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Life-history parameters of pterosaurs such as growth and ontogenetic development represent an enigma. This aspect of pterosaur biology has remained perplexing because few pterosaur taxa are represented by complete ontogenetic series. Of these, *Pterodaustro* is unique in that besides being represented by hundreds of individuals with wing spans ranging from 0.3 to 2.5m, it includes an embryo within an egg. Here we present a comprehensive osteohistological assessment of multiple skeletal elements of a range of ontogenetic sizes of *Pterodaustro*, and we provide unparalleled insight into its growth dynamics. We show that, upon hatching, *Pterodaustro* juveniles grew rapidly for approximately 2 years until they reached approximately 53% of their mature body size, whereupon they attained sexual maturity. Thereafter, growth continued for at least another 3-4 years at comparatively slower rates until larger adult body sizes were attained. Our analysis further provides definitive evidence that *Pterodaustro* had a determinate growth strategy.