

Morphological Variation in Size and Shape of Sella Turcica in North Gujarat Population

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Abstract

Introduction: The sella turcica, which is visible on conventional or digital lateral cephalography, is commonly traced for cephalometric analysis. About any pathology in the craniofacial area, this offers helpful diagnostic information. It is regarded as the most significant anatomical landmark for the purposes of orthodontics and may be clearly assessed on lateral cephalograms. Both its size and shape may exhibit anatomical variation. Individuals may have different sizes of Sella turcica. **Aim:** To assess any size discrepancy between men and women in the research population, as well as the sella turcica's average size and morphological variability among different age groups. **Objectives:** To ascertain the relationship between age and gender and the morphological differences of the sella turcica. **Material and Method:** The study focused on 100 previously acquired lateral cephalometric radiographs of patients from the Department of Oral Medicine & Radiology who met the selection criteria. These patients were divided into two groups, Group 1 for subjects between the ages of 10 and 19 and Group 2 for subjects between the ages of 20 and 30. In order to distinguish the morphological variety of sella turcica from normal morphology, linear measurements (Size) in sella turcica were taken in accordance with Silverman's guidelines. **Results:** The study found that, except from width, males had higher linear measurements than females. In contrast to other morphologies, the normal sella turcica shape, an irregular dorsum, and a double contour were more frequently seen in females than in males. **Conclusion:** The study found that, although it was not statistically supported, the form and size of the sella turcica varies according to participant's age and gender.

1. Introduction

A saddle shaped concavity present on the sphenoid bone is home to the sella turcica. The pituitary gland's

home, the central pituitary fossa, is a part of it. On its anterior and posterior edges, the tuberculum and dorsum sellae, respectively. The term "Sella turcica" alludes to the saddle-like appearance of the object.¹ The

two anterior and two posterior clinoid processes come from the pituitary fossa.²

Several studies have demonstrated the sella turcica's typical size and shape. It is easily visible on lateral cephalograms and is considered to be the most important anatomical marker for orthodontic purposes. Its dimensions and shape can vary anatomically in a number of ways. Size variations between individuals are possible for Sella turcica. The sella turcica typically has a posteroanterior dimension of 5-16 mm and a vertical dimension of 4-12 mm. Round, flat, and oval sella turcica are only a few variations.³

The abnormality in the size of sella turcica may indicate underlying diseases and pathologies such as adenomas, down's syndrome etc. based on the pituitary function.⁴⁻⁶

2. Methodology

Previously obtained 100 lateral cephalometric radiographs of patients using the machine of Kodak 8000C with Digital Panoramic & Cephalometric System available in the department of Oral Medicine & Radiology, fulfilling the data selection criteria were selected randomly and were divided in to 2 groups. Each group will comprise of 50 patients.

Group 1 – lateral cephalometric images from subjects between 10 to 19 years of age . Group 2 – lateral cephalometric images from subjects between 20 to 30 years of age

The selected patients were further grouped and equally distributed according to gender (male and female, 25 subjects of each group). The lateral cephalometric radiographs were thoroughly examined. Then, general information such as name, age & gender and dimension & morphologic variety with or without any abnormality was recorded in proforma. The dimensional measurements of sella turcica were done using Kodak Imaging software 6.12.18.9. Linear measurements (Size) in sella turcica were measured according to Silverman (Figure 1)⁷:

1. The length was calculated by taking measurements between the the tuberculum sellae (TS) and dorsum sellae (Sp).
2. The depth was measured using the line above to the deepest point on the floor of the fossa (BPF).
3. The anteroposterior maximum diameter was measured from the tuberculum sellae (TS) to the

farthest point on the posterior inner wall of the fossa. • The reference of axelsson et al. study was taken into account to determine the morphological variety of sella turcica apart from normal morphology (Figure 2).⁸ To analyze the data student's t test and chi square test were conducted in SPSS software version 27.0.

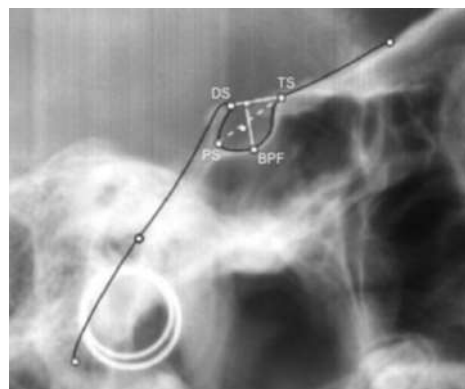


Figure 1 Radiographic and schematic image³ showing linear proportions of sella turcica.

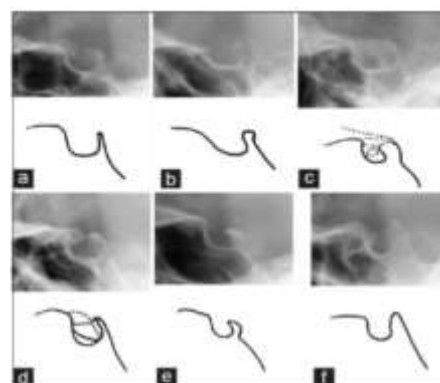


Figure 2: Axelsson's morphological variations of sella turcica.

3. Result:

The distribution of study participants based on their gender and different assessment parameters are shown in table 1. Out of the 50 male participants. The mean value was 8.5 mm and 7.4 mm for length and depth of sella turcica, respectively and 10.3 was the AP diameter. Similarly, out of 50 female participants, the mean value was 8.2 mm and 7.5 mm for Length and depth of sella turcica, respectively and 10 mm was the AP diameter. The difference between gender and different assessment parameters is not significant statistically.

Table 1: Distribution of study participants based on their gender and different assessment parameters

Assessment parameters	Sex	N	Mean (mm)	Std. Deviation	P value
LENGTH	M	50	8.5	0.5	0.9**
	F	50	8.2	0.5	
DEPTH	M	50	7.4	0.5	0.5**
	F	50	7.5	0.6	
AP DIAMETER	M	50	10.3	0.7	0.2**
	F	50	10.0	0.6	

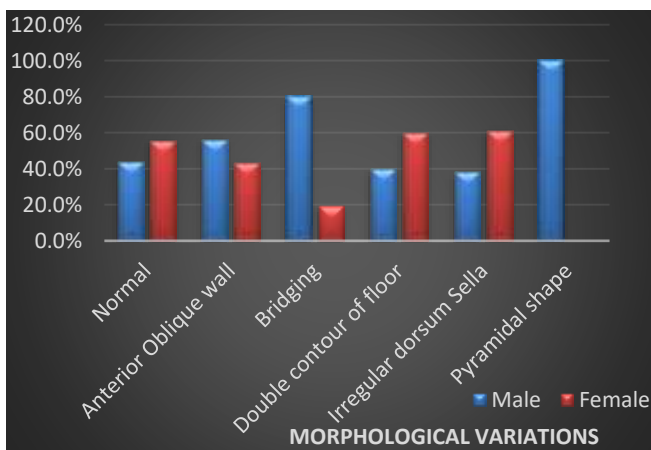
Table 2: Distribution of study participants based on their gender and different assessment parameters

Assessment parameters	Age group	N	Mean (mm)	Std. Deviation	P value
LENGTH	10-19	51	8.3	0.5	0.8
	20-30	49	8.4	0.5	
DEPTH	10-19	51	7.5	0.5	0.1
	20-30	49	7.4	0.6	
AP DIAMETER	10-19	51	10.2	0.7	0.7
	20-30	49	10.1	0.6	

The distribution of study participants based on their sex and different assessment parameters are shown in table 2. Out of the 51 participants between group 1 (10-19 years) mean range was 8.3 mm and 7.5 mm for Length and depth of sella turcica and the AP diameter was about 10 mm. Similarly, out of the 49 participants between group 2 (20-30 years), the mean range was 8.2 mm and 7.5 mm for length and depth of sella turcica and 10 mm was the AP diameter. But, the difference between gender and different assessment parameters is

not significant statistically.

Graph 1: Distribution of study participants based on their gender and morphological variation of sella turcica



Graph 1 displays the distribution of study participants according to their gender and morphological variation of sella turcica. It presents, 50% have normal morphology, 23% have anterior oblique wall, 5% have bridging sella turcica, 5% have double contour of floor, 13% have Irregular dorsum Sella and 4% have Pyramidal shape sella turcica. The difference between gender and morphological variation of sella turcica is statistically non-significant.

4. Discussion

According to the current study, the Sella turcica's AP diameter, length and width were having negligible difference in the values for men and women. The difference in these measurements between the sexes and age was non-significant.

Similar conclusions were reached by Bains S. et al.³ in their study, which found that the male and female Sella turcica had diameters of 10.62 mm and 10.57 mm, respectively, as well as lengths of 8.50 mm and 8.48 mm and widths of 8.24 mm and 8.22 mm. There was no obvious difference in the sexes. Chaitanya B et al.⁴ reported similar results as well. They discovered that Sella turcica had an AP diameter of 10.2 mm in males and 10.53 mm in females, a length of 8.25 mm and a width of 7.18 mm in males and 7.35 mm in females. Differences in age and gender were not statistically significant. Moreover, the difference between the linear measurement as per gender was present but was not statistically significant, according to Kumar TS et al.² Yet, when connected with age, the linear measuring

parameters were statistically significant.

The present study also observed that a normal morphology was encountered in 44% males whereas 56% in females. Other variations were anterior oblique wall seen in 26% males and 20% females, Irregular dorsum Sella was seen in 10% males and 16% females, bridging in 8% males and 2% females, double contour of floor in 4% males and 6% females, and pyramidal shape was observed 4% only in males, but statistically the difference was not significant.

The study led by Chauhan et al⁹ in which they assessed various forms of Sella turcica in 180 subjects as a general. The results were, only 28% participants were having normal shaped sella turcica, whereas different shapes were exhibited in 72% of participants. Irregular notching in dorsum was seen in 18% of participants, whereas 7% of subjects were having doubled contour floor.

Both the study by Bains S et al.³ and the study by Kumar TS et al.² produced results that were identical. In 40% of males and 41.7% of females, the Sella turcica morphology was normal. Additional variants included an anterior oblique wall in 27.5% of men and 29.1% of women, bridging in 10% of men and 9.1% of women, double floor contour in 6.7% of men and 5% of women, an irregular dorsum Sella in 5.8% of men and 8.3% of women, and a pyramidal shape in 10% of men and 8% of women. The study revealed morphological changes in sella turcica as well as statistically significant gender differences.

5. Conclusion:

The Study found length and AP diameter were observed more in males compared to females whereas, width was observed more in females than in males. But the difference between gender and different assessment parameters is statistically non-significant. The length, width and Ap diameter are slightly higher in the group 1 (19-20 years) and group 2 (21-30 years), but this difference is statistically non-significant. The study found that the normal morphological variations was commonest variation observed, followed by anterior oblique wall, irregular dorsum sella, bridging, double contour of floor and pyramidal shape.

Study also found that normal, double contour of floor and irregular dorsum sella variations were exhibited more in females whereas, anterior oblique wall,

bridging and pyramidal shapes were observed in males than in females. This difference was not significant statistically.

References

- [1] Weems RA, Jacobson A, Richard L. Radiographic Cephalometry from basics to 3-D Imaging. Chicago: Quintessence books; 2006. p. 33-43.
- [2] Kumar TS, Govindraj P. Relationship between the morphological variation of sella turcica with age and gender: A digital radiographic study. *J Indian Acad Oral Med Radiol* 2017;29:164-9.
- [3] Bains SK, Bhatia A, Mehta R. Assessment of morphological variation in size and shape of Sella Turcica in population of Faridkot- A radiographic study. *Baba Farid Univ Dent J* 2019;9(1): 52-57.
- [4] Chaitanya B, Pai KM, Chhapparwal Y. Evaluation of the Effect of Age, Gender, and Skeletal Class on the Dimensions of Sella Turcica Using Lateral Cephalogram. *Contemp Clin Den*.2018;9(2):195-9.
- [5] Nagaraj T, Shruthi R, James L, Keerthi I, Balraj L, Goswami RD. The size and morphology of sellaturcica: A lateral cephalometric study. *J Med Radiol Pathol Surg*. 2015;1:3-7.
- [6] Melek T, Sevgi O. Clinical and radiological significance of sella turcica: A literature review. *IOSR JDent Med Sci*. 2016;15:108-13.
- [7] Scribante A & et al. Sella turcica bridging and dental anomalies: is there an association? *Int J Paediat Dent*. 2017; 27:568-73.
- [8] Axelsson S, Kjaer I, Bjørnland T, Storhaug K. Longitudinal cephalometric standards for the neurocranium in norwegians from 6 to 21 years of age. *Eur J Orthod*. 2003;25:185-98.
- [9] Sathyanarayana HP, Kailasam V and Chitharanjan AB. The size and morphology of sella turcica in different skeletal pattern among South Indian population. A lateral cephalometric study. *J Ind Ortho Soc* 2013; 47: 266-271.