

# **Evidence dinosaur walked on all fours when young and switched to bipedalism as an adult**

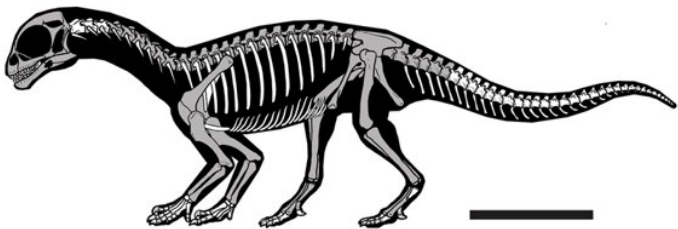
May 22 2019, by Bob Yirka

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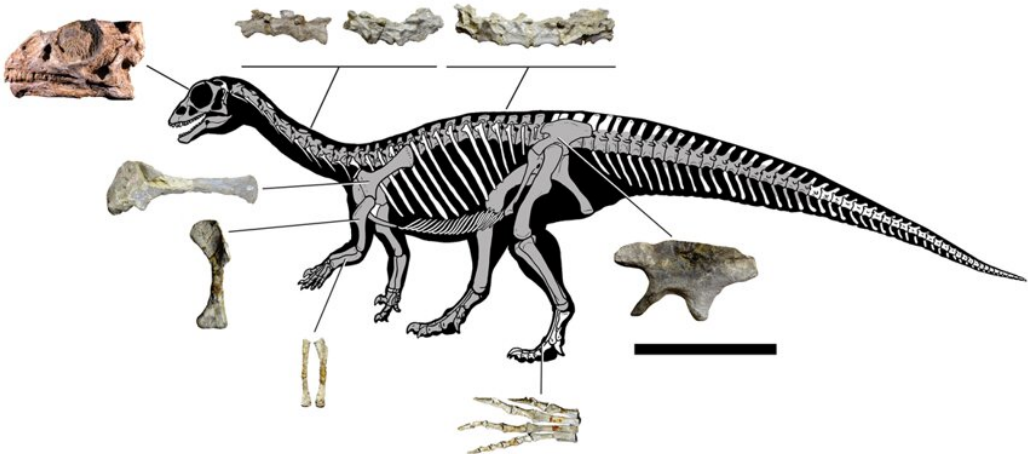
(a)



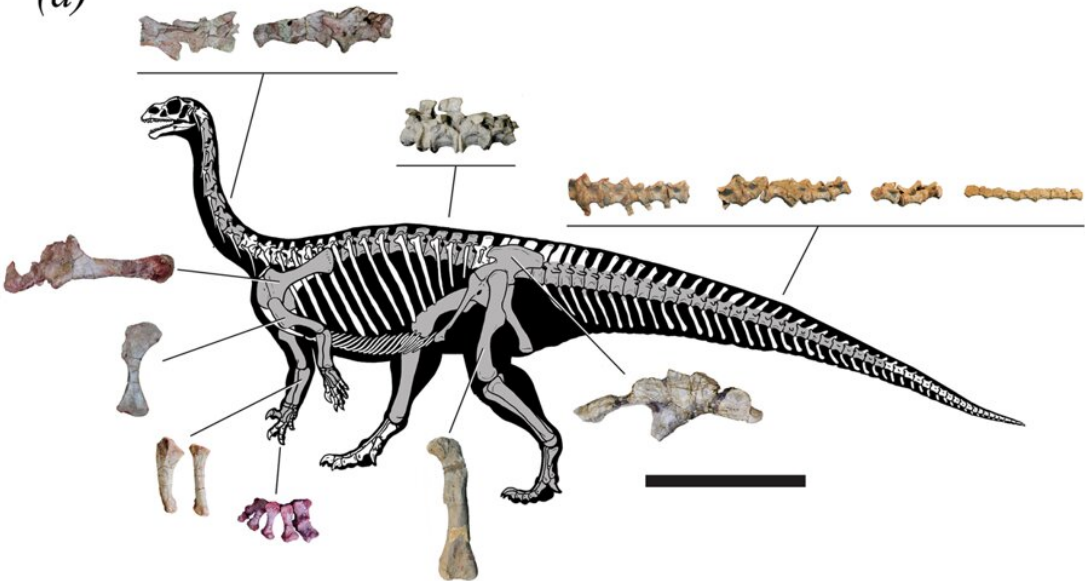
(b)



(c)



(d)



Mussaurus specimens. (a,b) hatchling, (c) yearling, (d) adult. Scale bars represent 5 cm (a), (b) 15 cm (c) and 100 cm (d). To better show isolated bones in (c), we used specimen PVL 4587, of the same ontogenetic age as MPM 1813 (except for the ilium, which belongs to MPM 1813). Preserved bones are shaded in grey. Credit: *Scientific Reports* (2019). DOI: 10.1038/s41598-019-44037-1

A team of researchers affiliated with institutions in Argentina and the U.K. has found evidence of a dinosaur that walked on all fours when it was young and then switched to walking on two legs as it grew to adulthood. In their paper published in the journal *Scientific Reports*, the group describes their study of *Mussaurus patagonicus*, an early sauropod species that lived in what is now Argentina, and what they learned about it.

Prior research had found evidence of *Mussaurus patagonicus* ("Patagonian mouse lizard") living in what is now Patagonia, Argentina. Like other [sauropod](#) species, it had a [long neck](#) and tail, walked upright, and weighed approximately one metric ton. It was also known to be quite small after hatching—small enough to fit in the modern human hand. This piqued the interest of the researchers, who wondered if it might have walked on all fours in its early stages of growth.

To learn more about *M. patagonicus* development, the researchers obtained and studied sample bone fossils from three periods during the life of the dinosaur: just after they were born, at one year, and as adults. They then used [computer simulations](#) to fill in the rest of the anatomy of the dinosaur. Next, they calculated the center of gravity for the dinosaur at each stage of its life. For a creature to walk upright, its center of gravity must be over its back legs, rather than farther up its spine, as is

the case with animals like cats and dogs.

The researchers found that during its early stages, the center of gravity for the dinosaur was farther up the spine, suggesting it walked on all fours. They also found that the center of gravity did not shift until the dinosaur reached adulthood, suggesting that it walked on all fours for most of its young life.

The finding is unique, because other than humans, no other species is known to walk on all fours during [early stages](#) of development and transition to [bipedalism](#) after growing to adulthood. The finding suggests that other [dinosaurs](#) might have done so, as well.

**More information:** Alejandro Otero et al. Ontogenetic changes in the body plan of the sauropodomorph dinosaur *Mussaurus patagonicus* reveal shifts of locomotor stance during growth, *Scientific Reports* (2019). [DOI: 10.1038/s41598-019-44037-1](https://doi.org/10.1038/s41598-019-44037-1)

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