

70448-6

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No. 70448-6

IN THE COURT OF APPEALS OF THE STATE OF WASHINGTON
DIVISION ONE

ALLYN LINDEMANN AND STEVEN LINDEMANN,

Appellants,

v.

TOYOTA MOTOR CORPORATION, TOYOTA MOTOR SALES,
U.S.A., INC., and TOYOTA MOTOR NORTH AMERICA, INC.

Respondents.

BRIEF OF RESPONDENTS

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I. INTRODUCTION

A sport utility vehicle crashed into plaintiff Allyn Lindemann's sedan at nearly 60 miles an hour. Although she survived an impact inches away from her in a crash worse than 99% of all collisions, Lindemann and her husband sued her vehicle's manufacturer, Toyota. They claimed that their Lexus was defectively designed, causing Lindemann greater injuries than she would have suffered without a defect. After hearing plaintiffs' evidence, the jury found the Lexus reasonably safe.

Plaintiffs' attacks on the verdict are meritless. Plaintiffs assert that the trial court wrongly admitted expert testimony of Dr. Elizabeth Raphael, an expert in biomechanics and occupant kinematics, explaining how Lindemann's obesity affected her injuries. Plaintiffs theorize that Lindemann's weight was irrelevant, the science connecting her weight to her injuries was novel, and discussing her obesity inflamed prejudice. Not at all. As *both* sides' experts testified, basic physics dictates that the greater a person's body mass, the greater the accident forces on her and the greater the chance of injury. Plaintiffs' own expert agreed that Lindemann's weight was indispensable to determining whether the accident forces on her bones were sufficient to break them, and agreed on the basic Newtonian formula used to calculate that force. That formula depends on the occupant's body weight.

Nor was this testimony irrelevant under the eggshell-plaintiff rule. Among other things, the testimony related to whether the Lexus' design posed an unnecessary or unexpected risk of injury. Even plaintiffs agreed

that the eggshell-plaintiff rule does not address issues of duty or breach.

Plaintiffs also vainly assert that the trial court erred in declining to give an eggshell-plaintiff jury instruction. But plaintiffs' proposed instruction could not have affected the outcome. The jury found that the design was not defective, an issue not affected by the proposed instruction. The proposed instruction was also wrong; it would wrongly have held Toyota liable for injuries not enhanced by the alleged defects.

The jury rejected plaintiffs' claims after a full and fair trial. The Court should affirm the verdict.

II. ISSUES

I. The superior court overruled plaintiffs' motion to exclude Toyota's expert's testimony explaining how Lindemann's weight affected her injuries and corresponding trial objection.

A. Does *Frye*¹ require exclusion of opinions based on established scientific principles and methods agreed to by both sides' experts?

B. Where both sides' experts agreed that plaintiff's body weight increased her injury risk and was essential to the formula that determines whether the design caused her injuries, does a trial court abuse its discretion by admitting evidence explaining the formula and the corresponding effects of her body mass?

C. Does the eggshell-plaintiff rule require exclusion of

¹ References in this brief to *Frye* and the *Frye* standard are to *Frye v. United States*, 293 F. 1013 (D.C. Cir. 1923).

evidence that a plaintiff's injuries were caused by accident forces dependent on her weight and not by an alleged product defect?

II. Plaintiffs assert that the trial court wrongly declined to instruct the jury on the eggshell-plaintiff rule.

A. Was denial of the instruction harmless where the jury decided that the product was not defective and never reached any issue affected by the proposed instruction?

B. Where the instruction would erroneously have authorized the jury to award damages for injuries not caused by the asserted product defect, did the trial court permissibly reject the instruction?

III. FACTS

A. The Crash.

In June 2009, plaintiff Allyn Lindemann was driving her 2004 Lexus ES 330 eastbound on a two-lane road near Redmond, Washington. Wells, 3/20 RP 91:20-21, 92:4-6, 101:9-10.² An oncoming Jeep Liberty SUV crossed the centerline at nearly 60 mph. Caldwell, 3/21 RP 26:5-11 (Jeep going 57-60 mph), 27:24-28:7 (Jeep crossed the centerline); Stephens, 4/1 RP 32:9-16 (Jeep going 55-60 mph). Without braking, the Jeep struck Allyn Lindemann's Lexus on the front driver's side. Wells, 3/20 RP 116:10-16 (Jeep did not brake before impact); Caldwell, 3/21 RP 37:23-38:2.

² All citations in this form refer to the Verbatim Report of Proceedings. Citations to CP refer to the Clerk's Papers. AB refers to the appellants' brief.

The collision was more severe than 99% of all frontal crashes. Raphael, 4/1 RP 207:5-20. The vehicles had a combined impact speed of at least 75 mph. Caldwell, 3/21 RP 99:10-15; Stephens, 4/1 RP 32:7-16. Each vehicle sustained 75 to 80 thousand pounds of force. Stephens, 4/1 RP 146:19-21. The Lexus was “stopped in its tracks,” spun around, turned backwards, and went off the road. Caldwell, 3/21 RP 28:8-11, Wells, 3/20 RP 113:18-20. Its change in velocity (delta-V) was about 35 mph. Raphael, 4/1 RP 207:20-23; Caldwell, 3/21 RP 106:5-8; Burton, 3/27 RP 20:3-10; Stephens, 4/1 RP 32:17-21. The Jeep was spun in the opposite direction and rolled over. Caldwell, 3/21 RP 28:12-14; Stephens, 4/1 RP 57:6-9; Wells, 3/20 RP 113:20-22.

The two vehicles collided at a 15° angle, with the Jeep coming in from the side of the Lexus. Stephens, 4/1 RP 195:14-19; Caldwell, 3/21 RP 36:12-19. The left front corner of the Jeep hit the left front corner of the Lexus, Syson, 3/25 RP 37:8-14, and the two vehicles’ fronts overlapped by only about 12 inches. Caldwell, 3/21 RP 118:6-11; Wells, 3/20 RP 110:12-19.

The Jeep’s left front made a direct hit near the Lexus driver door. The Jeep hit the Lexus’ driver-side A-pillar and drove it back into the lower left portion of the dash/instrument panel, rearward and in toward the center of the vehicle. Wells, 3/20 RP 105:10-14. (The A-pillar is the left or right front of the windshield, and the B-pillar is where the rear of the front door is. Wells, 3/20 RP 123:4-11.) The moving dash pushed the steering column about a foot from its normal position toward the

passenger's side. Stephens, 4/1 RP 113:1-20; Wells, 3/20 RP 106:23-107:13. The A-pillar was crushed rearward and bent in toward the center of the Lexus from direct contact with the Jeep. Stephens, 4/1 RP 79:20-25, 85:24-86:10, 88:14-24. Without dispute, the Jeep directly hit the A-pillar; paint from the Jeep was on the A-pillar. Mundo, 3/26 RP 96:16-20. The Jeep also directly hit the hinge pillar (the pillar that holds the door hinges, situated below the A-pillar). Stephens, 4/1 RP 87:1-9. The crush from the Jeep pushed back the Lexus' driver's side door. Stephens, 4/1 RP 54:8-25.

B. Lindemann's Injuries.

No reasonable consumer would expect to walk away after being hit on the driver's side by a 60-mph vehicle. And unfortunately, Lindemann was seriously injured. Her right foot, left knee (tibial plateau), both femurs, and both sides of her pelvis were fractured. Raphael, 4/2 RP 27:10-24 (right femur oblique fracture); Raphael, 4/2 RP 30:13-25 (left femur butterfly fracture); Burton, 3/27 RP 30:6-31:4 (left tibial plateau fracture). Both sides' experts agreed that these fractures resulted from Lindemann's impact with the knee bolsters and floor pan in front of her. Burton, 3/27 RP 64:7-19, 65:23-66:3, 74:5-7, 85:7-12; Raphael, 4/2 RP 33:25-34:5. These same accident forces lacerated major arteries in Lindemann's pelvis and legs. Raphael, 4/2 RP 38:25-39:5.

On her left leg, Lindemann also had bleeding from "a lateral branch of the left profunda femoris artery." Raphael, 4/2 RP 39:23-40:14. This was a result of a "degloving injury" on her leg. Raphael, 4/2 RP 39:9-

40:14, 43:7-25. Because of Lindemann's size, her left thigh "would have been pretty much right up against that door." Raphael, 4/2 RP 41:1-12. When an impact is on the left side of a vehicle, the driver's body also tends to move left, toward the impact. Burton, 3/27 RP 77:10-22. As a result of the shear force from the door being pushed backward by the crash forces and Lindemann's excessive forward excursion (forward movement, discussed below in section II.C.2), the skin on her left thigh was torn away. Raphael, 4/2 RP 40:15-41:20. She also had extensive iliac artery bleeding on both sides near the pelvis. Raphael, 4/2 RP 38:21-24. Dr. Raphael testified that the iliac artery bleeding was associated with the same forces that caused Lindemann's pelvic fractures. Raphael, 4/2 RP 38:25-39:5.

The "bulk" of Lindemann's bleeding was in her lower extremities. Raphael, 4/2 RP 37:11-14. Lindemann lost more than 40 percent of her blood through her iliac artery and profunda artery lacerations. Raphael, 4/2 RP 88:15-89:5; Burton, 3/27 RP 106:17-107:1.

This extensive bleeding caused a "low flow state in her brain." Raphael, 4/2 RP 35:25-36:14. The lack of blood flow deprived some areas of oxygen, causing "watershed infarcts" ("mini strokes") in her brain. Raphael, 4/2 RP 35:25-37:7, 36:18-37:7; Burton 3/27 RP 34:6-35:25. She suffered about a half dozen mini strokes. Burton, 3/27 RP 35:13-25. These were "small areas" and "she recovered from a lot of that injury." Burton, 3/27 RP 35:14-25. Plaintiffs' biomechanical expert agreed that Lindemann likely would not have had the watershed infarcts in the

absence of the iliac artery bleed. Burton, 3/27 RP 72:9-73:2.

C. How Lindemann Was Injured.

At trial, each side introduced testimony of a physician expert in biomechanics/occupant kinematics to explain why Lindemann sustained her injuries. Plaintiffs claim on appeal that evidence by Toyota's expert Dr. Elizabeth Raphael regarding the effect of Lindemann's weight on her injuries was irrelevant, novel science, and merely an excuse to inflame prejudice. AB 25-31. That is not correct. Plaintiffs' own expert Dr. Joseph Burton agreed that Lindemann's weight was essential in determining whether the accident forces were sufficient to cause her injuries. He also agreed with the principles relied on by Raphael.

1. Plaintiffs' Expert Dr. Burton.

Plaintiffs tried to blame the Lexus' deformation on design defects. *See* Part III.D below. Burton concluded that this deformation caused some of Lindemann's injuries, but he generally agreed with Raphael on the applicable scientific principles.

Specifically, Burton testified that Lindemann's pelvic fractures – which caused her major bleeding and mini-strokes – resulted from “deformation of the vehicle” and “forces driving her femurs back.” Burton, 3/27 RP 33:4-8. He said that the loads on the femur were driven back into the cup of the pelvis that holds the femur, and Lindemann's femurs were driven back while her hips were moving forward somewhat to the left. Burton, 3/27 RP 32:4-23. He testified that two large blood vessels were torn because of the pelvic and femur fractures, and that the

fractures happened because of “the loss of the occupant space crushing in on her legs and her legs crushing against them.” Burton, 3/27 RP 41:10-19. While Lindemann was in the hospital, her heart stopped from lack of oxygen – which, Burton said, was caused by the bleeding caused by the pelvic fractures and so ultimately caused by “deformation of the vehicle.” Burton, 3/27 RP 43:18-44:21. He testified that if the occupant space had preserved its structural integrity, at this delta-V and these Gs she would have had some injuries but not life-threatening. Burton, 3/27 RP 51:20-52:8. According to Burton, if the occupant space had been maintained Lindemann probably would not have suffered the strokes, brain injury, heart attack, pelvic fracture, tibia fracture, femur fracture, flail chest, or ankle fracture, and would probably have no “residual deficit.” Burton, 3/27 RP 52:12-53:8, 53:25-54:10.

As detailed below, Burton agreed with Toyota’s expert Raphael that as a matter of physics Lindemann’s weight increased her risk of injury, that Newton’s Second Law was the appropriate equation to determine whether the accident forces were sufficient to cause her injuries, and that the equation necessarily used her weight. However, Burton differed with Raphael’s ultimate conclusion. He concluded that Lindemann’s weight did not cause her injuries and the accident forces would not have caused those injuries without vehicle deformation – putting those matters directly in issue. He testified that “She’s well below that level where those forces, no matter what her weight is, would just cause these injuries without the collapse of the occupant space.” Burton,

3/27 RP 53:5-8. Plaintiffs' counsel asked "Did the g's account for her injuries?"; Burton answered "No." Burton, 3/27 RP 55:21-22. Plaintiffs' counsel asked, "[D]o you believe that Lindemann's weight caused her injuries?"; Burton acknowledged that her greater mass meant greater force, but testified that it was not sufficient to cause her injuries: "I don't believe her weight caused her injuries, but her weight would be a negative factor in any crash or in anything in life ... [t]he larger the mass, the force acting on it, the greater the force involved. The problem is, there's not enough force alone to create the circumstances for the force and her weight to cause the injury." Burton, 3/27 RP 57:6-16.

Burton readily agreed to the scientific principles used by Raphael (described at pages 13-17 below) regarding the effect of Lindemann's weight in breaking her bones and causing more forward movement. For example, like Raphael, Burton explained that when her Lexus was struck and pushed backwards, Lindemann's body would have continued forward. Burton, 3/27 RP 84:16-85:1. In fact, she would have continued moving forward until the knee bolsters, airbag and seatbelts brought her body to a stop. Burton, 3/27 RP 85:7-12. Like Raphael, he agreed that to determine the force being exerted on Lindemann's femurs, you should use $F=MxA$ (Force equals Mass x Acceleration). Burton, 3/27 RP 85:13-18, 87:6-10. Like Raphael, he testified that acceleration in this accident was 20 g at center of gravity, and a little higher where Lindemann was seated – as high as 25 g. Burton, 3/27 RP 85:19-24, 86:4-24. He agreed that if we were trying to determine the force that her knees experienced from the

bolsters, he would need to know the mass (Lindemann's body) moving forward. Burton, 3/27 RP 87:6-10. Like Raphael, Burton testified on direct that Lindemann was "morbidly obese, which means she's not just overweight, she's very overweight." Burton, 3/27 RP 57:10-12. Like Raphael, he agreed that Lindemann's weight dictated the forces experienced by the bones that fractured: "Because of her weight," he agreed, "her mass is higher; therefore, the force that her knees, femurs, pelvis will experience in this accident or any accident where her knees come in contact with the knee bolsters will be higher." Burton, 3/27 RP 87:11-18. Like Raphael, he agreed that to determine that force with Lindemann's mass going into her knees, femurs and pelvis, you would use the part of her weight distributed to her legs and multiply it by the g; he agreed that not all her 239 pounds went into the knee bolster because part of her weight was in her upper body and she was partially restrained. Burton, 3/27 RP 90:8-19.

Burton testified that a force of 300-500 pounds up to 1000 would be required to cause Lindemann's pelvic fractures, and "[a]nything above that is like, you know, a guarantee" of a fracture. Burton, 3/27 RP 90:20-91:11. Burton agreed that in principle, if Lindemann experienced 25 g of acceleration, only 40 pounds of her body weight going into the knees would be needed to create the force needed to break her pelvis. Burton, 3/27 RP 92:4-20. While he said it is not "that pure and simple" because part of her mass was restrained by the seatbelt, he agreed that whatever the mass value, the Newtonian force equation exists without deformation of

the vehicle coming back at her and that “the belt is not going to stop her from putting a load completely on the lower extremities.” Burton, 3/27 RP 92:8-20, 93:23-94:9, 95:12-20.

Like Raphael, Burton also agreed that Lindemann’s excess fat tissue affected the design’s performance because it would cause her to go further before being restrained by her seatbelt. He agreed that to some extent, “someone who is morbidly obese has fatty tissue around their midsection that makes it more difficult to slow that mass down when it’s moving forward in a collision such as this.” Burton, 3/27 RP 93:23-94:9. He agreed that it is partly true that, “if you have got some fatty tissue here that’s in front of the bones, the belt is going to dig into that fatty tissue, and you won’t be restrained as easily as if you – if you weighed, say, 160 pounds, or 180 pounds.” Burton, 3/27 RP 94:10-17. Though he downplayed the amount of fat at the belt line, he agreed that “a woman weighing 239 pounds has more body compliance at the lap belt area than a woman at 160 pounds.” Burton, 3/27 RP 95:2-11. Overall, he testified, “especially in a frontal collision,” the bigger an occupant is, the more difficult it is for the restraint system to protect the occupant. Burton, 3/27 RP 93:17-22.

2. Toyota’s Expert Dr. Raphael.

Toyota’s biomechanical and occupant kinematics expert, Dr. Raphael, is an emergency-room physician and a clinical associate professor at Stanford University Hospital. Raphael, 4/1 RP 197:13-18. She has treated “thousands and thousands of patients who have been in

automobile crashes.” Raphael, 4/2 RP 4:12-5:8. She has a mechanical engineering degree from MIT. She has been analyzing car accidents and biomechanics since the mid-1990s. Raphael, 4/1 RP 198:2-10; 201:6-20.

Contrary to plaintiffs’ assertion, Raphael did not testify that Lindemann’s obesity “was the sole reason for the severity of her injuries.” AB 1. Raphael testified to six opinions: (1) The injury to Lindemann’s brain was from low flow state from bleeding and not due to direct head trauma. (2) Because of Newton’s second law of motion ($F=MxA$), because Lindemann’s mass was higher, the forces on her body were higher. (3) This was a very severe crash, and the forces of the crash alone were significant enough to cause Lindemann’s lower extremity injuries. (4) Because of Lindemann’s excess soft tissue, her body moved forward more in the crash than it otherwise would have. (5) Severe crashes such as this one are capable of causing severe injury without intrusion into the occupant compartment. (6) And, Lindemann received the full benefit of her driver’s side airbag in the crash. Raphael, 4/1 RP 204:6-205:7.

Plaintiffs’ appeal concerns Raphael’s opinions about the effect of Lindemann’s body mass and soft tissue, so we focus on those. Contrary to plaintiffs’ assertions, Raphael’s opinions were very relevant – they directly responded to Burton’s testimony – and rested on sound scientific principles with which even Burton agreed. (Raphael’s trial testimony is discussed in this section. The evidence before the court when it ruled on plaintiffs’ pre-trial motion in limine is discussed in Part III.F below.)

Raphael testified that under Newton’s first law of motion, a body

in motion tends to stay in motion until acted on by outside force. Therefore, in the accident Lindemann's body would have stayed in motion until acted on. Raphael, 4/1 RP 214:1-11. In the collision, the Lexus' forward motion was arrested, but Lindemann's body would have continued moving forward until she contacted something else. Raphael explained that once the seatbelt engaged the stronger bony parts of Lindemann's body, it restrained her, but the belt was not able to control her motion during the time it was interacting with soft tissue of her body. Raphael, 4/1 RP 214:17-215:11.

Raphael testified that in a crash of this severity, Lindemann's knees would have struck the structure in front of her even without vehicle deformation. Raphael, 4/1 RP 215:12-20. Raphael testified that Newton's second law of motion – $F=MxA$ – dictated the amount of force on the bones in Lindemann's legs and pelvis during the accident. Based on the accident reconstruction, she understood that the acceleration at the center of the vehicle was 20-25 g and Lindemann experienced 21-26 g. Raphael, 4/2 RP 5:17-6:9, 6:18-7:6, 8:10-14, 12:22-13:18. In fact, both sides' experts agreed (1) the acceleration at the center of gravity of the Lexus was about 20 g; and (2) because Lindemann was seated away from the center of gravity, the g would have been slightly higher at her seated position. Raphael, 4/2 RP 8:4-14 (21 to a little over 26 g); Caldwell, 3/21 RP 148:11-15; Stephens, 4/1 RP 125:2-12 (in excess of 20 g), 126:19-127:14; Burton, 3/27 RP 86:4-24 (about 25 g). Thus, 25 g was not just "Toyota's estimate," as plaintiffs' appellate brief asserts. AB 23.

Raphael explained that the other variable in Newton's force equation is mass. Raphael, 4/2 RP 9:10-12. To know the forces on Lindemann's body, one must know her weight at the time of the accident: the M in $F=MxA$. Raphael, 4/2 RP 9:13-22. Plaintiffs' expert, Burton, agreed on this point too: "If we were trying to determine the force [that her knees and femurs and pelvis experienced], we would need the mass." Burton, 3/27 RP 87:6-10. Plaintiffs' accident reconstructionist also agreed: "the forces are going to be related to the mass of the object and the acceleration that it experiences." Caldwell, 3/21 RP 30:2-5. Lindemann's medical records said she weighed 239 pounds about nine months before accident, and a picture taken the day of the accident indicated she was still at that weight. Raphael, 4/2 RP 10:2-11:6.

Next, to determine the distribution of force between Lindemann's upper and lower body during the crash, Raphael used federal auto crash tests. The National Highway Traffic Safety Administration's New Car Assessment Program (NCAP) crash test of a 2004 Lexus ES 330 indicated that about half the dummy's body weight was on the shoulder belt and half on the lap belt. Raphael, 4/2 RP 11:7-12. To be conservative in her calculations, Raphael used 40% of Lindemann's body weight, or 100 pounds, going into the lower body. Raphael, 4/2 RP 12:13-21.

Raphael then did a straightforward $F=MxA$ calculation (the same calculation endorsed by Burton) to determine the force on Lindemann's femurs and pelvic bones during the accident. She explained that 100 pounds times 25 g equals 2500 pounds of force, conservatively. Raphael,

4/2 RP 12:22-13:6. That force exceeds the fracture threshold for femur and pelvic bones. Raphael, 4/2 RP 13:7-18. According to the medical literature, about 2000 pounds of force suffices to fracture femurs and about the same to cause Lindemann's pelvic injuries. Raphael, 4/2 RP 13:19-14:5. Burton agreed, except he opined that the threshold for fracture was even *lower* – about 1000 pounds. Part III.C.1 above.

Based partly on this calculation, Raphael opined that Lindemann's major fractures were caused by accident forces alone. For example, Lindemann's right femur sustained an oblique fracture. Oblique fractures are caused by force along the long axis of the bone. Raphael, 4/2 RP 27:23-28:5. Based on the calculation explained above, she opined, the accident forces were high enough to cause the fracture without any vehicle deformation. Raphael, 4/2 RP 29:3-22. The conclusion that Lindemann's right-femur fracture was not caused by deformation was further supported because the right side knee bolster was not deformed to the rear. Raphael, 4/2 RP 29:3-22. Similarly, Lindemann's left femur has a butterfly fracture. Butterfly fractures are caused by a back-to-front force along the long axis of the bone plus a constraint pushing on the bone from the side. Raphael, 4/2 RP 30:13-31:11. Raphael testified that there was sufficient force to cause the butterfly fracture regardless of instrument panel or dash deformation; that, she said, "goes back to the 2000 pounds" of force obtained from the $F=Ma$ calculation. Raphael, 4/2 RP 31:24-32:12. Similarly, Raphael opined, Lindemann's pelvis suffered sacrum fractures on both the right and left and the pubic symphysis. Raphael, 4/2 RP

32:13-33:13. These injuries are from a back to front force, with the forces acting up the femur bones into the pelvis. Raphael, 4/2 RP 33:20-34:5, 35:5-13. Raphael testified that these pelvic fractures were not caused by instrument panel deformation. Raphael, 4/2 RP 47:21-25. In addition, she explained, while the pelvic fractures are symmetrical or slightly biased to the right, the instrument panel deformation is biased to the left, and the instrument panel deformation is higher than some of her lower extremity injuries. Raphael, 4/2 RP 48:2-11.

Raphael also detailed why Lindemann's excess fatty tissue caused her to move further forward during the accident than a lean person would have. First, she testified that it is well known (in medicine and analysis of automotive crashes) that body mass index (BMI) affects an occupant's motion and injuries in a crash. Raphael, 4/2 RP 14:13-18. Lindemann's BMI is 35.9, making her obese class 2. Raphael, 4/2 RP 15:10-14. Raphael also cited 2010 study of normal and obese cadavers in sled tests. Raphael, 4/2 RP 17:2-9. (A sled is a partial car mockup on a rail, and can be accelerated to mimic the accelerations in crashes.) The study authors placed the cadavers in the seat on a crash-test sled, and accelerated it to simulate a 30-mph crash and looked at high-speed video to determine how the cadavers moved, how much forward excursion there was on the occupant, and whether that motion was in a different plane for obese versus nonobese cadavers. Raphael, 4/2 RP 17:20-18:8. The nonobese restrained cadaver's pelvis stayed in its seat. Raphael, 4/2 RP 19:2-17. In contrast, the obese restrained cadaver had significant forward excursion

because the seatbelt could not fully restrain the soft tissue. It did not stop the forward motion until the belt pressed against the hard bony parts of the body, such as the pelvis. Raphael, 4/2 RP 19:2-21. Thus, the sled tests cited by Raphael substantiated what Burton had already admitted: “if you have got some fatty tissue here that’s in front of the bones, the belt is going to dig into that fatty tissue, and you won’t be restrained as easily as if you – if you weighed, say, 160 pounds, or 180 pounds” and “a woman weighing 239 pounds has more body compliance at the lap belt area than a woman at 160 pounds.” Burton, 3/27 RP 94:10-17, 95:2-11.

In short: Raphael’s testimony directly responded to Burton’s opinions that Lindemann’s injuries were not caused by her weight, were caused by deformation of the vehicle, and would not have happened from the accident alone. In addition, Raphael’s testimony was firmly based on established scientific principles and research.

D. Evidence About Claimed Defects.

Plaintiffs did not claim the Lexus’ design caused the crash. Rather, they claimed the Lexus was unreasonably dangerous because it supposedly did not protect Lindemann sufficiently in the crash – a so-called “crashworthiness” claim. The jury’s rejection of plaintiffs’ defect theories and evidence was the basis of the verdict, and an understanding of the defect evidence may assist the Court.

Plaintiffs’ design experts Stephen Syson and James Mundo floated a variety of very specific design-defect theories, all attempting to show that the passenger compartment deformed because of a design defect.

Plaintiffs' brief barely discusses this evidence (AB 8-10) even though it was a mainstay of the trial. Toyota's closing argument emphasized the unpersuasiveness of plaintiffs' criticisms of the ES 330's design and the severity of this accident. Closing, 4/4 RP 58:9-60:4, 64:18-75:20.

Plaintiffs tried numerous defect theories, all of which the jury soundly rejected. For example, Mundo asserted that the Lexus' lower rail frame (a structural component) starts at the front bumper and "dead-ends against the dash panel," which he said was made of thin "cookie sheet" material that he implied could not take the load. Mundo, 3/26, 33:8-24. Instead, he suggested, the force should be transmitted to the reinforced rocker panel below the door as on the Ford Taurus and Chevy Lumina. Mundo, 3/26 RP 36:15-41:4, 77:22-78:9, 79:16-80:7. But on cross-examination, he acknowledged that the ES 330's rail *does* go around the bottom of the dash panel and connect to the rocker panel. Mundo, 3/26 RP 112:17-113:7, 122:22-123:2. Toyota's design expert Robert Lange demonstrated the lower rail does *not* end at the dash as Mundo claimed. He showed how it continues on beyond the front of the dash, under the floor panel, a little beyond the center of the car. Lange, 4/3 RP 4:3-5:22; *see also* Lange, 4/3 RP 7:1-10:8 (Lexus has structure that connects rail to rocker panel). In fact, Lange testified, in the Lindemann accident the Jeep *hit* this connector between the rail and the rocker, pushing it inward. Lange, 4/3 RP 17:22-18:15. Lange testified without contradiction that the structures on the Ford Taurus and Chevy Lumina would not have substantially affected the interaction between the Jeep and the Lindemann

vehicle, because none was designed for a collision where the vehicle struck them directly. Lange, 4/3 RP 18:22-19:6.

Mundo also asserted that the occupant compartment was made of sheet metal and floor pans and there was “not enough structure there to resist that kind of a crash load.” Mundo, 3/26 RP 42:1-7. He asserted that in the crash, the Lindemann vehicle’s A pillar collapsed because there was not enough strength. Mundo, 3/26 RP 42:17-43:2. He asserted that in the crash, the Jeep’s front tire and wheel assembly pressed against the dash panel, which folded “like a pie pan.” Mundo, 3/26 RP 43:23-44:3. He claimed the dash panel was held to the front rail only by a small number of welds, and the tire pushed into the dash panel and “popped” the welds, pushing the dash panel “straight on into the car.” Mundo, 3/26 RP 45:3-22, 46:17-22. He theorized that the left front wheel and tire were shoved rearward and made contact with the “dash panel,” the metal panel between the driver and the engine compartment. Mundo, 3/26 RP 140:5-141:4, 94:20-95:1.

But no evidence connected this theory to Lindemann’s injuries. She sustained fractures to *both* legs and *both* hips, not just the left. Indeed, only one foot was broken – her right foot, the side away from the supposedly intruding Jeep wheel. Raphael, 4/2 RP 23:12-16. Contrary to Mundo’s claim that the wheel deformed the dash panel, Mundo admitted that in a post-accident photograph, the wheel and tire were not even in contact with the lower instrument panel (dash panel). Mundo, 3/26 RP 103:24-104:3. He claimed the metal had just sprung back after the contact,

but admitted that in an actual test crash where the wheel and tire hit the lower dash panel, they remained in contact with it. Mundo, 3/26 RP 103:10-23, 104:6-9. Mundo's theory was that the hinge pillar and A-pillar deformed because of a supposed design defect, but plaintiffs' own reconstruction expert Caldwell explained that the *Jeep itself* struck the A-pillar (top of the hinge pillar) and deformed it. Caldwell, 3/21 RP 65:23-66:8. Mundo admitted that paint from the Jeep was on the A-pillar. Mundo, 3/26 RP 96:16-20. Even Mundo did not claim that the pillar should withstand a direct hit from a 4000-pound SUV travelling at 60 miles an hour.

Syson's criticism fared no better. He opined that the crash deformed the passenger compartment and reduced Lindemann's survival space. Syson, 3/25 RP 37:25-38:10, 44:9-19. If the passenger compartment had not deformed, he said, the forces on Lindemann would have been about half what they would be in a typical crash test. Syson, 3/25 RP 51:5-13. As an alternative, Syson proposed that the main unibody rail should extend in front of the tire and the bumper beam should be extended sideways to "deflect" a striking vehicle. Syson, 3/25 RP 67:24-68:7. But Syson admitted that his proposed bumper would extend 6-8 inches outward – bizarre for a sedan – and he did not know how much energy it would need to absorb to accomplish his purpose (or what material should be used). Syson, 3/25 RP 162:2-163:15. He did not opine that his extended bumper would have deflected the Jeep SUV away from the Lindemann vehicle. To the contrary, the Jeep actually *had* an

extended bumper, and it was just bent back by the collision. Wells, 3/20 RP 109:24-110:1.

Syson and Mundo also emphasized the Insurance Institute for Highway Safety's (IIHS) testing of a 2012 Lexus ES 350 and Camry – different models built eight years after Lindemann's 2004 Lexus – allowed a risk of leg injury in a small-offset crash. *E.g.*, Syson, 3/25 RP 74:7-75:7. Syson asserted that the IIHS tests closely resembled what he said happened in the Lindemann crash. Syson, 3/25 RP 78:7-17.

Plaintiffs' attempt to rely on the 2012 IIHS tests glossed over numerous differences. Syson agreed that the 2004 model vehicle that Lindemann drove was designed and built long before the IIHS instituted the small-overlap test, and that the IIHS gave the 2004 vehicle a good rating. Syson, 3/25 RP 120:24-122:13, 159:21-23 (vehicle met all IIHS recommendations). He also testified that the IIHS crash involved an overlap of 25%, while the Lindemann crash overlap was only 17%. Syson, 3/25 RP 143:24-144:11.

Lange testified that the Lindemann crash was not like the IIHS 25% overlap crash. Lange, 4/2 RP 25:22-24, Lange, 4/3 RP 36:5-12. Lange explained differences in orientation of the object attacking the vehicle and the results of the impact. Lange, 4/3 RP 36:5-37:17. Most importantly, unlike the IIHS crash, the Lindemann crash was at an angle, and the main deformation in the Lindemann crash was lateral from the Jeep crashing into the front body hinge pillar and pushing the structure toward the center of the car. Lange, 4/3 RP 37:11-24. In the Lindemann

crash the entire top of the front of the dash, including the steering column, was pushed a foot inboard and the front body hinge pillar moved inward. Lange, 4/3 RP 41:4-16. The Lindemann crash involved the lateral component while the IIHS crash was purely longitudinal. Lange, 4/3 RP 42:15-43:5. In the Lindemann crash, the side-impact airbag deployed; in the IIHS test, it did not. Lange, 4/3 RP 41:17-21. The side-intruding Jeep deformed the structure in ways not present in the IIHS crash. Lange, 4/3 RP 38:11-17. In the Lindemann crash, the front body hinge pillar and connection to the rocker panel had a “big bend” from direct interaction with the Jeep; the front body hinge pillar and rocker panel remained connected but were pushed substantially inward. Lange, 4/3 RP 43:24-44:8, 44:24-45:3. In the IIHS test, the front body hinge pillar separated from the rocker, which moved only a little inboard and rearward; the A pillar was not bent because the attacking object did not hit it, and the A pillar merely moved rearward. Lange, 4/3 RP 44:17-20, 45:3-8. In the IIHS test the wheel became trapped but in the Lindemann crash, it was not pushed back into the front body hinge pillar and was not trapped. Lange, 4/3 RP 40:14-22, 44:3, 44:20-24. In addition, the Lindemann crash had much higher acceleration than the IIHS test: in the IIHS test the vehicle did not bounce back, whereas the Lindemann vehicle’s bouncing back off the Jeep was the point of greatest acceleration on Lindemann. Lange, 4/3 RP 56:24-57:12, 58:23-59:3.

Lange testified that in numerous tests by both Toyota and the federal auto safety regulator, NHTSA, the Lexus never even approached

federal limits on femur impact load in crashes. Lange 4/2 RP 55:17-58:14. In front collision tests to NHTSA's specifications, the 2004 ES and others from its model run (2002-06) received four or five stars. Lange, 4/2 RP 67:2-68:10, 70:13-14. In 40-mph offset tests, the 2004 Lexus received the IIHS's best rating for left and right foot and leg injuries. Lange, 4/2 RP 70:2-76:9.

E. The Jury's Verdict Finding No Defect.

The jury was instructed on both tests for design defect: that a product is not reasonably safe if either (1) the product was unsafe to an extent beyond that which would be contemplated by the ordinary user, or (2) the likelihood that the product would cause injury similar to that claimed by plaintiff, and the seriousness of injury, outweighed the burden and adverse effect of designing a product that would have prevented the injury or damage. CP 1016-17.

The first question on the verdict form was: "Did the defendant supply a product that was not reasonably safe?" The jury answered "No." CP 1027. Because it found no defect, it did not reach whether any unsafe condition caused Lindemann's injuries, whether the Jeep driver (Jocelyne Wheeler) was negligent and was a cause of Lindemann's injuries, or damages. CP 1027.

F. The Order Overruling Plaintiffs' Motion in Limine to Exclude Dr. Raphael's Testimony About Lindemann's Weight.

1. Ruling on Motion in Limine.

Before trial, plaintiffs filed a Motion To Exclude Testimony Of Dr.

Elizabeth Raphael stating that Lindemann's pelvic fracture and stroke were due to her weight. CP 285-293. Plaintiffs argued that Raphael's opinions should be excluded on three grounds: (1) they were inadmissible under the *Frye* test; (2) Raphael's testimony sought to inflame prejudice against Lindemann because of her weight, and (3) according to plaintiffs, it was "irrelevant whether Mrs. Lindemann's weight worsened the impact of the crash because under the 'eggshell plaintiff' rule, a tortfeasor takes the plaintiff as it finds her." CP 285-86.

Toyota responded that (1) the probative value of Raphael's testimony vastly outweighed any possible prejudice and (2) Raphael's testimony was based on Newton's laws of motion and on numerous scientific studies. CP 611-618.

a. Relevance.

Plaintiffs argued that "[t]he real purpose of Dr. Raphael's theory is to inflame the jury's prejudice and invoke an emotional reaction against a tort victim." CP 291. Plaintiffs cited studies "about the prejudice against obesity" and asserted that these studies showed that "[p]rejudice and discrimination toward obese individuals have been consistently documented in a wide range of settings including health care, education, employment, and interpersonal relationships." 3/18 RP 97:19-25; CP 288-289. Plaintiffs argued there was "minimal if any probative value to the hypothesis that Lindemann would have suffered level 3 injuries instead of level 5 injuries if only she had a 'normal' weight." CP 290.

Toyota responded that the testimony went to evaluating the

design's performance and determining whether Lindemann had sustained *enhanced* injuries. “[P]laintiffs must prove that Lindemann suffered specific injuries that she would not have suffered in this same accident in a reasonably safe sedan,” and “to evaluate whether there were any *enhanced* injuries in this accident, the jury in this case will need to hear detailed expert testimony – from Dr. Raphael and others – on the measure and source of the forces coming up through Lindemann’s legs and into her pelvic bones.” CP 613, 617. “[I]f (as Dr. Raphael has concluded) Lindemann would have suffered those same injuries even in the absence of any vehicle deformation – because of the acceleration forces and involved mass ($F=M \times A$) – then that expert testimony and evidence is directly relevant to the vehicle design issues the jury will be asked to decide.” CP 617. Toyota explained why it was important:

This is about evaluating the design of this vehicle in the context of the forces that Lindemann’s body experienced in this accident. There has to be scientific discussion about that, about those forces; ... they’re asking us to take the M out of the F equals M times A, and we just talk about acceleration forces, but we can’t talk about the mass involved in that to get the forces that were exerted on her body, and the jury won’t be able to evaluate whether or not the forces that were exerted on her body were entirely because of the crash forces or were, in some part, because of vehicle deformation that was unreasonable.

3/18 RP 99:12-100:8.

b. Scientific Basis.

Plaintiffs also claimed that “Dr. Raphael did not identify a single

study that supports her claim that had Mrs. Lindemann weighed a hundred pounds less she would not have suffered pelvic fracture [sic].” Plaintiffs said her opinions were thus “not based on any generally accepted scientific principle” and violated *Frye*. CP 292-93.

In response, Toyota pointed out that Raphael’s theory is “supported by Newton’s second law of motion ($F=MxA$) and by extensive research on the correlation between obesity and an increased risk of injury in high speed accidents.” CP 611-12. First, Toyota explained that Raphael “arrived at her conclusions in this case by applying Newton’s second law of motion to (1) the amount of the deceleration of Gs experienced by Lindemann’s vehicle at the time of impact; and (2) the amount of Lindemann’s body mass that continued forward as the vehicle was being pushed back, increasing the amount of force transmitted back into her legs and into her pelvis.” CP 614. Raphael submitted a declaration explaining the scientific background and attaching examples of the research articles she examined. These research articles found “significantly greater hip and lower extremity excursion in crash tests where belted obese cadavers were used,” and that found that “[t]he fatality risk is 97% higher in obese drivers than normal BMI drivers.” CP 621-622. Toyota also pointed out in their Response that “Burton, plaintiffs’ own biomechanical expert, testified during his deposition that Lindemann’s weight was a factor in *his* calculation of the amount of force experienced by Lindemann’s femurs and pelvic bones.” CP 613.

Thus, Toyota argued that the *Frye* standard does not apply because

Raphael's testimony is based on Newton's second law of motion, it coincides with the opinions of plaintiffs' biomechanical expert (Burton), and it is supported by many research articles. CP 616-17.

c. Trial Court's Findings That Dr. Raphael's Testimony Was Relevant And The Probative Value Outweighed Any Potential Prejudice.

The Court found Raphael's testimony relevant and denied plaintiffs' Motion. 3/18 RP 105:20-106:7. "I certainly recognize that there is potential prejudice against obese people, but I think that if it were only being introduced for reasons of inciting a prejudice, certainly I would agree with you [that it would be excluded under Rule 403]. But...it's an essential part of the defense in the case" 3/18 RP 106:13-20.

The Court found that the defense should be allowed to present this type of evidence that "the injuries to [Lindemann's] pelvis would have occurred regardless of whether there was a collapse of the passenger compartment at all or not, just simply because of her size given this kind of collision." 3/18 RP 96:1-5. The Court stated that "this is what their defense is ... they are entitled to do it. I mean, obviously plaintiffs may or may not be able to convince the jury that it has any applicability or not, but I think that's for the jury." 3/18 RP 106:2-7.

d. Ruling That The Eggshell Plaintiff Rule Does Not Apply.

Plaintiffs argued that the evidence was irrelevant because "even if Toyota proved that obesity made her more vulnerable to injuries from the crash, it would not diminish Toyota's liability" because a "tortfeasor is

liable for the full effects” of an injury. CP 290; 3/18 RP 95:9-12.

Plaintiffs continued that “because we have a causal connection between a design defect, if we can prove it, and an injury to Lindemann we are in eggshell plaintiff land.” 3/18 RP 96:7-97:18.

Toyota argued that the eggshell plaintiff rule did not apply and did not make analysis of the crash forces involved irrelevant. 3/18 RP 100:22-102:16.

The Court denied the motion, holding that eggshell plaintiff rule “doesn’t apply to enhanced injuries” or “where you are talking about the injury being due not to what caused the accident but, rather, to the nature of the design of the vehicle.” 3/18 RP 105:21-106:1.

2. Plaintiffs’ Renewed Objection at Trial.

Before Raphael began testifying about her opinions at trial, plaintiffs renewed their objection. 4/1 RP 203:23-25. The Court did not change its ruling. 4/1 RP 204:1.

G. Denial of Plaintiffs’ Requested Eggshell Plaintiff Instruction.

Plaintiffs requested an instruction patterned after WPI 30.18.01. It would have stated that “If your verdict is for the plaintiffs” and if the jury found that “before this occurrence” Lindemann had a condition that was not causing pain or disability and the condition made her more susceptible to injury than a normal person, the jury should “consider all the injuries and damages that were proximately caused by the occurrence” even if greater than the injuries that a person without her condition would have

incurred. CP 1094. The trial court declined to give it.

IV. ARGUMENT

A. Standard of Review.

Admissibility of expert testimony is reviewed for abuse of discretion. *Weyerhaeuser Co. v. Commercial Union Ins. Co.*, 142 Wn.2d 654, 683, 15 P.3d 115 (2000). *State v. Olmedo*, 112 Wn. App. 525, 530, 49 P.3d 960 (2002). A trial court abuses its discretion only if its decision is manifestly unreasonable or exercised on untenable grounds, or for untenable reasons. *State ex rel. Carroll v. Junker*, 79 Wn.2d 12, 26, 482 P.2d 775 (1971). If the basis for admission of the evidence is “fairly debatable,” the trial court’s ruling should not be disturbed. *Grp. Health Coop. of Puget Sound, Inc. v. Dep’t of Revenue*, 106 Wn.2d 391, 398, 722 P.2d 787 (1986) (quoting *Walker v. Bangs*, 92 Wn.2d 854, 858, 601 P.2d 1279 (1979)).

Although a court’s post-*Frye* hearing determination that the expert’s theories are generally accepted is reviewed de novo, the same abuse of discretion standard generally applicable to admission of evidence should apply to a court’s decision whether to conduct a *Frye* hearing. See *State v. Gregory*, 158 Wn.2d 759, 830, 147 P.3d 1201 (2006). It is not clear what standard of review should be applied to a trial court’s decision not to conduct a *Frye* hearing at all; *de novo* review applies when trial court declines to conduct hearing because scientific evidence has been generally accepted, since that is the same question that would be determined by *Frye* hearing. *Id.*; *State v. Wilson*, 174 Wn. App. 328, 298

P.3d 148 (2013) (“[A]s a threshold issue before applying this de novo standard of review, we must determine whether the *Frye* test even applied to Dr. Sugar’s expert testimony. The *Frye* test applies only to evidence based on novel scientific theories or methods.”), unpublished portion of opinion. *But see State v. Greene*, 139 Wn.2d 64, 70, 984 P.2d 1024 (1999); *State v. Copeland*, 130 Wn.2d 244, 255, 922 P.2d 1304 (1996) (“Review of admissibility under *Frye* is de novo and involves a mixed question of law and fact.”)

B. The Court Did Not Abuse Its Discretion In Admitting Dr. Raphael’s Testimony.

Plaintiffs claim that the trial court erred in admitting Raphael’s testimony because her testimony was supposedly “novel” and lacked scientific validity, and so supposedly violated the *Frye* test; that explaining the effect of Lindemann’s weight was somehow more prejudicial than probative; and that it violated the eggshell plaintiff rule. AB 31-35. Plaintiffs are wrong on all counts.

1. Plaintiffs’ *Frye* Challenge Was Meritless.

a. *Frye* Did Not Apply.

Frye did not apply to Raphael’s testimony. “The *Frye* test is only implicated where the opinion offered is based upon novel science.” *Anderson v. Akzo Nobel Coatings, Inc.*, 172 Wn.2d 593, 611, 260 P.3d 857 (2011). It applies where either the theory and technique or method of arriving at the data relied upon is so novel that it is not generally accepted by the relevant scientific community. *Id.* If the evidence “does not involve

new methods of proof or new scientific principles,” it is not subject to the *Frye* test. *State v. Baity*, 140 Wn.2d 1, 10, 991 P.2d 1151 (2000).

Expert testimony is *not* properly excluded under *Frye* when the expert applies accepted techniques in a new context or to reach novel conclusions. *See, e.g., Anderson*, 172 Wn.2d at 611; *Lakey v. Puget Sound Energy, Inc.*, 176 Wn.2d 909, 919, 296 P.3d 860 (2013) (“While *Frye* governs the admissibility of novel scientific testimony, the application of accepted techniques to reach novel conclusions does not raise *Frye* concerns.”); *State v. Roberts*, 142 Wn.2d 471, 520–21, 14 P.3d 713 (2000) (stating that conclusions based on nonnovel methods of scientific proof are not susceptible to exclusion under *Frye*).

Raphael’s testimony was not based on “novel” science. Her opinions were supported by Newton’s second law of motion ($F=MxA$) and by extensive research on the correlation between obesity and an increased risk of injury in high speed accidents. CP 616-17. The scientific principles Raphael relied on – that the force experienced on Lindemann’s lower extremities was equal to the acceleration multiplied by her mass – were not only “unnovel,” but they were agreed to by plaintiffs’ experts. CP 613-15. Plaintiffs’ own retained biomechanical expert, Dr. Burton, as well as plaintiffs’ accident reconstructionist, agreed that Lindemann’s weight was a necessary part of the equation to determine the force that her body experienced in the crash: “The larger the mass, the force acting on it, the greater the force involved.” Burton, 3/27 RP 57:12-14. Burton used the *exact* same calculations to determine that the force that her knees,

femurs, and pelvis experienced was higher “[b]ecause of her weight.” Burton, 3/27 RP 87:11-18. This basic scientific principle has been applied and researched extensively in the context of the force on bodies in car crashes. Similarly, as to Lindemann’s fatty tissue causing more forward excursion before the belt restrained her, Burton agreed in deposition that “that her increase in adipose tissue gave her more excursion than somebody who had less adipose tissue” and “contributed to her forward excursion” (CP 615, 656), and at trial that Lindemann’s soft fatty tissue would cause more “compliance” with the belt, meaning she “wouldn’t be restrained as easily” and it would be “more difficult to slow that mass down.” Burton, 3/27 RP 94:5-17, 95:2-11; Part III.C.1 above.

Raphael also reviewed research articles confirming an increased risk of injury for obese occupants in high speed collisions. One article found that belted obese occupants experience increased excursion (forward movement) in collisions. Richard W. Kent, Jason L. Forman, and Ola Bostrom, Is There Really A “Cushion Effect”? A Biomechanical Investigation of Crash Injury Mechanisms In The Obese, 18 Obesity 4 (April 2010). Plaintiffs’ expert Dr. Burton also agreed with this conclusion, and testified that obese occupants have “more body compliance at the lap belt area.” Burton, 3/27 RP 95:7-11, 94:10-20. Another article Raphael relied on concluded that “[t]he fatality risk is 97% higher in obese drivers than normal BMI drivers.” David C. Viano, Chantal S. Parenteau, and Mark L. Edwards, Crash Injury Risks for Obese Occupants Using a Matched-Pair Analysis, 9 Traffic Injury Prevention 59

(2008).

These articles fully supported Raphael's conclusions, but such support is not necessary because scientific literature is not required to show general acceptance. *Reese v. Stroh*, 128 Wn.2d 300, 907 P.2d 282 (1995); *Advanced Health Care, Inc. v. Guscott*, 173 Wn. App. 857, 871-73, 295 P.3d 816 (2013). In *Reese*, the Supreme Court rejected the defendant's *Frye* argument that no scientific studies existed supporting the expert's causation opinion, and held that the expert may testify from his own knowledge and experience. *Id.* at 308-10. In *Guscott*, defendant's expert opined that decedent's aneurism had bled slowly because he did not have a "slit-like inferior vena cava," which the expert testified meant he did not suffer the trauma of a rapid bleed. Plaintiff objected that the expert "did not offer any peer-reviewed articles, texts, etc." to support his opinion. The Court of Appeals *reversed* the trial court's exclusion of the opinion, holding that peer-reviewed studies "may strengthen" the expert's testimony but "the competence of expert testimony does not depend on such studies." 173 Wn. App. at 877 (citation omitted).

So here. Though Raphael's opinions *are* supported by scientific studies, even if there were no scientific studies, her opinions are supported by her own training, practical experience and acquired knowledge, rendering *Frye* inapplicable. Raphael has a Mechanical Engineering degree from MIT and an M.D. from Wayne State University School of Medicine. Raphael, 4/1 RP 198:2-10. She is currently an emergency physician and a clinical associate professor at Stanford University

Hospital in Palo Alto, California. Raphael, 4/1 RP 197:13-18. Her experience and acquired knowledge in analyzing biomechanics in car accidents is not a novel methodology. *Reese*, 128 Wn.2d at 309-10. There is nothing novel about applying Newton's laws of motion to determine the crash forces in an accident. Nor is there anything novel about the theory that a person's weight amplifies the forces on their body in a severe crash.

Because Raphael's techniques and methodology were not based upon novel science, *Frye* did not apply. *Anderson*, 172 Wn.2d at 611-12.

b. Dr. Raphael's Theory Is Generally Accepted In The Scientific Community.

Even if *Frye* had applied, Raphael's testimony would easily satisfy it. To admit evidence when *Frye* applies, the trial court must find that the underlying scientific theory and the "techniques, experiments, or studies utilizing that theory" are generally accepted in the relevant scientific community and capable of producing reliable results. *Anderson*, 172 Wn.2d at 603 (quoting *State v. Riker*, 123 Wn.2d 351, 359, 869 P.2d 43 (1994)). "General acceptance may be found from testimony that asserts it, from articles and publications, from widespread use in the community, or from the holdings of other courts." *State v. Kunze*, 97 Wn. App. 832, 853, 988 P.2d 977 (1999) (footnotes omitted) (citations omitted).

Courts are solely to determine whether the theory "has achieved general acceptance in the appropriate scientific community," without reference to its application to the case or "whether the scientific theory

underlying the proposed testimony is correct.” *State v. Riker*, 123 Wn.2d 351, 359–60, 869 P.2d 43 (1994). The scientific community need not unanimously accept a particular theory or methodology. *Anderson*, 172 Wn.2d at 603 (“If there is a *significant* dispute among *qualified* scientists in the relevant scientific community, then the evidence may not be admitted,’ but scientific opinion need not be unanimous.”). Nor must an expert show general acceptance of all aspects of his opinions. *Id.* at 609-11. The *Frye* test does not require that “specific conclusions” be generally accepted or that every deduction that an expert makes be generally accepted in the scientific community. *Id.* at 611.

Plaintiffs try to raise quarrels, asserting that two research articles did not show that “gravity forces alone – independently of any design factors – cause obese people to suffer pelvic fractures in crashes similar to Lindemann’s.” AB 16-17. But there is no dispute that g forces can do so. Plaintiffs’ own expert Dr. Burton agreed they can. He agreed (1) to the amount of g forces at issue, (2) to the method of using those g forces to calculate the force on Lindemann’s legs and pelvic bones ($F=MxA$), and (3) that if the result was above 1000 pounds, “[a]nything above that is like, you know, a guarantee” of a fracture. Burton, 3/27 RP 90:20-91:11; Part III.C.1. Still, plaintiffs say, “[n]either article suggested that it is impossible for car designs to protect obese people.” AB 34. That is a straw argument. Raphael did not use the research articles to opine that it is impossible for car designs to protect obese people. She used the articles as one resource to show that obese people are more difficult to restrain in

crashes than non-obese people (the “body compliance” acknowledged by Burton, Part III.C.1) and have a higher injury risk in crashes (the “negative factor in any crash” acknowledged by Burton, Part III.C.1). CP 621-22. Moreover, as consistently recognized by Washington appellate courts, general acceptance may be found in a wide variety of sources – not just from the two sample articles that Raphael attached to her declaration in support of defendants’ response to plaintiffs’ motion in limine to exclude Raphael’s testimony. Even if the numerous articles supporting Raphael’s theories had not indicated “general acceptance” (they do), general acceptance can also be found from her testimony that asserts it. *Kunze*, supra, 97 Wn. App. at 853. Raphael submitted a declaration in which she explained her methodology’s general acceptance. CP 620-623. Moreover, general acceptance can also be found from “widespread use in the community;” as defendants argued in their response to plaintiffs’ pre-trial motion, Newton’s laws of motion are widely used in the community, including their acknowledgement by plaintiffs’ own expert Burton in this very setting and instruction in high school physics classes. Part III.C.1 above; CP 616-17.

Moreover, plaintiffs do not challenge the scientific *principle* that accident forces on a vehicle occupant’s body are calculated by multiplying the acceleration by the occupant’s mass. Instead, plaintiffs challenge Raphael’s *conclusions* that 40 percent of Lindemann’s weight went into her lower body. AB 32. They also challenge her conclusion that “by multiplying the ‘100 pounds of weight allegedly going into Lindemann’s

lower body by an acceleration number, 25, it is somehow possible to conclude that Lindemann would have fractured her bones even if the car had not collapsed.” AB 32-33. But challenges to conclusions are not governed by *Frye*. Theories and techniques are, and plaintiffs’ own expert Burton admitted that Raphael’s theory – using Newton’s second law of motion – was acceptable methodology; he endorsed the same method. Burton, 3/27 RP 87:11-18, 91:12-23.

Plaintiffs’ challenge falls short because *Frye* does not require that the specific conclusions drawn from the scientific data upon which Raphael relied be generally accepted in the scientific community. *Anderson*, 172 Wn.2d at 611. “*Frye* does not require every deduction drawn from generally accepted theories to be generally accepted. Other evidentiary requirements provide additional protections from deductions that are mere speculation.” *Id.* E.g., ER 104(a); ER 401; ER 403. Instead, *Frye* merely provides protection against novel methodologies. Using Newton’s laws of motion to determine the crash forces experienced by an occupant’s body, and using those crash forces to determine whether they were sufficient to cause certain injuries is not a novel methodology.

In sum, the trial court did not abuse its discretion in admitting Raphael’s testimony over plaintiffs’ *Frye* challenge because her opinions were not based on novel science and even if they were, they were generally accepted.

2. The Court Did Not Abuse Its Discretion In Overruling Plaintiffs’ ER 403 Challenge.

The court properly admitted Raphael's testimony over plaintiffs' ER 403 challenge. Her testimony went to a central issue in the case – whether the design of the Lexus vehicle caused enhanced injuries. As the trial court stated, “it’s an essential part of the defense in the case.” 3/18 RP 106:18-20.

Relevant evidence is admissible. ER 402; *Hayes v. Wieber Enterprises, Inc.*, 105 Wn. App. 611, 617, 20 P.3d 496 (2001). “Relevant evidence” is “evidence having any tendency to make the existence of any fact that is of consequence to the determination of the action more probable or less probable than it would be without the evidence.” ER 401; *Hayes*, 105 Wn. App. at 617. Evidence tending to establish a party’s theory, or to qualify or disprove the testimony of an adversary, is relevant. *Hayes*, 105 Wn. App. at 617; *Maicke v. RDH, Inc.*, 37 Wn. App. 750, 752, 683 P.2d 227 (1984).

Although relevant, evidence may be excluded if its probative value is substantially outweighed by the danger of unfair prejudice. ER 403; *Hayes v. Wieber Enterprises, Inc.*, 105 Wn. App. 611, 617, 20 P.3d 496 (2001). Evidence may be unfairly prejudicial under ER 403 if it is evidence “dragged in” for the sake of its prejudicial effect or is likely to trigger an emotional response rather than a rational decision among the jurors. *Hayes*, 105 Wn. App. at 617. Nearly all evidence will prejudice one side or the other in a lawsuit. *Id.* There is a presumption in favor of admissibility of relevant evidence and the burden of showing prejudice is on the party seeking to exclude the evidence. *Carson v. Fine*, 123 Wn.2d

206, 225, 867 P.2d 610 (1994).

The trial court has wide discretion in balancing probative value against potential prejudice. *State v. Stenson*, 132 Wn.2d 668, 701, 940 P.2d 1239 (1997). The appellate courts will not reverse absent a showing that the court's exercise of its discretion is "manifestly unreasonable or based upon untenable grounds or reasons." *Id.* Thus, appellate courts find reversible error only in exceptional circumstances under ER 403. *Carson*, 123 Wn.2d at 226.

In an enhanced injury case, the jury must evaluate whether the plaintiff experienced any enhanced injuries due to the defendant's product. The jury was instructed on this very issue:

"[A] manufacturer of an automobile is liable for that portion of the damage or injury caused by the product design or manufacturing defect over and above the injury or damage that probably would have occurred as a result of a reasonably foreseeable accident or collision impact even without the product defect. The manufacturer is liable for this enhanced injury or damage even though the defect did not cause the accident or collision itself.

CP 1018. Plaintiffs had to prove that Lindemann suffered specific injuries that she would not have suffered in this same accident in a reasonably safe sedan. Raphael's testimony was directly relevant to whether Lindemann would have suffered the same injuries even in the absence of any vehicle deformation – because the acceleration forces and the mass resulted in sufficient accident forces to cause the types of injuries Lindemann sustained ($F=M \times A$). Without such testimony, the jury would not have been able to properly evaluate whether or not the forces exerted on

Lindemann's body were entirely due to the crash forces or due to vehicle deformation.

Plaintiffs try to claim that the probative value of Raphael's testimony was "nil" because the probative value must be determined solely "in light of the Product Liability Act, Chap. 7.72 RCW, because that was the asserted basis for Toyota's liability." AB 26. But the probative value of Raphael's testimony is determined by looking at whether it has the tendency to make the existence of *any fact* that is of consequence to the determination of the action more probable or less probable than it would be without the evidence – not just one fact. ER 401. Testimony tending to prove or disprove defect or causation is certainly relevant to a fact of consequence to this action, as evidenced by the causation instruction to the jury. CP 1018.

The trial court's reasons for Raphael's testimony were unimpeachable and easily within its discretion:

I certainly recognize that there is potential prejudice against obese people, but I think that if it were only being introduced for reasons of inciting a prejudice, certainly I would agree with you [that it should be excluded under ER 403]. But in this case, I think that it's an essential part of the defense in the case, and therefore, they have to be able to be allowed to present it.

3/18 RP 106:13-20.

3. Dr. Raphael's Testimony Did Not Violate The Eggshell Plaintiff Rule.

Plaintiffs also assert that Raphael's testimony violated the eggshell-plaintiff rule. AB 35-43. On this issue too, plaintiffs are

incorrect – because the eggshell-plaintiff rule only applies to determining what damages are proximately caused *after* a tort has been established. As plaintiffs’ counsel acknowledged below, the eggshell rule has no role in determining whether the act was wrongful in the first place or whether plaintiff suffered any damage.

The Washington Supreme Court has consistently held that the eggshell-plaintiff rule determines the consequences when the defendant’s act is determined to have been “wrongful” and would ordinarily be “injurious.” In that situation, the eggshell rule holds a defendant responsible if the consequences of a “negligent injury” are more serious because of the plaintiff’s delicate condition:

If the original act of the defendant was wrongful, and would naturally, according to the ordinary course of events, prove injurious to some other person or persons, and does actually result in injury through the intervention of other causes which were not wrongful, the rule is that the injury shall be referred to the wrongful cause, pass by those which were innocent... The rule is, if by reason of delicate condition of health the consequences of a negligent injury are more serious still, for those consequences the defendant is liable, although they are aggravated by imperfect bodily conditions.

Reeder v. Sears, Roebuck & Co., 41 Wn.2d 550, 556, 250 P.2d 518 (1952) (quoting *Jordan v. City of Seattle*, 30 Wn. 298, 302, 70 P. 743 (1902)(approving jury instruction)) (emphasis added). *Accord*, *McCormick v. Jones*, 152 Wn. 508, 513-14, 278 P. 181 (1929) (quoting *Jordan*); *Frye v. Jensen*, 144 Wn. 553, 556-57, 258 P. 497 (1927) (approving jury instruction that “if by reason of delicate condition of

health the consequences of a *negligent injury* are more serious' than the consequences of a negligent injury would be to a person of robust health, the person causing the injury is liable therefor") (emphasis added).

In these cases, the eggshell-plaintiff rule applied *only* to determine the scope of defendant's responsibility for a wrongful act that already caused some other injury, *not* whether the defendant had acted wrongfully or caused any injury to begin with. The Second and Third Restatements of Torts confirm this basic rule. The former specified that "[t]he *negligent actor* is subject to liability for harm to another although a physical condition of the other which is neither known nor should be known to the actor makes the injury greater than [reasonably foreseeable]." Restatement (Second) of Torts § 461 (emphasis added). In the latter, the reporters wrote that "[w]hen an actor's *tortious conduct* causes harm to a person that, because of a preexisting physical or mental condition or other characteristics of the person, is of a greater magnitude or different type than might reasonably be expected, the actor is nevertheless subject to liability for all such harm to the person." Restatement (Third) of Torts - Liability for Physical and Emotional Harm § 31 (emphasis added).

Even plaintiffs' proposed eggshell-plaintiff instruction was not directed to whether Toyota was liable (whether the Lexus was defectively designed), but only to the scope of damages caused by an otherwise-tortious act. The proposed instruction (which was wrong for other reasons, Part II.C.2 below) would have told the jury that "[i]f your verdict is for the plaintiffs" the damages should include injuries that are greater

because of a pre-existing condition. CP 1094 (emphasis added).

In the court below, plaintiffs' counsel agreed that the eggshell-plaintiff rule does not apply to duty or breach of duty, and applies only when a breach has already caused some damage. Plaintiffs' counsel admitted that "the eggshell plaintiff cases are all about causation," they are "not about duty or breach," and "[d]uty and breach is established irrespective of eggshell plaintiff." 3/18 RP 97:4-13. Counsel's recitation of the rule acknowledged that wrongful conduct *and* injury are needed before the eggshell rule comes into play: "*Once she's injured because of the negligence, in this case strict liability* of the party, any *extra* injuries are all in the same pot." 3/18 RP 105:15-19 (emphasis added).

Raphael's testimony went to at least two issues not covered by the eggshell plaintiff rule: whether the design was unreasonably dangerous, and whether plaintiff suffered *any* injuries because of the claimed defects.

First, as Toyota explained, Raphael's opinions were "absolutely relevant to the issue of whether or not the vehicle was defectively designed in the first place." 3/18 RP 103:1-11. The jury was instructed that a product is not reasonably safe if the likelihood the product would cause injury similar to that claimed by plaintiffs, and the seriousness of that injury, outweighs the burden to design a product that would not have caused such damage and the adverse effect of an alternative design. CP 1016. Evidence that injuries like Lindemann's result from the crash forces (and her body type), regardless of vehicle deformation, is relevant to show the likelihood of the product causing such injuries is low and that

Lindemann's injuries do not lead to a finding of design defect. Similarly, the jury was instructed that a product is not reasonably safe if it is dangerous to an extent beyond that contemplated by the ordinary user, taking into account, *inter alia*, the seriousness of potential harm. CP 1016. Evidence that Lindemann sustained these injuries from the accident forces themselves, regardless of deformation, is relevant to show that the *product* was not dangerous in a way exceeding ordinary users' expectations. Because Raphael's testimony was relevant to whether the manufacturer breached a duty, it could not have violated the eggshell-plaintiff rule.

Second, as Toyota explained, the eggshell-plaintiff rule does not apply to the question whether the design caused *any enhanced* injuries: "whether or not the design of the vehicle contributed in any way or made the injuries worse over and above what they would have been just from the speeds and the mass of her body going forward." 3/18 RP 103:1-11. Plaintiff here was suing only for *enhanced* injuries that she claimed were caused by the Lexus' design. The jury was instructed that she had to prove that a defect "caused the plaintiff injuries which she would not have otherwise sustained in the accident or collision, absent the product defect." CP 1015; *see Baumgardner v. American Motors Corp.*, 83 Wn.2d 751, 758, 522 P.2d 829 (1974) (manufacturer can be held liable in negligence or strict liability for defects that proximately cause "enhanced injuries due to such defects"; plaintiff has burden to prove "nature and extent of the injuries proximately caused or enhanced by the defect").

In an enhanced-injury case, the only injuries caused by a *defect* are

those injuries, if any, that were over and above those injuries Lindemann suffered from the accident forces alone. Because the eggshell-plaintiff rule does not apply unless defendant's breach of duty has caused *some* injury independent of plaintiff's fragile condition, it cannot bar evidence that *all* of plaintiff's injuries were caused by the accident forces, not by a defect.

Plaintiffs cite no case holding that the eggshell-plaintiff rule excludes evidence that plaintiff was injured not because of a product defect but because of the accident forces and her own condition. Such a rule would defy common sense and turn manufacturers into insurers. Suppose an 85-year-old driver has fragile ribs because of osteoporosis and sustains a broken rib in a 3-mph accident. She sues the manufacturer, claiming that no reasonable consumer would expect a broken rib from a trivial accident. *Cf. Pruitt v. General Motors Corp.*, 72 Cal. App. 4th 1480, 1482, 86 Cal.Rptr.2d 4 (1999) (75-year-old plaintiff with "extreme bone atrophy" and jaw that was "very fragile and susceptible to injury" sued manufacturer because her jaw fractured in three places from deploying airbag; plaintiff testified at trial that she did not expect airbag to break her jaw). On plaintiffs' theory, the manufacturer would be barred from proving that plaintiff's rib was broken because of her osteoporosis. That would make no sense.

Nor do plaintiffs' cases say any such thing. None bars evidence that plaintiff was injured because of her condition and not by defendant's product. They concern the measure of damages. For example, in *Primm v. United States Fidelity & Guaranty Insurance Corp.*, 922 S.W.2d 319

(Ark. 1996), a student with spina bifida sued his school's insurer for the school's negligent supervision, after a fellow student tipped his wheelchair over while they were unattended. 922 S.W.2d at 320. The court there approved a "Measure of Damages" jury instruction that any *damages* included the full extent of any injury sustained even though the degree of injury resulted from a preexisting condition. *Id.* at 320-21. It did not suggest plaintiff's fragile condition must be ignored in deciding whether defendant owed a duty to prevent the injury or whether defendant breached a duty or caused any damages – issues addressed by Raphael's testimony here. In *Benn v. Thomas*, 512 N.W.2d 537 (Iowa 1994), the issue was the measure of damages where a defendant that had *negligently* caused a motor vehicle accident that injured the decedent and aggravated a pre-existing heart condition. 512 N.W.2d at 538. It did not endorse use of the eggshell-plaintiff rule to exclude evidence, let alone evidence tending to show that the defendant did not violate any duty or cause any injury. To the contrary, the court there stated the rule (as applicable to a defendant found negligent) as: "*Once the plaintiff establishes that the defendant caused some injury to the plaintiff*, the rule imposes liability for the full extent of those injuries, not merely those that were foreseeable to the defendant." 512 N.W.2d at 539-40 (emphasis added).

Similarly, *Casey v. Frederickson Motor Express Corp.*, 387 S.E.2d 177 (N.C. App. 1990), involved a *negligent* defendant. It did not bar evidence that the defendant was not at fault at all for plaintiff's injury. To the contrary, it confirms that the eggshell rule does *not* bar evidence that

defendant's conduct would not have caused injury without plaintiff's special susceptibility. It approved an instruction that "*When a defendant's negligent conduct would not have resulted in any injury to a plaintiff of ordinary susceptibility, the defendant would not be liable for the harmful consequences which result from the plaintiff's peculiar susceptibilities, such as a pre-existing disease or an extraordinary condition*" unless the defendant knew or should have known of plaintiff's condition. 387 S.E.2d at 179 (emphasis added). Even under plaintiffs' cases, the eggshell-plaintiff rule did not bar Toyota from presenting evidence – through Raphael – that its design did not enhance Lindemann's injuries and that she was injured because of the accident forces and her body mass.

C. The Trial Court Did Not Prejudicially Err in Rejecting Plaintiffs' Proposed Eggshell-Plaintiff Instruction.

Plaintiffs complain that the trial court denied their requested eggshell-plaintiff instruction. AB 35-43. The trial court's refusal to give an instruction is reviewed for abuse of discretion. *Stiley v. Block*, 130 Wn.2d 486, 498, 925 P.2d 194 (1996). Only if rejection is founded on an erroneous understanding of the law is review de novo. *State v. Winings*, 126 Wn. App. 75, 86; 107 P.3d 141 (2005). Denial of this instruction could not have prejudiced plaintiffs and was moreover correct.

1. Denial Of The Instruction Was Not Prejudicial.

Denial of plaintiffs' proposed eggshell-plaintiff instruction, whether error or not, did not affect the trial's outcome. In line with the rule that the eggshell-plaintiff rule does not apply unless the defendant's conduct was

otherwise wrongful (Part IV.B.3 above), the proposed instruction would have applied *only* if the jury's defect finding had been for plaintiffs. CP 1094 ("If your verdict is for the plaintiffs"). The jury here found no defect, so its verdict was for defendants. CP 1027-28. The instruction would never have come into play even if it had been given, so refusal to give it was harmless. *Peacock v. Piper*, 81 Wash.2d 731, 738-39 504 P.2d 1124 (1973) (where proposed instruction only applied if jury found at least one defendant liable, and jury found for all defendants, denial was not prejudicial). Indeed, since the eggshell-plaintiff rule does not affect the existence or breach of duty (Part IV.B.3 above), it would have been error for such an instruction to affect the no-defect finding.

Since the proposed instruction went only to causation and damages issues the jury never reached, denying the instruction, whether or not error, was harmless. *Boeke v. Int'l Paint Co. (California), Inc.*, 27 Wn. App. 611, 615, 620 P.2d 103 (1980) (any error in denying instruction harmless where subject of instruction was moot given verdict); *Okkerse v. Westgate Mobile Homes, Inc.*, 18 Wn. App. 45, 48-49 (1977) (similar); see *State v. Bourgeois*, 133 Wn.2d 389, 403, 945 P.2d 1120 (1997) (any error is harmless absent reasonable probability that it changed the outcome).

2. Plaintiffs' Instruction Was Legally Incorrect.

Finally, plaintiffs' proposed instruction was legally incorrect in this enhanced-injury/crashworthiness case. The trial court properly rejected it, because it misstates the law in an enhanced-injury case.

An enhanced-injury defendant is only liable for the *enhanced* injuries caused by the defect, over and above the injuries plaintiff would have sustained with a reasonably safe vehicle. WPI 110.02.02; *Couch v. Mine Safety Appliances Co.*, 107 Wn.2d 232, 241-43, 246, 728 P.2d 585 (1986) (approving instruction that “the manufacturer is liable for injuries or harm proximately caused by the defective design over and above the damages that would have occurred if its product had been reasonably safe.”); *see Baumgardner*, 83 Wn.2d at 758.

Plaintiffs’ proposed instruction violated this principle. Had the jury found Toyota liable, plaintiffs’ proposed instruction would have incorrectly held Toyota liable for *all* of Lindemann’s injuries – even her non-enhanced injuries (injuries she would have suffered in the same accident in a reasonably safe vehicle). Plaintiffs’ proposed instruction stated that if the jury’s verdict was for plaintiffs, and if “before this occurrence” Lindemann had a condition that was not causing pain or disability, and the condition made her more susceptible to injury, the jury should consider “all the injuries and damages that were proximately caused *by the occurrence*” even though they may have been greater because of the pre-existing condition. CP 1094 (emphasis added). The instruction would have wrongly held Toyota liable for “all the injuries and damages” caused by the *accident* (“occurrence”) instead of just the *enhanced* damages caused by whatever *defect* the jury found.

Plaintiffs miss the point in arguing that “[t]here is no authority for ignoring [the eggshell] principle in crashworthiness cases.” AB 41. The

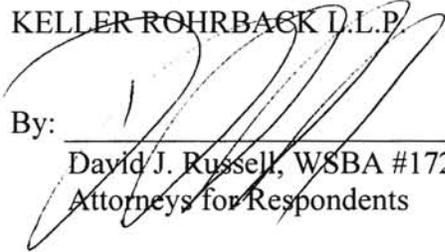
relevant “authority” holds that a crashworthiness defendant is liable only for the enhanced injuries caused by the defect, not all injuries caused by the accident. Plaintiffs’ cases say nothing different. Plaintiffs merely cite garden-variety eggshell plaintiff cases. AB 40-43. There is no dispute that Washington law contains an eggshell-plaintiff principle. *Reeder, supra*, 41 Wn.2d at 556; pp. 41-42 above. But that principle only holds the defendant, when liable, for “the consequences of a negligent [or now strict liability] injury.” *Reeder*, 41 Wn.2d at 556. Here, the consequences of the strict-liability injury are the enhanced injuries that would not have been suffered with a reasonably safe product; they do not include non-enhanced injuries that plaintiff would have suffered without a defect. Because plaintiffs’ proposed instruction would have dramatically expanded Toyota’s liability beyond damages that it had caused (if found liable), and granted plaintiffs recovery for non-enhanced damages that Toyota did *not* cause, it was erroneous and the trial court properly refused it.

V. CONCLUSION

The Court should affirm.

DATED: December 18, 2013

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