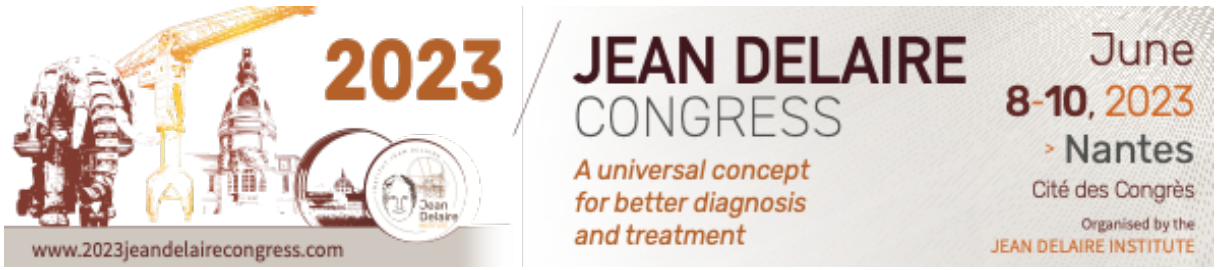

Anatomy and growth trajectories of the occipito-cervical junction in healthy children

Authors : Maxime TAVERNE[1]*, Juliette RAOUL-DUVAL[1], Angèle GANET[1], Pauline BAIXE[1], Carla CORNILLON[1], Lou ESCHAPASSE[1], Roman Hossein KHONSARI[1], Sandro BENICHI[2]

Photo orateur

Institutions :

1- Craniofacial Growth and Form lab. Pediatric University Hospital Necker – Enfants Malades, Paris

2- Department of Pediatric Neurosurgery. Pediatric University Hospital Necker – Enfants Malades, Paris

* Presenting author

Abstract :

INTRODUCTION: Decision to operate children presenting with anomalies of the occipito-cervical junction (OCJ) is difficult, mostly because so little is known about the normal growth of this region, and regarding the natural history of the conditions affecting it. The present study aims at quantifying the growth of the OCJ in a cohort of healthy children to pave the way for future studies that will provide objective insights to surgeons about whether and when to operate.

MATERIALS AND METHODS: The CT-scans and MRIs of 90 control children aged 0-18 years were included to reconstruct 3D surfaces of the skull base, the first two cervical vertebra, and the ligament network. Their 3D shape was quantified using geometric morphometrics. Growth trajectories of morphological variation were computed using 2-blocks partial least-squares regressions.

RESULTS: Here, we showed that morphology strongly covaried with age, allowing us to propose a robust predictive model. This model was very accurate, with less than a millimeter of local discrepancy between predicted shapes and real bone shape for any given age. Our model also precisely predicted the timing of closure of synchondroses.

CONCLUSIONS: We believe this work provides some objective information on the evolution of healthy patients and paves the way for further research on cohorts including patients with congenital anomalies of the OCJ. We hope that this will help to better understand their anatomical specificities, and to anticipate their morphological and functional evolution, should they undergo surgery or not.