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Craniovascular morphology of the early Upper Palaeolithic skull from Zlatý Kůň, Czech Republic

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The craniovascular system is part of the vascular network of the head, and includes the middle meningeal vessels, the dural venous sinuses, the emissary veins, and the diploic veins. These vascular networks leave marks in the skull in form of imprints, channels, and foramina. In palaeoanthropology, craniovascular traits provide the only available information about vascular networks. They inform on physiological processes associated with blood circulation, and provide an opportunity to investigate metabolic features, possibly associated with phylogenetic or demographic factors, in extinct hominins and past populations. Craniovascular features can supply information about evolutionary adaptations, inter- and intra-population differences, and individual life history [1]. Here we present an analysis of the craniovascular morphology of the early Upper Palaeolithic skull from Zlatý Kůň (Koněprusy caves, Czech Republic) [2]. The human remains from Zlatý Kůň belonged to an adult female and include fragmentary cranial and postcranial bones. Recently, a study revealed that this individual might be a representative of the earliest Eurasian inhabitants following the expansion out of Africa. Based on a genome analyses, it has been suggested that this female lived at least 45 000 years ago. Interestingly, her genome carries ~3% Neanderthal ancestry, which is similar to other Upper Palaeolithic hunter-gatherers [3]. It has been also shown that the cranium from Zlatý Kůň display a morphological affinity with pre-LGM (Last Glacial Maximum) population [4]. The skull consists of a partial neurocranium with better preserved right part (fragmentary parietal bones, a squama of the occipital bone, a large part of the frontal bone, and part of the right temporal bone) and several bones from the facial skeleton (zygomatic bones, the intact mandible and the right maxillary fragment). Although some parts of the cranium are missing, several craniovascular features can be observed and analysed. The traces of middle meningeal vessels seem to have a posterior dominance, at least on the right side, where the posterior branches are more numerous than the anterior ones. However, the main posterior branch runs antero-superiorly. The superior sagittal sinus runs into the right transverse sinus above the internal occipital protuberance. There is also a visible imprint of the occipital sinus. The tomographic scan of the cranium revealed well preserved and quite complex network of diploic channels. There is one large diploic channel within the frontal bone on the right side (the left part of the bone is not preserved). The diploe of the right parietal bone contains two large crossing channels, and several smaller branches originates from both. The left parietal bone contains only small fragments of the upper region, but there has been at least one large channel present as well. The occipital bone contains two vertical channels bilaterally. Three mastoid foramina are present at the right temporal bone and one occipital foramen is present at the inferior part of the occipital bone (parietal foramina are absent). When compared with the craniovascular patterns in modern humans, this individual display infrequent features, namely the posterior dominance of middle meningeal vessels (which may be due to the rather dolichocephalic proportions of the cranium), the imprint of the occipital sinus and an atypical confluence pattern, and the occipital foramen [5]. The results of this study may be useful for future research of craniovascular morphology in Upper Palaeolithic individuals.

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