

Broken tooth in dino tail 'proves' T. rex was predator

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A visitor looks at a the skull of a Tyrannosaurus rex at the Natural History Museum of Los Angeles on July 7, 2011. A broken T. rex tooth found in another dinosaur's tail bone offers the first hard evidence that the king of all meat-eating beasts hunted live prey, US paleontologists said Monday.

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Scientists have long debated whether the fossil record really proves the legendary Tyrannosaurus rex was a ferocious hunter or just a scavenger that feasted on carcasses of the dead.

Previous discoveries of [dinosaur bones](#) in the bellies of T. rex fossils, and even T. rex-shaped bites out of the tails of other dinosaurs, have strongly suggested that the late Cretaceous (66-100 million years ago) beast was a predator.

But paleontologists have not been able to rule out that T. rex was an opportunistic scavenger, and scientists say the latest research still cannot disprove that theory.

What researchers have described in the *Proceedings of the National Academy of Sciences*, a US journal, is the first discovery of a broken T. rex tooth in another dinosaur bone—in this case, in the [vertebrae](#) of a plant-eating hadrosaur.

"What we can tell from this without a shadow of a doubt is that a T. rex engaged a living hadrosaur," said lead author Robert dePalma, of the Palm Beach Museum of Natural History in Florida.

"What this present specimen does is it helps to essentially recrown the king," he told AFP.

The bones were uncovered in 2007 in the Hell Creek Formation, a prominent [dinosaur fossil](#) field that spans parts of Montana and North and South Dakota.

Poking out of two fused vertebrae is a major chunk of a T. rex tooth—a well-preserved crown 3.75 centimeters (1.5 inches) long.

T. rex teeth were as big as bananas, and they could regrow any lost during their lifetimes, much like sharks do today, de Palma said.



Tyrannosaurus rex tooth crown embedded between hadrosaur vertebrae and surrounded by bone overgrowth. Researchers Robert A. DePalma II on left and David A. Burnham on right. Credit: David A. Burnham.

The hadrosaur's bone regrew over the injury, signifying that the creature escaped and healed, maybe even living for years afterward.

"The rarity of this piece is so extreme," said dePalma, who worked with co-authors at the University of Kansas and the Black Hills Institute of Geological Research in South Dakota.

"We never in a million years expected to find something that was this clear in the [fossil record](#)," he added.

But researchers said their analysis does not mean the reputed dino bully ate only living beasts—it likely ate dead remains, too.

"Like most modern large predators, it almost certainly did also scavenge carcasses," said the study.

Some experts have argued that the lumbering T. rex—as tall as a two story house—could not run fast enough to be a skillful predator.

Jack Horner, curator of paleontology at the Museum of the Rockies in Bozeman, Montana, has described the T. rex as less like a lion and more like a hyena—a creature that fed on creatures large and small, both carrion and fresh-killed prey.

A survey of dinosaur remains in the Hell Creek Formation by Horner and colleagues in 2011 showed that there were a high number of T. rex bones compared to other large dinosaurs, suggesting the T. rex must have had a range of food options to keep its population thriving.

Horner has also advanced the theory that T. rex's short arms, big body and apparently strong sense of smell made it suited for sniffing out the dead.

Asked for comment on the latest research, Horner told AFP in an email it was "insignificant."

"It certainly does not refute our idea that T. rex was an opportunistic carnivore like a hyena. It simply shows that a tyrannosaur bit a hadrosaur," he said.

"It does not reveal any evidence concerning the circumstance."

Other evidence has been found of a T. rex apparently chomping on another dinosaur's tail, but those fossils lacked the tooth left behind and contained only a bite mark.

Ken Carpenter, a paleontologist at Utah State University who has uncovered one such T. rex bite mark, said the latest research backs up the bad-boy legend, but also renders a softer image of the T. rex as a fallible hunter, just like modern animals.

"When you have specimens that show regrowth of bone around an injury that can only be attributed to a T. rex, as in the case of the new article, then it is pretty conclusive that T. rex was indeed a predator," Carpenter told AFP.

"That we have evidence of failed kills, unsuccessful kills is kind of neat. It shows that T. rex was just as unsuccessful as predators today," he added.

"Let's face it. Everybody would think it was pretty bogus if something as cool as T. rex could only eat

dead things."

More information: Physical evidence of predatory behavior in Tyrannosaurus rex, *PNAS*, www.pnas.org/cgi/doi/10.1073/pnas.1216534110

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