T. rex's big tail was its key to speed and hunting prowess

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T. rex, credit: Natural History Museum.

Tyrannosaurus rex was far from a plodding Cretaceous era scavenger whose long tail only served to counterbalance the up-front weight of its freakishly big head.

T. rex's athleticism (and its rear end) has been given a makeover by University of Alberta graduate student Scott Persons. His extensive research shows that powerful tail muscles made the giant carnivore one of the fastest moving hunters of its time.

As Persons says, "contrary to earlier theories, *T. rex* had more than just junk in its trunk."

The U of A paleontology student began his research by comparing the tails of modern-day reptiles like crocodiles and Komodo dragons to T.rex's tail. Persons found for that all animals in his study, the biggest muscles in the tail are attached to upper leg bones. These caudofemoralis muscles provide the power stroke allowing fast forward movement.

But Persons found T.rex had one crucial difference in its tail structure.

The tails of both T.rex and modern animals are given their shape and strength by rib bones attached to the vertebrae. Persons found that the ribs in the tail of *T. rex* are located much higher on the tail. That leaves much more room along the lower end of the tail for the caudofemoralis muscles to bulk-up and expand. Without rib bones to limit the size of the caudofemoralis muscles, they became a robust power-plant enabling T.rex to run.

Persons extensive measurements of T.rex bones and computer modeling shows previous estimates of the muscle mass in the dinosaur's tall were underestimated by as much as 45 per cent.

That led many earlier *T. rex* researchers to believe the animal lacked the necessary muscle mass for running which in turn limited its hunting skills. That lack of speed cast *T. rex* in the role of a scavenger only able to survive by feeding on animals killed by other predators.

As for an *T. rex*'s exact speed, researchers say that is hard to measure, but Persons says it could likely run down any other animal in its ecosystem.

More information: Persons' research was published in the journal *The Anatomical Record*.

Provided by University of Alberta