

Origin attachments of the caudofemoralis longus muscle in the Jurassic dinosaur *Allosaurus*

Andrea Cau and Paolo Serventi

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The caudofemoralis longus muscle (CFL) is the primary limb retractor among non-avian sauropsids, and underwent a dramatic reduction along the dinosaur lineage leading to birds. The osteological correlates of the CFL among fossil reptiles have been controversial, because, contrary to traditional interpretations, the extent of the muscle is not necessarily related to the distribution of the caudal ribs. In some Cretaceous dinosaurs, the extent of the CFL has been inferred based on the preserved bony septa between the CFL and other tail muscles. Here, we describe a series of tail vertebrae of the Jurassic dinosaur *Allosaurus*, each showing a previously-unreported feature: a sulcus, formed by a regular pattern of tightly packed horizontal slits, that runs vertically along the lateral surfaces of the centra and neural arches. These sulci are interpreted as the origin attachment sites of the CFL, allowing for direct determination of the muscle extent along the tail of this dinosaur. Anteriorly to the 18th caudal vertebra, the sulcus runs along most of the centrum and neural arch, then it progressively reduces its vertical extent, and disappears between caudals 24 and 32, a pattern consistent with previous CFL reconstructions in other theropods.

Andrea Cau [cauand@gmail.com], Earth, Life and Environmental Sciences Department and Museo Geologico e Paleontologico “Giovanni Capellini”, Alma Mater Studiorum, Università of Bologna, Via Zamboni, 63, 40126, Bologna, Italy. Paolo Serventi [paolo.serventi@unimore.it], Department of Chemical and Geological Sciences, University of Modena and Reggio Emilia, Via Giuseppe Campi, 103, 41125, Modena, Italy.

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