NON-PRECEDENTIAL DECISION - SEE SUPERIOR COURT I.O.P. 65.37

MARK A. JACOBY Appellant v. RITE AID CORPORATION, THE PROCTER & GAMBLE DISTRIBUTING, LLC, THE PROCTER & GAMBLE MANUFACTURING COMPANY, AND THE PROCTER & GAMBLE COMPANY Appellee	IN THE SUPERIOR COURT OF PENNSYLVANIA No. 1508 EDA 2012

Appeal from the Order Entered May 2, 2012
In the Court of Common Pleas of Philadelphia County
Civil Division at No(s): 00024 February Term, 2011

BEFORE: STEVENS, P.J.**, LAZARUS, J., and COLVILLE, J.*

MEMORANDUM BY LAZARUS, J. **FILED DECEMBER 09, 2013**

Mark A. Jacoby (Jacoby) appeals from the order of the Court of Common Pleas of Philadelphia County that entered summary judgment in favor of Rite Aid Corporation (Rite Aid), Procter & Gamble Distributing, LLC, The Procter & Gamble Manufacturing Company, and the Procter & Gamble Company (collectively P&G). After careful review, we affirm.

The trial court set forth the relevant facts of the case as follows:

> Jacoby began using Fixodent in 1992. From 1992 to 1995, he used Fixodent approximately twice daily and consumed one 2.4 oz. tube per week. He started working at a chemical

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* Retired Senior Judge assigned to the Superior Court.

**President Judge Stevens did not participate in the consideration or decision of this case.

> manufacturing plant in 1995 and increased his Fixodent use to approximately 7 times a day. In 1998, he first experienced tingling and numbness in his extremities. Those conditions worsened until late 2000 when he ceased working at the chemical plant. [Jacoby] testified his Fixodent use then lessened and he began taking multivitamins containing copper and zinc. At that time his neurological conditions stabilized but did not improve. [Jacoby] uses a walker or electric wheelchair and has difficulty manipulating hand held objects. Medical examinations in 2000 showed the presence of a severe myeloneuropathy, cause unknown.

Trial Court Opinion, 4/27/12, at 1-2 (citations omitted).

On February 4, 2011, Jacoby filed a short form civil action complaint that incorporated by reference the Second Amended Long Form Complaint filed in the In re Denture Adhesive Cream Mass Tort Program.[1] The long form complaint contains the following relevant allegations:

> 14. Plaintiff(s) aver that when . . . Fixodent [is] foreseeably swallowed and/or otherwise exposed to the user's gastrointestinal tract . . . as a result, zinc in excess amounts is absorbed in the body's tissues, upsetting mineral homeostasis and resulting in depleted copper levels in the body. This copper depletion results in the development of, *inter alia*, a constellation of neurological symptoms and injuries.
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> 15. By the time these symptoms are noticed and eventually connected to excess zinc and copper depletion, permanent neurological and other physical injury has already been suffered by the user.
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> 16. While cessation of . . . Fixodent generally results in a return to normal zinc and copper levels, symptoms generally do not improve. The former user is thus left with permanent, profound personal injuries, and enduring disabilities.

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[1] The Second Amended Complaint, filed March 24, 2010, included as defendants several manufacturers of denture creams containing zinc.

Second Amended Long Form Complaint, 3/24/10, at 4-5.

Jacoby's short form complaint alleged, *inter alia*, that P&G designed, manufactured, tested and distributed Fixodent, and that Jacoby purchased Fixodent at Rite Aid. Jacoby's complaint alleged negligence; strict liability – design defect; strict liability – failure to warn; breach of implied warranties; violations of Pennsylvania's Consumer Protection Act, 73 P.S. §§ 201-1–201-9.3, common law fraud, and gross negligence and malice.

P&G and Rite Aid each filed an answer and new matter, after which the parties engaged in extensive discovery including the preparation of several expert reports. On February 1, 2012, P&G and Rite Aid filed a joint motion for summary judgment and a joint motion seeking a ***Frye*** hearing.[2] Jacoby filed timely responses, and the court held a ***Frye*** hearing on March 23, 2012. On April 27, 2012, the court granted the ***Frye*** motion, striking, *inter alia*, the reports and testimony of Jacoby's experts, Dr. Martyn T. Smith, Dr. Frederick K. Askari, and Dr. Ebbing Lautenbach. On May 1, 2012, the court granted P&G and Rite Aid's motion for summary judgment. This timely appeal followed.

Jacoby raises the following issues for our review:

> 1. Did the trial court abuse its discretion or err as a matter of law by concluding that zinc-induced copper deficiency myeloneuropathy is novel science and applying a ***Frye*** inquiry

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[2] ***Frye v. United States***, 293 F. 1013 (D.C. Cir. 1923).

to three of [Jacoby's] general causation experts, Dr. Martyn Smith, Dr. Frederick Askari, and Dr. Ebbing Lautenbach?

2. Even if a ***Frye*** inquiry was appropriate, did the trial court abuse its discretion or commit an error of law by evaluating scientific evidence underlying the opinions of [Jacoby's] general causation experts after finding their methodologies generally accepted?

3. Even if an evaluation of the scientific evidence was appropriate, did the trial court abuse its discretion or err as a matter of law by substituting its own limited analysis of the scientific evidence for that of [Jacoby's] general causation experts?

4. Did the trial court abuse its discretion or commit an error of law by granting [P&G and Rite-Aid's] motion for summary judgment after erroneously granting [their] ***Frye*** motion?

Appellant's Brief, at 5.

Although the order currently before the Court awarded summary judgment, "an appeal of a final order subsumes challenges to previous interlocutory decisions," such as preclusion of expert testimony. ***Betz v. Pneumo Abex***, 44 A.3d 27, 54 (Pa. 2012) (analyzing appeal from grant of summary judgment under the abuse of discretion standard because the underlying decision was an evidentiary ruling). "Generally, the appropriate appellate standard of review is the one pertaining to the underlying ruling." ***Id.*** Here, the trial court granted summary judgment after precluding Jacoby's expert testimony. Jacoby's issues on appeal, therefore, challenge the court's preclusion of his expert testimony. ***See Haney v. Pagnanelli***, 830 A.2d 978, 980 (Pa. Super. 2003). Admissibility of expert testimony under Pennsylvania Rule of Evidence 702 is left to the sound discretion of

the trial court, and as such, this court will not reverse the trial court's decision absent an abuse of discretion or misapplication of the law. ***Grady v. Frito-Lay, Inc.***, 839 A.2d 1038, 1046 (Pa. 2003).

As a preliminary matter, we set forth the conclusions of Jacoby's expert witnesses regarding causation without considering the methodologies the experts employed.[3]

In his report dated November 30, 2011, Martyn T. Smith, Ph.D., a toxicologist, stated that he reached the following opinions to a reasonable degree of medical certainty:

1. Zinc has toxic effects on the blood and nervous system.
2. Copper deficiency can be induced by chronic zinc exposure and can produce serious hematological and neurological changes leading to myelopathy.[4]
3. A regular intake of zinc from all sources in excess of 40 mg/day, the tolerable intake upper limit (IUL) set by the Institute of Medicine, a branch of the National Academy of Sciences, may lead to copper deficiency in certain individuals.
4. The regular use of Fixodent denture cream can readily lead to total intakes of zinc in excess of 40 mg/day in some users.
5. The manufacturers of Fixodent were aware of the potential dangers of incorporating zinc into denture cream and failed to adequately evaluate its safety prior to going to market.
6. The available medical literature is consistent with the conclusion that high-end users of Fixodent denture cream are

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[3] The methodologies will be considered later herein.

[4] Throughout the record, there are references to both myeloneuropathy and myelopathy.

susceptible to zinc-induced copper deficiency leading to myelopathy.

7. The weight-of-the-evidence indicates that Fixodent denture cream can cause excess zinc exposure leading to copper deficiency and subsequent toxic sequelae, including myelopathy.

8. The medical symptoms suffered by Mr. Jacoby are consistent with a toxic level of exposure to zinc from Fixodent denture cream.

9. Other chemical exposures at Mr. Jacoby's workplace are unlikely to have contributed to his medical condition.

Report of Dr. Smith, 11/30/11, at 4-5.

In his report dated December 1, 2011, Frederick K. Askari, M.D., Ph.D., a gastroenterologist and pharmacologist, stated that he holds the following opinions with a reasonable degree of medical and scientific certainty:

1. Zinc-induced copper deficiency and resulting hematological and neurological injuries are well-recognized in the medical community.

2. Fixodent is capable of causing zinc-induced copper deficiency and resulting hematological and neurological injuries.

3. The [pharmacokinetics] studies show that biologically available zinc is being released from Fixodent *in vivo* and that even single bolus doses of Fixodent in encapsulated form can cause zinc levels to rise sufficiently high in some subjects to block copper absorption.

4. Exposure to as little as 25 mg of zinc in . . . single repeated daily doses has been shown to be sufficient to cause suppression of copper in some humans.

5. The constellation of symptoms reported in denture cream case reports, including elevated blood zinc, suppressed blood copper, anemia, neutropenia, neurological injury, histories of significant Fixodent usage over many years, the resolving or stabilization of symptoms when patients stopped using

Fixodent and/or were copper supplemented corroborates the other evidence of causation described herein.

6. 1 mg of copper taken with Fixodent can off-set the zinc's impact on copper, thereby resolving hematological symptoms and potentially stabilizing neurological conditions caused by copper deficiency.

Report of Dr. Askari, 12/1/11, at 26.

In his report dated December 1, 2011, Ebbing Lautenbach, M.D., M.P.H., expressed the following opinions with a reasonable degree of medical certainty:

> [1.] One of the most common causes of acquired copper deficiency is excessive zinc ingestion. Zinc causes an upregulation of metallothionein production in the enterocytes. Copper has a higher binding affinity for metallothionein than zinc. Thus, copper displaces zinc from metallothionein, remains in the enterocytes and it is then lost in the stool as intestinal cells are sloughed off. Thus, there is a clear biological mechanism for excessive zinc ingestion causing copper deficiency. Moreover, the ability of zinc to induce changes in copper levels and cause certain hematologic abnormalities (i.e., anemia and neutropenia) has been long understood.
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> [2.] Numerous case reports and case series have described patients in which denture cream use has been linked to myeloneuropathy. Patients' histories often revealed poorly fitting dentures and ingestion of excessive amounts of denture adhesives. Finally, P&G's own work in healthy-volunteers revealed elevated plasma zinc levels following applications of 3g and 6g of Fixodent.
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> [3.] Spontaneous adverse event reports provided a strong signal for an association between Fixodent and myeloneuropathy, a signal acknowledged by the FDA. The fact that signals did not occur earlier were likely due, in part, to the lack of acknowledgement of zinc as an ingredient on the Fixodent packaging across the product line. The failure to acknowledge the zinc ingredient likely contributed to an inability of patients and clinicians to consider a link between Fixodent and

> myeloneuropathy in those patients with consistent signs and symptoms.
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> [4.] Case reports and case series hold an important place in the epidemiologic armamentarium. Such studies can serve as powerful examples, the findings of which may then be further evaluated in analytic epidemiologic studies.
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> [5.] In many of the published case reports, there was substantial evidence that the use of zinc-containing denture adhesives, such as Fixodent and Poligrip, contributed to myeloneuropathy and associated hematologic abnormalities.

Report of Dr. Lautenbach, 12/1/11, at 5-6.

The trial court provided the following summary and analysis of Jacoby's argument:

> The alleged causal chain follows: 1) Fixodent contains zinc; 2) some zinc in Fixodent is absorbed into the blood; 3) excessive zinc in the blood can cause a copper deficiency in some people; 4) some degree and duration of copper deficiency may result in copper deficiency myeloneuropathy. [Jacoby's] experts all rely on the same limited body of evidence summarized below:
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> Copper Deficiency Myelopathy refers to a metabolic disease of the spinal cord caused by low copper in the body. Only in recent years have the neurological manifestations of acquired copper deficiency in humans been recognized. An association of copper deficiency with myelopathy was only first reported in 2001. None of [Jacoby's] experts can identify the incidence of copper deficiency myeloneuropathy in the general population and readily admit this data is unavailable. [Jacoby's] experts also cannot identify the incidence of copper deficiency myeloneuropathy among denture cream users. There are no epidemiological studies observing the occurrence of copper deficiency myeloneuropathy among Fixodent users. Dr. Kumar, the leading researcher of copper deficiency myelopathy, on whom Jacoby's experts rely, recognizes often the cause of copper deficiency myelopathy is unclear. Reviewing 55 case reports of copper deficiency myelopathy, Dr. Kumar found no identified cause in 20%. Commonly identified likely causes of copper deficiency in patients with reported myelopathy include

prior history of gastric surgery, mal-absorption and excessive zinc ingestion.

While an association between copper deficiency and myelopathy is generally accepted in the scientific community, there is no evidence of how low a person's copper must be, or for how long a duration before it potentially results in myeloneuropathy. It is also a generally accepted principle excessive zinc can cause copper deficiency. However, it is uncertain how much zinc in Fixodent must be ingested and for how long a duration for it to result in copper deficiency. [Jacoby's] experts cite articles and studies observing incidences of copper deficiency among patients undergoing zinc therapy. Zinc therapy is commonly used to treat conditions like sickle cell disease, celiac disease, glucagonoma, psychosis, chronic chemodialysis and Wilson's disease. [Jacoby's] experts focus on Wilson's disease patients. Among Wilson's disease patients the lowed zinc doses administered were single 25 mg doses of zinc acetate per day. Dr. Askari opines this amount was sufficient to place some Wilson's disease study subjects into a negative copper balance within thirty days.

There is an analytical gap between the proposition that a thirty-day 25mg zinc dose may place a particular person into temporary negative copper balance and the proposition some people who ingest zinc-containing Fixodent will be placed into a negative copper balance. The zinc in Fixodent is in the form of hydrated Gantrez Calcium-Zinc salt. Unlike zinc acetate, this zinc salt can only become bio-available (capable of being absorbed by the body) if it disassociates from the Gantrez salt in Fixodent.

The only evidence showing bioavailability of zinc in Fixodent is [P&G's] pharmacokinetic studies, referred to as PK1 and PK2. PK1 compared 3g and 6g encapsulated Fixodent with 50mg zinc acetate. Plasma levels were then measured for 24 hours. PK2 compared 6g doses of encapsulated Fixodent with 25mg zinc acetate. Plasma levels were measured for eight hours. The studies conclude for every 1g of Fixodent ingested 9.8mg of zinc becomes bioavailable.

[Jacoby's] experts state there is a wide difference between [P&G's] baseline corrected data calculations versus the uncorrected data. They argue the corrected data underestimates the amount of bio-available zinc. To support this

> proposition [Jacoby's] experts Drs. Grainger and Askari describe several methodological flaws supposedly rendering the studies unreliable. Dr. Grainger . . . opines acute single-dose oral ingestion studies using gel caps straight to the stomach do not accurately reflect users' amounts, frequencies or gut processing of chronic denture cream ingestion. He states this limited single dose scenario does not duplicate documented human Fixodent user applications and ingestion conditions. Dr. Grainger reported these and other factors together represent a significant source of data variability not addressed in the studies. If we accept [Jacoby's] argument the studies are methodologically unreliable, there is no other evidentiary source showing Fixodent's zinc release in the body. Regardless, the studies do not show any connection between Fixodent and copper deficiency let alone copper deficiency myeloneuropathy.
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> The only evidence linking any denture cream to copper deficiency myeloneuropathy are case studies and reports totaling [less] than thirty individual cases. The largest is the Hedera report which examined a case series of eleven patients. The Nations article examined a case series of four patients. The remaining patients were documented in individual case reports. Dr. Smith acknowledges the Nations and Hedera articles have come under criticism for failing to document other sources of zinc exposure and publish available case information. Dr. Hedera acknowledged they did not establish a case definition or set of diagnostic criteria and they did not know how much denture cream patients used or how long they used it. Most significantly, of all the case reports there was only one individual who used Fixodent exclusively.

Trial Court Opinion, 4/27/12, at 2-4 (citations omitted).

Jacoby first challenges the trial court's determination that zinc-induced copper deficiency myeloneuropathy is novel science, thus requiring a ***Frye*** hearing. He maintains that since the 1930s it has been recognized that copper deficiency can cause neurological injuries, and that since the 1970s it has been recognized that zinc can induce copper deficiency. Appellant's Brief, at 34. While this is true, the real question before the court was

whether Fixodent releases sufficient zinc to cause copper deficiency myeloneuropathy.

It is well settled that the proponents of novel scientific evidence bear the burden of proving that such evidence derives from methodologies that have general acceptance in the relevant scientific community. ***Grady***, 839 A.2d at 1044. In ***Betz***, ***supra***, our Supreme Court noted:

> A reasonably broad meaning should be ascribed to the term "novel." Furthermore, we conclude that a ***Frye*** hearing is warranted when a trial judge has articulable grounds to believe that an expert witness has not applied accepted scientific methodology in a conventional fashion in reaching his or her conclusions. We believe a narrower approach would unduly constrain trial courts in the appropriate exercise of their discretion in determining the admissibility of evidence.

Id. at 53.

As an initial matter, the trial court noted that "scientists legitimately dispute the notion that Fixodent use can cause myeloneuropathy." Trial Court Opinion, 4/12/12, at 7. The opinion of Jacoby's experts that Fixodent can cause neurological injury is relatively new. "The first report of a patient with neuropathy postulated to be linked to denture cream was in 2005." Report of Dr. Lautenbach, 12/1/11, at 8.

Furthermore, the trial court correctly noted that Jacoby's "experts . . . employ methodologies not specifically addressed by Pennsylvania courts –

weight of the evidence, totality of the evidence and the Naranjo scale[5] used in a non-clinical context." Pennsylvania law does not allow "experts to evade a reasoned ***Frye*** inquiry merely by making reference to accepted methods in the abstract." ***Betz***, ***supra*** at 58. Rather, a court must examine the "breadth and character of an expert's extrapolations" when examining the general acceptance of the expert's methodology." ***Id.***

Jacoby's expert toxicologist, Dr. Smith, reviewed a body of evidence, applied a weight of the evidence approach, and opined that Fixodent can cause myeloneuropathy. Jacoby recognizes that weight of the evidence "methodology is not dependent on any single piece of evidence, but instead is based on the evidence in its totality." Opposition to P&G and Rite Aid's Motion to Exclude Expert Witness Testimony, 4/5/12, at 44. The only framework cited by Dr. Smith for allowing him to reach an opinion not supported by a particular study was his application of the considerations set forth by Sir Austin Bradford Hill, The Environment and Disease: Association or Causation, 58 Proc. Royal Soc'y Med. 295 (1965). The Hill considerations, "were developed as a mean[s] of interpreting an established association based on a body of epidemiologic research for the purpose of trying to judge whether the observed association reflects a causal relation between an

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[5] "The Naranjo adverse drug reaction probability scale has been used widely to classify the probability that an adverse event (often reported in a case report) is related to drug exposure." Report of Dr. Lautenbach, 12/1/11, at 8.

exposure and disease." ***Soldo v. Sandoz Pharms. Corp.***, 244 F.Supp.2d 434, 514 (W.D. Pa. 2003). "If an association is found, epidemiologists use a number of factors (commonly known as the 'Hill guidelines') for evaluating whether that association is causal or spurious." Restatement (Third) of Torts: Physical & Emotional Harm §28 (2010).

Dr. Smith was unable to define what kind of association is required for application of the Hill considerations. He variously defined it as requiring only a "possibility" or a "link" between an exposure and a disease. Deposition of Dr. Smith, 1/12/12, at 155, 174. Dr. Smith conceded that his definition was inconsistent with the example of association provided by Hill in the above cited article, where the mortality of chimney sweeps from scrotal cancer was 200 times that of workers not especially exposed to tar or mineral oils. ***Id.*** at 156. When asked at deposition to identify the equivalent statistical association that he attributed to Fixodent users and non-Fixodent users, Dr. Smith responded, "Those studies have not been done that would allow you to calculate such a number." ***Id.*** at 157.

Dr. Smith's definition was also inconsistent with generally accepted definitions of "association," which "refers to the statistical dependence between two variables, that is, the degree to which the rate of disease in persons with a specific exposure is either higher or lower than the rate of disease among those without that exposure." Charles H. Hennekens & Julie E. Buring, Epidemiology in Medicine 30 (Sherry L. Mayrent, ed. 1987).

Jacoby's second expert, Dr. Askari, focused on how much of the zinc in Fixodent is available to the body. Based on his review of case reports, he concluded that Fixodent can cause neurological injuries. Although Dr. Askari did not discuss his methodology, Jacoby characterized it as a weighing of the totality of the evidence. Appellant's Brief, at 29. Dr. Askari did not articulate any established method for how he weighed the various pieces of evidence that he considered.

In ***Trach v. Fellin***, 817 A.2d 1102 (Pa. Super. 2003), this Court noted that a the scientific method is "a method of research in which a problem is identified, relevant data are gathered, a hypothesis is formulated from these data, and the hypothesis is empirically tested." ***Id.*** at 1113 (citation omitted). "Within the meaning of the definition of the scientific method, 'empirical' means provable or verifiable by experience or experiment." ***Id.*** "Key aspects of the scientific method include the ability to test or verify a scientific experiment by a parallel experiment or other standard comparison (control) and to replicate the experiment to expose or reduce error." ***Id.***

Under ***Trach***, weight of the evidence and totality of the evidence are not scientific methodologies. They are not verifiable or replicable, but rather are based on subjective judgment. As recognized by one of the articles relied upon by Dr. Smith, weight of the evidence encompasses a varied of uses from "seat-of-the-pants qualitative assessment" to "aggregating diverse modalities" by use of formal quantitative weighing factors. ***See***

Sheldon Krimsky, *The Weight of Scientific Evidence in Policy and Law*, 95: Supplement 1 American Journal of Public Health S129 (2005).

Dr. Smith did not define his weight of the evidence approach, nor did Dr. Askari define the totality of the evidence approach. They did not define which forms of evidence they considered, and did not engage in any systematic weighing of factors. ***See*** Deposition of Dr. Smith, 1/12/12, at 146; Expert Report of Dr. Askari, 1/1/11).

In ***Betz***, the Supreme Court agreed with the defendants' challenge to the plaintiffs' experts' use of extrapolation because it "did not follow any acceptable scientific practice . . . in that it contained large analytical gaps; was in conflict with the dose-response relationship, and was internally inconsistent." ***Id.*** at 58. Accordingly, the trial court in the instant case properly focused on the analytical gaps in the theories presented by Jacoby's experts.

The trial court recognized the uncertainty regarding "how much zinc is absorbed by the body from Fixodent ingestion." Trial Court Opinion, 4/27/12, at 9. This is a significant gap because the research suggesting that zinc affects copper absorption did not involve the kind of zinc in Fixodent. Jacoby's experts did not establish a link between Fixodent ingestion and the ingestion of forms of zinc in the studies upon which they relied. The court further noted that the only studies with respect to how much zinc is absorbed from Fixodent were conducted by P&G. Those studies revealed that only small amounts of zinc are absorbed by the body from Fixodent

relative to other forms of zinc intake. If, as Jacoby's experts maintain, those studies are unreliable, then there is no evidence of record regarding the amount of zinc absorbed by the body from Fixodent.

The second gap recognized by the trial court is the lack of a basis on which to opine that the amount of zinc absorbed into the body from Fixodent could result in a copper deficiency. Jacoby's experts rely on studies conducted on Wilson's Disease patients indicating that ingestion of 25mg of zinc acetate could result in a temporary negative copper balance in some susceptible individuals. ***See*** Report of Dr. Askari, 12/1/11, at 9.

The Wilson's Disease research does not support an opinion with respect to whole body copper deficiency. Rather, it involves a negative copper balance, which refers to a temporary period of time during which the body excretes more copper than it takes in. By contrast, a copper deficiency refers to a state in which copper stores are depleted throughout the body. ***See*** Report of Timothy R. Koch, M.D., 12/24/11, at 15. As the trial court noted, Jacoby failed to establish a link between negative copper balance and copper deficiency.

An additional gap noted by the court was the lack of evidence regarding "how low a person's copper must be or for how long a duration before it potentially results in myeloneuropathy." Trial Court Opinion, 4/27/12, at 9. With respect to this point, Jacoby asserts that the trial court erred in ignoring his experts' extrapolation evidence. This Court has recognized that extrapolation is generally accepted in the scientific

community. ***Trach***, ***supra*** at 1118. Nevertheless, extrapolation is only valid where "the basic methodology employed to reach a conclusion is sound." ***Id.***

The sole materials presented by Jacoby that relate to the development of neurological problems are anecdotal case reports and case series, which do not provide a foundation for extrapolation. As explained by Jacoby's expert Dr. Lautenbach:

> A case report is the clinical description of a single patient . . . . A case series is simply a report of more than 1 patient with the disease of interest. One advantage of a case report or case series is its relative ease of preparation. In addition, a case report or case series may serve as a clinical or therapeutic example for other healthcare epidemiologists who may be faced with similar cases. Perhaps most importantly, a case report or series can serve to generate hypotheses that may be tested in future analytic studies . . . . The primary limitation of a case report or case series is that it describes, at most, a few patients and may not be generalizable. In addition, since a case report or case series does not include a comparison group, one cannot determine which characteristics in the description of the cases are unique to the illness. While the reports are thus usually of limited interest, there are exceptions, particularly when they identify a disease or describe the index case of a new disease.

Ebbing Lautenbach, *Epidemiologic Methods in Infection Control*, in Practical Healthcare Epidemiology, at 33, E. Lautenbach, et al., eds. (2010) (Exhibit 17 to Defendants' ***Frye*** Motion). "One of the characteristics of case reports and case series that dictate their rejection as scientific proof is the fact they are usually not planned ahead of time with a sound scientific protocol." Report of Lorene Nelson, Ph.D., 12/30/11, at 11 (Exhibit 10 to Defendants' ***Frye*** Motion).

In addressing this issue, the trial court relied on ***In re Denture Cream Products Liability Litigation***, 795 F.Supp.2d 1345 (S.D. Fla. 2011), where, as here, it was established that the only published case report involving an exclusive user of Fixodent was based on inaccurate data. Dr. Hedera, the principal author of the article, described the patient as having a high zinc level, but later testified that the patient's plasma zinc level was within the normal range when he was still using Fixodent. ***See*** Report of Dr. Nelson, ***supra*** at 37-39; Deposition of Peter Hedera, M.D., 6/4/11, at 302-04. Further, Dr. Hedera's article reported the patient as having his copper level return to normal following cessation of denture cream use, when in fact, it had not. ***Id.*** at 61. Thus, the patient did not have a high plasma zinc level before being treated, and his copper levels did not return to normal after he reduced his use of denture cream. Accordingly, the only case involving an exclusive user of Fixodent does not support Jacoby's theory of causation.

For these reasons, the trial court did not abuse its discretion in determining that Jacoby's experts lacked a sound foundation from which to extrapolate that Fixodent could cause neurological injury. Accordingly, its decision to strike the testimony of Dr. Smith and Dr. Askari was proper.

Jacoby also presented the testimony of epidemiologist, Dr. Lautenbach. He performed a review of the same case reports and case series that Dr. Smith and Dr. Askari considered. Dr. Lautenbach testified that he was unaware whether the classification he applied, the Naranjo

adverse drug reaction probability scale, had ever been used in the context of a hypothesis that an essential nutritional trace element, like zinc, causes long-term injury. Deposition of Dr. Lautenbach, 1/17/12, at 74. The Naranjo scale classifies the likelihood that an adverse event is related to drug therapy as either definite, probable, possible or doubtful. Report of Dr. Lautenbach, ***supra*** at 16. Dr. Lautenbach concluded that in 28 cases, the likelihood that myelopathy was related to denture cream exposure was probable, and that in two cases it was possible. ***Id.*** at 14-16.

Jacoby asserts that the trial court erroneously struck Dr. Lautenbach's testimony because it did not independently support causation. Rather, he asserts that Dr. Lautenbach's testimony was supportive of a causation analysis in conjunction with the evidence of the other experts. Nevertheless, based on our conclusion that the trial court did not err in striking the testimony of Dr. Smith and Dr. Askari, Jacoby's argument must fail.

In light of its exclusion of the testimony of Drs. Smith, Askari and Lautenbach, the trial court also excluded the testimony of Steven Greenberg, M.D. and David Grainger, Ph.D. Dr. Greenberg examined Jacoby, reviewed his medical history, and concluded that he suffered from copper deficiency myeloneuropathy caused by Fixodent. Report of Dr. Greenberg, 12/1/11, at 10. However, Dr. Greenberg's only analysis of the question of general causation is based on review of the same case reports, and textbooks reviewing the case reports, on which Drs. Smith, Askari and Lautenbach had relied. Because Dr. Greenberg was not offering an

independent opinion on general causation, the trial court did not err in concluding that his testimony could not create a triable issue of fact with respect to causation.

Dr. Grainger, a professor of pharmaceutics, prepared a report regarding "the release of zinc ions from commercially available denture adhesives." Report of Dr. Grainger, 12/1/11, at 1. His opinions regarding dissociation of zinc from Fixodent in the stomach did not create an independent basis upon which a jury could conclude that Fixodent causes neurological impairment.

Because the trial court did not abuse its discretion or err as a matter of law in determining that Jacoby failed to produce admissible evidence of causation, we affirm the order of the trial court granting summary judgment.

Order affirmed.

Judgment Entered.

Joseph D. Seletyn, Esq.
Prothonotary

Date: 12/9/2013