

# FACTA ANATOMICA

Eagle syndrome is also known as stylohyoid syndrome, styloid syndrome, or styloid-carotid artery syndrome. It was named after Watt W. Eagle an otolaryngologist at Duke University, who described the first case in 1937.



## EAGLE SYNDROME



**ELONGATED STYLOID PROCESS**



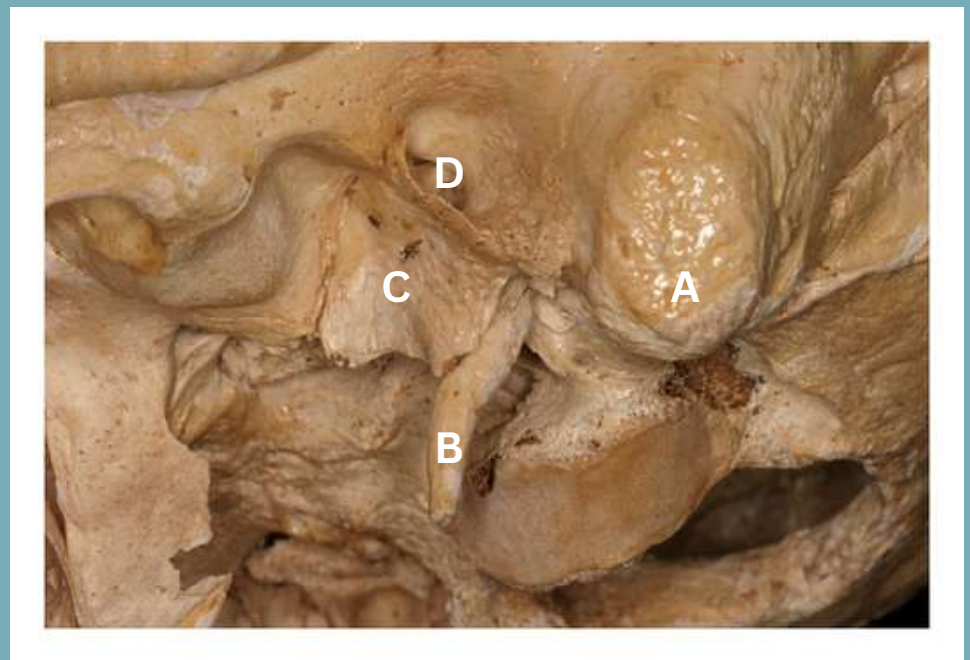
**NORMAL STYLOID PROCESS**

"It is a rare condition caused by elongation of styloid process or calcification of stylohyoid ligament which interferes with the functioning of neighboring structures and gives rise to orofacial and cervical pain often triggered by neck movements".

# INTRODUCTION

- The styloid process is a cylindrical, slender, needle-like projection.
- It projects downward from the inferior part of the petrous temporal bone in front of the stylo mastoid foramen. It is composed of a proximal and a distal segment.
- The proximal segment consists of the base of the process, which is contained within the vaginal process of the tympanic portion of the temporal bone.
- The distal component consists of the shaft and is the origin of three muscles, the stylohyoid, stylopharyngeus, and styloglossus. The styloid process gives attachment to the stylohyoid & stylomandibular ligament. Through these structures, the styloid process facilitates the movement of the tongue, pharynx, larynx, hyoid bone, and mandible.

A = Mastoid Process  
B = Styloid process  
C = Tympanic plate of temporal bone  
D = External acoustic meatus



***The internal jugular vein, internal carotid artery, glossopharyngeal nerve (CN IX), vagus nerve (CN X) and accessory nerve (CN XI) lie medial to the styloid process. The occipital artery and hypoglossal nerve (CN XII) run along its lateral side.***

***It's average length is 20-30 mm in the adult Caucasians and 15.4-18.8 mm in the Asian population.***

***An elongated styloid process is defined by being more than 30 mm long.***



## ETIOLOGY

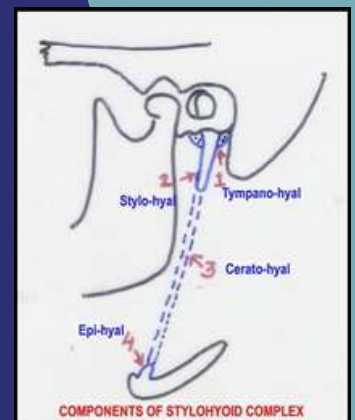
There is debate regarding the etiology of Eagle syndrome and a number of theories have been suggested.

- **Dr. Watt Eagle** proposed that surgical trauma (tonsillectomy) or local chronic irritation causes osteitis, periostitis, or tendonitis of the styloid process and the stylohyoid ligaments which resulted in reactive, ossifying hyperplasia.
- **Lentini (1975)** suggested the hypothesis that persistent mesenchymal elements, also known as Reichert cartilage residues, could undergo osseous metaplasia in the setting of an appropriate traumatic or stressful event.
- **Epifanio in 1962** considered that the ossification of the styloid process was also corresponding to endocrine disorders in women at menopause, who also had ossification of other ligaments in the body.
- **Gokce C et al. (2008)** reported that patients with the end-stage renal disease having abnormal calcium, phosphorus, and vitamin D metabolism had heterotopic calcification which caused elongation of the styloid process and thus the presentation of Eagle Syndrome.
- **Sekerci** by his retrospective study in 2015 indicated that a relationship exists between the presence of an arcuate foramen and an elongated styloid process.

## EMBRYOLOGY

The styloid process originates as a part of Reichert's cartilage, which forms from the second pharyngeal arch during.

- It divides into four parts, the tympanohyal part, the stylohyal part, the ceratohyal part, and the hypohyal part.
- The tympanohyal part develops antenatally, attaches to the petrous portion of the temporal bone, and gives rise to the base of the styloid process, which is ensheathed by the vaginal process of the tympanic part.
- The stylohyal part appears post-natally, and it gives rise to the shaft of the styloid process and the proximal portion of the stylohyoid ligament.
- The stylohyal part might unite with the tympanohyal after puberty; in some cases, they never do.
- The ceratohyal and its fibrous sheath regress, giving rise to the stylohyoid ligament.
- The hypohyal part gives rise to the lesser cornu of the hyoid bone.



## CLINICAL PRESENTATION

- Symptoms are most frequently seen in the third or fourth decades.
- Although there is no significant sex predilection but, symptoms are more common in women.
- The symptoms range from mild discomfort to acute neurologic and referred pain.
- Symptoms are divided into the classic eagle syndrome and vascular eagle syndrome.

### “CLASSIC EAGLE SYNDROME”

- It is usually seen in patients after pharyngeal trauma or tonsillectomy.
- It shows unilaterally presentation usually however, it may rarely have a bilateral presentation.
- **Pain in the distribution area** of the 5th, 7th, 8th, 9th, and 10th cranial nerves.
- **Episodic tic-like pain** attacks, that are typical of glossopharyngeal neuralgia  
Constant dull pharyngeal pain in the ipsilateral tonsillar fossa, that can be referred to the ear and aggravated by rotation of the head.
- Other symptoms include the **sensation of a foreign body in the pharynx (55%), dysphagia, painful swallowing, otalgia, headache, pain along with the distribution of the external and internal carotid arteries, pain on cervical rotation or mastication, facial pain and tinnitus.**
- Further, a **mass or bulge may be palpated in the ipsilateral tonsillar fossa,** exacerbating the patient's symptoms.

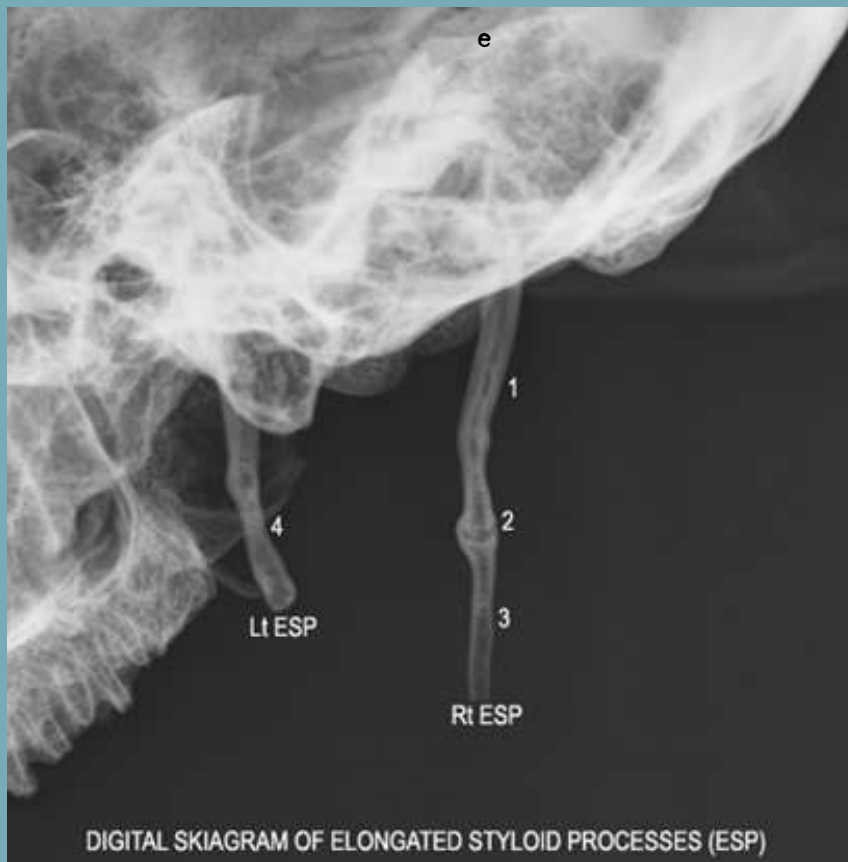
### “ VASCULAR EAGLE SYNDROME OR STYLOCAROTID SYNDROME ”

- Occurs due to the compression of internal or external carotid artery (along with their perivascular sympathetic fibers) by a laterally or medially deviated styloid process.
- Usually, there is no history of tonsillectomy.
- Turning the head can causes pain along with the distribution of the artery.
- This can potentially lead to **TIAs, vertigo, and syncope.**
- **Pain is often referred to supraorbital region** (impingement of the internal carotid artery)
- In the case of external carotid artery irritation, **the pain radiates to the infraorbital region.**



## DIAGNOSIS

- The diagnosis of Eagle's syndrome is based on medical history and physical examination.
- Intraoral palpation- place the index finger in the tonsillar fossa, and apply gentle pressure.
- Tenderness over the greater horn of the hyoid bone
- CT is the most accurate.
- 3-D CT reconstruction of the neck enables precise measurement of the length of the styloid process and the ossified stylohyoid ligament
- Orthopantomogram (OPG) and CT can both be used to assess the styloid process/stylohyoid ligament complex.
- CT angiography or catheter angiography - In cases where mechanical vascular compression



[1] partial calcification of proximal part (stylohyal part) of the right elongated styloid process

[2] Showing the core of “pseudo-articulation” portion of the right elongated styloid process, where a translucent horizontal gap is noted

[3] Showing the ceratohyal part of the elongated styloid process; where the core is not ossified; only the outline is calcified

[4] Showing the stylohyal part of the left elongated styloid process where the core is partially ossified

## TREATMENT

- IT can be treated conservatively or surgically, depending on severity.
- Initially conservative management is recommended.
- **Conservative management** consists of steroid or long-acting anesthetic injections at the inferior portion of the tonsillar fossa or the lesser cornu of the hyoid bone for symptomatic relief.
- **Surgical management** can be through an extra-oral transcervical approach or an intra-oral transpharyngeal approach.
- **The extra-oral transcervical approach** allows for better visualization but is considered a more complex and time-consuming approach that leaves a visible scar and possible transient weakness in the marginal mandibular nerve.
- **The intra-oral approach** provides a shorter operative time with the possibility of using a local anesthetic; however, poorer visualization poses a risk to the major vessels of the neck with an increased risk of bacterial contamination.

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"Eagle's syndrome should always be suspected when idiopathic unilateral pain occurs in the styloid region, especially in adult women and when the pain is not responsive to painkillers.

In addition, if the pain is exacerbated by swallowing, yawning and crying, supports the diagnosis"

MESSAGE FROM EXECUTIVE DIRECTOR  
PROF.DR. (COL.) CDS KATOCH, AIIMS RAJKOT



I heartily congratulate the Department of Anatomy for bringing this informative newsletter on the anatomical explanation of the EAGLE SYNDROME.

My best wishes to the entire team.

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