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Evaluation of Different Types of Styloid Process & Its Correlation with Age and Sex Using Digital Panoramic Radio-Graphs.

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Abstract:
Background: *Styloid process is an anatomical landmark which is present bilaterally and is an important factor for diagnosing 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 neck and head pain. It has been estimated that 2 to 28% of the general adult population has radio-graphic appearance of elongated styloid process. The objective of the study was to assess the elongation of styloid process on digital panoramic radio-graphs and to evaluate the prevalence of elongation according to age, sex and types.*
Materials and Methods: *A total of 120 panoramic radiographs of patients ranging from the age group of 15 years to 70 years were randomly selected and were divided into five groups for evaluation of variations in styloid process. Radiographs with an error were excluded from the study. Evaluation of styloid process was done along with the measurement tools in the software. Statistical analysis was performed after the compilation of the data.*
Results: *There was no increase or decrease in the mean length of styloid process in any particular order in the age groups; on analysing this statistically by Analysis of Variance (ANOVA test) the difference between the groups was statistically no significant on left as well as right side. The difference in the length on styloid process between male and female study subjects analysed by Student's T-test was statistically not significant on both sides with p-value 0.550 on left and 0.742 on right side. The results showed that Type I, Type II and Type III elongation of styloid process was seen on 34 (28.3%), 12 (10%) and 7(5.8%) study subjects respectively.*
Conclusion: *Proper clinical and radiographic evaluation can detect an elongated styloid process thus can definitely be of immense help to rationalize the line of management and the ultimate clinical outcome.*
Key words*: Styloid process; Eagle's syndrome; Panoramic radiographs; elongation of styloid process.*

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I. Introduction

Styloid process is derived from the Greek word 'Stylos' meaning a pillar. The styloid process is normally a cylindrical bone which arises from the temporal bone in front of the stylomastoid foramen. The length of the styloid process is usually 2 to 3 cm i.e. 20 to 30 mm. When it is more than 3 cm it is called as elongated styloid process, and it can cause pain in throat, difficulty in swallowing, foreign body sensation, carotid artery compression syndrome, pain when moving the head, vertigo, dysphagia, odynophagia, facial pain, earache, headache, tinnitus, and trismus. etc. This elongation was first described in 1652 by Italian surgeon Pietro Marchetti. In 1937, Watt W Eagle coined the term stylalgia to describe the pain associated with elongation of styloid process.[1-6] Langlais proposed three radiographic appearances of the styloid process.[7] The purpose of this study was to evaluate the elongation of styloid process by using digital panoramic radiographs.

II. Aim & Objectives

Aim:

- To measure and assess the length of elongated styloid process on panoramic radiographs.

Objectives:

- To determine the variation in age, sex, type and sides of elongated styloid process.
- To determine the usefulness of panoramic radiographs in undiagnosed neck and/or intermittent facial pain.

III. Inclusion and Exclusion Criteria

Inclusion criteria:

- Radiographs taken with proper positioning technique without superimposed structures were taken in the study.
- Radiographs with good contrast and radiographs in which both sides of styloid processes were completely seen were selected.

Exclusion criteria:

- The panoramic radiographs taken with improper technique, patients positioning errors, magnification errors artifacts or superimposed anatomical structures were excluded from the study.

IV. Materials and Methods

A total of 120 randomly selected digital panoramic radiographs were taken which were available as a soft copy in the computer of department of Oral Medicine and Radiology. The selected radiographs were carefully evaluated for the elongation of styloid process.

The selected radiographs were of patients above 15 years of age with the maximum age limit of 65 years and later divided into five groups of 16 to 25 years, 26 to 35 years, 36-45 years,46-55 years and 56 to 65 years. The lengths of the styloid process were measured on the frontal side of the styloid process, from the point of emergence of the process to their tips, regardless of whether or not the styloid process was segmented (fig 1).

Fig 1

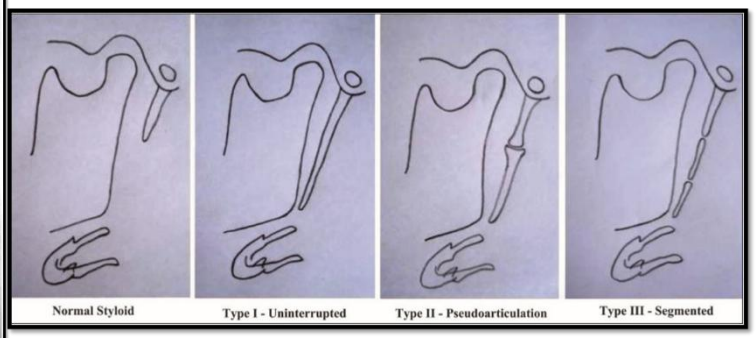


Fig 2

Further the elongated styloid processes were categorized according to classification by Langlais (fig 2) as Type I, elongated, which appears as an uninterrupted integrity of the styloid process. Type II, pseudo articulated, which is apparently joined to the mineralized styloid mandibular or styloid ligament by a single pseudo articulation. Type III, segmented, consists of either short or long noncontinuous portions of the styloid process or interrupted segments of mineralized ligament.[7]

Both unilateral and bilateral measurements were made and the prevalence of the same was recorded. Further, with the help of measurement tools available in the software, each styloid process on either side were measured and marked in red colour. Then each radiograph with the markings of measurement of styloid process were taken a snap shot and saved in one folder. A Statistical analysis was done after compilation of complete data.

STATISTICAL ANALYSIS

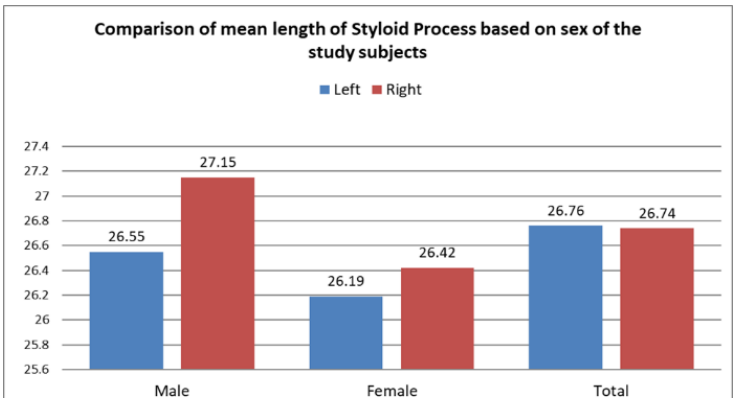
The data was analysed using SPSS version 20.0 (statistical package for social sciences), the quantitative values were expressed as mean and standard deviation and qualitative values in percentages. Chi-square test was used to detect difference in distribution of percentages and the Student t-test and ANOVA were used to test the difference between mean elongation for the gender, age and the side affected.

V. Results

Table 1: Comparison of mean length of Styloid Process based on sex of the study subjects

Sex	N (%)	Length of Styloid process on Left side		Length of Styloid process on Right side	
		Mean	SD	Mean	SD
Male	52 (43.33)	26.55	5.38	27.15	6.2
Female	68 (56.66)	26.19	6.28	26.42	6.75
Total	120 (100)	26.76	5.89	26.74	6.53
p-value (Student's T-test)		0.550		0.742	

Table 1



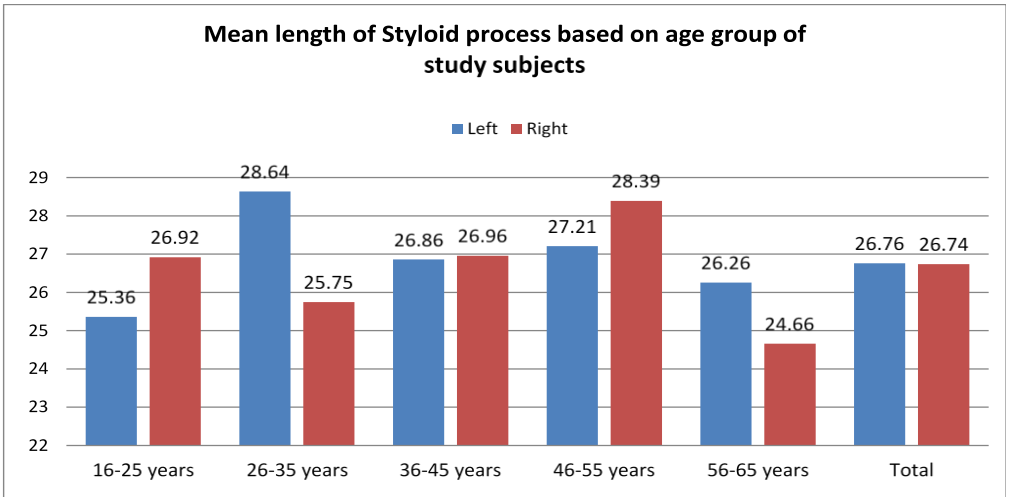
Graph 1

The difference in the length on styloid process between male and female study subjects analysed by Student's T-test was statistically not significant on both sides with p-value 0.550 on left and 0.742 on right side(table 1 and graph 1).

Table 2: Comparison of mean length of styloid process based on age group of study subjects

Age Group	N (%)	Length of Styloid process on Left side		Length of Styloid process on Right side	
		Mean	SD	Mean	SD
16-25 years	34	25.36	6.429	26.92	7.00
26-35 years	22	28.64	7.277	25.75	7.43
36-45 years	24	26.86	4.149	26.96	4.82
46-55 years	25	27.21	4.711	28.39	5.27
56-65 years	15	26.26	6.416	24.66	8.21
Total	120 (100)	26.76	5.89	26.74	6.53
p-value (ANOVA)		0.550		0.742	

Table 2



Graph 2

There was no increase or decrease in the mean length of styloid process in any particular order in the age groups; on analysing this statistically by Analysis of Variance (ANOVA test) the difference between the groups was statistically no significant on left as well as right side (table 2 and graph 2).

Table 3: Distribution of study subjects based on type of elongation

Type of elongation	Frequency	Percentage
Type I	34	28.3
Type II	12	10.0

Type III	7	5.8
No Elongation	67	55.8
Total	120	100.0

Table 3

The results showed that Type I, Type II and Type III elongation of styloid process was seen on 34 (28.3%), 12 (10%) and 7(5.8%) study subjects respectively. No elongation was seen in 67 (55.8%) study subjects (table 3).

Table 4: Distribution of study subjects based on side of elongation:

Side of elongation	Frequency	Percentage
Left	17	14.2
Right	18	15.0
Bilateral	18	15.0
No Elongation	67	55.8
Total	120	100.0

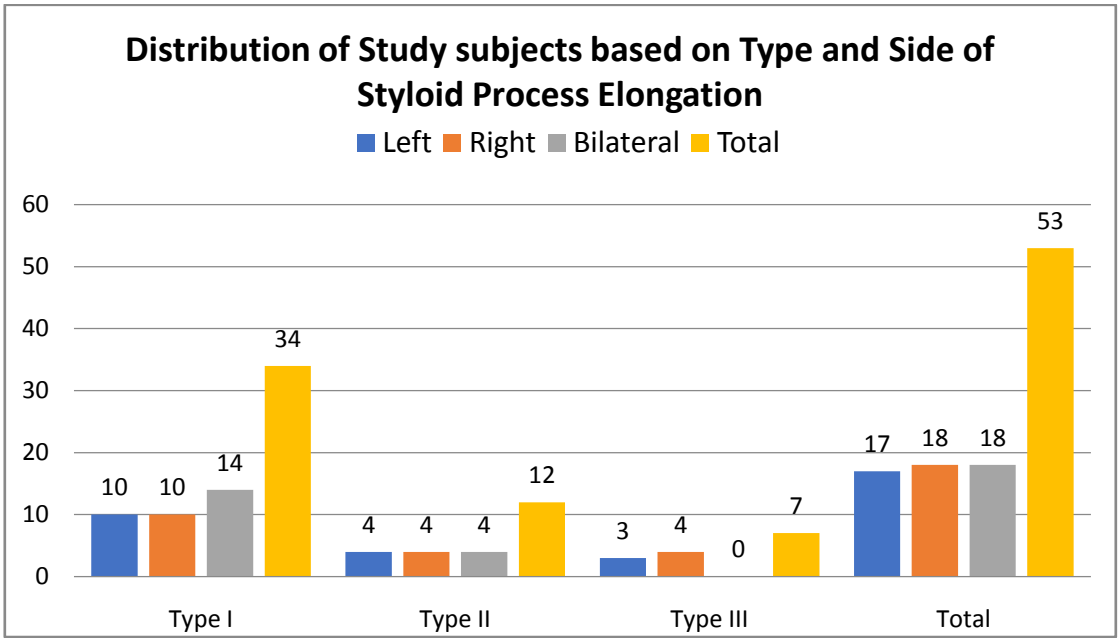
Table 4

The study revealed that left side and right-side elongation in 17 (14.2%) and 18 (15%) of the study subjects respectively; whereas, bilateral elongation of styloid process was seen in 18 (15%) of the study subjects (table 4).

Table 5: Distribution of study subjects based on type and side of elongation

Type and Side	Left	Right	Bilateral	Total
Type I	10	10	14	34
Type II	4	4	4	12
Type III	3	4	0	7
Total	17	18	18	53

Table 5



Graph 3

According to corresponding graph (graph 3), type I elongation was found in 10 subjects on left and 10 on right side whereas 14 study subjects showed bilateral type I elongation. Type II elongation was found in 4 subjects in left, right and bilateral sides each. Type III elongation was seen in 3 subjects on left side and 4 on right side.

VI. Discussion

The stylohyoid process and ligament are derived from the first and second branchial arches, in addition to Reichert'scartilage. It has been demonstrated that during foetaldevelopment, Reichert's cartilage links the styloid bone tothe hyoid bone. If these structures solidify, they can causethe pain and suffering present in

Eagle's syndrome.[8-11]Radiographic diagnosis should include plain radiography, orthopantomogram, anteroposterior; lateral skull films and CT scan.[12]There has always been a natural variation in the length of styloid process as debated by various researchers.[13-14] In the present study, we observed that there was no increase or decrease in the mean length of styloid process in any particular order in age groups which was in contrast with study conducted by G Roopashri etal.

In the present study, no statistically significant difference was observed between genders in the unilateral or bilateral elongation of the styloidprocess.This was in agreement with the reports of previous studies done bySmita R Priyadarshini et al, Ferrario VF et al, Ilgüy Metal and Omnell KA et al.But studies done by GRoopashri et al found that elongated styloid wasmore common in females than males. Although thesefindings were not statistically significant, thesefindings were similar to studies conducted byFerrario et al. This variation could bedue todifference in the sample size and life style amongpeople.[15-17]

In our study, we observed that type I elongation was most common among all types, these findings were similar to the study conducted by Vajendra Joshi et al.[18]The study revealed that left side and right-side elongation in 17 (14.2%) and 18 (15%) of the study subjects respectively; whereas, bilateral elongation of styloid process was seen in 18 (15%) of the study subjects (table 4) irrespective of age, sex and types.

VII. Conclusion

Panoramic radiography is useful for detection ofan elongated styloid process and/or ossification ofstylohyoid ligaments in patients with or withoutsymptoms and can thus help avoid misinterpretationof the symptoms and hence panoramic radiographyis an economical and best imaging modality to viewthe elongation of styloid process.

Proper diagnosis can definitely be ofimmense help to rationalize the line of management andthe ultimate clinical outcome.However, studies with largersample size would further help to assess the prevalence ofelongated styloid process with the type, pattern ofelongation and its correlation with age and sex.

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References

[1]. G Roopashri et al; Evaluation of Elongated Styloid Process on Digital Panoramic Radiographs; The Journal of Contemporary Dental Practice, September-October 2012;13(5):618-622.
[2]. Eagle WW. Elongated styloid process: Further observations and a new syndrome. Arch Otolaryngol 1948; 47:630-40.
[3]. Dinkar, Amonkar SS. Eagle's syndrome: Review of literature and case report. Indian J Dent Res 2003; 14:162-68.
[4]. Prabhu LV, Kumar A, Nayak, et al. An unusually lengthy styloid process. Singapore Med J 2007;48(2): e34-36.
[5]. Kim E, Hansen K, Frizzi J. Eagle syndrome: Case report and review of literature. Ear Nose Throat J 2008; 87:631-33.
[6]. Kolagi SI, Herur A, Mutalik A. Elongated styloid process–report of two rare cases. International Journal of Anatomical Variations 2010; 3:100-102.
[7]. Langlias RP, Miles DA, Van Dis ML. Elongated and mineralized stylohyoid ligament complex: A proposed classification and report of a case of eagle's syndrome. Oral Surg Oral Med Oral Pathol 1986; 61:527-32.
[8]. Monsour PA, Yougn WG. Variability of the styloid process and stylohyoid ligament in panoramic radiographs. Oral Surg OralMed Oral Pathol 1986; 61:522-26.
[9]. Winkler S, Sammartino FJ, Monari JH. Stylohyoid syndrome. Oral Surg Oral Med Oral Pathol 1981; 51:215-17.
[10]. Keur JJ, Campbell JP, McCarthy JF, Ralph WJ. The clinical significance of the elongated styloid process. Oral Surg OralMed Oral Pathol 1986; 61:399-404.
[11]. Steinmann EP. Styloid syndrome in absence of an elongated process. Acta Otolaryngol 1968; 66:347-56.
[12]. Strauss M, Yohar Z, Laurian N. Elongated styloid process syndrome: Intraoral vs external approach for styloid surgery. Laryngoscope1985; 95:976-79.
[13]. Moffat A, Ramsden RT, Shaw HJ. The styloid process syndrome. Etiological factors and surgical management. Laryngol Otol 1977; 91:279-94.
[14]. Jung T, Tschenitschek H, Hippen H, Schneider, Borchers Elongated styloid process: When is it really elongated. Dentomaxillofacial Radiol 2004; 33:119-24.
[15]. Ferrario VF, Sigurta D, Daddona A, Dalloca L, Miani A, Tafuro F, et al. Calcification of the stylohyoid ligament: Incidence andmorphoquantative evaluation. Oral Surg OralMed Oral Pathol 1990; 69:524-29.
[16]. Ilguy M, Ilguy D, Guler N, Bayirli G. Incidenceof the type and calcification patterns in patientswith elongated styloid process. J Int Med Res.2005 Jan-Feb;33(1):96-102.
[17]. Omnell KA, Gandhi C, Omnell ML.Ossification of the human stylohyoid ligament: a longitudinal study. Oral Surg Oral Med OralPathol Oral Radiol Endod. 1998; 85:226–232.
[18]. Joshi V, Iyengar AR, Nagesh KS, Gupta J. Elongated styloidprocess: A radiographic study. J Indian Acad Oral Med Radiol2007;19(4):498-502.

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