



PALEONTOLOGY TECHNICAL DIVISION TALK

in conjunction with the Alberta Palaeontological Society

Understanding growth in the hadrosaur, *Prosaurolophus maximus*, from southwestern Alberta

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January 15, 2021, 7:30-8:30 pm Mountain Time

Webinar, there will not be a meeting at Mount Royal University, Room B108 in December

1 CPD (Continuing Professional Development) credit will be awarded for this event

ABSTRACT

Hadrosaurs, or duck-billed dinosaurs, are large herbivores that were present during the Late Cretaceous period. Hadrosaurs can be divided into two sub-families, the lambeosaurines, or hollow-crested hadrosaurs, and the hadrosaurines, or solid or non-crested hadrosaurs, both of which have been found on almost every continent. This abundance of hadrosaurs has led to discoveries of specimens at almost every growth stage, making hadrosaurs an excellent group for studying dinosaur growth. In this study, we examine the changes that occur during growth in *Prosaurolophus maximus*, a hadrosaurine known from southern Alberta and northwestern Montana. This species is known for having a small bony crest located directly above the eye, which has been thought to have been used for sexual display. We examine three juvenile specimens of *P. maximus*, which represent the smallest known members of the species, using both morphometric and histological techniques, to better understand growth in this dinosaur species.

Fifteen skulls of *P. maximus*, including the three juvenile specimens were examined using morphometric analyses to determine the rates at which bones in the skull change throughout growth. The results of these analyses indicate that the snout of *P. maximus* grew at a faster rate than the rest of the skull, which is a strong indicator that area was used for sexual display. In contrast, the crest of *P. maximus* grew at the same rate as the rest of the skull, suggesting that this area was not strongly related to a display feature. Due to these results, we hypothesize that *P. maximus* had a soft-tissue display structure associated with the snout, and that its bony crest was not strongly associated with sexual display in this species, unlike what was previously thought.

Histological sections of the three juvenile specimens, and one large specimen were taken in order to determine the biological age of those specimens. These biological ages were then compared with skull morphology in each specimen, to determine the developmental timing of the display structure present in *P. maximus*, and compared to tibial circumference of each specimen, a proxy for body mass, to create a growth curve for the species. The results of this analysis showed that the examined specimens ranged between the ages of three and seven when they died. When these ages were compared, it showed that the crest is poorly developed at age three, has started developing at age four, and is fully developed at age seven. Additionally, the large *P. maximus* individual that was examined had yet to reach skeletal maturity, suggesting the species may reach a maximum body size larger than represented by currently known specimens, perhaps with a skull length approaching the size of its relative *Saurolophus angustirostris*. Finally, the reconstructed growth rate for *P. maximus* demonstrated that its growth rate is much lower than other hadrosaurines, and is closer to that observed in lambeosaurines, suggesting that environmental differences or the complexity of display structures may play a larger role during growth than previously thought.

BIOGRAPHY

Eamon Drysdale grew up in London, Ontario. He completed his undergraduate degree at the University of Western Ontario, where he completed an Honour's Thesis project examining the mineralogy of Palaeozoic

stromatoporoids under Dr. Jisuo Jin and Dr. Roberta Flemming. He then completed an MSc in Geoscience at the University of Calgary under Dr. Darla Zelenitsky and Dr. François Therrien investigating the growth and development of the hadrosaur species *Prosaurolophus maximus* using three juvenile specimens from the Bearpaw Formation of southern Alberta. His current research interests focus on understanding the evolutionary factors influencing growth and sexual display in hadrosaurs.