



## Sutural Morphology of Asterion in Dry Human Skulls

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### ABSTRACT

Sutural bones are usually small, irregularly shaped bones, often found in sutures of the cranium. It is important to know about them as they may complicate the surgical orientation if present in the asterion. The study aims to observe the incidence of the sutural morphology of asterion in dry human skulls. Total 120 human adult dry skulls consisting of 80 male and 40 female skulls were analyzed for Type-I and Type-II asterions. out of 120 skulls, (n=240) Type-I asterion was observed in 36 (15%) skulls, and Type-II was observed in 204 (85%) skulls. Type-I was 28 (17.5%) in males, 8 (10.0%) in females and 36 (15.0%) in total skulls. Type-II was 132 (82.5%) in males, 72 (90.00%) in females and 204 (85.0%) in total skulls. In the present study, the incidence of Type-I asterion was found more in males than females. The study can be useful to neurosurgeons, forensic experts, anthropologists and radiologists.



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### INTRODUCTION

Asterion is the point where the parietal, temporal and occipital bones meet. It is the surgical landmark to the transverse sinus location, which is of immense importance in the surgical approaches to the posterior cranial fossa (Martinez *et al.*, 2005). Sutural bones are usually small, irregularly shaped bones, often found in sutures of the cranium. These bones appear in addition to the usual centres of ossification of the cranium and are uncommonly seen (Ersoy *et al.*, 2003). The sutural morphology

was classified into two types: Type -I where a sutural bone was present and Type -II where the sutural bone was absent. It is imperative to know about these bones because they can mislead in the identification of fracture of skull bones in medico-legal cases and may confuse the surgical orientation if present in the asterion (Soames *et al.*, 2004). Hence the study of sutural morphology of asterion was planned.

### MATERIALS AND METHODS

Total 120 human adult dry skulls consisting of 80 male and 40 female skulls were analyzed for Type-I and Type-II asterions. The skulls were retrieved from the Department of Anatomy, SGT medical college, Gurugram and PGIMS, Rohtak. Asterion on both sides of skulls was examined.

### RESULTS

**Type -I** where a sutural bone was present.

**Type -II** is where the sutural bone was absent.

Both Type-I (Figure 1) and Type-II (Figure 2) of asterions were examined in male and female skulls.

**Table 1: Incidence of Types of Asterion in Male and Female Skulls**

Gender	Type-I	Type-II	Total
Male (n=160)	28 (17.5%)	132 (82.5%)	160 (100%)
Female ( n=80 )	8 (10%)	72 (90%)	80 (100%)
Total (n=240)	36 (15%)	204 (85%)	240 (100%)
$\chi^2$	2.353		
p value	0.125		

**Table 2: Incidence of Types of Asterion in Males on Right and Left Sides**

Side	Type-I	Type-II	Total
Right (n=80)	14 (17.5%)	66 (82.5%)	80 (100%)
Left ( n=80 )	14 (17.5%)	66(82.5%)	80 (100%)
Total (n=160)	28 (17.5%)	132 (82.5%)	160 (100%)
$\chi^2$	0.000		
p-value	1.000		

**Table 3: Incidence of Types of Asterion in Females on Right and Left Sides**

Side	Type-I	Type-II	Total
Right (n=40)	3 (7.5%)	37 (92.5%)	40 (100%)
Left ( n=40 )	5 (12.5%)	35 (87.5%)	40 (100%)
Total (n=80)	8 (10.0%)	72 (90.0%)	80 (100%)
$\chi^2$	0.556		
p-value	0.456		

**Table 4: Comparative Analysis of Types of Asterion**

Author	Population	No. of skulls	Type-I Asterion	Type-II Asterion
(Carolineberry and Berry, 1967)	Americans	50	12%	88%
(Gümüşburun <i>et al.</i> , 1997)	Turks	302	9.92%	90.08%
(Singh, 2012)	Indian	55	16.3%	83.6%
(Mwachaka <i>et al.</i> , 2009)	Kenyan	79	20%	80%
(Modasiya and Kanani, 2018)	Gujarati	110	8.18%	91.12%
Havaladar <i>et al.</i> (2015)	South-Indian	250	19.2%	80.8%
Present study	Indian (Haryana)	120	15%	85%



**Figure 1: Arrow showing Type-I asterion**



**Figure 2: Arrow showing Type-II asterion**

Both left and right side of the skulls were examined. Out of the total 120 skulls, Type-I asterion was observed in 36 (15%) skulls, and in 204 (85%) skulls Type-II was observed (Table 1). Out of 80 male skulls, Type-I asterion was observed in 14 (17.5%) on both right and left sides, whereas the incidence of Type-II was observed 132 (82.5%) on both left and right sides (Table 2). Out of 40 female skulls, 5 (12.5%) asterion of Type-I was found on the left side and 3 (7.5%) on the right side while on the left and right side the Type-II asterion was observed in 72 (90%) of total skulls (Table 3). In the present study, the incidence of Type-I asterion was found more in males than females.

## DISCUSSION

In the present study, two types of asterion were observed, Type-I was 28 (17.5%) in males, 8 (10.0%) in females and 36 (15.0%) in total skulls. Type-II was 132 (82.5%) in males, 72 (90.00%) in females and 204 (85.0%) in total skulls. In North American skulls, Type-I was observed in 12% and

Type-II in 88% skulls (Carolineberry and Berry, 1967). In another study in Turks, Type-I was observed in 9.92%, and Type-II was in 90.8% of skulls (Gümüşburun *et al.*, 1997). In the Indian population, it was reported 16.36% as Type-I and 83.64% as Type-II (Singh, 2012). In Kenyans, it was reported Type-I as 20% and Type-II as 80% Mwachaka *et al.* (2009) (Table 4). In the present study, the incidence of Type-I asterion was found more in males than females.

## CONCLUSIONS

This study may be useful to neurosurgeons while performing surgery via craniometric point and to radiologists when interpreting radiological images of fractured skulls. It may also be useful to forensic experts and anthropologists in the identification of male and female skulls.

## Conflict of Interest

The authors declare that they have no conflict of interest for this study.

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