

STUDY OF THE DENTITION OF THE PARTICULAR PLACODONT *HENODUS CHELYOPS* – TOOTH REPLACEMENT AND FEEDING BEHAVIOUR

Pommery, Y.^{1,2,3}, Scheyer, T.M.⁴, Neenan, J.M.⁵, Reich, T.⁴, Fernandez, V.^{6,7},
Voeten, D.F.A.E.^{6,8,9}, Losko, A.S.¹⁰ & Werneburg, I.^{1,2}

¹Eberhard-Karls-Universität Tübingen, Senckenberg Centre for Human Evolution and Palaeoenvironment (HEP), Tübingen, Germany, yannick.pommery@gmail.com

²Eberhard-Karls-Universität Tübingen, Fachbereich Geowissenschaften, Tübingen, Germany

³Université de Bourgogne-Franche-Comté, Dijon, France

⁴Universität Zürich, Paläontologisches Institut und Museum, Zürich, Switzerland

⁵University of Oxford, Oxford University Museum of Natural History, Oxford, UK

⁶European Synchrotron Radiation Facility, Grenoble, France

⁷Natural History Museum London, London, UK

⁸Uppsala University, Department of Organismal Biology, Uppsala, Sweden

⁹Naturalis Biodiversity Center, Leiden, Netherlands

¹⁰Forschungs-Neutronenquelle Heinz Maier-Leibnitz, Garching, Germany

Placodontia is a Triassic sauropterygian reptile group characterized by flat and enlarged crushing teeth adapted to a durophagous diet. The enigmatic placodont *Henodus chelyops* has numerous autapomorphic character states, including extreme tooth count reduction to only a single pair of palatine and dentary crushing teeth. This renders the species unusual among placodonts and challenges the interpretation of its particular dentition. The skulls of two *H. chelyops* specimens were visualized with synchrotron tomography to investigate the complete anatomy of their functional and replacement crushing dentition in 3D. All teeth of both specimens were segmented, measured, and statistically compared to reveal that *H. chelyops* teeth are much smaller than the posterior palatine teeth of other cyamodontoid placodonts except for *Parahenodus atancensis* from the Iberian Peninsula. The replacement teeth of this species are quite similar in size and morphology to the functional teeth. As other placodonts, *H. chelyops* exhibits vertical tooth replacement. This suggests that vertical tooth replacement arose relatively early in placodont phylogeny. Analysis of dental morphology in *H. chelyops* revealed a concave shape of the occlusal surface and the notable absence of a central cusp. This dental morphology could have reduced dental wear and protected against failure. Hence, the concave teeth of *H. chelyops* appear to be adapted to process small invertebrate items, such as branchiopod crustaceans. These crushing palatine teeth are combined with a cutting edge with denticles and baleen-like grooves, which could respectively be used to scrape the plants of the substratum and filter the plankton from the water.