



# Eagle's Syndrome

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# Introduction

- ⋮ Eagle's syndrome is characterized by recurrent attacks of pain in oropharynx and face or some other form of retromandibular-cervical pain.
- ⋮ Eagle's syndrome is glossopharyngeal neuralgia, which may be due to an elongated styloid process or calcified stylohyoid ligament .
- ⋮ In 1937 Watt W. Eagle described the symptom complex of elongated styloid process which was named as Eagle's syndrome.
- ⋮ Normal length of styloid process is 2-3 cm. If it exceeds more than 3 cm it is called as elongated styloid process.

# Introduction

- ∪ Eagle has described two syndromes, which are attributed to elongated styloid process.
- 1. *Classic Eagle's syndrome* usually follows tonsillectomy and includes pain in throat, sensation of foreign body in throat and pain on deglutition.
- 2. *Stylocarotid syndrome* may or may not follow tonsillectomy and even if the styloid process is not elongated or deviated to one side. Pain is caused by mechanical irritation of the sympathetic nerve tissue in the walls of the internal and external carotid artery by the tip of the styloid process or the ossified ligament

# History

- ∪ Ossification of the stylohyoid ligament was first reported in 1652 by **Marchetti**.
- ∪ In 1937, **Eagle** presented the first two cases of symptomatic elongated styloid process.
- ∪ **Messer** and **Abramson** recommended surgical removal of the elongated styloid process while others recommended injection of a steroid solution at the lesser horn of the hyoid or the inferior aspect of the tonsillar fossa.

# Incidence

- ∪ An elongated styloid process occurs in about 4% of the general population.
- ∪ In which only a small percentage (between 4-10.3%) of these patients are symptomatic. So the true incidence is about 0.16%.
- ∪ It is often observed in the third and fourth decade of life.
- ∪ Female-to-male predominance of 3:1.
- ∪ Bilateral involvement is quite common but does not always involve bilateral symptoms.

# Etiology

- ⋮ Eagle (1937) considered surgical trauma (tonsillectomy) or local chronic irritation could cause osteitis, periosteitis, or tendonitis of the stylohyoid complex with consequent reactive, ossifying hyperplasia.
- ⋮ Epifanio (1962) considered that the ossification of the styloid process was related to endocrine disorders in women at menopause, accompanied by the ossification of ligaments elsewhere (eg, iliolumbar, thyrohyoid).
- ⋮ Lentini (1975) formulated the hypothesis that persistence of the mesenchymal elements (Reichert cartilage residues) could undergo osseous metaplasia as a consequence of trauma or mechanical stress during the development of the styloid process.

# Etiology

- u Gokce C reported that ectopic calcification might have a role for the elongation of Styloid Process, especially in patients with abnormal calcium (Ca), phosphorus (P), and vitamin D metabolism (as in end-stage renal disease).

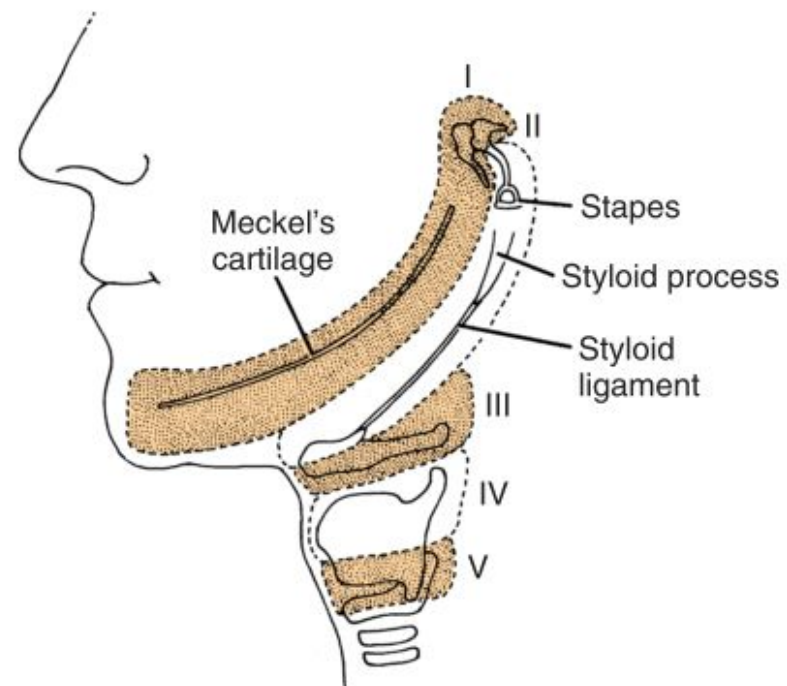
# Embryology

- ∪ Cartilage of the second branchial arch (Reichert's cartilage), forms bony structures proximally and distally.
- ∪ Its central portion withers, leaving a fibrous band—the stylohyoid ligament.
- ∪ Proximally, it forms the styloid process, the manubrium of the malleus, the long process of the incus, and the stapes suprastructure.
- ∪ Distally, it forms the hyoid bone.
- ∪ Styloid process, stylohyoid ligament and lesser horn of the hyoid bone developmentally originate from the second branchial or hyoid arch.



# Embryology

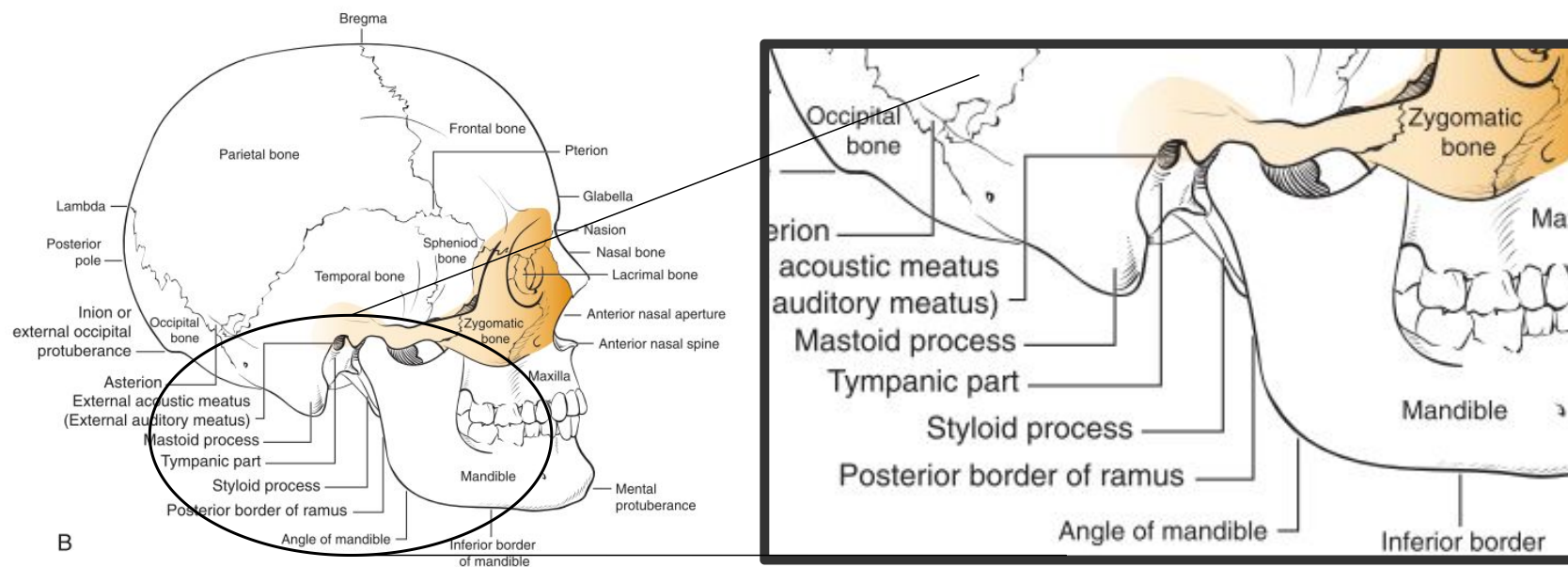
In the adult, it is possible to trace the path of the embryonic second arch cartilage from the styloid process, to the stylohyoid ligament, ending at the lesser cornu of the hyoid bone.



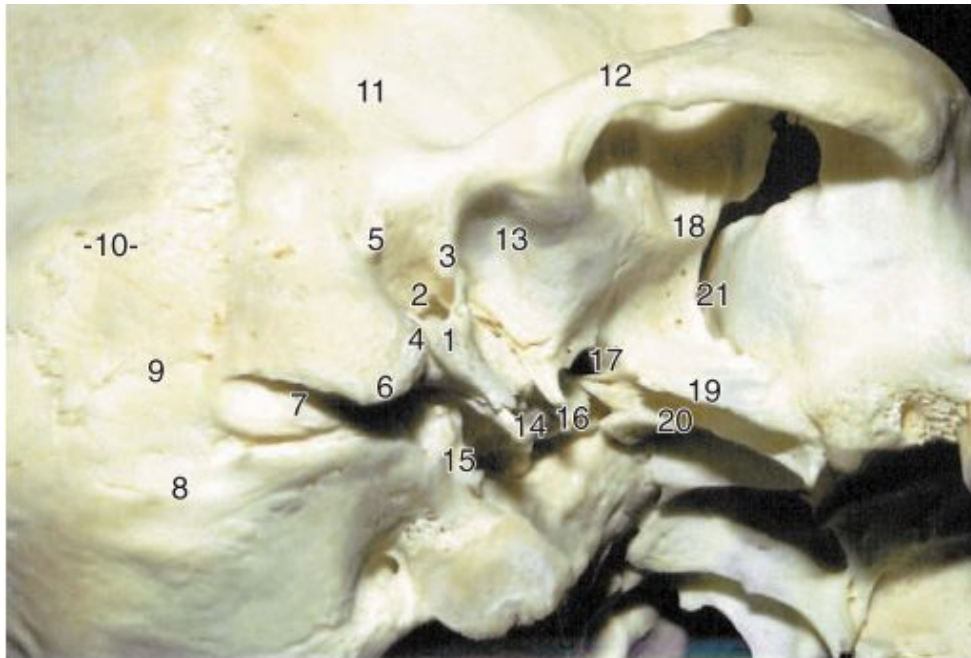
# Anatomy

- ↳ Styloid process is derived from the Greek word *stylos*, meaning a pillar.
- ↳ According to the Gray's Anatomy the normal length of styloid process is 2 cm to 3 cm.
- ↳ It projects downwards and forwards from the inferior surface of the temporal bone just in front of the stylomastoid foramen.
  - ↳ Anterolaterally : Stylomastoid foramen,
  - ↳ Posteriorly : Mastoid bone
  - ↳ Medially : Jugular foramen, carotid canal, internal jugular vein & Cranial nerves VII , IX , X , XI , XII .

# Lateral View Of The Craniofacial Skeleton



## Cranium, Lateral Inferior View (Right Side)



- 14, styloid process;
- 15, jugular foramen
- 16, carotid canal;
- 17, sphenopalatine foramen;
- 19, lateral pterygoid process;
- 20, medial pterygoid process

# Anatomy

- u The tip of the styloid process is close to the external carotid artery laterally, while medially, it is in close proximity to the internal carotid artery and accompanying sympathetic chain.

# Attachments

- ∪ It serves as an anchoring point for several muscles associated with the tongue and larynx.

- ∪ Its proximal part (tympanohyal) is ensheated by the vaginal process of the tympanic portion.

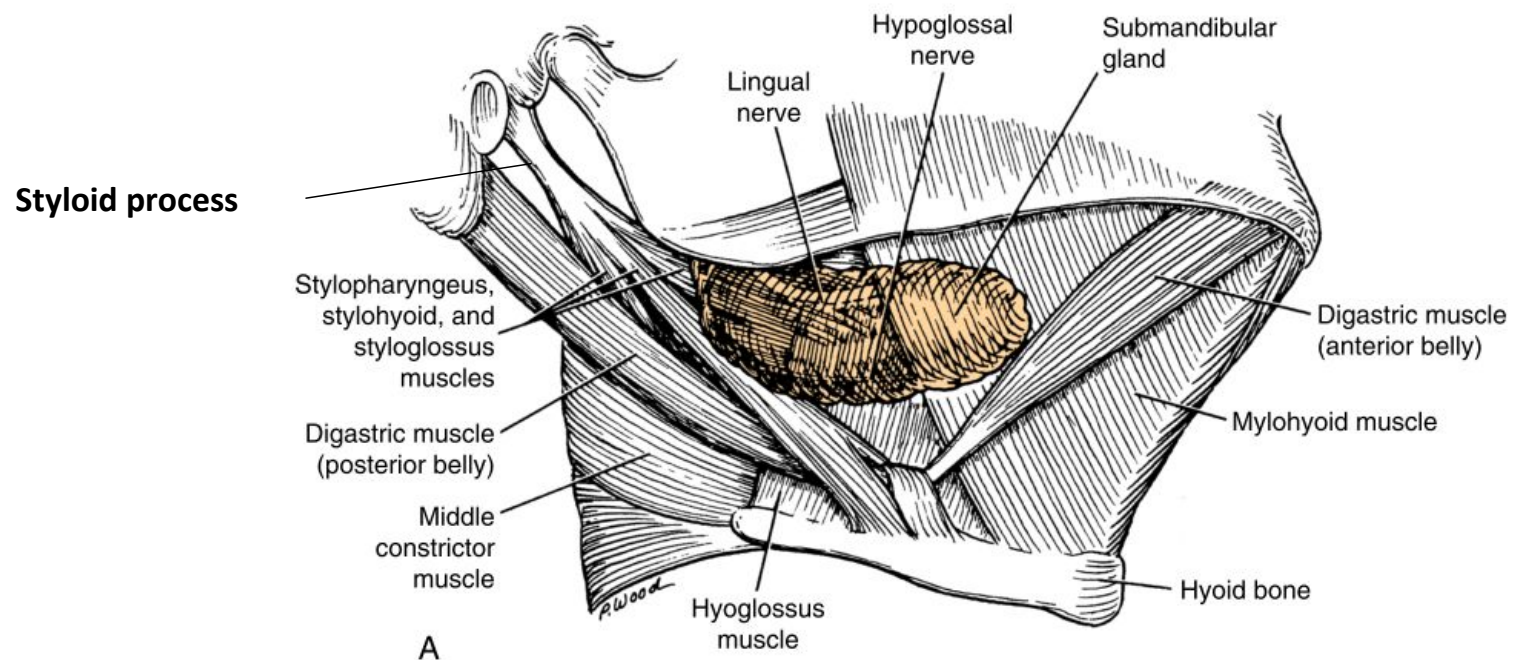
- ∪ Its distal part (stylohyal) gives attachment to the two ligaments.

1. Stylohyoid,
2. Stylomandibular.

- ∪ Three muscles

1. Styloglossus,
2. Stylohyoid,
3. Stylopharyngeus.

# Muscle attachments of Styloid process

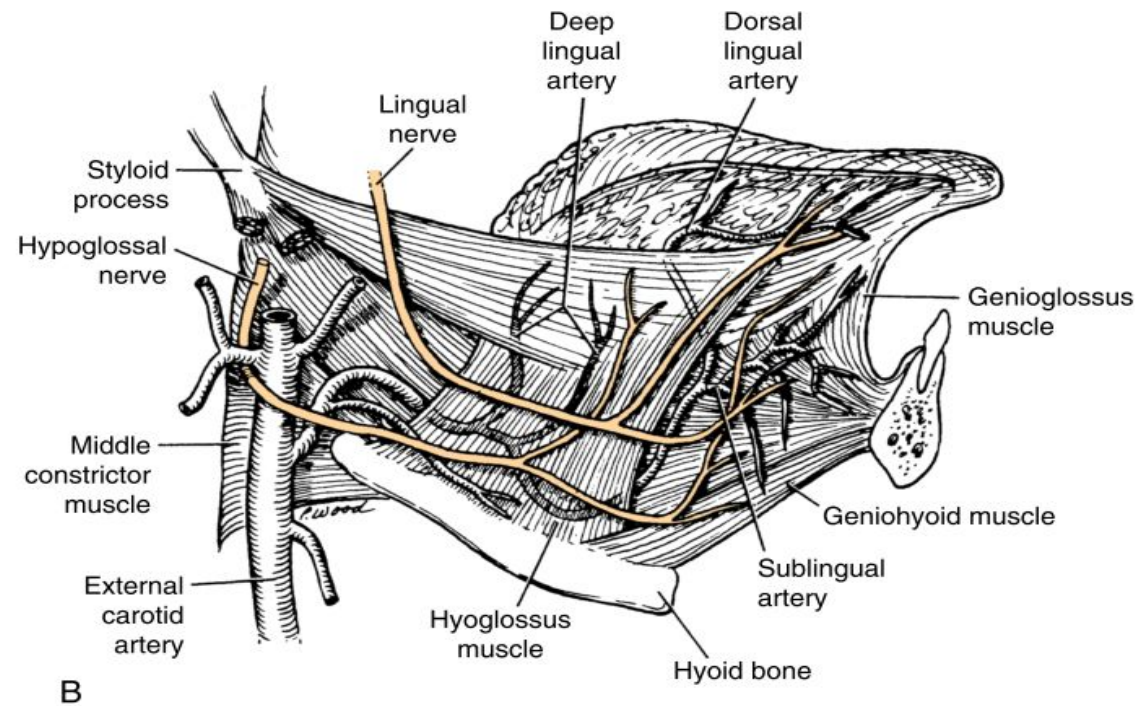


# Contents

- ↳ Retro Styloid compartment contains carotid arteries, internal jugular vein, facial nerve, glossopharyngeal nerve, vagal nerve, and hypoglossal nerve.



# Deeper Anatomy Of The Submandibular Fossa



# Pathophysiology

- ∪ Eagle considered tonsillectomy responsible for the formation of scar tissue around the styloid apex, with consequent compression or stretching of the vascular and nervous structures contained in the retrostyloid compartment.
- ∪ However, Eagle syndrome is also discovered in patients who have never been subjected to tonsillectomy. So many other factors have been considered, such as the following:
  1. The ossification of the stylohyoid ligament complex, causing contraction of the stylopharyngeal muscle and stretching of the XII cranial nerve.

# Pathophysiology

2. The fracture and medialization of the ossified stylohyoid ligament, with incomplete repair due to continuous hyoid bone movements and formation of excessive granulation tissue.
3. The ossification of muscular tendons leading to irritation of the structures nearby.
4. The abnormal length associated with abnormal angulation of the styloid process.



↳ Glossopharyngeal Neuralgia:

- It may be due to compression of nerve by vessel.
- Retromolar malignancy
- Post Tosilectomy
- Oedema of Glossopharyngeal nerve.

# Signs And Symptoms

- ∪ Classic eagle syndrome is characterised by
  1. Ipsilateral dull and persistent pharyngeal pain,
  2. Referred pain to the ear,
  3. Exacerbation of pain by rotation of the head,
  4. Dysphagia,
  5. Sensation of foreign body in the throat,
  6. Tinnitus,
  7. Cervicofacial pain.

## Signs And Symptoms

- ∪ Mild to sharp stabbing pain in the ear, throat, or retromandible;
- ∪ Provoked by swallowing, turning head, carotid compression; usually Post-tonsillectomy; styloid process longer than 2.5 cm.
- ∪ the stylopharyngeus muscle, a small muscle that aids in elevating the pharynx during swallowing.

# Signs And Symptoms

- υ Stylocarotid syndrome is characterized by
  - υ Compression of the internal or external carotid artery by a laterally or medially deviated styloid process.
  - υ Pain along the distribution of the artery
    - υ In case of impingement of the internal carotid artery, patients often refer supraorbital pain and parietal headache.
    - υ In case of external carotid artery irritation, the pain radiates to the infraorbital region.
  - υ Pain is provoked and exacerbated by rotation and compression of the neck.

# Differential Diagnosis

- ∪ Costen's syndrome

- ∪ The Temporomandibular joint is sensitive to palpation, with pain and crepitation.
- ∪ Hearing is poorer with buzzing in the ears.

- ∪ Trotter's syndrome

- ∪ in the lower jaw radiating towards the ear, with deafness and blockage in the ear, with palatine asymmetry (involving a tumour of the m. levator palatini) and trismus (involving pterygoid muscles).



# Differential Diagnosis

- ∪ Miofacial painful syndrome
  - ∪ The syndrome manifests with muscular spasm, restricted mobility and sensitivity.
- ∪ Trigeminal neuralgia
  - ∪ Trigeminal neuralgia is the most frequent neuralgia in the facial area.
  - ∪ In 95% of cases it involves the second and third branches of the trigeminus (n.maxillaris and n. mandibularis)
  - ∪ It occurs in the form of sudden excruciating, “boring” pain, resembling an electric shock, usually lasting for less than one minute.

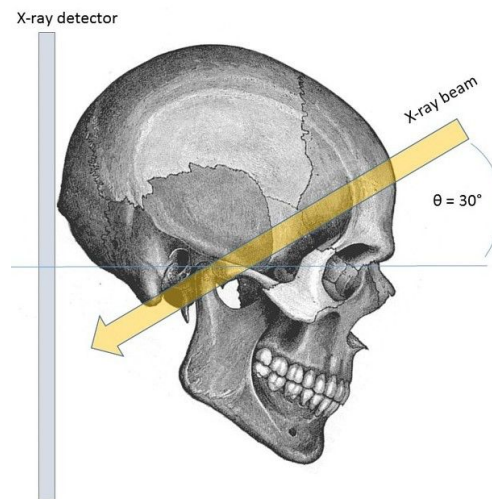
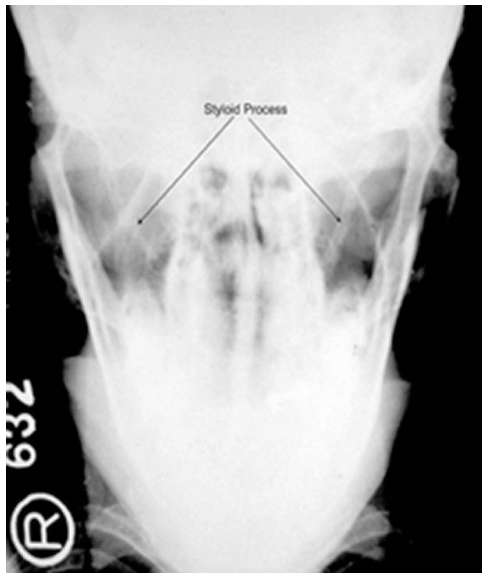
# Diagnosis

∪ Clinical diagnosis of the eagle syndrome can be done by bimanual palpation of tonsillar fossa,

## **Radiological Diagnosis**

- ∪ Soft tissue lateral radiograph of the neck,
- ∪ Skull Towne's view
- ∪ Computed tomography (CT) scan
- ∪ Orthopantomogram

# Skull Townes view



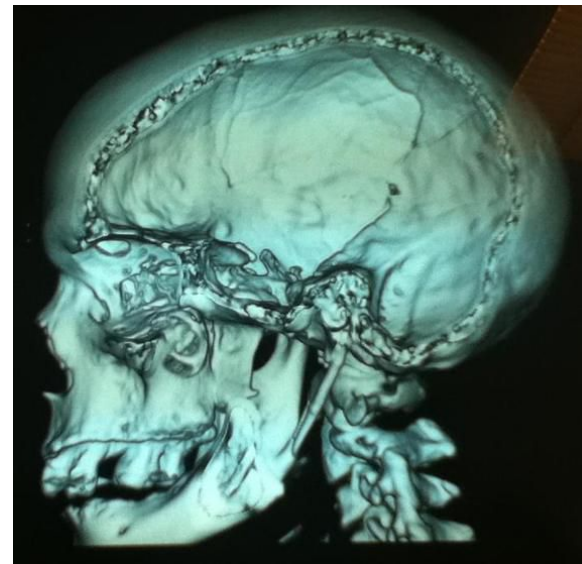
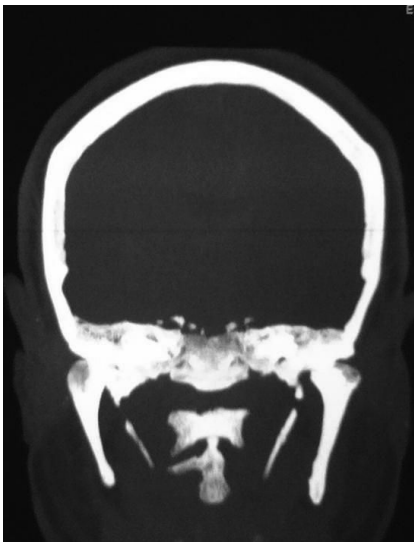
The **Townes view** is an angled AP radiograph of the skull

## Normal Computed Tomography Anatomy Of Nasopharynx.



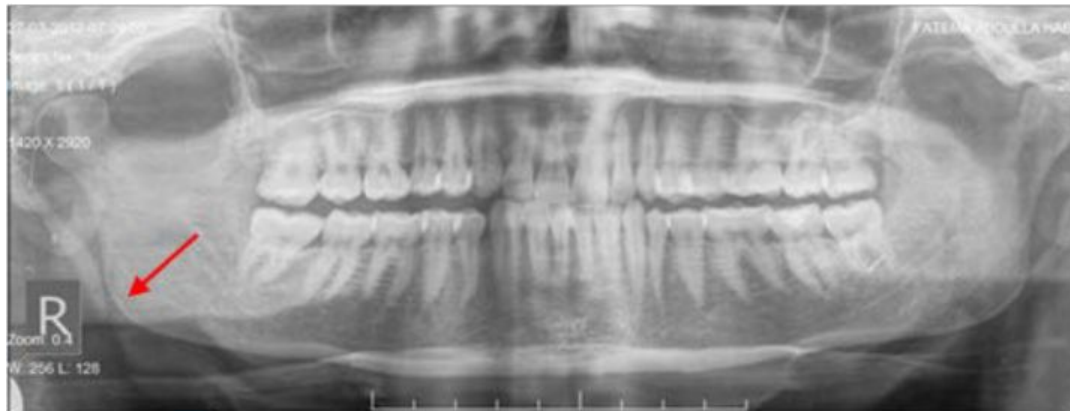
The torus tubaris (t), fossa of Rosenmuller (r), nasal septum (n), and styloid process (s) are marked

# Computed Tomography



3 D Reconstruction of CT Scan

# Orthopantomogram

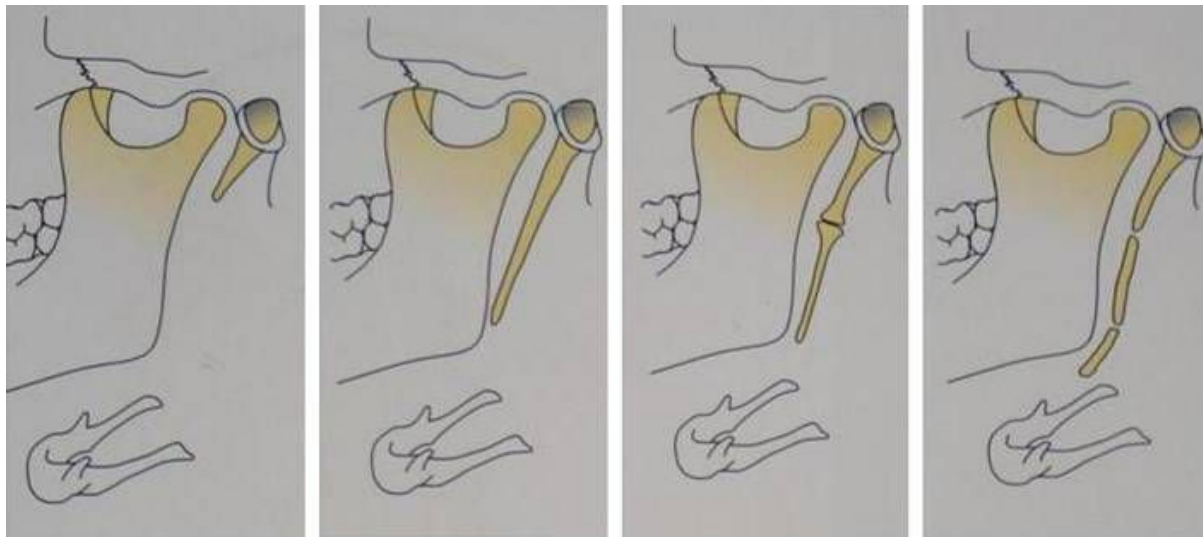


**Figure 2.** Orthopantomogram (OPG) showing a right-sided unilateral elongated styloid process (red arrow).

# Langlais classification

- ∪ Langlais have classified elongated Styloid process as
  1. **Type I** which is uninterrupted, elongated Styloid process,
  2. **Type II** which is a pseudo-articulation between Styloid process and Stylohyoid ligament and
  3. **Type III** in which there are interrupted segments of the mineralized ligament, creating the appearance of multiple pseudo-articulations.

# Langlais classification



**Normal Styloid**

**Type I**

**Type II**

**Type III**



# Management

## u Medical management:

1. Analgesics
  - NSAIDS
2. Anticonvulsants
  - like carbamazepine (400mg/day initially increased to 600-00mg/day),
3. Antidepressant
  - Like amitriptyline(25mg/day) - tricyclic antidepressants on low dosage help in chronic pain relief
4. Local infiltration with steroids with local anaesthetic agents.
  - Hydrocortisone 25mg (1ml) diluted with 1ml .25 % lidocaine is injected close to styloid process

# Surgical Management

## **Intraoral approach**

### ∪ Advantages

1. Avoids external scarring,
2. Less time consuming.

### ∪ Disadvantages

3. Risk of deep space neck infection,
4. Poor visualization of the surgical field,
5. Major risk of iatrogenic injury to main neurovascular structures,
6. Poor haemorrhage control,
7. Alterations of speech and swallowing for postoperative oedema,
8. Difficult in patients with markedly decreased jaw opening.

# Surgical Management

## Extraoral approach

### ∪ Advantages

1. Better visualization of the surgical field,
2. Greater intraoperative sterility.

### ∪ Disadvantages

3. More time-consuming,
4. Risk of injury of facial nerve structures,
5. Neck scar,
6. Longer recovery.

# Surgical Management

- ∪ Intraoral approach:
- 1. Transpharyngeal approach:
  - ∪ The surgeon locates the styloid process by digital palpation of the tonsillar fossa.
  - ∪ After the incision and the identification of the styloid process, it is necessary to split the muscles, to elevate the mucoperiosteum, and, finally, to fracture and excise the styloid process.
  - ∪ If the pharyngeal tonsil is present, performing tonsillectomy first during the same operation is necessary.
- 2. Tonsil-sparing transoral approach:

# Surgical Management

## Extraoral approach:

- ⋮ The external approach starts with a cervical incision at the upper two thirds of the anterior margin of the sternocleidomastoid muscle to the hyoid bone.
- ⋮ After identification and incision of the platysma muscle and the superficial cervical fascia, the parotid fascia is reflected anteriorly and the carotid sheath and the sternocleidomastoid posteriorly in order to reach the posterior belly of the digastric muscle and the vascular-nervous bundle of the neck.
- ⋮ The styloid process can now be palpated. Aponeurotic and muscular insertions are separated from the styloid process. Styloidectomy is then performed.

# Complications

- ∪ Deep neck space infection,
- ∪ Injury to main neurovascular structures,
- ∪ Haemorrhage,
- ∪ Temporary alterations of speech and swallowing,
- ∪ Injury of the facial nerve.

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THANK YOU

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