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CASE REPORT

Sphenoid Fracture Associated with Internal Derangement of TMJ - A Case Report

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Abstract:

Introduction: Sphenoid fracture is rarely happening fracture when it's get associated with mandibular movements and how it is get treated. Patients complaint is preauricular pain and neck pain without systemic illness. **Intervention**: Occlusal soft splint was given. **Outcome**: Patient was painless and felt relieved. **Conclusion**: Many cases we encounter now are related to TMJ rather than other causes, So it's essential to properly examine the patient and should have different treatment plans.

Key Highlights:

- **38-year-old female** with right-sided facial, head, and ear pain associated with **dizziness**.
- History of **head trauma 3 weeks' prior** after hitting her head against a shelf.
- Pain initially localized to the **right side of the head**, gradually spreading to the **lower jaw**.
- **VAS pain score: 7/10**, indicating severe pain.
- **No relief with analgesics, gabapentin, or amitriptyline** following ENT and neurological consultations.
- Dental history revealed **missing mandibular first and second molars bilaterally** and previous restoration of a lower-right posterior tooth.

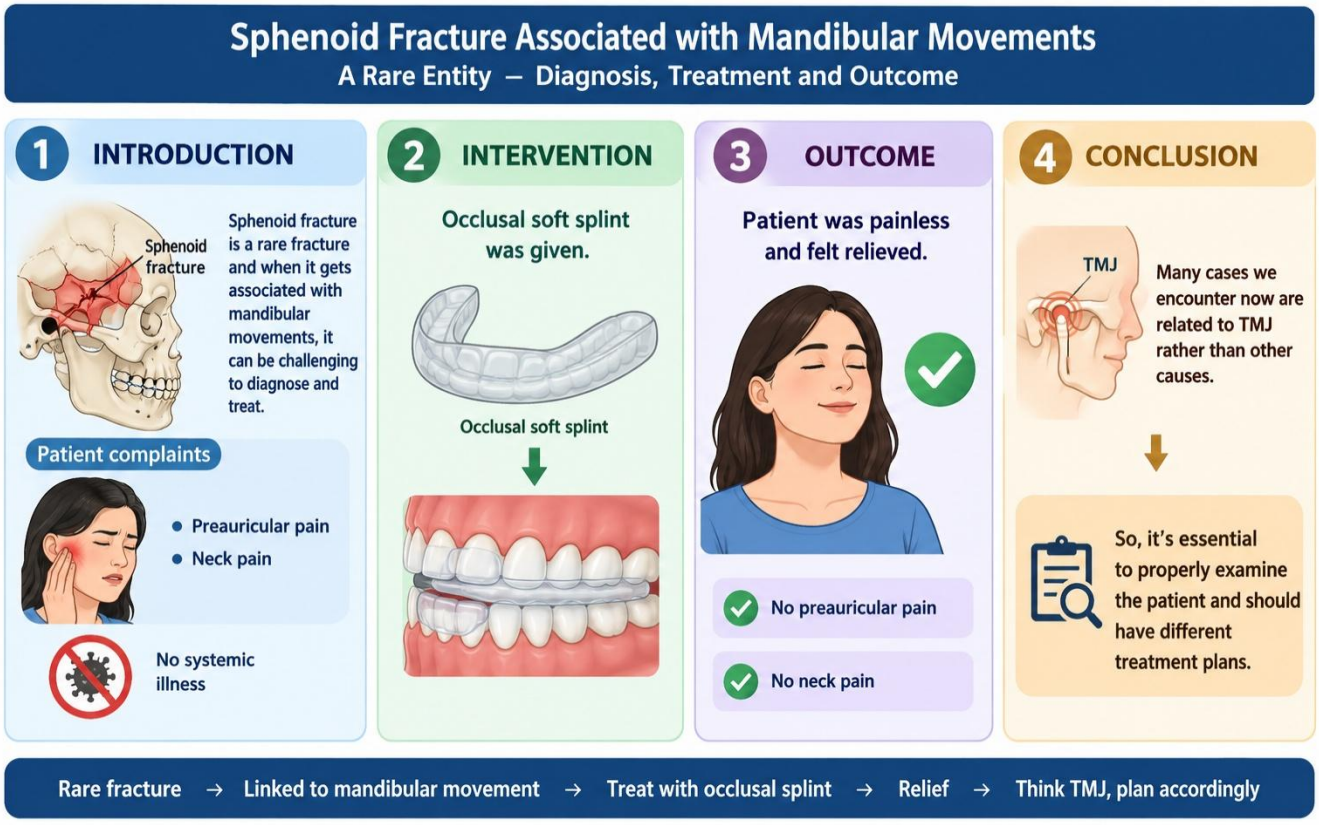
Keywords: Sphenoid Fracture, Internal Derangement of TMJ, TMJ Tenderness, MPDS, Eagles Syndrome.

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Graphical Abstract:



1. Introduction:

Temporomandibular joint was the only bilateral joint which articulates with a single bone and it is complex to treat the TMJ disorders. TMJ disorders includes arthritic, musculoskeletal and neuromuscular conditions that involve TMJ, muscles of mastication and associated tissues. Etiology for this disorder is under constant debate [1,2].

Eagles syndrome was first described by watt weeks' Eagle in 1937. When styloid process is elongated above 25mm named as elongated styloid syndrome [3,4].

Compression or irritation of internal or external carotid artery, facial pain, headache, dizziness, pain aggravated by head rotation. Ossification of styloid process may be hereditary. Women in 4th to 5th decade are most commonly affected [5].

Sphenoid bone is a bat shaped bone which is unpaired and present in midline, lying at junction of anterior and middle cranial fossa which consists of body, lesser wing, greater wing. It articulates with ethmoid anteriorly and occipital posteriorly, parietal, temporal, zygomatic laterally and vomer bone inferiorly. Incidence of sphenoid bone fracture is rare [6,7].

Incidence of sphenoid fracture is less common. Park et al., in 2015 described 0.5%, Kelley et al., quoted about 2% in 1991, Abhinav et al., concluded 3.4% cases in 2020, Barbose et al., in 2014 reported 1% cases, Harnsburger et al., reported 1.8% cases in 1990, Alvi et al., in 2003 reported 2.1% [8-10].

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Most common site of fracture involvement is sphenoid sinus due to thin walls, greater wing often associated with zygoma and orbital fractures, lesser wing involve optic canal, clivus in posterior skull base with severe trauma. Isolated sphenoid fracture is extremely rare [11,12].

2. Case Report:

A 38-year-old female patient came with a chief complaint of pain in her right side of the face and head and ear pain along with dizziness who went to otorhninologist for and prescribed analgesics and reviewed after 1 week. Patient had no relief even after taking analgesics. She was then referred to neurologist for the same complaint and was prescribed gabapentin and amitriptyline for 5 days and after taking the medications still the same complaint continues. She was then referred to oral and maxillofacial surgery for opinion regarding auricular and facial pain with a main complaint of pain in her right half of the entire face and head along with dizziness. Upon asking further history about having any trauma experience, she gives a history of trauma by hitting to the shelf and sustained injury to head to3 weeks back. Pain initially present in right head region and which was gradually spread to lower jaw and pain was measured using visual analog score which was recorded be 7 (strong pain) out of total score 10. She is not having any other medical or surgical condition. But patient had a dental history who had restoration done before 3 years in her lower right back tooth and right mandibular 1st and 2nd molar was absent and left lower 2 molars was absent.

On examination, patient had tenderness over the right temporalis, right masseter, right trapezius, right sternocleidomastoid muscle, also over the both TMJs which was slightly increased in right TMJ. Mouth opening and lateral movements was within normal range. Mahans test was positive. Provisional diagnosis was given as Internal derangement of TMJ. Patient was advised to take OPG and which revealed elongation of right styloid process more than usual.

Patient advised to take CT scan which revealed linear incomplete undisplaced fracture noted in right greater wing of sphenoid (Figure 1 and 2) and right styloid process elongation of measuring 3.4cm when compared to left it is 2.3cm and was obviously not compressing the adjacent arteries and nerves.

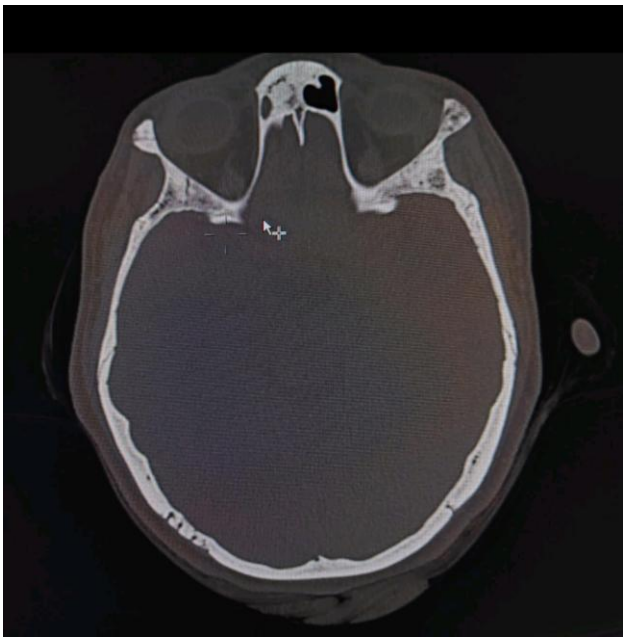


Figure 1



Figure 2

Patient was advised to wear soft splint of thickness 2mm was advised along with Tab. Zerodol TH 8mg BD and she was made to wear splint for entire 24 hours for 10 days. At the next visit after 20 days, patient was asked for followup. Now the VAS score was reduced to 3(uncomfortable pain) out of 10. On examination, the pain was gradually reduced and

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Stage	Medication	Splint therapy	VAS score	Clinical findings
1 Initial visit	Tab. Zerodol-TH 8 mg BD	24hrs/day For 10 days	7	Muscle tenderness
2 1st follow up (20 days)	Dose reduced from 8 mg BD → 4 mg BD for 10 days	Splint checked (no perforation)	3	Mild tenderness in trapezius, SCM, temporalis
3 2nd follow up	Completed course	Splint continued	1	Significant reduction in muscle tenderness

patient felt relieved of pain at rest. On palpation mild tenderness was present over the trapezius, sternocleidomastoid and temporalis. Soft splint was checked for perforations and advised to continue soft splint for another 1 week and Tab. Zerodol TH dosage was reduced from 8mg to 4mg BD for 10 days was advised.

On the next followup, eventually pain got reduced to 1 (least score) out of 10 and was occasionally present.

3. Discussion:

On discussing the literature, dizziness was most common Lateral neck pain, headache (Hemicranial, migraines) also a contrasting feature for eagle's syndrome. In some cases, eagle's syndrome was associated with inferior alveolar nerve paresthesia. About 4% of the population are having this syndrome, but symptomatic cases are usually 0.16% only [14,18,24]. Frequent headaches are common, which resembles migraine. As presented in CT, patient was not symptomatic of any vascular or neural involvement [14-17,23,24].

Though the case presented with exact Eagles syndrome symptoms like dizziness, headache and neck pain which was associated with an internal derangement of TMJ. Surprisingly patient was relieved of pain and it was reduced after wearing soft splint [15-17].

Pain onset, duration, quality, behavior, aggravating and relieving factors, function, limitation, parafunctional habits. In this case, muscles of mastigation was initially relieved and that made sphenoid bone to heal under rest [23,24].

From this case, patient shows three conditions which includes sphenoidal bone fracture with TMJ internal derangement and associated Eagles syndrome. Eagles syndrome has a contrasting feature like pain during movement and pain in neck, throat is most contrasting feature and it has two types namely classic type and stylocarotid type, in the 2nd type styloid process compresses or irritates the internal or external carotid artery and associated sympathetic fibers and they may experience headache, facial pain, dizziness and transient ischemic attack or syncope due to vascular compromise, especially with head movement. This case exactly shows the above mentioned symptoms TMJ internal derangement shows dull pain lasts for minutes to hours. Patient presented maximum symptoms look alike both Eagles syndrome and internal derangement of TMJ. Main etiology of Eagles syndrome as described by Eagle is tonsillectomy which is responsible for the formation of scar tissue at the apex of styloid with consequent compression or stretching of vascular or nervous structures in retro styloid compartment [13,14]. Eagles syndromes main treatment is surgical management i.e. styloidectomy, but here we avoided the surgical need and better treated the

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patient with conservative management which relieved the stress of masticatory muscles and ultimately reduced the pain which was not responding to other conservative treatments [16,19,23]. Thielen et al., stated that surgical management is the best and curative option for eagle's syndrome but in this article it is proven that conservative management is also curative [22].

In an article Abdullah et al., described elongated styloid syndrome (ESS) as a 52-year-old male with a three-year history of non-painful clicking during jaw movement initially diagnosed as TMJD-related internal derangement [25]. The patient presented with a history of annoying jaw sounds for three years, described as a popping sound without bilateral clicking or crepitation. Tinnitus and progressive hearing loss were observed in the right ear, and a hearing aid was recommended by an otolaryngologist [14,27,29]. The patient was initially diagnosed with TMJD and managed accordingly; nevertheless, his symptoms persisted. Imaging revealed prominent bilateral styloid process elongation that exceeded the recognized cut-off level of >30 mm for elongation [26]. The patient was informed of his diagnosis and its treatment but opted only for further swallowing and auditory assessments of his ear and nose symptoms. Clinicians should consider including ESS as a differential diagnosis in patients presenting with non-specific chronic orofacial symptoms for timely diagnosis and favorable clinical outcomes. Based on their radiographic interpretations, SP elongation is classified into four types with 30 mm as the cut-off level: (i) No elongation detected (type 0), (ii) Elongated SP longer than 30 mm (type 1), (iii) Pseudo-elongated SP related to the mineralization of the stylohyoid ligament (type 2), and (iv) Elongated but segmented/interrupted SP longer than 30 mm (type) females between 40-60 years are more likely to present with ESS [27,28].

TMJ disorders shows dull stabbing pain with moderate intensity which lasts for minutes to hours with a inability to open mouth and pain during mastigation.

4. Conclusion:

This is a peculiar case which was associated with Eagles syndrome and TMJ disorder. Here diagnosis becomes a challenging factor where the Eagles syndrome and TMJ disorder both presentation will be almost similar except some contrasting feature like TMJ tenderness and pain or triggers points in muscles of mastigation. Although this patient went to every specialist for her condition, finally it was a maxillofacial surgeon who provided her the correct treatment at a proper time.

5. Declarations:

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Informed Consent Statement: Not applicable.

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Acknowledgments: Not applicable.

Conflicts of Interest: The authors declare no conflict of interest.

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