The Foramen Ovale and Sphenoidal Angle in Man

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Summary. The structure of the greater wing of the sphenoid in the region of the foramen ovale and sphenoidal angle is described in both the adult human and in two partly ossified human embryos. It is shown that the foramen ovale of man is enclosed by membrane bone, derived from a medial process associated with the scaphoid fossa, and a lateral tongue, the most dorsal part of which is present in many adults as a process on the lateral margin of the foramen. These structures are parts of an extensive membrane bone which forms the larger part of the greater wing of the sphenoid. It is shown that the foramen of Vesalius represents the site of fusion between this membrane bone and the more medial, cartilaginous, ala temporalis. Various inconstant patterns of grooves and foramina in the vicinity of the foramen ovale can be interpreted as arising from the interplay of the various parts of the membrane bone and the emissary venous plexus from the middle meningeal veins to the pterygoid plexus. The embryonic anlagen of the pterygo-sphenoidal and pterygo-spinous ligaments are described, and the association of these structures with the parts of the membrane bone are discussed.

Key words: Sphenoid bone – Greater wing – Membrane bone – Human – Osteology.

Introduction

It is now more than a decade since one of us (F.L.D.S.) observed that the outline of the foramen ovale in the human skull is as often as not interrupted by a small spicule of bone which grows posterolaterally into its lumen from the anterior border (Fig. 1 a). In the small series examined at that time it appeared that this process was to be found in those specimens where traces of the sphenoid...
Fig. 1. a shows adult human left greater wing with process (arrow) and groove lateral to it. 
b shows an accessory emissary foramen (arrow) and no process; foramen Vesali (arrow) is present 
and its position should be compared with that of the deep cleft between angle and lingula in 
(a). c is a graphic reconstruction of the developing left greater wing region in an 81 mm human 
embryo viewed postero-laterally. The membranous alisphenoid and the cartilaginous ala temporalis 
are only connected by ossification at the lateral margin of the foramen rotundum. The medial 
process and the lateral tongue are drawn in heavy stipple as they are only present as condensed 
mesenchyme flanking the mandibular nerve. Vein A of the emissaries is not distinct in this specimen. 
Magnifications (a), (b), natural size; (c) ca. ×15