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Association of supernumerary tooth with the normal anatomical variants of sella turcica

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ABSTRACT: Dental anomalies like supernumerary teeth or hyperdontia are found to be associated with the normal anatomical variants of the sella turcica.Sella turcica bridging is the most common normal anatomical variant which are found to be associated with various dental anomalies.The aim of this paper was to study the association of the supernumerary teeth with the normal anatomical variants of the sella turcica. A good quality pre-orthodontic radiographs (panoramic radiographs and cephalographs) of bothgender and between the age group of 11-40 years were collected from thedatabase of the Department of Oral Radiology. Panoramic radiographs were evaluated for the presence/absence of supernumerary teeth while, cephalographs were evaluated for the anatomical variants of sella turcica. The study revealed that out of 845 radiographs, 40 subjects (4.73%) were present with single unilateral supernumerary teeth.Chi-square test revealed a significant association between the occurrence of supernumerary teeth and anatomical variant of sella turcica ($p = 0.003$*). The study concluded that the different variants of sella turcica along with sellar bridging should be taken into consideration while predicting dental anomalies in a subject while evaluating a cephalograph.

KEYWORDS: Anatomical variant, dental anomalies, sella turcica, supernumerary teeth

I. INTRODUCTION

There are numerous dental anomalies which a dentist encountered during day to day practice. These dental anomalies can be broadly divided based upon their shape, size, number, position and eruption. Supernumerary teeth or hyperdontia is the tooth anomaly related to the number. It simply implies the presence of an extra tooth or teeth other than the normal dentition. The prevalence of supernumerary teeth for permanent dentition is between 0.5 and 5.3% and in primary dentition is between 0.2 and 0.8% in various populations.This dental anomaly is also found to be associated with numerous syndromes like cleidocranial dysplasia, Gardner's syndrome, Ehlers–Danlos syndrome, and Fabry–Anderson syndrome. [1]

Dental anomalies like supernumerary teeth or hyperdontia are found to be associated with the normal anatomical variants of the sella turcica. Sella turcica is a saddle shaped concavity which is present on the intra-cranial surface of greater sphenoid bone and acts a home for the pituitary gland. This structure consist of tuberculumsellae, floor, and dorsum sellae. The anatomical variants of sella turcica can be classified into oblique anterior wall, double contour of the floor, irregularity (notching) in the posterior part of the dorsum sellae, pyramidal shape of the dorsum sella ST bridging,hypertrophic posterior clinoid process, hypotrophic posterior clinoid process, and oblique contour of the floor. Sella turcica bridging is the most common normal anatomical variant which are found to be associated with various dentofacial anomalies. [2-8]

The aim of this paper was to study the association of the supernumerary teeth with the normal anatomical variants of the sella turcica.

II. MATERIALS AND METHODS

A good quality pre-orthodontic radiographs (panoramic radiographs and cephalographs) of both gender and between the age group of 11-40 years were collected from thedatabase of the Department of Oral Radiology. All the cephalographic radiographs with poor visibility of sella turcica on cephalogram or cephalograms of the patient with craniofacial anomaly or syndrome, and history of trauma were excluded from the study. Panoramic radiographs with more than one supernumerary tooth were also excluded from the study. A total of 845 radiographs met the inclusion and exclusion criteria. These panoramic radiographs were analysed for the presence of supernumerary teeth. The subjects with supernumerary tooth were taken as cases and rest of the subjects without

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supernumerary teeth were considered as control for the study. The cephalographic radiographs of both case and control subjects were then evaluated for the presence of normal and anatomical variants of sella turcica. The anatomical variants evaluated were namely: oblique anterior wall, double contour of the floor, irregularity (notching) in the posterior part of the dorsum sellae, pyramidal shape of the dorsum sella, sellar bridging (type A, type B, partial),hypertrophic posterior clinoid process, hypotrophic posterior clinoid process, and oblique contour of the floor. Descriptive analysis was done to evaluate the frequency of different shapes of sella turcica in case and control subjects. Chi-square test was done to find the association between supernumerary tooth and anatomical variants of sella turcica.

III. RESULTS

The study revealed that out of 845 radiographs, 40 subjects (4.73%) were present with single unilateral supernumerary teeth. Equal gender predilection (Male: 20; female: 20) were found for the prevalence of supernumerary teeth. The prevalence of different shapes of sella turcica namely normal, type A bridge, type B bridge, partial bridge, hypertrophic clinoid process, hypotrophic clinoid process, notched clinoid process, pyramidal, double contour of the floor, oblique contour of floor, and oblique anterior wall among the subjects without supernumerary teeth was 336, 57, 34, 187, 27, 2, 80, 28, 19, 15, and 20. The prevalence of different shapes of sella turcica namely normal, type A bridge, type B bridge, partial bridge, hypertrophic clinoid process, hypotrophic clinoid process, notched clinoid process, pyramidal, double contour of the floor, oblique contour of floor, and oblique anterior wall among the subjects with supernumerary teeth was 12, 2, 1, 12, 4, 2, 3, 2, 1, 0, and 1. The frequency of the different shapes of sella turcica in the subjects with and without supernumerary teeth is shown in Table 1. Chi-square test revealed a significant association between the occurrence of supernumerary teeth and anatomical variant of sella turcica (p = 0.003*).

Supernumerary teeth	Shape											Total	p value
	← Bridging →												
	Normal	Type A bridge	Type B bridge	Partial bridge	Hypertrophic	Hypotrophic	Notching	Pyramidal	Double contour of floor	Oblique anterior wall	contour of floor		
Absent	336	57	34	187	27	2	80	28	19	15	20	805	
Present	12	2	1	12	4	2	3	2	1	0	1	40	
Total	348	59	35	199	31	4	83	30	20	15	21	845	0.003*

Table 1: Frequency of the different shapes of sella turcica in the subjects with and without supernumerary teeth

IV. DISCUSSION

Embryologically, sella turcica serves as the key area for the migration of the cranial neural crestal cells. These pluripotent cells will migrate into differentcraniofacial development fields. These cells will undergo sequential andreciprocal in these fields to form number of differentiated cells. These cells are responsible for the formation of two important facialprimordia namely, frontonasal process and first branchial arch; which willdevelop into the proximal maxilla and mandible.These primordial structure arethe location for the development of the teeth. These teeth are formed from stomodeal ectoderm and cranial neural crestal mesenchymal cells. Coordinated expression ofthese two cells causes initiation of tooth formation, shaping of the tooth andcytodifferentiation. Hence, it can be concluded that the cranial neural crestal cells which are responsible for the formation of both sella turcica and teeth or in other words, anymalformation/deviation in the morphology of ST can be reflected as the dental anomaly related to shape, size, number or position. [9]

'Bridging' is the most commonly studied anatomical variant of the sella turcica and is found to be associated with the congenitally missing upper lateral incisors and lower second premolars, palatally displaced canine, maxillary malposed canine, dental transposition or supernumerary teeth. [2-8] To the best of our knowledge no studies are done to associate the presence of supernumerary

teeth with other anatomical variants of sella turcica. The reason might being the lower prevalence rate of the other anatomical variants of sella turcica.

Our study showed that the most common anatomical variant of sella turcica found to be significantly associated with the supernumerary tooth was partial bridging. The other anatomical variants found to be associated with this dental anomaly was type A bridge, type B bridge, partial bridge, hypertrophic clinoid process, hypotrophic clinoid process, notched clinoid process, pyramidal, double contour of the floor, and oblique contour of floor however; their prevalence rate was quite low.

V. CONCLUSION

Hence, from the present study we can conclude that the presence of the supernumerary teeth is significantly associated with the anatomical variants of sella turcica. Although, bridging is the most common anatomical variant associated with the supernumerary teeth but, presence of other anatomical variants of sella turcica with hypertrophic clinoid process, hypotrophic clinoid process, notched clinoid process, pyramidal, double contour of the floor, and oblique contour of floor should also be taken into consideration while predicting for the presence of supernumerary teeth in a subject in near by future.

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