

Pinniped Evolution and *Puijila darwini*

Pinnipeds are carnivorous marine mammals that have “finned back feet,” similar to the fins used by a scuba diver. The Latin-derived word “pinniped” literally means “finned-foot.” Pinnipeds include three groups of mammals living today; namely, sea lions, seals, and walrus.

By 2007, when the first edition of this book was published, scientists had discovered 20,000 fossil pinnipeds. (See Appendix A.) Despite this plethora of

fossils, evolution scientists have not found any definitive fossils showing a land mammal evolving into a seal, sea lion or walrus.

Canadian paleobiologist and professor, Dr. Natalia Rybczynski of the Canadian Museum of Nature, wrote this candid assessment in 2009: The “*fossil evidence of the morphological steps leading from a terrestrial ancestor to the modern marine forms has been weak or contentious.*”¹



Sea lion



Walrus



Seal

All three types of pinnipeds living today, sea lions (left), walruses (bottom left), and seals (below), have finned back feet, the telltale sign of a pinniped.

Enaliarctos—The Oldest Pinniped

Enaliarctos, the oldest fossil pinniped, looks like a sea lion, and not a missing link.² (See photos below.) Dr. Natalia Rybczynski highlights this missing link problem—the absence of fossils from a land mammal to pinnipeds: “With *Enaliarctos* considered the earliest pinniped, there exists a major transformational gap

between a terrestrial ancestor and the appearance of flippers pinnipeds. Indeed, most studies of pinniped relationships and evolution do not consider the critical first evolutionary stages, that ultimately gave rise to this successful group of marine carnivores.”¹



Fossil bones of Enaliarctos



Museum painting of Enaliarctos



Sea lion

Puijila—A New Discovery

In April 2009, a team of evolution scientists reported the discovery of a missing link—a fossil pinniped with webbed feet, not flippers, and dubbed this animal *Puijila darwini* (in honor of Charles Darwin).^{1,3,4,5}

According to these scientists, this new fossil solves a conundrum for the theory of evolution that has existed for over 150 years. They wrote: “*Puijila* is a morpho-

logical intermediate in the land-to-sea transition of pinnipeds and provides new evidence concerning the evolution and biogeography of the earliest pinnipeds.”¹

Scientists who oppose evolution question whether *Puijila* is a missing link or even a pinniped. The reasons for their skepticism are discussed in the following 11 pages.



Above: Research assistant at the Canadian Museum of Nature preparing *Puijila darwini*.

Problems with *Puijila*

Puijila Found with a Rabbit

Opponents of evolution would suggest that *Puijila* could not be a “prehistoric” animal since it was found with fossils of a rabbit, a shrew and a duck?^{6,7} How could *Puijila* be that old if it was found with modern types of animals?

Problems with Fossil Numbers

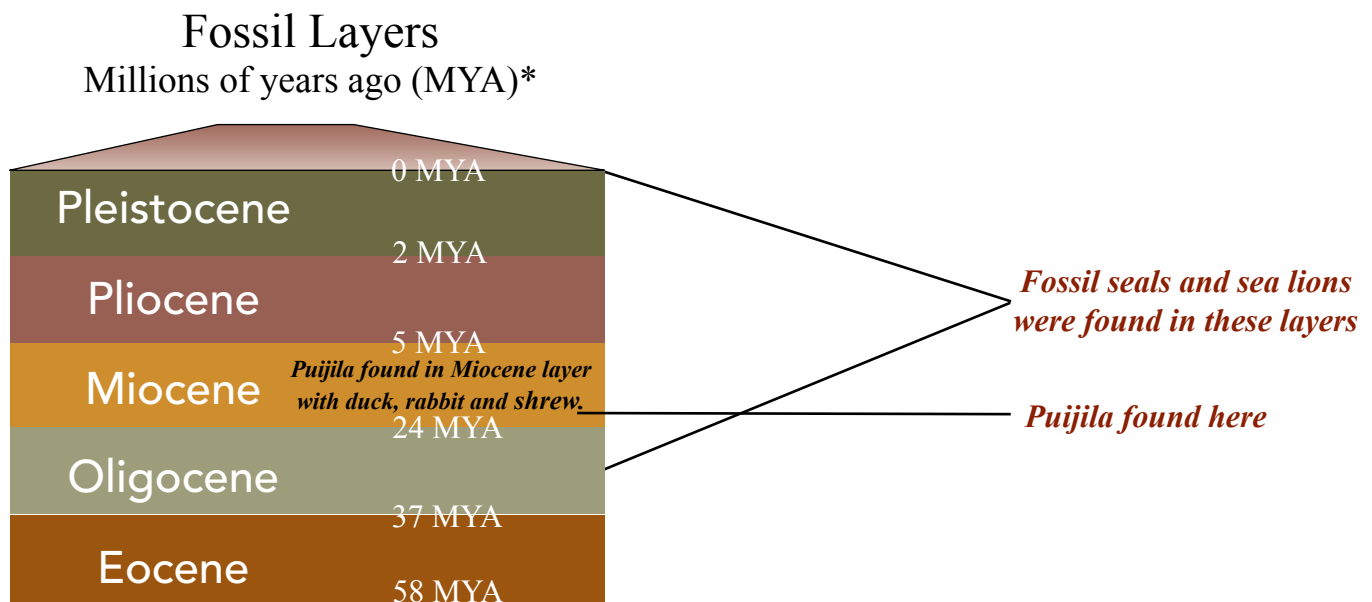
If evolution is true, why would you find only a single fossilized intermediate animal (*Puijila*) in the ancestral line of pinnipeds? The fossil record should be evenly distributed and representative of animals that lived in the past. Since 20,000 pinnipeds have been found, one should find thousands of each of the evolving animals between a land animal and pinnipeds, not just one fossil of one animal. Because of this odd pattern of fossil numbers, *Puijila* requires closer scrutiny.

Problems with Miocene Layer

Although *Puijila* was reported to be the ancestor of pinnipeds, it was discovered in the *same* rock layer in which pinnipeds were found (Miocene¹). In fact, pinnipeds (seals and sea lions) have been found in rock layers below *Puijila* (Oligocene^{8,9}). Opponents of evolution ask how *Puijila* could be an “ancestor” to seals and sea lions if it was found above them? This would be equivalent to calling your younger cousin your “great-great-great-great-great-great-great-great grandfather.” (See chart below.)

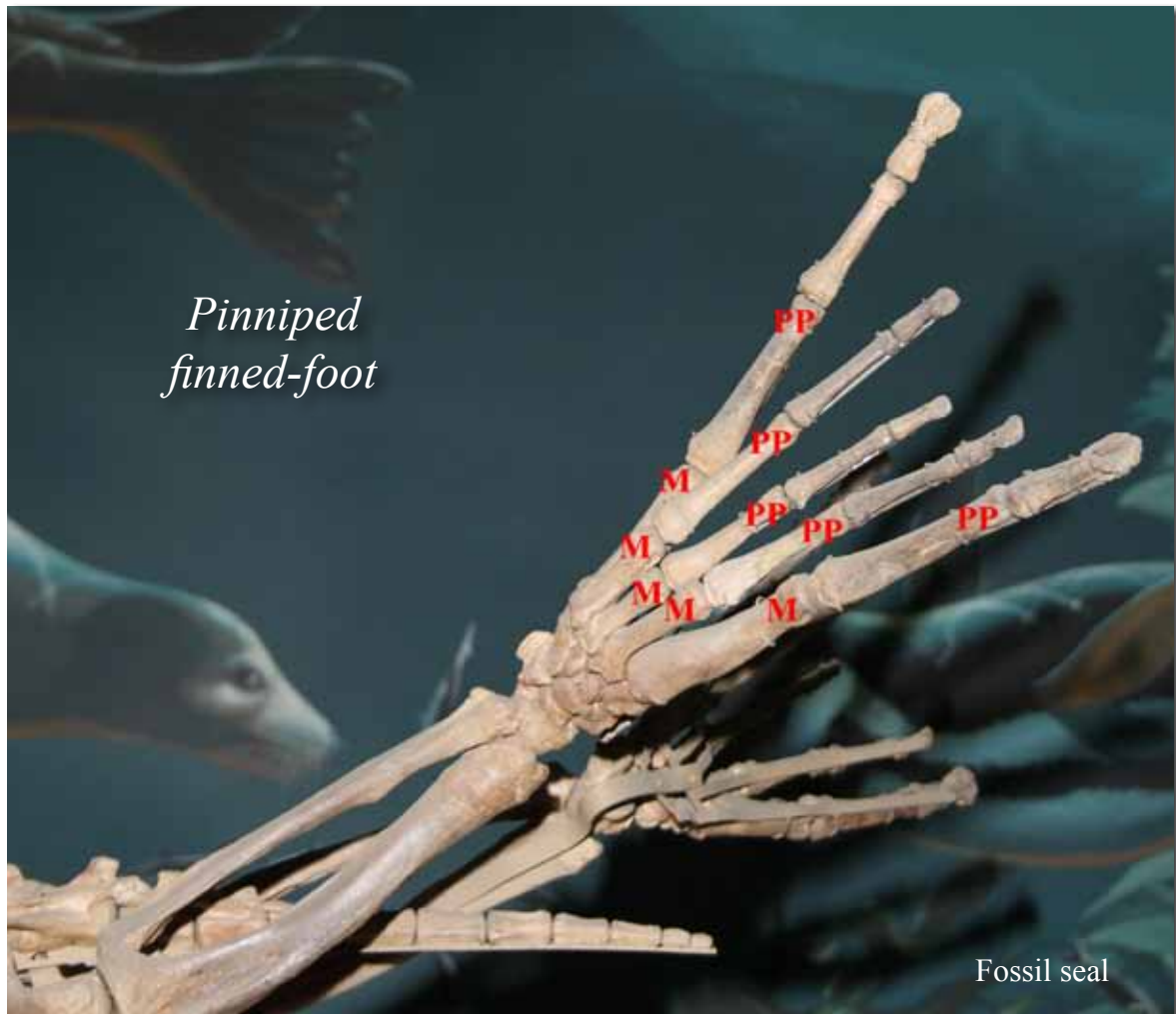
Was *Puijila* Even a Pinniped?

The last and most serious charge about *Puijila* is the use of the scientific classification of “pinniped,” by the scientists who discovered this fossil.^{4,5} Opponents of evolution ask: Why call *Puijila* a pinniped if it does not have the classic pinniped characteristics of finned back feet, front flippers, pinniped dental patterns, and large eye sockets?



*Scientists do not agree on the age or number of years it took to deposit these fossil layers. This is a theoretical construct to evaluate the theory of evolution.

Is *Puijila* a Pinniped?



Did *Puijila* Have Finned Back Feet?

Pinnipeds have a distinct bone pattern in their finned back feet. The first and last digits (toes) are longer, giving the end of the foot a V-shaped appearance as shown above.¹⁰ This V-shaped pattern can be seen not only in the tips of the toes but also in the length of the proximal phalanges (PP) and in the length of the metatarsals (M).

In *Puijila* (left), the middle digits are longer than the first and fifth toes—the *opposite* of pinnipeds. This can be seen in the length of the proximal phalanges (PP) and in the length of the metatarsals (M). (The author has provided asterisks* to show where distal toe bones are missing on *Puijila*.)



*North American
river otter*

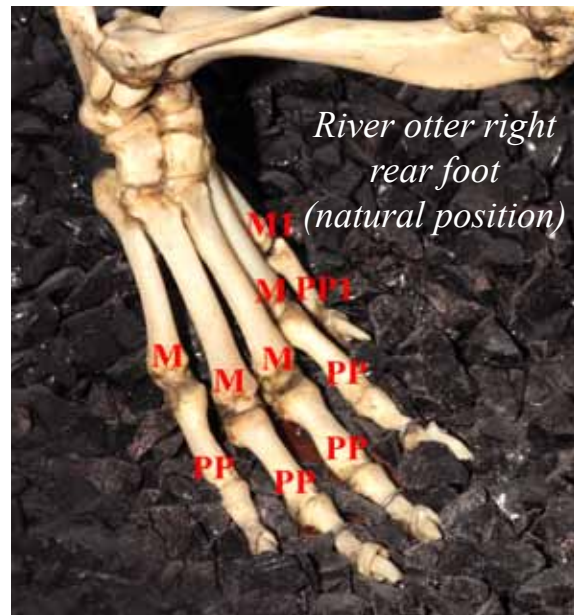
Puijila Pinniped or Otter?

Surprisingly, nearly all of the features of *Puijila* are similar to modern otters, not pinnipeds: *Puijila* did not have the typical oversized back finned feet or front flippers of a pinniped. Rather, *Puijila* had four small webbed feet similar to a North American river otter.¹ (See photos this page) Also, the limb proportions of *Puijila* were similar to a modern otter.¹ The overall length of *Puijila* was about 110 cm, nearly the same length as the living North American river otter (112 cm).¹

¹² *Puijila* had a long tail like a river otter, not a short tail typical of pinnipeds.^{1,13} *Puijila* had an upturned ridge on the back end of the skull, but male North American river otters have this same feature. According to the official Canadian Museum of Nature web site, *Puijila* had six upper incisors, the same as river otters.^{14,15,16,17} *Puijila* may have had four lower incisors.¹⁸ Sea otters have four lower incisors,^{19,20} while river otters have six lower incisors,^{16,17} whereas pinnipeds have either two or four.²¹



*Puijila right rear foot
(flattened)*



*River otter right
rear foot
(natural position)*

Puijila right front foot (flattened)



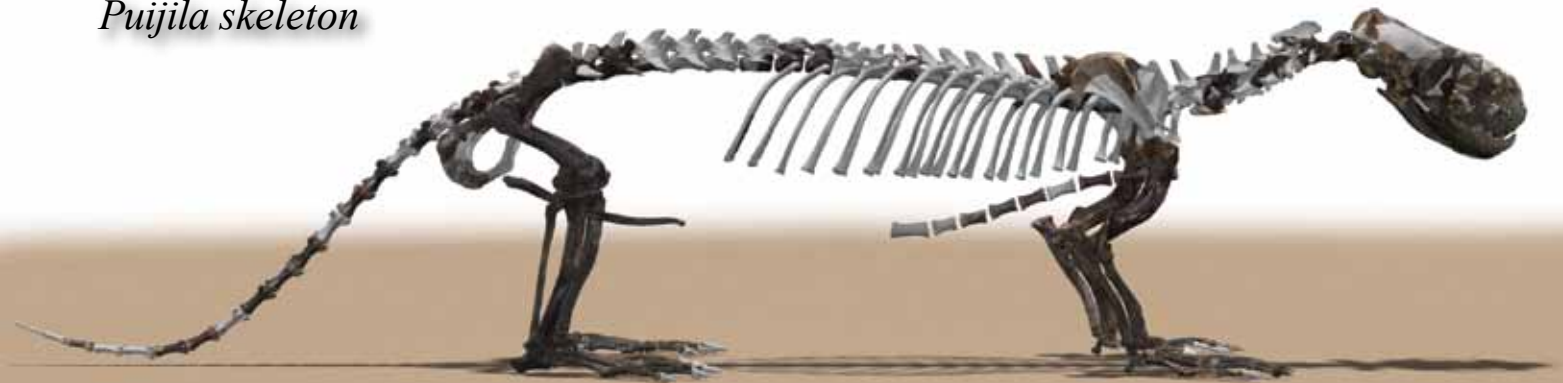
River otter right front foot (natural)



Puijila Skeleton Pinniped or Otter?

Although scientists who support evolution refer to *Puijila* as a “walking seal”³ or an otter with a seal’s head,²² its skeletal appearance is very similar to a river otter, as shown in the photographs below.

Puijila skeleton



River otter skeleton



Top: Recreated model of *Puijila*. Actual bones found are brown and missing bones are white. Starting with the tail and moving forward, compare the brown bones of *Puijila* to the bones of the river otter. **Author’s Note:** The museum artist did not place cartilaginous endings on *Puijila*’s ribs, which would connect them to the sternum. Disregard the subjective positioning of the feet chosen by the artist, placing *Puijila* on its heels rather than its toes.

Could *Puijila* be an otter?



Puijila darwini

What do you think?

When one compares the artistic rendition of *Puijila* (above) with the living North American river otter (below), their uncanny similarities challenge the scientific interpretation that *Puijila* was a walking seal. Evolution opponents ask: If *Puijila* looked like an otter

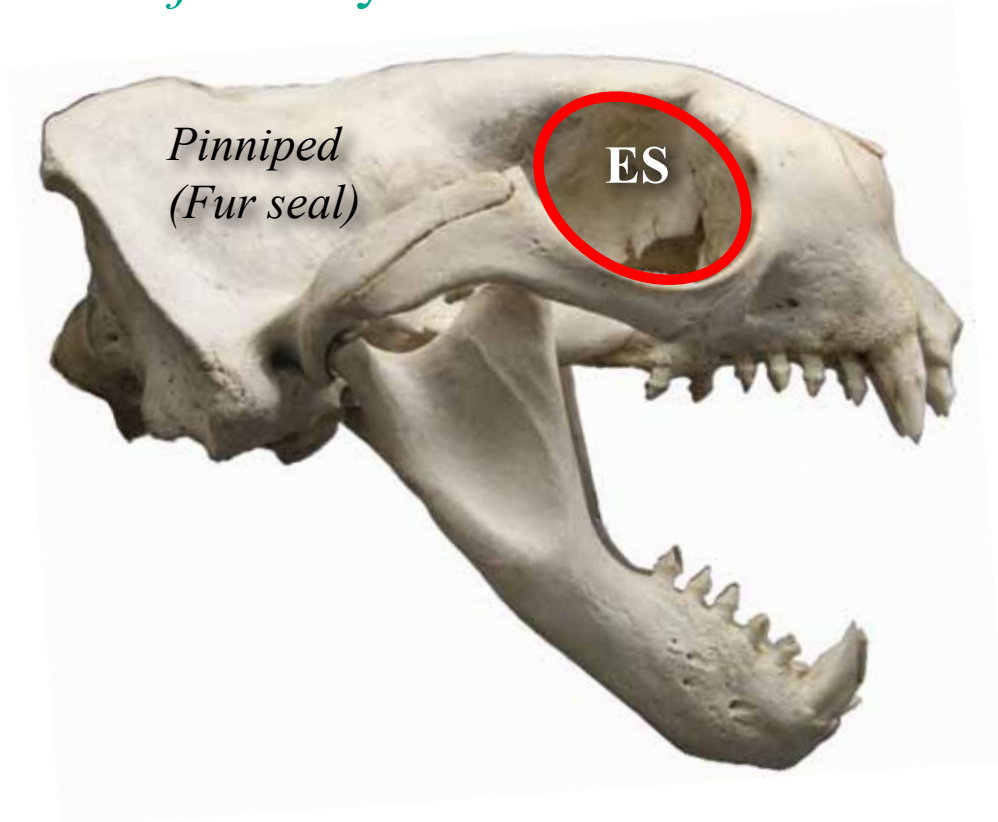
and had the same bone anatomy as an otter, shouldn't it simply be called an otter and not a missing link?

For an even more technical discussion on the skull anatomy of *Puijila*, you are invited to continue on and read the last section of this appendix.

North American river otters



Puijila's Eye Socket



One key feature of a pinniped is the enormous eye socket relative to the size of the skull.

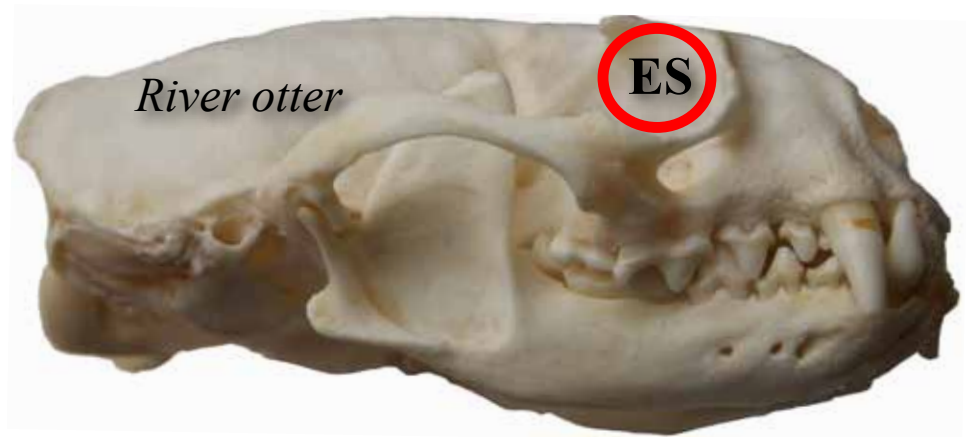
Examine the relative size of the eye sockets of *Puijila*, a river otter and a pinniped.

Did *Puijila* have a large eye socket as the scientists suggested when they reported the discovery?^{23, 24} Or did *Puijila* have a small eye socket similar to a river otter?

Author's Note:

The fur seal skull on this page was reduced to the same size as *Puijila* in order to make the eye socket comparisons. In reality, *Puijila's* skull and the modern river otter skull are both small, about the size of your palm.

The shape of *Puijila's* skull, especially the back segment, is speculative and should be taken into account when comparing *Puijila's* skull to the river otter skull. The white areas of *Puijila's* skull indicate where bone is missing.



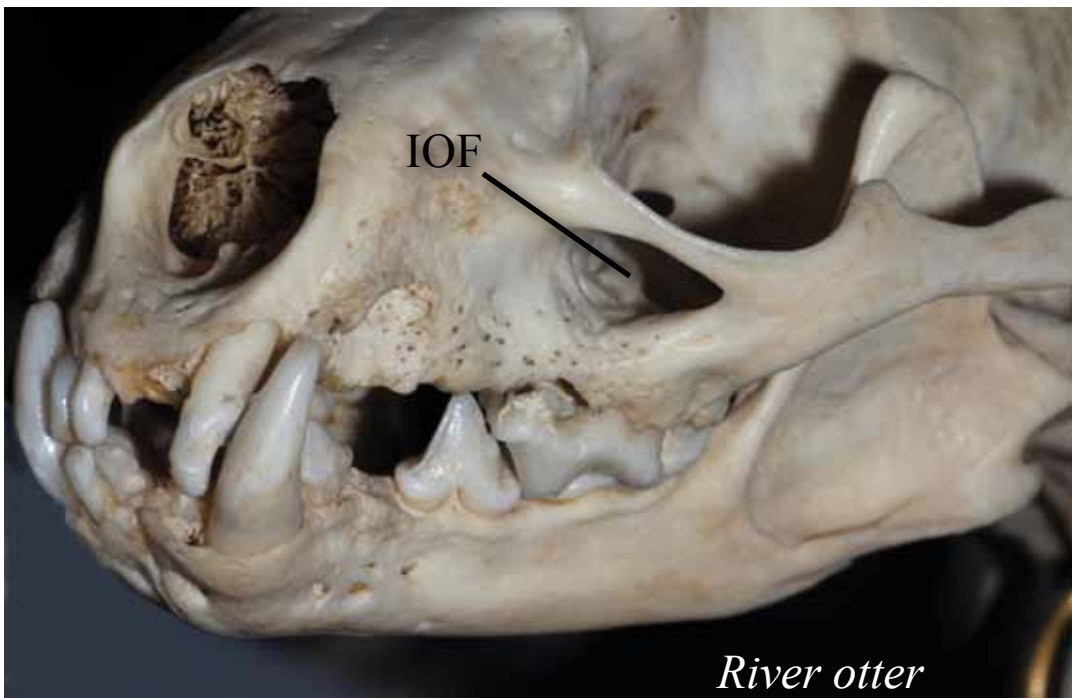


*Pinniped
(Harbor seal)*

Puijila's Infraorbital Foramen

Pinnipeds have a large passage just below the eye, which carries nerves out to the surface of the face, called an infraorbital foramen (labeled IOF).²⁵ River otters have this same feature.

Scientists who support evolution report that *Puijila's* large infraorbital foramen implies *Puijila* was a pinniped.²⁶ Could this feature just as well imply that *Puijila* was an otter?



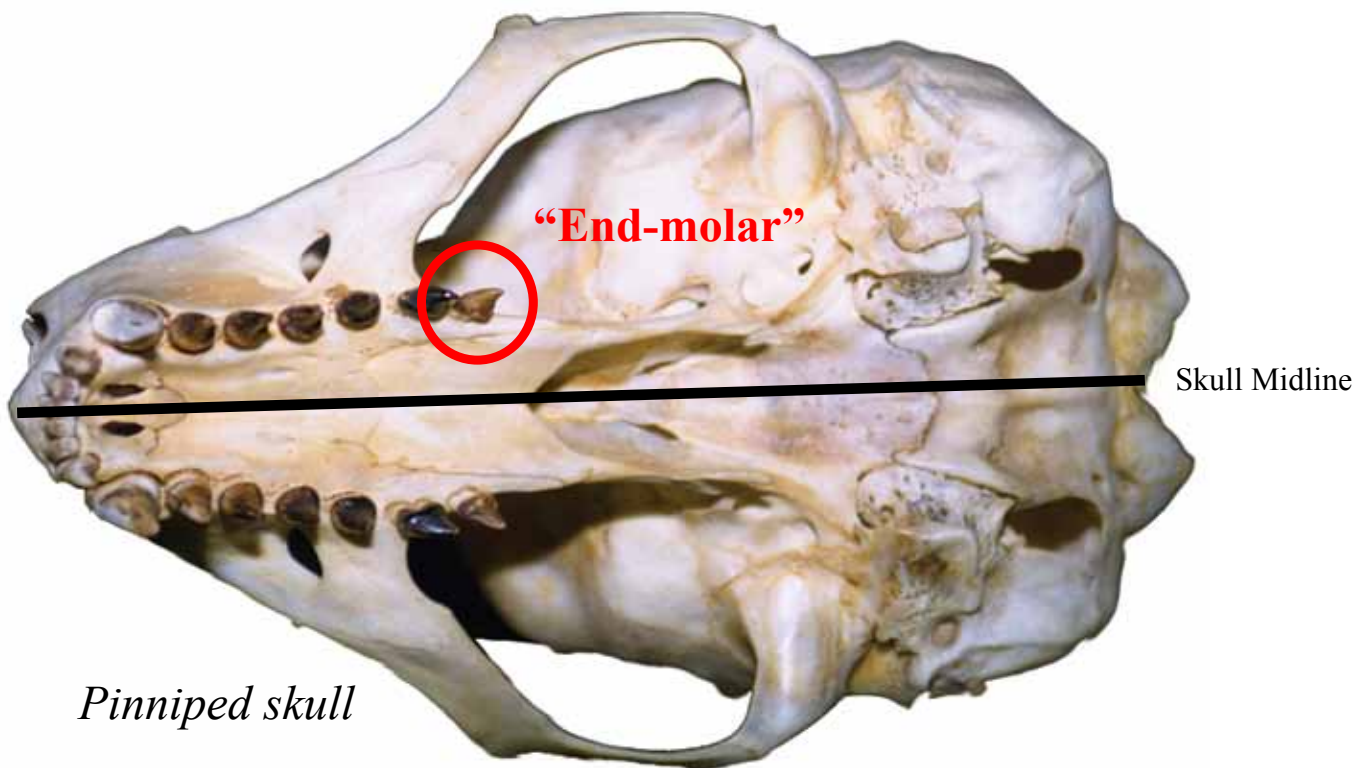
River otter

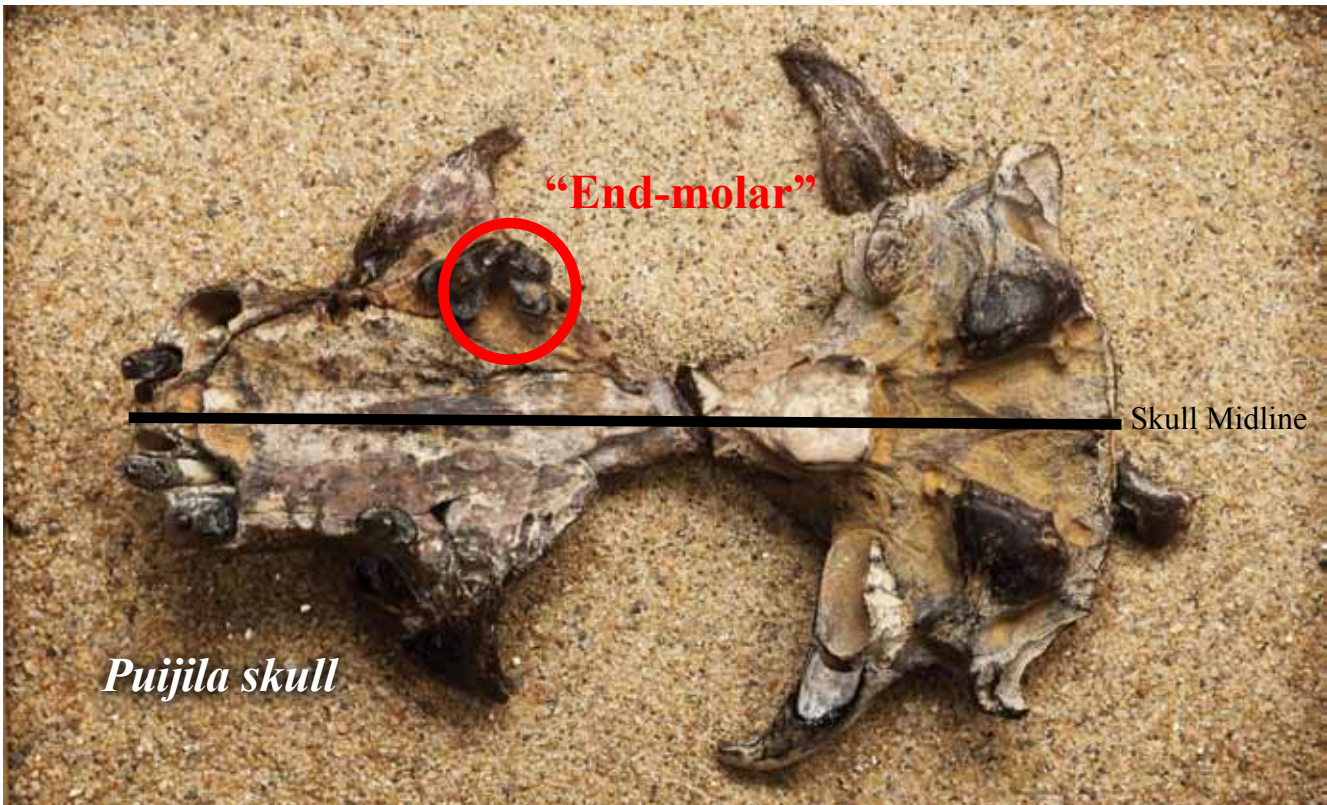
Puijila's Teeth

Another reason scientists classified *Puijila* as “a pinniped” is because they believed *Puijila* had a pinniped tooth pattern. They wrote, “Each upper ‘end-molar’ in pinnipeds is very small and located slightly towards the midline of the skull. This molar pattern is normal for pinnipeds, but unusual in other mammals. *Puijila's* molars follow the pinniped pattern.”²⁷

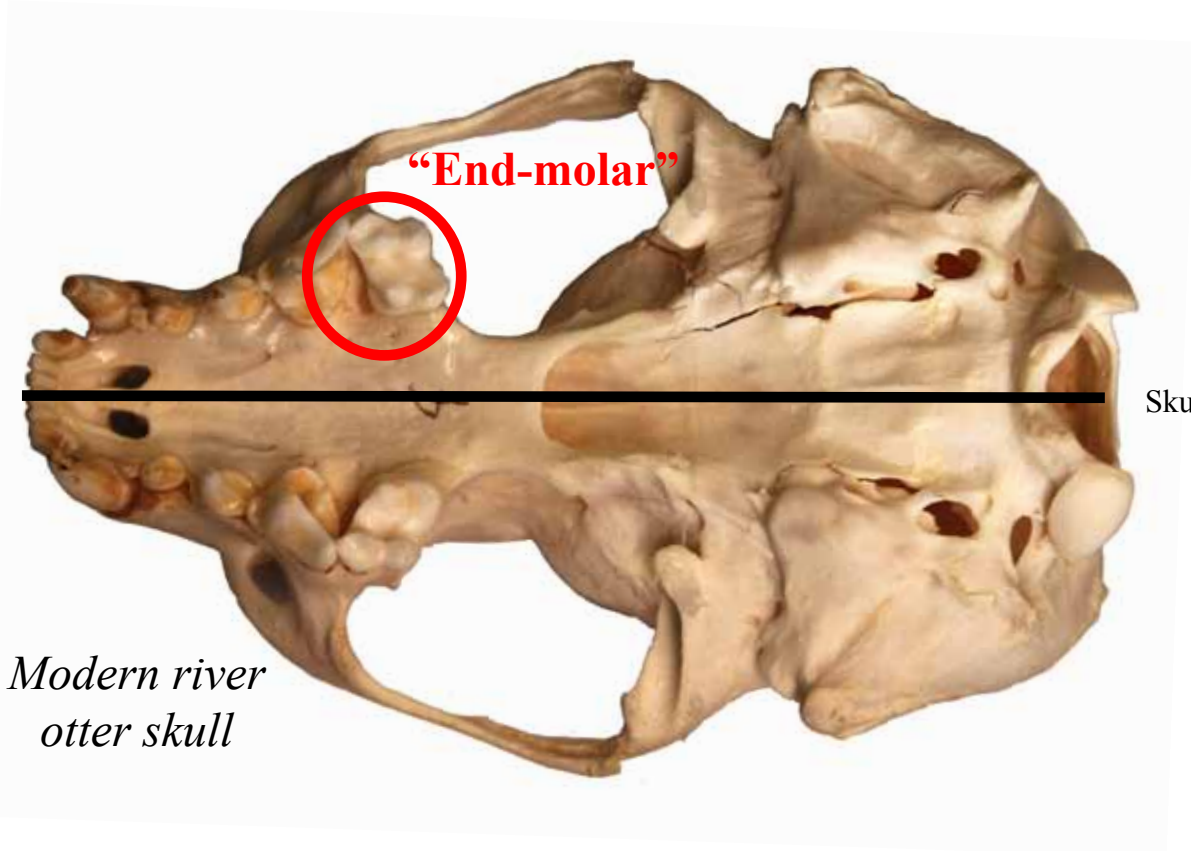
For verification of this claim, let’s compare the skulls of a pinniped, an otter and *Puijila*. The following three photos were taken from the bottom of the skull looking up after the lower jaws were removed.

Do you agree that *Puijila's* last tooth is smaller and closer to the skull midline, as in pinnipeds? Or do you think *Puijila's* ‘end-molar’ compares more favorably—size, shape and position—with a common river otter?

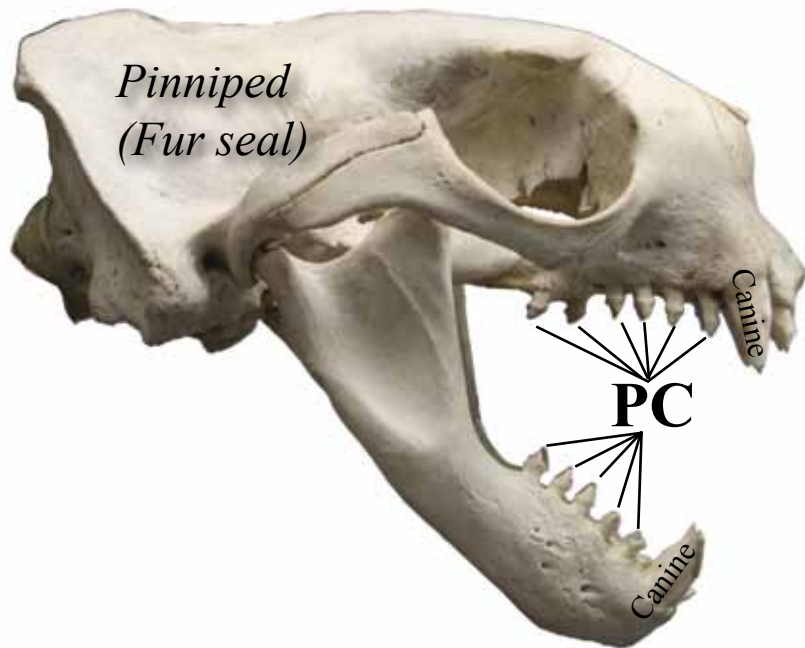




Puijila skull



Modern river otter skull

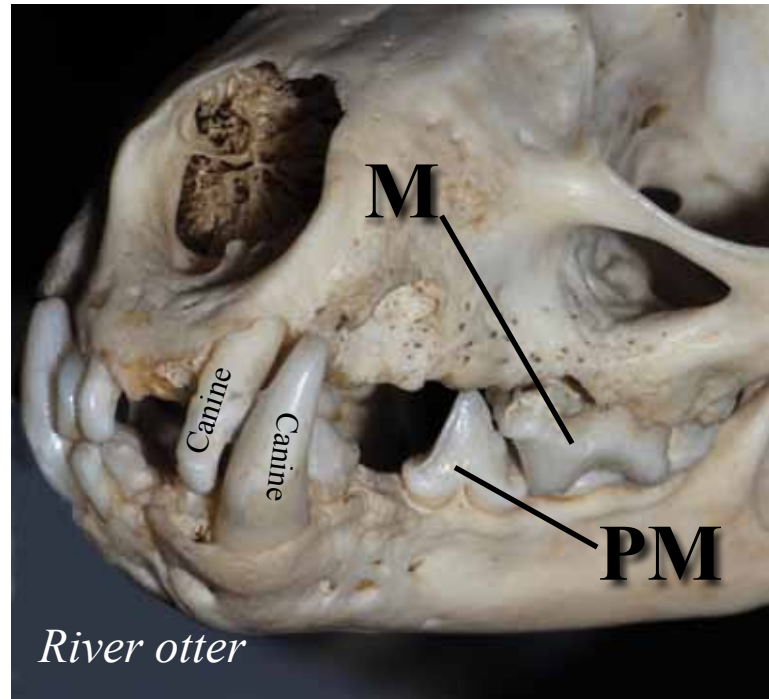


Pinniped Post-Canine Teeth

Pinnipeds are very unusual mammals because they have only *one type* of tooth in the back of their jaw called post-canine teeth (**PC**).²⁸ This can clearly be seen in this fur seal skull above.

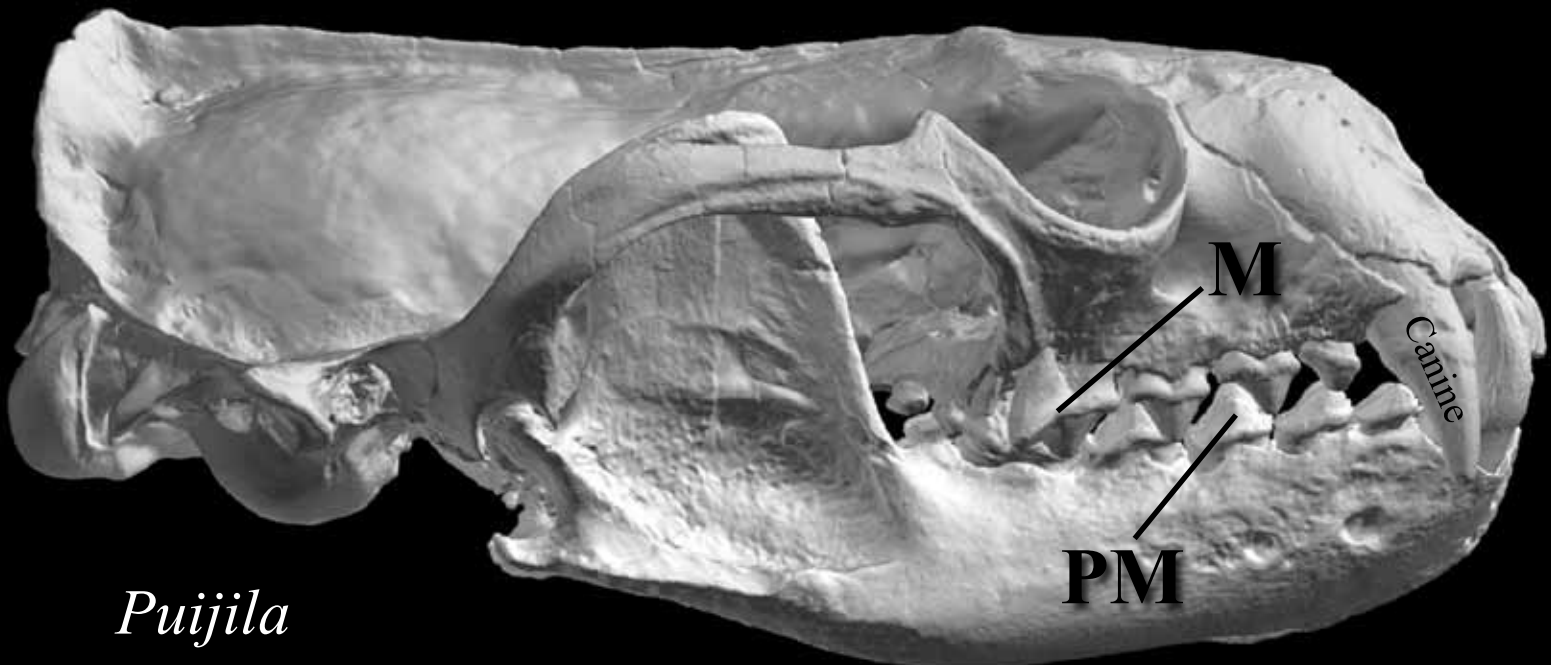
Most other mammals have *two types* of teeth in their back jaw, namely premolars (**PM**) and molars (**M**) as seen in this modern otter skull (above right).

Scientists reported that *Puijila* had a pinniped



head. If so, one would expect it to also have the pinniped tooth pattern; namely, only one type of tooth (post-canine) in the back jaw, but this is not the case. *Puijila* has two distinct types of back teeth, premolars and molars, like an otter.¹

After reading this appendix, do you agree that *Puijila* was a pinniped? Or did scientists get it wrong?



Puijila