

Metoptic canal and duplication of the optic canal in human orbits

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The region of the optic strut can be traversed by some minor canals whose incidence and general characteristics have never been studied. As such canals could be the route for vessels that could interfere in the surgery of the orbital apex we undertook a detailed anatomical study on a vast collection of dry skulls. The examination of 943 dry adult skulls was carried out to precise the anatomy of canals in the optic strut area, their development and relationships with the optic canal. A canal traversing the optic strut was present in 8.54% of the orbits. Based on diameter, position within the optic strut and thickness of the bony plate separating it from the optic canal, the canals piercing the optic strut were classified in four types. Type I includes all cases of duplication of the optic canal (optic canal + ophthalmic canal) and it was observed in 0.64% of cases. Type I canal encompass cases of very large ophthalmic canals (diameter larger than 2 mm), far too large for the purpose of just transmitting the ophthalmic artery (type Ia), and cases of ophthalmic canals showing a calibre higher than 1 and lower than 2 mm and compatible, therefore, to host the ophthalmic artery (type Ib). Type II is a small channel that pierces the floor of the optic canal and runs backwards remaining separated from posterior part of the optic canal by a very thin (< 0.5 mm) bony plate that, for its thinness, could be the result of late events of calcification. The calibre of this kind of canal ranges from 120 μ m to 1 mm and it was observed in 1.96% of cases. Type III is a small canal that traverses the whole thickness of the optic strut and a bony pillar or a thick bony lamina separate it from the optic canal. As the previous one, it can be very narrow or it can reach a respectable calibre though never larger than 1 mm, otherwise it would have been considered as type I canal. It was observed in 3.66% of cases. Type IV is a canal piercing the base of the optic strut. In 0.42% of orbits it traverses the entire thickness of the optic strut (type IVa) or in 2.07% of orbits it appears as a canal apposed to the lateral side of the optic strut (type IVb); as such, its very thin lateral wall is the only separation from the superior orbital fissure. In conclusion, the area of the optic strut is the frequent site of canals joining the orbit with the middle cranial fossa. Some of them can host the ophthalmic artery, others can be run by minor vessels which, however, can be the source of annoying bleedings in surgical procedures.