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Pterosaurs walked on all fours and jumped awkwardly for long distances before taking off
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Pterosaurs Used All Four Legs for Take-Off

Launching themselves with just two feet was impossible

A researcher at the Johns Hopkins University (JHU) School of Medicine argues in a recent study, published in the journal *Zitteliana*, that pterosaurs, the giant 500 pound (roughly 250 kilograms)-heavy flying reptiles that lived from the late Triassic to the end of the Cretaceous Period, between 220 and 65.5 million years ago, used all of their four limbs for take-off, and did not take to the sky by pushing the ground with their rear feet, as modern-day birds do.

Michael B. Habib, M.S., working at the Center for Functional Anatomy and Evolution at JHU, says that he based his theory on the fact that modern-day birds cannot evolve to greater sizes than they have already achieved because of the weight limitations their bodies imply. In other words, the muscles on their hind legs, which are required in order for them to push off the ground, are so heavy, that they become too cumbersome to carry in mid-flight.

And therein lies the problem of previous theories regarding pterosaurs, Habib says. In order for the giant lizard to lift its 500-pound body off the ground, it would have required extremely large leg muscles, which would have simply been too heavy to sustain while flying. But evolution gifted pterosaurs with four legs, out of which just the two frontal ones were endowed with powerful large wings, growing to impressive sizes, and measuring some 35 feet (approximately 10 meters) from tip to tip.

"The difference between pterosaurs and birds with regard to critical mechanical properties is very, very large. Pterosaurs had long, huge front limbs, so no partner was required. Then, with wings snapping out, off they'd fly. But using all four legs, it takes less than a second to get off of flat ground, no wind, no cliffs," he said. "This was a good thing to be able to do if you lived in the late Cretaceous period and there were hungry tyrannosaurs wandering around," Habib argues.

By using state-of-the-art imaging techniques to analyze the structural differences between the bones of 15 modern-day bird species and three pterosaur species, the scientist managed to safely conclude that muscle strength must have been divided between 4 legs, instead of two. He also added that the erroneous belief that the scientific community had up until this point was introduced when the inaccurate two-legged take-off model was first presented.