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ORIGINAL ARTICLE

Evaluation of Elongated Styloid Process on Digital Panoramic Radiographs in Pune City - A Retrospective Study

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***ABSTRACT*:**
Styloid process is derived from the Greek word 'Stylos' meaning a pillar. Styloid process of temporal bone is a slender projection attached to base of the skull and extends downwards, forwards and slightly medially. From its extremity the stylohyoid ligament passes downwards and forwards to the lesser horns of hyoid bone.The length of the styloid process is usually 2–3 cm. When it is more than 3 cm it is called as elongated styloid process. The elongated styloid process may produce characteristic head and neck pain syndromes, commonly known as Eagle's syndrome. An awareness of this syndrome is important to all health practitioners involved in the diagnosis and treatment of head and neck pain. The objective of the study was to assess the elongation of styloid process on digital panoramic radiographs and to evaluate the prevalence of elongation according to age, gender, side of occurrence and type of elongation. Panoramic radiographs can show an accurate image of elongated styloid process which can confirm the diagnosis. This can prevent misinterpretation of the pathology as tonsillar, dental, pharyngeal and muscular pain. With this in mind, the present study was planned to assess the prevalence of elongated styloid process in 300 Digital panoramic radiographs (600 sides).
Key words: Digital radiograph, eagles syndrome, styloid process.

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INTRODUCTION

Styloid process is a bony projection that originates from the inferior aspect of the temporal bone, anterior and medial to the stylomastoid foramen. The styloid process is developed from the proximal part of the cartilage of the second branchial or hyoid arch by two centers: one for the proximal part, the tympanohyal, appears before birth; the other comprising the rest of the process is named the stylohyal and does not appear until after birth.The normal length of styloid process is usually 20-30 mm, when it is more than 30 mm it is considered as an elongated styloid process.[1] Elongated styloid process when causing dysphagia, pain in throat, referred pain to the ear and mastoid region or an abnormal sensation of a foreign body in the pharynx is known as Eagle'ssyndrome. These signs and symptoms are caused due to compression of the neural and vascular structures by the elongated styloid process.Studies in India have estimated that in 19.4 – 52.1% of the general population there was radiographic evidence of an elongated styloid process, the highest 52.1% being recorded in the region of north India.[2]The importance of this syndromeis useful for all the health practitioners involved in the diagnosis and treatment of head and neck pain. The panoramic radiographs made for some other reason shows an accurate image of the styloid process. In 1986 Langlias proposed three radiographic appearances for elongated styloid process i.e. Type I: Elongated, Type II: Pseudo-segmented, Type III: Segmented.[2]

So this study was performed to investigate the prevalence of elongation according to age, gender, side of occurrence and type of elongation in the Pune population.

MATERIAL AND METHODS

Total 300 digital panoramicradiographs were obtained from Oral and Maxillofacial Radiology Departmental archives.

Inclusion criteria

The selected radiographs were of patients between 20 years of age to 70 years of age.

150 male and 150 females are included in the study.
Exclusion criteria
Radiographs having positioning and magnification errors
Radiographs where the styloid process was not clearly seen
The styloid process measuring 30 mm or less in length was considered to be normal, and when it was greater than 30 mm it was considered to be elongated.[3]

The elongated styloid processes were further classified according to langlias classification of elongated styloid process.[4] (Fig. 1)

STATISTICAL METHODS

The data was analyzed using SPSS version 22 (Statistical package for social sciences) and Chi-square test was used to detect difference in distribution of percentages.

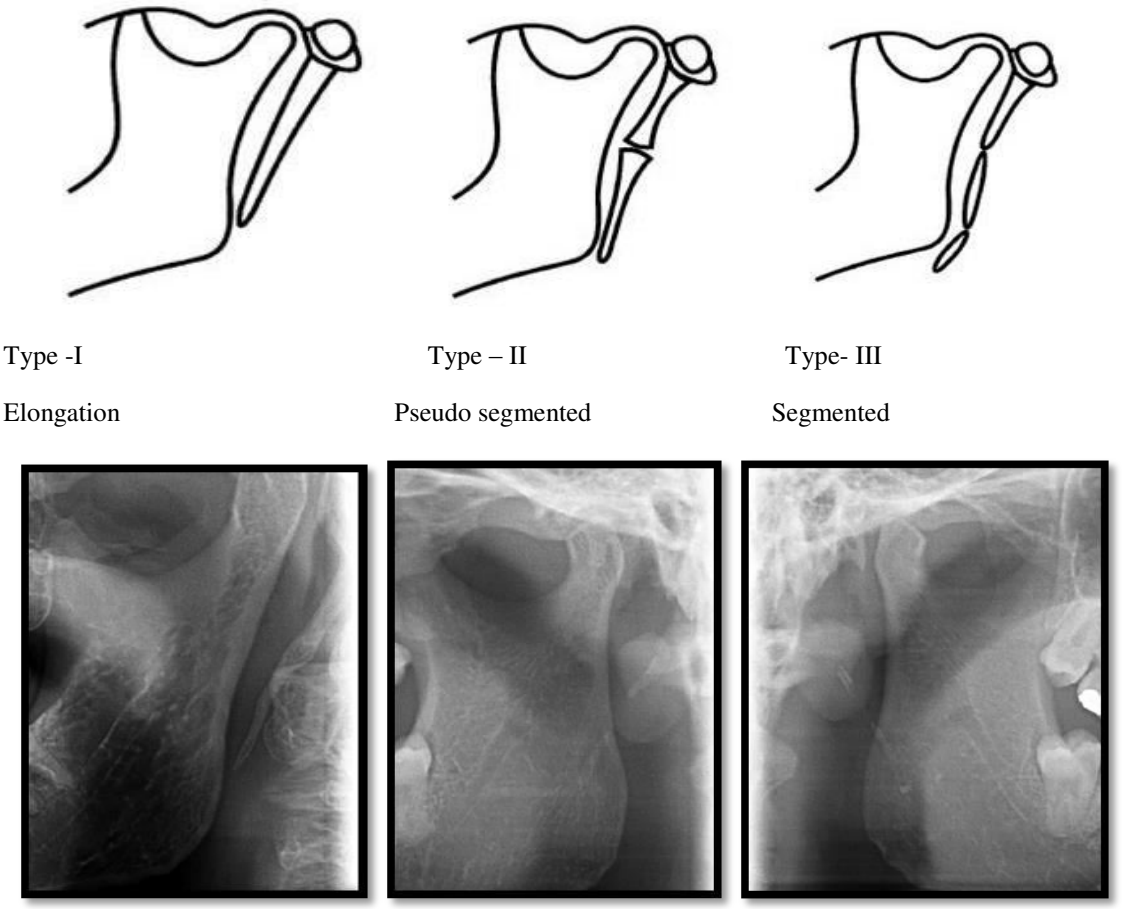

Figure1: Pattern of elongated styloid process.

RESULTS

Table 1: Difference between the mean elongations of styloid process according to age of the study subjects

Side	Age Group in years	Count	mean	SD	Difference	p value
right	10.-30 years	44	33.62	3.71	0.15	0.058903
	30-50 years	30	32.49	2.78	0.98	
	50-80 years	14	35.11	3.51	1.64	
	Total	88	33.47	3.46	0	
left	10.-30 years	39	34.33	4.64	0.09	0.709
	31 - 50 years	22	33.67	3.47	0.57	
	51-80 years	14	34.87	4.21	0.63	
	total	75	34.24	4.21		

Elongated styloid processes were most common in the age group of 10-30 years of age, with a mean age of 34 years.93 Females and 70 males had elongated styloid processes.
The average length of elongated styloid process on the right side was significantly more than compared to the left side.
51 digital panoramic radiographs showed bilateral elongation of styloid process.
61 digital panoramic radiographs showed unilateral elongation of styloid process.
More than 85.2% of styloid process had langlais type I elongation, 9.9% type II pseudo segmented and 4.9% type III segmented.
Type I Elongation of styloid process was more common than other type.

Table 2: Distribution of Study sample according to gender

Gender	Normal	Elongated	total
Male	80	70	150
Female	57	93	150

Table 3: Difference between the mean elongations of styloid process according to gender of the study subject

Side	gender	number	mean	SD	t value	sig
Left	male	29	35.22	5.21	1.68	0.162
	female	46	33.63	3.36		
Right	male	41	33.44	3.28	0.124	0.94
	female	47	33.54	3.68		

Table 4: The percentage distribution of the types of the elongated styloid process

Side	Type I		Type II		Type III		Total	
	N	%	N	%	N	%	N	%
right side	78	88.63	6	6.81	4	4.56	88	100
left side	61	81.33	10	13.33	4	5.34	75	100
Chi sq value – 16.36 df = 2					Sig – 0.024*			

Table 5: The percentage distribution of the sides of the elongated styloid process

Side	number	mean	SD	t value	Sig
right side	88	33.47	3.46	1.32	0.045
left side	75	34.24	4.21		

Table 6: The percentage distribution of unilateral and bilateral elongation of styloid process

Age	sex	unilateral		bilateral		total	
		number	%	number	%	number	%
10.-30 years	male	8	40	12	60	20	100
	female	21	58.33	15	41.67	36	100
31-50 years	male	12	57.14	9	42.86	21	100
	female	11	64.7	6	35.3	17	100
51 - 80 years	male	1	20	4	80	5	100
	female	10	66.66	5	33.34	15	100
Total		**63**	55.26	**51**	44.74	**114**	100

DISCUSSION

The stylohyoid chain segments are derived embryological from the second brachial arch. Anatomical variety in the length of the styloid process and its stylohyoid chain is said to have significant anatomic, anthropological and also of clinical significance.[5] A consciousness of clinical and radiologic presentation of styloid process elongation is critical to all wellbeing experts included in the conclusion and treatment of head and neck pain. Eagle syndrome, now and then called styloid or stylohyoid disorder, is characterized as the symptomatic elongation of the styloid process or mineralization (ossification or calcification) of the stylohyoid ligament complex.[6]itwas initially introduced by Eagle, an otorhinolaryngologist, in 1937.

In present study, the elongated styloid processes were more prevalent in the age group 10-30 years, and mean age was 34 years, which was similar to the study conducted by R. Sudhakar Reddy et.al [7]

In the present study, we found that females had elongated styloid than males which was in consistent with the studies done by different researchers. In our study styloid process elongation more common with female than male, it was similarly discovered the study conducted by Bozkiret al.[8]

In the present study, the average length of elongated styloid process on the left side was significantly more than compared to the right side which was in consistent with the study conducted by B More and Asrani et al. whose studies revealed that elongated stylois process was more on right side.[9]

In present study, bilateral elongation was found in 31.2% subjects however unilateral elongation was found in 38.6% subjects. This was consistent with the study directed by Smita R. Priyadarshiniet al.[10]

Studies conducted by Begga M.B. et al discovered 79.5% of cases had respective elongation in the styloid process and 20.5% of cases had one-sided, though More C et al discovered bilateral elongation in 75% and one-sided in 25% of cases .[11]

In our study, rate appropriation of types on type I 85.2% , type II 9.9% and type III 4.9% we found that type I elongation was most basic among all the type. These finding were similar the study conducted by G Roopashriet al.[12]

CONCLUSION

It is critical for the dental specialists to know about the varieties of styloid process. Elongated Styloid processes may be a coincidental asymptomatic radiological finding. Appropriate clinical and radiographic evaluation can perceive an elongated styloid process.

It was found that the elongation of the styloid process is an anatomical assortment, which must be considered by dental experts; the all panoramic radiography is an easy approach and low cost can be used to aid in diagnosis.

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