Adolescent T. rex unraveling controversy about growth changes in Tyrannosaurus

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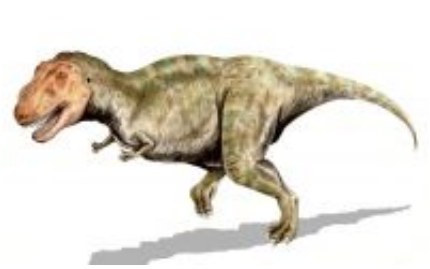

Tyrannosaurus rex, a theropod from the Late Cretaceous of North America, pencil drawing. Image: Wikipedia.

A much-anticipated study of an adolescent Tyrannosaurus rex is poised to help resolve long-standing controversies over the growth of tyrannosaurid dinosaurs.

In 2001, a paleontology field crew from Burpee Museum of Natural History (Rockford, IL) were prospecting for dinosaur fossils near Ekalaka, Montana, when they discovered bones of a half-grown T. rex weathering out from exposures of the Hell Creek Formation. "Jane", as she was later named, turned out to be the most complete adolescent T. rex ever discovered, filling a critical gap between juvenile and adult that had caused decades of scientific debate.

Prior to Jane's discovery, a small lightly built tyrannosaur skull collected near Ekalaka in 1942 had been at the center of a controversy over how

much T. rex changed during growth. The skull had spent an uneventful half century on display at Cleveland Museum of Natural History, Ohio, when in 1988, famed paleontologist Dr. Robert Bakker redescribed the fossil as a new species, Nanotyrannus lancensis, proposing that it represented a smaller, more sleek cousin of T. rex.

This interpretation has been controversial since 1999 when Dr. Thomas Carr showed that the differences between "Nanotyrannus" and those of adult T. rex are also seen during growth in other species of tyrannosaurids. This suggested that the Cleveland skull was from a juvenile T. rex rather than being a separate species in its own right. However, this hypothesis met with surprising resistance. Could a dinosaur really change that much during growth?

"The extreme changes from the sleek skull of juveniles to the robust skull of adults were too much for some people to believe; for example, they didn't like to hear that T. rex lost tooth positions as it grew from a juvenile with many teeth, to an adult with fewer teeth. Regardless, the search was on for a transitional specimen that could test the hypothesis."

Enter Jane. Her fine skull and skeleton was intermediate in size and shape between the Cleveland skull and fully adult T. rex. Carr's research team are presenting a detailed study of Jane at the Society of Vertebrate Paleontology 2015 annual meeting in Dallas.

"Jane shows us that the gap is in fact bridgeable because many features seen in her are more similar to adult T. rex than to the Cleveland skull. The features are exactly what we'd predict are necessary to make the change to a full adult." said Carr.

Another important dimension of the "Jane" story is that she was discovered on public lands, then collected and mounted for display by a public museum. "Dinosaur fossils such as this emphasize the importance

of accredited institutions collecting on public lands, which makes the specimens on them available for scientific study", asserts Dr Carr.

In a world where commercially collected dinosaurs demand ever upwardly spiralling prices, Jane is a world-class dinosaur that didn't come with a million dollar price tag. Burpee Museum director of science and exhibits, Scott Williams, summed up:

"Jane is simply the best preserved and most complete example of a publicly accessible, subadult Tyrannosaurus rex in the world. For the last 10 years she has been available to qualified researchers as well as exhibited to the general public. The quality of the specimen and its availability will undoubtedly provide researchers decades of important data regarding the ontogeny of the most recognized dinosaur species in the world."

Regardless of Jane's completeness and growth stage, she doesn't close the book on T. rex growth and evolution; there is still a gap for yet undiscovered fossils to fill between her sleek form and the deep, imposing skulls of adults.

Provided by Society of Vertebrate Paleontology

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