“Lucy’s Bones” Excerpt Transcript

Excerpt from (September 2, 2016) episode of Science Friday.

JOHN DANKOSKY	This is Science Friday. I'm John Dankosky. It's being described as the cracking of a 3.2-million-year-old cold case. How Lucy, the famed fossil skeleton of an early human ancestor, may have died by falling out of a tree. The clues-- new high-resolution CT scans of her bones. The research out of the University of Texas has been disputed by some anthropologists, including some who've worked extensively on Lucy in the past. More about that in just a bit. When we saw this paper, it made us curious. What are the stories that bones are telling us about our ancient human relatives, and how do we know they're true? How are new technologies expanding what we can know about how they lived and how our singular branch sprung from the tree? Here to trace the science behind the stories of our millions-year-old kin are my guests-- John Hawks, first, a Professor of Anthropology at the University of Wisconsin-Madison. John Hawks, welcome back to the show. Thanks so much for joining us.
JOHN HAWKS	Thanks. Great to be here, as always.
DANKOSKY	So tell us about your reaction to this paper. We're now hearing that Lucy may have died from a heart impact, possibly falling out of a tree. What's the evidence that's being pointed to here?
HAWKS	Well, the team who analyzed the bones got to scan them for the first time, because the bones came to the United States on tour. And they took them into a high-resolution scanner at the University of Texas. And they spent a lot of time reconstructing the fragments of the bones. And on Lucy's upper right arm, her humerus, that upper right arm bone, has got the head of it, the side that connects to your shoulder, sort of punched into the bone. And the outsides of it is sort of crushed outwards. And people have seen that since they found the fossil. And they sort of assumed, well, this is damage that probably happened after it was fossilized, as it was underground, under high pressure. But the team of John Kappelman and his colleagues looked at it. And they said, you know, this looks funny to us. It looks like the kind of break that you see when somebody is thrusting out their arm to stop a fall. And that was where they really started their detective work.

	They looked across the rest of the skeleton. They found some other breaks that they thought were indicative of breakage that happened around the time of death, not healed breaks. We can tell when there are signs of healing, something that wasn't healed but happened when the bones were possibly still fresh. So that was where they went to say, hey, something happened here, and it's really something we need to explain.
DANKOSKY	So there has been some criticism of this research, and you've asked some questions yourself. Why is there a debate over this?
HAWKS	I think part of it is people really feel like they know this fossil. Here's a fossil that's been out of the ground for more than 40 years. And when you've got this iconic image of something, especially the folks who've worked on it for a long time, what's really unusual is when a new study comes out and says, hey, I found something new. And the people who have known these things for 40 years say, hey, no, no way. That can't be. And you look at that and say, what's going on here? There is a lot of damage that happens to fossils when they're buried in the ground and fossilized. As that process of mineralization is happening, they're buried under tons of sediment. And what you want to see in a case like this is that there's been a comparison made to other fossils of other kinds of animals that are found along with these fossils. And you say, oh, OK, this pattern is either like the other fossilization damage, or it's different. In this case, the paper didn't have that kind of information. So it made people, like me included, very skeptical.
DANKOSKY	So there's not CT scans of bones from other animals found just around the site?
HAWKS	Exactly. The thing is that you look at that and you say, wow, this is like a forensic case. And the first thing you do if you want to prove that something is a gunshot is look at a lot of gunshots and other kinds of things. It's like you watch CSI. They're going to shoot a gun into the ballistic gel and show, OK, we can recognize this pattern. And that's what hasn't been done in this case, understandably, right, because we don't go running all kinds of animal fossils through high resolution scanners all the time. But it's one of those things that, as the technology progresses, we demand more and more evidence to document what we're finding.
DANKOSKY	I want to bring into our conversation Tracy Kivell, who's a paleoanthropologist at the University of Kent in the UK. She focuses

	specifically on hand bones, which we'll talk about in just a moment. Tracy, welcome to the show.
TRACY KIVELL	Hi. Thank you very much for having me.
DANKOSKY	First of all, I want to ask, what would it tell us, do you think, about Lucy's species or anything about the time she lived if it turns out she really did fall out of a tree?
KIVELL	Well, I guess there are many aspects about Lucy's skeleton and many other early fossil humans that suggested they were-- they said they had the potential to climb trees. But it's been a huge debate in our field basically since Lucy was discovered, whether or not the features of her skeleton that suggest she was climbing in trees were actually something that she was using, or were they just sort of relics or retentions from a more arboreal ancestor. So the idea that potentially this evidence of this actual behavior would be is quite helpful.
DANKOSKY	So in your work, Tracy, you look specifically at the anatomy of the hand in fossil hand bones. So what sorts of questions can a hand answer? What can you learn from a hand?
KIVELL	Well, I think the hands are exciting, because they can tell us about two big questions in human evolution, potentially whether or not we're using our hands for climbing in trees and suspending in trees and how long into our human evolutionary history did we do that, and when did we stop using our hands for locomotion and become fully committed to walking on two feet on the ground. But it also can tell us about when we used tools or when we began to use tools and when a human hand is very well-known for our dexterity. But we don't know exactly when that dexterity evolved and when we started to use tools and to make tools. And so our hands are directly involved in both of those big questions about human evolution.
DANKOSKY	If we look at Lucy as an example, what do her hand bones tell us about how she lived or what she did?
KIVELL	Well, that there are a lot of hand bones for Lucy's species. But unfortunately, we don't have articulated or a hand skeleton that belongs to one individual, which means that we are little bit more limited in what we can say about what Lucy may have done with her hands. But we can put together sort of a composite skeleton of the hand. And when we do that, we can tell that potentially her fingers were a little bit longer

	relative to the length of her thumb than in a human hand. She didn't have quite as long fingers as we see in a chimpanzee or bobono. But her fingers seem to be a little bit longer potentially than ours are, which is an indication that maybe she is still spending at least some time in the trees. And also, her finger bones are a little bit more curved than a human's. And both of those things are an indication that she had the potential to spend some time climbing in trees.
DANKOSKY	I want to thank our guests. Tracy Kivell, a paleoanthropologist at the University of Kent in the UK. Thank you so much for your time. I really appreciate it.
KIVELL	Oh, thank you very much.
DANKOSKY	And thanks also to John Hawks, a professor of anthropology at the University of Wisconsin-Madison. Thank you, John.
HAWKS	Thank you. Much appreciated.