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## Three-dimensional morphological analysis of tooth row of a new skull specimen of a polycotyloid plesiosaur from the earl

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### 1. Introduction

*Manemergus anguirostris* Buchy et al. 2005 is a Cretaceous "short-necked plesiosaur" belonging to the family Polytycolidae. Because this species was proposed on the basis of a single immature specimen (holotype), adult features including the number of teeth are still unknown, causing serious problem for determination of a higher-level phylogenetic position of this species. that are useful for phylogenetic analysis The holotype of this species has 5 premaxillary, 10 maxillary, 15 dentary teeth including 9 symphysial teeth; the number is approximately half of the average number of teeth in other polycotyloids. Buchy (2005) assumed that the smaller number of teeth observed in the holotype represents a diagnostic feature of this species, since Carpenter (1996) stated that the number of premaxillary teeth of a polycotyloid plesiosaur *Dolichorhynchops osborni* and the number of the teeth of the Recent crocodiles do not increase with growth.

However, Carpenter (1996) did not discuss the number of other teeth, and the smallest skull of *D. osborni* specimen described by him is 1.5 times longer than that of the holotype of *M. anguirostris*. Furthermore, there is not reliable basis to apply the forming processes of tooth of the Recent crocodiles and other animals to the present species.

In this study, the forming process of a tooth of *M. anguirostris* is directly analyzed by three-dimensional morphological analysis with CT scanning on the basis of an adult specimen newly recovered from the early Turonian of Morocco.

### 2. Results

The number of alveolus of the preserved symphysis is 6, though the anterior symphysis is missing. At least fifteen alveolus, the teeth of which are not symphysis, are recognized in the CT scanning image. From CT scanning image, the pre-emitted teeth are observed. They are formed in bilateral symmetrical process. The new teeth are formed in bilateral symmetrical process, in pair. In the specimen examined, the pre-emitted teeth pairs are observed at intervals in teeth row, not in succession pairs. The newly formed tooth is positioned to adjacent to the caudal side of the old ones.

### 3. Discussions

The observed tooth forming process by CT image is different from that of the crocodiles, in that a new tooth appears below of the old teeth. Therefore Buchy's (2005) assumption that the tooth forming process is comparable with in polycotyloids and crocodiles is inadequate. This study demonstrates that direct observation of the three-dimensional morphology by means of CT scanning technique is more reliable for reconstruction of teeth forming process of polytycolids than the assumption from the Recent animals.

The specimen examined provides additional adult characters of *M. anguirostris*, which may be useful for future phylogenetic analysis of plesiosaurs.

Keywords: Paleobiology, Paleovertebrate, Paleophysiology, Plesiosaur