

CASE REPORT

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Craniofacial Dysmorphism in Mozart's Skull

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ABSTRACT: Mozart's craniofacial dysmorphism shown in his portraits and in the skull held by the Mozarteum in Salzburg (Austria) helps to document the role of pathology in human identification. The specific syndrome is formed by a premature synostosis of the metopic suture (PSMS) in association with an abnormally shaped skull.

KEYWORDS: physical anthropology, craniofacial dysmorphism, Mozart, musculoskeletal system

Premature synostosis of the metopic suture (PSMS) is an uncommon form of craniosynostosis which has been described with a spectacular deformity of the frontal bone called trigonocephaly [1]. There are two varieties of PSMS: isolated with no other defects and the other in association with cerebral or other malformations. The latter makes up only 10% of the cases [1,2]. The incidence of isolated PSMS was found to be 0.3 per 1000 in a newborn infant population and constitutes about 50% of all craniosynostosis [3]. But in studies on juveniles the incidence is considerably lower as a result of the self-correcting characteristic of this craniosynostosis [4]. The main evidence of isolated PSMS is a deformity ranging from a minor variation to a severe aesthetic deformity [5].

Severe forms require surgery, but the mildest ones have an acceptable cosmetic appearance in the long term [6]. PSMS has been analyzed by skull description and radiology since clinical reports have demonstrated that adults may only present a mild midline bony ridge in the supraglabellar sulcus of an apparently normal forehead [6].

We report the description of anthropological cranium adjustments and nonmetric morphological features concerned with the PSMS in W. A. Mozart—1756-1791 [7]. Mozart was buried in a mass grave and his skull was obtained from the grave diggers by the brother of

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Joseph Hyrtl, the famous Viennese anatomist, and remained within the family until 1899 [8]. The skull is today the property of the Mozarteum in Salzburg. The historical sources reveal that Mozart was small, less than 1.5 m tall, and the main facial features shown in his portraits are a straight forehead with anteriorly placed eyes, marked cheekbones, and prominent nose and upper lip. Specific anthropological features may be summarized as a short skull (168 mm) having a broad midface and a pronounced alveolar prognathism. Hypoplasia on all teeth evokes a metabolic disease [7].

The Mozart skull, with a cranial breadth/cranial length $\times 100$ of 88.7, is ultrabrachycephalic, and the cranial capacity is estimated, by the method of filling with mustard seed, to be near 1585 cc. The straight forehead has a weak frontal sinus that does not affect the frontal midline morphology and smooth supraorbital rims. The main metric morphological feature (Table 1) is the reduction of the orbit volume. The interorbital breadth is normal. The supraglabellar sulcus is divided in the midline by a small protuberance that forms a ridge near the nasion. The surrounding bone surface of the ridge is covered by many smooth small furrows, caused by dura mater emissary veins (Fig. 1). The coronal suture has upper limbs anteriorly curved at the bregma (Fig. 2). The radiograph reveals a linear bone thickening at the location of the metopic suture. The interpalatal suture is wide with a funnel-like incisive canal that is wider than normal. Transillumination shows several areas of thinning in the frontal bone, usually called digital markings, suggesting brain contact that was closer than usual. The frontal eminences are prominent and well spaced apart.

Gradation and variants in self-correcting skull deformities limit the diagnosis of premature synostosis of the metopic suture (PSMS) in adults. This study has established the clinical diagnosis of Mozart's PSMS by the appearance of the affected frontal and coronal sutures [7]. This diagnosis is confirmed by radiology, computed tomography (CT) scan features, and the abnormally shaped skull. A compensatory mechanism in suture closure allows the skull to grow, resulting in a relatively broad midface and palate in a small skull (cranial horizontal circumference is 504 mm). PSMS associated with undersized stature suggests a possible endocrine relation. Further investigations of thinnings of the frontal are in progress based on an endocranial cast. Genetic factors have been suggested as a possible cause, but it can also be the consequence of disease or extrinsic influences [2]. The specific syndrome of Mozart provides an unusual combination of features.

TABLE 1—Comparison of cranial measurements (mm) between Mozart's and hyperbrachycephalic skulls.

	Mozart	German ^a
Glabello-occipital length	168	179
Maximum cranial breadth	149	148
Head horizontal circumference	504	517
Bizygomatic breadth	136	135.4
Nasion-bregma chord	105.7	113
Bregma-lambda chord	113.6	113
Minimum frontal breadth	97	97.7
Orbit height	34	36
Orbit breadth	36	38.5
Nasal height	49	52
Interorbital breadth	24	23.4
External palate breadth	65	64
Palate length	50	51

^aMeans of ten hyperbrachycephalic, adult, South German, male skulls from the Museum of Man, Paris (France).

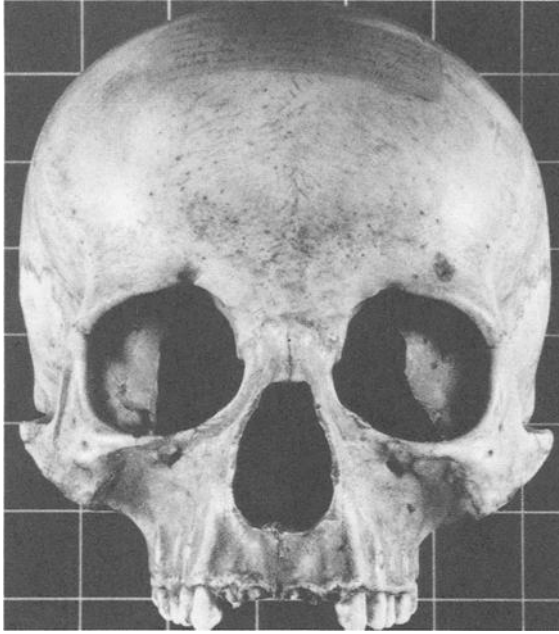


FIG. 1—The skull of W. A. Mozart. Premature synostosis of the metopic suture is evidenced by a medial supraglabellar protuberance associated with many small furrows and a restricted orbital breadth.

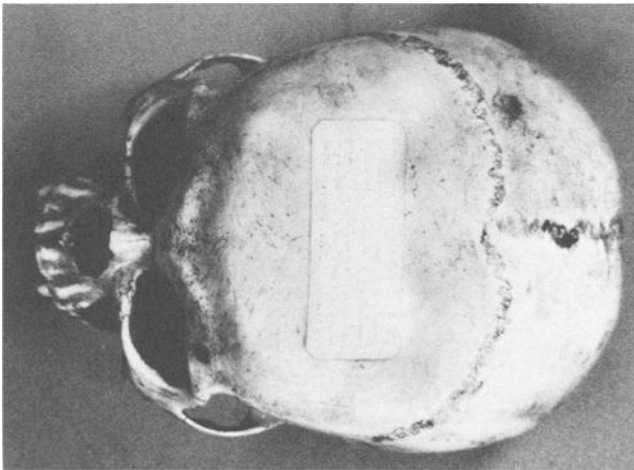


FIG. 2—The skull is ultra-brachycephalic and the coronal suture has upper limbs anteriorly curved at the bregma; a bone thickening is located at the metopic suture.

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