



Sella Turcica Shape's Anomalies in Tunisian Children: Prevalence and Skeletal Class Relationship

Wafa Hammami¹; Hiba GMati²; Sarah DHaoui³; Yamina ELelmi³; Chiraz Baccouche¹; Soumaya Touzi¹; Anissa Zinelabidine²; Hichem Ghedira³

¹Department of Dental Anatomy, Monastir, Tunisia.

²Department of Orthodontic, Farhat Hached Hospital, Sousse, Tunisia.

³Department of Pediatric Dentistry, Monastir, Tunisia.

*Corresponding Author(s): Wafa Hammami

Department of Dental Anatomy, Monastir, Environnement Street, Bouarada 6180, Siliana, Tunisia.

Tel: +21652735739;

Email: hammamiwafaaa@gmail.com

Abstract

Introduction: Cephalometric radiographs are very important tool not only in orthodontic and pedodontic treatment but also in diagnosing of systemic aberrations such as pituitary gland anomaly. The development of Sella Turcica overlapped with it that's why any anomaly of the bony structure can influence the gland [6]. Throughout the literature, many author studied the different anomalies that can affect the shape of the Sella Turcica. The classification of Axelson modified by Becktor seems to be the most detailed and complete [2]. The aim of our study is to investigate the prevalence of Sella Turcica anomalies in the pediatric population and to determinate the relationship between the presence of the different aberrations and skeletal and dento-alveolar malocclusions they presented.

Materials and methods: 104 lateral radiographs were collected from the Department of Pediatric Dentistry of Monastir. Children aged between 7 and 12 years old. The inclusion criteria were: Presence of a malocclusion, good visibility of anatomical structures and absence of congenital craniofacial deformities. Bad quality of radiographs with discrepancies: double limits, deformities and children with hereditary aberrations were excluded. The cephalometric analysis was conduct according to Segner and Hassund's method. The evaluation of ST form was performed according to Axelsson's classification modified by Becktor. The sample size was divided in 2 groups: Group 01 with normal Sella Turcica's shape and group 02 with anomaly. The statistics were established with IBM SPSS STATISTICS 22.

Results: Sella's anomalies was found in about 59.6% with higher value respectively for Oblique anterior wall(15.4%), Incomplete bridge(13.5%), Sella turcica bridge type B(9.6%). Difference between sex was statistically insignificant with $p=0.6$.

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The skeletal class that is related the most to sella turcica anomaly is class I then III then II respectively. Sella turcica bridging is more frequent in skeletal class III than the other classes.

Conclusion: Sella turcica shape anomalies are frequent in the pediatric tunisian population (59.69%). The bridging type seems to be the common most detected aberration in the world.

Children with Sella turcica bridging are characterized by a more distal position of the mandibular basal bone than in unaffected subjects.

Introduction

Several points in the cranium have been defined to facilitate the cephalometric analysis used by orthodontists to determine a diagnosis, establish a treatment plan and superimpose the results on the initial tracing.

Sella Turcica (ST) is an important anatomic structure which contribute to give information about craniofacial development direction [1,7]. It cites the pituitary gland responsible of hormones' growth. So that, any anomaly that alters the pituitary gland can influence the shape of the bony structure [6] as same as that any pathology in the gland can appear from an altered

form of the Sella Turcica. Then, the detection of the morphological anomaly can reveal problems in the regulation of secretion of glandular hormones (prolactin, growth hormones, thyroid-stimulating hormone, and follicular Stimulating hormone) [1] which can lead to growth problems. Pediatric dentist and orthodontists can detect this defect and contribute to an early diagnosis of hormonal troubles.

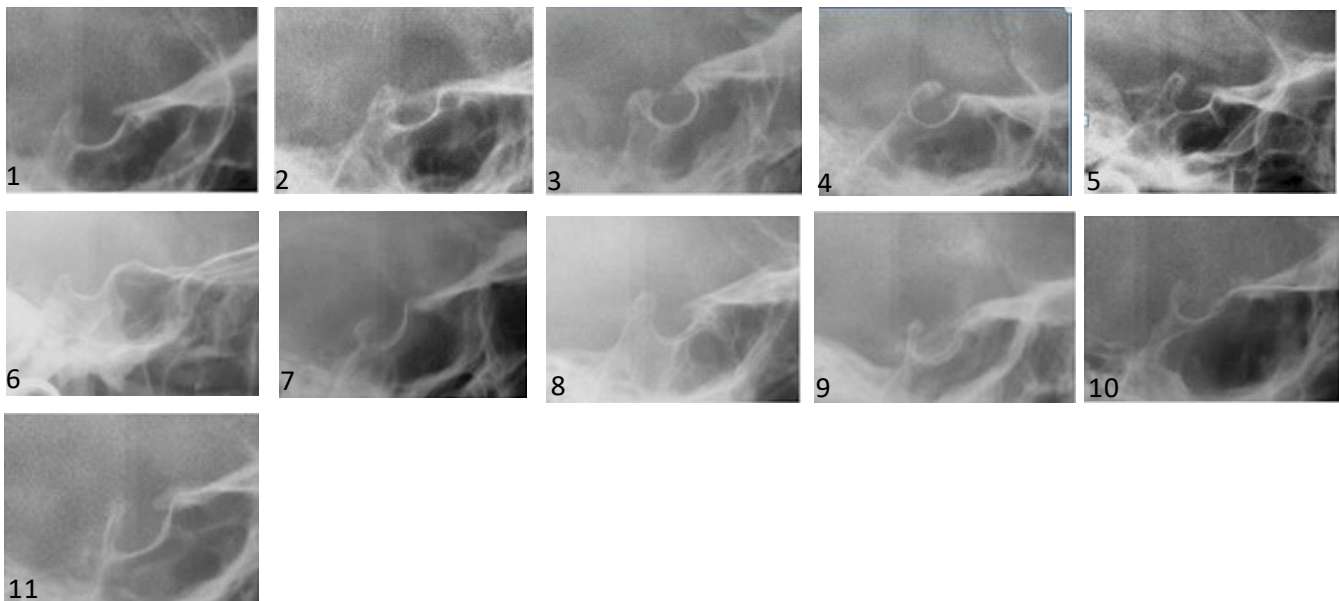
Several studies conducted on the shape of Sella Turcica presented that the final morphological appearance of the Sella Turcica is established in the early embryonic structure [1]. The aim of our study is to investigate the prevalence of Sella Turcica anomalies in the pediatric population and to determinate the relationship between the presence of the different aberrations and skeletal and dento-alveolar malocclusions they presented.

Materials and methods

This is a retrospective study of radiographs of patients seeking orthopedic treatment at the Department of Pediatric dentistry of Monastir of aged between 7 and 12 years old who had consulted for a malocclusion.

The inclusion criteria were: Good visibility of anatomic structures and absence of congenital craniofacial deformities. Cephalometric analysis was performed according to Segner and Hassund's method [6].

Sella Turcica shape's was identified according to Axelsson classification modified by Becktor al.'s (Figure 1).



1: Normal sella turcica; 2: Sella turcica bridge type A—ribbon-like fusion; 3: Sella turcica bridge type B—extension of the clinoid processes; 4: Incomplete bridge; 5: Hypertrophic posterior clinoid process; 6: Hypotrophic posterior clinoid process; 7: Irregularity (notching) in the posterior part of the sella turcica; 8: Pyramidal shape of the dorsum sellae; 9: Double contour of the floor; 10: Oblique anterior wall; 11: Oblique contour of the floor.

Figure 1: Classification of the morphological shape of Sella Turcica according to Axelsson and Becktor.

The sample size was distributed into groups: group 01 of 42 subjects with normal Sella Turcica and group 02 of 64 children with Sella Turcica anomalies. Statistics were established with IBM SPSS Statistics 22.

Intra-observer bias was eliminated by retracing randomly selected 15 cephalograms on two different occasions under similar conditions.

Results

Prevalence of Sella Turcica abnormalities

The prevalence of Sella turcica different shapes was illustrated in the table I. Sella turcica was normal in 40.4% with 21.2% Females and 19.2% males. Sella 's anomalies was found in about 59.6% with higher value respectively for Oblique anterior wall(15.4%), Incomplete bridge(13.5%) and Sella turcica bridge type B(9.6%). Then Sella turcica bridge type A and Oblique con-

tour of the floor (5.8%)following by Double contour of the floor and , Hypertrophic posterior clinoid process(3.8%)and at last Pyramidal shape of the dorsum sellae (1.9%).

Abnormalities of sella turcica and sex

Sella Turcica anomalies was present in 30.7 % of the males and in 28.7% of the females included in the study (Table I).

Oblique anterior wall Was the most found lesion in the females 7.7% while incomplete bridges in the higher type in male group 9.6%.

Although percents of female altered were higher in most of sella’s anomalies,differences between sex’alterations were statistically insignificant with p-value of Pearson test =0.63>0.05 (Table II).

Abnormalities of sella turcica and skelatal class

33% from children with skelatal class I presented normal Sella Turcica (Table III).

The most detected anomaly in skelatal class I ‘s subject was oblique anterior wall. Then respectively results gave Sella turcica bridge type B,Sella turcica bridge type A, Hypertrophic posterior clinoid process,Incomplete bridge and Oblique contour of the floor.

The prevalence of children in skelatal class II with normal Sella was 45.8% .Those with anomalies was 54.2%:Incomplete bridge(20.8%), Oblique anterior wall (12.5%), Double contour of the floor and Oblique contour of the floor(both 8.3%),Sella turcica bridge type B(4.2%) (Table III).

For children with skelatal class III: 40% was with normal Sella Turcica,20% with bridge Type B,20% with incomplete bridge and 20% with pyramidal shape of the dorsum sellae.

Sella turcica bridging was almost found in class III (40%) in the tunisian population (Table III).

Total bridge was most present than pseudo-bridge in class I (29.2% vs 4.2%).

Incomplete bridge was higher than total bridge for skelatal classe II (20.8% vs 4.2%) and equals in class III (20%).

Table 1: Cross table of Sella form and Sex.

	Percents	sex		Total
		Male	Female	
1	%in the sella type	47.6%	52.4%	100%
	% of the total	19.2%	21.2%	40.4%
2	%in the sella type	33.3%	67.6%	100%
	% of the total	1.9%	3.8%	5.8%
3	%in the sella type	40%	60%	100%
	% of the total	3.8%	5.8%	9.6%
4	%in the sella type	71.4%	28.6%	100%
	% of the total	9.6%	3.8%	13.5%
5	%in the sella type	50%	50%	100%
	% of the total	1.9%	1.9%	3.8%
8	%in the sella type	0%	100%	100%
	% of the total	0%	1.9%	1.9%
9	%in the sella type	0%	100%	100%
	% of the total	0%	3.8%	3.8%
10	%in the sella type	50%	50%	100%
	% of the total	7.7%	7.7%	15.4%
11	%in the sella type	100%	0%	100%
	% of the total	5.8%	0%	5.8%
Total	%in the sella type	50%	50%	100%
	% of the total	50%	50%	100%

Table 2: Correlation between sex and Sella form.

Variables	Test	Sex	Sella type
Sex	Pearson Correlation	1	-0.068
	Sig. (2-tailed)		0.633
Sella type	Pearson Correlation	-0.068	1
	Sig. (2-tailed)	0.633	

Table 3: Cross table of Sella form and skeletal classes.

Type of sella	Class I						Class II							Class III				
	0	1	2	3	4	TOTAL	5	6	7	8	10	16	TOTAL	-7	-3	-2	-1	TOTAL
1	12.5%	12.5%	50%	25%	0%	100%	27.3%	27.3%	27.3%	0%	9.1%	9.1%	100%	0%	50%	0%	50%	100%
	4.2%	4.2%	16.7%	8.3%	0%	33.3%	12.5%	12.5%	12.5%	0%	4.2%	4.2%	45.8%	0%	20%	0%	20%	40%
2	0%	0%	33.3%	33.3%	33.3%	100%	-	-	-	-	-	-	-	-	-	-	-	-
	0%	0%	4.2%	4.2%	4.2%	12.5%	-	-	-	-	-	-	-	-	-	-	-	-
3	0%	25%	25%	25%	25%	100%	100%	0%	0%	0%	0%	0%	100%	100%	0%	0%	0%	-
	0%	4.2%	4.2%	4.2%	4.2%	16.7%	4.2%	0%	0%	0%	0%	0%	4.2%	20%	0%	0%	0%	20%
4	0%	0%	0%	0%	100%	100%	40%	60%	0%	0%	0%	0%	100%	0%	100%	0%	0%	100%
	0%	0%	0%	0%	4.2%	4.2%	8.3%	12.5%	0%	0%	0%	0%	20.8%	0%	20%	0%	0%	20%
5	0%	0%	50%	0%	50%	100%	-	-	-	-	-	-	-	-	-	-	-	-
	0%	0%	4.2%	0%	50%	8.3%	-	-	-	-	-	-	-	-	-	-	-	-
8	-	-	-	-	-	-	-	-	-	-	-	-	-	0%	0%	100%	0%	100%
	-	-	-	-	-	-	-	-	-	-	-	-	-	0%	0%	20%	0%	20%
9	-	-	-	-	-	-	0%	0%	0%	50%	50%	0%	100%	-	-	-	-	-
	-	-	-	-	-	-	0%	0%	0%	4.2%	4.2%	0%	8.3%	-	-	-	-	-
10	0%	20%	20%	20%	40%	100%	33.3%	33.3%	0%	0%	33.3%	0%	100%	-	-	-	-	-
	0%	4.2%	4.2%	4.2%	8.3%	20.8%	4.2%	4.2%	0%	0%	4.2%	0%	12.5%	-	-	-	-	-
11	0%	100%	0%	0%	0%	100%	50%	0%	50%	0%	0%	0%	100%	-	-	-	-	-
	0%	4.2%	0%	0%	0%	4.2%	4.2%	0%	4.2%	0%	0%	0%	8.3%	-	-	-	-	-
Total	4.2%	16.7%	33.3%	20.8%	25%	100%	33.3%	29.2%	16.7%	4.2%	12.5%	4.2%	100%	20%	40%	20%	20%	100%
	4.2%	16.7%	33.3%	20.8%	25%	100%	33.3%	29.2%	16.7%	4.2%	12.5%	4.2%	100%	20%	40%	20%	20%	100%

Discussion

The size and form of Sella Turcica depend on the development of pituitary gland. Any deformities detected in the lateral radiographs may be a sign of glandular pathologies which need more investigations.

Sella Turcica was altered in more than the half of the subjects 59.6%. This results are similar to the Indian population [7] with 62.7% but with discordance with the findings of the Polish children 46.9% [6], the Norwegians 65-71% [2] and the Saudis 67% [1]. That may be due to ethnicities and population's proper characteristics.

Anomalies of ST's shape were especially detected in males group. This finding differs with the study of Axelsson et al. who found a dominance of females [2].

In our study, Oblique anterior wall was the most found lesion in the females. This results opposed to the study of Axelsson where this lesion is higher in males [2].

Incomplete bridges was the most detected aberration of sella in the male group

No statistically significant relationship was established between the two sexes which coincides with the literature [2,5,8,9].

Sella Turcica's anomalies highly present for the two sexes, were Oblique anterior wall, Incomplete bridge and Sella turcica bridge.

Sella turcica bridge type A and B were respectively 5.8% and 9.6% which approach to Becktor findings. who reported a true sella turcica bridge in 5.6 % and a pseudo-bridge in 13% [2].

Sella turcica shape anomalies are most detected in children with skeletal class I and II than III.

The most found Anomalie class I 's subject was Oblique anterior wall. Then Sella turcica bridge

type B, Sella turcica bridge type A, Hypertrophic posterior clinoid process, Incomplete bridge and Oblique contour of the floor.

anomalies in class II were: Incomplete bridge, Oblique anterior wall, Double contour of the floor and Oblique contour of the floor, Sella turcica bridge type B.

For children with skeletal class III, it was Sella Turcica bridge type B, incomplete bridge and pyramidal shape of the dorsum sellae.

Sella turcica bridging was higher in class III than II. (table III) which can be considered similar to Polish children [6], Iranian population [9], Valzidahe, Mayer Marcotty and different with the Nepalese population [5] which found that skeletal class II is more common in ST bridging because class II is more common in his population. This variability is due to ethnicities and population specificities.

Total bridge was most present than partial one in class I.

Partial bridge was most detected than total calcification in our study which coincides with Italian children [8] and Polish children's data [6] and differs of Iranian population with higher prevalence in class III than II and I [9]. These differences in bridging may be explained by differences inter populations and ethnicities.

Limits

A true distinction between the bony union in the bridging type seems to be difficult with the 2D radiographs. The use of 3D imaging software is recommended for more precision of the anatomic zone of sphenoid.

Conclusion

The prevalence of dysmorphologies of sella turcica in Tunisian children is about 59.6%.

The shape of sella do not depend of sex

Sella turcica bridging was most present in class III.

The early appearance of sella turcica bridge, should alert clinicians of the possibility of skeletal cranio-facial dysmorphosis.

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