Tittle:. Growth of the PetroMastoid V and its application in the cranial deformations without synostosis.

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Introduction: the PetroMastoid V (PMV) is a biomechanical unit of the posterior cranial fossa fundamental to absorb the muscular constraints of vertebral origin. It also determines the scale of the skull base. The growth of the PMV from the fetus to adulthood was modeled and compared to cranial deformations.

Material and methods: Thirty two TDM of normal subjects (1 day to 33 years) and seven fetuses (second trimester) was studied as reference. The petromastoid part of the temporal bone was segmented in two regions of interest. The squamous part was excluded. The 3D coordinates of the centroid and the three inertia axes were calculated (Myrian®, Intrasense, Montpellier, France). The sella turcica was used as median reference of the PMV. The change of intra-ROI et inter-ROI parameters during growth were calculated. The deformation of the PMV were calculated in 11 posterior brachycephalies and 48 plagiocephalies without synostosis.

Results: The PMV angle, between the two petromastoid centroid and the sella turcica centroid, increases slightly in prenatal period (80° to 100°), stays around 100° from birth to 5 years, then decreases slightly to adulthood. The posterior displacement of the PM is very fast up to 5 years to reach 90% of the adult growth. Asymmetry between the two sides was not highlighted of. The shape of the PM changed during prenatal period but it remainsunchanged in the postnatal period. Compared to the reference population, the PMV angle is increased in the posterior brachycephalies. In deformational plagiocephalies, the PM angle is normal but the shape of the PM wais elongated in the occipital bossing side and reduced in the flattening side.

Discussion: the major changes of the PMV angle and the shape of the petromastoid part of the temporal bone are prenatal. After birth, the shape of the petromastoid stays unchanged and the angle decreases slightly after 5 years. The growth of the mastoid air cells was not included in the skeletal segmentation. In the cranial deformation without synostosis, this biomechanical unity of the skull base is also deformed.