

# Nonsyndromic Isolated Temporal Bone Styloid Process Fracture

Hamed Kermani,<sup>1</sup> Nima Dehghani,<sup>2</sup> Farzad Aghdashi,<sup>3</sup> and Mohammad Esmaeelinejad<sup>3,\*</sup>

<sup>1</sup>Department of Oral and Maxillofacial Surgery, Oral and Maxillofacial Diseases Research Center, School of Dentistry, Mashhad University of Medical Sciences, Mashhad, IR Iran

<sup>2</sup>Department of Oral and Maxillofacial Surgery, School of Dentistry, Kermanshah University of Medical Sciences, Kermanshah, IR Iran

<sup>3</sup>Department of Oral and Maxillofacial Surgery, School of Dentistry, Shahid Beheshti University of Medical Sciences, Tehran, IR Iran

\*Corresponding author: Mohammad Esmaeelinejad, Department of Oral and Maxillofacial Surgery, School of Dentistry, Shahid Beheshti University of Medical Sciences, Tehran, IR Iran. Tel: +98-2166050480, Fax: +98-2122439976, E-mail: esmaeelinejad@gmail.com

Received 2014 October 8; Revised 2015 January 7; Accepted 2015 May 12.

## Abstract

**Introduction:** Fracture of the styloid process (SP) of the temporal bone is a rare traumatic injury in normal individuals who are not suffering from Eagle's syndrome. Diagnosis and management of this problem requires comprehensive knowledge about its signs and symptoms. This study aimed to present an isolated styloid process fracture in a nonsyndromic patient.

**Case Presentation:** A 50-year-old male patient was referred to our department with a complaint of sore throat. However, presentation of the problem resembled the symptoms of temporomandibular joint disorder (TMD). Fracture of the SP of the temporal bone was detected on the radiographs. Conservative treatment was undertaken for the patient. The symptoms diminished after about four months.

**Conclusions:** Physicians should be aware of the signs and symptoms of different pain sources to prevent misdiagnosis and maltreatment.

**Keywords:** Eagle Syndrome, Glossopharyngeal Nerve Diseases, Fractures, Spontaneous, Temporomandibular Joint Disorders

## 1. Introduction

Orofacial pain is a challenge for dentists, maxillofacial surgeons and otolaryngologists around the world. The spread of pain and similarity of characteristic signs of different pain sources have made the diagnosis of the origin of pain difficult. The temporomandibular joint disorders (TMDs) are common causes of pain in the maxillofacial region. Understanding the common signs and symptoms of this disorder is important (1). The importance lies in mimicking the symptoms of TMD and other conditions. Pain due to styloid process (SP) fracture is similar to that of TMD (2). The styloid process of temporal bone is a cylindrical projection on the inferior aspect of petrous bone. The stylo-hyoid ligament (SL) is a fibrous cord, which is attached from the lesser cornu of the hyoid bone to the end of the styloid process. The combination of these three anatomical structures is known as the stylo-hyoid chain (SC). The proximity of SC to important anatomical structures like the contents of the carotid sheath reveals the importance of SP and SL (3).

Elongation of SP or ossification of SL is a characteristic sign of Eagle's syndrome and leads to pain of the neck or sore throat (4). Although the fracture of the elongated SP is more common, the isolated SP fracture has been reported in some studies (5). The fracture of SP is a rare traumatic event and has not been reviewed in the literature very well. The associated signs of the SP fracture like the pain of the neck and maxillofacial area are similar to TMD and may lead to misdiagnosis. Careful clinical and paraclinical examinations can help the clinician distin-

guish these two problems from one another.

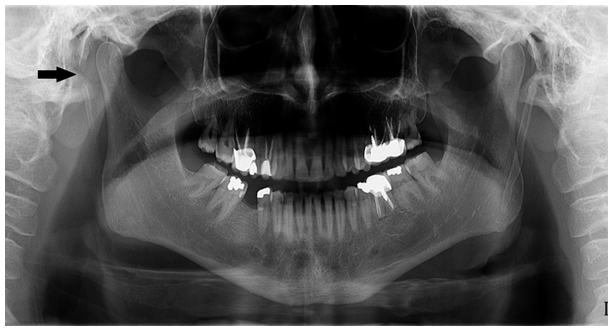
This study aims to present a rare case report of pure fracture of the styloid process of temporal bone, which represented the signs and symptoms of TMD in the patient.

## 2. Case Presentation

A 50-year-old male with a chief complaint of pain during chewing and swallowing was referred to our department. He mentioned a history of trauma to his right mandibular angle during an assault four months previously. The patient did not have any neurosurgical signs, loss of consciousness (LOC), dizziness or vomiting. The Glasgow coma scale (GCS) of the patient was 15 when he was referred to our department.

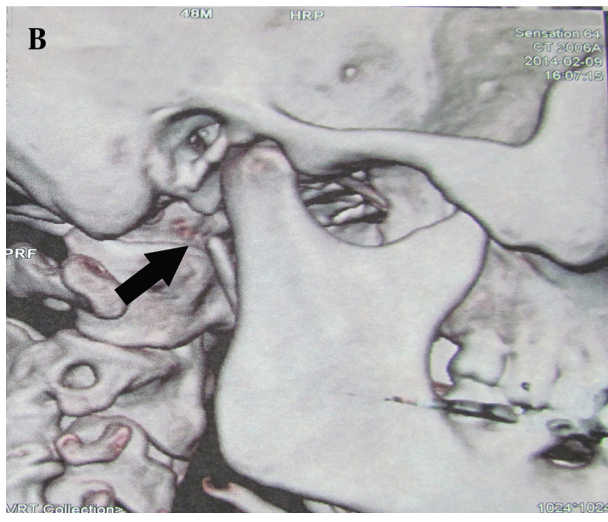
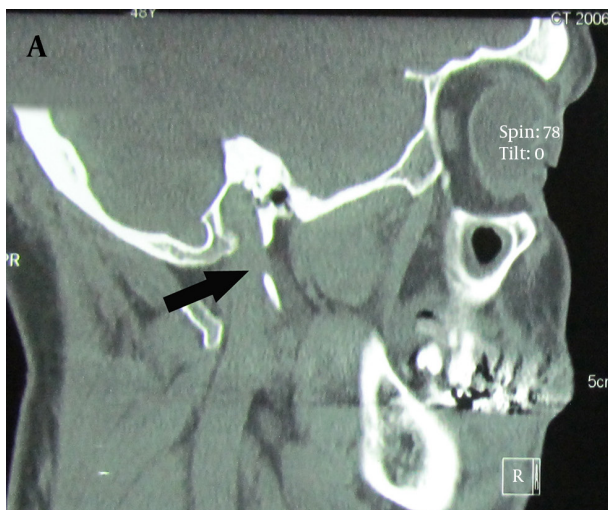
The main complaints of the patient were pain on the right side of the neck and lower jaw during chewing and swallowing. Although the patient experienced pain during mandibular movements and yawning, no limitation of jaw movements was observed. The nature of the pain was sharp and intermittent and lasted a few seconds every time the patient turned his head or upon chewing. The maximum mouth opening (MMO) was about 46 millimeters and there was no deviation in mandibular movements. On clinical examination, there was neither extra-oral swelling nor tenderness of temporomandibular joint (TMJ) or masticatory muscles. Intra-oral examination did not show any occlusal problems or premature contact. The patient did not mention any surgical history or tonsillectomy. He did not complain of symptoms mimicking glossopharyngeal neuralgia.

**Figure 1.** Panoramic View of the Patient



The right SP fracture is indicated by the arrow.

**Figure 2.** The SP Fracture is Obvious in CT Views (arrows)



A, The sagittal view of the patient; B, three-dimensional CT

A panoramic radiograph was obtained from the patient (Figure 1). The radiographic view of the jaws showed elongated SP in the left side whereas the right SP was normal

in size but displaced. The right displaced SP on panoramic view suggested fracture of this process without mandibular condyle fracture. Computed tomography (CT) was obtained for more evaluation and to detect other possible fractures. The CT views confirmed right SP fracture (Figure 2).

The treatment plan for the patient was conservative treatment and follow-up. He was instructed to restrict neck movements. An anti-inflammatory (Naproxen 500 mg for every 8 hours for two weeks) and muscle relaxant (Tizanidine 2 mg twice a day for two weeks) drugs were prescribed to reduce the pain during the mastication. After four months of observation, the patient's pain and discomfort resolved and he was able to masticate and swallow painlessly.

### 3. Discussion

The styloid process fracture is a rare condition in traumatic patients, and usually occurs in association with other facial bone fractures especially mandibular fractures. In several researches in the literature, SP fracture was reported in patients with the Eagle's syndrome (4, 6, 7). Elongated SP and mineralized SC are more susceptible to sudden fracture after a mild injury. Eagle described a traumatic elongation of SP due to tonsillectomy with or without resulting fracture. This type of Eagle's syndrome is characterized by otalgia, ipsilateral cervicofacial pain, dysphagia, foreign body sensation in the throat, trismus and tinnitus (6).

The proximity of important anatomical structures like the internal carotid artery, vagus, and facial nerves reveals the clinical importance of this bony process (3). The styloid process fracture may cause serious life threatening problems or difficulty in treatment of associated fractures. Dislocation of the fractured SP sometimes complicates the management of facial fractures. Gulicher and Gerlach reported a case of mandibular fracture that failed to be reduced because of SP fracture (8).

The diagnosis of SP fracture is based on radiographic examination combined with the history of a traumatic injury and symptoms mentioned by the patient. Various signs and symptoms related to the SP fracture have been reported in the literature. Pharyngeal and diffuse facial pains are usually the chief complaints (9). These patients usually have a clinical history of trauma to the face or neck, although sudden fracture of elongated SP has been reported in several studies (4). Limitation in mandibular movements and dysphagia are other common symptoms (4). In some cases, the presentation of SP fracture resembles the symptoms and signs of TMD (2, 5). Atsu et al in 2006 reported a case revealing spontaneous TMD and SP fracture (2). They concluded that exact examination and history taking of the patient help the clinician distinguish these two problems from one another. The patients with SP fracture occasionally sense a foreign body in the throat and discomfort during head turning (4). Although the patient experienced pain during mastication, the mandibular movements were without any limitation and there was no preauricular pain during the

examination. The latter symptoms combined with a history of trauma clued us to suspect SP fracture. The styloid process fracture was obvious on CT views.

Similar symptoms of orofacial pains from different sources, i.e. TMD and especially glossopharyngeal neuralgia are two important conditions, which may resemble the signs and symptoms of SP fracture (5).

Pre-auricular pain and limitation of mandibular movements are the most frequent signs and symptoms and the usual chief complaints in TMD patients (1). The clinical importance of TMD is its early diagnosis and preventing the progression of symptoms and worsening of the patients' conditions. Early diagnosis of TMD is sometimes difficult due to the similarity of this problem to other maxillofacial pains (9). The origin and distribution of the pain in patients with TMD are sometimes similar to other causes of oral and maxillofacial pain.

Glossopharyngeal neuralgia (GPN) is a facial pain syndrome characterized by deep pain on one side of the throat extending to the ear (10). The pain distribution and symptoms of this neuralgia is similar to the symptoms of SP fracture and is sometimes confusing. Glossopharyngeal neuralgia is characterized by intermittent paroxysmal attacks usually lasting shorter than two minutes (10). The nature of the attacks is unilateral, sharp and severely painful. Glossopharyngeal neuralgia can be associated with bradycardia and asystole, which helps distinguish GPN from SP fracture (10).

### 3.1. Management

The management of SP fracture depends on the severity and displacement of the fracture (5) and the amount of the fractured SP displacement (5). Surgical removal of the SP may be necessary when either the SP is elongated or severely displaced (5). In some other cases which SP fracture is associated with other facial bone fractures, it may not be possible to reduce fractures without performing surgery. In an SP fracture with mild discomfort, conservative treatments may be appropriate and sufficient. In our case, we administered muscle relaxant agents to lessen muscle tonicity and reduce patient discomfort during head turning. The patient was ordered to limit his neck movements for several weeks to give a chance to heal the fracture site.

In conclusion SP fracture mimicking orofacial pain, particularly TMD is a diagnostic challenge and physicians

should be aware of its signs and symptoms to prevent misdiagnosis and mismanagement.

### Acknowledgments

We would like to express our gratitude and appreciation to Dr. Mojdeh Kalantar Motamedi for editing the manuscript.

### Footnote

**Authors' Contribution:** Hamed Kermani was the supervisor of the project. The manuscript was written by Mohammad Esmaeelinejad. Nima Dehghani, Farzad Aghdashi contributed in managing the patient and editing the manuscript.

### References

1. Pour DG, Rajaei E, Golestan B. Association between magnetic resonance imaging, temporomandibular joint scanographic findings and clinical manifestations of joint pain and sounds in temporomandibular disorders. *Iran J Radiol.* 2010;7(4):245-9.
2. Atsu SS, Tekdemir I, Elhan A. The coexistence of temporomandibular disorders and styloid process fracture: a clinical report. *J Prosthet Dent.* 2006;95(6):417-20. doi: 10.1016/j.prosdent.2006.04.005. [PubMed: 16765153]
3. Weidenbecher M, Schick B, Iro H. [Styloid syndrome and its treatment]. *Laryngorhinootologie.* 2006;85(3):184-90. doi: 10.1055/s-2005-870504. [PubMed: 16547894]
4. Blythe JN, Matthews NS, Connor S. Eagle's syndrome after fracture of the elongated styloid process. *Br J Oral Maxillofac Surg.* 2009;47(3):233-5. doi: 10.1016/j.bjoms.2008.08.009. [PubMed: 18823683]
5. Reichart PA, Sooss W. Fracture of the styloid process of the temporal bone: an unusual complication of dental treatment. Report of a case. *Oral Surg Oral Med Oral Pathol.* 1976;42(2):150-4. [PubMed: 1066595]
6. Orlik K, Griffin GD, Zoumberakis E. Unilateral neck pain: a case of Eagle syndrome with associated nontraumatic styloid fracture. *Am J Emerg Med.* 2014;32(1):112 e1-2. doi: 10.1016/j.ajem.2013.08.043. [PubMed: 24079986]
7. McCorkell SJ. Fractures of the styloid process and stylohyoid ligament: an uncommon injury. *J Trauma.* 1985;25(10):1010-2. [PubMed: 4046079]
8. Gulicher D, Gerlach KL. Failed closed reduction of a bifocal mandibular fracture because of dislocation of the mandibular ramus behind the styloid: case report. *Br J Oral Maxillofac Surg.* 2000;38(4):280-2. doi: 10.1054/bjom.1999.0172. [PubMed: 10922151]
9. Dubey KN, Bajaj A, Kumar I. Fracture of the styloid process associated with the mandible fracture. *Contemp Clin Dent.* 2013;4(1):116-8. doi: 10.4103/0976-237X.111633. [PubMed: 23853469]
10. Blumenfeld A, Nikolskaya G. Glossopharyngeal neuralgia. *Curr Pain Headache Rep.* 2013;17(7):343. doi: 10.1007/s11916-013-0343-x. [PubMed: 23709235]