

[Until this opinion appears in the Ohio Official Reports advance sheets, it may be cited as *State v. Grad*, Slip Opinion No. 2024-Ohio-5710.]

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SLIP OPINION NO. 2024-OHIO-5710

THE STATE OF OHIO, APPELLEE, v. GRAD, APPELLANT.

[Until this opinion appears in the Ohio Official Reports advance sheets, it may be cited as *State v. Grad*, Slip Opinion No. 2024-Ohio-5710.]

Newly discovered evidence—Crim.R. 33(A)(6)—Standards for granting a hearing on a motion for leave to file a motion for new trial—Abuse of discretion—Judgment reversed.

(No. 2023-0213—Submitted December 12, 2023—Decided December 9, 2024.)

APPEAL from the Court of Appeals for Medina County,

No. 22CA0011-M, 2022-Ohio-4221.

BRUNNER, J., announced the judgment of the court, with an opinion joined by DONNELLY and STEWART, JJ. FISCHER, J., concurred in judgment only. DETERS, J., dissented, with an opinion joined by KENNEDY, C.J., and DEWINE, J.

BRUNNER, J., announcing the judgment of the court.

{¶ 1} This appeal involves a father’s 2014 convictions for felonious assault and child endangering after his infant son, W.G., was found to have 26 bone fractures. The state established the element of causation through a medical expert who used a process-of-elimination methodology: he opined that the appellant, Kenneth Grad, *must have* intentionally caused his son’s injuries because the expert could identify no nontraumatic medical cause of the bone fractures.

{¶ 2} In the course of reaching this opinion, the expert made numerous assertions about general medical principles—that is, medical facts that he contended are true, without regard to the particular individuals at issue in this case. For example, the expert made assertions about how the human body works and the possible genetic and metabolic conditions that could have caused W.G.’s injuries. Notably, the expert made these assertions to rebut Grad’s criticisms of his testimony.

{¶ 3} Seven years later, Grad returned to court claiming the scientific community’s understanding of some of the expert’s assertions had changed significantly. He presented the court with four recently published scientific studies that he claimed establish that the expert’s assertions were wrong. He therefore moved leave to file a motion for a new trial under Crim.R. 33, claiming the new studies constitute newly discovered evidence. The trial court denied Grad’s motion for leave without holding a hearing. The Ninth District Court of Appeals affirmed. 2022-Ohio-4221 (9th Dist.).

{¶ 4} In this appeal, we consider when medical studies published after a defendant’s convictions may qualify as newly discovered evidence under Crim.R. 33(A)(6) and whether the trial court should have held a hearing before denying Grad’s motion for leave. For the reasons explained below, we reverse the court of appeals and remand the cause to the trial court to hold a hearing on Grad’s motion for leave to file a motion for a new trial.

I. BACKGROUND

{¶ 5} On July 16, 2008, Grad was charged with three counts of endangering children under R.C. 2919.22(B)(1) and (E)(1)(d); three counts of felonious assault under R.C. 2903.11(A)(1); and two counts of endangering children under R.C. 2919.22(A)(1) and (E)(1)(c). The alleged victim was his son, W.G., who was only about two months old at the time. The Ninth District recounted the circumstances that led to Grad's indictment:

When W.G. was 41 days old, his parents, Kenneth and Laura Grad, took him to a podiatrist because one of his feet appeared swollen. When the podiatrist examined W.G., he quickly realized that W.G.'s injuries far exceeded anything that he would be able to handle in his office. He, therefore, persuaded the Grads to take W.G. to a hospital immediately. At Akron Children's Hospital, an x-ray revealed that the tibia in W.G.'s left leg was fractured. It also revealed that W.G. had had other fractures that were in various stages of healing. Additional x-rays of W.G.'s body revealed a total of 26 fractures, including fractures of W.G.'s fingers, arms, legs, ribs, and skull. The type of fractures suggested that some had been caused by twisting and others by squeezing. Doctors also discovered a laceration on W.G.'s scrotum.

When interviewed about the injuries, the only trauma the Grads disclosed was one time when Mr. Grad accidentally bumped W.G.'s head into a dresser. Doctors sent W.G.'s blood for genetic testing to determine whether he has osteogenesis imperfecta, but the results came back negative. W.G.'s pediatrician also tested him for hypermobility after Mrs. Grad reported that she had the condition, but he determined that W.G. did not have hypermobility.

2016-Ohio-8388 at ¶ 2-3 (9th Dist.).

A. Pretrial proceedings

{¶ 6} Pretrial proceedings lasted more than six years. In the summer of 2013, Grad filed a motion asking the trial court to let his expert conduct a physical examination of W.G. and W.G.'s sibling, but the court denied the motion. By April 2014, the parties were focused on expert evidence concerning the cause of W.G.'s injuries. The State intended to call Dr. R. Daryl Steiner to testify at trial that W.G.'s injuries must have been caused by abuse. Grad, in turn, planned to argue that W.G. had been misdiagnosed by Dr. Steiner and others and that W.G.'s injuries were the result of a genetic condition or an undiagnosed metabolic bone disease. He also intended to present evidence that doctors had diagnosed W.G.'s mother, Laura Grad, along with W.G.'s maternal uncle and maternal grandmother with the disease.

{¶ 7} On October 14, 2014, Grad filed numerous motions, two of which are relevant here. In one, he informed the trial court that the State had not produced to him a written report from Dr. Steiner, and he asked the court to exclude testimony from Dr. Steiner if the State did not do so. Grad also moved for a *Daubert* hearing on the admissibility of that evidence. *See Daubert v. Merrell Dow Pharmaceuticals, Inc.*, 509 U.S. 579 (1993).

{¶ 8} In the *Daubert* motion, Grad also noted that the State apparently took the position that rather than provide a report from Dr. Steiner, it would be sufficient for Grad to review the testimony that Dr. Steiner had provided in the November 2009 trial of Laura Grad.¹ Grad sought to rebut that position by arguing that the relevant science had changed in the five years since Laura Grad's trial:

1. Laura Grad was also charged in connection with these events. In 2009, she was convicted of two counts of child endangering and was sentenced to five years in prison. The Ninth District vacated

Not only have the facts changed [since November 2009] regarding the health of the child and his parents, *but the science has changed with regard to the metabolic bone disorder and the interpretation of various occult fracture films*. In fact, since Mrs. Grad's trial, she has been diagnosed with a disease that may present an explanation for the various injuries suffered by the child. This requires careful evaluation in this matter especially as there exist no forensics or external evidence of trauma to support the conclusion that the child suffered abuse at the hands of Mr. Grad.

....

The science surrounding occult child fractures, corner and bucket fractures, and metabolic bone disorder is now hotly debated. In fact, one of the defense's prospective expert witnesses Dr. Charles Hyman has recently coauthored an article which identifies certain findings based on research that did not exist in 2008. Dr. Hyman's article is titled *A Critical review of the Classic Metaphyseal Lesion: Traumatic [or] Metabolic*. As the title explains, the article is the most comprehensive research and article on the evidence supporting whether bucket handle and corner fractures are in fact fractures, and if so, were they caused by trauma or metabolic bone disease.

Because the science continues to change, not only are expert reports required from the State's purported experts, but an opportunity to *voir dire* these experts pursuant to [*Daubert*] is necessary.

one of her convictions. See *State v. Grad*, 2012-Ohio-1385 (9th Dist.). The sentence on her remaining conviction was three years' imprisonment.

(Emphasis added.)

{¶ 9} In the second motion Grad filed on October 14, 2014, he requested funds to retain his own experts to testify at trial. Grad noted that Dr. Hyman’s research draws from experts in numerous fields, including general pediatrics, bones specialties, pediatric radiology, and genetics, and argued that retaining experts was essential for his defense. He again emphasized the evolving nature of the science relevant to the case:

The science surrounding the classic [metaphyseal] lesion and whether it has any substantive connection to abuse has been hotly debated for the past decade—and in the last year alone there is new research and literature surrounding the alleged classic [metaphyseal] lesion. The Court should be made aware that there will be considerable debate as to whether all the alleged fractures were in fact fractures. Instead many of the irregularities the State’s radiologist identifies as a fracture were, in fact, not fractures at all, but instead, evidence of a metabolic bone disorder.

{¶ 10} In the ensuing weeks, Grad filed reports from three experts he had retained—Dr. Charles Hyman, Dr. David Ayoub, and Dr. Thomas Young. He also identified at least five experts on his witness list: Dr. Ayoub, Dr. Hyman, Dr. Golder Wilson, Dr. Marvin Miller, and Dr. Michael Holick.

{¶ 11} The trial court issued two orders addressing Grad’s motions. On November 3, 2014, the court ruled that it would not require the State to produce a report from Dr. Steiner, because Dr. Steiner had already provided testimony about W.G.’s injuries in Laura’s trial and a separate juvenile-court matter. The court granted Grad’s motion for a *Daubert* hearing, to take place before the State’s

experts testified, and explained that it would not allow Dr. Steiner to deviate from the testimony he had provided in Laura's trial and in the separate juvenile court matter. On November 13, 2014, the court granted Grad up to \$17,000 for experts.

B. Trial proceedings

{¶ 12} Trial began on December 8, 2014. The state presented testimony from expert witnesses, including Dr. Steiner. Grad's attorney cross-examined Dr. Steiner, but he did not call any defense experts to testify.

1. Testimony of Dr. Steiner on Direct Examination

{¶ 13} When the Grads brought W.G. to Akron Children's Hospital on June 17, 2008, Dr. Steiner was working as an emergency-room pediatrician. He was also the medical director of the hospital's Care Center, which evaluated children suspected to be victims of abuse or neglect.

{¶ 14} The State devoted most of its direct examination to having Dr. Steiner describe the information he thought was relevant to determining the potential causes of W.G.'s injuries. Dr. Steiner testified that on June 18, 2008, he examined W.G. and discussed this examination with the Grads. He also spoke with Laura separately to find an explanation for W.G.'s injuries. He testified that Laura told him that Grad had tripped and caused W.G.'s head to bump into a dresser, which left a bruise on the left side of W.G.'s head. Laura added that W.G.'s sibling would also sometimes throw toys into W.G.'s crib. However, Dr. Steiner concluded that these events were not sufficient to cause the 26 bone fractures seen in W.G.'s x-rays. Dr. Steiner also testified that Laura told him she knew of no family history of any sort of brittle-bone disease in her own family or Grad's family. Finally, Dr. Steiner testified that Laura told him W.G. was taking baby formula; based on that information, Dr. Steiner concluded W.G. was receiving adequate nutrition.

{¶ 15} Next Dr. Steiner testified about the summer 2008 x-rays of W.G. He identified bone fractures in various stages of healing all over W.G.'s body.

Dr. Steiner also noted that several fractures were what he referred to as “bucket-handle fractures” or “corner fractures.” The name “bucket-handle fracture” refers to the fact that when viewed on an x-ray, the fracture can resemble a bucket handle. According to Dr. Steiner, bucket-handle fractures “are highly specific for abusive injury.” Dr. Steiner then identified what he believed were several bucket-handle fractures on W.G.’s x-rays.

{¶ 16} Dr. Steiner also considered the results of W.G.’s blood tests. Those tests showed no signs of infection, metabolic or genetic diseases, or problems with W.G.’s kidneys or liver.

{¶ 17} The State then asked Dr. Steiner to provide his ultimate opinion on the cause of W.G.’s injuries. He concluded that W.G. had “suffered multiple fractures over a period of time that [were] nonaccidental; therefore, he suffered physical abuse.”

{¶ 18} The State also asked Dr. Steiner questions about a subject it expected Grad to raise during cross-examination: whether a Vitamin D deficiency—rather than abuse—could have caused or contributed to W.G.’s bone fractures. Dr. Steiner testified unequivocally that it could not.

{¶ 19} Dr. Steiner began by addressing the role Vitamin D plays in the body. He explained that Vitamin D is an enzyme that enhances the absorption of calcium and phosphorus from food in the intestines into a person’s bloodstream for use in the body. A person with a deficiency in Vitamin D may not absorb calcium and phosphorus well. Dr. Steiner then described the mechanism in a pregnant woman’s body that increases the absorption of calcium and phosphorus to ensure that both she and the fetus have sufficient amounts of both. And that mechanism, he stated, is entirely independent of the mother’s Vitamin D levels. Dr. Steiner then testified that the placenta contains a hormone that actively pumps calcium and phosphorus into the fetus. He added that the fetus does not need its own source of

Vitamin D in utero because it is not eating food and therefore does not need to extract calcium and phosphorous from anything.

{¶ 20} Dr. Steiner repeatedly emphasized that a newborn child has normal levels of phosphorus and calcium—and therefore normal bone health—no matter what levels of Vitamin D the mother may have. If a woman has a “significant insufficiency or deficiency of Vitamin D” or rickets, a bone disease related to low levels of Vitamin D, then, according to Dr. Steiner, her child will nonetheless be “fine.” He continued: “So the babies have normal phosphorus and calcium independent . . . of the mother’s Vitamin D. Baby’s skeletal health—the strength of the bones—the bone growth is independent of mother’s Vitamin D.”

{¶ 21} Dr. Steiner did note an exception to this rule—i.e., a situation in which a child’s bone health may be related to the mother’s levels of Vitamin D:

Now, in very rare circumstances, most notably in isolated tribes in India and Australia where women do not have sufficient diets, are completely clothed, are not exposed to dietary Vitamin D or calcium, and have no sunlight exposure, occasionally—rarely in those situations those mothers will have babies that have rickets that do not have normal bone. But the mothers are severely affected by rickets by low calcium and low phosphorus. As a matter of fact, they may have so low of calcium and phosphorus that they will go into seizures or have tetanus, where they can’t move their muscles. Their muscles are very stiff and they can’t contract the muscles because of low calcium. All of that is based on their low—extremely low levels of Vitamin D.

Apart from these rare circumstances, however, Dr. Steiner reiterated that a newborn’s bone health is simply not related to the mother’s levels of Vitamin D:

So while the baby's in the uterus, our maker has made adjustments to preserve the baby's skeletal maturation, bone strength and so on, independent of Vitamin D.

Baby doesn't need Vitamin D. He doesn't take dietary calcium. He's not eating anything in the uterus.

Later he emphasized the point again, stating, "So the baby starts off life with perfectly normal bone, independent of mother's Vitamin D status. That's a safety measure put in place to allow the baby to be healthy."

{¶ 22} Dr. Steiner then explained how a child can develop a Vitamin D deficiency after birth. According to Dr. Steiner, a newborn infant will begin to need Vitamin D after about five to seven days. At that point, an infant "begins to get his nutrition from his intestinal tract," and without Vitamin D available to facilitate the absorption of calcium and phosphorus from food in the intestines into the infant's bloodstream, "the baby will begin to develop signs of low calcium. It won't be able to absorb as much calcium. And over the period of the next several months, may develop rickets." So, according to Dr. Steiner, "this whole thing explains—helps to explain why we don't see neonatal rickets before the age of about three months, and most commonly before six months, except in those very, very unusual situations of tribes in India and Australia, some Muslim countries. Kuwait, for example."

{¶ 23} Dr. Steiner then connected this testimony to W.G. He stated plainly that W.G. was born with normal bones, and he had no reason to be concerned that W.G.'s bone health was impacted by low levels of Vitamin D in Laura or W.G.:

So in [W.G.'s] situation, independent of mother's Vitamin D level, [he] was born with normal bones based on that physiology, based on how Vitamin D works in the maternal-fetal unit.

So he was born with normal bones.

He then, very soon, began to take formula, which had Vitamin D in it. So he had sufficient Vitamin D, at the proper time, to absorb his calcium and phosphorus to allow for good bone health.

Dr. Steiner dismissed any concerns that a Vitamin D deficiency in Laura could have caused or contributed to W.G.'s bone fractures: "So the issue of maternal Vitamin D deficiency is a nonentity in this situation. It doesn't apply. There's no reason, at [W.G.'s] age—given his diet, there's no reason to suspect that [W.G.] had rickets, healing rickets, any kind of rickets, any kind of metabolic bone disease."

{¶ 24} The State then asked Dr. Steiner whether W.G. was tested for a genetic disorder affecting the bones called osteogenesis imperfecta, also commonly referred to as brittle-bone disease. Dr. Steiner testified that W.G. was tested, and the results showed that he does not have the disorder. And the additional fact that W.G. did not suffer from any bone fractures after he was brought to the hospital in June 2008 caused Dr. Steiner to conclude that W.G. does not suffer from a genetic disorder affecting his bones.

{¶ 25} Dr. Steiner then reiterated his ultimate opinion on the cause of W.G.'s bone fractures: that W.G. "suffered these fractures as a result of nonaccidental trauma. He was physically abused on multiple occasions over a period of several weeks."

2. Testimony of Dr. Steiner on Cross-Examination

{¶ 26} During cross-examination, Grad's counsel asked Dr. Steiner about the methodology he used to conclude that W.G.'s injuries must have been caused by intentional abuse, rather than some other innocent cause. Dr. Steiner confirmed

that he used a process-of-elimination methodology called differential diagnosis. That methodology required him to eliminate all benign causes of the injuries before concluding that the injuries were caused by the intentional conduct of another person.

{¶ 27} Grad’s counsel also asked questions about the limited genetic testing performed on W.G. Dr. Steiner admitted, for example, that he did not have W.G. tested for an inherited hypermobility disorder called Ehlers-Danlos Syndrome (“EDS”). He also acknowledged that there are numerous types of osteogenesis imperfecta and that he had Grad’s DNA tested for only one type—the mildest one. And he acknowledged that when the test came back negative, the doctor who performed the test informed him that the test “does not rule out all types of osteogenesis imperfecta or all brittle bone conditions.”

{¶ 28} Grad’s counsel then asked Dr. Steiner about his decision not to order a skin biopsy on W.G. to conduct additional genetic testing. The State objected, however, and represented that the prosecutor’s office had been involved with the decision not to proceed with additional genetic testing of W.G. In part, the State decided against performing additional genetic testing because a biopsy would have been very expensive. The State explained that it would also have been physically intrusive, that W.G. had “been through enough,” and that the State had ruled out osteogenesis imperfecta as best it could: “We could test him from now until the cows come home, but we decided we weren’t going to have him retested and pay for those tests.”

{¶ 29} Dr. Steiner testified that he and two other medical professionals had concluded that additional testing for osteogenesis imperfecta was not warranted. Given the results of W.G.’s blood tests and his x-rays, Dr. Steiner believed the likelihood that W.G. had one of the rarer types of osteogenesis imperfecta was “so low that it was not worth the risk” of traumatizing W.G. by conducting a skin biopsy. Dr. Steiner clarified, however, that he decided not to conduct additional

genetic testing in his capacity as a physician seeking to identify the best treatment for W.G. as his patient, *not* in his capacity as an expert seeking to identify the cause of W.G.’s injuries for use in a potential criminal prosecution.

{¶ 30} Grad’s counsel also asked Dr. Steiner about the possibility that a Vitamin D deficiency—rather than abuse—could have caused or contributed to W.G.’s bone fractures. Dr. Steiner acknowledged that he did not have W.G.’s blood sample tested to determine his Vitamin D levels. But in his view, there was no reason to do so, as he stated during his direct examination. He also acknowledged learning in 2009—five years before Grad’s trial—that Laura Grad had a Vitamin D deficiency. But he made no effort to learn more about that deficiency because Laura was not his patient and he believed there was no possibility her Vitamin D deficiency could have caused W.G. to have a Vitamin D deficiency as a newborn. “The intrauterine infant develops healthy bones unrelated to mother’s Vitamin D level. That’s basic physiology of how Vitamin D works and what Vitamin D does. So no, . . . Laura’s Vitamin D deficiency does not play a role in [W.G.’s] bone health at six weeks of age.” If any doctors disagree with that conclusion, Dr. Steiner stated, “then those doctors are not correct. They’re not up to date on the physiology of maternal fetal medicine.”

{¶ 31} Dr. Steiner then denied being aware that Grad had had rickets as a child. But he also stated that even if he had known that in 2009, it would not have been something for him to investigate with respect to W.G. It would have been a disease that Grad had as a child but had “no relationship to [W.G.]”

C. Conviction and direct appeal

{¶ 32} The jury found Grad guilty of all eight charges: three second-degree-felony counts of endangering children, three second-degree-felony counts of felonious assault, and two third-degree-felony counts of endangering children. The trial court sentenced him to 24 years in prison.

{¶ 33} On appeal, Grad argued that the attorneys who represented him at trial had provided ineffective assistance by failing to present any expert medical testimony on his behalf. 2016-Ohio-8388 at ¶ 5 (9th Dist.). He noted that his counsel had obtained reports from several expert physicians and some of them were ready to testify at trial, but that his counsel declined to call them. *Id.* According to Grad, because the State’s case was so heavily dependent on expert medical testimony—relying almost entirely on its experts’ conclusions that W.G.’s injuries must have been caused by abuse because they could identify no other cause—his attorneys’ decision not to call any experts on his behalf was objectively unreasonable, constituting ineffective assistance. *Id.*

{¶ 34} The appellate court disagreed, concluding that his attorneys’ decision not to call defense experts was a reasonable trial strategy. *Id.* at ¶ 9. Among other things, Grad’s counsel had obtained concessions from the State’s experts during cross-examination and emphasized those concessions during closing argument. For example, Grad’s counsel was able to get “the State’s expert witnesses to concede that there were additional tests that could have been done to further investigate whether W.G. had an underlying bone disorder that made his bones fracture under normal handling.” *Id.* at ¶ 8. And during closing argument, Grad’s counsel emphasized the doctors’ failure to perform additional testing. *Id.* And counsel noted that “the State’s doctors had accepted that the fractures in W.G.’s skull were likely caused by accidental trauma,” which counsel argued “was evidence that W.G.’s bones could fracture under normal handling.” *Id.* The appellate court therefore affirmed Grad’s convictions. We declined jurisdiction. 2017-Ohio-8136.

D. Postconviction petition

{¶ 35} While his direct appeal was pending, Grad filed a postconviction petition. As he did in his direct appeal, he argued that his trial counsel had provided ineffective assistance by failing to call any experts on his behalf. *See* 2017-Ohio-

8778 at ¶ 2 (9th Dist.). The trial court denied the petition on the ground that his argument was barred by res judicata. *Id.* And even if res judicata did not apply, the trial court held that his attorneys’ decision not to call any experts on his behalf was a reasonable trial strategy. *Id.*

{¶ 36} Grad appealed, arguing that his counsel’s performance was outside professional norms, but the Ninth District disagreed and affirmed judgment of the trial court. *Id.* at ¶ 7. The appellate court noted that Grad’s ineffective-assistance argument was similar to the one he had presented in his direct appeal, but the court did not further discuss this issue. *Id.* at ¶ 4-5. Instead, the Ninth District focused on Grad’s not having challenged the trial court’s res judicata finding, and without any argument against the trial court’s application of res judicata, it affirmed the trial court’s judgment. *Id.* at ¶ 5. The appellate court also held that the trial court did not err in not holding an evidentiary hearing. Although Grad argued that his petition ““contained evidence that was not part of the record on direct appeal,” ” the appellate court held that the expert reports and opinions obtained by his trial counsel were in the record before trial and that Grad did not identify any evidence that was new. *Id.* at ¶ 7. Based on this reasoning, the appellate court held that the trial court properly declined to hold an evidentiary hearing.

{¶ 37} When Grad sought our review of the appellate court’s decision, we denied jurisdiction. 2018-Ohio-1990.

E. Motion for leave to file a motion for a new trial

{¶ 38} On October 22, 2021, Grad filed a motion for leave to file an untimely motion for a new trial under Crim.R. 33. He based his motion on newly discovered evidence that he claimed materially affected his “substantial rights,” *see* Crim.R. 33(A) and (A)(6). In such a motion, the defendant must establish that the new evidence

(1) discloses a strong probability that it will change the result if a new trial is granted, (2) has been discovered since the trial, (3) is such as could not in the exercise of due diligence have been discovered before the trial, (4) is material to the issues, (5) is not merely cumulative to former evidence, and (6) does not merely impeach or contradict the former evidence.

State v. Petro, 148 Ohio St. 505 (1947), syllabus. In addition, because Grad filed his motion more than 120 days after his trial ended, he was required to show “by clear and convincing proof that [he] was unavoidably prevented from the discovery of the evidence upon which he must rely.” See Crim.R. 33(B); see also *State v. Parker*, 2008-Ohio-5178, ¶ 16 (2d Dist.), quoting *State v. Walden*, 19 Ohio App.3d 141, 145-146 (10th Dist.1984) (“[A] party is unavoidably prevented from filing a motion for new trial if the party had no knowledge of the existence of the ground supporting the motion for new trial and could not have learned of the existence of that ground within the time prescribed for filing the motion for new trial in the exercise of reasonable diligence.” [Bracketed text added in *Parker*.]).

{¶ 39} In support of his motion for a new trial, Grad offered four scientific studies published after his trial concluded—between 2016 and 2021. Each one, he argued, contradicted assertions made by Dr. Steiner at his trial.

- *2021 study*. The most recent study Grad offered was published on June 17, 2021, by Dr. Holick and several other researchers. According to an affidavit from Dr. Holick presented by Grad with his motion, the study discussed an infant found to have had 23 fractures in utero. The child tested negative for osteogenesis imperfecta and had normal Vitamin D levels, but the child had a family history of EDS. Additional genetic testing of the child revealed “a new genetic cause for bone fragility in infants not previously recognized by medical science” as well as “multiple, other possible genetic variations

[suspected to have] deleterious effects on bone development in infants.” According to Dr. Holick, his findings in the 2021 study “imply that the genetic variants involved in skeletal development and fragility are not limited to the current panel of genetic tests and thus raise a question on the validity of the current recommendations.”

- *2019 study.* Another study was published in 2019 by Dr. David Ayoub and two other researchers. According to an affidavit from Dr. Ayoub that Grad presented with his motion, the study involved an evaluation of 75 infants ranging from 2 to 32 weeks old who had signs of metabolic bone disease as well as multiple unexplained bone fractures. In his affidavit, Dr. Ayoub observed that most of the “mothers and/or their infants suffered [from] significant deficiencies in Vitamin D, such that it was reasonably likely to explain the radiographic changes of rickets and fractures in these young infants.”
- *2017 study.* A third study was published in 2017 by Dr. Holick with other researchers. This study focused on 72 infants under one year old, all of whom had been diagnosed with nonaccidental trauma. Of the 72 infants, however, 67 either had clinical evidence of EDS or had at least one parent with EDS, while the remaining 5 were found to be deficient in Vitamin D or have rickets. In addition, 48 of the 72 infants had their Vitamin D levels measured and 27 of those infants were found to have deficient levels of Vitamin D. Dr. Holick concluded that “EDS, [osteogenesis imperfecta]/EDS and vitamin D deficiency/infantile rickets are associated with fragility fractures in infants that can be misinterpreted as caused by non-accidental trauma due to child abuse.”
- *2016 study.* A 2016 study was also conducted by Dr. Holick and one other researcher. It examined two infants who had both been diagnosed with nonaccidental trauma but who also showed signs of Vitamin D deficiency.

Both were very similar to W.G. in that they were born after uncomplicated pregnancies and their parents had brought them to the hospital when they were 16 and 10 weeks old, respectively, because of unexplained swelling. At the hospital, x-rays revealed each infant had multiple bone fractures without any bruising to the surrounding tissue. Both were given Vitamin D supplements. They both healed and began to thrive.

{¶ 40} In addition to these studies, Grad provided the court with new information about W.G.’s family medical history. At the time of his trial, it was known that Laura had a history of Vitamin D deficiency, had hypermobility, and had been diagnosed with osteopenia in 2009. Also, Grad had had rickets as a child. In his motion, Grad presented evidence that Laura had been diagnosed with EDS by four different physicians. She had also suffered leg injuries exacerbated by EDS: she was hospitalized for leg fractures for 20 days in 2017 and received medical treatment for foot and ankle injuries twice in 2019. In addition, Grad informed the court that another one of his children had been diagnosed with hypermobility and a Vitamin D deficiency. That child is also suspected to suffer from EDS.

{¶ 41} Next, Grad presented the court with evidence that the cost of whole-genome genetic testing had decreased significantly. It was approximately \$10,000,000 at the time of his indictment in 2008 and approximately \$10,000 by the time of his trial in 2014. But by the time Grad moved for a new trial in October 2021, the cost was below \$1,000.

{¶ 42} Grad used this new evidence to argue that Dr. Steiner’s testimony was wrong in many important respects. For example, he argued that the 2021 study established a major flaw in Dr. Steiner’s differential-diagnosis methodology because it showed that “[t]here *were* diseases that could have caused WG’s condition.” (Emphasis added.) And the lower cost of genetic testing today makes testing W.G. now affordable. The 2021 study and cost evidence therefore show

that Dr. Steiner cannot be said to have sufficiently ruled out the possibility of a genetic condition in W.G. for purposes of his differential diagnosis.

{¶ 43} Grad also argued that all the studies he presented show that numerous conclusions reached by Dr. Steiner at Grad’s trial were erroneous. He pointed to Dr. Steiner’s testimony that infants are born with “perfectly normal bone, independent of mother’s Vitamin D status,” his conclusion that W.G. himself “was born with normal bones,” and his assertion that Laura’s Vitamin D levels were not related to W.G.’s bone health as an infant. The 2019, 2017, and 2016 studies show, however, that a mother’s Vitamin D levels *can* contribute to an infant’s being susceptible to bone fractures before birth or shortly after. This, Grad claims, along with the diagnosis of W.G.’s sibling with Vitamin D deficiency and hypermobility, shows that Dr. Steiner did not sufficiently consider whether Laura’s Vitamin D deficiency could have negatively impacted W.G.’s bone health at birth.

{¶ 44} Without holding a hearing, the trial court denied Grad’s motion for leave to file a motion for new trial, concluding, “The documents submitted by Grad do not support the claim that he was unavoidably prevented from timely discovering the evidence. . . .” It noted that the four studies were authored by either Dr. Holick or Dr. Ayoub. Both had been on Grad’s witness list, but his counsel had made what the court called a “strategic decision” not to call them. In addition, the trial court stated, “While these new studies were published after the trial, the opinion of the experts has not changed since the time of trial.” Specifically, the trial court noted that Grad’s experts were then of the opinion that W.G.’s injuries were caused by “various undiagnosed medical conditions,” and in this motion, Grad was attempting to get “those same experts in front of a new jury to present the same arguments [they] would have presented in 2014 under the guise of the evidence being newly discovered.” The trial court also stated that Grad had acknowledged that the studies do not present “new theories of what happened to W.G.,” but instead, as Dr. Holick acknowledged, simply “affirmed” or “confirmed” the views

he held when Grad was tried. The court also concluded that Grad’s motion was unreasonable because “[i]f a defendant could simply wait until a new study—the 2021 study in this case—‘affirming theories’ from years earlier was published, the time frames set forth in Crim.R. 33 would be meaningless.”

{¶ 45} The appellate court affirmed. 2022-Ohio-4221, ¶14 (9th Dist.). It held that the trial court did not abuse its discretion when it concluded that Grad was not unavoidably prevented from discovering the four scientific studies to which he pointed. *Id.* at ¶ 12. It noted that Dr. Holick and Dr. Ayoub had been identified by Grad’s counsel as potential witnesses before his trial, and although counsel did not ultimately call them, counsel relied on their opinions when cross-examining Dr. Steiner. *Id.* at ¶ 11. In addition, while the four studies on which Grad relies had not been published at the time of his trial, the studies were “premised on the same theories upon which [Dr. Steiner] was cross-examined.” *Id.*

{¶ 46} Grad then sought review of five propositions of law by this court. We initially denied review, *see* 2023-Ohio-1149, but Grad moved for reconsideration, and we agreed to hear two propositions of law:

I. A defendant need only present prima facie evidence of newly discovered scientific evidence to obtain a hearing on a motion for leave to file a motion for a new trial.

II. Scientific discoveries postdating trial may constitute newly discovered evidence even if the basis for those scientific discoveries [was] generally known or available at the time of trial.

See 2023-Ohio-1979.

II. ANALYSIS

{¶ 47} “Appellate review of a trial court’s ruling on a motion for leave to file a motion for a new trial is conducted under an abuse-of-discretion standard.” *State v. Hatton*, 2022-Ohio-3991, ¶ 29. “A court abuses its discretion when a legal rule entrusts a decision to a judge’s discretion and the judge’s exercise of that discretion is outside the legally permissible range of choices.” *State v. Hackett*, 2020-Ohio-6699, ¶ 19. “The term ‘abuse of discretion’ connotes more than an error of law or of judgment; it implies that the court’s attitude is unreasonable, arbitrary or unconscionable.” *State v. Adams*, 62 Ohio St.2d 151, 157 (1980). To the extent Grad’s propositions of law raise questions of law, however, we review them de novo. *See State v. Vanzandt*, 2015-Ohio-236, ¶ 6.

{¶ 48} The issues and arguments raised in Grad’s two propositions are related, so we begin with the second proposition. Grad argues that the appellate court abused its discretion when it concluded he was not unavoidably prevented from discovering the four studies that were the crux of his motion, since those studies were based on theories available to him at his trial. He acknowledges that new scientific discoveries necessarily have roots in earlier theories and discoveries. But Grad argues that the bare existence of those earlier theories and discoveries cannot preclude any and all *new* scientific evidence based on them from constituting newly discovered evidence. In support, he points to numerous decisions recognizing new medical discoveries, studies, and tests as newly discovered evidence, including revised scientific understandings of shaken-baby syndrome, DNA testing, and eyewitness identification. *See, e.g., State v. Butts*, 2023-Ohio-2670, ¶ 20, 43, 100 (10th Dist.) (holding that scientific studies on shaken-baby syndrome published after the defendant’s trial constituted newly discovered evidence under Crim.R. 33(A)(6)). Ultimately, he urges us to adopt the view stated in *Butts* that a trial court should determine whether “the form and nature

of the evidence supporting the arguments are drastically different today than they were [at the time of trial].” *Butts* at ¶ 70.

{¶ 49} The State acknowledges the Tenth District’s holding in *Butts*. It contends, however, that scientific studies published after trial cannot constitute newly discovered evidence if they simply confirm theories that were in existence at the time of trial, and it argues that Grad’s new evidence falls within that category. Amicus curiae Ohio Attorney General Dave Yost takes a position similar to the State’s. He argues that we should hold that a scientific article published after a trial is over cannot be considered new evidence for purposes of Crim.R. 33 if “the conclusion of the article was known at the time of trial or could have been known with reasonable diligence.”

{¶ 50} Nevertheless, we note that Grad, the State, and the attorney general appear to agree with the general principle that new scientific evidence can—at least in certain circumstances—constitute newly discovered evidence under Crim.R. 33. They disagree on exactly what those circumstances are and whether the evidence Grad presented fits within that context. However, neither the State nor the attorney general posits that changes in scientific knowledge can *never* constitute newly discovered evidence.

{¶ 51} Tension between the legal system and scientific progress arises because the legal system uses evidence to “resolve disputes finally and quickly,” but scientific knowledge is “subject to perpetual revision.” *Daubert*, 509 U.S. at 597. As amicus curiae the Innocence Network explains, one implication of this tension is that convictions that are heavily based on scientific evidence can—if that evidence later comes to be disputed, outdated, or debunked within the scientific community—be seen as unjust.

{¶ 52} The Innocence Network points us to several examples of areas in which changes in the understanding of the scientific community led to convictions based on old and outdated science being vacated.

A. Fire science

{¶ 53} The Innocence Network explains that in the 1970s, fire investigators attributed certain physical markers at the scene of a fire to arson. But by the early 1980s, the scientific community’s understanding of fire science had changed significantly. An important discovery was the concept of flashover, a “‘transition phase in the development of a compartment fire in which surfaces exposed to thermal radiation reach ignition temperature more or less simultaneously and fire spreads rapidly throughout the space.’ ” Caitlin M. Plummer & Imran J. Syed, “*Shifted Science*” Revisited: *Percolation Delays and the Persistence of Wrongful Convictions Based on Outdated Science*, 64 *Clev.St.L.Rev.* 483, 492 (2016), quoting *National Fire Protection Association 921: Guide for Fire and Explosion Investigations*, § 3.3.78 (7th Ed. 2011) (“NFPA 921”). The phase is described as “the transition from ‘a fire in a room’ to ‘a room on fire.’ ” *Id.*, quoting NFPA 921 at § 5.10.4.1. Researchers found that flashover could occur “in potentially every compartment fire” and it could cause some of the physical markers previously thought to occur only in cases of arson. *Id.* at 492.

{¶ 54} In response to this development, the National Fire Protection Association formed the Technical Committee on Fire Investigations in 1985. *Id.* Seven years later, in 1992, the committee released NFPA 921, a treatise providing guidance on investigations into fires and explosions. *Id.*

{¶ 55} The new understanding of flashover and new investigatory methods discussed in NFPA 921 led to significant changes in fire investigations, but not quickly. The changes came to be generally accepted by the scientific community only in the 2000s. *See id.* at 493-495. And through the 1990s, defendants were still facing the debunked investigatory methods of the pre-NFPA 921 world. *Id.* at 495.

{¶ 56} Perhaps the most prominent example is the case of Cameron Todd Willingham, who was convicted based on obsolete fire-science testimony in 1992 and executed in 2004. *See generally* Paul C. Giannelli, *Junk Science and the*

Execution of an Innocent Man, 7 N.Y.U. J. L. & Liberty 221, 224 (2013). Others convicted based on the old investigatory methods have been exonerated. *See, e.g., Gavitt v. Ionia Cty.*, 67 F.Supp.3d 838, 842-848 (E.D.Mich. 2014) (discussing a defendant’s conviction based on fire science in 1985 and his eventual exoneration in 2012, thanks to new scientific evidence concerning flashover that emerged in the 1980s).

B. Shaken Baby Syndrome

{¶ 57} In the 1970s, a physician in England developed criteria for diagnosing a condition that would come to be known as Shaken Baby Syndrome (“SBS”). Plummer & Syed, 64 Clev.St.L.Rev. at 511-512. He concluded that a clinician could reliably diagnose a child as a victim of SBS if three symptoms—known as the “triad”—were present in the child: (1) encephalopathy, or brain injury, usually in the form of brain swelling; (2) subdural hematoma, or bleeding on the surface of the brain; and (3) retinal hemorrhage, or bleeding behind the eyes. *Id.*

{¶ 58} Two legal scholars have found that only a small number of criminal convictions were based on an SBS diagnosis in the early 1980s, but the number grew significantly in the 1990s and 2000s. *Id.* at 512-513. Before the substantial increase in SBS convictions, however, some questioned the scientific basis for the SBS hypothesis. *Id.* at 513 (discussing medical studies in 1987 and 1988 questioning whether shaking is necessarily the cause of observed injuries).

{¶ 59} Later researchers published additional studies making incremental contributions to the scientific community’s understanding of SBS. *See id.* at 513-515 (discussing research). Although a debate in the scientific community over SBS—now referred to as Abusive Head Trauma—continues, some consensus has emerged: the triad of symptoms can be caused in ways other than shaking, including accidents. *Id.* at 514-515. As a result of these changes in the scientific community’s understanding of the triad, numerous courts have vacated convictions based on

SBS. *See, e.g., Commonwealth v. Epps*, 474 Mass. 743, 768-769 (2016); *State v. Edmunds*, 2008 WI App. 33, ¶ 23.

{¶ 60} Another significant example of the changing science on SBS leading to a new trial is *Butts*, 2023-Ohio-2670 (10th Dist.). In 2003, Butts was convicted of murder and other offenses based on the triad-based theory of SBS. *Id.* at ¶ 4. In 2019, he filed a motion for leave to file a motion for a new trial based on the change in the scientific community’s understanding of SBS. *Id.* at ¶ 7. The trial court held an evidentiary hearing and ultimately granted him a new trial. *Id.* at ¶ 8, ¶ 14.

{¶ 61} The Tenth District Court of Appeals affirmed. It first concluded that the trial court had not abused its discretion in acknowledging that Butts’s new scientific evidence on SBS was not available until 2018, postdating his trial by 15 years, and therefore it affirmed the trial court’s decision to grant the Butts’s motion for leave. *Id.* at ¶ 73. Even though Butts had called as a witness at trial an expert who challenged the reliability of an SBS diagnosis, the appellate court noted that the expert’s opinion was considered a fringe theory at that time. *Id.* at ¶ 37-39, 68. And Butts’s new evidence showed that the triad-based theory of SBS on which he was convicted was by then “the subject of substantial criticism.” *Id.* at ¶ 69. The new evidence was “entirely different in character” from the evidence available at the time of trial. *Id.* at ¶ 65. Ultimately, the Tenth District held that “it is the emergence of a legitimate and significant dispute within the medical community in the years following Mr. Butts’s trial as to the causes of [the victim’s] injuries—which is material to the defense and could not have been discovered within the timeframe set forth in Crim.R. 33—that constitutes newly discovered evidence.” *Id.* at ¶ 66; *see also* ¶ 70 (“Although the basic premises underlying Mr. Butts’s arguments are generally parallel to those raised at his 2003 trial, we nonetheless agree with the trial court that the form and nature of the evidence supporting the arguments are drastically different today than they were in 2003.”).

{¶ 62} The Tenth District also affirmed the trial court’s decision to grant Butts a new trial. *Id.* at ¶ 101. It noted the lack of nonmedical inculpatory evidence presented at Butts’s 2003 trial, *id.* at ¶ 82, along with the fact that the scientific community’s understanding of SBS was “dramatically different” from what it was in 2003, *id.* at ¶ 85. The record therefore showed “a reasonable probability that a jury, looking at both the old and new medical testimony, would have a reasonable doubt as to Mr. Butts’s guilt.” *Id.* at ¶ 92.

C. The law

{¶ 63} These examples provide ample support for the basic proposition that new scientific evidence may permissibly constitute newly discovered evidence under Crim.R. 33(A)(6) and (B). In particular, when scientific evidence provided substantial support for an element of a crime at trial, a significant posttrial change in the state of scientific knowledge concerning that trial evidence may constitute newly discovered evidence.

{¶ 64} We decline to define the degree of change required in terms of a “quantum leap,” *Butts*, 2023-Ohio-2670, at ¶ 70 (10th Dist.), or another term that focuses on how dramatically the change is perceived by the scientific community. As the examples above show, scientific change may occur slowly, over long periods of time and through measured, incremental advances in scientific knowledge, rather than through a single “gobsmacking revelation.” Rather, the growth of scientific knowledge must be considered in respect to the case at issue. A court must first evince a clear understanding of what the new scientific evidence shows. It must then compare that evidence to the level of similar-subject scientific evidence available at the time of trial. In doing so, it must query whether, if the trial were to occur today, the new evidence would provide the defendant with a significantly stronger argument for his defense such that it could have the effect of leading to a different outcome. If the answer is yes, then the defendant has presented “clear and convincing proof that the defendant was unavoidably prevented from the discovery

of the evidence upon which he must rely,” Crim.R. 33(B), and the motion for leave should be granted.

{¶ 65} Next, we recognize that determining whether a change in scientific evidence is *significant* when judging a motion for leave differs somewhat from the question at the center of a motion for a new trial—which involves convincing the court that the new evidence “discloses a strong probability that it will change the result if a new trial is granted,” *Petro*, 148 Ohio St. 505, at syllabus. The significance question at the motion-for-leave stage relates to the fact that a scientific study may be new, having been published after trial, but the trial court should still consider the extent to which the evidence would provide greater assistance defending against the indictment in a new trial than was available to the defendant at trial. Whether the change in scientific knowledge is significant such that it offers new evidence to support a stronger argument in defense of the charges—so that a different outcome *could* be reached if a trial were held today—ensures that a trial court need not grant leave for evidence of a recently published study that would have only a *de minimus* impact in a new trial.

{¶ 66} The question at the motion-for-new-trial stage thereafter focuses on whether the new evidence “discloses a *strong probability* that it *will* change the result if a new trial is granted” (emphasis added), *id.* Notably, at the motion-for-new-trial stage, the defendant must clear a higher bar after the court first grants leave to file the new-trial motion. As we have recently instructed, “[U]ntil a trial court grants leave to file a motion for a new trial, the motion for a new trial is not properly before the court.” *State v. Bethel*, 2022-Ohio-783, ¶ 41. And clearly, a trial court presented with a motion for leave must withhold its decision on the merits of the motion for a new trial. *Id.*; *see also Hatton*, 2022-Ohio-3991, at ¶ 33 (“Unless and until a trial court grants a defendant leave to file a motion for a new trial, the merits of the new-trial claim are not before the court.”).

{¶ 67} The State and the attorney general approach posttrial scientific discoveries in the negative, beginning with an analysis of when new scientific evidence is *not* newly discovered evidence. As noted, the State contends that scientific evidence is not new if it serves merely to confirm “alternate medical theories known at the time of trial.” The attorney general contends that new scientific articles provide cumulative evidence, not newly discovered evidence, if they merely support conclusions known at the time of trial or if the articles rely on scientific theories that predate the studies, perhaps by decades. These arguments are similar to the conclusion of the appellate court that the new studies Grad presented were “premised on the same theories” that were available to Grad at trial and relied on by him to cross-examine Dr. Steiner. 2022-Ohio-4221 at ¶ 11 (9th Dist.).

{¶ 68} The problem with these approaches is that they assume that a flower blooms as soon as a seed is planted. Scientific history is replete with theories initially considered fringe or outlier, which only later—after additional study and peer review—become mainstream scientific conclusions. In *Butts*, 2023-Ohio-2670 (10th Dist.), for example, if one were to focus solely on whether the new evidence on SBS presented by the defendant “merely confirmed or was premised on medical theories” he presented at his trial, the motion would have lacked merit because he already had an expert challenge the validity of the State’s SBS diagnosis at his trial. Yet as the appellate court in *Butts* recognized, the position of the defendant’s expert was considered an outlier view at the time of his trial. And by the time the defendant filed his motion for leave, the science had changed to the point that the State’s position at trial had become “the subject of substantial criticism,” *Id.* at ¶ 69.

{¶ 69} Or consider a defendant convicted of arson in the late 1980s based on now-debunked fire science. If the defendant pointed to the then-recent discovery of flashover at his trial, then, according to the State and attorney general, the

evidence that emerged in the 1990s could not be considered newly discovered evidence because it would have “merely confirmed” or been “premised on” the flashover theory the defendant pointed to at trial—even though that flashover theory was not yet generally accepted at the time of trial.

{¶ 70} The position advanced by the State, the attorney general, and the appellate court therefore avoids the fact that scientific conclusions may change and scientific evidence may grow over time. New scientific theories need to be tested. They may at first be considered fringe or outlier theories. But over time, especially as new variables are discovered and tested, validated studies lead to new conclusions. These conclusions then form part of a significant change in the scientific community’s understanding of a particular issue that may cast doubt on a criminal conviction. We agree with Grad that in cases in which scientific evidence provides substantial support for an element of a crime at trial, a significant posttrial change in the state of scientific knowledge concerning that evidence may constitute newly discovered evidence.

{¶ 71} The parties also dispute whether the evidence Grad presented with his motion for leave should have been considered at a hearing to determine whether it amounted to newly discovered evidence as contemplated by Crim.R. 33(A)(6) and (B). The State and the attorney general argue that the evidence is not comparable to the evidence at issue in *Butts*, as it comprises small studies that do not reflect a significant change in the relevant science at issue here. Grad responds by explaining that the studies reveal information not known at the time of his trial. He also argues that to the extent there is any dispute about what the studies show for purposes of this case, the trial court should have held a hearing.

{¶ 72} We agree with Grad that the trial court abused its discretion by failing to hold a hearing on his motion for leave to file a motion for a new trial. Grad and the State agree that when a defendant files a motion for leave based on newly discovered evidence more than 120 days after the verdict, *see* Crim.R. 33(B),

a hearing on the motion is required if a defendant makes a prima facie showing that he was unavoidably prevented from discovering the evidence on which he seeks to rely. If a defendant fails to present prima facie evidence of being unavoidably prevented from discovering such evidence, a court may deny leave without holding a hearing. *See, e.g., State v. Cleveland*, 2009-Ohio-397, ¶ 54 (9th Dist.) (“A defendant is only entitled to a hearing on a motion for leave to file a motion for a new trial if he submits documents which, on their face, support his claim that he was unavoidably prevented from timely discovering the evidence at issue”). We have little trouble concluding that Grad’s evidence meets the prima facie evidence standard.

{¶ 73} Dr. Holick averred that his 2021 study revealed “a new genetic cause for bone fragility in infants not previously recognized by medical science,” as well as “multiple, other possible genetic variations [suspected to have] deleterious effects on bone development in infants.” According to Dr. Holick, these findings show that the genetic tests for bone development and fragility that were run on W.G. are not sufficient to confirm abuse through a differential diagnosis. Based on this opinion, Grad contends that the 2021 study shows that Dr. Steiner’s testimony that a genetic bone disorder *could not* have caused W.G.’s injuries was wrong.

{¶ 74} Specifically, Dr. Steiner acknowledged that the differential-diagnosis methodology he employed required him to rule out all possible genetic causes of W.G.’s injuries before he could conclude that the injuries were caused by abuse. He also testified that he had ruled out the possibility that W.G. had a genetic bone condition based on W.G.’s negative test for one type of osteogenesis imperfecta, the family history reported by Laura, and W.G.’s lack of bone fractures after June 2008. According to Grad, the 2021 study shows that even accepting as true W.G.’s negative osteogenesis imperfecta test, W.G.’s family history, and the absence of breaks after June 2008, W.G. could still suffer from a genetic bone disorder that led to his injuries. As additional context, he notes that the cost of

genetic testing has dropped substantially since the time of his trial. Consequently, Grad asserts, the 2021 study and the lower cost of genetic testing show that the differential diagnosis Dr. Steiner performed for Grad's trial would not be viewed as sufficient to sustain a conviction in a trial today. Today, the possibility that W.G.'s injuries had a genetic cause of the sort discussed in the 2021 study would have to be ruled out before a jury could conclude that those injuries had been caused by abuse.

{¶ 75} Grad also contends that the 2021, 2019, 2017, and 2016 studies provide significant new information concerning Vitamin D deficiencies showing that Dr. Steiner's trial testimony on that subject was in error. At trial, Dr. Steiner testified that the differential-diagnosis methodology required him to rule out the possibility that W.G.'s injuries were caused by a metabolic bone disorder, such as a Vitamin D deficiency, before he could conclude that the injuries were caused by abuse. He then testified that he ruled out the possibility that W.G. had a deficiency in Vitamin D as an infant based simply on the fact that W.G. began ingesting baby formula shortly after birth. Importantly, Dr. Steiner was aware that Laura Grad had a Vitamin D deficiency, but he testified that, as a matter of "basic physiology," an infant's bone health in utero and at birth are *entirely unrelated* to the mother's levels of Vitamin D. As a result, according to Dr. Steiner, Laura's Vitamin D deficiency *could not* have impacted W.G.'s bone health and there was no need for him to have W.G.'s Vitamin D levels tested in order to rule out the possibility that his injuries were caused by a deficiency in Vitamin D.

{¶ 76} According to Grad, the findings in the 2021, 2019, 2017, and 2016 studies show that several aspects of Dr. Steiner's testimony ruling out a Vitamin D deficiency were wrong. First, contrary to Dr. Steiner's testimony, the studies show that a mother's Vitamin D levels *can* impact an infant's bone health and cause the infant to be vulnerable to fractures. Second, the studies show that Dr. Steiner was wrong when he testified that infantile rickets is found only in very rare

circumstances, the sort found only in isolated “tribes in India and Australia, some Muslim countries.” According to Dr. Ayoub, the newer studies show that infantile rickets is more common than Dr. Steiner acknowledged and is often related to a mother’s Vitamin D levels. And as additional context, Grad notes, W.G.’s sibling was diagnosed with hypermobility and a Vitamin D deficiency after trial, and this sibling is also suspected to suffer from EDS. Grad therefore contends that if his trial were to take place today, Dr. Steiner would need to more seriously consider whether W.G. had a Vitamin D deficiency when Grad and Laura brought him to the hospital in June 2008 before ruling it out as a possible cause of his injuries. Accordingly, the differential diagnosis Dr. Steiner performed for Grad’s trial would not be viewed as sufficient to sustain a conviction today, because it did not adequately account for the possibility that a mother’s low Vitamin D levels could negatively impact an infant’s bone health shortly after birth.

{¶ 77} In our view, the evidence Grad presented was more than sufficient to require a hearing on the motion for leave to file a motion for a new trial. The state’s theory of causation at Grad’s trial relied substantially—if not exclusively—on Dr. Steiner’s differential diagnosis, which required him to rule out all possible benign causes of W.G.’s injuries. Grad challenged Dr. Steiner’s testimony by asking whether Dr. Steiner had sufficiently ruled out the possibility that W.G. suffered from a genetic condition or metabolic bone disorder related to Vitamin D. The four studies are prima facie evidence that if the trial were held today, Grad would have a significant new argument related to potential genetic causes and significantly stronger arguments for more than one cause, including a Vitamin D deficiency, to lead to a reasonable inference that W.D.’s injuries were not caused by abuse. That evidence would affect the jury’s assessment of reasonable doubt regarding Grad’s criminal liability today for the condition of W.G. when he was examined at the hospital. Moreover, Grad demonstrates with his motion that additional genetic testing could be done today at a fraction of its cost in 2014 and

that W.G.’s sibling has been diagnosed with the same conditions as Laura Grad—Vitamin D deficiency and hypermobility.

{¶ 78} The State’s arguments to the contrary do not affect this conclusion. The State argues that nothing in the studies is really new because two of the experts Grad had available at trial—Dr. Holick and Dr. Ayoub—are among the authors of all four studies, and both state that the studies “confirmed” the scientific theories and findings they held at the time of Grad’s trial. The word “confirmed” is counterbalanced by what needs to be confirmed—an outlier theory at its beginning. As the *Butts* case demonstrates, an outlier position at the time of trial may be “confirmed” in the sense that new developments in science buoy the outlier position to one that is central and accepted by a scientific community. We conclude that when that happens, the resulting scientific conclusions may constitute newly discovered evidence.

{¶ 79} The State further suggests that the four studies cannot constitute newly discovered evidence because they represent the views of only a small portion of the medical community. The State follows with an assertion that “[t]he reports and/or testimony of these doctors would not have been any more credible or probative in 2021 than they were in 2014.” That is a potential question for a jury. Under these facts, there exists no sufficient reason for a trial court to deny Grad’s motion for leave without even conducting a hearing. If anything, the State’s assertions focus on issues that may be ripe for exploration at a hearing, though we note that arguments about strengths or weaknesses of the studies would need to be supported by evidence beyond the bare assertions of counsel.

{¶ 80} The State next emphasizes—as the appellate court did in Grad’s direct appeal—that Grad’s counsel made a strategic decision not to have his experts testify at his trial and instead obtained concessions from Dr. Steiner on points relating to his testing of W.G. for genetic and metabolic bone disorders. *See* 2016-Ohio-8388 at ¶ 8 (9th Dist.). For example, the jury was aware that W.G. had been

tested for one type of osteogenesis imperfecta and no other genetic conditions. In our view, these arguments would be considered by the trial court on Grad's motion for leave or, if leave is granted, when considering whether a new trial is warranted. At this point, however, they do not prevent the evidence in Grad's motion from supporting the holding of a hearing.

{¶ 81} Finally, the State and the attorney general suggest that ruling in Grad's favor will open the floodgates, forcing trial courts to hold hearings and grant a new trial every time a new study is published. This is untrue for many reasons. First, our conclusion here concerns *only* criminal cases in which scientific evidence presented through the testimony of one or more experts was used to establish an element of the crime. Second, as we make clear above, a trial court is not required to grant leave on the bare fact that a scientific study relating to a matter involved in a defendant's trial is published after trial. The defendant must show that a posttrial change in scientific knowledge would provide him with a significantly stronger argument for his defense such that it could lead to a different outcome if trial were held today. Third, the State may present scientific evidence of its own when responding to either a motion for leave or a motion for new trial, so if the relevant scientific knowledge has not significantly changed, the State will be able to present to the court evidence to support that argument.

{¶ 82} We conclude that the appellate court erred by affirming the trial court's denial of Grad's motion for leave to file a motion for a new trial without holding a hearing on that motion. At the very least, the trial court should have held a hearing on the motion for leave. We therefore remand this case to the trial court for it to hold such a hearing.

III. CONCLUSION

{¶ 83} For these reasons, we reverse the court of appeals and remand the case to the trial court for it to hold a hearing on Grad's motion for leave.

Judgment reversed

and cause remanded to the trial court.

DETERS, J., joined by KENNEDY, C.J., and DEWINE, J., dissenting.

{¶ 84} I dissent from the majority’s decision reversing the judgment of the Ninth District Court of Appeals and remanding the cause to the trial court to hold a hearing on Kenneth Grad’s motion for leave to file a motion for a new trial. The lead opinion wrongly finds that the evidence on which Grad relies—affidavits of two experts whom Grad declined to call during his 2014 trial—reflects a significant posttrial change in scientific knowledge. But the affidavits merely repackage expert testimony available and known to Grad at the time of his trial. Grad did not present newly discovered evidence, so the trial court properly denied his motion for leave to file a motion for a new trial. I would affirm the judgment of the court of appeals.

Background

{¶ 85} Grad moved for leave to file a motion for a new trial based on what he claims is newly discovered evidence. The purportedly new evidence primarily consists of two affidavits—one from Dr. Michael Holick and one from Dr. David Ayoub—and four scientific studies completed for publication after Grad’s December 2014 trial.² In an entry denying Grad’s motion, the Medina County Common Pleas Court explained that Grad was not unavoidably prevented from discovering the evidence he presented. Although the four studies he attached to his motion postdate his trial, the trial court found that their conclusions were cumulative to the evidence that Grad could have presented in 2014. And because

2. Grad also submitted several other pieces of purported new evidence: information about a decrease in the cost of genetic testing; the diagnosis of a relative of Grad’s son W.G. with a brittle-bone disease; and several news articles detailing journalistic investigations of Dr. Daryl Steiner. The lead opinion glosses over this aspect of Grad’s motion and focuses on the scientific articles. This is with good reason: the family history of disorders allegedly causing weak bones is not new, the news articles are not competent evidence, and the wider availability of genetic testing is not evidence—new or otherwise.

that evidence was cumulative, the trial court held that Grad had failed to establish “by clear and convincing proof” that he had been unavoidably prevented from timely discovering new evidence, *see* Crim.R. 33(B).

{¶ 86} The court of appeals affirmed. It agreed with the trial court that “the scientific studies that Mr. Grad characterizes as newly discovered evidence . . . are premised on the same theories upon which the State’s expert was cross-examined [by Grad’s counsel].” 2022-Ohio-4221, ¶ 11 (9th Dist.) For this reason, the court of appeals held that the trial court did not abuse its discretion by concluding that Grad had failed to provide prima facie proof that he was entitled to file a delayed motion for new trial. *Id.* at ¶ 12. This was the correct result.

Obtaining leave to file an untimely Crim.R. 33(A)(6) motion for a new trial requires proof of new evidence

{¶ 87} Resolving Grad’s motion requires sorting through the different standards for motions under Crim.R. 33. A motion for a new trial on the grounds of the discovery of new evidence material to the defense must be filed within 120 days after a verdict is rendered. Crim.R. 33(B). Missing this deadline, as Grad did, does not necessarily end efforts to obtain a new trial based on new evidence. Leave may be granted to file an untimely motion for a new trial. Crim.R. 33(B). To succeed on a motion for leave, a movant must present “clear and convincing proof” that he was unavoidably prevented from discovering the new evidence. *Id.*³ *see also State v. Hatton*, 2022-Ohio-3991, ¶ 28. This burden is distinct from that for succeeding on a motion for new trial under Crim.R. 33(A)(6), which requires a showing that the new evidence bears “a strong probability that it will change the

3. As the lead opinion notes, the State and Grad agree that a hearing must be held on a motion for leave to file a motion for a new trial “if a defendant makes a prima facie showing that he was unavoidably prevented from discovering the evidence on which he seeks to rely.” Lead opinion, ¶ 72. But nothing in the rule requires a hearing on a motion for leave to file a motion for a new trial.

result if a new trial is granted.” (Cleaned up.) *State v. LaMar*, 2002-Ohio-2128, ¶ 85.

{¶ 88} We recently explained what a defendant must show to establish the “unavoidably prevented” component in the context of postconviction relief, which is analogous to the “unavoidably prevented” requirement in Crim.R. 33(B). *State v. Johnson*, 2024-Ohio-134, ¶ 1, 16, fn. 3. *Johnson*’s focus was on a movant’s burden to “submit evidence of specific facts” showing why he “was unable to timely obtain” the relevant new evidence. *Id.* at ¶ 27. We held that the date of an affidavit containing purported new evidence is not conclusive proof that a defendant was unavoidably prevented from timely discovering the new evidence. *Id.* at ¶ 25, 27.

{¶ 89} Here, the focus is not on whether Grad timely obtained the evidence he presented in his motion. Instead, our consideration is whether the evidence was *newly discovered* evidence. A movant under Crim.R. 33(B) must demonstrate not only that he was unavoidably prevented from discovering some unspecified thing, but also that he was prevented from discovering “the evidence upon which he must rely.” Crim.R. 33(B). And the rule specifies that the evidence upon which he must rely is “new evidence.” Crim.R. 33(A)(6). So to satisfy the requirements of Crim.R. 33(B), a movant must establish that (1) he was unavoidably prevented from discovering evidence and (2) the evidence was *new* evidence.⁴ Of course, in keeping with our holdings in *Hatton* and *State v. Bethel*, 2022-Ohio-783, a movant at this stage need not make the merits showing that such new evidence would probably change the outcome at trial; that requirement comes only if the motion for leave is granted. *Hatton*, 2022-Ohio-3991, at ¶ 28; *Bethel* at ¶ 41.

4. The lead opinion implicitly acknowledges this two-part standard when it explains that “scientific evidence may permissibly constitute newly discovered evidence” if there is “a significant posttrial change in the state of scientific knowledge concerning . . . trial evidence.” Lead opinion at ¶ 63.

The scientific studies on which Grad relies are not new evidence

{¶ 90} Turning to Grad’s motion, it is clear that he did not meet the burden described above. Notwithstanding their recent publication dates, the four scientific studies on which Grad relies are not new evidence. The studies may be regarded only to the extent that they are incorporated into expert testimony, and the expert opinions on which Grad relies have not changed since his trial.

{¶ 91} Start with Ohio’s evidentiary rules for scientific studies. Learned treatises, such as the scientific studies submitted by Grad, are admissible evidence only to the extent permitted by Evid.R. 803(18). *Moretz v. Muakkassa*, 2013-Ohio-4656, ¶ 53-54. This rule “permits the admission of statements from learned treatises during the testimony of expert witnesses.” *Id.* at ¶ 53. But there are strict limitations on how scientific literature may be used. Scientific literature is not admissible “as independent evidence.” *Id.* at ¶ 60. It is admissible only if offered in connection with an expert’s testimony, and then only if statements are “read into evidence.” Evid.R. 803(18). The literature “may not be received as exhibits.” *Id.*

{¶ 92} Because Grad’s studies are not independent evidence, their newness must be evaluated in the context of the expert testimony through which they are offered. In this case, that expert testimony comes in the form of two affidavits: one from Dr. Holick and the other from Dr. Ayoub. Both doctors prepared expert reports for Grad before his 2014 trial, and neither doctor offers evidence that is qualitatively new.

{¶ 93} Consider Dr. Ayoub’s affidavit. He presents a recent study on the relationship between low Vitamin D levels, rickets, and bone fragility in infants. This study, he attests, substantiates his conclusion that the State’s expert at trial provided medical testimony that was “unequivocally, objectively, medically false.” Tellingly, his conclusion about the purported falsity of the State’s medical testimony relies not on the 2019 study but on research available during Grad’s trial: articles dating from 1925, 1943, 2008, 2009, 2010, and 2013, as well as from 2014

and 2016. And Dr. Ayoub does not assert that the 2019 study changed the scientific consensus regarding the relationship between Vitamin D levels and bone fragility in infants. Instead, he avers that the 2019 study has “only confirmed” his theories from 2008, six years before Grad’s trial.

{¶ 94} Dr. Holick offers more of the same. He presents three studies dating from 2016, 2017, and 2021. Like Dr. Ayoub’s 2019 study, these three studies relate to Vitamin D levels, rickets, and bone fragility in infants. Nothing in Dr. Holick’s affidavit suggests that the three studies have altered the scientific landscape, shifted the consensus, or even refined his own theories. Echoing Dr. Ayoub, Dr. Holick concludes in his affidavit that the new scientific literature has “only confirmed” his original pretrial expert report.

{¶ 95} What’s old does not become new merely because it accumulates a few more supporting data points. And the accumulation of a few additional supporting studies is all that Grad and his experts have to offer. The recycled nature of Grad’s offering stands in stark contrast to the evidentiary offerings in *State v. Butts*, 2023-Ohio-2670 (10th Dist.), a case cited by the lead opinion. In *Butts*, a court of appeals, quoting the defendant’s expert, concluded that newly published scientific literature constituted new evidence because expert testimony “explained that, in the more than 15 years since [the defendant’s] trial, a shift ha[d] occurred in the medical community that would ‘cause a sea change in the trial dynamic’” *Id.* The shift in the scientific consensus was so extensive that according to the expert testimony, a change had occurred in the accepted differential diagnosis for injuries of the type sustained by the victim. *Id.*

{¶ 96} No similar shift has been shown here. Contrary to the lead opinion’s insinuation, the affidavits from Drs. Ayoub and Holick do not state (either explicitly or implicitly) that their theories have transformed from scientific outlier positions to the mainstream. Therefore, Grad has not carried his burden under Crim.R. 33(B) to show that he was unavoidably prevented from discovering *new* evidence.

CONCLUSION

{¶ 97} Grad did not support his motion for leave to file a motion for new trial with new evidence. Instead, he repackaged his experts’ pretrial opinions into affidavits and tied them up with a few new studies that have not changed the existing scientific consensus. For this reason, I would affirm the Ninth District Court of Appeals’ decision holding that the trial court did not abuse its discretion by denying Grad’s motion for leave to file a motion for a new trial. The majority does not, so I respectfully dissent.

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Jones Day, Vito R. Giannola, and Emily DelColle, urging reversal for amicus curiae The Innocence Network.
