

# Bilateral elongated styloid process - a case report

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## ABSTRACT

Eagle's syndrome, also known as elongated styloid process, is a condition that may be the source of craniofacial and cervical pain. It is infrequently reported but is probably more common than generally considered. Diagnosis is confirmed through clinical symptoms, radiological findings, and physical examinations. In this paper a case of ES exhibiting unilateral symptoms with bilateral elongation of styloid process is reported and the literature is reviewed.

**Key words:** Eagle's syndrome, Elongated, Styloid process

## INTRODUCTION

Eagles syndrome or stylohyoid syndrome, is defined as the symptomatic elongation of the styloid process or mineralization (ossification or calcification) of the stylohyoid ligament complex. The styloid process is a thin, cylindrical, sharp osseous process, deriving from the posterior lower surface of the petrosal bone directed downwards and forward. The styloid process in some cases could be long enough to cause symptoms due to compression of surrounding anatomical structures. Eagle first described this syndrome characterized by elongated styloid process or ossified stylohyoid ligament.<sup>1</sup>

## CASE REPORT


A 50 year old male patient reported to K.D. Dental College, with a chief complaint of pain in right side of ear and neck since 1 year.

History revealed that the pain was insidious in origin, dull to moderate in intensity and intermittent in nature. The pain was characterized as a needle-like, piercing pain inside the right ear, and it had worsened one week before, along with headache since 1 week. It was unilateral and did not cross midline. The intensity of pain was aggravated by movements such as looking up and turning face to left side and became worse during

deglutition. In addition, patient also had a sensation of foreign body in throat on swallowing. There was alteration in taste in right half of tongue and paresthesia over right half of face. There was no relevant medical or dental history.

Patient was moderately built and nourished, mentally sound. (Fig. 1, 2) All his vital signs were within normal limits. On extraoral examination, temporomandibular joint showed bilaterally symmetrical movements with an opening click on right side, along with tenderness over the right TMJ region. There was also tenderness between upper end of sternocleidomastoid muscle and angle of mandible & also along the carotid artery. A small bony hard projection was palpable in right submandibular area at anterior border of sternocleidomastoid muscle, which was tender. Mouth opening was 25mm and mandibular protrusion was 8mm.(Fig. 3) On intraoral examination, he had a normal complement of teeth, with no carious or filled teeth, and with moderate stains and calculus. The lateral pterygoid muscle was tender on palpation on right side. Based on the history and clinical findings, a provisional diagnosis of Myofascial Pain Dysfunction Syndrome was put forth.

Panoramic radiograph showed that the length of both right and left styloid process was approximately 7cm, with Langlais type II pattern(Fig. 4). Considering the elongated styloid process and suspecting eagles syndrome, a TMJ Tomogram and CT scan were advised.(Fig. 5, 6) TMJ tomogram showed thin condylar head and increased interarticular space. CT scan showed the elongated styloid processes bilaterally based on the history, clinical findings and investigations, a final diagnosis of Eagles Syndrome was put forth.

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## DISCUSSION

Eagle syndrome was first documented by Watt W. Eagle an otorhinolaryngologist in the year 1937. The styloid process is a slender outgrowth at the base of the temporal bone, immediately posterior to the mastoid apex. It arises from the inferior surface of the temporal bone at the junction of its petrous and tympanic portions. It lies caudally, medially, and anteriorly towards the maxillo-vertebro-pharyngeal recess (which contains carotid arteries, internal jugular vein, facial nerve, glossopharyngeal nerve, vagal nerve, and hypoglossal nerve).<sup>2</sup>

With the stylohyoid ligament and the small horn of the hyoid bone, the styloid process forms the stylohyoid apparatus, which arises embryonically from the Reichert cartilage of the second branchial arch. Three muscles and two ligaments are attached to the styloid process. The muscles are stylopharyngeus, stylohyoideus and styloglossus, which are innervated by glossopharyngeus, facialis and hypoglossus nerve. The stylohyoid ligament extends from the tip of the styloid process up to the lesser horn of the hyoid bone and the stylomandibular ligament, which commences under the attachment of styloglossus muscle and ends on the angle of mandible.<sup>2,3</sup>

In the adult the styloid ligament, normally composed of dense fibrous connective tissues may retain some of its embryonic cartilage and this have the potential to become partially or completely ossified in later life. Such as the ossification can get triggered by various factors. The pathophysiological mechanisms include: (1) Compression of the neural elements, the glossopharyngeal nerve, lower branch of the trigeminal nerve, and/or the chorda tympani by the elongated styloid process; (2) Fracture of the ossified stylohyoid ligament, followed by proliferation of granulation tissue that causes pressure on surrounding structures and results in pain; (3) Impingement on the carotid vessels by the styloid process, producing irritation of the sympathetic nerves in the arterial sheath; (4) Degenerative and inflammatory changes in the tendonous portion of the stylohyoid insertion (5) Irritation of the pharyngeal mucosa due to direct compression by the styloid process; (6) Stretching and fibrosis involving the fifth, seventh, ninth, and tenth cranial nerves in the post-tonsillectomy period.<sup>2</sup>

Eagle defined the length of a normal styloid process at 2.5-3.0 cm. Various authors differ in opinion, and it can range anywhere between 1.5 to 3cm. The incidence of elongated styloid process is reported to be 4 to 7% as a whole. Average age is  $43.35 \pm 14.88$  years. The condition is known to occur most frequently in females, though there are conflicting reports. They present diversely according to the length and width of the styloid process, angle and direction of the curve, and degree of calcification of the stylohyoid ligament.<sup>5,6</sup>

Recognized symptoms include facial pain, sore throat, otalgia, dysphagia, headache, and a sensation of a

foreign body in the pharynx; in rare cases, alteration in taste or vocal changes can also be observed. The diagnosis of ES must be based on a good medical history and physical examination. It should be possible to feel an elongated styloid process by careful intraoral palpation, placing the index finger in the tonsillar fossa and applying gentle pressure. If pain is reproduced by palpation and either referred to the ear, face, or head, the diagnosis of an elongated styloid process is very likely. A styloid process of normal length is usually not palpable. Injection of local anaesthetic into tonsillar fossa relieves pain and can be used as a diagnostic tool.<sup>4,5,6</sup>

Eagle initially described two types of syndromes. First, 'classic styloid syndrome' occurs mainly after tonsillectomy and is characterized by isolated pharyngalgia in the tonsillar fossa. Its symptoms include dysphagia, odynophagia, a sensation of increased salivation, and a sensation of a foreign body in the pharynx. In rare cases, it can be accompanied by vocal changes. The second type 'stylocarotid syndrome', which is caused by the stylohyoid organs exerting pressure on the internal and external carotid arteries, regardless of tonsillectomy. Pain in the eye, parietal cephalalgia, aphagia and vision disturbance can occur.<sup>8</sup> The diagnosis of ES can be ascertained with imaging which includes lateral head and neck radiograph, Towne radiograph, panoramic radiograph, lateral-oblique mandible plain film etc. In radiographs a threshold length of 3 cm is accepted as abnormal by current conventions. Plain radiographs are the commonest modality chosen. Lateral views are the best to show the length of the styloid process, but antero-posterior views are also needed to determine whether there is bilateral involvement and the presence of lateral deviation.<sup>1,2,6</sup>

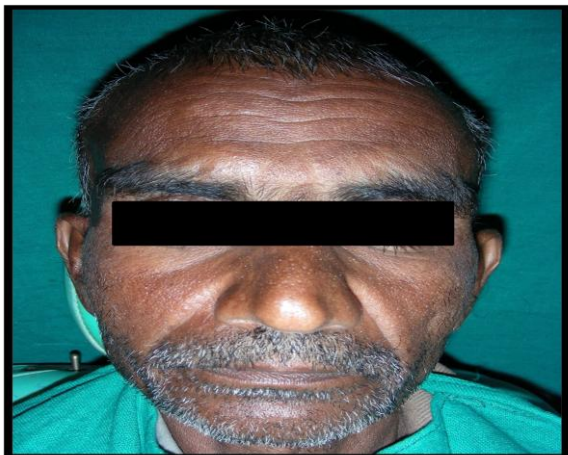
CT scans with coronal images of the upper cervical region provide excellent definition of the complex and adjacent soft tissues, thus it is used to evaluate the length of the stylohyoid complex. Axial images provide information about the location and immediate relations of the stylohyoid chain. Currently, 3D spiral CT is the most advanced diagnostic imaging technique to evaluate the stylohyoid chain in spatial geometry, with accurate length measurements.<sup>6</sup>

## RADIOGRAPHIC CLASSIFICATION

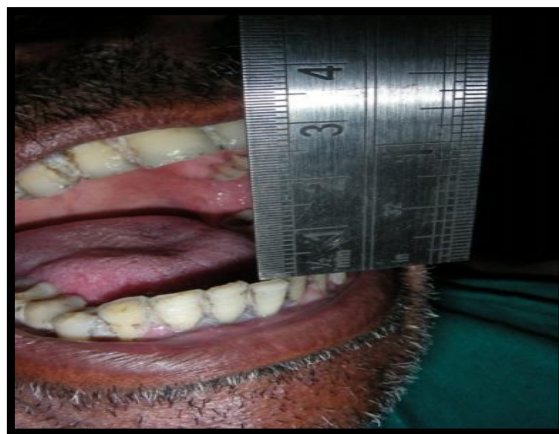
Langlais et al, 1986 gave the following classification

1. Type I (Elongated styloid process) pattern represents an uninterrupted, elongated styloid process
2. Type II (Pseudoarticulated styloid process) is characterized by the styloid process apparently being joined to the stylohyoid ligament by a single pseudoarticulation. This gives the appearance of an articulated elongated styloid process.

3. Type III(Segmented styloid process) consists of interrupted segments of the mineralized ligament, creating the appearance of multiple pseudoarticulations within the ligament(Fig. 7)<sup>2</sup>



**Fig. 1: Frontal profile of the patient**



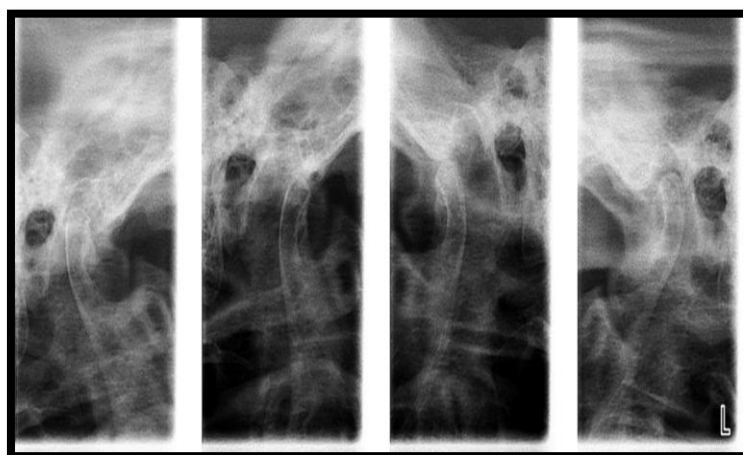
**Fig. 3: Mouth opening was 25mm**



**Fig. 2: Lateral profile of the patient**



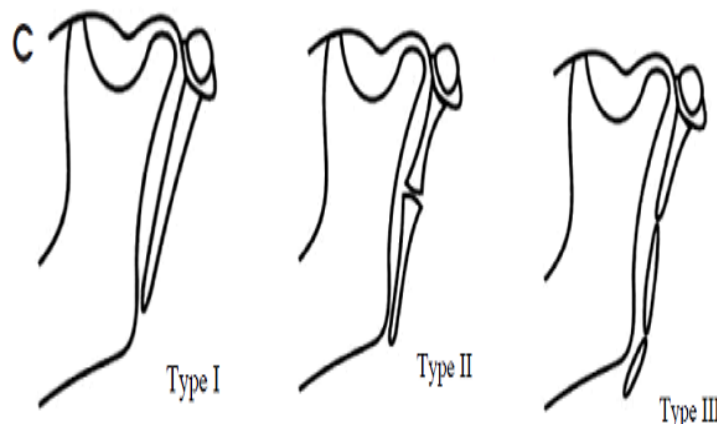
**Fig. 4: Digital OPG of the patient showing bilateral elongated styloid process(Langlais Type II)**



**Fig. 5: TMJ Tomogram showing thin condylar head and increased interarticular space**



**Fig. 6:** CT scan showing the elongated styloid processes bilaterally



**Fig. 7:** Classification of elongation of styloid process based on type of calcification (Langlais 1986) Type I (elongated), Type II (pseudo articulated), and Type III (segmented)

Some disorders which should be considered in the differential diagnosis of eagles syndrome include laryngopharyngeal dysesthesia, temporomandibular arthritis, glossopharyngeal and trigeminal neuralgia, chronic tonsillo-pharyngitis, Sluders syndrome, cluster type headache, temporal arteritis, cervical vertebral arthritis, benign or malignant neoplasms, migraine, tension headache, atypical facial pain, myofascial pain syndrome, tonsillitis, psychosomatic disease, trigeminal neuralgia, TMJ disorders, temporal arteritis, unerupted or impacted molar teeth and faulty dental prostheses, costens syndrome and trotters syndrome<sup>2</sup>.

The elongated styloid process syndrome can be treated conservatively or surgically. Conservative treatment options have included transpharyngeal injection of steroids and lignocaine, nonsteroidal anti-inflammatory drugs, diazepam, the application of heat, traditional Chinese medicines, and transpharyngeal manipulation with manual fracturing of the styloid process. It should be noted that blind fracture of the styloid process does not usually relieve symptoms and risks damage to nearby neurovascular structures. The most satisfactory and effective treatment is surgical shortening of the styloid process through either an intraoral or external approach. The most significant advantage of an external approach is enhanced exposure of the styloid process

and the adjacent structures, and this outweighs all other considerations. It also facilitates the resection of a partially ossified stylohyoid ligament. Transoral resection causes no outside scars, but involves the risk of deep cervical infection and possible neurovascular injury.<sup>2,9</sup>

## CONCLUSION

Eagle's syndrome is a more common disorder than generally considered in oral and maxillofacial departments. The elongated styloid process syndrome can be diagnosed by a detailed history, physical examination, and radiological investigations. It can be confused or mistaken for many other conditions that must be excluded. Resection of the elongated styloid process is the treatment of choice. It is essential that every practitioner should be aware about it to prevent misdiagnosis and unnecessary trouble to the patient.

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