



2014 Transportation Committee Mini-Conference

Friday, July 11, 2014 in Chicago, IL

**ADVENT AND ACCEPTANCE OF BIOMECHANICAL ENGINEERING
EXPERTS IN LOW SPEED IMPACT ACCIDENTS: AVOIDING
PITFALLS AND MAXIMIZING THE EFFECTIVENESS OF YOUR
EXPERT FROM START TO FINISH**

Introduction

The admissibility of biomechanical engineering expert testimony is a continually evolving area of law, and each State takes a unique approach. Biomechanical engineering uses a mechanical engineering methodology to determine the forces involved in an accident and their effect on the victim, and whether the particular accident could have caused the precise injuries claimed. As biomechanical engineers are often not medical doctors, they are frequently limited in their testimony on causation. A state-by-state analysis shows that courts will usually allow the testimony of a biomechanical engineer to discuss generally whether the forces created in an accident could typically cause an injury. However, the scope of the biomedical engineer's testimony is often limited when it comes to whether the particular accident in fact caused the specific injuries at issue.

Depending on the jurisdiction, the biomechanical engineer must be able to meet the requirements of Federal Rule of Evidence 702 (or the equivalent State rule), *Daubert*, and/or *Frey* in that the expert must rely on commonly accepted principles and methods within the scientific community. Generally, if a biomechanical engineer can qualify as an expert and their methods are accepted by the court, they will be permitted to testify so long as they keep within the bounds of their expertise and do not testify as to causation.

Checklist

Courts will consider several factors in determining whether an expert's testimony is admissible. The following is a checklist of such factors.

- First, the expert's knowledge or experience must be useful to the finder of fact in resolving the issue in question.

□ Second, the court will consider whether as a result of the expert's particular qualifications the witness can form a more intelligent opinion on the disputed issue than an average juror could make alone, or whether the expert's opinion will interfere with the jury's duty to decide the case from the facts admitted into evidence.

□ Third, the expert's testimony should be based on established and generally recognized scientific or technical principles, and his or her opinion should be based on credible facts, data, and analysis.

□ Finally, the court will determine whether the expert's opinion consists of a judgment based on undisputed underlying facts, and whether the witness has personal knowledge of the facts upon which his or her opinion is based.

The court will hold the expert's testimony inadmissible if the expert's opinion does not materially aid the trier of fact in resolving a disputed issue in the case. The testimony will also be inadmissible if the witness's opinion is outside his or her own area of expertise or specialization.

The Expert's Qualifications

To qualify as an expert, a witness must possess special knowledge, skill, experience, training, or education of some subject on which the jury's knowledge would likely be inadequate without expert assistance. As a matter of law, the court makes the determination of a witness's qualifications as an expert not based on his or her title, but on the witness's actual qualifications and knowledge of the particular subject matter. As such, an expert's knowledge may be based upon practical experience as well as academic or scientific training. Further, the expert need not have complete knowledge about the field in question and need not be certain, but need only be able to aid the jury in resolving a relevant issue.

Whether or not a witness is qualified as an expert can only be determined on a case-by-case basis by the nature of the opinion he or she offers. It is important to note that experts other than biomechanical engineers could be qualified to offer expert testimony in biomechanics-related fields. The court may conclude that the scope of the witness's experience and education encompasses the issue in a logical or fundamental sense. The absence of formal credentials in biomechanics may go to the weight of the witness's testimony before the jury, but generally the law does not require such particularized degrees of specialization. Alternatively, the scope of the witness's experience and education may embrace the subject in question in a broad way, but the subject may be so specialized that the witness will not be qualified to testify. Therefore, a practitioner must keep in mind that, even though a witness other than a biomechanical engineer may be qualified to testify as an expert on an issue involving biomechanics, the scope of the witness's experience and knowledge on the particular subject matter at hand is decisive.

The Subject Matter of the Expert's Testimony

Expert and opinion evidence is often considered an indispensable aid to the trier of fact in cases involving technical, scientific, or other complex matters. Consequently, witnesses possessing the necessary training, skill, and knowledge may often testify not only to the facts,

but to their opinions regarding the facts so far as is necessary to educate the jury and assist it in reaching the proper verdict.

As a result of the jury’s general inability to accurately interpret the barrage of scientific and technical facts that it is presented with, the expert in biomechanics functions to simplify the facts and offer the jury the assistance of the expert’s wealth of knowledge. The field of scientific interpretation of evidence has developed to such an advanced point that its use is commonly accepted. Accordingly, the current jurisprudential trend is that expert testimony should not be excluded solely because it amounts to opinion on ultimate facts.

Use of Demonstrative Evidence

Demonstrative materials can greatly aid the expert when explaining technical subjects. Photographs, charts, slides, diagrams, illustrations, models, graphs, live experiments, and films are all means of making complicated testimony interesting, intelligible, and accessible to the jury. Whether such items are admissible is usually a matter of discretion left to the trial judge and the trial judge’s ruling will rarely be disturbed on appeal.

The Expert’s Experiments

The basis of a biomechanical expert’s opinion may be an experiment that they themselves performed. To be admissible, experimental evidence must be relevant, and its probative value must outweigh the possibility of prejudice, confusion of the issues, or undue consumption of time. This is dependent on whether the conditions of the experiment are identical with or similar to the actual conditions in question. The circumstances of the experiment must be the same or substantially similar to those of the incident in question in order for evidence of the experiment to be admissible.

Counsel must keep in mind that in establishing a proper foundation for admission of a biomechanical engineer’s expert opinion based on tests and experiments, the threshold burden includes proving the reliability of the underlying scientific techniques utilized. While the field of biomechanics is not entirely novel, counsel should be prepared to show a scientific consensus supporting the use of the proffered scientific techniques and the scientific validity of the techniques used.

State by State Breakdown

Note: This list is just illustrative and by no means exhausted, and is only intended to give a general overview of the acceptance of biomechanical engineering expert testimony throughout the United States.

State	Case	Biomechanical Engineer Expert Testimony Accepted	Biomechanical Engineer Expert Testimony Limited/Excluded	Reasoning

Alabama	1) <i>CSX Transp., Inc. v. Miller</i> , 46 So. 3d 434, 443-444 (Ala. 2010)	1) Yes		1) This case is not directly on point, but a biomechanical expert was allowed at the trial level which indicates that their testimony is accepted
Alaska	1) <i>Wells v. State</i> , 46 P.3d 967, 971 (Alaska 2002) 2) <i>Cable v. Shefchik</i> , 985 P.2d 474, 477 (Alaska 1999)	1) Yes; 2) Yes		1) This case is not directly on point, but a biomechanical expert was allowed at the trial level which indicates that their testimony is accepted. 2) This case is not directly on point, but a biomechanical expert was allowed at the trial level which indicates that their testimony is accepted.
Arizona	1) <i>Lohmeier v. Hammer</i> , 214 Ariz. 57, 60 (Ariz. Ct. App. 2006) 2) <i>Granville v. Howard</i> , 2012 Ariz. App. Unpub. LEXIS 202, 8-10 (Ariz. Ct. App. 2012)	1) Yes; 2) Yes		1) The biomechanical expert's testimony was admissible under Ariz. R. Evid. 702, 704 because the testimony was based on his own experience and was not subject to a <i>Frye</i> hearing under <i>Logerquist</i> . 2) Expert did not opine about whether Plaintiff had suffered injury. Court stated that they are "unaware of any authority requiring a biomechanical engineer to base opinions regarding motion, velocity, and forces in an accident involving an infirm plaintiff to only rely on crash tests involving infirm volunteers - and [they] are dubious such tests exist for obvious ethical reasons." Decided that Expert's lack of experience and knowledge about crash victims with similar spinal conditions to Plaintiffs' went to the weight of his testimony rather than its admissibility.
Arkansas				

<p>California</p>	<p>1) <i>People v. Dellinger</i> (1984) 163 Cal.App.3d 284, 209 Cal. Rptr. 503 2) <i>People v. Roehler</i> (1985) 167 Cal. App.3d 353, 213 Cal. Rptr. 353 3) <i>Luckett v. Agelopoulos</i>, 2007 Cal. App. Unpub. LEXIS 3715, 19-20 (Cal. App. 1st Dist. May 9, 2007)</p>	<p>2) Yes; 3) Yes</p>	<p>1) Yes</p>	<p>1) The appellate court reversed on the grounds that the experiment the biomechanical engineer relied on was unreliable and not on the grounds that a biomechanical engineer could not testify to the effect of forces used on the human tissue. The court noted that it was not delivering an opinion on acceptable uses of biomechanic expert testimony: "We have not undertaken the monumental and inappropriate task of evaluating the legitimacy of the entire field of biomechanics. . . . The field of biomechanics was not on trial here; only the reliability of the two procedures employing biomechanical principles used." 2) The trial court had ruled that the engineering experts could testify about the potential force applied to the head of the dummy and the dory, but that only appropriately qualified medical experts could testify concerning the "injuries to the human heads involved." The appellate court affirmed, concluding that the trial court properly admitted the test results "bearing in mind the trial court's delineation between the engineering testimony and the medical testimony." The court pointed out that it was not delivering any opinion on the emerging field of biomechanics. 3) Expert's testimony remained in his field of expertise. He testified to the forces generated in the accident and spoke only in general about the types of injuries that those forces could cause. During <i>voir dire</i>, direct examination, and cross-</p>
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				examination, expert explained that he could only testify as to how forces cause injuries in the spine and could not opine as to the cause of Plaintiff's injuries and whether Plaintiff was in fact injured. On this record, the court of appeals found that the trial court properly exercised its discretion to admit expert's testimony.
Colorado	1) <i>Schultz v. Wells</i> , 13 P.3d 846 (Colo. Ct. App. 2000) 2) <i>People v. Shreck</i> , 22 P.3d 68 (Colo. 2001)		1) Yes	1) Trial court did not abuse its discretion in applying both the Colorado Rules of Evidence and the <i>Frye</i> test to determine that the biomechanical engineering expert's scientific evidence was inadmissible. 2) Foundational case on issue of expert opinion testimony the court ruled that "CRE 702, rather than <i>Frye</i> [general acceptance test], governs a trial court's determination as to whether scientific or other expert testimony should be admitted." at 70.
Connecticut				

<p>Delaware</p>	<p>1) <i>Kelly v. McHaddon</i>, 2001 Del. Super. LEXIS 60, 1 (Del. Super. Ct. Jan. 24, 2001) 2) <i>Rizzi v. Mason</i>, 799 A.2d 1178 (Del Sup. Ct. 2002) 3) <i>Benjamin v. Appliance & Refridg. Services, Inc.</i>, 2002 Del. Super. LEXIS 392 (Del. Sup. Ct. 2002) 4) <i>Eskin v. Carden</i>, 842 A.2d 1222 (Del. 2004)</p>	<p>1) Yes, in part</p>	<p>1) Yes, in part; 2) Yes; 3) Yes; 4) Yes</p>	<p>1) Plaintiff's motion in limine was granted in part and denied in part. The engineer was not permitted to testify regarding the cause (or lack thereof) of plaintiff's injuries. She was, however, permitted to testify regarding the forces implicated by a particular accident and their effect upon the human body generally. The defense's biomechanical engineer had an advanced degree in "medical engineering," which she asserted was the equivalent of 1-1/2 years of medical school. The court nevertheless refused to permit her to testify regarding the cause (or lack thereof) of the plaintiff's injuries, stating: "The Court's holding today recognizes a simple irrefutable fact: biomechanical engineers are not doctors." 2) Excluding opinion that the loads placed on the plaintiff's spine were significantly less than the loads required to cause permanent injuries. The court determined that the biomedical engineer's opinion regarding causation of the victim's injuries was excluded because, not only was it based on studies of normal spines, but because he was not a medical doctor and was therefore not qualified to render an opinion regarding the medical cause and degree of an injury. 3) Biomechanical engineer unqualified to rebut physician's testimony that a rear-end collision caused plaintiff's concussion. 4) The trial court correctly excluded the biomechanical expert's proffered testimony because it did not connect the</p>
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				<p>general biomechanical analysis of the physical forces involved in the accident to the unique medical history of the injured party. However, a trial judge may admit biomechanical expert opinion that a particular injury did (or did not) result from the forces of an accident only where the trial judge determines that the testimony reliably creates a connection between the reaction of the human body generally to the forces generated by the accident and the specific individual allegedly injured or another determinative fact in issue</p>
Florida	<p>1) <i>Mattek v. White</i>, 695 So.2d 942 (Fl. App. Ct. 1997) 2) <i>Stockwell v. Drake</i>, 901 So. 2d 974 (Fla. Dist. Ct. App. 4th Dist. 2005)</p>		1) Yes, 2) Yes	<p>1) Finding it "elementary" that an expert in biomechanics and accident reconstruction was not qualified to give opinion calling for medical expertise in defective pedicle screw case. 2) Trial court did not err in refusing to permit biomechanical engineer from testifying that Plaintiff's brain injury was more likely than not caused by the accident, within a reasonable degree of engineering certainty. "Depending upon the mechanism of injury, a biomechanical engineer may be able to offer an opinion. If the injury were caused by the plaintiff hitting the dashboard ... whether the wearing of a seatbelt would have prevented injury would require the examination of the forces of the accident and the acceleration of the body in the vehicle. The biomechanical engineer would be capable of testifying that the plaintiff would not have suffered injuries</p>

				connected with hitting the dashboard if he were wearing a seatbelt. Thus, the expert would not be testifying to the extent of injury. " at 976.
Georgia	1) <i>Cromer v. Mulkey Enterprises, Inc.</i> , 562 S.E.2d 783, 254 Ga. App. 388 (Ct App 2002) 2) <i>Hankla v. Jackson</i> , 699 S.E.2d 610 (Ga. Ct. App. 2010)	2) Yes, in part	1) Yes; 2) Yes, in part	1) Where causation testimony was precluded despite the biomechanical engineer's Ph.D. in physics, his 22 years of university study of the behavior of materials under different levels of stress, impact, and assault, his participation in seminars on low-speed automobile accidents, and his authoring a book on low-speed impacts and biomechanics. 2) The trial court correctly determined that the testimony the Expert was qualified to provide was relevant to the issues presented in the complaint and should not have been excluded. Nevertheless, the Expert did not have any experience diagnosing or treating brachial plexus injuries. Therefore, the trial court erred by failing to preclude the Expert from providing expert testimony regarding any questions of medical treatment or diagnosis.
Hawaii	1) <i>Ho v. Nishijima</i> , 2003 Haw. LEXIS 689, 1 (Haw. Dec. 30, 2003)		1) Yes	1) The circuit court did not abuse its discretion when it limited defendant's expert testimony with respect to causation to prevent cumulative testimony.
Idaho	1) <i>Hansen v. Roberts</i> , 154 Idaho 469, 474-475 (Idaho 2013)	1) Yes		1) Trial court did not abuse its discretion in allowing biomechanical engineer to testify when Plaintiff presented no evidence to support assertions that "biomechanical engineering is not a science."

<p>Illinois</p>	<p>1) <i>Whiting v. Coultrip</i>, 755 N.E.2d 494, 324 Ill App 3d 161 (Ill App Ct 2001) rehearing denied 2001 WL 108317 (Sept. 2001) 2) <i>Martin v. Sally</i>, 341 Ill. App. 3d 308, 309 (Ill. App. Ct. 2d Dist. 2003)</p>	<p>2) Yes, but appeals court said allowing testimony was error (though not prejudicial and not reversed).</p>	<p>1) Yes</p>	<p>1) The appeals court gave its reasons for deciding that the biomechanical and biomedical evidence did not satisfy "Frye plus" test, based upon lack of showing of the methods' general acceptance within those scientific communities and empirical testing and subjection to peer review; and further stated that it did not suggest that such testimony could never be admissible, but only that foundation was inadequate here. 2) On appeal, the injured party contended that the trial court erred in allowing a reconstructionist and biomechanicist to testify that the impact or contact between the two vehicles was not sufficient to injure any human or aggravate any condition in the injured party's back that existed prior to the accident, including her protruding disc because his testimony was irrelevant and based on speculation and matters of common knowledge. The appellate court agreed that the admission of said testimony was in error, but found it did not require reversal as it was not prejudicial under the circumstance.</p>
<p>Indiana</p>	<p>1) <i>Witte v. Mundy</i>, 820 N.E.2d 128, 135, 2005 Ind. LEXIS 3, 15 (Ind. 2005)</p>	<p>1) Yes</p>		<p>1) This appeal is not directly on point, but a biomechanical expert was allowed at the trial level which indicates that their testimony is accepted. Reversed on other grounds.</p>
<p>Iowa</p>				
<p>Kansas</p>				

Kentucky	1) <i>Taylor v. Commonwealth</i> , 2009 Ky. App. Unpub. LEXIS 323, 6, 2009 WL 485034 (Ky. Ct. App. Feb. 27, 2009)	1) Yes		1) This criminal appeal is not directly on point, but a biomechanical expert was allowed at the trial level which indicates that their testimony is accepted.
Louisiana	1) <i>Keener v. Mid-Continent Cas.</i> , 817 So. 2d 347 (La.App. 5 Cir. Apr. 30, 2002) 2) <i>Square v. LeBlanc</i> , 903 So. 2d 1178 (La.App. 3 Cir. June 1, 2005) 3) <i>Taylor v. Progressive Security Ins. Co.</i> , 09-791 (La. App. 3rd Cir. 4/7/10), 33 So. 3d 1081. 4) <i>Dore v. Mitsui Sumitomo Ins.</i> , 117 So. 3d 231, 233 (La.App. 3 Cir. 2013)	2) Yes; 3) Yes; 4) Yes	1) Yes;	1) On appeal, the insurer, dealership, and employee argued that the trial court erred in failing to qualify their expert witness as an expert in biomechanics and injury causation and refusing to allow him to testify, and in allowing the testimony of the couple's neurosurgeon on causation of the stroke. The appellate court found that the proposed biomechanics expert's <i>voir dire</i> showed lack of educational and experience in both spinal injuries and their relationship to car crashes. 2) Plaintiff did not question scientific basis or expertise of witness, only the information used to reach conclusions, this went to the weight of the testimony not the admissibility, so no <i>Daubert</i> hearing was required. 3) The biomechanical engineer, who had four years of training involving car crashes to study the biomechanics of a person's body as they are subjected to crashes, was allowed to testify. The Court of Appeal found that the trial court properly admitted the expert in the field of biomechanics of low speed crashes and properly allowed him to use relevant demonstrative evidence in presenting his testimony. 4) Court allowed expert testimony, appeals

				court upheld verdict based, in part, on testimony.
Maine	1) <i>Reali v. Mazda Motor of Am., Inc.</i> , 106 F. Supp. 2d 75, 2000 U.S. Dist. LEXIS 9644, 1, 2000 WL 960413 (D. Me. 2000)	1) Yes, in part	1) Yes, in part	1) The court concluded that the biomechanical engineer could testify on human tolerance levels, but he could not testify about his simulations because the court rejected his Delta V figure as unreliable.
Maryland	1) <i>Leake v. Johnson</i> , 204 Md. App. 387 (2012) 2) <i>Lahocki v. Contee Sand & Gravel Co.</i> , 41 Md. App. 579, 591 (Md. Ct. Spec. App. 1979)	1) Yes; 2) Yes		1) Biomechanical engineering expert allowed to testify in trial court. 2) Allowing biomechanic to testify, stating, "The validity of such an opinion, while arguable, was for a jury to decide." Reversed on other grounds.
Massachusetts	1) <i>Commonwealth v. Neverson</i> , 619 N.E.2d 344 (Mass. App. Ct. 1993)		1) Yes	1) Affirming court's refusal to allow professor of biomechanics to testify as to medical consequences of a child's fall.
Michigan	1) <i>Owens v. CSX Transp., Inc.</i> , 2010 Mich. App. LEXIS 1911, 19-20 (Mich. Ct. App. Oct. 12, 2010)	1) Yes		1) Not directly on point, but expert allowed at trial level.
Minnesota	1) <i>Malith v. Soller</i> , 2010 Minn. App. Unpub. LEXIS 552, 4 (Minn. Ct. App. June 15, 2010)		1) Yes	1) The district court ruled inadmissible expert's testimony on the ground that it lacked foundational reliability and that expert's approach to the crash analysis "is not generally accepted in the [biomechanical] community." Concluding that plaintiff was unable to establish injury causation without expert opinion testimony, the district

				court determined that there remained no material fact issue on this essential element for trial and summary judgment was granted for defendant. Affirmed on appeal.
Mississippi	1) <i>Grant v. Ford Motor Co.</i> , 89 So. 3d 655, 2012 Miss. App. LEXIS 260, 5, 2012 WL 1592170 (Miss. Ct. App. 2012)		1) Yes	1) Appeals court affirms trial court's exclusion of expert who had failed to qualify as an expert in biomechanics on two previous occasions in federal court, had only taken one "brief course" in biomechanics, and who had never been published in the field. Further, the expert had never personally reviewed victims medical records, had never made the necessary measurements of the vehicle involved, and was not familiar with the relevant forces involved in the crash.
Missouri	1) <i>Koedding v. Kirkwood Contractors, Inc.</i> , 851 S.W.2d 122, 125 n.3 (Mo. Ct. App. 1993)	1) Yes		1) PhD in orthopedic biomechanics and 25 years experience performing biomechanical research, including work on Challenger shuttle disaster, deemed sufficient.
Montana	1) <i>Suda v. Harmo</i> , 2008 Mont. Dist. LEXIS 493 (Mont. Dist. Ct. 2008) 2) <i>Davis v. Church of Jesus Christ of Latter Day Saints</i> (1990), 244 Mont. 61, 796 P.2d 181	1) Yes, in part; 2) Yes	1) Yes, in part	1) Expert should be allowed to testify to the issues of the forces involved in the accident and the general types of injuries those forces may generate and plaintiff will have the opportunity on cross-examination to question expert about the basis for his opinions. However, without medical expertise, expert may not testify as to medical causation of the injuries. 2) The Montana Supreme Court affirmed the district court's allowance of testimony by a biomechanical expert regarding the slope of a sidewalk.

Nebraska	1) <i>Austin v. Timperley</i> , 2013 Neb. App. LEXIS 218, 3, 2013 WL 6622917		1) Yes	1) This case is not on point, but the trial court granted plaintiff's motion <i>in limine</i> to exclude a biomechanical expert's testimony finding that the reasoning or methodology underlying the expert testimony was not scientifically valid and reliable.
Nevada	1) <i>Hallmark v. Eldridge</i> , 189 P.3d 646 (Nev. 2008)		1) Yes	1) Reversing and remanding overly speculative testimony of a qualified biomechanical engineer expert as testimony was erroneously admitted; setting forth considerations for assessing expert testimony that largely track those set forth in <i>Daubert</i> . The expert had academic degrees, was licensed to practice medicine, and had ten years of surgical experience. However, it was not shown that the expert's testimony was based on a reliable methodology; thus, his testimony did not assist the jury in understanding the source of decedent's injury.
New Hampshire	1) <i>McLaughlin v. Fisher Eng'g</i> , 150 N.H. 195, 203, 834 A.2d 258, 265, 2003 N.H. LEXIS 161, 17, CCH Prod. Liab. Rep. P16,783 (N.H. 2003)	1) Yes		1) Trial court properly allowed accident reconstruction expert to testify regarding biomechanical issues where expert did not testify as to any medical opinions. Expert's "extensive background as an accident reconstruction expert was sufficient to qualify him to offer the opinion that the plaintiffs' decedents would have died even if the snowplow mount had been removed from the pick-up truck."

<p>New Jersey</p>	<p>1) <i>Suarez v. Egeland</i>, 801 A.2d 1186, 353 NJ Super 191 (App Div 2002) 2) <i>Hisenaj v. Kuehner</i>, 194 N.J. 6, 10 (N.J. 2008) 3) <i>Yarchak v. Trek Bicycle Corp.</i>, 208 F.Supp.2d 470, 501 (D.N.J. 2002)</p>	<p>2) Yes; 3) Yes</p>	<p>1) Yes</p>	<p>1) Biomechanical engineer's opinion that low-impact accident could not have caused motorist's neck and back disc herniations was not scientifically reliable. 2) The court noted that the narrow issue on appeal was whether the Appellate Division overstepped its bounds when it reviewed the trial court's admission of expert testimony from defendant's biomechanical engineer by concluding that it did not rest on a scientifically reliable foundation. Defendant's biomechanical engineer had testified that, given the circumstances of the low-impact collision, no biomechanical mechanism existed that would have caused a chronic injury to result from the impact. The supreme court noted that the Appellate Division failed to restrict itself to the record made before the trial court. The court reversed the decision and remanded the case to the Appellate Division. 3) 25 years as a professor of biomechanics" deemed sufficient.</p>
<p>New Mexico</p>	<p>1) <i>Baerwald v. Flores</i>, 122 N.M. 679 (N.M. Ct. App. 1996)</p>	<p>1) Yes</p>		<p>1) The witness was qualified to testify as an expert in biomechanics. He had a graduate degree in engineering and practiced in the field. The trial court could reasonably determine that he possessed knowledge and experience that would assist the jury in understanding the biomechanical aspects of this case.</p>

<p>New York</p>	<p>1) <i>Clemente v. Blumenberg</i>, 183 Misc. 2d 923, 705 N.Y.S.2d 792 (N.Y. 1999) 2) <i>Santos v. Nicolos</i>, 24 Misc. 3d 999, 999 (N.Y. Sup. Ct. 2009) 3) <i>Cardin v. Christie</i>, 283 AD 2d 978 (4th Dept. 2001) 4) <i>Plate v. Paliside Film Delivery</i>, 39 AD 2d 3d 835 (2nd 2007) 5) <i>Valentine v. Grossman</i>, 283 AD 2d 571 (2nd Dept. 2001). 6) <i>Amodio v. Bianco</i>, 15 AD 3d 979 (4th Dept. 2005)</p>	<p>3) Yes; 4) Yes; 5) Yes; 6)</p>	<p>1) Yes; 2) Yes</p>	<p>1) Finding a biomechanical engineer "lacks the training and experience to testify that plaintiff did not sustain serious injuries". 2) A biomechanical engineer is not a doctor and is therefore not qualified to testify about the causal relationship between a motor vehicle accident and the injuries that the person sustained. 3) The trial court "did not abuse its discretion in permitting defendants expert opinion on injury causation analysis to offer his opinion that the impact of the collision was insufficient to cause the alleged injury to plaintiff". 4) It was error for a trial court to rule that a Biomechanical Engineering expert was not qualified to testify regarding whether the force of the impact in the subject accident could have caused a serious injury or exacerbated a pre-existing injury to the plaintiff's cervical spine. 5) Biomechanical Expert testimony admissible because it was probative to the central issue in the case. 6) Testimony in regard to a Biomechanical Opinion, based upon ICA, (Injury Causation Analysis) does not involve novel scientific evidence. Therefore, the Court upheld the trial courts ruling that no <i>Frye</i> Hearing was necessary.</p>
<p>North Carolina</p>	<p>1) <i>Floyd v. McGill</i>, 156 N.C. App. 29, 575 S.E.2d 789 (2003) 2) <i>Howerton v. Arai Helmet, Ltd.</i>, 358 N.C. 440, 597 S.E.2d</p>	<p>1) Yes; 2) Yes</p>		<p>1) The court holds that a neurology expert and an otolaryngology expert were qualified to testify regarding the biomechanics of plaintiff's brain injury following a motor vehicle accident. 2) NC Supreme Court reverses Court of Appeals' reversal of trial court's</p>

	674 (2004)			order allowing defendant's motion to exclude testimony of plaintiff's experts, including a biomechanical expert. The Court analyzes the issue of expert testimony admissibility according to North Carolina's standard for expert testimony existing at that time.
North Dakota				
Ohio	1) <i>Rybaczewski v. Kingsley</i> , 1998 Ohio App. LEXIS 1694 (1998)	1) Yes, in part.	1) Yes, in part.	1) Stating that "The most that [the biomechanical engineer] should have been permitted to testify to was the amount of force appellant experienced in the accident." However, permitting the testimony was not plain error when combined with other circumstances.
Oklahoma	1) <i>Covel v. Rodriguez</i> , 2012 OK 5, P15, 272 P.3d 705, 2012 Okla. LEXIS 7 (Okla. 2012)	1) Yes		1) By being qualified as an expert in accident reconstruction, biomechanics and human factors, expert was qualified to give opinions and conclusions based on his training and experience in those fields.
Pennsylvania	1) <i>Collins v. Cooper</i> , 2000 PA Super 22, P1, 746 A.2d 615, 617, 2000 Pa. Super. LEXIS 69, 1 (Pa. Super. Ct. 2000) 2) <i>Rake v. Moultrie</i> , 2005 Pa. Dist. & Cnty. Dec. LEXIS 90, 1, 74 Pa. D. & C.4th 12, 14 (Pa. County Ct. 2005)		1) Yes, in part; 2) Yes, in part	1) Superior court finding it was not error to limit cross-examination to reference to chiropractor's reports, because chiropractor did not testify and reports were not in evidence; further, law did not recognize biomechanical experts. 2) Plaintiffs' biomechanical expert was properly limited to testifying that the collision could have caused the wife's injuries rather than that the collision was the cause of the injuries because the expert did not have any degree or experience in any field of medicine and, thus, was not qualified to render a medical opinion as to the cause of the

				injuries.
Rhode Island	1) <i>Boscia v. Sharples</i> , 860 A.2d 264 (R.I. 2004).	1) Yes		1) Case not entirely on point, however, the court held that photos are also admissible without requiring an expert to testify regarding the forces required to produce the damage shown in the photos
South Carolina	1) <i>Wilson v. Rivers</i> , 593 S.E.2d 603, 605 (S.C. 2004)	1) Yes		1) MD and PhD in "human physiology," with "training in biomechanics" deemed sufficient
South Dakota	1) <i>Maroney v. Aman</i> , 565 N.W.2d 70 (S. Dak. 1997)		1) Yes	1) Biomechanical expert's opinion as to whether a stroke was traumatically induced was properly excluded
Tennessee	1) <i>Shires v. King</i> , No. 2:05-CV-84, 2006 U.S. Dist. LEXIS 98293, 2006 WL 5171770 (E.D. Tenn. Aug. 10, 2006) 2) <i>Brown v. Crown Equip. Corp.</i> , 181 S.W.3d 268, 272 (Tenn. 2005)	1) Yes, in part; 2) Yes	1) Yes, in part	1) "[The biomechanical engineer] clearly should be allowed to testify regarding the forces applied to plaintiff's head . . . , and how a hypothetical person's body would re-pond [sic] to that force. He cannot offer opinions, however, 'regarding the precise cause' of plaintiff's injury."). 2) The trial court erred in excluding as unreliable the testimony of the plaintiffs' two expert witnesses, a mechanical engineer and a biomechanical engineer, and thereafter granting a directed verdict in favor of the defendant.
Texas	1) <i>Gammill v. Jack Williams Chevrolet, Inc.</i> , 972 S.W.2d 713 (Tex Sup Ct 1998) 2) <i>General Motors Corp. v. Burry</i> , 203 S.W.3d 514 (Tex. App. Fort Worth 2006)	1) Yes, in part; 2) Yes	1) Yes, in part	1) A professor of mechanical engineering who had conducted research in biomechanics, while qualified to opine whether a seatbelt was defective, lacked any qualifications to testify as to the cause of an infant's death in a car crash. The expert's testimony was thus limited to "the forces implicated by a particular accident and their effect upon the human body generally."

				2) Biomechanical expert's testimony as to how passenger moved in accident and likely suffered a head impact at side of vehicle had probative value as to whether a defect in vehicle's side airbag deployment design caused passenger's injuries that gave rise to products liability action against vehicle manufacturer; expert's conclusions were based on her extensive knowledge about how human bodies move when forces are applied to them.
Utah	1) <i>Patey v. Lainhart</i> , 1999 UT 31, P12, 977 P.2d 1193, 1196, 366 Utah Adv. Rep. 21, 1999 Utah LEXIS 38, 6 (Utah 1999)	1) Yes		1) This case is not directly on point, but a biomechanical expert was allowed at the trial level which indicates that their testimony is accepted
Vermont	1) <i>Fagnant v. Foss</i> , 2013 VT 16, 2013 Vt. LEXIS 20, 18-19, 2013 WL 1010484 (Vt. 2013)	1) Yes		1) Affirming trial courts denial of plaintiff's motion <i>in limine</i> seeking an order precluding defendant from "referring to, eliciting evidence of, or making arguments on" the damage to the vehicles and any alleged correlation between the visible vehicle damage and injuries to the vehicle occupants.
Virginia	1) <i>Combs v. Norfolk & Western Ry. Co.</i> , 507 S.E.2d 355, 256 Va. 490 (1998) 2) <i>Titsworth v. Robinson</i> , 475 S.E.2d 261, 252 Va 151 (1996)		1) Yes; 2) Yes	1) Expert was a professor of engineering, science and mechanics, and the director of biomechanical engineering at Virginia Polytechnic Institute, had a bachelor's degree in mechanical engineering, a Ph.D. in biomechanical engineering, and a master's degree in medical science. However, Virginia Supreme Court found he should not have been allowed to opine as to the cause of the plaintiff's ruptured disc. The court agreed

				<p>that only a medical doctor is qualified to give expert opinion regarding the cause of a human injury. Even though the expert had completed all the academic work required for a medical degree, he had not completed a medical internship or residency and was not licensed to practice medicine.</p> <p>2) "The challenged expert testimony is speculative, is founded upon assumptions lacking a sufficient factual basis, relies upon dissimilar tests, and contains too many disregarded variables. Consequently, we hold that the testimony is unreliable as a matter of law, and, therefore, the trial court erred in admitting it." at 155.</p>
Washington	<p>1) <i>Doherty v. Municipality of Metropolitan Seattle</i>, 83 Wn. App. 464, 921 P.2d 1098 (1996)</p> <p>2) <i>Ma'ele v. Arrington</i>, 111 Wn. App. 557, 45 P.3d 557 (2002)</p> <p>3) <i>Stedman v. Cooper</i>, 292 P.3d 764 (Wash. Ct. App. Div. 1 2012)</p> <p>4) <i>Gonzalez-Mendoza v. Burdick</i>, 2013 WL 3477281 (Wash. App. Div. 1, July 8, 2013)</p> <p>5) <i>Johnston-Forbes v.</i></p>	<p>2) Yes; 4) Yes; 5) Yes, in part</p>	<p>1) Yes; 3) Yes; 5) Yes, in part</p>	<p>1) A biomechanic could not testify as to causation.</p> <p>2) The court concluded a biomechanical engineer's testimony that involved calculation of the maximum force that could have impacted the vehicle occupant was generally accepted in the scientific community.</p> <p>3) Expert biomechanical testimony about the physical forces involved in the collision was not logically relevant to the issue of the degree to which motorists were injured in motor vehicle accident so as to be admissible in action stemming from accident, where clear message of testimony was that force of the impact could not have caused injury, but testimony was not based on a medical perspective.</p> <p>4) The court held that the biomechanical engineer's testimony about the forces in the</p>

	<i>Matsunaga</i> , 177 Wn. App. 402, 311 P.3d 1260 (Wash. App. Div. 2, October 29, 2013)			collision were not novel and satisfied ER 702. According to the court, the expert's methodology used to determine change in velocity was not so novel as to trigger a <i>Frye</i> analysis. 5) Trial court limited expert's testimony by (1) excluding a repair bill because it was misleading (implied minimal damage), and (2) ensuring that expert did not refer to the repair bill. Expert was permitted to testify about the "forces exchanged and the capacity for injury, but he "would not testify about whether there actually was any injury to the Plaintiff. He was also permitted to testify about "the forces and the limits' involved in the collision" and was able to "compare them to 'activities of daily living.'" Court of appeals affirmed.
West Virginia	1) <i>Estep v. Mike Ferrell Ford Lincoln-Mercury, Inc.</i> , 223 W. Va. 209, 220, 672 S.E.2d 345, 356, 2008 W. Va. LEXIS 110, 30, CCH Prod. Liab. Rep. P18,131 (W. Va. 2008)	1) Yes		1) This case is not directly on point, but a biomechanical expert was allowed at the trial level which indicates that their testimony is accepted
Wisconsin	1) <i>Gaertner v. Holcka</i> , 219 Wis. 2d 436, 580 N.W.2d 271, 273, 1998 Wisc. LEXIS 96, 5 (Wis. 1998)	1) Yes		1) This case is not directly on point, but a biomechanical expert was allowed at the trial level which indicates that their testimony is accepted

Wyoming	1) <i>Wagoner v. Schlumberger Tech. Corp.</i> , No. 07-CV-244-J, 2008 U.S. Dist. LEXIS 109634, 2008 WL 5120750 (D. Wyo. June 19, 2008)	1) Yes, in part	1) Yes, in part	1) "[Biomechanics experts] may, for example, testify as to the forces involved in the . . . accident and how those forces may affect an individual or object; they may not express any opinions regarding whether plaintiff . . . has suffered a brain injury . . . or as to the . . . cause of the alleged brain injury."
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