



## RADIOLOGIC MEASUREMENTS OF THE SELLA TURCICA IN AN ADULT NIGERIAN POPULATION

\*<sup>1</sup>Osunwoke EA, <sup>2</sup>Mokwe CR, <sup>3</sup>Amah-Tariah FS

<sup>1&2</sup>Department of Human Anatomy, Faculty of Basic Medical Sciences, University of Port Harcourt, Nigeria.

<sup>3</sup>Department of Human Physiology, Faculty of Basic Medical Sciences, University of Port Harcourt, Nigeria.

### ABSTRACT

The sella turcica is an osseous structure closely related to the hypophysis cerebri (or pituitary gland). This study was carried out to analyze the dimensions of the sella turcica of adult Nigerian skulls using two parameters; length and depth. The study was carried out on 100 lateral radiographs comprising of 69 males and 31 females. The results obtained showed the Mean  $\pm$  SD of the length and depth of the sella turcica as  $12.59 \pm 1.59$ mm and  $8.94 \pm 1.99$ mm respectively. For males, the Mean  $\pm$  SD of the sella turcica length was found to be  $12.61 \pm 1.64$ mm and depth was found to be  $8.97 \pm 2.11$ mm, for that of females, the Mean  $\pm$  SD of the sella turcica length was found to be  $12.55 \pm 1.50$ mm and depth was found to be  $8.87 \pm 1.75$ mm respectively. Results showed an insignificant ( $P > 0.05$ ) difference between the dimensions of male and female subjects. The results of this study will serve as a normative reference standard that could assist in a more objective evaluation and detection of pathologic conditions of the sella turcica and its associated pituitary gland. The study could also find use in other fields such as anthropology and forensic medicine

**Keywords:** Sella turcica, Radiologic, Nigeria.

### INTRODUCTION

Investigations concerning the sella turcica focus on size and morphology. Normal anatomical variation of the sella turcica must be considered, as it may vary greatly in normal adult individuals [1,2]. The sella turcica is an osseous structure closely related to the hypophysis cerebri (or pituitary gland). It has additional clinical significance, since its morphology reflects, to some extent that of the pituitary gland itself. Clinicians should be familiar with the normal radiographic anatomy and morphologic variability of this area, in order to recognize and investigate deviations that may reflect pathological situations, even before these become clinically apparent [3, 4, 5]. The anatomy of the sella turcica is variable in size and shape. It has been classified into three types: round, oval or flat [6]. It can also be deep or shallow in both children and adults. The predominant shape of the sella turcica in African subjects studied was oval and the difference in frequency of oval shaped sella and that of a round or flat type is highly statistically significant [7]. Profile radio graphs of 177

individuals who had undergone combined orthodontic and surgical treatment have been studied and results revealed the presence of sella turcica bridge (fusion of anterior and posterior clinoid processes) in 33(18.6%) of the 177 subjects studied. Of 33 persons, 10 had a type A sella turcica bridge and 23 had a type B sella turcica bridge [8]. Sellar volume increases with age: for example mean volume for a boy 5 years 9 months to 6 years 8 months is  $228 \text{ mm}^3$ , for a boy 15 years 9 months to 16 years 8 months is  $640 \text{ mm}^3$  [9].

In a cephalometric study of the sella turcica using standardized lateral cephalograms of 184 healthy Greeks (91 males and 93 females), it was revealed that the shape of the sella turcica was different between genders, age was not found to be correlated with shape coefficients and allometry was observed in both genders with the sella showing a tendency towards a flatter and wider shape with increase in size [10]. According to some researchers, the normal range of the sella turcica varies between 11-16mm in length and

8-12mm in routine bilateral x-ray film of skulls [11]. Bergland *et al.*, studied the sella turcica in connection with 225 autopsies and found 6 percent with a sella turcica bridge by direct inspection [12]. A researcher, classified the sella turcica into three segments; an anterior wall, the floor and the posterior wall (the dorsum sellae).The shape was described as round ,oval or flat, the round and oval types being the most common [13].

It has been found that altered sella turcica morphology is present in patients with spina bifida [14]. Quaknine and Hardy made radiological observations in 266 patients and reported that the sella floor was regular and symmetrical in 252 cases (94.7%) and asymmetrical or slightly oblique in 14 cases (5.3%)[15]. It has been revealed that the sella area correlated poorly with the size of the pituitary gland[16].

This study is aimed at analyzing the dimensions of the sella turcica of unsexed adult Nigerian skulls.

**MATERIALS AND METHOD**

A total number of one hundred (100) samples of lateral X-rays gotten from University of Port Harcourt Teaching Hospital (UPTH) and Braithwaite Memorial Hospital (BMH), both in Rivers State, Nigeria were used for this research. The radiograph of skulls used in this study were selected on the basis of the fact that the crania were completely ossified, there were no degenerative changes, no

bone growth or destruction in the hypophyseal region. Lateral radiographs were mounted on an X-ray viewing box and measurements taken directly from the radiographs with the aid of a meter rule. Using a digital vernier caliper and a meter rule, the length and depth of the sella turcica were measured in a sagittal plane from the margin of the tuberculum sella to the dorsum sella, because the sella turcica is limited anteriorly by tuberculum sella and bounded posterior by the dorsum sella. The depth of the sella turcica was measured using the distance from the posterior clinoid process to the base of the fossa. The dimensions of the sella turcica were measured in the antero-posterior and vertical directions. The length or antero-posterior measurements were taken from the most dorsal point of the tuberculum sella in the sagittal plane to the anterior edge of the dorsum sella in the same plane. This represents the true antero-posterior dimension of the outlet of the pituitary fossa. The vertical or depth measurement was taken along a line dropped from the antero-posterior line to the deepest point on the floor of the sella.

**RESULT**

The result of this study is presented in the table below. Table 1 is showing the mean and standard deviations of the length and depth of the sella turcica using radiographs.

**Table1. Mean and Standard deviation of the length and depth of the sella turcica using radiographs**

Length (mm)	N	Mean±SD
Males	69	12.6±1.64
Females	31	12.55±1.50
(P>0.05)		
Depth		
Males	69	8.97±2.11
Females	31	8.87±1.75
(P>0.05)		
Total	100	

**DISCUSSION AND CONCLUSION**

Investigations concerning the sella turcica focus on the size and morphology. Consequently, beyond its obvious anatomical importance it has additional clinical significance, since its morphology reflects to some extent that of the pituitary gland itself. This research work was conducted to analyze the dimensions of the sella turcica of the adult Nigerian skulls using two parameters; length and depth. From the studies on the lateral radiographs, analysis of the resultant mean and standard deviations showed that there was no significant difference between the sexes. This is not in line with the works of some researchers in which they found gender differences between both sexes in the shape and dimensions of the sella turcica with males having larger values than the females [17,-19] Axelsson *et al* found gender differences in their study of the length and depth of

the sella turcica [19]. This corroborates our findings in this study. According to Clucton *et al*,[11] the normal range of the sella turcica varies between 11-16mm in length and 8-12mm in routine bilateral x-ray film of skulls. This falls in line with our findings on the dimensions measured in this study. The values obtained for the Igbos and Yorubas by Akpuaka *et al*. [20] indicated that the mean length and depth of the sella turcica in Igbo subjects were 10.92±1.56mm and 5.52±0.89mm respectively. While for the Yoruba subjects it was 11.10±1.47mm and 6.96±1.38mm respectively. The values obtained in this study were higher than that obtained by Akpuaka *et al* [20].

This research work has further assisted in establishing a normative data on the dimensions of the sella turcica from lateral radiographs especially in the southern

part of Nigeria. The results of this study will serve as a normative reference standard that could assist in a more objective evaluation and detection of pathologic conditions

of the sella turcica and its associated pituitary gland. This study could also find use in anthropology and forensic science.

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