



Age determination by spheno-occipital synchondrosis fusion in Central Indian population

Rajeshwar Sambhaji Pate^a, Chaitanya Vidyadhar Tingne^{b,*}, Pradeep Gangadhar Dixit^b

^a Department of Forensic Medicine and Toxicology, Rajiv Gandhi Government Medical College, Kalva, Thane, Maharashtra, India

^b Department of Forensic Medicine and Toxicology, Indira Gandhi Government Medical College, Nagpur, Maharashtra, India

ARTICLE INFO

Keywords:

Forensic medicine
Spheno-occipital synchondrosis
Fusion
Age determination
Central India

ABSTRACT

The spheno occipital suture synchondrosis is a vital contributor to adolescent and adult age estimation in that it can provide an upper or lower age bound depending on its state of fusion. The present study evaluates the utility of the spheno-occipital suture fusion in age estimation of the Central Indian population. The sample includes 198 (117 males and 81 females) cadavers aged between 8 to 26 years. Grading was done using Mitra-Akhalghi Scale as - Open, Semi closed and Closed. Our study demonstrates that a significant linear correlation exists between the age of an individual and spheno-occipital suture closure for both the sexes and observation of the degree of fusion of this single suture allows the prediction of age in mature individuals.

1. Introduction

Age estimation is of paramount importance in cases where bodies are found in decomposed, mutilated state or only fragmentary remains are discovered.^{1,2} Estimation of age is usually most accurate in the early phases of development and greatly depends on the state of preservation of diagnostic features in the remnants.³ Since the bone resists putrefaction and destruction by animals, they can lead to the reliable determination of age, sex, race and stature of the individual.⁴ Sometimes even when the age of person is known by the horoscope, hospital records and birth certificate, its scientific confirmation is required by court of law and certain administrative departments. The spheno occipital suture synchondrosis is a vital contributor to adolescent and adult age estimation as it can provide an upper or lower age limit depending on its state of fusion. This information is particularly useful when combined with information obtained from other epiphysis and the dentition, but in the absence of supplementary skeletal evidence; the basilar suture (spheno-occipital suture) is used frequently as a stand-alone indicator.⁵ The present study was designed to evaluate the utility of the spheno-occipital suture fusion in age estimation of the Central Indian population.

2. Material and methods

2.1. Sample

The sample consisted of 198 (117 males and 81 females) cadavers

aged between 8 and 26 years (Table 1) brought for medicolegal autopsy to Department of Forensic Medicine at a major teaching hospital in Central India. Each and every case was positively identified by the accompanying relatives and a documented proof of age was obtained in all cases. The initial study sample comprised of 291 cases, however individuals (n = 93) with known developmental disorders, unknown age or those who had suffered major head trauma involving base of skull were excluded.

2.2. Grading

The skull cap was removed using an electric saw and brain taken out after dividing medulla just below the foramen magnum. The dura was completely stripped off along with the remnants of nerves from the surface of endocranium. Dura adherent to the area between the rostral margin of foramen magnum and body of sphenoid bone and clenoid process anteriorly was cleared and the state of closure of the suture established. The length of cartilaginous part of the suture was measured by STANLAY™ digital Vernier calliper (Range – 0.00–150 mm, Accuracy - $\pm 0.02\text{mm}/\pm 0.001$) and its consistency examined with scalpel. Grading was done using Mitra-Akhalghi Scale as - Open (0): suture was open or less than $\frac{1}{4}$ has been calcified, Semi closed (1+): more than $\frac{1}{4}$ and less than $\frac{3}{4}$ of cartilage had been calcified and Closed (2+): more than $\frac{3}{4}$ has been calcified (see Figs. 1–3).

* Corresponding author.

E-mail address: ctingne@gmail.com (C.V. Tingne).

<https://doi.org/10.1016/j.jflm.2017.12.013>

Received 8 December 2016; Received in revised form 30 November 2017; Accepted 30 December 2017

Available online 03 January 2018

1752-928X/ © 2018 Elsevier Ltd and Faculty of Forensic and Legal Medicine. All rights reserved.

Table 1
Actual number of individuals in each stage of fusion for males and females.

Age	Males (n = 117)			Females (n = 81)		
	Open	Semi-closed	Closed	Open	Semi-closed	Closed
8	1	0	0	4	0	0
9	3	0	0	1	0	0
10	2	0	0	1	0	0
11	2	0	0	1	1	0
12	1	0	0	1	1	0
13	2	0	0	0	2	0
14	1	1	0	0	1	1
15	1	1	0	0	0	1
16	0	6	0	0	0	2
17	0	7	3	0	0	6
18	0	5	3	0	0	9
19	0	1	5	0	0	9
20	0	0	19	0	0	11
21	0	0	11	0	0	2
22	0	0	16	0	0	14
23	0	0	13	0	0	5
24	0	0	5	0	0	3
25	0	0	7	0	0	4
26	0	0	1	0	0	1
Total	13	21	83	8	5	68
Mean age	11.11 ± 2.12	16.80 ± 1.16	21.48 ± 2.05	9.25 ± 1.58	12.6 ± 1.14	20.27 ± 2.65
Range at 95% CL (years)	9.96–12.26	16.30–17.30	21.04–21.92	8.15–10.35	11.60–13.60	19.64–20.90

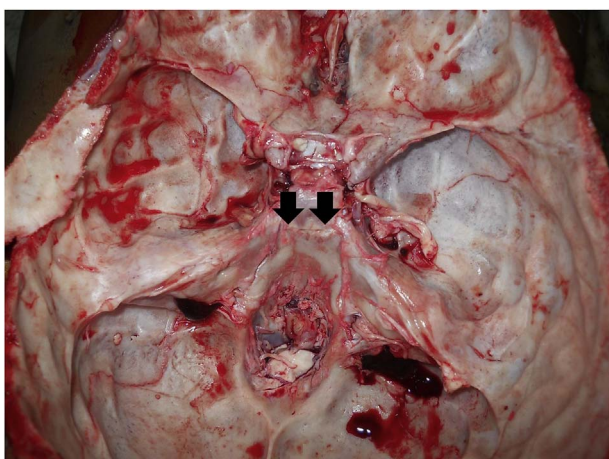


Fig. 1. Skull base showing Open sphenoparietal suture.

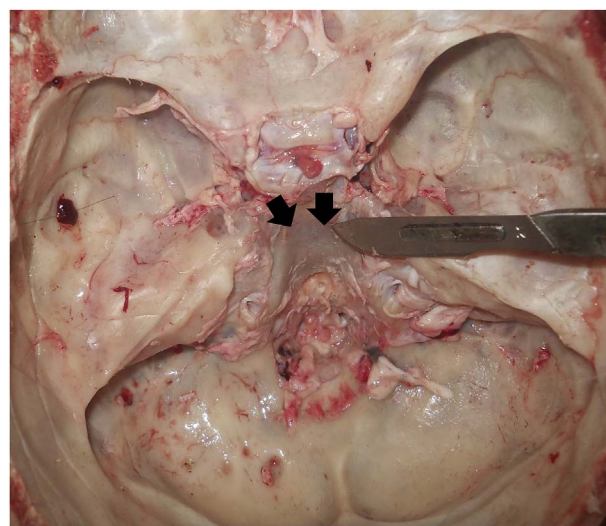


Fig. 3. Skull base showing closed sphenoparietal suture without scar.

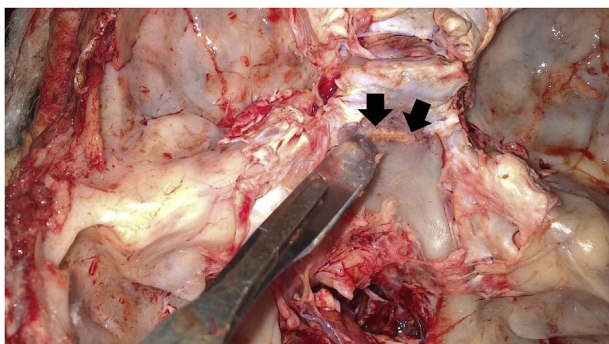


Fig. 2. Skull base showing semi-closed sphenoparietal suture.

2.3. Statistical analysis

The developmental score for sphenoparietal suture closure and the corresponding age of the individual were analysed using Medcalc statistical software version 13.1.0.0. The status of suture closure grades were compared among three groups using One way Analysis of

Variance [i.e. ANOVA] (F-test). The ‘p’ value ($p < .05$) was considered as statistically significant. A Spearman's rank correlation coefficient (ρ) was calculated to test the relationship between age and phase. While this is not a direct test of observation error, a strong correlation presumably indicates relative consistency in scoring.

3. Results

Amongst 117 male cadavers 13 had open suture. The mean age of male cadavers with open suture was 11.11 (SD ± 2.12) years. Maximum age in the group with open suture was 15 years. Twenty one male individuals had semiclosed suture with a mean age of 16.80 (SD ± 1.16) years and an age range of 14–19 years. Eighty three male cases had closed suture. Mean age of male cases with closed suture was 21.48 (SD ± 2.05) years and the lowest age in closed suture group was 17 years (Table 1).

As far as female cases were concerned, 8 cases had open suture with a mean age of 9.25 (SD ± 1.58) years. Maximum age in the open

Download English Version:

<https://daneshyari.com/en/article/6555047>

Download Persian Version:

<https://daneshyari.com/article/6555047>

[Daneshyari.com](https://daneshyari.com)