

Human Palaeontology and Prehistory (Physical Anthropology)

Virtual reconstitution and new palaeopathological study of the Magdalenian child's skull of Rochereil

Bertrand Mafart^{a,b,*}, Gaspard Guipert^a, Camille Alliez-Philip^a, Jean-Jacques Brau^c

^a Antenne de l'Institut de paléontologie humaine, Europol méditerranéenne de l'Arbois, bâtiment Villemin, B.P. 80, 13145 Aix-en-Provence cedex, France

^b Département de préhistoire, Muséum national d'histoire naturelle, UMR CNRS 5198, institut de paléontologie humaine, 1, rue René-Panhard, 75013 Paris, France

^c Cabinet dentaire, hôpital d'instruction des armées Laveran, B.P. 80, 13998 Marseille Armées, France

Received 2 May 2007; accepted after revision 11 September 2007

Available online 26 November 2007

Presented by Yves Coppens

Abstract

A fragmented skull of a child aged between two and four years was discovered within a Magdalenian level (11255 ± 50 BP, OxA-16932) in the cave of Rochereil in the Dordogne 'département', France. The presence of a lacuna in the frontal bone and the general appearance of the skull had led to the conclusion of a postmortem trepanation of one hydrocephalous child. Examination of the tables and of the diploe and, by means of electron microscopy, of the edges shows that the frontal lacuna is a pathological lesion and not a trepanation. Several dysmorphic and dysplastic lesions of deciduous teeth are associated. The virtual three-dimensional reconstruction of the cerebral skull rules out the previous diagnosis of hydrocephaly. The only tenable diagnosis is macrocrania. Numerous aetiologies can be cautiously evoked for the large cranial lacuna and the associated dysmorphic lesions, but no conclusive diagnosis can be put forward for this insulated skull. **To cite this article:** B. Mafart et al., C. R. Palevol 6 (2007).

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Résumé

Reconstitution virtuelle et nouvelle étude paléopathologique du crâne d'enfant magdalénien de Rochereil. Le crâne très fragmenté d'un enfant âgé de deux à quatre ans avait été découvert dans un niveau magdalénien (11255 ± 50 BP, OxA-16932) dans la grotte de Rochereil, Dordogne, France. L'existence d'une lacune du frontal et l'aspect général du crâne avaient fait conclure à un cas de trépanation post mortem d'un enfant hydrocéphale. L'examen des tables osseuses, de la diploe et de ses berges prouve que cette lacune du frontal est une lésion pathologique et ne résulte pas d'une trépanation. Des lésions dystrophiques et dysplasiques des dents déciduales sont associées. La reconstitution virtuelle du crâne cérébral montre que le diagnostic précédent d'hydrocéphalie ne peut être retenu ; tout au plus s'agit-t-il d'une macrocrairie. Plusieurs étiologies peuvent être prudemment discutées pour cette large lacune frontale associée à des lésions dentaires et à une possible macrocrairie, mais sans qu'aucun diagnostic de certitude puisse être avancé. **Pour citer cet article :** B. Mafart et al., C. R. Palevol 6 (2007).

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Keywords: Palaeopathology; 3D imaging; Magdalenian; Skull; Child; Tumour; Hydrocephaly

Mots clés : Paléopathologie ; Imagerie tridimensionnelle ; Magdalénien ; Crâne ; Enfant ; Tumeur ; Hydrocéphalie

* Corresponding author.

E-mail address: bertrand.mafart@univ.u-3mrs.fr (B. Mafart).

1. Introduction

In 1971, H-V Vallois published the study of a child's skull discovered in 1939 in the cave of Rochereil in a Magdalenian archaeological level [19,37]. This skull was completely crushed in the sediments, and the mandible was fractured during the excavation. An initial reassembly was carried out by H.V. Vallois, but the skull was some years later broken again and was reconstructed a second time before its study. This author estimated the age at death between two and a half and three years. He described one hyperbrachycrany and a disproportion between the face and cerebral skull. That led him to propose a diagnosis of hydrocephaly. The presence of a wide circular opening in the frontal bone was then attributed to a postmortem endocranial trepanation with the aim of removing a disk of skull bone. This case of postmortem trepanation was presented as certain and as the only case observed for the Palaeolithic period. It was related by H.V. Vallois to some religious or perhaps magical hypothetical practices connected with the supposed suffering of this hydrocephalic child [37].

An examination of this skull, conserved at the Institute of Human Palaeontology, Paris, convinced us that the reconstruction was not satisfactory and that these diagnoses were clearly open to question. With the authorization of Prof. de Lumley, director of the Institute, we resumed the study of this fossil with three objectives: (i) the realisation of a more anatomically satisfactory reconstruction by means of virtual images, (ii) a reinvestigating of the diagnosis of hydrocephaly and (iii) a new discussion on the aetiology of the cranial lacuna.

2. Description

Most of the cerebral skull, the upper dental arch, and the anterior part of the palate together with the mandible are preserved. The anterior part of the skull base is missing, including the sphenoid bone and the nasomaxillary area. Most of the bones were fractured in multiple places and, in some cases, deformed. The edges of the paramedian lacuna on the right side of the frontal bone are fractured and non-jointed in its external quarter. The missing parts in this skull had been partially filled with synthetic materials during the course of former reconstruction attempts, in particular the right temporo-parietal area, the left lateral side of the skull from the asterion to the middle of the parietal, the lower posterior and lateral parts of the occipital. At the facial level, the lower and lateral edges of the orbits, the ascending branches of the maxillae and the anterior part of the skull base had been reconstructed. There is a brown var-

nish that is covering most of the parts, except for the recently fractured areas (Fig. 1).

The left horizontal branch of the mandible, fractured during the excavation behind the canine was reconstructed with a synthetic material and replaced in an excessively internal position. The deciduous teeth are in position on the mandibular and maxillary arches. The lower left canine and first molar and the upper right canine were lost postmortem. The left and right upper central and lateral incisors were reversed during the reconstruction. Their internal edge is rounded and their occlusal edge slanted towards the inside, whereas, anatomically, the external angle is always higher and more rounded than the internal angle, which is straighter. The left incisor was reimplanted in an excessively external position, creating a pseudo interincisive diastema. In the same way, the root of the second left premolar was implanted into a synthetic material at an excessively posterior position, creating a diastema with the first premolar.

The previous restoration was responsible for the incorrect positioning of many bones and bones fragments, especially those of the skull base and of the face. The upper edge of the right temporo-parietal lacuna is displaced of 20 mm towards the exterior, the occipital foramen is tilted forward, and the width of the left orbit is excessive. The position of the maxilla, determined by H.V. Vallois by connecting the mandible with the temporal condyles, is incorrect when the anomalies of the base of skull and the mandible are taken into account.

A dental age of less than three years was proposed by H.V. Vallois. The eruption of the deciduous teeth had occurred, with a minimal wear of the enamel. The crown of the first permanent mandibular molar is formed and included in the bone. The crowns of the upper and lower permanent incisors are two-thirds formed. The crowns of the lateral incisors and the upper canines are formed to mid-height and are in an endopalatal position. There is a lacuna at the base of the right lower canine and no bud is visible either at this level or under the deciduous premolars. There is no start of osseous resorption behind the first permanent lower right molar. These absences of buds may correspond to a delayed growth or an agenesis of the permanent teeth. The age at death estimated using the Uberlaker method [36] is three years \pm 12 months, and, according to the Stermer Beyer–Olsen and Risnes method [33], is between three and four years. The sex of this child is indeterminable. We have retained an estimation of the age at death between 2 and 4 years for this child of unknown sex.

The teeth present many dysplasias and dysmorphias, in particular mandibular. The central incisors are large

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