**STATE’S DIRECT EXAMINATION AT PRELIMINARY HEARING**

**OF PEDIATRIC NEUROSURGEON REGARDING**

**SHAKEN BABY SYNDROME IN CHILD HOMICIDE CASE**

**DIRECT EXAMINATION**

**By Prosecutor:**

**Q.** Good afternoon. Would you please state your full name and spell it for the record.

**A.** It’s M.W.

**Q.** What is your profession, sir?

**A.** I’m a pediatric neurosurgeon.

**Q.** What’s the nature of your current employment?

**A.** I’m full time faculty at the University of Utah. I’m chairman of the Division of Pediatric

Neurosurgery at the PCMC.

**Q.** Would you share with the court and with the rest of us a brief synopsis of your

educational background?

**THE COURT:** Well, Defense Counsel, for the purposes of this preliminary hearing will you stipulate to the doctor’s qualifications?

**Defense Counsel:** I will, Your Honor. I would like them to provide in lieu of that a recent C.V.

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**Q.** (by prosecutor) Let me just ask you a few quick questions, Dr. W. In connection with

your employment and training as a pediatric neurosurgeon, have you become familiar with diagnosing the causes of injuries, specifically head injuries and central nervous system injuries to young children?

**A.** Yes, I have.

**Q.** Have you had clinical experience in diagnosing the cause of those types of injuries?

**A.** Yes.

**Q.** Do you have some estimate of how many children you may have seen either in treatment,

in diagnosis or consulting with other physicians during your career?

**A.** These would be just children with head injuries?

**Q.** Yes.

**A.** No matter what the cause?

**Q.** That’s correct.

**A.** It would literally be thousands. We see several hundred a year, 200 or 300 a year. I’ve

been in practice there for 15 years.

**Q.** And approximately how many of those children were suspected of having been abused?

**A.** Between 600 and 700, I think, is a good estimate.

**Q.** Dr. W., are you familiar with studies that have been done relating to the effects on young children of simple falls from up to a distance of five feet or a height of five feet?

**A.** Yes.

**Q.** What have those studies shown?

**A.** Those studies have shown that falls from what we call common heights, falls from the bed, from the table, from the changing table, chairs and so forth, are rarely, and I emphasize rarely, associated with serious injury.

 Mostly they are associated with either no injury or bruising or orthopedic concerns such

as a broken arm. Depending on the series that you read, upwards of 10 percent of the children who fall from a height between three and five feet will have a skull fracture, but no brain injury, only a skull fracture. So that they have no underlying brain injury and often are not—no specific treatment is needed.

**Q.** In those studies that you are familiar with where a child fell from that type of a height or

that kind of a circumstance, did any of those children die from those injuries?

**A.** No.

**Q.** Have you participated in studies that have been done in Utah along those lines as well?

**A.** Yes.

**Q.** And would you tell us about those and the results?

**A.** We’ve done two studies which may be pertinent to what you are asking. One was a study looking at the cause of serious injury—I’m sorry, serious head injury in children that were admitted to the Primary Children’s Medical Center and approximately 90 percent of the overall admissions for serious head injuries were due to either automobile accidents or auto/pedestrian accidents. That figure is interesting in that it’s—if you look at other urban centers, they would have a much higher incidence of falls from apartment buildings, but since we don’t have a population that lives in high-rises, at least very many people, we don’t see that like they would in Chicago, for example.

The overall admissions to our hospital of children who are abused is in the range of five

to seven percent. We looked at a different study and that was we looked at children under two years of age who died from a head injury and what was the reason they died. It’s curious because at that age you’re not generally riding around in the family car as much as the other family members may be, so what happens to this group of children. And it turns out is if you die from a head injury under two years of age that 70 percent of the time it’s abuse or non-accidental trauma.

**Defense Counsel:** Your Honor, I suppose I would object to the conclusion without some foundation as to whose determination it has been that they died of abuse.

**Q.** (by prosecutor) Could you tell us how that study was conducted?

**A.** The study was conducted by the medical community determining that there were no other—either it was obvious abuse or it was a situation where it was strongly medically suspected, not necessarily proven in court because so many of those cases don’t actually end up going through the system here.

**Q.** So when you say that 70 percent of the cases were found to be related to non-accidental trauma or abuse, that’s a medical conclusion; is that correct?

**A.** Yes.

**THE COURT:** There was an objection. I’m going to overrule the objection since this is strictly preliminary as to the doctor’s observations and that of child abuse so that will be received.

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**Q.** (by prosecutor) Dr. W., in your position, and as I understand it you’re a member of the

child protection team at the Primary Children’s Hospital; is that correct?

**A.** Yes.

**Q.** Is it common for you to consult with other physicians and render opinions as to the cause

of injuries with children, with young children?

**A.** Yes.

**Q.** Are you familiar with what is termed the Impact Whiplash Shaken Baby Syndrome?

**A.** Yes, I am.

**Q.** Will you tell us generally what that phrase refers to in the profession?

**A.** It refers to almost exclusively young children that are picked up and shaken violently back and forth. Many of these children then are bashed, so to speak. As they are being shaken their head is being bashed down into something and that’s where the term Impact Shaken Baby comes from. Some of them, not all of them, obviously, have this impact injury also and they can sustain injury just on the basis of the whiplash-type motion that’s created by being shaken.

**Q.** Is this syndrome a diagnosis that’s widely accepted in the field?

**A.** Yes, it is.

**Q.** And would you tell us what is the spectrum of possible injuries that can occur to a young infant involved in that kind of a shaking?

**A.** In regards to the nervous system, to the brain and the spinal cord, a baby has—technically we refer to these children as being under two years of age, but most of them are under one year of age that we see and they have very poor neck muscle control—that is, their neck muscles are not fully developed and strong as ours are. And when you shake a baby in that situation they cannot resist and hold their head still so that the head on top of the body literally bounces back and forth in a to-and-fro whiplash-type action That can cause direct injury to the brain, that is it’s what we call shear forces, but the stopping and starting and going back and forth creates a shearing action and it literally can tear the brain, especially in these children whose brain is not yet mature. In addition, it could tear blood vessels that are around the brain. In addition, it could bruise the brain by bouncing off the inside of the skull, and it can cause problems at the junction between the spinal column and the skull by this whiplash-type action creating forces so that there is dislocation between the spine and the skull.

**Q.** What part do retinal hemorrhages or other hemorrhages in the eye play in respect to this particular syndrome?

**A.** Most of the children we see with the Shaken Baby Syndrome have retinal hemorrhages. It does not have to happen, but the mechanism of this injury of shaking back and forth often forces blood down the optic—around the optic nerve, around the sheath that covers the optic nerve, into the back of the eye. So that when you look in the eye you can see blood and that has come to be an important part of the syndrome. If a little baby comes in and has retinal hemorrhages there is almost no other mechanism by which they can achieve that.

**Q.** Is there any particular aspect or particular type of injury that always must be present to

diagnose that a baby has been shaken?

**A.** No, it varies from case to case. One child will have a group of injuries and the next child

will have a little bit different grouping. The most common, familiar type is blood over the surface of the brain, retinal hemorrhages and a child who is deeply unconscious.

**Q.** Is it common or uncommon to have other injuries evident with a child who has been shaken such as external signs of trauma, bruises, skull fractures, those kinds of things?

**A.** That depends on what happens to the child, obviously. If someone has been striking the child with a blunt object, either the hand, the first or some object, then there can bruising and there can be a fracturing of the skull. The other thing that happens is when they are shaking the child and they bash the child’s head down onto something hard, that will often bruise the scalp and result in a skull fracture also. But if they don’t bash the child down, but it is a pure shake or if they throw the child down onto something that’s more soft, then you don’t see the bruising. And I have seen many cases, actually, where there is a fracture but overlaying the fracture there is no bruising whatsoever so it varies.

**Q.** Can the type of injuries that you’ve talked about be fatal to a young infant?

**A.** Yes.

**Q.** And what are the types of things that can cause a risk of death in the shaken baby situation?

**A.** Well, the shearing of the brain itself, which I mentioned, can cause death. The bleeding that occurs in the brain can lead to death because of the blood that occurs. The brain swelling is the most common form of death in these children because of the massive swelling which they usually get, especially if there has been bleeding, and if you injure the brain stem at the junction between the spine and the skull, then that can essentially cause instant death because you damage the ability to breathe and your consciousness.

**Q.** Now, Dr. W., were you asked to review records relating to the fatal injury suffered by R.O.C.?

**A.** I was.

**Q.** And what records did you have occasion to review?

**A.** I reviewed his hospital record including his transport and emergency room and ICU, intensive care unit, records and I reviewed the autopsy records.

**Q.** Are those the types of records that you would ordinarily review in order to render an opinion as the cause of injuries to a child?

**A.** Yes.

**Q.** What were the actual findings that were documented in those records as the injuries that were suffered by R.O.C.?

**A.** I’m not sure where you would like me to start, but in the records I reviewed, at the time he was initially seen by the paramedics he was not breathing, was unconscious and was in a full arrest, cardiac as well as respiratory arrest. Eventually after resuscitation he developed a heart rhythm but was never able to breathe on his own other than a few agonal gasps, which were not effective breathing. He was essentially brain dead when he was found, remained that way, was method criteria for brain death the following day when he died the day following his injuries. The pertinent information that was helpful to me was the autopsy information, which showed some blood at the base of the brain, two separate areas of bleeding in the lower brain stem and the upper cervical spinal cord and hemorrhages in the eyes.

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**Q.** Is that particular collection of injuries something that’s common in infants?

**A.** It’s common from trauma. It doesn’t occur—the only other circumstance where that can

occur without trauma is the rupture of a blood vessel, either an aneurysm or what we call an arteriovenous malformation. We always look for that circumstance. It’s exquisitely rare. I’ve seen it one time in my years of practice. My colleagues around the country will tell you they’re never seen it or they’ve seen it once or twice.

**Defense Counsel:** Objection to that, move to strike the last answer.

**THE COURT:** The last phrase will be stricken out.

**Q.** (by prosecutor) Dr. W., were you—as you reviewed these records were you satisfied that both that and any other natural cause of this condition was ruled out?

**A.** Yes.

**Q.** Based upon the review that you did and upon your training and experience, are you able to render an opinion as to what likely caused the death of R.O.C.?

**A.** Yes.

**Q.** What is your opinion, doctor?

**A.** That he was shaken violently resulting in an injury to the cranial/vertebral junction at the junction of the cervical spinal cord and the brain stem, that he had injury to the blood vessels in that area resulting in a small amount of bleeding and as a stroke or infraction of his brain, lower brain stem resulting in not being able to breathe, unconsciousness and death.

**Q.** Do you have an opinion as to the likely mechanism? You mentioned shaking. Will you tell us a little bit more what you believe occurred here?

**A.** In the absence of other signs of bruising, I believe that he was shaken in a whiplash-type fashion in a violent nature. This cannot happen innocently in the sense of just trying to shake a child to get their attention. I believe that mechanism is what created the injuries to this child.

**Q.** When you say violent, do you have an opinion as to whether this was a sustained action, a sustained shaking or just a single shake?

**A.** I do.

**Q.** And what is that opinion?

**A.** This was sustained.

**Q.** Are you able to state an opinion as to how long before the baby went into complete arrest the injuries were likely inflicted?

**A.** The baby went into—the baby probably became unconscious immediately and within a few minutes, if not immediately, stopped breathing.

**Q.** What is the basis for that opinion, doctor?

**A.** Because of the injuries suffered at the brain stem, that injury is not consistent with breathing.

**Q.** Is what you have seen in this case consistent with any injury happening hours or even half a day earlier and slow bleeding causing the problem?

**A.** No. In fact, it’s obvious that did not happen. There is only a small amount of blood there. The blood is not what caused the baby to die.

**Q.** There has been testimony before the court that there were three separate areas of hemorrhage up and down, basically, R.’s spinal column. What significance does that have to you as a neurosurgeon?

**A.** I think it’s important because we obviously would like to be able to find a cause of

spontaneous bleeding if that did indeed happen. The autopsy was done very carefully to look for evidence of spontaneous hemorrhage. There is none. The fact that—the autopsy I reviewed showed two spots near the brain stem that were separate areas of hemorrhage. If there is a third area, that just further, I think, substantiates the fact that it was trauma and there were separate injuries not all of a sudden three places that just decided to bleed.

**Q.** Again, Dr. W., from your training and experience, are you able to say whether this collection of injuries was likely a result of a fall from, say, two to three feet?

**A.** It was not.

**Q.** If the explanation offered by the caretaker was that the child was dropped from her arms while putting him into a play pen with a pliable bottom, that he fell somewhere between 18 inches and three feet onto that bottom of the play pen, but she still had some grasp of his leg and the back of his head and the back of his neck impacted with the bottom of the playpen and bent forward and that that fall occurred at 9:30 in the morning the day of his death, that he was fussy and somewhat sleepy but otherwise seemed okay during the day and finally that the baby awoke from a nap at 2:30 to 3:00 in the afternoon, she picked him up and suddenly he went into full arrest. In your opinion, is that accidental sufficient to account for the injury that he suffered?

**A.** No, it is not.

**Q.** Would you explain to us why not?

**A.** Because that mechanism of injury does not explain the force necessary to generate the kind of injuries this child sustained. You just don’t get this kind of injury from that fall, plus where there were two or three sites of bleeding, that’s two or three sites of injury. It would not have happened from a single fall.

**Q.** Is there anything about the timing of the fall and the time that the baby went into arrest that enters into your opinion about that?

**A.** No.

**Q.** Do you have an opinion as to whether the injury that was evident with R. could have occurred at 9:30 in the morning and that he seemed okay although maybe fussy and sleepy and then suddenly went into arrest at 2:30 in the afternoon?

**A.** I do.

**Q.** And what is that?

**A.** It’s not consistent with the type of injuries that were found in this young man. Whatever happened instantly to his brain stem and there is nothing there to explain later deterioration. No hemorrhage or expanding blood clot to explain that.

**Q.** Could these injuries have been caused by simply throwing the baby down into a crib or a playpen?

**A.** No.

**Q.** —with some force? Doctor, can you tell us what a person who is engaged in this type of shaking would actually see happening as they do the shake to the infant? What would they likely see happen?

**A.** They would see the head dramatically bouncing back and forth on top of the infant’s body as the shaking is happening so that it rapidly is bouncing back and forth.

**Q.** And I think you said earlier that likely he went into full arrest within a short time after that?

**A.** Yes.

**Q.** Possibly immediately?

**A.** Yes.

**Q.** In your opinion, doctor, is there any other medical explanation for the type of injuries that were found with R. other than a severe and repeated shaking?

**A.** No, there isn’t.

**Q.** Again, based on your training and experience and what you have seen in this case, does this type of severe and repeated shaking involve a grave risk of death to an infant two months of age?

**A.** Yes, it does.

**Prosecutor:** I believe that’s all I have, your Honor.

**CROSS-EXAMINATION**

**Q.** (by defense counsel) Dr. W., do you serve on any child advocacy committees or boards, interest groups other than the child protection team in which you work at P CH?

**A.** I do not.

**Q.** Have you ever held such memberships?

**A.** No.

**Q.** Did you attend R.C. at all while he was still on life support systems?

**A.** No, I did not.

**Q.** Did you view him at all while—prior to the pronouncement of death?

**A.** Not to my knowledge.

**Q.** Did you attend his autopsy?

**A.** No.

**Q.** When you testified that you had, and I think you were using the plural “we” so I want to clarify your own involvement in the 600 to 700 cases that medical personnel had determined to be cases of abused children at PCH, was that a population of children who had suffered head injuries that had been abused or injuries to any parts of their bodies that were the result of abuse?

**A.** Head injuries.

**Q.** And over what number of years was that?

**A** Well, my figure was an estimate and it’s based on—I recently queried the computer and found that we have seen—by “we” I mean the neurosurgical service at PC of which I am chairman and during which period I have been there all this time, our service has seen 307 what we think are abused children with head injuries that were admitted to the intensive case unit over the past four years.

**Q.** So you extrapolated back to get the 600 or 700?

**A.** We have a number of children who do not require ICU care who have head injuries and abuse. So there would be maybe another hundred in that four-year period and then looking at it over a 15-year period it’s a conservative estimate.

**Q.** And of that 600 or 700 estimate, how many of those children did you have primary responsibility for?

**A.** Again, I would be guessing, but probably more than half. During one year of that period I was without an associate.

**Q.** So in more than half of those cases you would have rendered medical services on behalf of those children?

**A.** Yes.

**Q.** And what is your board certification in?

**A.** American Board of Neurological Surgery.

**Q.** You told Judge G. that falls from a common height rarely, and you said I underlined rarely or emphasized rarely, result in serious injury. I take it that means that in a rare occasion an accidental fall has resulted in this kind of severe death causing or at least severe injury?

**A.** Yes.

**Q.** Have you ever had such a child admitted to Primary during your stay there?

**A.** Yes.

**Q.** On how many occasions?

**A.** Actually I can only recall one.

**Q.** What were the circumstances of that child’s injury as you determined them to be?

**A.** The child fell from a chair, was standing on a chair and fell backwards off the chair hitting the back of his head as the first point of impact. He sustained bleeding over the surface of the brain and developed what we call a subdural hematoma.

**Q.** Was it a fatal injury?

**A.** No.

**Q.** But life threatening?

**A.** Yes.

**Q.** How old was that child?

**A.** I believe he was approximately two years old.

**Q.** After striking the—did he hit the back of head on the chair or on the floor?

**A.** On the floor.

**Q.** Were there any other head injuries he sustained other than, I think you said it was a subdural—what was his injury, subdural—

**A.** Subdural hematoma, yes.

**Q.** Do you know if he had retinal hemorrhaging?

**A.** He did not have retinal hemorrhaging.

**Q.** You cited generally a number of studies that put the—that discussed the serious injury result from falls of three to five feet. Do you have a particular study that you were relying on in providing that information to the court?

**A.** There are several studies. My memory—I’ll have a hard time remembering on specifics. There are two studies I know from the mid-seventies looking at children who fell from what I termed common heights. One study involving approximately 600 children and the other study I think was 66 children.

**Q.** Do you remember the journal that these studies were in?

**A.** One was in the Journal of Trauma and one was in the—it was a pediatric journal, one of the pediatric journals.

**Q.** So I take it you did not review those articles prior to testifying?

**A.** Actually I did but it’s been—I didn’t do it today and I don’t remember the specifics.

**Q.** Were those, unknown, at least unremembered journals the source of the 90 percent figure of head injuries in children?

**A.** No, that’s actually an article that I authored.

**Q.** You should remember that one.

**A.** That one is in a journal called Child’s Brain. I can’t tell you which year though. It was early eighties.

**Q.** Early eighties?

**A.** I will be happy to give you a reprint.

**Q.** I would like to have one. When you cited to the court a statistic that five to seven percent of the—and I believe you limited it to head injured children admitted to PCH have been abused, is that the population that you were talking about?

**A.** It’s a little more closely defined. It was in the reference to the same article where most of them were automobile accidents or automobile/pedestrian accidents. These were only children who had what we defined as serious head injuries, that is they were unconscious more than six hours. And if you look at that population, which excludes those kids which were unconscious for a short time and woke up, that population was like five to seven percent was non-accidental trauma.

**Q.** Again, that was a medical judgment that these were abused children?

**A.** Yes, it was.

**Q.** Has any attempt—Do you know of any attempt that PCH has undertaken to determine what percentage of those cases in which the medical staff concludes that there is abuse later result in pleas of guilty or conviction of some offense involving child abuse?

**A.** I don’t know.

**Q.** Do you have an opinion about what that correlation, if any, has been during the 15 years you’ve been at P?

**A.** I’m not sure I understand your question. Do I have an opinion about how many of these are proven in court?

**Q.** Either through pleas of guilty or through convictions of a jury of some child abuse related offense?

**A.** Well, I would say that a very small percentage of them actually end up in court. Most of them end up in therapy situations. My opinion is that the ones that end up in the court system, a very high percentage of those end up with a guilty verdict or a guilty plea of some kind. My guess would be three-fourths probably.

**Q.** Of that latter group—but you’re saying it’s a minority? Do you think it’s as little as ten or 15 percent that ever gets into a court system?

**A.** Probably.

**Q.** The second PCH study that you cited involving children under two who died from head injuries being victims 70 percent of the time of abuse, which was again a medical determination. Was that a study which you authored?

**A.** That’s not a published study. It’s a study that I did personally.

**Q.** Okay.

**A.** Looking at our patients but that data was not published.

**Q.** So it is today—it’s not in accessible printed form by you?

**A.** That’s correct.

**Q.** What is the difference, in your opinion, between an injury that is obviously the result of abuse or an injury—with an injury that is strongly presumed to be abuse?

**A.** An obvious abuse situation would be one in which there are multiple injuries that have occurred at the same time and period instead of just one and the history of sustained injuries is not adequate to explain, that would be a very high suspicion at least of abuse and then the nature of the injuries that are found. Certain types of skull fractures are more strongly suggestive of abuse. Bilateral skull fractures as opposed to just one side, the type of bleeding that may occur in the brain, those things sort of add up to making it more strong or not.

**Q.** Then into what—what are the criteria for your second category, those in which abuse is strongly presumed but not obvious?

**A.** The nature of the injury.

**Q.** Now, you’ve used that for both categories so help me see the difference.

**A.** It’s a little hard to explain. What I’m trying to say, I guess, is that there are some injuries that I think from a medical perspective I’m very comfortable in saying that they just couldn’t have occurred without an injury causing them and a certain type of injury and if the story does not match that then I think that very strongly speaks that it occurred in a different way.

Sometimes the story—nothing is perfect so sometimes the story that’s told can explain

the problem. For example, the child fell down the stairwell and there may be multiple bruises and multiple injuries that occurred at the same time, but the nature of the story that’s told or the nature of the findings in the child just make one suspicious that the story is not correct, although it could be.

**Q.** Is it your opinion—Is it your understanding that the long description that the prosecutor gave you of an event that the defendant described regarding a fall into a playpen was her statement of how R.C. was injured?

**A.** I think that was presented to me as a hypothetical. If this happened, if this is what happened, what would I think.

**Q.** Is it your understanding that the defendant made a statement to the police describing that kind of scenario?

**A.** I don’t know if she did or not.

**Q.** Well, when portrayed to you, when given to you, was it your understanding that that statement of an event had been given, if that were given as an explanation of the injury, whether or not it would be likely true or believable or accurate as causing the injury?

**A.** Again, if I understand you correctly, I was told that that was—I honestly don’t remember if I was told that was what she said or if that was a hypothetical or whatever, but I think it was given to me as a story that essentially was hypothetical was what I was thinking of it was and, yes, I thought that was not consistent with the injuries found at autopsy.

**Q.** Would it not be your practice—I take it if caretakers or parents or paramedics bring a seriously head injured child to your facility that you would, you or a staff member, would want to make some inquiry of persons who might have information regarding the source of the injuries.

**A.** Correct.

**Q.** And you would expect to speak to a caretaker to find out what they might know about the scenario, would you not?

**A.** Yes.

**Q.** Would you not be likely to ask them to give you any information they had no matter how minor or not, but that might describe that child’s day, to help you get a complete picture?

**A.** Sure.

**Q.** So in such a scenario you would agree, would you not, that a person providing you information might give you a lot of irrelevant information which in no way relates to the cause of injury that you are interested in?

**A.** Yes.

**Q.** So a parent could report diarrhea and the child has a skull fracture and you know that diarrhea is not related.

**A.** Correct.

**Q.** And what you don’t know at this time, I take it, from the way the information was presented to you is whether the defendant who described such event was simply providing complete information of all of the possibilities or trying to account for the cause of injury?

**Prosecutor:** I’ll object to that, your Honor. I think he has already testified he doesn’t know whether she’s ever said that so he can’t further speculate beyond that.

**THE COURT:** If you will rephrase it, please.

**Q.** (by defense counsel) You were not told then, I take it, by anyone who described that playpen scenario to you whether it was given to them as a clear explanation of the injury or not, did you?

**A.** Technically, no, if that’s what you are asking.

**Q.** In the 15 years that you have been at PCH, in how many cases have you been involved in a fatal head injury in a child under two which was diagnosed as a whiplash or shaking injury without the impact component?

**A.** Many times. I’d have to—I don’t even know how to guess.

**Q.** 15?

**A.** I don’t know how many of those 600 patients were under two, but not the majority for sure, but the ones I’ve seen under two with the whiplash-type injury I would guess that.

**Q.** And these are fatal ones?

**A.** Right.

**Q.** Okay.

**A.** I would guess 10 percent or in that range.

**Q.** So maybe 60 or so in 15 years?

**A.** Probably less than that.

**Q.** We’re talking about maybe two a year?

**A.** Yes.

**Q.** Of the shaking syndrome deaths that have come to your attention in that under two population, what percentage of those deaths included some blunt force trauma or impact injury in addition to the shaking?

**A.** I think most of them did. That’s the same figure I was trying to come up with just now.

**Q.** Is that like 90 percent?

**A.** Yes.

**Q.** So this violent shaking that you have described has ordinarily manifested itself with other injuries to the child?

**A.** Yes.

**Q.** You have testified that most such shaken children have retinal hemorrhages, true?

**A.** Yes.

**Q.** And that that is one of the classic symptoms, is it not, of Shaken Baby Syndrome?

**A.** Yes.

**Q.** As considered by many, if not most physicians who study that area?

**A.** Yes.

**Q.** Could you very briefly draw for me on the board a diagram of the eye and show me where that retinal hemorrhaging occurs?

**A.** This is the eye.

**Q.** Okay.

**A.** The globe.

**Q.** Side view?

**A.** The lens. You are looking from the side. The light comes in here, passes through the lens. In purple I’ve drawn the retina, the layer which is light sensitive and the optic nerve enters from behind. Bleeding can literally occur anywhere, but the classical form is pools of blood that occur in the retinal layer, isolated pockets. After time that blood can spread around, but often it is little globs, so to speak, or blood that you see when you look into the eye graphs. The fluid that fills this back part of the eye also gets blood that dribbles through it.

**Q.** What is that area called?

**A.** It’s called the vitreous.

**Q.** All right. And it’s your understanding—is it your understanding that R.C. had the retinal hemorrhages that you have described in that, the back of the eye?

**A.** Yes.

**Q.** Is that the information based on the pathologist in Iowa?

**A.** Yes.

**Q.** In his report?

**A.** Yes.

**Q.** Could you mark for me—and just reviewing his report, he describes suprachoroidal and choroidal hemorrhages. Where are those hemorrhages?

**A.** Well, the choroidal layer is a layer on the retina. So again, it’s these hemorrhages that you see back here.

**Q.** That’s—the choroidal area is not anterior to the retinal area, it’s in front of it?

**A.** Yeah, it’s laying right on top of the retina.

**Q.** But it is not the retina?

**A.** No, it’s one of the layers of the retina. The retina has several layers.

**Q.** Is it your testimony then that suprachoroidal and choroidal hemorrhages are synonymous with retinal hemorrhages?

**A.** Yes.

**Q.** Could you note for me on that diagram where the pars plicata of the choroid is?

**A.** I have no idea.

**Q.** Did you read the report of Dr. F.—R.F.?

**A.** I did. That’s a point of anatomy that I just don’t remember where that is.

**Q.** And you didn’t look that up? Okay.

**A.** I did one time about 30 years ago.

**Q.** One of the statements in his report regarding the right eye is that a cross situation of the optic nerve demonstrates, it looks like rare red blood cells in the subdural space. What does he mean by that?

**A.** The dura is the lining or the covering around the brain. It extends out along the optic nerve before it comes to an end. In that space between the nerve and the dura, the sheath around the nerve, he is describing a few red blood cells.

**Q.** What is the significance of the word rare for that?

**A.** He doesn’t see many.

**Q.** Do you know why one would not often see red blood cells in that area? Is that another hemorrhage that is rare?

**A.** You’re not supposed to have any red blood cells there.

**Q.** When you indicated that the choroidal hemorrhaging was synonymous with retinal, we are in agreement, to make sure I understand, that you acknowledge that that area, the choroid, is the middle vascular tunic of the eye lying between the retina and the sclera; is that correct?

**A.** Right, yeah.

**Q.** So is the suprachoroidal hemorrhage a separate layer from the choroidal hemorrhage?

**A.** I honestly don’t know how technical he is with that. If you’re talking about—if you break down the layers of the retina, and I can’t do that for you, I think there are seven, the suprachoroidal hemorrhage would be hemorrhage outside the choroidal layer. If he is talking about hemorrhage in the choroidal itself, I’m not sure how that would look. As opposed to looking like a glob or a spot that we typically see, it might just look like a red retina. I’m not sure.

**Q.** Thank you. You can take your seat if you want. When you testified that almost no other mechanism can cause the retinal hemorrhages, are you referring—you’re not referring to accidental causes, you’re referring to all causes?

**A.** I’m referring to all causes.

**Q.** So it is a hemorrhage in the eye, for instance, unlike the kind of hemorrhages one may get in a death by ligature around the neck; is that correct?

**A.** Yes, it is.

**Q.** These—and these retinal hemorrhages are not visible to the naked eye the way the hemorrhages from a ligature death are; is that correct?

**A.** That is correct.

**Q.** In any of the shaken baby deaths in which you have had some involvement, and take your figure of two a year, have you ever encountered a set of injuries like the one involving R.C.?

**A.** Not exactly.

**Q.** And you would agree, would you not, that it is rare, to use your term, to have the injuries to the spinal cord and the hemorrhaging around the brain stem in the absence of any subdural hemorrhaging?

**A.** Yes.

**Q.** You’ve never seen that—you’ve never seen this before, this set of injuries, correct?

**A.** I don’t think I have, this exact set, no.

**Q.** You would have expected to have found subdural hemorrhaging in a shaken baby death, would you not?

**A.** The usual case you do.

**Q.** And in the usual case you don’t find the hemorrhaging along the spinal cord, do you?

**A.** I’m really not sure because it’s not often looked at.

**Q.** You have no personal knowledge in your time there at Primary of any other shaken baby deaths in which there was a hemorrhaging determined to be along the spinal cord, is that true?

**A.** No, I have—I have treated patients who have had tearing of the brain at the junction between the skull and the spine.

**Q.** Okay.

**A.** That had been the result of shaking; is that what you are asking me?

**Q.** No. You understand that in this case there was found to be, according to the autopsy report, specific trauma along the spinal cord not merely blood seeping from a brain stem junction injury, but actually what appeared to be trauma and original trauma along the length of the spinal cord. Is that your understanding?

**A.** Yes, it is.

**Q.** And you have never treated anyone with that kind of injury where it is understood to be a shaken baby case; isn’t that true?

**A.** I think yes, not that I know of.

**Q.** Did you review the medical records of R.’s prior hospitalization about a week or ten days before his death?

**A.** Yes, I did.

**Q.** Do you presently—Do you have a copy of that report?

**A.** I do not.

**Q.** Have you provided a copy to the county attorney’s office or to the prosecutor of that record?

**A.** No, I was provided a copy to look at from his office.

**Q.** From whose office?

**A.** From the prosecutor’s office.

**Q.** These were the records associated with the viral—

**A.** Yes.

**Defense Counsel:** I indicate I have not received a copy of those.

**Prosecutor:** I don’t have those either so we’ll have to clarify that.

………………………………………

**Q.** (by defense counsel) Did you see anything significant in that hospital chart that caught your eye in relationship to his death the following week?

**A.** No.

**Q.** What was the diagnosis of his prior admission?

**A.** I don’t recall what the diagnosis on the chart was.

**Q.** Did you understand it to be a lung, a congestion, a pneumonia, something along those lines?

**A.** I honestly don’t recall. I remember it was not impressive. It was a viral syndrome essentially of some kind.

**Q.** Did you determine what kinds of medications he had been on during that hospital stay?

**A.** I did review the records at that time. I do not remember what they were.

**Q.** Did you do any subsequent investigation to determine if any of those medications have had any reports of any spontaneous hemorrhaging or other complications that had relevance whatever to R.’s medical condition a week or so later?

**A.** No.

**Q.** You testified, doctor, that—I believe that the scenario in the shaken baby case as you believe it to have occurred here was violent shaking which caused the injury to the brain stem and the spinal cord bleeding and then a stroke in the area of the brain stem, in the brain stem.

………………………………..

**Q.** Was that your testimony, that there was ultimately a stroke, that this little boy had a stroke?

**A.** Yes.

**Q.** What was the cause of the stroke?

**A.** The injury that he sustained.

**Q.** And exactly what does the injury do to his physiology that causes a stroke to occur? First tell me what you mean by a stroke.

**A.** Well, I mean, by stroke I mean injury to a blood vessel and thereby lack of blood flow to an appropriate part of the brain. I believe that this was—that he suffered both a direct trauma to his brain stem and a stroke.

**Q.** Do you believe that at the time that the whiplash injury was occurring that the stroke was occurring immediately following the shaking?

**A.** Yes.

**Q.** And would the stroke then be the result, say, of a compression of the brain, the blood vessels in the brain stem, a rupture of some of those vessels? What is the injury?

**A.** Both. Bleeding because of rupture of the blood vessels and direct trauma compressing the blood vessels plus direct trauma, that is direct bruising to the brain itself.

**Q.** And how would bruising of the brain cause the stroke?

**A.** That’s a separate injury.

**Q.** That’s what—I was getting confused there. Okay. Now, did you see any evidence of bruising in the autopsy of R.C.?

**A.** Not directly, no.

**Q.** So even though you said there was bruising to the brain, there is no forensic finding to support that opinion; is that correct?

**A.** No direct—no gross pathological finding to support that.

**Q.** Does that mean nothing they could find, that they could see?

**A.** That’s correct.

**Q.** And so what is the difference between their not finding it and your saying it’s there?

**A.** Because of the mechanism of his injury. If he died right away we would not go through the usual evolution of more and more swelling and more and more lack of blood flow, so to speak. His brain was already dead or dying quickly so he could literally have hitting of the brain but not manifested as an outward bruise like you might normally see.

**Q.** Wouldn’t the fact that he was maintained on life support with blood continuing to circulate through his brain have permitted time for those bruises to have developed?

**A.** Not—excuse me, usually not.

**Q.** Not within the 18 or so hours since his shaking?

**A.** He required medication just to keep his blood pressure up.

**Q.** Uh-huh (affirmative).

**A.** And the brain was already dead.

**Q.** You’ve told the court that the kind of shaking that produced this injury could not be the kind of shaking that an adult would do to get a child’s attention. Do you remember that?

**A.** Yes.

**Q.** Isn’t it true that an adult could violently shake a child to get a child’s attention?

**A.** Could?

**Q.** Could.

**A.** Yes.

**Q.** Especially an adult who is angry either at the child or at someone else and who is essentially out of control themselves could do that?

**A.** Well, as a hypothetical—

**Q.** Uh-huh (affirmative).

**A.** —yes.

**Q.** I take it your testimony was intended to say that ordinarily an adult who simply wants to get a child’s attention would not be expected to use that kind of force to do so?

**A.** That’s correct.

**Q.** When you said that the injury in your view was the result of sustained shaking and not a single shaking—in the course, in the sort of millisecond by millisecond examination of the process of shaking on a baby, would I be correct—well, would you agree that there is a point in the shaking in which there is no injury followed by some succeeding point in which trauma has occurred?

**A.** Yes.

**Q.** So in a shaking scenario, if it’s your testimony that a single shake could not have accounted for this kind of injury, are you able to say whether it was the fourth shake or the eighth shake or the second shake that was responsible?

**A.** No, I’m just—I’m basing that on experimental models that have been designed to try to reproduce the mechanism that are involved here and you can’t do with a single shake.

**Q.** And is that because you can’t have sufficient force in one shake or because the pattern of Shaken Baby Syndrome and the reports of perpetrators of Shaken Baby Syndrome almost never report a single shake but report a pattern of shaking?

**A.** Actually I think it’s both. We certainly—I don’t know of a single instance in my own experience where I believed that it was a single shake and was somehow led to believe that. But again, in the experimental model it takes—you have to get the head moving back and forth. As higher forces are generated more injury is occurring.

**Q.** So it’s your testimony then that the more a baby is shaken the higher the velocity of the head?

**A.** To a degree, yeah. There is a limit, obviously.

**Q.** Would that not assume that the person doing the shaking is using greater and greater force?

**A.** I’m not sure. The baby can perhaps be generating some of that force by bouncing back and forth.

**Q.** Well, but any force that the baby—I thought because the baby doesn’t have sufficient—any control really at R’s age to control head movements, isn’t that true?

**A.** That’s true.

**Q.** That any of those head movements would be not forceful movements at all but sort of incidental kind of movements?

**A.** Well, there I must say we’re on ground here that I don’t know that I know what I’m talking about and nor do you.

**Q.** I’m glad you are on the record then.

**A.** You’re talking about the physics of how fast the head moves and whether the baby can by simply bouncing back and forth generate some of the force on his own and I don’t know and I don’t know that anybody knows the answers to that. It just makes sense that the more the baby is shaken the faster it goes.

**Q.** Wouldn’t it also make sense that the more times a baby is shaken the more opportunities there are for an injury to occur?

**A.** Yes.

**Q.** And you would agree that there will be a point in one particular movement that the trauma occurs? So what you don’t know is whether that would—could be on the first or the second or the fourth or the seventh shake?

**A.** That’s correct.

**Q.** You testified, doctor, that the injury was not consistent with breathing. What did you mean by that?

**A.** The location of the injury, the lower brain stem and the upper spinal cord is where the breathing center is in the brain.

**Q.** So because of this stroke or compression that have previously been described that, that would have suppressed breathing?

**A.** Yes.

**Q.** And virtually simultaneously cardiac activity?

**A.** Yes or no. It really varies from case to case. Some hearts will stop right away. The cardiac center is not exactly the same place so it may not.

**Q.** Is it higher or lower?

**A.** It’s higher.

**Q.** When you said that the bleeding did not cause the baby to die, I take it you meant simply that this baby didn’t die from a loss of blood, correct, but that the baby died from either the pressure of the pooling blood on the crucial vessels in the brain or the bleeding’s association with the stroke, the trauma to the blood vessels?

**A.** No, that’s not what I meant.

**Q.** Tell me what you meant then.

**A.** I meant that the baby did not develop an expanding blood clot.

**Q.** Uh-huh (affirmative).

**A.** Which in and of itself was sufficient to kill the child.

**Q.** And it’s not blood clots themselves that cause death but what they do to the—to the organs or vessels nearby; isn’t that true?

**A.** Well, it’s direct—if you die from a blood clot it’s direct pressure on your brain.

**Q.** Right.

**A.** Not necessarily the blood vessel but the brain, but I wasn’t referring to the blood loss or anything like that. I was referring to the fact the child did not have an expanding blood clot.

**Q.** Did R.’s brain swell during the hours that he was on life support?

**A.** Yes.

**Q.** Is there anything unusual about the swelling insofar as head injuries in infants are concerned?

**A.** No.

**Q.** When you testified that in your view his respiratory and subsequent cardiac arrest happened virtually instantaneously with the injury, what is your basis for saying that?

**A.** The location of the injury, the location of the bleeding around the lower brain stem and upper spinal cord and the fact that the breathing center is located in that same area. There is nothing there to explain why he would have stopped breathing later. There is no expanding blood clot, for example, to press on the brain and make him quit breathing later.

**Q.** So in your view it would not be possible for there to have been a slow bleeder, for instance, that over some period of time built up pressure on the brain stem to cause the cessation of respiration?

**A.** That’s correct. It’s because it wasn’t there. You would have seen it in the autopsy if it was there.

**Q.** What would you have seen that was not present in this autopsy?

**A.** You would have seen a blood clot. I’m talking about a physical piece of blood clot, at least an ounce or two in size, that would have been pressing on the brain, the lower brain stem.

**Q.** Is there anything else you would have expected to see if this fatal injury had had some time interval?

**A.** The only other explanation that one could think of would be a delayed hemorrhage, for example, into the substance of the brain. They don’t have to be large. They can be small, but in the right area it can be fatal and make you stop breathing, for example. And again, that would have been seen at autopsy if it was there.

**Q.** Have you been involved in any cases at Primary Children’s in head injury fatalities under age two in which there appeared to be some multiple hour interval between injury and death?

**A.** Yes.

**Q.** And is there anything in those children or in their autopsy reports that was present, other than the blood clot and the hemorrhage potentially that you’ve described, that was not present in R.?

**A.** There are almost always in those cases who deteriorate to die, is massive swelling in the brain generalized all over or a blood clot which we’ve described.

**Q.** We were talking about percentages, doctor. Tell me once again what the—at your hospital at least during your practice there, what percentage of children who have been admitted or examined where it is believed they have been injured as a result of shaking has there been death of those children? What percentage of them have died?

**A.** I don’t know. Just—you’re talking the shaking?

**Q.** Just the shaking.

**A.** And I don’t—I can’t tell you that figure. Most of them don’t die so it’s not the majority. It’s not insignificant. I would guess that 20 to 25 percent perhaps. I’m guessing at that figure.

**Q.** Could it also be as small as the 10 percent figure that you have used for the other study? Could it be as low as 10 percent, do you think, that result in death?

**A.** It could be. I would be a little surprised but again, I don’t have that data right now.

**Q.** When respiration in an infant stops but the heart continues to beat for some period but the child is essentially in the dying process, what is happening to the child’s total system?

**A.** Most of your body shuts down, so to speak, so that the blood can go to the brain, to the heart, to the vital organs, to the kidney.

**Q.** How does it shut down?

**A.** Well, your peripheral circulation. For example, if you saw that child he would be very pale and sort of cold, in a sense, to the touch because peripheral circulation has been shut down, so to speak, so they can have more blood available centrally. It’s the body’s mechanism of trying to cope with what’s happened. It happens in all cases of shock, for example. You try to protect your brain and protect the vital organs.

The—when the blood pressure is sustained artificially and when you are on the respirator

the heart does not require a signal from the brain to beat. In the normal situation the brain does control it, but when the brain dies the heart has its own rhythm and pacemaker so that it can literally go for months and months if the child is kept oxygenated and on life support systems. So when—in this situation where you’re on a respirator and blood pressure is being sustained artificially, the major systems that are being taken care of are brain, heart, kidneys and liver.

**Q.** During that period of time when the body is trying to focus its resources to cope with the injury of the heart and brain, as you’ve described, would that have any—cause any acceleration of hemorrhaging that may be occurring, internal bleeding in the brain area that is occurring?

**A.** No.

**Q.** When the heart stops beating—I understand that the paramedics reported that R. was in full respiratory and cardiac arrest and his body was now shutting down. I take it that’s a process that takes some—at least a few minutes to complete, that sort of shutting down and dying process?

**A.** Usually, yes. In this case, for example, it’s possible that the injury itself resulted in cardiac as well as respiratory arrest but if the respiratory arrest occurs first then the heart would stop within—it usually takes about seven to ten minutes.

**Q.** And you just have insufficient information—you just don’t know whether the two stopped simultaneously or if the cardiac shut down subsequent to the respiratory?

**A.** I don’t know.

**Q.** Laymen at least are told that when a body has died since blood is no longer being pumped you don’t bleed, for instance. Maybe blood might ooze out, but you don’t bleed the way you would from an open cut—

**A.** Correct.

**Q.** —Correct? In a child who has had cardiac arrest but has, in R.’s case, who had suffered some injury, traumatic injury, to the brain stem or the spinal cord, during that period when he was between cardiac arrest and his resuscitation by the paramedics, would that hemorrhaging that he had—that you believe he had already suffered have continued?

**A.** It would not have continued while he was in arrest.

**Q.** Okay.

**A.** It would require very efficient cardiac massage to conceive that it might have continued. I believe that the hemorrhage had occurred right away and then once he was in arrest he probably had no further hemorrhage even when his blood pressure was restored.

**Q.** Is that based on some particular, you know, studies or is this just your best thinking?

**A.** It’s just the way it happens.

**Q.** Okay. So you are confident that all of the blood found in the autopsy that Dr. F. did was present and had pooled there prior to the resuscitation of the paramedics of this little boy?

**A.** Yes.

**Q.** Okay, then, once he was resuscitated and his blood now was re-circulating through his body, wouldn’t the trauma or the tears in the vessels along the spinal cord and in that area of the brain stem that had been bleeding—why wouldn’t they start bleeding anew?

**A.** Because they were clotted off just like a blood vessel clots most times when you—when it’s cut. It clots off. It just wouldn’t—if it had—I mean the explanation for it is if it had kept bleeding we would see that in the autopsy. You would see a massive hemorrhage in essence. So going retrograde you know that it didn’t occur because it wasn’t there.

**Q.** Could the hemorrhaging have continued however between respiratory arrest and cardiac arrest if it had not—it could have been hemorrhaging during that period?

**A.** Yes.

**Q.** Now, there—Dr. A. reports that there was a rupture in the anterior lens of one of the eyes of this little boy. Do you remember that description?

**A.** Yes.

**Q.** In which he—I think he indicates that it was, however, not done at the time in his opinion of this injury but was related to some prior event or possibly a birth trauma. Does that ruptured anterior lens have any significance for you?

**A.** No, it doesn’t.

**Q.** Are you familiar with that kind of rupture of an anterior lens being consistent with a direct blow to the eye by a fist?

**A.** Yes.

**Q.** Did you find anything—did you review the birth records of R.C.?

**A.** No.

**Q.** Did you find anything in the medical records that you reviewed that would explain how it was that R. had suffered on a prior occasion that ruptured anterior lens?

**A.** No.

**Q.** Does that kind of injury heal itself, do you know?

**A.** I don’t know.

**Q.** But it did not cause you to believe that R. may have previously been the victim of some

kind of abusive behavior?

**A.** I wasn’t sure what it meant. My impression was that the forces generated in shaking could potentially shake a lens loose so I thought it could potentially have occurred with this injury. I know it could occur from direct trauma to the eye and I know it can be a congenital problem so I’m not sure what to make of it.

**Q.** You know that—I believe it is Dr. H. who—let me just find his letter. Just one moment. I thought I had it with me. Let me see. You concede that you are not an expert, you’re not an ophthalmologist?

**A.** That’s correct.

**Q.** And if either Dr. H. or Dr. A. concluded that that torn lens was not associated with this event but some prior event, would that cause you any concern as to whether—

**A.** I would defer to their judgment, if that’s what you are asking. Would it cause me concern that he had a previous abuse, is that what you mean?

**Q.** That’s correct.

**A.** Sure, it raises the question. Again, I don’t know how to answer that.

**Defense Counsel:** I have no other questions, thank you.

**REDIRECT EXAMINATION**

**By Prosecutor:**

**Q.** Just a few points, Dr. W. You testified that it is common among shaken babies to see other types of injuries, possibly blunt force injuries or subdural hematomas. Does the absence of those injuries affect your opinion in this case in any way?

**A.** No, it doesn’t.

**Q.** There was some questioning on cross-examination about whether an adult could create this type of injury by violently shaking a child to get their attention. Do you have an opinion about whether an adult in a normal situation trying to revive a child could cause this degree of injury?

**A.** Yes.

**Q.** And what is your opinion?

**A.** My opinion is that they would not. They could not.

**Prosecutor:** I believe that’s all I have, Your Honor, thank you.

**THE COURT:** Further cross?

**RECROSS EXAMINATION**

**Q.** I take it that regarding the question of whether an adult in reviving a child could cause this kind of injury, you said they could not or would not. Actually, they could cause the injury but your opinion is that they would not do so?

**A.** Correct.

**Q.** Because your opinion is they would not use—choose to use the kind of force that would result in this kind of injury.

**A.** Yes.

**Q.** You have not demonstrated for the court the kind of shaking—well, at least we have not demonstrated on the record the kind of shaking that you believe was required to cause the kind of injuries. Can you demonstrate with your hands the kind of speed, if you’re able to do so, that you think would cause—

**A.** I think I can do so to some degree. Obviously the amount of force generated is going to vary, but the experimental studies done where dolls have been designed to try to mimic the child, a small child in this situation. Shaking the child bounces the head back and forth but hardly any force is generated, but tilting the body back and forth shaking like this is what is required to get that head bouncing back and forth enough to tear it off the cervical spinal column or to tear those blood vessels, but this kind of shaking won’t do it. It requires a back and forth turning of the body in essence like this.

**Q.** Could the record reflect that the kind of shaking Dr. W. says is inconsistent with the kind of injury R. suffered had him pushing his arms forward out from his body sort of parallel to the floor on multiple times, but that the kind of shaking he believes would account for R.’s injuries has his arms moving out from his body but down to the ground.

……………………………………..

**Q.** (by defense counsel) Does that also include the monkey—there have been some monkey studies done to try to reproduce these kinds of injuries, have there not?

**A.** Yes.

**Q.** And what do the monkey studies—do they confirm or do they give a little different result regarding the kind of shaking or force necessary?

**A.** I don’t remember the data actually from all of the monkey studies, but it basically confirms that it takes a violent force to shake the baby.

**Q.** Do you know whether it confirmed the kind of circular force that you were describing versus the more outward and inward force?

**A.** I don’t recall right now which way they did that.

**Q.** Do you have a particular study that you were relying upon in describing the circular force in which the child is moved sort of out vertically and then ends up more parallel to the floor? That’s what you’ve been describing, I take it?

**A.** Yes.

**Q.** What’s that study?

**A.** It’s a study by Dr. D. from the Children’s Hospital of Philadelphia found in the Journal of Neurosurgery. I’d have to find the dates for you. It was probably three or four years ago. I would be happy to get the specific reference for you.

**Q.** Okay. One second then. Well, when you mention Dr. D., it’s that same Dr. D. who concluded in his analysis of a laboratory biomechanical model, that’s the one you’re describing, correct?

**A.** Her.

**Q.** Her, excuse me, her. She disputes this shaken baby mechanism of injury as causing the fatal injuries and she indicated that the cranial impact trauma is an essential component of these deaths, does she not?

**A.** That was the—the major conclusion from her article was that most of these children are bashed as I indicated.

**Q.** Well, and she—isn’t she the one who believes that, in fact, you cannot get this kind of injury without there being some blunt force trauma?

**A.** Yes, but let’s not put words in her mouth. She’s saying that it takes a violent amount of trauma and that it’s usually associated with a blunt trauma at the end of the shaking episode. We’re talking about separation of the head from the neck not the typical massive hemorrhage up above the brain.

**Q.** So while you rely upon her for your conclusions about the kind of force, you dispute her conclusion regarding the blunt force trauma as being usually an essential component of what is characterized as Shaken Baby death?

**A.** I don’t dispute that at all. I know Dr. D. very well. I’ve discussed this paper personally with her. She believes that blunt trauma is an essential part of the usual shaken baby syndrome that we see, not every one.

**Q.** And she concludes—I have her article. This is the article you are talking about, Shaken Baby Syndrome, is it not?

**A.** Yes. Is that the one from the Journal of Neurosurgery?

**Q.** Yes, 1987. And her conclusion is that the Shaken Baby Syndrome, at least in its most severe acute form, and you would say R.C. had an acute and severe form?

**A.** Yes.

**Q.** Is not usually caused by shaking alone and unless the child has predisposing factors, fatal cases of Shaken Baby Syndrome are not likely to occur from the shaking that occurs during play, feeding or swinging or even a more vigorous shaking given by a caretaker as a means of discipline. That’s her conclusion, is it not?

**A.** Yes, and it’s mine too.