3D models related to the publication: The morphology and evolution of chondrichthyan cranial muscles: a digital dissection of the elephantfish *Callorhinchus milii* and the catshark *Scyliorhinus canicula*

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Abstract

This contribution contains 3D models of the cranial skeleton and muscles in an elephantfish (*Callorhinchus milii*) and a catshark (*Scyliorhinus canicula*), based on synchrotron tomographic scans. These datasets were analyzed and described in Dearden *et al.* (2021) "The morphology and evolution of chondrichthyan cranial muscles: a digital dissection of the elephantfish *Callorhinchus milii* and the catshark *Scyliorhinus canicula*." *Journal of Anatomy.*

Keywords: chondrichthyan, cranial muscles, digital dissection, elasmobranch, holocephalan

Inv nr.	Taxon	Description
M3#708	*Callorhinchus milii*	cranial skeleton and muscles
M3#709	*Scyliorhinus canicula*	cranial skeleton and muscles

Table 1. List of 3D models.

INTRODUCTION

As the sister-group to bony fishes, the anatomy of sharks, rays and chimaeras (=chondrichthyans) plays a crucial role in our understanding of jawed vertebrate evolution. The two constituent chondrichthyan groups — holocephalans (chimaeras) and elasmobranchs (sharks and rays) — display wildly different cranial architectures, the origins of which have important implications for the origins of jawed vertebrate anatomy. In the associated manuscript (Dearden *et al.* 2021), we carried out a digital dissection of two chondrichthyans widely used as model species, the elephantfish *Callorhinchus milii* and the catshark *Scyliorhinus canicula*, which we used to review evidence for the evolution of chondrichthyan cranial muscles in the fossil record. Resulting from this digital dissection are detailed models of the cranial and pharyngeal skeleton and associated muscles, which we present here (Fig. 1 and table 1).

METHODS

The 3D surfaces were extracted in Mimics 21.0 (Materialise), using the segmentation threshold tool. This was done with a combination of manual and interpolatory segmenting. Models were imported into Blender (blender.org), which was used to capture images. The models are provided here in .ply format, which are openable in many free software packages.

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BIBLIOGRAPHY

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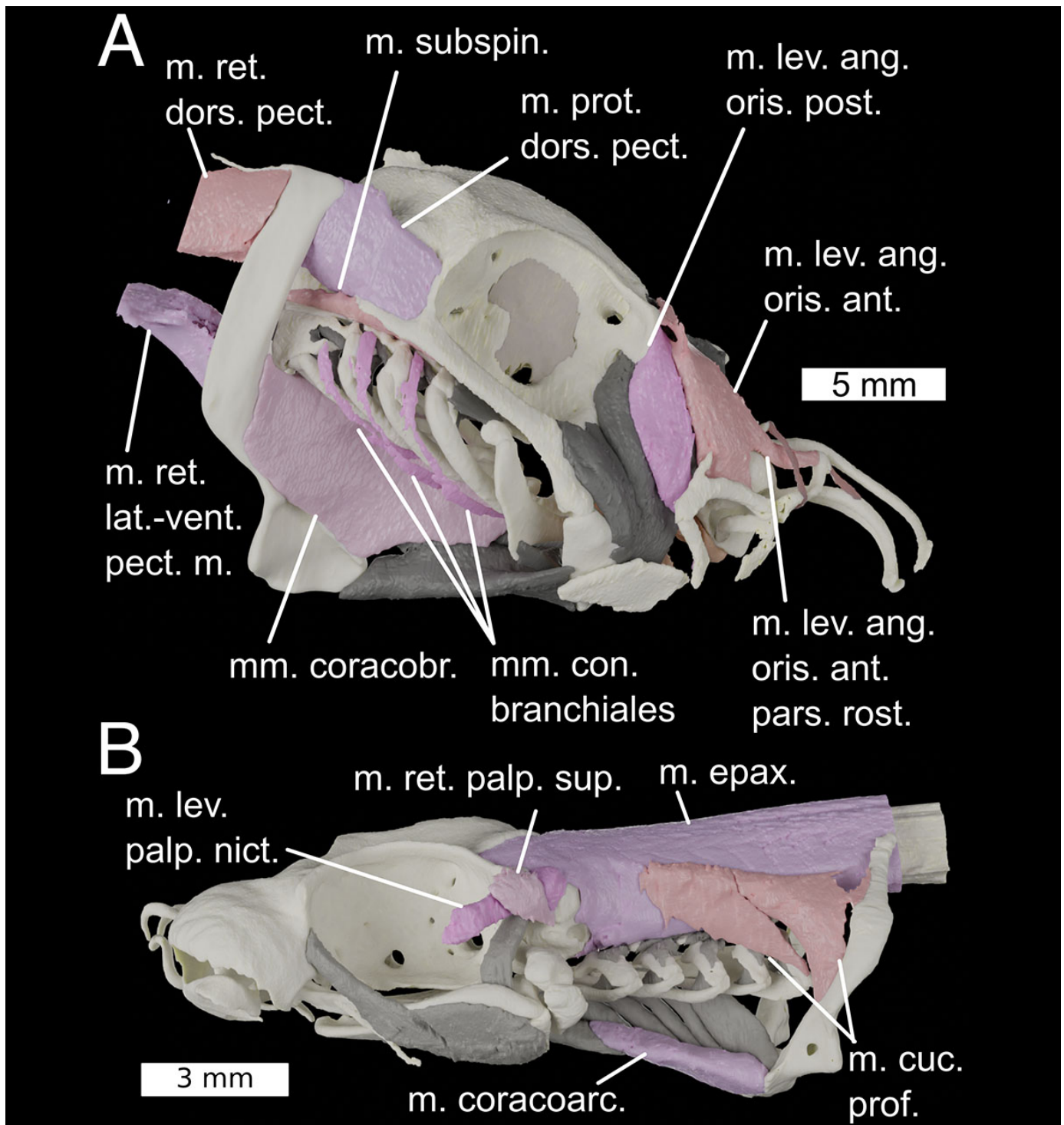
Figure 1. The cranial skeleton and select muscles in two chondrichthyans, based on the data published herein. **A**, the holocephalan *Callorhinchus milii*. **B**, the elasmobranch *Scyliorhinus canicula*. Colours: cream, cartilage; beige, pinks, muscles; greys, deeper muscles. Abbreviations: **m.**: muscle; **mm.**: muscles; **mm. con. branchiales**: mm. constrictors branchiales; **m. coracoarc.**: m. coracoarcualis; **mm. coracobr.**: mm. coracobranchiales; **m. cuc. prof.**: m. cucullaris profundus; **m. epax.**: m. epaxialis; **m. lev. ang. oris ant.**: m. levator anguli oris anterior; **m. lev. ang. oris ant. pars. rost.**: m. levator anguli oris anterior pars rostralis; **m. lev. ang. oris post.**: levator anguli oris posterior; **m. lev. palp. nict.**: m. levator palpebrae nictitantis; **m. prot. dors. pect.**: m. protractor dorsalis pectoralis; **m. ret. dors. pect.**: m. retractor dorsalis pectoralis; **m. ret. lat.-vent. pect. l**: m. retractor latero-ventralis pectoralis lateral; **m. ret. palp. sup.**: m. retractor palpebrae superioris; **m. subspin**: m. subspinalis.