Fossils of sauropodomorph ancestor show it walked upright, was quick and agile

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Artistic reconstruction of the limb musculature of the early diverging sauropodomorph dinosaur Thecodontosaurus antiquus. Artwork by Gabriel Ugueto (http://gabrielugueto.com). Credit: DOI: 10.1098/rsos.211356

A trio of researchers at the University of Bristol has found evidence of an early ancestor of the giant sauropodomorph dinosaurs that walked upright and was also likely quick and agile. In their paper published in the journal *Royal Society Open Science,* the group describes their study of Thecodontosaurus antiquus—a much smaller member of sauropodomorphs—found at a site in southwest England.

Sauropodomorphs have made the headlines in recent years due to their massive size. Fossils unearthed over the past several years have shown that they were very large herbivorous sauropods. In this new effort, the researchers found a fossil of one of their ancestors that lived approximately 20 million years earlier that was much smaller—just 30 centimeters tall when standing.

Examination of the fossil, which, the researchers note, was in good condition because it was lodged in a fissure that protected it from the weather, showed that it was approximately 200 million years old (it lived during the Late Triassic), and it resembled a velociraptor more than the massive, pillar-legged dinosaurs that would come later. Study of its back legs showed that they were made for running, not holding a lot of weight; its muscles would have contracted quickly. More specifically, they found that grooves, crests, insertion points and protrusions all suggested that the creature was a fast mover, able to escape predators by running faster than them. Also, its hip bones suggested the dinosaur was able to twist as it ran, allowing for sharp turns, which would have also helped in evading predators.

They also found that the forelimbs had much less muscle, suggesting that they were not used for walking or running and that T. antiquus walked upright. The researchers suggest their forelimbs, which were outfitted with hands capable of cutting limbs and stuffing them into their mouths, were quite agile, as well. Deep grooves in the bone suggested flexibility and the ability to extend an arm to reach higher into a tree.

The researchers also suggest the fossil presents a unique opportunity to learn more about dinosaur evolution and how dinosaurs that walked upright evolved to walk on all fours as they grew larger.

More information: Antonio Ballell et al, Walking with early dinosaurs: appendicular myology of the Late Triassic sauropodomorph

Thecodontosaurus antiquus, *Royal Society Open Science* (2022). DOI: 10.1098/rsos.211356

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