

IN THE CIRCUIT COURT OF THE
17TH JUDICIAL CIRCUIT IN AND
FOR BROWARD COUNTY, FLORIDA
CASE NO.: 07-020728(11)

MARIE RENZETTI,
Plaintiff,
vs.

STATE FARM MUTUAL AUTOMOBILE
INSURANCE COMPANY,

Defendants.

_____ /

Radiology Department
Shands Hospital
1600 SW Archer Road
Gainesville, Florida
10:00 a.m., Wednesday
February 3, 2010

- - -

D E P O S I T I O N

of

ANTHONY A. MANCUSO, MD

taken on behalf of the Plaintiff
pursuant to Notice of Taking Deposition

REPORTED BY KAREN L. BIERY
JOHNS, STEPHENSON & BIERY
ADVANTAGE COURT REPORTERS

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APPEARANCES:

STEVEN W. IGOU, Esquire, Law office of
Igou & Smith, 545 Delaney Avenue, Building #5,
Orlando, Florida 32801, appearing by telephone on
behalf of the Plaintiff.

DAVID M. GOLDSTEIN, Esquire, Marcos,
Rothman, Scharf, Valdes, Nguyen & Goldstein, 4000
Hollywood Boulevard, Suite 715-S, Hollywood, Florida
33021, appearing on behalf of the Defendant.

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1 ANTHONY A. MANCUSO, MD,
2 being first duly sworn, testified as follows:

3 DIRECT EXAMINATION

4 BY MR. IGOU:

5 Q Please state your name, sir.

6 A Anthony Mancuso.

7 Q And what have you been asked to do in this
8 case?

9 A I've been asked to render opinions about
10 predominantly the meaning of some studies done on
11 Ms. Renzetti with regard to whether or not they show
12 findings that are consistent with closed head
13 injury.

14 MR. IGOU: Okay, let's put on the record
15 real quick, we have an agreement, we're going
16 to attach the deponent's CV as Plaintiff's
17 Exhibit Number 1, the case list as Plaintiff's
18 Exhibit Number 2, a one-page letter from the
19 defendant as Plaintiff's 3 --

20 MR. GOLDSTEIN: Woody, it's three pages.

21 MR. IGOU: Three-page letter. And the
22 report of Dr. Herbst as Plaintiff's 4. Okay.

23 Q Dr. Mancuso, we're here to talk primarily
24 about DTI. Do you have any opinions as to whether
25 or not at the present time that's an appropriate

1 modality upon which to base a diagnosis of closed
2 head injury or TBI?

3 MR. GOLDSTEIN: Form.

4 A It's useful in the evaluation of traumatic
5 brain injury.

6 Q And you have not published on DTI
7 specifically, is that correct?

8 A That's correct.

9 Q And would you agree that, in the past five
10 to seven years, DTI has emerged as a useful and more
11 sensitive modality than traditional MR in detecting
12 mild traumatic brain injury?

13 A Yes, I would, in the research venue.

14 Q And how do you quantify that?

15 A Quantify it?

16 Q What's the basis of that opinion?

17 A Oh, it's not used clinically routinely
18 to -- DTI and fiber tracking is not used clinically
19 for any ongoing medical decision-making in making
20 plans for how a patient's going to be cared for or
21 rehabilitated. All of those considerations remain
22 in the research arena, especially --

23 Q You're a member of the American College of
24 Radiology, correct?

25 A Sorry. Especially in the case of mild

1 head injury, mild closed head injury.

2 Q It is recognized by the ACR, correct?

3 A I don't know what's recognized --
4 recognized as a study?

5 Q Is it recognized as a modality that has
6 extended indications?

7 A Extended indications, I don't know what
8 that means.

9 Q Well, you're a member of ACR, correct?

10 A No.

11 Q And you're allowed to bill for DTI,
12 correct?

13 A We don't bill separately for DTI.

14 Q Can be billed together with the MR or
15 separately if it's ordered separately, correct?

16 A Well, that's fine. Whatever those people
17 who want to pay for it want to do, that's fine.

18 MR. GOLDSTEIN: Woody, can we just be
19 clear, I guess, for the record? It's the
20 American?

21 MR. IGOU: American College of Radiology.

22 MR. GOLDSTEIN: Thank you.

23 A Oh, the American College of Radiology.
24 Yes, they can only make recommendations. They have
25 no authority to enforce that. Just because the

1 American College says something can be billed for
2 doesn't mean the third parties will pay for it.

3 Q Right.

4 A And I think probably, Woody, that would
5 be -- and I'm not saying I know this for sure, but
6 that would probably be in the context of known
7 clinical uses for it, like mapping -- preoperative
8 mapping for brain tumors through tractography and
9 perhaps for preoperative mapping of deep range
10 stimulation, which is essentially what our group
11 does here.

12 Whether or not it would be paid for
13 separately for the evaluation of somebody with
14 traumatic brain injury of any severity, I don't know
15 if people would pay for it for that indication
16 separately.

17 Q But as far as published studies, there are
18 numerous studies wherein DTI has been used to
19 examine physical changes in the brain in the context
20 of a mild traumatic brain injury, correct?

21 A Numerous? There have been more recently,
22 in the last few years, a significant number of
23 publications on mild traumatic brain injury, yes.

24 Q And the studies published so far are
25 consistent in noting that there is an increased

1 sensitivity to the microscopic changes in white
2 matter shown by DTI that is not visible on MR?

3 A Yes, that's true. But what they haven't
4 done in mild brain injury is shown that that has any
5 predictive value in predicting outcome or permanent
6 disability. There's no study to my knowledge that
7 shows that.

8 Q Are you aware of any studies that have
9 utilized DTI in the context of mild traumatic brain
10 injury which have also utilized the outcome on
11 neuropsychological testing?

12 A Yes, most -- in mild?

13 Q Yes.

14 A Yeah, I think there's some out there. You
15 know, the literature flows together to me because,
16 most -- you know, 90 percent of the literature is on
17 moderate and severe, but I believe you're right. I
18 believe there's some literature out there that
19 relates it to neuropsychiatric changes.

20 But there's no definitive study that I
21 know of that links it to whether those are permanent
22 or not and whether you can predict rehab outcome or
23 anything like that. That still remains in the
24 experimental realm from my familiarity with the
25 literature.

1 Q There are several studies involving DTI in
2 mild traumatic brain injury in which the results of
3 the FA and the diffusion were consistent with
4 depressed scores on the neuropsychological
5 testing --

6 A Yes, that's true, there's no question.
7 I'm not debating that at all. That is true. The
8 question in the mild cases that remains to be
9 answered is whether those changes persist and are
10 permanent. There's nothing that establishes that's
11 true, and that's still well in the experimental
12 realm and, as far as I'm concerned, if people are
13 doing it for that purpose, it should be with an IRB
14 and under an experimental protocol, if they're
15 linking it to long-term predictive outcomes.

16 MR. GOLDSTEIN: Doc, can you tell us what
17 IRB is?

18 A I'm sorry, Institutional Review Board.

19 Q For example, there's a study by Lipton in
20 2008 in which the mild traumatic brain injury
21 patients had suffered the injury six months to three
22 years prior, and they were able to note continued
23 elevation of the MD and lowering of the FA up to
24 three years later in the context of a mild traumatic
25 brain injury.

1 MR. GOLDSTEIN: Woody, when you say the
2 Lipton study, can you tell me what study that
3 is?

4 MR. IGOU: That's Lipton, M. L., et al.,
5 2008, Multifocal white matter ultrastructural
6 abnormalities in mild traumatic brain injury
7 with cognitive disability.

8 MR. GOLDSTEIN: And published in what
9 journal?

10 MR. IGOU: Published in -- you can find it
11 with that much information. I've got it
12 somewhere. I'll give it to you.

13 Q Doctor, so you are aware there are studies
14 in the context of mild traumatic brain injury and
15 DTI showing that the increased FA and decreased
16 diffusion have continued into the post-acute phase
17 of injury?

18 MR. GOLDSTEIN: Form. You can answer.

19 A Yes, I'm aware of that, but, once again,
20 we're talking about studies that are in the
21 experimental realm and require a lot more
22 confirmation from other research groups. You can't
23 accept that. And, once again, I don't think any of
24 those studies -- I'd be happy to read that one,
25 Woody -- any of the studies conclusively say that

1 that's linked to neuropsychiatric outcome or
2 prognosis. That article may say that or may
3 speculate, but I stay up with this literature pretty
4 well because I have to advise, you know, our group
5 here about where this stands, and we're in those
6 discussions all the time.

7 You know, I'll review that article, but I
8 still believe all of this is most properly and still
9 in the experimental realm and should be being done
10 in the context of protocols and, if in an
11 institution that has an IRB, under IRB guidelines.

12 Q Well, I mean, in fact -- you know, I'm
13 looking at a study by N-I-O-G-I, et al., from 2007,
14 and it talks about the lack of correlation between
15 standard MR lesions and outcome with memory and
16 executive function. I mean --

17 MR. GOLDSTEIN: Form.

18 A Well, that's true --

19 MR. GOLDSTEIN: Wait for a question.

20 Form.

21 A I understand what his question is, but I
22 think you have to ask a question, Woody.

23 Q Well, I mean, you know, there has been
24 shown a lack of correlation on standard MR with
25 seeing, you know, microlesions and then trying to

1 pair that up with neuropsychological testing, you're
2 aware of that?

3 A That's true. There's no question, we've
4 known for many years that, and probably a decade or
5 more now, that the standard MR imaging doesn't do
6 well at predicting outcomes, yeah.

7 Q And in this same study by Niogi, which
8 states what we just talked about, it also found a
9 correlation between DTI outcome and poor reaction
10 time in simple cognitive tasks. Are you aware of
11 that study?

12 MR. GOLDSTEIN: Objection, form.

13 A In what kind of brain injury?

14 Q In a mild traumatic brain injury found on
15 DTI, they correlated it with impaired cognitive
16 reaction time wherein that correlation cannot be
17 made on standard MR?

18 MR. GOLDSTEIN: Form.

19 A Yeah, well, that's true. We've already
20 discussed that. We know that that's true. The
21 question is does that recover or not, and, of
22 course, it also depends on -- there's various
23 amounts of mild brain injury. You know that
24 there's -- these are relatively broad categories and
25 there's people that are at one end of the spectrum

1 of mild brain injury and ones that are closer to
2 moderate than they are to mild. So, you know, I
3 don't know how that study group is constituted, but
4 what you're saying is true.

5 Q Okay. Now, from the time you went to
6 medical school till today, you would agree with me
7 that the concept of diffuse axonal injury has
8 changed, correct?

9 A I'm not sure that it's changed. I think
10 people know more about it.

11 Q Know more about it. And wouldn't it be
12 fair to say that ten to 15 years ago it was felt
13 that diffuse axonal injury did not even exist in the
14 context of mild traumatic brain injury?

15 A I don't know that to be true, but I think
16 we've learned more -- you know, I don't know how
17 widely held that opinion was, but I think that
18 people know that -- it depends also on how you
19 define diffuse axonal injury. You know, is it
20 recoverable or nonrecoverable injury? You know,
21 does it actually result in -- you talking about
22 complete disruption of the axon or you talking about
23 transient edema in them --

24 Q Doctor, let's just clarify some terms
25 here. You look at MR studies primarily and you look

1 at MR studies of the brain and you either see
2 something or you don't, correct?

3 A Yes.

4 Q You're not an expert on recovery of mild
5 traumatic brain injury, correct?

6 A Only to the extent of how imaging might
7 integrate into the care of those patients.

8 Q But you don't get involved in outcome of
9 patients; you simply read what you see and you pass
10 them on to the next expert, correct?

11 A Yes. We talk about what the findings mean
12 in the context of clinical care, but it's the
13 treaters who actually treat the patients.

14 Q So, for the purposes of our discussion,
15 when I say diffuse axonal injury, I mean whether or
16 not there are objective signs of physical injury to
17 brain matter or not. Okay?

18 A Okay. Yeah, I understand.

19 Q So isn't it a correct statement that
20 more -- lately, in the last five to ten years, it
21 has been discovered and it is now widely held that
22 some diffuse axonal injury can be found in the
23 context of a mild traumatic brain injury?

24 A Yeah, we've agreed on that a few questions
25 ago, absolutely.

1 Q And there have been autopsy studies which
2 have confirmed that; when the brain is looked at
3 microscopically after death, people who had suffered
4 a mild traumatic brain injury were found to have
5 these problems?

6 A I'm not familiar with that literature or
7 that proof. People usually don't die from mild
8 traumatic brain.

9 Q People that died from other causes were
10 autopsied and found to have diffuse axonal injury on
11 scanning of the brain tissue. Aaron Bigler and
12 Blumberg, et al., found that. Are you aware of
13 those studies?

14 MR. GOLDSTEIN: Objection, form. When you
15 say Bigler, Blumberg, what's the study?

16 MR. IGOU: Blumberg, et al., Staining of
17 amyloid precursor protein to study axonal
18 damage in mild head injury, Lancet 1994 --
19 these are actually older -- and Aaron Bigler
20 did a similar study.

21 A Yeah, I can look at that one to see how
22 they define mild brain injury, you know, and the
23 exact findings, but sounds like people did autopsies
24 in people who had had TBI and found evidence of
25 brain damage.

1 MR. GOLDSTEIN: Madam Court Reporter, I
2 just don't know if you got my objection to form
3 on the last question.

4 Q Doctor, likewise in the context of
5 football players and from other sources, we are
6 learning that this physical disruption and injury is
7 more prevalent than previously supposed 20 years
8 ago, would that be a fair statement?

9 A Yes.

10 Q And while you would agree that DTI can
11 pick up this type of subtle diffuse axonal injury
12 damage that MRI cannot pick up, you have questions
13 about what the meaning of that is, would that be a
14 fair statement?

15 A Well, yes, that's a fair statement. You
16 have to take it in the context of what's going on
17 with that particular patient, you have to take it in
18 the context of exactly how those studies are done
19 from a technical perspective, and you have to take
20 it from the perspective of whether there may be
21 other things that explain the findings that might be
22 supposed to be due on DTI to trauma.

23 Q Let's go to Dr. Herbst's findings on the
24 DTI. Do you have any problems with how the test was
25 done, how the evidence is presented in his report?

1 MR. GOLDSTEIN: Objection, form and
2 compound.

3 A Yeah, we can -- there's two parts to your
4 question, Woody. If I understand it, it's how the
5 test was done and how it was reported. Is that
6 right?

7 Q Right --

8 A So I'm going to deal with -- I'm sorry,
9 did you have something to say?

10 Q A poor question, but tell me what your
11 thoughts are on Dr. Herbst's report.

12 A Okay, so -- but your question was how the
13 test was done and how it's reported. So first I'm
14 going to talk about how the test was done.

15 From the documents I've seen from
16 Dr. Herbst, the first thing that I notice is I can't
17 tell at all that the opinions are -- whether they're
18 based on quantitative data or not. I don't know
19 what the FA threshold was. I don't know if
20 Dr. Herbst has a database, a normative database done
21 on his machine with his techniques that he compares
22 the quantitative FA data to age-matched controls,
23 which would be generally the way these things are
24 substantiated in the literature.

25 So I don't know what the FA cutoff is for

1 abnormality. I don't know whether it's compared to
2 age-matched control. Similarly, I don't know
3 whether the mean diffusivity is calculated in a
4 quantitative way or whether it's against age-matched
5 control.

6 I can't tell also from his report
7 whether -- what the cutoff for the angle of the
8 tensor was. Typically, it's about 45 degrees, you
9 know, so you don't get false positive findings based
10 on fibers that turn more acutely than 45 degrees. I
11 don't know what angle he's chosen.

12 And also, with regard to a comparison to
13 what he does compared to the literature, it seems as
14 if he bases his opinions on DTI and fiber tracking
15 on the basis of the color coded, I'll call them,
16 wire diagrams as opposed to the quantitative data
17 that's presented in the literature that is the
18 actual measured fractional and isotropy in parts of
19 the brain that are known to be the ones most likely
20 to be injured.

21 It appears as if he bases his opinions
22 about the fiber tracking on the basis of pictures,
23 and I have no idea how those were thresholded.

24 So I have -- and I'm not saying he has to
25 put all that in his report. I just don't know

1 whether that's done or not, so I have no idea about
2 the validity of the fiber tracking diagrams as he
3 presents them. So that's sort of my --

4 Q Okay. Let's take that. Generally
5 speaking, the fiber track diagrams are based upon
6 the FA and DM raw data which built it into a
7 picture, isn't that how it works?

8 A Yes, that's true. Yes.

9 Q So we can assume that he did that; you
10 just don't know what that raw data --

11 A No, I can't assume -- I can't assume what
12 his thresholds were or how those images were -- not
13 his thresholds, but his default settings for
14 abnormal, and I can't assume that he compared it to
15 an age-matched control, and I don't know how he
16 thresholds --

17 Q We'll cover all that. But I'm just
18 saying, one of the last things you said was he's
19 basing his opinion on the tractography, but the
20 tractography emerges as a result of underlying data,
21 which if that underlying data is okay with you, then
22 it's okay to rely on the pictures?

23 A Well, no, it's not okay to rely on the
24 pictures because, if the basis for his using this in
25 clinical practice is the literature we're been

1 talking about, none of the literature supports using
2 these, I'll call them, wire tractograms as the means
3 of evaluating this. In fact, they've shown to be
4 less accurate than using quantitative data. And
5 so --

6 Q Well, if he uses them in conjunction -- I
7 mean, you can use all three in conjunction, which is
8 okay, correct?

9 A Sure --

10 Q Assuming that --

11 A Sure, but I don't see in the report the
12 quantitative data or the, you know, the other things
13 that I mentioned.

14 Q Well, I'll try to get that for you.

15 The --

16 A Oh, wait, there's some more --

17 Q What is the standard FA threshold?

18 MR. GOLDSTEIN: I'm sorry, Woody. The
19 doctor had one more thing to add.

20 A Now I forgot. It will come up.

21 A standard FA threshold. It depends on
22 what -- exactly what part of the brain you're
23 looking at, and it depends on age-matched controls,
24 but, yes, there's typically a standard range of
25 FA's, depending on exactly what part you're looking

1 at, that's around .3 to .33 or .35 as high as .39,
2 in general.

3 Q It's also been held that 2.5 standard
4 deviation's from normal?

5 A Well, again, you have to talk about
6 age-matched controls. That might be --

7 Q Are you aware of an age-matched control
8 norm that's utilized --

9 A I think most of -- no, I'm not aware of
10 it, but because this, again, is in the experimental
11 realm and virtually all of the studies that are
12 credible will have age-matched controls for their
13 populations, and those will vary depending on age.
14 There's an expected diminution in the general
15 population over time with age of diminished FA
16 because of the aging of the brain.

17 Q That's correct. And that would be
18 expected to be global, correct?

19 A Well, no, I think it is what it is in any
20 individual. We know that the brain might age
21 because of more vascular disease at one carotid
22 bifurcation than the other, so it can be asymmetric.

23 But you'd -- you know, so you just have to
24 look at the population. It's not necessarily
25 global, but there's definitely a global diminution

1 in FA and increase in mean diffusivity over time,
2 but in an elderly population who's susceptible to
3 carotid and vertebral vascular disease, it might be
4 more on one side than the other and, you know, just
5 the -- the other things that have been done on the
6 aging brain and all, I think they show that it's not
7 necessarily a uniform process.

8 Q Well, taking away some, you know,
9 one-sided phenomenon, you would expect the age
10 changes, just like you would on MR, to be global and
11 bilateral rather than unilateral?

12 A What you're saying is right, but they're
13 frequently asymmetric, very frequently asymmetric on
14 just the anatomic imaging, what you're talking
15 about, I think. On the anatomic imaging, it's not
16 uncommon to see far more small vessel changes on one
17 side than the other. They'll be on both sides, but
18 it's not unusual to see asymmetry at all.

19 In fact, asymmetry is sort of the rule. I
20 don't want to misanswer your question. It will be
21 global, but it's frequent that it's more on one side
22 than the other or asymmetric.

23 Q It would also be consistent to say that,
24 if a trauma was on one or the other side of the
25 brain, that you would expect an asymmetry related to

1 the site of trauma?

2 A A significant trauma, yes.

3 Q Now, with an elderly patient like we're
4 dealing with here, all the other things being equal,
5 a person in their seventies would have a worse
6 outcome from an equivalent trauma to the brain than
7 someone who was 30, fair?

8 A Yes, I think that's theoretically a fair
9 assumption.

10 Q And one of the reasons for that is that,
11 even -- we know in Mrs. Renzetti she has some
12 atrophy; there is more room for the brain to move in
13 trauma than someone who has a full size,
14 snugly-fitting brain at age 30 or 20?

15 A Well, I think again it would be hard to
16 prove that. That sounds fine to me in theory.

17 Q I'm not talking about Mrs. Renzetti
18 specifically, but, in general, that is the case?

19 A Well, I don't know what "that is the case"
20 means. I think that what you're saying makes common
21 sense. I don't know that it's proven.

22 Q Okay. And would it be fair to say that
23 the elasticity of brain tissue at the age in the
24 late seventies is less than those in their twenties?

25 A Most likely.

1 Q Reduced elasticity, all other things being
2 equal, you would expect more damage to the brain
3 than someone with brain tissue with more elasticity,
4 given an equal trauma?

5 A I think theoretically that's true, yes.

6 Q Those are some of the reasons that you see
7 perhaps more damage in the elderly on the studies
8 that you've examined than in a younger brain, is
9 that correct?

10 A No, I don't think I can say that from what
11 I've seen. I think that almost always relates far
12 more to the degree and nature of the trauma than it
13 does to age.

14 Q Let's assume that there are sufficient
15 norms and the FA and DM raw data are sufficient for
16 your -- to your liking. What is this DTI showing?

17 MR. GOLDSTEIN: Form.

18 A The DTI showing? You mean the
19 tractography part of it? Woody, you mean the
20 tractography --

21 Q Yes.

22 A -- is that what we're talking about?

23 MR. GOLDSTEIN: Form. Go ahead.

24 A It shows that -- as it's been thresholded
25 and as those pictures are presented, without

1 quantitative data, it suggests that there are
2 diminished tracts in the left frontal region
3 compared to the right. And I don't think I can tell
4 from it whether those would be projection tracts
5 or -- he's got them in yellow. You know, typically,
6 projection tracts -- well, they go front to back and
7 side to side and up and down, you know.

8 I don't know what the yellow means. It's
9 not one of the standard colors that I'm used to
10 looking at, but the yellow ones that he has suggest
11 that there are -- that there's a diminished FA and
12 presumably an increased mean diffusivity in the left
13 frontal region compared to the right, again, with no
14 quantitative data to back that up.

15 Q And if you assume Mrs. Renzetti is
16 right-handed, there are studies that show handedness
17 should, all other things being equal, increase the
18 connectivity on the left side of the brain?

19 A Her left hemisphere should be dominant. I
20 don't know whether the studies show increased --
21 because the right side of the brain has different
22 functions, so people could connect that up for other
23 reasons. So I'm not aware of specific studies that
24 shows more -- quantitatively more connectivity or
25 differences in FA or diffusivity based on

1 handedness, but you're right, her left hemisphere
2 should be dominant. I don't know about more
3 connectivity.

4 Q Okay, so --

5 A That you would actually measure as
6 different from side to side, you know, because in
7 the normative data that I've seen, pretty much the
8 FA's and the mean diffusivity is the same on both
9 sides of the brain in the control subjects.

10 Q And in people who have suffered trauma,
11 the abnormalities can be asymmetric?

12 A Yes.

13 Q And are you aware of any -- what is your
14 differential diagnosis when looking at these DTI
15 studies of Mrs. Renzetti's brain?

16 A Looking at the entire study or just the
17 DTI's?

18 Q Just the DTI.

19 MR. GOLDSTEIN: Form.

20 A So just the wire diagrams? I have no
21 diagnosis because I don't know what the data mean.
22 I have to know all those other things before I can
23 understand what the tractography means.

24 Q Okay, well, let's --

25 A And --

1 MR. GOLDSTEIN: Woody, wait, wait --

2 Q -- tractography which is similar in nature
3 that was done at Shands, and it showed these same
4 changes, not necessarily Mrs. Renzetti, what would
5 your differential diagnosis be?

6 MR. GOLDSTEIN: Woody, I object. The
7 doctor continues to talk, but you keep talking
8 over him --

9 MR. IGOU: Sorry.

10 MR. GOLDSTEIN: -- and I don't want to
11 ruin the record, so --

12 MR. IGOU: We certainly don't like talking
13 over each other.

14 MR. GOLDSTEIN: I know it's hard with the
15 phone, so, please, as soon as you hear
16 anything, just stop, let him finish, then we
17 can go the next question because I now know --
18 I'm going to offer the doctor the opportunity
19 to finish what he wanted to say if he can
20 remember it.

21 A You know, Woody, you know, I mumble
22 sometimes, so I understand if you didn't hear me.
23 You reanswered that in the form of a hypothetical,
24 did you just? If you'll just ask -- I forgot
25 exactly what I was going to say, but it will come

1 up.

2 Q Let's say that you got a similar finding
3 on a DTI that you did at Shands Hospital on a
4 patient, similar in findings to this. You don't
5 have to make any assumptions about the validity of
6 this, but similar findings. What would your
7 differential diagnosis be at that point?

8 MR. GOLDSTEIN: Form.

9 A The first thing I'd have to know is what's
10 going on with the patient. I mean, this is a
11 patient with no history I'm getting, you know, just
12 the finding?

13 Q Yeah.

14 A But no history. That's not the way that
15 we do things --

16 Q A history of an automobile accident.

17 MR. GOLDSTEIN: I want to make sure I
18 understand the question. Is the question, if
19 you had Dr. Herbst's report in front of you on
20 a patient that Dr. Mancuso would see here at
21 Shands, what would his diagnosis be?

22 MR. IGOU: No.

23 A No.

24 Q If Dr. Mancuso or someone at Shands were
25 to do MR with DTI and had findings similar to what

1 we see in Dr. Herbst's report and they gave a
2 history of being in a car accident, what would his
3 differential diagnosis be?

4 MR. GOLDSTEIN: Form. Go ahead.

5 A And I'm not allowed to know how severe the
6 car accident was or the nature of the trauma; all I
7 know is that there was a head injury?

8 Q Right. I mean, just for background, you
9 often don't have any more data than that when you're
10 working at the hospital in a nonforensic setting,
11 correct?

12 A Frequently, that's true.

13 Q So what would you do?

14 A I'd get more history. But that's all
15 right, I can answer your question.

16 So if I understand the question right,
17 it's this thing was done technically okay to my
18 satisfaction, if I get the spirit of the question,
19 and the tractography reliably shows some decreased
20 FA in the left frontal region in an almost
21 80-year-old person?

22 Q Yes.

23 A Well, what I would do is I would look
24 for -- considering the trauma was of main interest,
25 I would look in other areas of the brain to see if

1 there were regions that are more typically injured.
2 Because the spirit of your question is would I
3 include trauma in the differential. I think that's
4 the spirit of your question.

5 And in order to do that as a more likely
6 possibility as an explanation of findings, I would
7 look at the anterior and posterior corpus callosum,
8 I would look at the internal capsules, I would look
9 at the subcortical white matter in both the coup and
10 the contrecoup areas and decide whether those areas
11 that are more typically affected by the mechanism,
12 the shear mechanisms which go on in closed head
13 injury, if they're injured.

14 If, in fact, there were areas other than
15 the left frontal that are typically injured in
16 trauma, then I would include trauma in the
17 differential.

18 Then I would look around also with the
19 tractography, assuming it was done correctly, and
20 see if there were other regions of the brain that
21 showed some diminished connectivity, if you will.
22 We both know what we mean by that. Okay, Woody? I
23 would look around at other areas of the brain to see
24 if they had similar but lesser and whether this was
25 just part of a global problem.

1 The other thing I would do is look at the
2 images, the anatomic images at the various pulse
3 sequences in general to be sure there wasn't
4 something, you know, obvious like an old cerebral
5 infarct or -- I wouldn't say she had a brain tumor,
6 you know, or changes elsewhere that --

7 Q Well, that's something. You would want to
8 rule out stroke and want to rule out tumor.

9 A Sure. I mean, but you don't -- that's
10 really not a -- as a cause of these old -- what
11 might be old findings. But in the setting of head
12 trauma, you don't expect to find a brain tumor; you
13 know what I'm saying? So that doesn't make much
14 sense.

15 Q I mean, just --

16 A So what it would come down to in somebody
17 this age group is needing to know the degree of
18 trauma, needing to know the associated findings.
19 And if your question is would trauma possibly be in
20 the differential diagnosis, sure, but it would have
21 to be put in the clinical context, which, by the
22 way, I have a significant problem with here, even
23 putting this lady in the category of -- I'll get off
24 the hypothetical and on to it, on to more
25 specifics --

1 Q Let's stay on the hypothetical. I mean,
2 what are the things that you want to rule out when
3 you see this type of picture? You want to rule out
4 stroke, tumor. Do you have any congenital concerns?

5 A Not really. She reaches 79 years old and
6 was relatively normal her whole life. I don't think
7 so. Just aging changes in the brain would be the
8 most likely explanation for asymmetries in
9 connectivity.

10 Q Okay. So you think the aging process is
11 the most likely explanation for the asymmetry if it
12 exists?

13 A Yes, and whether or not there are -- with
14 regard specifically to putting trauma lower on that
15 list, whether there are changes in other parts of
16 the brain that are more typically affected by
17 trauma.

18 Q So, traditionally, you would think the
19 corpus callosum would or should be involved?

20 A Anterior and posterior corpus callosum,
21 internal capsules, low frontal regions -- not high
22 frontal regions, low frontal regions -- bilaterally,
23 typically asymmetrically, anterior temporal lobes,
24 more anterior than -- I'm sorry, temporal lobes,
25 more anterior than posterior, usually a little bit

1 more lateral than mesial, but, you know -- that's
2 the typical pattern in brain stem, but you don't get
3 brain stem in mild injury.

4 Q So do you think that the pattern that
5 you're seeing on this DTI is strongly consistent,
6 mildly consistent, or inconsistent with known
7 patterns?

8 A Is this this theoretical MR?

9 Q Yes.

10 A No, it's not most consistent with trauma
11 in the absence of other changes in, again, in an
12 almost 80-year-old woman. But, again, you know, you
13 have to look at that. You can't look at that
14 without, in a definitive way, without more specific
15 information about what's going on with the patient.

16 Q But you're not saying if you saw this
17 picture in the abstract that you would say, Oh,
18 because of the anatomical locations, this can't be
19 trauma? You're not saying that?

20 A No, I'm not saying that. What I'm saying
21 is that, if I saw this in this theoretical and
22 that's all I saw, that would not be the -- in a 79,
23 80-year-old person, that would not be the first
24 thing I'd attribute it to, but I'd want to know more
25 about the patient.

1 Q Now, you might want to rule out a
2 dementing process?

3 A Sure, I mean, but you do that with
4 neuropsychiatric testing. You know, all imaging is
5 flawed with regard to its specificity in dementias.
6 If it were dementia, it would be sort of an
7 asymmetric frontal temporal type of dementia based
8 on a theoretical study that looks the same as this
9 one.

10 Q So the MR on Mrs. Renzetti is not
11 indicative of Alzheimer's, would you agree?

12 A No, Alzheimer's has, you know, has sort of
13 a mesial temporal lobe and high posterior parietal,
14 relatively symmetric, but can be asymmetric, look.
15 If it were going to be consistent with a dementia,
16 it would be more of a -- and, again, that's a
17 neuropsychiatric diagnosis -- it would be more of a
18 frontotemporal, you know, or frontal kind of
19 dementia, not Alzheimer's. It's not typical of
20 Alzheimer's at all, but it could be an effect of a
21 developing frontotemporal kind of a dementia.

22 Q Also, you would not think about
23 Alzheimer's because we also have an intact
24 nonatrophic hippocampus?

25 A Well, right, that's what I'm getting at.

1 Her atrophy is predominantly along the, you know,
2 the operculum, along her Sylvian fissure, you know,
3 her more lateral than mesial temporal lobes than her
4 frontal region. So, again, it's not Alzheimer's.
5 She doesn't have Alzheimer's clinically anyway from
6 the neuropsychiatric testing.

7 So if it were a -- and she doesn't -- I
8 don't even think she's demented really definitively
9 from the testing, but certainly be something you
10 want to think about, it would be a frontotemporal
11 type, not Alzheimer's. That would be the only thing
12 the findings would be mildly consistent with. So
13 your question, does it look like Alzheimer's, the
14 answer is no.

15 Q And the atrophy we see on Mrs. Renzetti's
16 brain is relatively mild for her age?

17 A Yeah, it's average to mild.

18 Q And the amount of white matter
19 hyperintensities would be mild for her age?

20 A Yes, in her age group, we typically see
21 more.

22 Q So from those two perspectives, she's got
23 a healthy looking brain for her age?

24 A Yeah, I think for her age she's in the --
25 sort of in the better category at her age, better

1 than average. Now, that doesn't go along with
2 function necessarily. That just goes along with the
3 way her brain looks, and we all know that the way
4 the brain looks doesn't necessarily correlate with
5 function.

6 Q But there is -- there can be a correlation
7 between the white matter load and function?

8 A Absolutely, but she doesn't show that kind
9 of a load where you'd worry about function.

10 Q There can be a correlation between degree
11 of atrophy and function?

12 A There can be, absolutely, yes.

13 Q On both of those counts, she's above
14 average?

15 A I think so. I think she's got a good
16 looking brain for almost 80.

17 Q So with those two things being kept in
18 mind, then you look at the theoretically abnormal
19 DTI that we did at Shands that show this, you
20 wouldn't primarily say, Well, these left-sided white
21 matter abnormalities are due to age, and, if you
22 did, what would you be basing that on?

23 MR. GOLDSTEIN: Form.

24 A I wouldn't say it was due to age? Well, I
25 don't know the degree, Woody. I mean, we don't know

1 whether the differences were -- on this theoretical
2 study we're seeing, is due to a 0.1 difference in FA
3 or a .1 difference in FA. I can't make any sense of
4 that.

5 Q No, I'm saying if you had done it and you
6 had the cutoffs where you wanted them and it was
7 not -- we're not talking about this study. I'm
8 talking about the study that you did that showed
9 these same asymmetries. What would make you think,
10 for whatever reason, this was due to age --

11 MR. GOLDSTEIN: Form.

12 Q -- and, if so, what would you be basing
13 that on?

14 A Just that that's the most likely cause in
15 an 80-year-old person. Remember, just like we're
16 talking about tractography finding more subtle
17 differences in trauma, you could also expect it to
18 find more subtle differences in the aging brain. So
19 I think that, you know, it might be that it's a sign
20 that -- it's an early sign of a developing
21 predominantly left-sided, you know, aging change or
22 dementia or asymmetric development of degenerative
23 changes in the frontal lobes that just goes along
24 with the aging brain.

25 Q Are you aware of studies which show that

1 the emergence is asymmetrical on the left side?

2 A No. No, I'm not saying that. You asked
3 me what I might attribute it to, and all I'm saying
4 is you have a more sensitive test than the imaging,
5 and just like it might pick up asymmetries, it might
6 pick up asymmetries due to trauma in a more
7 sensitive way, it might pick up asymmetries due to
8 the natural aging process or the development of a
9 slowly developing dementia.

10 We're going to come to the same place on
11 this. You would need to put this in a more robust
12 clinical context to come down strongly on one side
13 or the other. So without some compelling evidence
14 of significant head trauma, trauma would not be the
15 first on the list. The aging brain would be.

16 Q Are you aware of any studies that have
17 been published on mild traumatic brain injury and
18 DTI which show that left-sided asymmetric decreased
19 FA and reduced -- I'm sorry, increased FA would be
20 found? Let me start over.

21 A You mean increased diffusivity, I think.

22 Q Yeah.

23 A You meant diminished FA --

24 Q -- FA, decreased diffusivity.

25 MR. GOLDSTEIN: The question is are you

1 aware of any such studies.

2 A Focally in the left?

3 Q Yes.

4 A I mean, it just depends on where the
5 trauma occurs --

6 MR. GOLDSTEIN: The question is are you
7 aware of any such studies.

8 A Oh, am I aware of those studies that
9 differentiate that --

10 Q I'm sorry --

11 A -- that focus on the left side? I'm
12 confused.

13 Q It's better if I just tell you what the
14 study says.

15 A Yeah, there you go.

16 Q Study by Mayer, M-A-Y-E-R, et al.,
17 entitled A prospective diffusion tensor imaging
18 study in mild traumatic brain injury, published in
19 Neurology 2010. It states, Contrary to our initial
20 hypothesis, mild traumatic brain injury patients
21 demonstrated increased FA and reduced RD within the
22 genu and several left hemisphere white matter tracks
23 compared to age- and education-matched controls
24 during the semi-acute phase of injury.

25 MR. GOLDSTEIN: Form. Go ahead.

1 A Oh, yeah. Yeah. I'm not sure I know
2 about that study, but I'm sure -- yeah, we're
3 talking about studies that are done during the
4 acute -- right after the trauma, within, say, a few
5 weeks, within days or two or three weeks.

6 Q Right.

7 A Yeah, they show increased FA, which is,
8 you know, if you think about it, is a little
9 paradoxic, but, in the acute phase, you can either
10 see increased or decreased FA's.

11 Q Well, I mean, increased -- but I'm talking
12 more about the left side.

13 A The left, I didn't -- I didn't hear any
14 specificity in that summary of that study you read.
15 I'm sorry, I didn't hear any sided specificity in
16 that study. Did I miss it? You want to read that
17 again?

18 Q No, it's too confusing.

19 So I guess you have other concerns about
20 this being used to make a diagnosis of traumatic
21 brain injury?

22 MR. GOLDSTEIN: Form.

23 A Well, I don't have -- I don't know what
24 you mean by other concerns.

25 Q Well, I guess history. Do you have --

1 A Are we talking about the theoretical --

2 Q No, we're talking about Mrs. Renzetti
3 here.

4 A Yes, I have other concerns.

5 Q Okay.

6 A And then we have to get back to the
7 original question about what did I think of
8 Dr. Herbst's report, because we only talked about
9 the technical aspects of the study.

10 Q Then let's finish that.

11 A So then we have to remember to do what you
12 just asked, which was other problems.

13 Q Right. But keep in mind that Dr. Herbst,
14 I do not believe, has given an opinion on the
15 differential diagnosis.

16 A I agree. I was just going to say I didn't
17 see anywhere in his report -- you know, he's sort of
18 mostly attributing these things to vascular white
19 matter disease, if I can summarize his report.

20 MR. GOLDSTEIN: Can we go off the record
21 for one second, Woody?

22 MR. IGOU: Sure.

23 (Off record discussion.)

24 MR. GOLDSTEIN: Let the record reflect off
25 the record that I asked plaintiff's counsel if

1 there was additional quantitative data over and
2 above what's been provided in his report that
3 may be contained in Dr. Herbst's file. Counsel
4 indicated he was going to contact Dr. Herbst to
5 see if he could find that information and
6 agreed to turn that over to me as soon as it
7 was received. Agreed?

8 MR. IGOU: Agreed.

9 Q Dr. Mancuso, do your reports on DTI
10 contain raw data?

11 A We don't use it clinically for this
12 purpose, so, no, we don't do that. We don't use
13 fiber tracking in evaluating brain trauma. The only
14 clinical uses for this are done by our neurosurgical
15 team, who I said earlier map the brain tumors prior
16 to surgery so they can avoid the tracks during
17 surgery and for deep brain stimulators. So, no, we
18 don't report these, we don't report quantitative
19 data, we don't use the line diagrams, and we believe
20 this remains in the realm of experiments.

21 If we did begin to report these, then we
22 would establish our normative database, we would
23 make our results both quantitative and with
24 tractography and report our FA thresholds and our
25 angular thresholds, that we would include that, but

1 we just don't do it --

2 Q All of that in the report?

3 A Yeah, it's easy. You just -- well, say
4 for a CT -- you know, on any MR report you'll see it
5 begins with some preamble about T1 and T2-weighted
6 sequences were done with this spin echo and that.
7 It's only another line. It's, you know, the FA
8 threshold was this, the angle was this.

9 The other thing I wanted to mention,
10 Woody, about the technique, also it would be
11 interesting to know if Dr. Herbst uses any
12 techniques in his analysis of stripping away
13 nonbrain, like skull and scalp, to correct, and any
14 correction for anatomic localization, that is,
15 registering the anatomic images with the tensor
16 images. Okay? That would be another thing to know
17 about, you know, the specific reliability of the
18 data.

19 And that just -- that goes to whether or
20 not his technique of producing these comport with
21 the techniques that are used in the studies that
22 you've been quoting.

23 Q Right. There are things like motion and
24 pulsation artifacts that have to be taken care of?

25 A Yeah, exactly. And I'm almost sure that's

1 all going on, and that's nothing I would put in a
2 report. It would be useful for us to understand
3 whether he does these to the same degree of rigor
4 that the literature reflects.

5 Q Q-ball imaging, do you know what that is,
6 QBI?

7 A Q-ball? These have lots of names, but
8 what is q-ball?

9 Q It's one of the solutions to some of the
10 problems with getting a correct image, I guess.

11 A Yeah, there's --

12 Q -- persistent angular structure.

13 A Well, q-ball, if it's a persistent angular
14 structure, you may be talking about angular
15 corrections of the tensor. Just what he does will
16 be sufficient to generate the quantitative data and
17 to be sure that the chances of false positive
18 readings are reduced as much as possible consistent
19 with what's --

20 Q Just to summarize, there are a number of
21 possible ways to get toward a gold standard, get rid
22 of some known problems, and you try to do as many of
23 those as you can?

24 A Fair enough. That's exactly what I'm
25 getting at.

1 Q Okay. Now, phase two, not technical, but
2 what?

3 A Oh, you asked then about his report, and I
4 was just going to remark that I don't see in the
5 history -- in the indication, he calls it in his
6 report, and I'm now looking at his report on -- the
7 exam date was 8/12/2009 and his sign-off date was
8 8/20/2009. MVA three years ago, head trauma, memory
9 loss, trouble finding words, very emotional lately,
10 and the technique, it's MRI brain with DTI
11 tractography, just so we all know what we're talking
12 about.

13 And I don't see anywhere in here except
14 one place where he attributes any of these findings
15 to trauma. Okay? So he -- and I don't want to
16 reinterpret anybody's report, but, in his
17 comments --

18 Q Well, let's say if you were in the ER, you
19 know, do you necessarily attribute things to trauma
20 or not, or do you just report the findings?

21 A Well, I report the findings and then
22 always correlate them with clinical and give -- the
23 conclusion in my report always strives to put the
24 findings in the clinical context. But that's not a
25 standard of care. That's my personal -- you asked

1 what I did, and that's what I do.

2 Q You don't find it odd that he chose not to
3 say, you know, explicitly, I think this was caused
4 by trauma, right?

5 A No, I don't find it odd at all. I'll tell
6 you the only thing that I find odd in the report,
7 because what he does is he pretty much just lists
8 objectively, you know, ischemic changes and
9 decreased axons, and it's a very objective report
10 about, you know, about projection fibers being
11 decreased, left frontoparietal and left
12 fronto-occipital projection tracts being decreased.
13 Very objective report under his impression, okay?

14 And, no, and, in fact, he makes a specific
15 attempt to -- I don't know if he does susceptibility
16 imaging per se, but whatever he does, he makes a
17 specific statement that there were no blood products
18 identified. But that --

19 Q On that count, this many years later, it's
20 possible that hemosiderin had been reabsorbed?

21 A Oh, sure. And some of this injury takes
22 place without ever producing blood products. I was
23 just pointing that out because he took the time to
24 mention that.

25 Q Because he did MR, CT, and the

1 tractography all at once.

2 A Yes, he did. It's a complete study. He
3 did MR, CT, tractography, and FDG, a nuclear study
4 at some point too, I think. I don't know if that
5 was him or something else.

6 But the only thing that I find confusing
7 after being, you know, completely objective in, I
8 think, in the report about the statement and not
9 really attaching anything to it, there's this one
10 area in the either right posterior frontal or
11 anterior parietal that he identifies, and I'll just
12 give you -- it's on -- I don't have the page numbers
13 on the report, but --

14 MR. GOLDSTEIN: First of all, let's
15 identity. It's on the MRI with DTI.

16 A Yeah, we're talking about the same report,
17 and it's the second page of what I have, but at the
18 top it shows six images, and it goes from the upper
19 left hand corner, Series 10 Image 18, and the lower
20 right hand corner of those six images on top, Series
21 10 Image 17. So it's a selected series of images
22 out of Series 10. And he's got comments in the
23 upper left-hand corner.

24 Q Gosh, I don't see that.

25 A It's on the one that also has -- in the

1 middle of the page, it has Right Maxillary sinus :
2 Inflammation. Can you find the page that has a
3 picture of the face phase on it and the eyeball.
4 You ought to be able to find that looking through it
5 quickly.

6 And there's three color pictures down at
7 the bottom. So it's six black-and-whites, two in
8 the middle showing the phase and it says Maxillary
9 sinus : Inflammation, and three at the bottom that
10 are purple and yellow.

11 MR. GOLDSTEIN: And what about that page
12 do you want to discuss?

13 A I want to discuss the six pictures that
14 are at the top and the comments in the -- that he
15 labels comments.

16 Q I'm just having trouble -- I have six at
17 the top, image 19, 20, 21.

18 A No, we need Image 18, 15 -- 18 and 15 and
19 17.

20 Q At the top?

21 A At the top. So a group of six. There's
22 FLAIR images and then some --

23 Q I don't have that.

24 A Well, we can fax it over to you.

25 MR. GOLDSTEIN: It's marked.

1 A So, anyway, the only thing that confused
2 me was that it says in the comments, and I'll just
3 read from the comments in the upper left-hand
4 corner, In the right parietal lobe, consistent with
5 shear injury, but ischemic changes cannot be
6 excluded.

7 And I don't understand the whole report
8 being, you know, objective and talking about
9 ischemic changes and all that and picking out one
10 thing, without any other findings on the study that
11 are structurally consistent where brain injury
12 occurs, you know, in the areas I mentioned, and then
13 picking out one area of increased signal intensity,
14 you know, a 3-millimeter area, and saying it's
15 consistent with shear, but can't exclude ischemic
16 changes. I just would have flipped those two things
17 around and said, Looks like chronic ischemic
18 changes. So that's the only thing in his report
19 that confused me.

20 Q That's on the MR, not on the DTI?

21 A Well, yeah, that's on the MR, right. He's
22 picked out an area in that area. And I just
23 couldn't figure out why that was singled out by
24 inference as more likely due to trauma than due to
25 just the ischemic changes, which pretty much

1 everything else was attributed to.

2 Q Okay. Anything else?

3 MR. GOLDSTEIN: That's kind of a broad
4 question. Anything else as far as what?

5 Q Anything else regarding the report? You
6 talked about the technical issues. You were talking
7 about issues in the report itself. If you're
8 finished with that, I think you probably want to
9 talk about the clinical history and correlation.

10 A You got it. That's right. That's what we
11 agreed we were going to do after we did the report.

12 Q Okay.

13 A So, in putting this in clinical context --
14 and I have looked through the EMS and the ER and the
15 subsequent treaters' records and the neuropsych
16 things, and nowhere in the medical record can I find
17 it documented that she had any altered state of
18 consciousness. It only seems that this comes up
19 down the road after all this medical evaluation took
20 place.

21 So I don't see -- she certainly -- there's
22 no retrograde amnesia greater than -- there's no
23 retrograde amnesia at all that I could see in the
24 record, and then there really isn't any medically
25 documented altered state of consciousness, except

1 much later in the evolution of the matter. But
2 nothing written down by a doctor that said she had
3 an altered state of consciousness ever.

4 So even if we were to assume that that
5 came up later as factually medically, she would be,
6 at the most, mild end of the spectrum of mild head
7 trauma. I mean, it barely raises to that level, and
8 it doesn't raise to that level based on the
9 documented medical record.

10 Q You'll admit that transient amnesia during
11 the car accident can often be overlooked, especially
12 if the person is by themselves in the vehicle?

13 MR. GOLDSTEIN: Form.

14 A Yeah, I think I understand the question.
15 Could a transient amnesia or transient altered state
16 of consciousness in an unobserved trauma occur?
17 Yes. But as soon as treaters and everybody were on
18 the scene -- and then that's never documented
19 subsequently as a complaint. When people elicit a
20 medical record from her, she never volunteers that
21 that happened. So, what I'm saying, giving the
22 patient the benefit of the doubt, if she then much
23 later in the process reports that, then that would
24 put her at the very lowest end of the spectrum of
25 mild TBI.

1 Q And as we discussed earlier, because of
2 her age, she could have a worse than expected
3 outcome?

4 A Yeah, I think we agreed that theoretically
5 that the elderly brain might be more susceptible to
6 shear injury, yes.

7 Q And it is also -- I mean, I've got the
8 study here, but it basically says, you know -- here
9 it is. This is a quote from the N-I-O-G-I, initial
10 S. N., et al., 2007. On page 972, it says, There's
11 mounting evidence that individual differences in
12 microstructural white matter integrity account for
13 variation in a wide range of cognitive skills.

14 MR. GOLDSTEIN: Form.

15 Q Do you agree with that?

16 MR. GOLDSTEIN: Form.

17 A Yeah, it sounds like a reasonable
18 statement.

19 Q Okay. So, in other words, I think what
20 he's saying is, doing these DTI's in different
21 levels of injury -- and it states somewhere else in
22 that study that, you know, some people with a
23 moderate or severe injury have been studied with DTI
24 in the chronic phase as well as people with mild
25 traumatic brain injury, and there can be a recovery

1 in the moderate and severe or there can't be, and
2 that the decrease in FA remains in people who are
3 having chronic problems.

4 MR. GOLDSTEIN: Form.

5 A Well, I think that's -- I understand the
6 question. I think that's well established in the
7 moderate and the severe, and I think it remains an
8 experimental question in the milds. And then taking
9 it to this case specifically, the only thing I'd be
10 willing to give on her is she's in the most mild of
11 the milds, and we don't know that any of this DTI
12 evidence is predictive of outcome in the milds,
13 actual functional outcome.

14 Q If there are studies showing a
15 relationship between functional outcome in the
16 chronic stage and abnormalities on DTI, you haven't
17 read those studies?

18 A I have not seen -- and, as I said, Woody,
19 you know, I keep up with this literature because I
20 have to advise everybody here on, you know -- by
21 everybody, I mean the scientists and the
22 clinicians -- about these things. I haven't seen
23 one -- and we do the vets with their concussive
24 injuries too. But I haven't yet seen anything on
25 mild DTI that says that it is a predictor, a

1 reliable predictor of functional outcome.

2 And I guess you told me ones that I may
3 not have seen that these changes in mild may
4 persist, but, again, remember, there's a range of
5 mild. Mild is typically defined, you know, in these
6 experiments as, you know, transient, you know, less
7 than 20, 30 minutes of altered state of
8 consciousness. A Glasgow of 13 to 15, there's a
9 range right there. So, you know, you've got to be
10 careful about apples and apples and oranges and
11 oranges, even inside of the mild category.

12 Following me?

13 Q Yeah, I follow you. But it would be fair
14 to say that -- you know, I'm looking at. . .

15 Okay, the study by Lipton, 2009, study was
16 to determine whether frontal white matter diffusion
17 abnormalities could predict acute executive
18 functioning. Okay? So you don't have a problem
19 with acute executive functioning being consistent
20 with abnormalities of DTI?

21 MR. GOLDSTEIN: Form.

22 Q Correct?

23 A Okay, so we're saying in the acute brain
24 trauma setting --

25 Q I'm sorry, I looked at the wrong one.

1 Lipton, M. L., et al., 2008, looked at mild
2 traumatic brain injury with cognitive disability on
3 DTI, and they were having cognitive impairment due
4 to mild TBI occurring six months to three years
5 prior versus ten healthy controls.

6 A Yes.

7 Q They compared the FA and MD, and it showed
8 an overall shift toward lower FA in patients
9 compared to controls. Areas of significantly
10 decreased FA were found in subject groups in the
11 corpus callosum, et cetera, et cetera. Co-located
12 elevation of mean diffusivity, MD, was found in
13 patients within each region, et cetera.

14 MR. GOLDSTEIN: Form.

15 A And I think it's really important that you
16 look at the context here. This is what I was
17 getting at earlier. Notice that where they found
18 correlating abnormalities were in areas that are
19 most susceptible to DTI, which was in the anterior
20 and posterior corpus callosum and whatever else you
21 mentioned there, not just an isolated frontal lobe
22 thing.

23 So it's sort of the company it keeps kind
24 of a setting. But, again, if you read the
25 conclusions of these studies, I think they will all

1 say that more work has to be done on this to
2 determine whether this eventually correlates with
3 functional outcome. That's my understanding of the
4 current state of literature. We certainly --

5 Q You could say that about MRI, you could
6 say that about neuropsychological testing, you could
7 say that about almost anything, couldn't you?

8 A Well, that -- no. I think the literature
9 does -- the experimental literature at some point
10 does translate into clinical utility that's
11 generally accepted as reasonable, but, you know,
12 when you're looking at this in the medical-legal
13 context, it needs to be proven and correlated and
14 not have that speculative tone in the conclusions.

15 Everything we do in medicine can be
16 improved on, but it does reach a point where it's
17 reasonable to use it to make certain conclusions.
18 And my understanding of the current literature, as
19 we all understand it at this institution in any
20 case, for this still remains speculative with regard
21 to predicting outcome or its utility in mild TBI.

22 And so -- and, really, what people look at
23 when they're looking at whether they're going to
24 rehab people or how intensively and all, they still
25 look at their function. They don't look at their

1 DTI studies.

2 Q Well, let's talk about Mrs. Renzetti's
3 symptomatology. You're not aware -- you haven't
4 read any depositions or talked to anybody that was
5 with her immediately following the accident in the
6 outside world?

7 A No, I've read only the neuropsychs and
8 sort of the ortho visits. Her medical record is
9 what I've read and the neuropsychs, the two
10 neuropsych opinions.

11 Q You can't discount what outsiders and
12 people dealing with her in the outside world
13 observed, can you?

14 A I wouldn't discount anything.

15 Q And so if they're reporting a, you know,
16 rather immediate decrease in cognition, problems
17 with speech, emotional lability, those would be
18 consistent at least with frontal lobe type injuries?

19 A Yeah, you're talking about things that
20 might be or they could be consistent with elevated
21 levels of anxiety, and this is a woman who was, you
22 know, nervous for a good deal of her adult life. So
23 it could be just PTSD-like stuff too.

24 Q But those are also consistent with a
25 frontal lobe type injury?

1 A Assuming you have enough evidence that
2 there was a frontal lobe injury. And, again, you
3 know, I'm giving the benefit of the doubt to the
4 patient here that there was the mildest form of mild
5 head injury. I really -- you know, I have to wonder
6 what would be the most likely cause of that, whether
7 it's a stress response versus an actual brain
8 injury. So could it be? Could it be
9 hypothetically? Sure.

10 Q A stress response would likely diminish
11 over time and she would return to function, correct?

12 A It depends on how -- you know, some people
13 magnify that over time and sort of get fixated on it
14 and some people get over it. That's a personality
15 thing. I can't predict that in general. It would
16 just depend on what kind of a psychological
17 substrate you're dealing with.

18 Q You would agree that, in the context of
19 approaching dementia, you've worked with people who
20 you're doing the MRI and you're trying to figure out
21 if they're demented or progressing, serial
22 neuropsychological test batteries are the gold
23 standard for that?

24 A You'd have to ask a mental health
25 professional about what the gold standard is, but

1 that sounds reasonable to me.

2 Q If you do serial neuropsychological test
3 batteries in the case of emerging dementia or
4 emerging Alzheimer's, you would expect a decrease in
5 memory function over time?

6 A Well, yeah, and I think that depends on
7 whether the patient is under aggressive active
8 therapy or is -- you know, what the life
9 circumstances are, but I think dementias are
10 progressive and think their progression is --
11 non-Alzheimer's dementias' progression, even
12 Alzheimer's, is not very predictable, but you do --
13 dementia still is not a very treatable disease, so
14 you expect it to progress.

15 Q And, conversely, if someone has a
16 traumatic brain injury, serial neuropsychological
17 testing a year apart should show some improvement?

18 MR. GOLDSTEIN: Form, basis.

19 A I just -- it's hard for me to predict. I
20 think you ought to ask the people who give those
21 tests whether that's true or not.

22 Q Okay. In a study from 2006 in the Journal
23 of Neuroimaging, Salmond, S-A-L-M-O-N-D, C. H., et
24 al., found the following: A significant positive
25 correlation was found between the diffusivity and

1 impairment of learning and memory in the left
2 posterior cingulate, left hippocampal formation and
3 left temporal, frontal and occipital cortex. Do
4 those areas include abnormalities that we see on
5 Mrs. Renzetti's DTI?

6 MR. GOLDSTEIN: Form.

7 A Only one of them. And what is the context
8 of that study group? What is that study group?

9 Q These are chronic head injury survivors.

10 A So we might be looking at a group of, my
11 guess is, moderate to severely head injured people.
12 Because what you're describing there are multiple
13 areas of the brain that are more typically affected
14 than an isolated left frontal situation. So to
15 answer your question, yeah, she's got isolated
16 questionable findings to me right now in one area of
17 the brain whereas those people have multiple areas
18 of the brain that have to talk to each other to get
19 things going right for them.

20 Q You would agree that the frontal lobe is a
21 commonly affected area of the brain in the context
22 of a motor vehicle velocity change type injury?

23 A More typically the low frontal region, and
24 more typically bilateral.

25 Q If we're going to see demented-type

1 abnormalities in the brain, a lot of those are more
2 posterior than what we're seeing here?

3 A No, it depends. You know, you could take
4 dementia and split it up into two general
5 categories, frontotemporal and Alzheimer's-like. So
6 they're distributed based on the kind of dementia
7 you're dealing with.

8 Q The only differential diagnosis you would
9 have based upon the studies that you've looked at in
10 regards to dementia would be frontal lobe dementia?

11 A I don't have a diagnosis of dementia. I
12 just think her brain's aging, and I don't even know
13 that the left frontal region's that much abnormal
14 than the right. We're now on Ms. Renzetti, right,
15 we're not on our theoretical --

16 Q Right.

17 A Yeah. No, I don't know -- for her
18 factually, I don't know whether that's a, like I
19 said, a .01 change or a .03 change or a .2 change in
20 FA in those two areas. It could be a totally
21 inconsequential asymmetry based on the data I have
22 here. Dr. Herbst didn't seem to attach much
23 significance to those findings, frankly.

24 Q Well --

25 A I mean, I'm not saying he has to come to a

1 conclusion. I just don't see that he came to a
2 conclusion about it except to say pretty much
3 ischemic changes except for that one white dot that
4 we talked about.

5 Q Well, he would have to be asked what his
6 differential diagnosis was, correct?

7 A Well, I think asking what the differential
8 diagnosis is and coming down on what's more likely
9 are two different things. I mean, we're here to
10 decide -- I think most of the time you guys want to
11 say what's more reasonable than not, and I've got to
12 tell you, in this one, it's far more reasonable than
13 not this is something other than trauma. I mean,
14 this isn't a 51 percent test here.

15 Q And what are your -- what are you saying,
16 age related or nothing at all?

17 A That's right, given the -- no, age
18 related. Given the -- first of all, I don't know
19 the magnitude of the asymmetry we're looking at, so
20 we don't know exactly what we're talking about.
21 Second of all, I don't think that this is a setting
22 that would result in significant permanent changes
23 in her brain.

24 Q So --

25 A In a clinical context.

1 Q If we don't take into account the DTI
2 because we don't have the raw data, we're just
3 looking at MR's that you would be able to rely on,
4 you would say that the most likely explanation would
5 be -- well, you wouldn't know because she's got
6 normal MR.

7 A Well, far more -- no -- yeah, her age.
8 She has these little white dots, and there's no way
9 that little white dot in the right parietal region
10 was caused by an accident because you don't get
11 those little white dots in the brain without getting
12 knocked out. I mean, without getting either really
13 bad mild or moderate head injury, you just don't get
14 that kind of brain-scarred gliosis that's out there.
15 So, essentially, her study is normal and a little
16 bit better than average for her age.

17 Q So if you're just relying upon the
18 neuroradiological data that you can accept, you're
19 looking at someone with an above average brain for
20 her age?

21 A Yeah.

22 Q And no abnormalities?

23 A Yeah, normal for her age, right.

24 Q So you would have to defer on any other
25 opinions to neuropsychologists or neurologists or

1 other experts because that's all you've got?

2 MR. GOLDSTEIN: Defer as to what?

3 Q As far as what's going on with her?

4 MR. GOLDSTEIN: Form.

5 Q You know, you're getting into all this
6 forensic hypothesizing, but, I mean, all you've got
7 to rely upon really is an above average MR of her
8 brain and you have to defer to other specialists on
9 what might be going on, correct?

10 MR. GOLDSTEIN: Form.

11 A All I can tell you -- I think I understand
12 the spirit of your question is what -- the findings
13 on this study have nothing to do with making a
14 clinical decision in this patient. So the clinical
15 decision-making or the arguments that you guys are
16 having about this, yeah, you have to rely on what
17 the -- you know, what the treaters are saying.

18 Q Does this --

19 A I think that's what you mean by defer. I
20 don't think the treaters are allowed to say that
21 anything on these imaging studies make any
22 difference either. Okay?

23 Q Right. I mean, we have to go to another
24 level of analysis which is commonly done, which is
25 going down to neuropsychological testing and that

1 sort of subtle analysis?

2 A Yeah, that would go to the findings and
3 the credibility of the neuropsych testing. If
4 that's what you mean by defer, sure. But the images
5 really do not contribute to supporting trauma as the
6 most reasonable explanation for the findings that
7 are on the study.

8 Q But if we weren't here having fun talking
9 about DTI, it would just be another of many, many
10 cases where there's a mild traumatic brain injury, a
11 normal MRI, and we go on to look at it from another
12 perspective, which is neuropsychologically and in
13 other ways?

14 A Yeah, and that's up to you guys, I agree
15 with that, yes. That's correct.

16 Q So we're really here talking about the DTI
17 aspect of this and, you know, you feel it's
18 experimental only in the context of mild traumatic
19 brain injury but not experimental in the context of
20 moderate and severe brain injury?

21 A Well, with regard to predicting outcome,
22 yes. I think we can accept that it identifies
23 things in mild. We just don't know what that means
24 in terms of predicting function, long-term
25 functional outcome, right.

1 Q If that is tied to a temporal decrease in
2 cognitive abilities assessed by virtue of
3 neuropsychological testing, then that would go along
4 with the DTI findings and could be consistent or
5 inconsistent?

6 A No, I don't think you can link it. It
7 doesn't make any sense in this case. First of all,
8 I think that --

9 Q I don't mean in this case. I mean --

10 A Oh, in general?

11 Q -- in a case of abnormal DTI, you would
12 say, Well, look, some people get better with what we
13 see here, some people don't; go out and get some
14 testing; a year later, three years later see how
15 you're doing?

16 A So you're asking the same question another
17 way; we're not talking specifically about
18 Ms. Renzetti?

19 Q No.

20 A Yeah, that's fine.

21 Q So when you say that, in the case of mild
22 traumatic brain injury and DTI, we're not sure about
23 outcome, since we know that DTI shows physical
24 injury to the brain in the context of mild traumatic
25 brain injury, then to say anything about recovery,

1 you would rely upon standard neuropsychological
2 testing serially over time to show or not show that?

3 MR. GOLDSTEIN: Form.

4 A Yeah, I think you also have to
5 take into -- you know, the problem, as you know,
6 Woody, is these three categories, I think they're
7 not subdivided enough. I think there are people who
8 have mild TBI that have Glasgows that are 13 and
9 there's ones that are 15, and you can't really
10 establish that they've ever lost consciousness.

11 And just, again, we've talked about common
12 sense earlier in this deposition, about, you know,
13 older brains having more space, and common sense is,
14 if you really don't have or you have a very
15 transiently altered state of consciousness, you're
16 just stunned or however you want to do it, it's --
17 just common sense says that brain is not going to be
18 permanently injured.

19 But there probably are people at the other
20 range of TBI that borders on moderate head injury
21 that may have some, you know, long-term minor
22 impairment. I don't think any of these people are
23 going to be severely impaired. You know, and
24 that --

25 Q There's variation among the categories; in

1 other words, some people have come in with a, you
2 know, horrible looking MRI and they go out and they
3 go on with their life and it doesn't seem to give
4 them much problem? I mean, you've had --

5 A Right.

6 Q -- plenty of cases like that.

7 A Yeah, that happens.

8 Q Conversely, you've had lots of cases where
9 the person has a blow to the head, a normal MRI, and
10 their life is turned upside down and they are truly
11 having problems and suffering, and it's hard to
12 explain why?

13 A Well, that's right. I think your last
14 statement there is it's hard to explain why and,
15 again, that may come into the realm of the mind
16 rather than the brain.

17 Q Well, haven't we in the last 30 years come
18 to figure out that lots of people who would have
19 been called crazy 40 or 50 years ago are now people
20 that have what we now know is a mild traumatic brain
21 injury?

22 A I'm not calling anybody crazy, but, yeah,
23 again, I think we're talking about matter of degree
24 here. You know, there's personal variability. I'm
25 not going to argue that there isn't variation

1 between how people adjust to things.

2 Q But, I mean, the evolution of this has
3 been that we now are looking at the brain in such a
4 discrete way that was not possible 30 years ago that
5 we are now saying these things are real, they are
6 microscopic brain injury, and it's not all in the
7 people's heads as we might have said 30 or 40 years
8 ago, wouldn't that be true?

9 MR. GOLDSTEIN: Form.

10 A Well, I think, you know, all in the
11 people's heads, that's not a very perceptive or
12 patient-oriented kind of a statement. Yeah, if
13 that's characterized some people's thinking in the
14 past, I think the objective stuff we have nowadays
15 has improved on that.

16 Q And the difference between psychiatric
17 difficulties and objective brain injury has also
18 become more clarified whereas 30 or 40 years ago the
19 two were not to be considered related to each other
20 at all, and now they are considered -- many
21 psychiatric difficulties formerly thought to be
22 purely psychiatric and nonphysical have been found
23 to be related to physical objective changes in the
24 brain, fair?

25 MR. GOLDSTEIN: Form, basis.

1 A Yeah, it's a lot of assumptions inside
2 that, but if you're saying our understanding of
3 brain disease and psychological disease and
4 structural correlates of that, you know, has
5 improved, sure.

6 Q And structural injury to the brain is now
7 believed to occur at lesser levels of trauma than it
8 was 30 years ago?

9 A Well, I think there's much more of an
10 awareness of that in many venues. You know them.
11 The NFL quarterbacks are the most famous example of
12 that and, of course, you know, I saw the change
13 about Muhammad Ali when he used to come to UCLA when
14 he started having his dementia. So, yeah, I think
15 we know more about that.

16 I still think, you know, teasing out in
17 these very, very mild things, reactive changes from
18 truly organic disease is difficult, you know, in
19 this very mild end of the mild spectrum.

20 Q We are now in a position to know whereas
21 we weren't 30 or 40 years ago that some of the
22 psychiatric type complaints we see in mild traumatic
23 brain injury or, as it's otherwise known,
24 post-concussive syndrome are actually due to
25 chemical changes in the brain that we didn't know

1 about 20 or 30 years ago, would that be fair?

2 MR. GOLDSTEIN: Form.

3 A Yeah, I think some neurotransmitter
4 correlates is what you're saying. You're
5 saying, you know -- I think that's what you mean by
6 chemical, right? You don't mean the anatomy
7 changing; you mean neurotransmitter differences or
8 how the neurons function --

9 Q Right.

10 A -- are different? Yeah, I think there's
11 probably a neurotransmitter chemical correlate to
12 the anatomic, you know, imaging data we have. I
13 don't know that that's proven in humans, but it's a
14 reasonable hypothesis.

15 Q And the secondary type of injuries, in
16 other words, those that chemically cascade and
17 follow the initial trauma, a lot more is known about
18 those in the context of mild, moderate, or severe
19 injury than 30 or 40 years ago, correct?

20 MR. GOLDSTEIN: Form.

21 A Oh, yeah, there's no question that -- I
22 know what he's talking about. There's no question
23 that hypoxia and ischemia, I think is what you're
24 talking about, induced make all this stuff worse,
25 but, in general, unless somebody's having a heart

1 attack along with their accident, you know, with
2 mild head injury, you're not talking about a lot of
3 secondary changes from -- you talking about hypoxic
4 ischemic injury --

5 Q There could be wallerian degeneration,
6 there could be oxidation type of injuries.

7 A Oh, I thought you were talking about, you
8 know, the acute injury then being made worse by
9 localized tissue damage --

10 Q No, no, no, talking about secondary -- in
11 other words, primary traumatic injury is structural.
12 Secondary follow-up abnormalities that cause
13 problems because of the initial --

14 A Oh, you mean getting amyloid deposits and
15 tangles --

16 Q Right.

17 MR. GOLDSTEIN: Let me just object to the
18 form and whether there's an actual question on
19 the table.

20 Q There is now known to be a series of
21 secondary processes following the initial trauma
22 which are harmful to the brain that weren't known
23 about 30, 40 years ago?

24 MR. GOLDSTEIN: Form.

25 A Yeah, but I'm not sure that that level of

1 secondary injury is going on in the mildest of mild.
2 But you're right, I think that there's secondary
3 effects in the brain just like there is in stroke.

4 Q And you would agree that, in all the years
5 that you've been looking at MRI's, it is difficult
6 for you to sit there and look at those films to say,
7 by just looking at the film, This is how the
8 person's doing out in the real world? You'd admit
9 that's difficult for you?

10 A Sometimes it's very predictable, and
11 oftentimes it's not predictable.

12 Q In the more severe cases, it's more
13 predictable, but, as you move toward the milder end,
14 it becomes less predictable?

15 A Yes, and, as you move toward the milder of
16 the milder, it becomes more predictable again. So,
17 at each end of the spectrum, I think it's quite
18 predictable. However, you know, there's that zone
19 in the middle where the -- you know, it's ambiguous
20 and based on the individual protoplasm you're
21 dealing with.

22 MR. IGOU: That's all I have. Thank you,
23 sir.

24 (The witness elected to read and sign the
25 deposition; the witness was excused and the

deposition adjourned at 11:40 a.m.)

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CERTIFICATE OF OATH

STATE OF FLORIDA
COUNTY OF ALACHUA

I, KAREN L. BIERY, Notary Public, State of Florida, certify that ANTHONY MANCUSO, MD, personally appeared before me on this 3rd day of February, 2010, and was duly sworn.

WITNESS my hand and official seal this 10th day of February, 2010.

KAREN L. BIERY
Notary Public
State of Florida
Johns, Stephenson & Biery
Advantage Court Reporters

CERTIFICATE OF REPORTER

STATE OF FLORIDA
COUNTY OF ALACHUA

I, Karen L. Biery, do hereby certify that I was authorized to and did stenographically report the deposition of ANTHONY MANCUSO, MD; that a review of the transcript was requested; and that the foregoing transcript, pages 1 through 73, is a true record of my stenographic notes.

I further certify that I am not a relative, employee, attorney, or counsel of any of the parties, nor am I a relative or employee of any of the parties' attorney or counsel connected with the action, nor am I financially interested in the action.

DATED this 10th day of February 2010.

KAREN L. BIERY

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ERRATA SHEET

I, ANTHONY MANCUSO, MD, have read my deposition in the case of Renzetti vs. State Farm taken on 2/3/2010, and the transcript constitutes a true and accurate transcription of same with the exception of the following amendments, additions, deletions, or corrections:

PAGE NO. LINE NO. CHANGE AND REASON FOR CHANGE_

Under the penalties of perjury, I declare that I have read my deposition and that it is true and correct subject to any changes in the form or substance entered here.

SIGNATURE: _____

DATE: _____

Court Reporter: Karen L. Biery

O : Igou

C : Goldstein