

Using Substantial Factor Analysis in Closed Head Injury Cases

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Nearly ten million closed head injuries occur in the United States each year, and ninety percent of these involve mild to moderate injury. See Long, "Post Concussion Symptoms After Head Trauma," 79 So. Med. J. 728-732 (1986). Medical research has progressed rapidly in the past decade in both the diagnosis of these injuries and in documenting outcome. It is therefore expected that closed head injury claims will grow in number, in the severity of the injury claimed, and in the amount of damages requested.

In the typical closed head injury claim, the plaintiff describes a post-traumatic syndrome following a mild to moderate head injury. Such syndrome includes attention and memory deficits as well as chronic headache, dizziness, and emotional reactions, such as anxiety and depression. Alves, "Understanding Posttraumatic Symptoms After Minor Head Injury," 1 J. head Trauma Rehab. 1 (1986).

Defending the causation and damage aspects of a closed head injury case is frequently a difficult and intimidating undertaking. The defendant's negligence is often clear; the plaintiff's complaints are usually severe and ominous, although vague and hard to quantify.

However, the authors believe these cases may nonetheless be vigorously defended in the areas of proximate cause and apportionment of damages, through substantial factor analysis. This approach applies, both to the event itself and to the claimed resulting damages, the general negligence principle that one's conduct must be a substantial factor in producing the claimed harm. This article first discusses recent medical studies that document favorable outcomes in closed head injury cases and the significance of pre-existing conditions in causing or contributing to symptoms identified with closed head injuries, and then analyzes substantial factor analysis as a framework for applying this information to rebut causation and to limit damages.

ANATOMICAL BASES OF THE CLOSED HEAD INJURY

Recent medical research indicates that no direct impact to the head is required to sustain a closed head injury and the symptoms of closed head injuries are frequently not associated with any lesion that can be visualized on a computerized topography scan (CT scan) or by magnetic resonance imaging (MRI). For example, swelling and lesions, such as subdural hematomas, are typical symptoms of closed head injuries and are demonstrable on CT scans and MRIs. However, another typical head injury, caused by acceleration-deceleration of the brain, such as that which occurs with whiplash injury or severe infant shaking, is a brain stem injury frequently described as a diffuse axonal injury. See Vowles, "Diffuse Axonal Injury in Early Infancy," 40 J. Clinical Pathology 185-189 (1987); and Gennarelli, "Diffuse Axonal Injury and Traumatic Coma in the Primate," 12 Annals of Neurology 564-574 (1982).

Diffuse axonal injuries are not demonstrable with MRIs and CT scans (although they probably will be in the future since they are now demonstrable on autopsy and on auditory brain stem testing). See Elwany, "Auditory Brain Stem Responses (ABR) in Patients with Acute Severe Closed Head Injuries. The Use of the Grading System," 102 J. Laryngology & Otology 755-759 (1988). And yet the consequences of a diffuse axonal injury can be severe as such an injury is thought to disrupt neurological processes that are necessary for attention and memory. See Gentilini, "Neuropsychological Evaluation of Mild Head Injury," J. Neurology, Neurosurgery, & Psychiatry 137-140 (1985). Memory loss has been found to occur despite the preservation of consciousness and it is hypothesized that acceleration-deceleration accidents resulting in brain stem injuries can ultimately cause more damage in the memory centers of the temporal lobe than in other areas of the brain.

A plausible neurophysiological basis is therefore possible for symptoms resulting from certain kinds of head injuries even when no objective findings of brain injury can be found on CT scan or MRI.

LONG-TERM EFFECTS OF MILD AND MODERATE HEAD INJURIES DISPUTED

The defense's goal in closed head injury litigation is to demonstrate that the plaintiff's physical complaints may well stem from conditions that were not caused by the defendant's allegedly tortious behavior. For example, even though the defendant's negligence may have caused an automobile accident that hurt the plaintiff, that accident may not have been even a substantial factor in causing the plaintiff's current physical problems. Even if defendant's negligence was a contributing factor, defense counsel should attempt to apportion the damages among several causes, and thereby reduce his or her client's liability.

Pre-existing conditions affecting brain function, such as head trauma, substance abuse, and psychiatric problems, are common. The problem in closed head injury cases has not been in obtaining recognition of pre-existing conditions, but rather in obtaining an acknowledgment of their significance as elements contributing to the plaintiff's present allegedly impaired condition.

Acknowledging the significance of the pre-existing conditions is the key to apportionment of damages. While apportionment in non-head trauma cases has increased with developments in medical knowledge and technology, experts in closed head injury cases have remained reluctant to attempt to apportion damages. The medical literature now provides a basis for apportionment in some cases. Use of substantial factor analysis, both in legal argument and in presentation and cross-examination of expert testimony, best establishes the significance, and thus, apportionability, of pre-existing conditions.

Application of the substantial factor and apportionment analysis requires familiarity with recent medical studies that describe outcome after mild and moderate closed head injuries. Early studies were not helpful. See, e.g., Rimel, "Disability Caused by Minor Head Injury," 9 *Neurosurgery* 221-228 (1981); Barth, "Neuropsychological Sequelae of Minor Head Injury," 13 *Neurosurgery* 529-533 (1983). The frequently-cited Rimel study indicated very high rates of disability and unemployment in patients three months after seemingly insignificant head injuries. The conclusion was that many of these people may have suffered irreversible organic brain damage. The Barth study had similar findings, showing high rates of unemployment after minor head injuries.

More recent studies have produced strikingly different results from the Rimel and Barth studies and are advantageous in the defense of mild and moderate closed head injury cases. These studies have emphasized the necessity to control for pre-existing head injuries, drug abuse, alcohol abuse, and psychiatric problems in order to obtain valid data regarding the outcome of mild to moderate head injuries. See, e.g., Gentilini, "Neuropsychological Evaluation of Mild Head Injury," 48 *J. Neurology, Neurosurgery, & Psychiatry* 137 (1985). Gentilini made a significant contribution by studying fifty mild head injured patients and fifty uninjured subjects using a strict methodological approach and adequate control groups. Standard neuropsychological testing was administered. After one month, no conclusive evidence was found that mild head injury caused cognitive impairment. He concluded that if there was structural damage after a mild head injury, the patient generally recovered from a neuropsychological standpoint within one month after trauma.

In 1986, Binder also challenged the argument that persisting, measurable cognitive deficits typically occur after mild head injury. See Binder, "Persisting Symptoms After Mild Head Injury: A Review of the Post Concussive Syndrome," 8 *J. Clinical & Experimental Neuropsychology* 323-346 (1986). He found that findings of persistent cognitive impairment are attributable to failure to control for the effects of previous injuries. Binder described the "selective vulnerability" of certain populations to the long term effects of mild head injuries. These populations include those with prior head injuries and patients over forty years old.

Another important study is Dikmen, "Neuropsychological and Psychosocial Consequence of Minor Head Injury," 49 *J. Neurology, Neurosurgery, & Psychiatry* 1227-1233 (1986). Dikmen studied twenty subjects with minor head injuries and compared them to an uninjured group at one and twelve months after injury, using a battery of neuropsychological and psychological measures. The results indicated that a single minor head injury in persons with no prior compromising condition was associated with mild but probably clinically non-significant difficulties at one month after injury. Dikmen concluded that prior reports and literature may have overestimated head injury-related losses; he criticized the earlier writings' failure to take into account effects of pre-injury characteristics and injuries to other parts of the body.

In 1987, a study noted that the majority of hospital admissions for head trauma were due to minor injuries. Levin, "Neurobehavioral Outcome Following Minor Head Injury: A Three-Center Study," 66 *J. Neurosurgery* 234-243 (1987). Minor injuries were described as those where the patient suffered no loss of consciousness or only a transient loss of consciousness without major complications and without requiring intracranial surgery. Levin acknowledged the controversy surrounding the long-term effect of closed head injuries. Therefore, he studied fifty-six patients with minor head injury three months post-injury using quantified test of memory, attention and information processing speed.

The post concussion symptoms that nearly all of the patients in the Levin study initially reported, including cognitive problems, physical complaints, and emotional malaise, had substantially subsided by the three monthly follow-up examination. These data suggested that a single uncomplicated minor head injury produces no permanent disabling neurobehavioral impairment in the great majority of patients who are free of pre-existing neuropsychiatric disorder and substance abuse. The Gentilini, Binder, Dikmen, and Levin studies suggest that closed head injuries are often associated with conditions or damages which are the product of many contributing factors and causes, potentially commencing before birth and continuing through the time of the negligent act of the defendant and after.

APPLYING THE SUBSTANTIAL FACTOR APPROACH TO CAUSATION

The significance of the above-referenced studies is a s a tool in limiting and apportioning damages claims. The task for the defense practitioner is to integrate

the above findings into a framework that can be used to argue causation and damage apportionment issues. An overview of substantial factor analysis as such a mechanism is therefore appropriate.

A principal test of legal cause is "but for" - a test of exclusion. The defendant's conduct is not a cause of the event if the event would have occurred without it; or conversely, the defendant's conduct is a cause of the event if the event would not have occurred "but for" that conduct. See Prosser & Keeton, *The Law of Torts*, §41, at 266 (5th ed. 1984); *Rudeck v. Wright*, 218 Mont. 41, 709 P.2d 621, 628 (1985). The "but for" test usually fairly and accurately expresses the requirement of legal causation. However, when two or more causes concur to bring about an event and any one of them operating alone would have been sufficient to bring about the results, a "but for" causation test fails. It is suggested that the standard of proof for determining causation under these circumstances should be a substantial factor test. Under this standard, the defendant's conduct may be a "but for" cause of plaintiff's harm, but defendant's conduct can be shown to have made such an insubstantial contribution to the ultimate outcome that liability should not be imposed.

A substantial factor analysis was applied in early cases where two causes concurred to bring about an event, and either one of them operating alone would have been sufficient to cause the identical result, as when concurrent negligently set fires merge and burn the plaintiff's property. Prosser & Keeton, *supra*, at 266-267. Historically, the substantial factor test has been increasingly used not only when "but for" analysis inappropriately relieved a defendant from liability, but also when application of the "but for" rule resulted in excessive liability for one defendant. The substantial factor analysis was therefore deemed appropriate by many courts when multiple potential causes complicated the causation analysis. It gained increasing acceptance and refinement, culminating in its inclusion in §§431(a) and §433 of the Second Restatement of Torts. Acceptance of the substantial factor test, and application of it, varies by jurisdiction. See generally, 57A Am.Jur.2d, *Negligence* §478. Some jurisdictions have rejected the doctrine entirely. See, e.g. *Markiewicz v. Salt River Valley Water Users' Association*, 118 Ariz. 329, 338 n.6, 576 P.2d 517, 526 n.6 (1978).

The comments to Section 431 of the Second Restatement suggest an important shift in application of the substantial factor rule. While the rule originally addressed multiple concurrent causes, the Second Restatement indicates that the rule also applies when causes apart from the defendant's negligence may not each be of sufficient significance independently to have caused the claimed injury. See *Mahoney v. Beatman*, 110 Conn. 184, 147 A. 762 (1929); *Whitner v. Von Hintz*, 437 Pa. 448, 263 A. 2d 889 (1970); *Carney v. Goodman*, 38 Tenn.App. 55, 270 S.W.2d 572 (1954); *Milwaukee & Suburban Transport Corp. v. Royal Transit Co.*, 29 Wis.2d 620, 139 N.W.2d 595 (1966). The focus under such an analysis is whether the actor's conduct was of sufficient significance to attach liability for the claimed damages. *Spinks v. Chevron Oil Co.*, 507 F.2d 216 (5th Cir. 1975). "Substantial factor" has been increasingly viewed not as an alternative to the "but for" test of causation, but rather an additional requirement. Restatement (Second) of Torts, §431, comment a; *State of Alaska v. Abbott*, 498 P.2d 712 (Alaska 1972); *Spinks v. Chevron Oil Co.*, *supra*.

Prosser and Keeton note that the substantial factor formula also applies to other "troublesome" situations (the Law of Torts, *supra*, at 267-268):

- One is that where a similar, but not identical result would have followed without the defendant's act; the other where one defendant has made a clearly proved but quite insignificant contribution to the result, as where he throws a lighted match into a forest fire.

The relevant considerations for determining whether a given act or conduct constitutes a substantial factor are set forth in Section 433 of the Second Restatement. These considerations included the number of other factors which contribute in producing the harm and the extent of the effect which they have in producing it.

Official Comment d to §433(a) elaborates on the general principle:

- There are frequently a number of events each of which is not only a necessary antecedent to the other's harm, but is also recognizable as having an appreciable effect in bringing it about. Of these the actor's conduct is only one. Some other event which is a contributing factor in producing the harm may have such a predominant effect in bringing it about as to make the effect of the actor's negligence insignificant and, therefore, to prevent it from being a substantial factor. So too, although no one of the contributing factors may have such a predominant effect, their combined effect may, as it were, so dilute the effects of the actor's negligence as to prevent it from being a substantial factor. (Emphasis added.)

The concept of "dilution" in comment d to §433(a) is intriguing, because it recognizes that actions or conduct which, in a vacuum, could reasonably be held a "substantial factor" in causing the plaintiff's damages may not be substantial or significant when viewed in light of the totality of the plaintiff's circumstances. In other words, events legally sufficient to constitute legal cause standing alone, may not rise to that level considering the other contributing factors in the case.

Based on medical studies that describe good outcomes for mild and moderate head injuries and that suggest that those who do not experience total recovery from mild and moderate head injuries are probably demonstrating the result of cumulative injuries, it can be argued that "but for" the prior insults to the brain, the injury of which the plaintiff complains probably would not have occurred or events unrelated to the defendant's conduct were also substantial factors contributing to the plaintiff's current condition. In such a case it would be patently unfair to ascribe the plaintiff's cumulative brain injury to one defendant. Substantial factor analysis provides the legal mechanism to attack causation by requiring the fact finder to assess the totality of causes or factors contributing to the plaintiff's condition.

APPLYING THE SUBSTANTIAL FACTOR APPROACH TO DAMAGES

It is a general principle that the extent or type of harm caused by one's negligence, or the manner by which the harm was caused, need not be foreseeable or expected before there can be a recovery. See *Lafferty v. Wattle*, 349 S.W.2d 519 (Mo.App. 1961); *Crislip v. Holland*, 401 So.2d 1115 (Fla.App. 1981); Restatement (Second) of Torts, §435 (1). This principle will be asserted by the plaintiff in head injury cases resulting from minor trauma or where there was no direct impact to the head, leaving defense counsel facing the proverbial "thin skulled" or "eggshell" plaintiff. Defense of such damages is made more difficult in that even where there is evidence of other prior insult or injury which would have contributed to causing the plaintiff's condition, many jurisdictions will hold the most recent tortfeasor responsible for the whole of the damages, unless they can be apportioned with reasonable probability. *Richman v. City of Berkley*, 84 Mich.App. 258, 269 N.W.2d 555 (1978); *Newbury v. Vogel*, 151 Colo. 520, 379 P.2d811 (1963); *Walsh v. Snyder*, 295 Pa.Super. 94, 441 A.2d 365 (1982).

Despite these legal principles, the two separate issues of legal cause of the event causing injury and causation of resulting damages are closely, if not inextricably, intertwined. While an actor may properly be held responsible for unlikely or attenuated damage caused by a negligent act, the plaintiff must nonetheless demonstrate by his or her evidence that, to a reasonable degree of probability, such damages did in fact flow from that negligent act. Further, at some point the legal limit of cause-and-effect is reached, and obscure or remote actual causes will not be recognized as actionable. *Doe v. Manheimer*, 212 Conn.748, 563 A.2d 699 (1989).

Logically, a substantial factor analysis should be used to determine recoverability of damages as well as to determine legal cause. Whether it can be applied to damages is ambiguous under the law. Section 431 (a) of the Second Restatement speaks in terms of an actor's conduct being a "substantial factor in bringing about the harm." See *Hook v. Lakeside Park Co.*, 142 Colo. 277, 351 P.2d 261 (1960); *Galioto v. Lakeside Hospital*, 123 App.Div.2d 421, 506 N.Y.S.2d 725 (1986), *Roberson v. Counselman*, 235 Kan. 1006, 686 P.2d 149 (1984). Section 433A states that damages for harm are to be apportioned among two or more causes where there are distinct harms, or where there is a reasonable basis for determining the contribution of each cause to a single harm. Virtually all types of "causes," whether innocent, tortious, pre-existing or even acts of God, are subject to apportionment under Section 433A.

Use of the substantial factor approach to damages does have a basis in the concept, often recognized, that at some point the liability of an actor, even for negligent conduct, must be limited. This need for some limitation upon consequences is sometimes stated as one of foreseeability. *Palsgraf v. Long Island R. Co.*, 248 N.Y. 339, 162 N.E. 99 (1928); *Alegria v. Payon*, 101 Idaho 617, 619 P.2d 135 (1980); *Newton v. Davis Transport & Rentals, Inc.*, 312 So.2d 200 (Fla.App. 1975).

Alternatively, the limitation may be imposed by public policy, thereby recognizing the "rule of law" exceptions to liability stated in the Reporter's Notes to §433, Restatement (Second) of Torts Appx. (1966). See also *Lacy v. District of Columbia*, 424 A.2d 317 (D.C.App. 1980); Restatement (Second) of Torts §435(2). Whatever the rubric, courts, in giving credence to these policy considerations, have reduced damages and have refused to find liability, even in the face of admitted negligence and a "cause-in-fact" relationship to the claimed damages. Application of substantial factor analysis to damages, then, has a foothold in existing law and a reasonable basis exists for urging a further expansion of existing law to recognize it. In *Lacy*, supra, the court held substantial factor analysis appropriate "whenever there are concurring causes of a single injury, regardless of whether the other causes are relatively passive or preexisting, such as a physical condition, or relatively active and occur subsequently, such as intervening negligent or criminal acts." 424 A.2d at 322.

As we have seen, recent medical research indicates that a failure to recover from mild to moderate head injuries is seen in individuals with cumulative injuries. While an expert witness such as a neuro-psychologist or neurologist might not be able to say that "but for" some specific prior insult (such as a previous head injury), the subject accident would not have impaired the plaintiff, the same expert might testify that it is reasonably probable that the prior injury was a "substantial factor" contributing to the overall reduction in function which the plaintiff now exhibits. The expert then may be able to reasonably apportion the cumulative harm suffered to the various contributing causes, depending upon the amount of information available concerning the plaintiff's pre- and post-accident level of function.

SPECIFIC LITIGATION STRATEGIES

A defense strategy that anticipates the use of the substantial factor test of causation requires discovery which must be thorough and undertaken early in the litigation process. The focus upon the pre-accident plaintiff is at least as important as his post-accident condition. Interrogatories should be designed to elicit information as to plaintiff's medical, psychological, social, academic and employment status pre-accident, and must seek information as to prior injuries and prior accidents and significant medical history as well as psychological or psychiatric intervention. Report cards, standardized IQ test results, and counseling or disciplinary records even as early as elementary school may be probative as to pre-existing deficiencies or conditions. In cases involving children and even young adults, prenatal, birth and pediatric histories could contain facts indicative of an early brain injury. Complete records for all post-accident care and treatment must be obtained, including the underlying raw test data used or relied on by the plaintiff's experts.

Any prior alcohol, drug or other substance abuse by the plaintiff should be probed in detail, although this inquiry seems best suited to deposition environment. Substance abuse is relevant in a brain damage case and any attempt by plaintiff to withhold such relevant information by, for example, a Fifth Amendment privilege, requires imposition of sanctions by the court, probably including dismissal. *Bramble v. Kleindienst*, 357 F.Supp. 1028 (D.Colo. 1973); *Pavlinko v. Yale-New Haven Hospital*, 192 Conn. 138, 470 A.2d 246 (1984).

Experts should be hired as early as possible in the litigation. They should be used not only for performing independent medical examinations, but also in helping to formulate deposition questions for the plaintiff and plaintiff's experts. Another important role of the defense expert is to apprise defense counsel of the pertinent medical research which will further guide discovery and development of trial tactics. The successful use of a defense expert in this regard is illustrated in *Lima v. United States*, 508 F.Supp. 897 (D.Colo. 1981), *aff'd*, 708 F.2d 502 (10th Cir. 1983), a case in which the issue was whether the swine flu immunization was the cause of the plaintiff's Guillain Barre syndrome. The court emphasized the importance of the medical and epidemiological evidence that was presented. "Where, as here, the exact organic cause of a disease cannot be scientifically isolated, epidemiologic data becomes highly persuasive." 508 F.Supp. at 907. The court ultimately held that, since the medical research did not support the plaintiff's theory of causation, the plaintiff had failed to sustain his burden of proof.

Some courts require such epidemiological evidence to establish a prima facie case of causation when such evidence is obtainable. *Brock v. Merrell Dow Pharmaceuticals, Inc.*, 874 F.2d 307 (5th Cir. 1989) modified, 884 F.2d 166 (5th Cir. 1989), *reh'g denied*, 884 F.2d 167 (5th Cir. 1989); *Renaud v. Martin Marietta Corp.*, 749 F.Supp. 1545 (D. Colo. 1990).

A primary goal of taking the plaintiff's expert's deposition is to obtain admissions that factors other than the current accident were substantial factors in bringing about the plaintiff's symptoms and that by comparison, defendant's negligence was not a substantial factor. Defense counsel should methodically point out and obtain agreement that factors other than the defendant's conduct were substantial in bringing about the plaintiff's harm. It is then unlikely that the plaintiff's expert will be able to state within a reasonable degree of medical or psychological probability that the accident complained of was the cause of the plaintiff's symptoms.

All discovery should be undertaken with an eye towards filing successful dispositive pre-trial motions. As discussed before, motions to dismiss can be based on plaintiff's assertion of Fifth Amendment privilege in regard to drug usage. A motion for summary judgment or eventually one for directed verdict can be based on the plaintiff's failure to establish causation. In addition, motions in limine should be filed regarding the scope of admissible psychological testimony. *Executive Car & Truck Leasing, Inc. v. DeSerio*, 468 So.2d 1027 (Fla.App. 1985); *GIW Southern Valve Co. v. Smith*, 471 So.2d 81 (Fla.App. 1985).

While jurisdictions vary, most courts appear to give a "substantial factor" jury instruction, when appropriate, in addition to and not in lieu of a "but for" instruction. A separate instruction should also be submitted articulating the "dilution of the effect of negligence" concept of Section 433 of the Second Restatement; *Smith v. State Compensation Insurance Fund*, 749 P.2d 462 (Colo.App. 1987). Instructions defining each type of substantial factor which the evidence supports (pre-existing conditions, concurrent causes, intervening or subsequent causes) are necessary, together with an enabling instruction providing the mechanism for the jury's assessment of the contribution of each to the plaintiff's condition. Since legal determinations by the trial court as to use of substantial factor evidence and law are the bases for its instructions, proposed instructions must be carefully drafted and submitted with supporting factual and legal authority.

CONCLUSION

Given the findings of current medical research on closed head injuries, defense counsel should not hesitate to advocate substantial factor analysis in such cases as a way to fairly analyze the causal relationship of the injury to the symptoms and to apportion damages. In so doing defense counsel will not only impart a rule of reason to the awarding of damages, he will also provide the defense a favorable theme around which the case can be structured and presented to the judge and jury.

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