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ELONGATED STYLOID PROCESS OF TEMPORAL BONE AND CALCIFICATION OF THE STYLOHYOID LIGAMENT: LITERATURE REVIEW

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ABSTRACT

The styloid process of the temporal bone corresponds to a thin bony projection located between the external and internal carotid arteries, after the larynx. Radiographically has radiopaque characteristic with length of 2.5 to 4 cm when exceeding this is considered the styloid ligament or the styloid process presents any changes. Some authors argue that stretching occurs through a hyperplasia stimulated by a previous trauma, such as tonsillectomy, others report that stretching would be an anatomical variation that starts his training early in life. The prevalence of this change in the population reaches a variation of 5-84%, with no predilection for gender and affecting more bilaterally when the stretch is accompanied by symptoms, it is characterized as Eagle syndrome. The most common symptoms are pain on either side of the throat, with or without radiation to the mastoid ear or region of the affected side, dysphagia, and foreign body sensation in the throat glossalgia, dysphonia, recurrent headache, carotidine, vertigo, visual disturbances and restrictions on neck movement. Considering the great importance of knowing the anatomy of the hyoid apparatus and their variations, knowing even identify them in radiographic examinations, this study aimed to conduct a literature review checking the etiology, prevalence, symptoms and classification.

KEYWORDS: Styloid process, temporal bone, calcification, stylohyoid ligament.

1. INTRODUCTION

The styloid complex or style-hyoid apparatus is formed by the styloid ligament, lesser horn of the hyoid bone and styloid process, the latter corresponds to a thin bony projection, included in the petrous portion of the temporal bone located between the external and internal carotid arteries later. It will larynx. They are inserted the stylopharyngeus muscles, styloglossus and stylehyoid ligament and the styloid walking toward the lower horn of the hyoid bone. It has embryological origin of cartilage tissue of Reichert's[1-4].

In radiographic analyzes, such as panoramic radiography, the styloid process can be viewed with a radiopaque image, after the external auditory canal, with a downward trend and former usually has a length of 2.5 to 3 cm, however presenting a change this length is considered an anomaly may be the very calcification ligament stylohyoid, stylomandibular or elongation of styloid process itself temporal bone[5-8].

The etiology may be related to three theories, two based on previous traumas that trigger a metaplasia and hyperplastic response and anatomical variation[1-4].

The prevalence of changes in the population reaches a variation of 5-84%, with no predilection for gender and affecting more bilaterally. Increased age is related to the presence of the styloid process elongation[1,5,6,11].

The majority of patients with this variation are asymptomatic, but when symptoms may have pain on either side of the throat, with or without radiation to the mastoid ear or region of the affected side, dysphagia, foreign body sensation and then called Syndrome Eagle[3,4,7,10-18].

Considering the great importance of knowing the anatomy of the hyoid apparatus and their variations, knowing even identify them in radiographic examinations, this study aimed to conduct a literature review checking the etiology, prevalence, symptoms and classification.

2. MATERIAL AND METHODS

The literature review of this work was conducted through a survey in the major databases: Pubmed, LILACS, BIREME and the CAPES periodical portal.

3. LITERATURE REVIEW

The styloid process is a cylindrical bone structure attached to the petrous portion of the temporal bone, following the base of the skull above the foramen stylemastoid. It is projected obliquely forward, downward and slightly to the mesial positioning between the internal and external carotid arteries, usually at the apex of this struc-

ture reaches the back edge of the jaw, in this area there is the insertion of muscles: stylopharyngeus, stylohyoid, styloglossus and ligaments: stylohyoid and stylomandibular. Along with the ligament and the lesser horn of the hyoid bone, the styloid process of the temporal bone, form the style-hyoid chain[1-4].

The style-hyoid chain have embryonic origin derived from Reichert cartilage where ossification of the styloid process is carried out: first through the formation of tympanic bone portion, which takes place before birth and becomes the basis of this structure, short It has appearance and fused portion petrous temporal bone; Following happens in the second stage, characterized by a distal ossification, forming the styloidal portion, which merges the tympanic, this step is completed in late adolescence. The third portion called ceratoial which is the ligament portion of the styloid chain and the fourth portion is the hyoid developing the lower horn of the hyoid bone, finalize the process[1-6].

The normal length of the styloid process reaches variations in literature 1.5 to 4.0 cm when these measures are exceeded we are facing the elongated styloid process or the mineralization of ligament styloidal complex, there are many controversies about the normal size of this structure. Authors confirm that this discrepancy between what would be considered normal is because of the lack of standardization at the time of measurement of these structures [1-3,6-10].

Several theories have been proposed and debated in an attempt to elucidate the etiology of this change. Both believe that a previous trauma such as tonsillectomy or pharyngeal trauma could stimulate ossification two distinct processes: the first called reactive hyperplasia, which is stimulation of the styloid process, causing a continuous ossification with the terminal portion of this bone invading the styloid ligament; the second, through a reactive metaplasia ossification induction some portions of the ligament styloid theories hyperplasia or reactive metaplasia could be the explanation for the presence of ossification in any age group, according to these theories, a second arc sheet branchial persists, with potential for cartilage or bone formation when stimulated. Due to the histological characteristics found in bone hyperplasia of the styloid process and styloid ligament metaplasia of the more appropriate term for this variation is ossification and no calcification. The third theory describes how an anatomical variation that starts during the styloid process of ossification and formation of the styloid ligament early in life, thus explaining the presence of this variation in young people[1-4].

Radiological tests such as panoramic radiography, play an important role to demonstrate these variations, most authors credited the panoramic sufficient efficacy radiography for the evaluation of stretching and calcification of the styloid ligament. From the evaluation of these tests Langlais images, Miles, and Van Dis, in the year performed the classification of the styloid process in normal elongated pseudo articulated and targeted, according to the authors the classification would be: Type 1: elongated presenting radiographic features in that is the integrity of change with radiopaque image of the styloid process, with a length of 28 mm; Type 2: called pseudo articulated where apparently the styloid process is with the styloid ligament by a single joint; Type 3: consists of short portions or discontinuous long ossification of the styloid ligament own[1-4].

The elongated styloid ligament may be symptomatic or not. When symptomatic is characterized as Eagle syndrome. The first styloid ligament calcification studies dating from the sixteenth century, however Eagle, between 1937 and 1949, studying 200 cases, detailed the symptoms of mineralization complex stylohyoid ligament, which later characterize a syndrome such as your name[3.10,13-18].

The most common symptoms are pain on either side of the throat, with or without radiation to the mastoid ear or region of the affected side, dysphagia, foreign body sensation in the throat glossalgia, dysphonia, recurrent headache, carotid, vertigo, visual disturbances and restrictions on neck movement can complete the clinical picture.

In its original publication, Eagle, presented two clinical possibilities of presentation of this pathology: the classic stylohyoid syndrome that would be related in most cases with tonsillectomies with persistent pain in the pharyngeal region radiating to the ears, and stylocarotideal syndrome not related to tonsillectomies, present only by stretching calcification and profise styloid there would be a compression of the external and internal carotid arteries, providing intense neck pain[3,10,13-18].

Studies of prevalence of elongated styloid process and ossification of the same name ligament are conducted mostly through panoramic radiographs as performed by Guimaraes *et al.* (2000)[11], who obtained results of 5%; Correll (1979)[1] using the same radiographic examination results reached 18.2%, and Tavares Freitas (2007)[6], achieved a percentage of prevalence of elongated styloid process in 32.4%, and the isolated ligament ossification of the styloid 39.5 %. Others studies also verified the occurrence of ossification of stylohyoid ligament in patients aged between 2 and 21 years, found that 40.7% patients had anatomical variation. Ferrario *et al.* (1990)[6], reported an overall prevalence 84.4%. More recently Kursoglu *et al.* (2005)[12] analyzed 55 panoramic radiographs of adult patients with results for prevalence of 83.6%. This wide range of prevalence is justified by the lack of standardization in the measures of the structures and the concept of what can be consider an elongated styloid process.

Regarding gender most affected the vast majority of studies did not show significant differences between female and male[1,5,6,12].

The relationship between the presence of ossification of the styloid ligament and elongation of the styloid pro-

cess and the increasing age was proven by several studies[6] disagreeing with Correll *et al*. (1979)[1].

With the popularity of imaging, it is extremely important that the dentist is aware of mandibular maxillofacial anatomy. Anatomical variations such as ossification of the styloid ligament or the extension of the styloid process, shows prevalence with great discrepancy being detected in routine radiographs and the possibility of the occurrence of symptoms, and then characterized as the Eagle syndrome, as it has symptoms similar to glossopharyngeal neuralgia and trigeminal, temporal arteritis, migraine, histamine headache, dysfunction myofascial pain syndrome, pain secondary to third molars unerupted or impacted, cervical arthritis, tumors and absent dental prosthesis, so as that the patient is not hurt by a wrong treatment.

4. CONCLUSION

The ossification of the styloid ligament and elongation of the styloid process has etiology based on previous trauma theories that trigger a reaction metaplastic and hyperplastic and anatomical variation.

The prevalence reaches a large discrepancy between 8% and 84%.

There is no preference for gender and age increases the chances of the presence of the styloid ligament ossification as the lengthening of the eponymous process.

REFERENCES

[1]. Correll RW, Jensen JL, Taylor JB, Rhyne RR. Mineralization of the stylohyoid stylomandibular ligament complex: A radiographic incidence study. Oral Surg. 1979; 48(4):286-91

[2]. Pereira FL, IwakiLFilho, José Pavan AJ, *et al*. Styloid-Stylohyoid Syndrome: Literature Review and Case Report. J Oral Maxillo Fac Surg. 2007; 65:1346-53.

[3]. Langlais RP, Dale AM, Van Dis ML. Elongated and mineralized stylohyoid ligament complex: A proposed classification and report of a case of Eagle's syndrome. Oral Surg. 1986; 61(5):527-32.

[4]. Sa ACD, *et al*. Alongamento do processo estilóide (síndrome de Eagle): relato de dois casos. Revista radiológica Brasil. 2004; 385-7.

[5]. Lages LPD, *et al*. Alongamento do processo estilóide e síndrome de eagle: considerações anatômicas clínicas, diagnóstico e prevalência. Odontologia CV Lin Cientif. 2005; 5:183-8.

[6]. Tavares H, Freitas CF. Prevalência do alongamento do processo estilóide do temporal e calcificação do ligamento estilo-hioideo, por meio da radiografia panorâmica. Rev de Odont da Universidade Cidade de São Paulo. 2007; 19:188-200.

[7]. Rossi AC, Freire AR, Prado FB, Botacin PR,Caria PH. Caracteristicasmorfométricas do processo estiloide alongado em crânio humano: Relato de caso e associação com a Síndrome de Eagle. Rev Odont de Araçatuba. 2009; 30(1):20-3.

[8]. Costa RC. Alterações anatomicas do processo estiloide em exames de tomografia computadorizada. Trabalho de conclusão de curso. Faculdade de odontologia, Universidade Federal do Rio Grande do Sul. 2000.

[9]. Pinto PRO, *et al*. Avaliação do processo estilóide em sujeitos com discrepância esquelética de classe III. Rev Odont Ciênc. 2008; 23: 44-7.

[10]. Barros ELD, Lins CCSA. Considerações anátomo-clínicas da síndrome de Eagle. Int J Dent. 2010; 9(2):90-92.

[11]. .Guimaraes SMR, *et al.* Prevalência de alteração morfológica do processo estilóide em pacientes com desordens de diagnostico e orientação a pacientes com desordens temporomandibulares da faculdade de odontologia na universidade Federal de juiz Minas Gerais.

[12]. Kursoglu P, Unalan F, Erdem T. Radiological evaluation of the styloid process in joungadultes resident in Turkey's Yeditepe University faculty of dentistry. Departamento de Protese, Faculdade Universidade Yaditepedontologia da Turquia. 2005

[13]. Carlini JL, *et al.* Síndrome de Eagle: relato de caso tratado por abordagem intraoral e revisão de leitura. Revista brasileira de Cirurgia buco-maxilo-facial. 2007; 10:77-82.

[14]. Farias JG, *et al.* Síndrome de Eagle. Revista brasileira de ciências da saúde. 2006; 10: 99-102.

[15]. Guzzo FAV, *et al.* Síndrome de Eagle: relato de caso. Revista paranaense de medicina. 2006; 20:47-51.

[16]. Higino TCM, *et al.* Síndrome de Eagle: relato de três caso. Arq. Int. Otorrinolaringolo. 2008; 12: 141-4.

[17]. Rosa RR, *et al*. Síndrome de Eagle. Revisão de literatura sobre variações, diagnóstico e tratamento. Revista de Odontologia da Universidade Cidade de São Paulo. 2008; 20: 288-94.

[18]. Silva EDO, *et al*. Síndrome de Eagle relato de cinco casos. Odontologia Clin-Cientif. 2009; 8:169-73.