

# Fracture of the styloid process associated with the mandible fracture

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## Abstract

Fracture of the styloid process (SP) of temporal bone is an uncommon injuries. Fracture of the SP can be associated with the facial injuries including mandible fracture. However, injury to the SP may be concealed and missed diagnosis may lead to the improper or various unnecessary treatments. A rare case of SP fracture associated with the ipsilateral mandibular fracture and also the diagnostic and management considerations of the SP fracture are discussed.

**Keywords:** Eagle's syndrome, stylohyoid chain, styloid process

## Introduction

There is paucity of literature related to injury to the styloid process (SP) and its management. This is largely due to the failure to recognize the injury and its diagnosis.<sup>[1]</sup> Rarity of the lesion adds to the difficulty in the diagnosis. Fracture of the SP can be associated with the facial injuries including the mandible fracture.<sup>[2]</sup> In this report, we present a rare case of SP fracture associated with the ipsilateral mandibular fracture. The diagnostic and management considerations of the SP fracture are also discussed.

## Case Report

A 27-year-old male patient had an interpersonal fight and received a blow with a blunt object on the left side of the face. Patient presented to the Department of Oral and Maxillofacial Surgery with the chief complaints of inability to chew and pain in left retromandibular region. On presentation patient was fully conscious, oriented and vitals were stable. There was no history of loss of consciousness. Also there was history of bleeding after trauma from the left ear. On local examination of the head and neck region there was diffuse swelling with retromandibular fossa and lower third

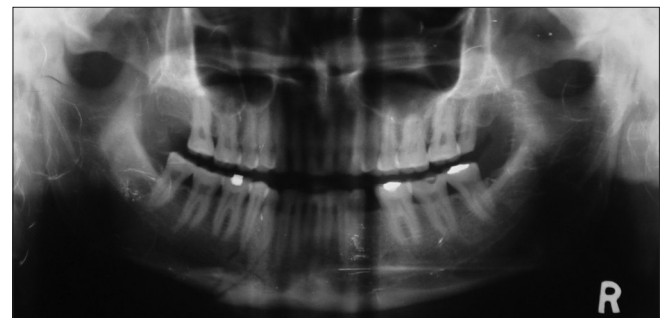
of the face in the mental region on the left side. There was extreme tenderness in the region between the left posterior border of the mandible and the mastoid process and condylar movements were indistinct. Intra-orally there was occlusal step present with the lower premolar region, which correlated well with the extra-oral tenderness with left inferior border of the mandible in the mental region.

Even though it is uncommon to find ipsilateral condylar and parasymphysis fracture of the mandible. But the history of blunt injury with positive history of bleeding from the ear on the same side and indistinct condylar movements with preauricular swelling were suggestive of ipsilateral fracture of condyle and parasymphysis of the mandible. A clinical diagnosis of fracture of ipsilateral condyle and Parasymphysis of the mandible was made. But an orthopantomogram revealed intact condylar process on either side. It also showed moderately elongated styloid process (ESP) on both sides and a suspected fracture of left SP [Figure 1]. A computerized tomography scan was ordered which confirmed the presence of elongated SP on either side and an undisplaced fracture of left SP [Figures 2a and 2b]. Pain and tenderness around the left ear was correlated with fracture of the SP on the same side.

Mandibular fracture was treated with open reduction and internal fixation. SP fracture was managed conservatively with neck collar and analgesics. Inter-maxillary fixation was

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**Figure 1:** Elongated styloid process (SP) on both sides with suspected fracture of left SP

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**Figure 2a:** Undisplaced fracture of left styloid process



**Figure 2b:** Pseudosegmentation of right styloid process

maintained for 2 weeks post-operatively. Post-operative period was uneventful. Patient was asymptomatic and occlusion remained intact after 1½ year follow-up.

## Discussion

The SP is slender, pointed and projects antero-inferiorly from the inferior aspect of the Temporal bone. Its length is variable, ranging from a few millimeters to an average of approximately 2.5 cm.<sup>[3]</sup> An ossified stylohyoid chain (SHC) length of longer than 25-30 mm has been reported as elongated on radiographic studies with conventional methods.<sup>[4]</sup> Based on the criteria suggested by Goldstein and Scopp<sup>[5]</sup> for radiographic evaluation of ESP, orthopantomogram showed SP on either side extending more than one third of the length of the ramus, but not down to the angle of the mandible [Figure 1]. The fracture of the SP presents with the symptoms similar to that of Eagle's syndrome.<sup>[1]</sup> The so called Eagle's syndrome or stylalgia is caused by elongated SP or ossified stylohyoid or stylomandibular ligaments.<sup>[6]</sup> Along with the features of the Eagle's syndrome, a patient with the traumatic fracture of the SP may present with clinical examination findings of the associated injury subsequent to the trauma. In this clinical report, the patient presented several of the symptoms related to mandible fracture, but his discomfort when turning the head and severe tenderness with the left retromandibular region resulted in consideration of SP fracture.

The Fracture of SP can occur especially in cases of complete ossification of the SHC, multiple neck trauma or sudden head movement.<sup>[7]</sup> The SP fracture has also been reported to occur secondary to the fracture of the mandible. A hypothesis has been put forth which states that a SP fracture occurs in association with a mandible fracture when the direction of force is from one side and contact occurs between the cranial end of the fractured ramus and the SP.<sup>[2]</sup> The cause of SP fracture in this patient could be the blunt trauma to the neck or sudden head movements and same injury led to the parasymphysis fracture of the mandible.

The diagnostic criteria for SP fracture are symptoms of pain in association with clinical evidence of a fractured SP, combined with radiographic or computed tomography evidence of SP fracture, and alleviation of symptoms after treatment.<sup>[8]</sup> Clinical history of trauma, such as road traffic accident or sudden head movement along with acute severe pharyngeal pain, diffuse facial pain, dysphagia, and limitation of mandibular movements should raise the suspicion of a concealed SP fracture.<sup>[9]</sup> A diagnostic 2D-CT/3D-CT is the most valuable method of evaluation of the SHC. However, it is important to differentiate between the fracture of the ossified SHC and the natural discontinuity (segmentation) of the ossified SHC. Along with the clinical suspicion of the lesion, the CT diagnosis is possible by visualization of irregular fracture ends. While, segmentation is diagnosed by visualization of the usually smooth bony cortex at both ends.<sup>[7]</sup> However, if the patient presents immediately after the injury, the associated facial injury may divert the attention of the physician resulting in delayed diagnosis and treatment of the underlying SP fracture. In this clinical report, left SP showed evidence of fracture in the proximal part [Figure 2a], while on right side SP showed pseudosegmentation [Figure 2b].

Management of a fractured SP may include various strategies which include conservative treatment, medical management or surgical approach.<sup>[4]</sup> The conservative therapy consist of heat, rest, a liquid diet, and a 3-week prescription of non-steroidal anti-inflammatory agents and muscle relaxants.<sup>[8]</sup> Medical management involves injections of steroids, long-acting local anaesthetic agents at the site of palpation of ESP in the tonsillar fossa or at lesser horn of hyoid bone, and oral administration of carbamazepine.<sup>[10]</sup> Surgical intervention may be done by either the intraoral and extra-oral approaches. However, any surgical procedure may have some risk to the patient, conservative treatment is preferable if it resolves the symptoms.<sup>[8]</sup> In this clinical report, the management included conservative therapy (self-care, analgesics, muscle relaxants, and neck collar) and surgical treatment of the mandible fracture. Inter-maxillary fixation for

2 weeks helped in improvement of the patient's symptoms. Correct diagnosis along with the timely treatment of the lesion may reduce the chances of the long term consequences of the traumatic Eagle's syndrome.

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