injury had nothing to do with the design of their product.

In order to refute these defenses and prosecute this case, a biomechanical analysis was required. The following evidence was obtained during the investigation and prosecution of this case which was vital to the injury causation analysis:

1. The claimant's prior medical history and medical records revealed no evidence of congenital defect.

2. Radiographic studies on the claimant revealed no congenital abnormality or defect. Specifically, the head CT scan showed swelling consistent with a blow to the head.

3. The EMT reports revealed evidence inconsistent with heat stroke and consistent with a major hematoma.

4. Detailed interviews of the players and coaches at the practice provided information to reconstruct the accident. It was critical to determine as precisely as possible the exact nature of the head contact (whether it was side, crown, or front).

5. The treating neurosurgeon provided testimony that the injury was caused by hematoma rather than heat stroke and/or congenital defect.

6. Evidence from the school district the claimant was playing for was utilized to determine that the helmet was properly fitted and maintained.

7. The actual helmet itself was preserved.

The biomechanical engineer was able to utilize all of the evidence herein to conclude that the claimant's injury was caused by a direct blow to the front part of his head. The hematoma and brain swelling on the CT scan were in a location consistent with the area of contact to the plaintiff's head identified in the interviews of the players and coaches. Congenital defect, heat stroke, and other theories offered by the defendants were eliminated by a biomechanical engineer and treating physician. The analysis indicated that the plaintiff's theory was more likely than the defendant's theories to have caused the accident. The biomechanical engineer was then able to analyze the forces necessary to create such an injury and those absorbed by the helmet to conclude that different padding with better energy-absorbing characteristics would likely have prevented plaintiff's injury.