

Ancient sea reptile with gammy jaw suggests dinosaurs got arthritis too

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This is Dr. Judyth Sassoon of the University of Bristol, UK with the lower jaw of the Westbury pliosaur. Credit: Simon Powell

Imagine having arthritis in your jaw bones... if they're over two meters long! A new study by scientists at the University of Bristol has found signs of a degenerative condition similar to human arthritis in the jaw of a pliosaur, an ancient sea reptile that lived 150 million years ago. Such a disease has never been described before in fossilized Jurassic reptiles.

The Bristol scientists studied a giant specimen of the pliosaur *Pliosaurus* dating from the Upper Jurassic. Found in Westbury, Wiltshire, it has

been kept since its discovery in the collections of the Bristol City Museum and Art Gallery.

The 8 metre long pliosaur was a terrifying creature with a large, crocodile-like head, a short neck, whale-like body and four powerful [flippers](#) to propel it through water in pursuit of prey.

With its huge [jaws](#) and 20 cm long teeth, it would have been capable of ripping most other marine reptiles or [dinosaurs](#) to pieces, but this particular individual was the unfortunate victim of an arthritis-like disease.

University of Bristol scientist, Dr Judyth Sassoon, was fascinated by the specimen when she saw it in the museum's collections and studied it for her MSc research project.



This shows Dr. Judyth Sassoon holding part of the snout of the Westbury pliosaur. The holes on the specimen are tooth sockets Credit: Simon Powell

She soon noticed that it had the signs of a degenerative condition similar to human arthritis, that had eroded its left jaw joint, displacing the lower jaw to one side. This animal evidently lived with a crooked jaw for many years, because there are marks on the bone of the lower jaw where the teeth from the [upper jaw](#) impacted on the bone during feeding. Clearly the animal was still able to hunt in spite of its unfortunate condition.

There are several signs on the skeleton to suggest that the animal could have been an old female who had developed the condition as part of the [aging process](#). The pliosaur's large size, and the fused skull bones, suggest maturity. It is identified, very tentatively, as possibly female because its skull crest is quite low – presumed males had a higher crest.

Dr Judyth Sassoon said: "In the same way that aging humans develop arthritic hips, this old lady developed an arthritic jaw, and survived with her disability for some time. But an unhealed fracture on the jaw indicates that at some time the jaw weakened and eventually broke. With a broken jaw, the pliosaur would not have been able to feed and that final accident probably led to her demise."

Pliosaurus were probably pursuit or ambush predators, feeding on fish, squid and other [marine reptiles](#) but would also have been capable of scavenging. They were at the top of their food chains, so there would not have been any predators to take advantage of an aging, disabled pliosaur – except for another pliosaur.

Professor Mike Benton, a collaborator on the project, said: "You can see these kinds of deformities in living animals, such as [crocodiles](#) or sperm whales and these animals can survive for years as long as they are still able to feed. But it must be painful. Remember that the fictional whale, Moby Dick from Herman Melville's novel, was supposed to have had a crooked jaw!"

The pliosaur from Westbury is an amazing example of how the study of disease (palaeopathologies) in fossil animals can help us to reconstruct an extinct animal's life history and behaviour and to show that even a Jurassic killer could succumb to the diseases of old age.

The research is published today in the leading international palaeontological journal, *Palaeontology*.

More information: 'Cranial anatomy and palaeopathology of an Upper Jurassic pliosaur (Reptilia: Sauropterygia) from Westbury, Wiltshire' by Judyth Sassoon, Leslie Noè, and Michael J. Benton in *Palaeontology*.

Provided by University of Bristol

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