



## MORPHOMETRIC ANALYSIS OF OPTIC CANAL LENGTH IN DRY HUMAN SKULLS OF RAJASTHAN STATE

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### ABSTRACT

**Introduction:** Optic Canal is situated in between the two roots of lesser wings of sphenoid, lateral to body of sphenoid. It is traversed by the optic nerve and ophthalmic artery, the nerve being medial to the artery. The study of optic canal has enormous clinical significance as the optic nerve "The Nerve of Vision" travels through it. The present study was undertaken with the aim to determine the length of optic canal in dry human skulls of Rajasthan State. **Materials and Methods:** The present study was conducted using 400 dried human skulls and lengths of the optic canal were measured along the medial wall. **Results:** The length of optic canal at right side was  $7.12 \pm 1.29$  mm and at left side was  $6.99 \pm 1.27$  mm. **Conclusion:** Detailed anatomy of the optic canal is important to decipher the various pathologies of the region as well to guide surgical procedures and therapeutic options.

**KEYWORDS :** Optic canal , orbit, length, variations

### INTRODUCTION

Optic canal is one of the channels of communication between orbit and middle cranial fossa. It has two openings i.e., orbital opening and cranial opening. It is situated in between the two roots of lesser wings of sphenoid, lateral to body of sphenoid. It is traversed by the optic nerve and ophthalmic artery, the nerve being medial to the artery<sup>1</sup>. The artery and nerve are separated by a layer of dense connective tissue which may occasionally be ossified to result in the duplication of the optic canal<sup>2</sup>. The main optic canal and its accessory counterpart are observed to be placed parallel to each other<sup>3</sup>. In these cases, the larger main canal carries the optic nerve with the meninges (Optic canal), while the smaller accessory/duplicated one transmits the ophthalmic artery (Ophthalmic canal)<sup>4</sup>. The variations in the optic canal anatomy can pose a dangerous situation during endoscopic optic nerve decompression and during sphenoid-ethmoid injuries and they can also evoke confusion during the interpretation and the evaluation of the CT scans or the X-rays of the sphenoid-ethmoid region<sup>5</sup>. The present study was conducted with the aim to determine the length of optic canal in dry human skulls.

### MATERIALS & METHODS

The study was conducted on 400 dry human skulls of unknown age & sex procured from the Department of Anatomy, Sawai Man Singh Medical College, Jaipur and various other medical colleges of Rajasthan. The damaged skulls and those having crack or fracture lines in the region of orbit were excluded for the purpose of this study. The presence of optic canal was noted on the both sides of cranial cavity through its cranial aperture (Fig.1). Length of the optic canal was measured by using a marked needle (Fig.2) along the medial wall.



Fig. 2:- A Measuring Needle.

### RESULTS

The lengths of Optic Canal in 400 dry human skulls were depicted in tabulated form in Table 1 whereas Fig. 3 shows the graphical representation of the observed data.

Table 1:- Frequency distribution of Optic Canal length.

Length Interval	Right		Left		p-values
	n	In %	n	In %	
≤ 5	50	12.5%	62	15.5%	0.063NS
6	86	21.5%	79	19.8%	
7	106	26.5%	108	27.0%	
8	82	20.5%	101	25.3%	
9	76	19.0%	50	12.5%	
	400	100%	400	100%	

This table revealed the association of the main optic canal length with sides right and left. At left side, most of the cases in 7mm Length Interval was 27.0% followed by 25.3% in 8mm, 19.8% in 6 mm .In Right side, where cases were observed 26.5% in 7 mm Length Interval followed by 21.5 % in 6mm, 20.5% in 8 mm of length interval . No significant difference was observed in both the sides in distribution of main optical canal length with P value = 0.063NS.

Thus, the length of optic canal at right side was  $7.12 \pm 1.29$  mm and at Left side was  $6.99 \pm 1.27$  mm.

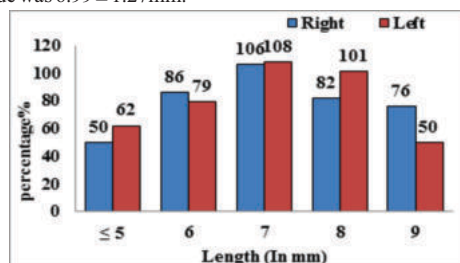


Fig. 3:- Graphical representation of Frequency distribution of main optical canal length.

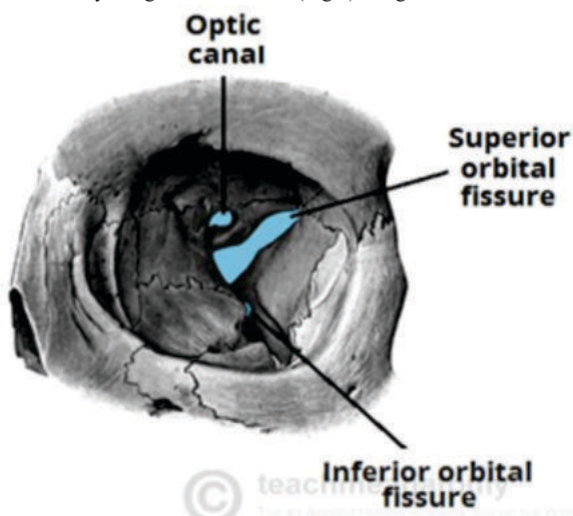


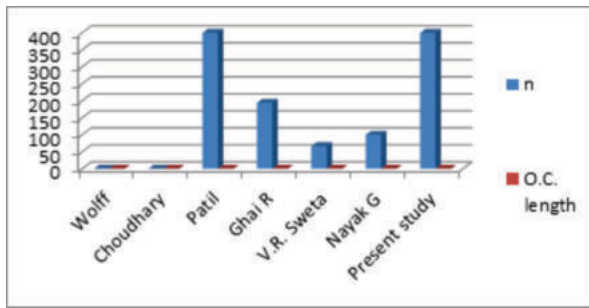
Fig. 1:- The Optic Canal located in the bony Orbit.

**DISCUSSION**

Several authors have previously studied the Optic Canal length as mentioned in Table 2. Fig. 4 depicts the graphical representation of the tabulated data in Table 2.

**Table 2: Comparing Optic Canal Length by various authors with present study.**

Authors	n	O.C. length
Wolff et al5	-	10 - 12
Choudhary et al6	-	9 - 11
Patil et al2	400	8 - 10
Ghai R et al7	194	8 - 12
V.R. Sweta et al3	67	7 - 10
Nayak G et al8	100	8 - 10
Present study	400	5 - 9



**Fig. 3:- Graphical representation depicts the Optic Canal Length of different authors with present study.**

Thus we may conclude that the length of the optic canal varies from 8 to 11mm in both the sides in various studies. These variations can possibly be explained by the fact that anatomical descriptions are not always based on healthy individuals. Other possible explanations for these variances in the description include selection bias, study size, and universal definitions. Anatomical structures can vary between various populations and diverse individuals, yielding different results. So normal anatomy and variations are difficult to determine.

**CONCLUSIONS**

Detailed anatomy of the optic canal is important to decipher the various pathologies of the region as well to guide surgical procedures and therapeutic options. The optic canal transmits the optic nerve, ophthalmic artery, and sympathetic nerve fibers. The study of optic canal has enormous clinical significance as the optic nerve "The Nerve of Vision" travels through it.

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