

Dental anatomy of the apex predator *Sinraptor dongi* (Theropoda: Allosauroidea) from the Late Jurassic of China

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Abstract: The dental morphology of the holotype of the theropod *Sinraptor dongi* from the Jurassic Shishugou Formation of China is comprehensively described. We highlight a combination of dental features that appear to be restricted to *Sinraptor*: (i) crowns with denticulated mesial and distal carinae extending from the root and an irregular surface texture on the enamel; (ii) a D- to salinon-shaped cross-sectional outline at the crown base in mesialmost teeth; (iii) mesial crowns with mesial carinae spiraling mesiolingually and lingually positioned longitudinal groove adjacent to the mesial carina; and (iv) particularly labiolingually compressed lateral teeth with weakly labially deflected distal carinae, flat to concave basocentral surfaces of the labial margins of the crowns, and horizontally elongated distal denticles showing short to well-developed interdenticular sulci. Using cladistic, multivariate, discriminant, and cluster analyses, we demonstrate that the dentition of *Sinraptor* is relatively similar to that of ceratosaurids, megalosauroids, and other allosauroids and is particularly close to that of *Allosaurus*. The dental anatomy of *Sinraptor* and *Allosaurus*, which differs mainly in the labiolingual compression of the lateral crowns and in the number of premaxillary teeth, shows adaptations towards a predatory lifestyle, including premaxillary teeth capable of enduring tooth-to-bone contact and crowns with widely separated mesial and distal carinae capable of inflicting widely open wounds.

Key words: tooth, crown, denticle, dinosaur, theropod.

Résumé : La morphologie dentaire de l'holotype du théropode *Sinraptor dongi* de la Formation jurassique de Shishugou, en Chine, est décrite de manière exhaustive. Nous soulignons une combinaison de caractères dentaires qui semblent être exclusifs à *Sinraptor*, dont (i) des couronnes présentant des carènes mésiales et distales s'étendant jusqu'à la racine, et une texture de l'émail irrégulière, (ii) une section transversale de la base de la couronne des dents les plus mésiales en forme de D ou de salinon, (iii) des carènes mésiales des couronnes mésiales spiralant mésiolingualement et un sillon longitudinal adjacent à la carène mésiale sur la surface linguale et (iv) des dents latérales particulièrement comprimées labiolingualement présentant des carènes distales faiblement déviées labialement, des surfaces basocentrales plates à concaves des marges labiales des couronnes et des denticules distaux allongés horizontalement montrant des sulcus interdenticulaires courts à bien développés. En utilisant des analyses cladistiques, multivariées, discriminantes et typologiques, nous démontrons que la dentition de *Sinraptor* est assez semblable à celle des cératosauroïdes, des mégalosauroïdes et d'autres allosauroïdes, et est particulièrement proche de celle d'*Allosaurus*. L'anatomie dentaire de *Sinraptor* et d'*Allosaurus*, dont la principale différence est la compression labiolinguale des couronnes latérales et le nombre de dents prémaxillaires, présente des adaptations à un mode de vie prédateur, dont des dents prémaxillaires résistantes aux contacts dent-à-os et des couronnes présentant des carènes mésiales et distales largement séparées pouvant infliger de larges blessures ouvertes. [Traduit par la Rédaction]

Mots-clés : dent, couronne, denticle, dinosaure, théropode.

Introduction

Sinraptor dongi Currie and Zhao, 1993 was one of the apex terrestrial carnivores in the vertebrate ecosystem of the “upper” Shishugou Formation, Xinjiang Uygur Autonomous Region, Xinjiang Province, northwestern China (Currie and Zhao 1993; Xu and Clark 2008; Fig. 1A (3)). The formation has yielded one of most

diverse dinosaur faunas from the Jurassic of Asia and is currently divided into lower, middle, and upper beds (Choiniere et al. 2014a, 2014b; Moore et al. 2018). The upper section of the Shishugou Formation (here referred as the “upper” Shishugou Formation), which includes the upper part of the middle beds and the upper beds (Fig. 1A), is the richest taxonomically, with a dozen dinosaur species recorded to date (Currie and Zhao 1993; Eberth et al. 2010;

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