

# Variations in Condylar Foramen and Condylar Canal

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## Abstract:

The posterior part of the occipital condyles exhibits a depression known as the condylar fossa. The superior articular facet of the atlas is accommodated within this fossa during movements of the atlanto occipital joint. Rarely within this fossa does a foramen be present which is called as the condylar canal or the posterior condylar canal 1. This foramen can be either unilateral or bilateral and the foramen may or may not be patent (1). If the foramen is patent, it usually transmits an emissary vein to the sigmoid sinus and nerves which supply the duramater of the posterior cranial fossa. This emissary vein is called as the posterior condylar vein which connects the veins present in the sub occipital triangle with that of the sigmoid sinus.(2)Here,the various variations found in condylar foramen and condylar canal was discussed below as follows.

**Key Words:** Condylar canal, condylar foramen, condylar fossa and jugular foramen.

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## INTRODUCTION:

The condylar canal (or condyloid canal) is a canal in the condyloid fossa of the lateral parts of occipital bone behind the occipital condyle. The posterior condylar canal is the largest emissary foramen of the posterior cranial fossa. It is apparent just posteroinferior to the jugular foramen and posterior to the hypoglossal canal. (3)The Condylar canal gives way to a condylar emissary vein from sigmoid sinus to vertebral vein between the axis and atlas, in most cases 1 or between the superior bulb of the internal jugular vein and suboccipital venous plexus.(4).The posterior condylar foramen is located behind the condylar of the occipital bone.

## DISCUSSION ABOUT THE PAST FOUNDED VARIATIONS:

The condylar canal opens at the base of the skull just behind the occipital condyles. The patency of the channel depends upon the condylar emissary vein which runs along its path. Krause discovered condylar canal was present bilaterally in 21% and unilaterally in 38%. Ginsberg<sup>7</sup> found this channel bilaterally in 55.9% and 17.6% unilaterally. Boyd<sup>8</sup> found this channel 77% unilaterally. (5).Galarza<sup>9</sup> found intrasinus form 24.6% bilaterally, 17.8% on the right side and 13.5% on the left where as retro sinus form he found 1.2% bilaterally and 1.2% unilaterally on the right side. Kapakin<sup>10</sup> reported doubled canal on right side. Berge & Bergman<sup>11</sup> found that the posterior condylar canal was doubled in six of the 144 patent foramina (4%) and tripled in one case (<1%).The condylar canal is found bilaterally in 70.31% and unilaterally in 20.31% of skulls. (6).Double canal was found in 7.81% of skulls and 3.12% showed septation in the canal which might have been due to aberrant course of posterior condylar emissary vein or passage for the entry of an aberrant meingeal artery. However intrasinus was the most prevalent form and it was present bilaterally in 60.94% of the skulls. There were 12.5% cases of intrasinus type on the right side and 9.37% on the left. Retrosinus form was found 7.81% on right side and 9.37% on the left.(7)

## VARIATIONS OF POSTERIOR CONDYLAR CANAL WITH JUGULAR FORAMEN:

Berge & Bergman (2001) found that the posterior condylar canal was doubled in six of the 144 patent foramina (4%) and tripled in one case (<1%). In case of kapakin anatomical variations,the posterior condylar canal (PCC) was doubled on the right side and there was only one on the left side.(4) According to the presence of bridging, the JF can be defined as Type I (one septation, two compartments) on the right side and Type IV (three septations, four compartments) on the left side. The dome of the jugular fossa is present on the right, absent on the left.The jugular foramen shows a canal-like structure with an external and an internal opening. The lengths of the longest and widest axes of the JFs are measured as 21.93 x 16.56 mm on the right and 16.75 x 15.14 mm on the left side. The right JF is larger. The PCC is doubled on the right side and there is only one on the left side.(8)

## MORPHOLOGY AND CLINICAL SIGNIFICANCE OF CONDYLAR CANAL:

The posterior condylar canal is almost a constant entity in the condylar fossa and only in a miniscule percentage the canal is absent making it and the structures traversing through it clinically significant.(9) In the present study, out of a 156 skulls studied, the foramen was absent bilaterally in 5.76% of the skulls therefore the structure is clinically important because the foramen is present in 94.2% and it connects the extracranial veins with the intracranial dural venous sinuses. In the present study there is preponderance towards bilaterally present foramen (78.9%) and unilateral being (21.1%). Surprisingly when the foramen was unilateral more orientation was shown on the left side (61.3%) than the right (38.7%). Of the examined skulls more number of foramina was patent on the right side (69.5%) than the left (30.4%). In the skulls where the foramina were not patent there is a significant shift to the right (67.2%) than the left side (32.72%).Of the examined skulls the crescent shaped condylar fossa was the most common (58.9%) followed by oval shaped (34.6%) and

oblong shape (6.4%). The measurements of space where the articulation of the atlas takes place the mean length and breadth is more on the right (15mm and 7mm) than the left side (12mm and 6mm). The present study indicates that condylar fossa is broader on the right side than the left side.(10) Surgical approaches to the foramen magnum and the craniocervical junction like the far lateral approach will involve extensive dissection of structures related to the posterior condylar canal and particularly the posterior condylar canal.

#### CONCLUSION:

The posterior condylar canal in the occipital bone showed some differences, which may accompany variations in the posterior condylar veins. Knowledge of the anatomical relationships and variations of these veins is necessary not only for radiological diagnosis, but also when considering surgical or endovascular treatment of skull base diseases. The statistical insignificance of the radiological and anatomical measurements indicated that the radiological assessment greatly helps to organize the preoperative preparation. Thus, the variations of condylar foramen, morphology and clinical significance of the condylar canal are reviewed.

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