

EAGLE'S SYNDROME: RADIOGRAPHIC STUDY OF THE INCIDENCE OF ELONGATED STYLOID PROCESS

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GONÇALES, Eduardo Sanches et al. Eagle's syndrome: radiographic study of the incidence of elongated styloid process. *Salusvita*, Bauru, v. 22, n. 1, p. 25-33, 2003.

ABSTRACT

The elongated styloid process is an abnormality that may be accompanied by ossified stylohyoid and stylomandibular ligaments. When symptomatic is called Eagle's syndrome, which is characterized by headache, dysphagia, dysphonia, restricted movement of the neck, and a feeling of a foreign body lodged in the throat. The diagnosis is based upon clinical and radiographic findings. Treatment is indicated in cases of symptoms leading to discomfort of the patient. The aim of this study is to investigate the incidence of elongated styloid process based in a random sample of panoramic radiographs of patients of the Dentistry Clinic of the University of the Sacred Heart in Bauru, Brazil. The purpose is to determine the incidence of elongated styloid process.

KEY WORDS: panoramic radiography; temporomandibular joint; anatomy.

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INTRODUCTION

The stylohyoid apparatus derivates from the second branquial arch (KRENNMAIR; PIEHSLINGER, 1999; SIVERS; JOHNSON, 1985; SOLFANELLI et al., 1981) and includes the stiloed process, the stylohyoid ligament and the short horn of the hyoid bone (LEITE et al., 1988; MORAES et al., 1991; NICCOLI FILHO et al., 1986; WATANABE et al., 1998).

The styloid process is a bone cylindrical elongation at the inferior aspect of the temporal bone (MADEIRA et al., 1995; MCMINN; HUTCHINGS, 1992; WATANABE et al., 1998), (FIGURE 1). When its length exceeds 30 mm it is considered as elongated (LEITE et al., 1988; MORAES et al., 1991; NICCOLI FILHO et al., 1986; SOLFANELLI et al., 1998), (FIGURE 2). It is located between the external and internal carotid arteries and originates two ligaments, the stylohyoid and the stylomandibular. (SIVERS; JOHNSON, 1985).

The stylohyoid ligament is a strip of conjunctive tissue inserted in the free extremity of the styloid process extending to the lower horn of the hyoid. (WATANABE et al., 1998). On the other hand, the stylomandibular ligament is inserted in the inner aspect of the mandible angle. (SIVERS; JOHNSON, 1985).

Anomalies of this apparatus are not uncommon and are represented mainly by a marked elongation of the styloid process and/or calcification of the stylohyoid ligament (MORAES et al., 1991) in one or both sides (FIGURE 3). Some studies (LEITE et al., 1988; NICCOLI FILHO et al., 1986; SIVERS; JOHNSON, 1985; SOLFANELLI et al., 1998) report that the incidence varies from 4% to 28% in average population and the etiology is controversial. (CORRELL; WESCOTT, 1982; MORAES et al., 1991).

The calcification mechanism is not yet completely understood. It has been suggested that, due to its embryologic origin, the stylohyoid ligament retains some cartilage with osteogenic potential.

The anatomical condition of an elongation of the styloid process may be asymptomatic but can also originate the Eagle's Syndrome (WATANABE et al., 1998), Stylohyoid Syndrome (LEITE, et al., 1988; SIVERS; JOHNSON, 1985) or Elongated Styloid Process Syndrome (SIVERS; JOHNSON, 1985) that was described in details in 1937 by Eagle although it had been previously mentioned by Marchetti in 1652. (WINKLER et al., 1981).

Symptoms include headache, sore pharynx, ear, neck, face, tongue and along the internal and external carotid arteries. Blurred vision and dizziness may accompany severe pain. Disphagia,



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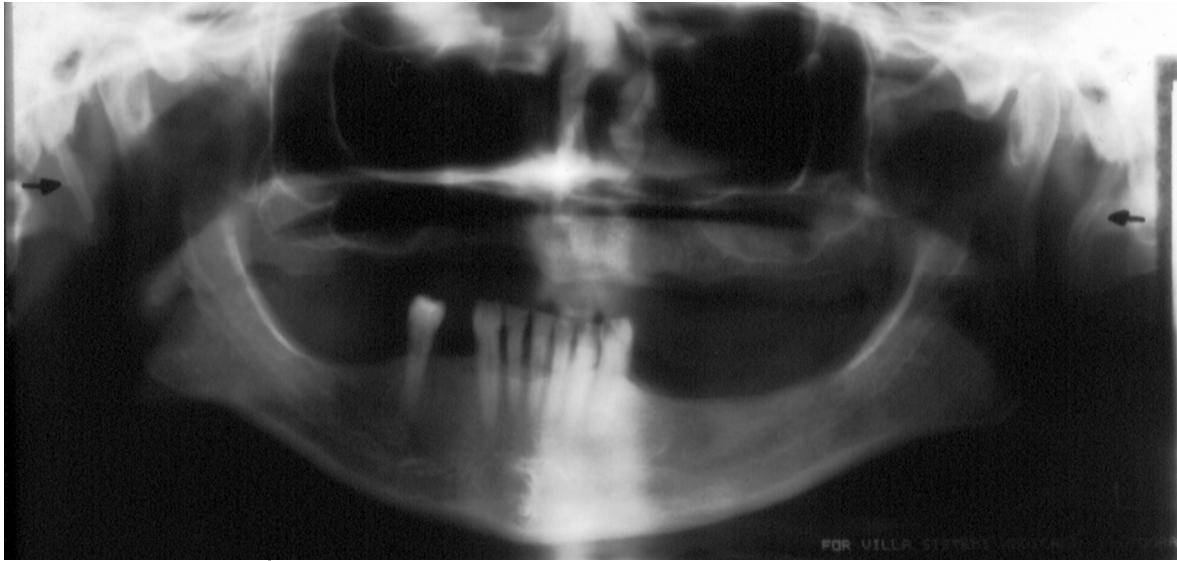



FIGURE 1 – Panoramic X-ray showing normal styloid.

 GONÇALES, Eduardo Sanches et al. Eagle's syndrome: radiographic study of the incidence of elongated styloid process. Salusvita, Bauru, v. 22, n. 1, p. 25-33, 2003.

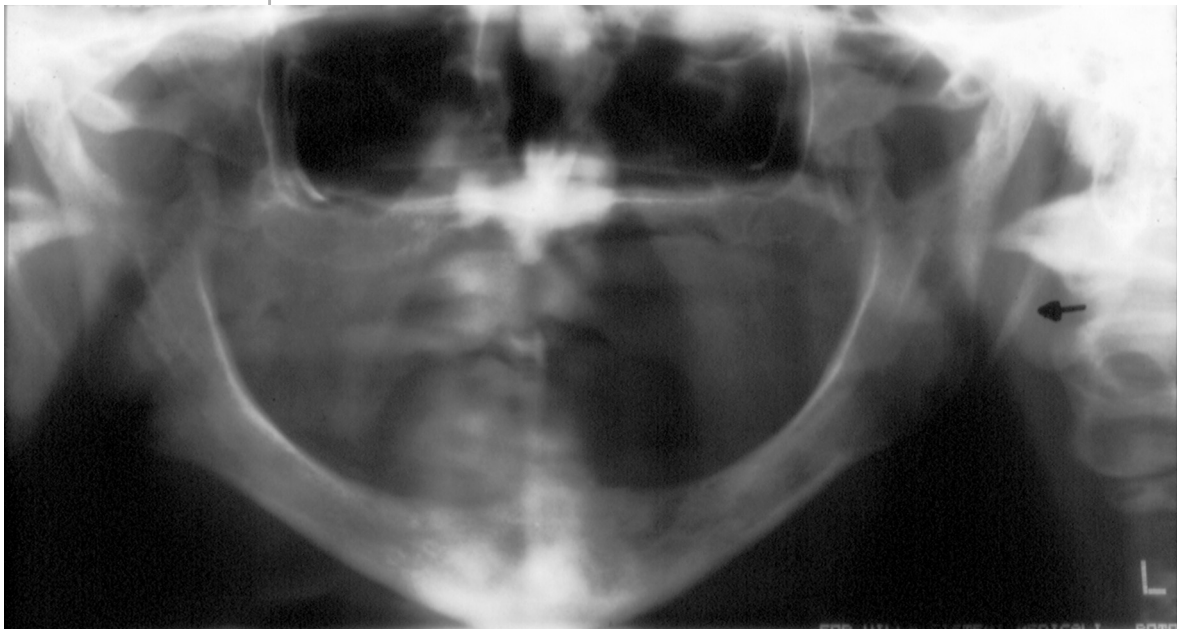


FIGURE 2 – Panoramic X-ray showing elongated.



FIGURE 3 – View of styloid process and calcified stylohyoid ligament in a panoramic X-ray.


dysphonia, restriction to cervical movements and sensation of foreign body in the throat complete the clinical features. (BRAUN; SOTEREANOS, 1983; CORRELL; WESCOTT, 1982; GROSSMANN; PAIANO, 1998; LEITE et al., 1988; MORAES et al., 1991; NICCOLI FILHO et al., 1986; SIVERS; JOHNSON, 1985; SOLFANELLI et al., 1981).

Some authors (GLOGOFF et al., 1981; KRENNMAIR; PIEHSLINGER, 1999; LEITE et al., 1988; MORAES et al., 1991; SOLFANELLI et al., 1981; WATANABE et al., 1998) relate Eagle's syndrome to tonsillectomy and others (DE LEEUW et al., 1994; GLOGOFF et al., 1981; KRENNMAIR; PIEHSLINGER, 1999; MORAES et al., 1991; SOLFANELLI et al., 1981; WATANABE et al., 1998) to the pressure of the intern and extern carotid artery. Whatever is the cause of the elongation of the styloid process, it acts as a foreign body on the nearby soft tissues. (LEITE et al., 1988).

In most reports, the diagnosis and evaluation are based on clinical and radiographic exams. (KAUFMAN et al., 1970; MORAES et al., 1991; SEPÚLVEDA et al., 1997; WATANABE et al., 1998). From the clinical point of view the diagnosis of Eagle's syndrome is difficult and may be done by transpharyngeal palpation from the tonsillar fossa (GLOGOFF et al., 1981; MORAES et al., 1991; PALESY et al., 2000), although it must be confirmed by radiographic evidence. Usually, the panoramic projection (orthopantomography) is used to visualize the elongated styloid process (CORRELL; WES-



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COTT, 1982), although others, such as PA and lateral cephalometric, can help in this regard (MORAES et al., 1991; SIVERS; JOHNSON, 1985), besides magnetic resonance and computerized tomography. (KRENNMAIR; PIEHSLINGER, 1999).

According to literature (CARROLL, 1984; WATANABE et al., 1998), the incidence of elongated styloid process and/or calcified stylohyoid ligament is greater among females and there is no predisposition to be uni or bilateral.

Differential diagnoses for Eagle's Syndrome include atypical trigeminal neuralgia (GLOGOFF et al., 1981; SIVERS; JOHNSON, 1985; SOLFANELLI et al., 1981; WATANABE et al., 1998), temporomandibular joint disfunctions (CORRELL; WESCOTT, 1982; LEITE et al., 1988; SIVERS; JOHNSON, 1985; WINKLER et al., 1981), intruded third molars (CORRELL; WESCOTT, 1982; LEITE et al., 1988; SIVERS; JOHNSON, 1985; SOLFANELLI et al., 1981; WATANABE et al., 1998), migraine (GLOGOFF et al., 1981; SIVERS; JOHNSON, 1985; SOLFANELLI et al., 1981), cervical arthritis (SIVERS; JOHNSON, 1985; SOLFANELLI et al., 1981), salivary glands diseases (SIVERS; JOHNSON, 1985), amygdalitis or chronic faringitis (SOLFANELLI et al., 1981), esophageal diverticulitis (SOLFANELLI et al., 1981), carotid ateroma (MANZI et al., 2001), otitis (SIVERS; JOHNSON, 1985; WINKLER et al., 1981) and tumors. (SIVERS; JOHNSON, 1985; SOLFANELLI et al., 1981).

Treatment depends on the degree of discomfort of patients. The surgical resection of the styloid process is, most of the time, the best option (CORRELL; WESCOTT, 1982; SOH, 1999; WINKLER et al., 1981). Non-surgical treatment includes tranquilization of patients against cancerofobia (SIVERS; JOHNSON, 1985).

The objective of this study was to determine the incidence of elongated styloid process and calcified stylohyoid ligaments in a random sample of panoramic X-rays from patients of the Dentistry Clinic of the University of the Sacred Heart.

MATERIALS AND METHODS

448 panoramic X-rays from patients of the Dentistry Clinic of the University of the Sacred Heart were examined. The X-rays were taken with an Orthopantomographic Rotograph 230 Fiad equipment using TMG/A Kodak films, Kodak Lanex regular cranes processed by a Macrotec (2 min 5 s) machine. The selection of X-rays was at random.

For the analysis the radiographic image of the elongated styloid process and/or calcified stylohyoid ligament was taken into consideration, which were measured with a pachimeter directly over the film taking as reference the attachment of the base of the styloid process to the temporal bone and its extremity. Any process longer than 30 mm was considered as elongated. Values were reduced in 25% due to the magnification of the equipment. Data were submitted to statistical analysis using Chi² at a level of 0.05.



GONÇALES, Eduardo Sanches et al. Eagle's syndrome: radiographic study of the incidence of elongated styloid process. *Salusvita*, Bauru, v. 22, n. 1, p. 25-33, 2003.

RESULTS

Out of 448 panoramic X-rays examined 102 (22.79%) showed signs of bilateral elongated styloid process. Sixty-six individuals (14.43%) were females and 36 (8.04%) were males with age varying from 10 to 73 years. Groups with greater prevalence included ages from 25 to 30 and 40 to 45 years. Statistically there was significance (0.05) for males since 36 cases showed alteration out of 115 males included in the sample. For females the alterations were not significant (0.05) as can be seen in TABLE 1.

The average length of the elongated styloid process was 43.7mm with a variation from 30mm to 105 mm. 39.22% of cases were between 30 and 35 mm (TABLE 2).

TABLE 1 – Distribution of individuals according to sex and presence or absence of alteration in the styloid process.

Sex	Male		Female		Total
	With alteration	Without alteration	With alteration	Without alteration	
Absoluto (%)	36 8.04	79 17.63	66 14.73	267 59.60	448 100

GONÇALES, Eduardo Sanches et al. Eagle's syndrome: radiographic study of the incidence of elongated styloid process. *Salusvita, Bauru*, v. 22, n. 1, p. 25-33, 2003.

TABLE 2 – Distribution of bilateral elongated styloid among 102 individuals according to its length (in mm).

LENGTH OF THE STYLOID PROCESS	Right side styloid process	Left side styloid process	Total
30 — 35	39	41	39.22
35 — 40	23	24	23.04
40 — 45	13	16	14.22
45 — 50	7	5	5.88
50 — 55	6	7	6.37
55 — 60	4	3	3.43
60 — 65	5	2	3.43
65 — 70	2	0	0.98
70 — 75	0	0	0.00
75 — 80	0	1	0.49
80 — 85	0	0	0.00
85 — 90	1	2	1.47
90 — 95	0	1	0.49
95 — 100	1	0	0.49
100 — 105	1	0	0.49
TOTAL	102	102	100

DISCUSSION

The incidence of elongated styloid process in the present study was 22.79%, which lies within results from other authors (LEITE et al., 1988; NICCOLI FILHO et al., 1986; SIVERS; JOHNSON, 1985; SOLFANELLI et al., 1981) (4% - 28% in average population).

In the literature (CARROLL, 1984; WATANABE et al., 1998), a greater incidence of elongation and/or calcification of the stylohyoid ligament is reported for females; in the present study although a greater incidence was found among females (14.43%); values for males (8.04%) were found with statistical significance taking into consideration the total number of males in the sample size.

Etiology for this anomaly is uncertain (CORRELL; WESCOTT, 1982; MORAES et al., 1991) as the mechanism of calcification of the structures is not fully understood (LEITE et al., 1988; NICCOLI FILHO et al., 1986). Eagle's Syndrome is only considered when there are symptoms (DE LEEUW et al., 1994; GLOGOFF et al., 1981; KRENNMAIR; PIEHSLINGER, 1999; LEITE et al.,

1988; SOLFANELLI et al., 1981; WATANABE et al., 1998); conversely, if there is elongation of the styloid process without symptoms it is not possible to characterize the Eagle's Syndrome. Its occurrence is rare despite the high incidence of elongated styloid process (4% to 28%) (LEITE et al., 1988; NICCOLI FILHO et al., 1986; SIVERS; JOHNSON, 1985; SOLFANELLI et al., 1981) and its diagnosis is based in clinical and X-ray exams (MORAES et al., 1991; SIVERS; JOHNSON, 1985; WATANABE et al., 1998). However, the diagnosis can be ascertained only after the disappearance of symptoms following surgical treatment. (CORRELL; WESCOTT, 1982).

It is suggested a wide divulgation of this pathology since cases have been not adequately diagnosed inducing patients to go to several specialists and undergoing treatment that sometimes leads to negative results (GLOGOFF et al., 1981, LEITE et al., 1988; MORAES et al., 1991). X-ray evidences of an elongated styloid process of more than 30 mm and tenderness in the tonsils fosse indicate the possibility of Eagle's Syndrome. (SIVERS; JOHNSON, 1985).

CONCLUSIONS

Presence of elongated styloid process was statistically significant in males.


The frequency of measures for styloid process varied from 30 to 35 mm.

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GONÇALES, Eduardo Sanches et al. Eagle's syndrome: radiographic study of the incidence of elongated styloid process. *Salusvita*, Bauru, v. 22, n. 1, p. 25-33, 2003.

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