



Anatomical Variations of Posterior Condylar Canal

Authors

Nishigandha Sadamate¹, Ravindra Vedpathak², Dr Joy Ghoshal³, Dr V. G. Sawant⁴

^{1,2}Assistant Lecturer, ²Professor and Head, ³Professor

Department of Anatomy, Dr. D. Y. Patil, Medical College, Nerul, Navi Mumbai

ABSTRACT

The posterior condylar foramen is largest of emissary foramina present in human skull. It is also called as condyloid canal. Variations in posterior condylar canal may be associated with variations in posterior condylar vein which may be wrongly considered as pathological. So the study was done to assess prevalence, normal anatomic pattern and variations of condylar canal. Study conducted to determine the variations in the occurrence of posterior condylar canal with patency and if patent whether Intrasinus or Retrosinus.

228 dry skulls of unknown sex and age studied from different medical colleges in Mumbai and Navi Mumbai. Skulls were examined by direct observation for bilateral and unilateral presence or absence of posterior condylar canal and also any other variations. By passing probe patency was checked to note whether canal is intrasinus or retrosinus.

Study shown Posterior condylar canal was present in 83.33 % of skulls in which 48.68 % bilateral, 19.29 % Right Unilateral and 15.35 % Left Unilateral and 16.66% were bilateral absent. Study highlights the 80 % canals were Intrasinus and 20 % Retrosinus.

Conclusion: *Anatomical variations of post. condylar canal is important for radiologist, Neurosurgeons, ENT Surgeries thus study gives basic knowledge to surgeons before planning a surgery in occipital condylar regions.*

Key Words: *Posterior condylar canal, Intrasinus, Retrosinus.*

Introduction

The posterior condylar foramen is largest of emissary foramina present in human skull. This foramen appears into the posterior condylar canal which is present in depressions immediately posterior to occipital condyles.⁽¹⁾

During embryonic period the posterior condylar canal acts as an important route for venous circulation connecting intracranial venous sinuses with extracranial venous system. With gradual change from foetal to neonatal circulation this venous system atrophies leading to closure of venous bone tunnel. Failure of closure will lead to persistence of the posterior condylar canal.⁽²⁾

The posterior condylar canal transmits an emissary vein which is called as posterior condylar vein to sigmoid sinus and nerves which supply the dura mater of posterior cranial fossa and meningeal branches of occipital artery.⁽³⁾

Variations in posterior condylar canal may be associated with variations in posterior condylar vein which may be wrongly considered as pathological. Thus the knowledge of anatomical relationship and variations of these veins is not only necessary for radiological diagnosis but also when considering surgical or endovascular treatment of skull base.

So the study was done to assess normal anatomic pattern prevalence and variations of condylar canal.

Aims and Objectives

- To determine the variations in the occurrence of posterior condylar canal and
- To assess the patency of canal whether canal is Intrasinus type or Retrosinus type.

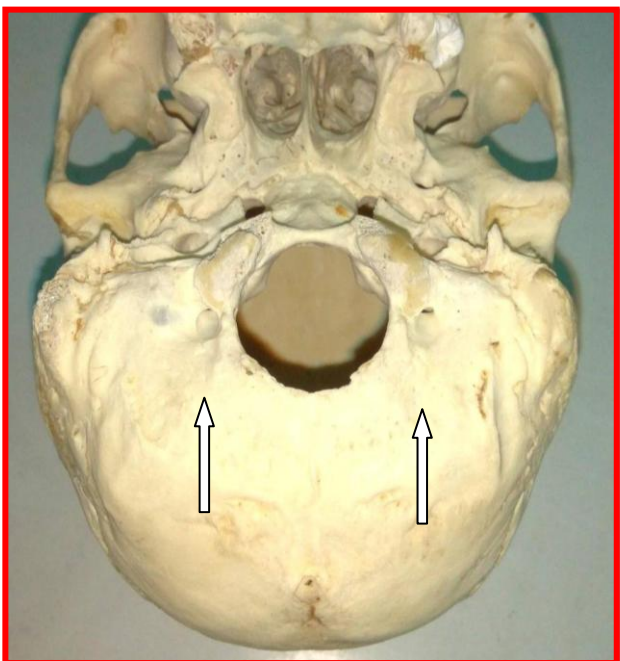
Material and Methods

228 dry skulls of unknown sex and age were studied from different medical colleges in Mumbai. Dr. D. Y. Patil Medical college, Nerul, Navi Mumbai, Terena Medical College, M.G.M. Medical College, Bharati Vidhypeeth Dental College, Dr. D.Y. Patil Ayurvedic college from Navi Mumbai and Grant Medical College, Mumbai.

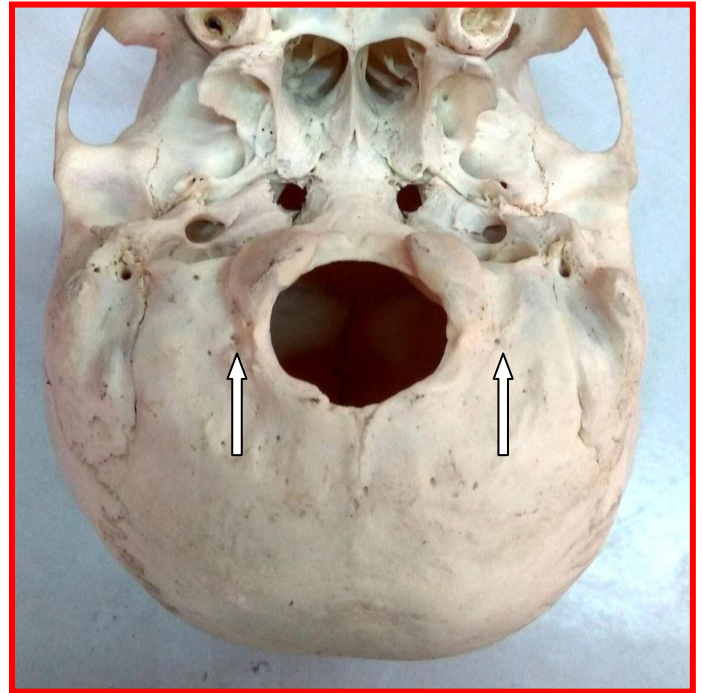
Skulls were examined by direct observations for bilateral and unilateral presence or absence of posterior condylar canal and other variations. By passing probe patency was checked to note whether canal is Intrasinus type or Retrosinus type.

Photographs of each skull was taken by using a digital camera.

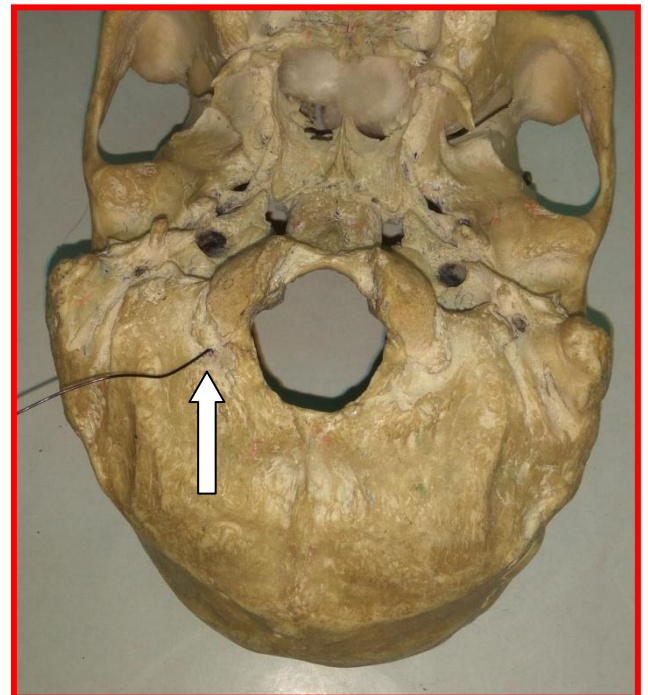
Photograph No. 1 - Bilateral Presence of condylar canal



Photograph No. 2 - Bilateral Absence of condylar canal



Photograph No. 3 - Presence of condylar canal on Right side



Photograph No. 4 - Presence of condylar canal on Left side



Observations and Results

	No. of Skulls	Percentage %
Bilateral Presence	111	48.68
Right Unilateral Presence	44	19.29
Left Unilateral Presence	35	15.35
Bilateral Absence	38	16.66

The study showed that posterior condylar canal was present in 83.33% of skulls in which 48.68% were Bilateral, 19.29% Right unilateral and 15.35% Left unilateral and 16.66% showed bilateral absence.

3 skulls showed duplicate canal on right side. One skull showed duplicate canal on both right and left side.

Table No. 2 Percentage of Intrasinus type and Retrosinus type

	No. of Skulls	Intrasinus %	Retrosinus %
Bilateral	111	80.19	19.21
Right Unilateral	44	72.27	22.72
Left Unilateral	35	82.85	17.14

Total 80% of skulls showed Intrasinus type canal and 20% were Retrosinus type canal.

Discussion

The posterior condylar canal opens in the groove for sigmoid sinus posterolateral to jugular foramen in posterior cranial fossa. This leads to the speculations that these anomalous foramen might be acting as additional source of drainage of intracranial veins into extra cranial veins.

Boyd (1930) reported posterior condylar canal with incidence of 77% unilateral.

Ginsberg (1994) showed 55.9% presence of bilateral condylar canal and 17.6% was unilateral .⁽⁴⁾

Krause (1998) found 21% bilaterally presence while unilateral was 38% of skulls.⁽⁵⁾

Berge J & Bergman RA (2001) found that posterior condylar canal was doubled in 6 of 144 patent foramina i.e. 4% and tripled in one case means less than 1% .⁽⁶⁾

Manoj Kumar (2015), observed the percentage of bilateral presence of posterior condylar canal was 48.33%, left unilateral presence was 18.33% and right unilateral was 15% and the canal was absence in 16.66% of skulls.⁽⁹⁾

In present study it is found that out of 228 skulls, 111 skulls showed bilateral presence of posterior condylar canal with an incidence 48.68%, right unilateral 44 skulls with an incidence 19.29%, left unilateral presence seen in 35 skulls with an incidence 15.35% and canal was absent in 38 skulls with an incidence 16.66%. Thus the present study coincides with Manoj Kumar’s study.

S. Kavitha, A Anand (2013), found patent foramen in 62.58% of skulls and it was more on right side 69.5% and left side 30.4%.⁽⁷⁾

Goda J. Patel S, Chandravadiya L. (2013), observed patent canal was intrasinus type found in 71.88% of skulls, bilateral presence of intrasinus type was 64.94%, 12.5% intrasinus on right side and 9.37% found on left side.⁽⁸⁾

Present study shown total 80% intrasinus type and 20% retrosinus type. Bilateral presence of posterior condylar canal showed 80.19% were intrasinus and 19.81% were retrosinus, Right

unilateral shown 72.27% intrasinus and 22.72% retrosinus, Left unilateral presence showed 82.25% intrasinus and 17.14% was retrosinus.

Hence a thorough anatomical knowledge of posterior condylar canal is essential prior to performing interventions in this area so as to avoid surgical complications.

Conclusion

- Anatomical variations of posterior condylar canal is important for Radiologist to interpret the x-rays, CT scans and MRI imaging.
- It is clinically important during transcondylar approaches for Neurosurgeons and ENT surgeons. Thus study gives basic knowledge to surgeons before planning a surgery in occipital condylar regions.
- Condylar vein can be used as access route to hypoglossal dural arteriovenous fistulas thus variations of posterior condylar canal are important during treatment of arteriovenous fistulas.

References

1. Boyd GI. The emissary foramina of the cranium in man and the anthropoids. *J. of Anat* 1930; 65:108 - 121.
2. Dimple Dev V., Suman U., Shubha R. Study of incidence, laterality and patency of the posterior condylar canal in 100 dry human skulls. *Int J. Anat. Res* 2015, Vol 3(1):831-34. ISSN 2321- 4287
3. Usha Kothandaraman, Sadhu Lokanadham, Posterior condylar foramen - anatomical variation, *International Journal of Medical Science and Public Health* | 2015 | Vol 4 | Issue 2
4. Ginsberg LE. The posterior condylar canal. *Am J. Neuroradiol* 1994; 15: 969-972.

5. Krause W. The posterior condylar canal. *Treaty of human anatomy*. Barcelona, Salvat 1998; 1: 152- 158.
6. Berge JK.; Bergman RA. Variations in size and in symmetry of foramina of the human skull. *Clin. Anat.* 6:406-13, 2001.1
7. S Kavitha, A Anand. A study of the condylar canal and its incidence, morphology and clinical significance. *Int j. cur res rev*, jan 2013; 05(02): 66-70.
8. Goda J, Patel S, Chandravadiya L, Rupareliya S, Patel S, Chavda S. Variations of the posterior condylar canals. *Int J. Res Med* 2013; 2(1): 118-120.
9. Manoj Kumar. Variations of Posterior Condylar Canal in South Indian Skulls. *J. Pharm. Sci. & Res.* Vol. 7(9), 2015, 762-763.