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Review Article

Pterygoid Hamulus Bursitis: A Rare and Overlooked Cause of Orofacial Pain

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Abstract

Pterygoid hamulus bursitis (PHB) is an infrequently reported condition that presents with chronic orofacial pain, often misdiagnosed as temporomandibular disorders (TMDs) or other common craniofacial pain syndromes. This condition arises from inflammation of the bursa surrounding the pterygoid hamulus (PH), a small hook-like bone structure of the sphenoid bone. Anatomical variations such as elongation of the PH or repetitive mechanical irritation are among the primary causes of this rare pathology. Clinically, PHB manifests as pain radiating to the soft palate, throat, or temporomandibular joint area, accompanied by symptoms such as dysphagia or otologic discomfort. This comprehensive review examines the current understanding of PHB, including its anatomy, pathophysiology, clinical presentation, diagnostic challenges, and management strategies, based on the available literature and clinical evidence. Early recognition and appropriate management, including surgical intervention when necessary, are essential to alleviate symptoms and prevent long-term complications.

Keywords: Bursitis, facial pain, synovial bursa, temporomandibular joint, oral surgery

INTRODUCTION

Orofacial pain encompasses a spectrum of clinical conditions affecting the head, face, and neck, with etiologies ranging from dental pathologies to neuropathic disorders. Among these, non-dental causes, such as temporomandibular joint disorders (TMDs), Eagle syndrome, and neuralgias, often dominate the differential diagnosis (1). However, rarer causes like pterygoid hamulus bursitis (PHB) are frequently overlooked, primarily due to their nonspecific clinical features and limited awareness among clinicians. This underrecognition often delays diagnosis and prolongs patient suffering, as individuals endure persistent pain while undergoing ineffective treatments for misdiagnosed conditions (2).

The pterygoid hamulus (PH), though a relatively small anatomical structure, plays a significant role in oropharyngeal function and is prone to mechanical irritation. Anatomical variations, such as elongation or angulation of the PH, may lead to repetitive trauma of the surrounding soft tissues, resulting in inflammation of the synovial bursa enveloping the hamulus (3). This condition, termed PHB, is characterized by chronic orofacial pain that is often referred to adjacent regions, including the temporomandibular joint, throat, or ear. These referred pain patterns contribute to the diagnostic complexity of PHB, as the symptoms overlap with those of more prevalent conditions such as TMDs, glossopharyngeal neuralgia, or masticatory myalgia (4).

Despite its rarity, PHB deserves attention due to its debilitating impact on patients' quality of life. Early and accurate diagnosis not only prevents unnecessary interventions but also ensures timely treatment, which may include conservative measures or surgical resection of the hamulus (5). This review synthesizes current knowledge about PHB, highlighting its anatomical and clinical features, diagnostic approach, and treatment strategies. By doing so, we aim to improve awareness among clinicians and provide a comprehensive resource for understanding and managing this uncommon yet significant condition.

Anatomy and Function of the Pterygoid Hamulus

The pterygoid hamulus is a hook-like bony projection that extends inferiorly from the medial pterygoid plate of the sphenoid bone. Measuring approximately 6-8 mm in length,

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it serves as a critical anatomical fulcrum for the tensor veli palatini muscle, which wraps around the hamulus before inserting into the soft palate (6). This unique anatomical configuration allows the tensor veli palatini muscle to tighten the soft palate during swallowing and speech, facilitating proper oropharyngeal function. In addition, the pterygoid hamulus provides an attachment point for the pterygomandibular raphe, a fibrous band connecting the buccinator and superior pharyngeal constrictor muscles, thereby contributing to the coordination of oral and pharyngeal musculature (7).

Variations in the morphology of the pterygoid hamulus, such as elongation, irregular angulation, or roughened bony surfaces, can predispose individuals to chronic irritation of the surrounding tissues. These variations may be congenital or acquired, with the latter often resulting from repetitive microtrauma, overuse, or age-related changes (8). Over time, this irritation leads to inflammation of the synovial bursa enveloping the hamulus, culminating in PHB. The inflammation not only causes localized pain but also impacts the adjacent soft tissues and neurovascular structures, producing a constellation of symptoms that extend beyond the immediate anatomical site (9). Avarage length, angulation and interhamular distances calculated in the literature are shown in Table 1.

Table 1. Morphometric analysis of pterygoid hamulus

Author	Avarage length	Avarage angulation	Avarage interhamular distance
Putz and Kroyer (7)	7.2mm	Saggital: 75 Frontal: 58	Between 26mm and 36.9 mm
Eyrich et al. (10)	L: 5mm R: 4.9mm	No data	Hamulus to median cut distance: L: 19.6 mm R: 19.9 mm
Orhan et al. (3)	L: 5.48±1.94 mm R: 5.40±2.00 mm	No data	No data
Komarnitki et al. (11)	6.88 mm	Sagittal: 35.3 Frontal: 22.47	No data
Krmpotić-Nemanić et al. (12)	Children: 3.6 mm Adults: 6.9 mm Elders: 5.0 mm	Children: 19.6 Adults: 35.9 Elders: 19.7	Children: 31 mm Adults: 38.9 mm Elders: 32.7 mm

mm: Milimeters

Pathophysiology

The pathophysiology of PHB is complex, involving both mechanical and inflammatory components. At its core, PHB arises from chronic irritation or trauma to the bursa overlying the pterygoid hamulus, a hook-like bony projection at the medial pterygoid plate (13). This irritation can lead to inflammation of the bursa, resulting in pain and referred symptoms that radiate to surrounding anatomical structures.

The pterygoid hamulus serves as a functional pulley for the tensor veli palatini muscle, which tenses the soft palate and plays a critical role in swallowing and speech (14). Repetitive mechanical stress on the hamulus, such as from excessive muscle activity or trauma caused by adjacent tissues, contributes to bursal irritation. Prolonged or repeated inflammation may lead to fibrosis and thickening of the bursa, perpetuating the cycle of pain and dysfunction (15).

Anatomical variations, such as an elongated or abnormally shaped hamulus, exacerbate the condition by increasing mechanical stress on the overlying tissues (14). In such cases, even normal activities like chewing or speaking may provoke inflammation, leading to chronic symptoms. Additionally, systemic conditions such as rheumatoid arthritis or other inflammatory disorders may predispose individuals to bursitis by amplifying the inflammatory response (16).

The close anatomical relationship between the pterygoid hamulus and the greater palatine nerve explains the referred pain patterns commonly observed in PHB. Sensitization of the nerve fibers by chronic inflammation may lead to hyperalgesia, where normal stimuli are perceived as painful, or allodynia, where non-painful stimuli evoke pain (11). This neural component further complicates the condition and underscores the need for multidisciplinary management.

Etiology and Risk Factors

PHB is a multifactorial condition with various intrinsic and extrinsic factors contributing to its onset. Key etiological factors include:

1. Anatomical Variations:

An elongated or abnormally angulated pterygoid hamulus is a significant risk factor for PHB. Studies have shown that these anatomical variations increase the likelihood of mechanical irritation to the overlying bursa, particularly during mastication or speech (17).

2. Repetitive Trauma:

Activities involving repetitive or excessive movement of the soft palate, such as vigorous chewing, frequent swallowing, or even prolonged speaking, can lead to microtrauma and bursal irritation. Patients with habits like bruxism or clenching may also experience increased mechanical stress on the pterygoid hamulus (14).

3. Inflammatory Disorders:

Systemic inflammatory conditions such as rheumatoid arthritis or gout can predispose individuals to bursitis, including PHB. These disorders amplify the inflammatory response, making the bursa more susceptible to irritation and swelling (18).

4. Dental and Surgical Factors:

Dental procedures involving the posterior maxilla, such as extractions or implant placement, may inadvertently traumatize the pterygoid hamulus. Similarly, surgical interventions in the oropharyngeal region can lead to postoperative inflammation and subsequent PHB (14).

5. Age and Gender:

While PHB can occur at any age, studies suggest that older adults are more susceptible due to degenerative changes in soft tissues and increased likelihood of systemic inflammatory conditions (19). There is no strong gender predilection, though certain lifestyle factors may influence risk.

Diagnostic Challenges

Diagnosing PHB is particularly challenging due to its nonspecific symptomatology and the overlapping clinical features it shares with more common orofacial pain disorders (20). Patients with PHB often present with diffuse, poorly localized pain that radiates to the soft palate, throat, ear, or temporomandibular joint (TMJ) area, mimicking conditions such as TMDs, Eagle syndrome, or myofascial pain dysfunction (21). Additionally, the rarity of PHB, combined with limited awareness among clinicians, further delays its recognition, leading to misdiagnoses and ineffective treatment approaches.

One of the primary diagnostic hurdles is the absence of pathognomonic clinical signs. Most patients describe a dull, aching pain that worsens with activities involving the oropharynx, such as swallowing, chewing, or speaking (22). However, these symptoms are often attributed to more common disorders, particularly when accompanied by tenderness in the TMJ region or masticatory muscles. Misdiagnosis is further compounded by the lack of specific imaging findings in routine diagnostic modalities such as panoramic radiographs, which are often insufficient to visualize the pterygoid hamulus in detail (23).

Advanced imaging techniques, including cone-beam computed tomography (CBCT) and magnetic resonance imaging (MRI), have significantly improved the diagnostic accuracy for PHB. CBCT provides high-resolution images of the pterygoid hamulus, allowing precise evaluation of its morphology, elongation, and angulation (24). Meanwhile, MRI is invaluable for assessing soft tissue changes, such as inflammation of the surrounding bursa or adjacent muscles (25). Together, these imaging modalities enable clinicians to identify anatomical variations and inflammatory changes that confirm the diagnosis of PHB. However, the routine use of these tools in orofacial pain clinics is limited by their cost and accessibility, particularly in low-resource settings (26).

Clinical palpation remains a crucial aspect of the diagnostic process. Palpating the medial pterygoid region intraorally, with attention to tenderness or pain elicited around the hamulus, is often indicative of PHB (27). Despite its utility, this technique requires skill and familiarity with the anatomy of the pterygoid region, which may not be routinely performed in general dental or medical practice. As such, interdisciplinary collaboration between oral and maxillofacial surgeons, otolaryngologists, and radiologists is essential for accurate diagnosis.

Clinical Presentation

The clinical presentation of PHB is highly variable, reflecting the multifactorial nature of its pathophysiology and its impact on surrounding anatomical structures. Most patients report a gradual onset of pain, which may persist for months or even years before an accurate diagnosis is made (28). Pain is typically described as deep, dull, and aching, localized to the posterior region of the oral cavity or radiating to the ear, throat, or TMJ area (29). In some cases, patients experience intermittent sharp pain exacerbated by movements such as swallowing, speaking, or chewing.

Referred pain patterns are a hallmark feature of PHB and are attributed to the proximity of the pterygoid hamulus to key neurovascular structures. The greater palatine nerve and branches of the maxillary nerve may become sensitized, leading to radiating pain that mimics neuralgias or TMD-related disorders (30). Dysphagia, a sensation of fullness in the throat, or even otologic symptoms such as ear fullness or tinnitus are not uncommon, further complicating the clinical picture (31).

Physical examination findings often include tenderness upon palpation of the medial pterygoid region, which can be assessed intraorally (32). In advanced cases, palpation may reveal a bony prominence corresponding to an elongated pterygoid hamulus, and this finding, combined with patient-reported pain during palpation, strongly suggests PHB. Additionally, muscle spasms or hyperactivity in the surrounding masticatory muscles may be observed, particularly if the patient has been experiencing chronic pain. The main symptoms and associated complaints in the clinical studies are shown in Table 2.

Table 2. Symptoms and associated complaints

Symptom	Number of cases	Percentage
Ear complaints	11	35.47%
TMJ complaints	14	45.1%
Dysphagia	13	41.9%
Tender on palpation	25	80.6%
Speech disturbance	4	12.9%

Treatment Strategies

Treatment of PHB is dictated by the severity of symptoms, underlying anatomical variations, and the presence of any contributing systemic factors. Management typically begins with conservative measures, focusing on alleviating inflammation and reducing mechanical irritation of the pterygoid hamulus.

Conservative Management

Nonsteroidal anti-inflammatory drugs (NSAIDs) are often the first line of treatment, providing symptomatic relief from pain and inflammation (33). Adjunct therapies such as topical analgesics, corticosteroid injections, or oral muscle relaxants may also be employed to reduce discomfort and improve function. Physical therapy techniques, including soft tissue massage and myofascial release, have been reported to alleviate muscle tension and reduce referred pain in patients with PHB.

For patients with persistent symptoms, splint therapy using custom-made oral appliances may be considered. These appliances aim to reduce mechanical strain on the pterygoid hamulus by altering occlusal forces and repositioning the jaw (34). While conservative measures are effective in many cases, they often provide only temporary relief, particularly in patients with significant anatomical abnormalities or chronic inflammation.

Surgical Management

In cases refractory to conservative treatment, surgical resection of the pterygoid hamulus may be indicated. This procedure involves careful excision of the elongated or angulated hamulus to eliminate the source of mechanical irritation. Surgical resection is performed under local or general anesthesia, with intraoral access minimizing postoperative morbidity and ensuring aesthetic outcomes.

Recent advancements in minimally invasive surgical techniques have further improved the prognosis for patients undergoing hamulus resection. Outcomes are generally favorable, with most patients experiencing significant pain relief and restoration of function within weeks of surgery. However, careful patient selection and thorough preoperative planning are essential to minimize complications and ensure optimal results. A short review the cases with treatment approaches are shown in Table 3.

Table 3. Literature review of pterygoid hamulus syndrome cases

Author	Sex	Age	Side	Pain location	Duration	Conservative treatment	Surgical treatment
Shah et al. (21)	M	26	L	Craniofacial (Palatal, ear)		No	Yes
Prats-Sisquella et al. (22)	F	69	L	Craniofacial	4 months	Yes (Failed)	Yes (LA)
Maracineanu et al. (30)	M	41	R	Craniofacial (Ear, TMJ, lateral pharyngeal)	2years	Yes (Failed)	Yes (GA)
Elmonofy et al. (17)	F	55	L	Craniofacial (Ear, temporal)	>4 years	Yes (Failed)	Yes (LA)
Galvez et al. (24)	F	54	R	Local, oral	>10 years	Yes	No
Firdouse et al. (14)	F	17	L&R	Craniofacial (Ear, throat, temporal orbital)	>1 years	Yes (Failed)	Yes (GA)
Thukral et al. (17)	F	48	R	Craniofacial (Oropharynx to face)	6 months	Yes	No
Thukral et al. (17)	F	52	L	Craniofacial (Tooth 28, temporal)	N/A	Yes (Failed)	Yes (LA)
Thukral et al. (26)	F	57	L	Craniofacial (Neck, temporal, face)	6 months	No	Yes (LA)
Kende et al. (13)	M	45	L&R	Craniofacial (TMJ, palatal, pharyngeal)	2 years	No	Yes
Kende et al. (13)	M	23	L	Craniofacial (Ear, temporal)	2-3 years	No	Yes
Shetty et al. (4)	F	42	L&R	Craniofacial (Temporal, orbital)	3 years	No	Yes
Bandini et al. (31)	F	36	L&R	Craniofacial (Oropharynx)	6 months	Yes	No
Cho et al. (25)	F	62	L	Craniofacial (Oral, pharynx, ear)	10 years	Yes	Yes (GA)
Sattur et al. (27)	M	52	L	Local	1 year	Yes	No
Orhan et al. (3)	F	26	R	Craniofacial (Palate, oropharynx, TMJ)	9 months	No	Referred
Ramirez et al. (9)	F	43	L	Craniofacial (Ear, mandible, temporal)	N/A	Yes	No
Ramirez et al. (9)	F	52	L	Craniofacial-cervical (Neck, scalp)	N/A	Yes	No
Sasaki et al. (29)	M	47	L	Craniofacial (Oral, pharynx, temporal, frontal)	8 years	No	Yes (LA)
Eyrich et al. (10)	M	25	R	Craniofacial (Palate, TMJ)	>1 year	No	Yes (LA)
Shankland (5)	M	73	L&R	Craniofacial (Palate, oropharyngeal)	N/A	Yes	No
Shankland (5)	F	47	R	Craniofacial (Ear, face, neck, TMJ)	N/A	Yes	No
Shankland (5)	F	38	L&R	Craniofacial (Ear, mandible, throat)	N/A	Yes (Failed)	Yes (LA)
Kronman et al. (28)	F	70	R	Craniofacial (Jaws, face, orbital, neck,TMJ)	>20 years	No	Yes (LA)
Salins et al. (20)	F	50	L&R	Craniofacial (Palate, ear, zygoma)	2 years	Yes	No
Charbeneau et al. (32)	M	222	L	Local	N/A	No	No
Wooten et al. (23)	M	20	R	Local	2 weeks	No	No
Wooten et al. (23)	M	4	L&R	No (Only swelling)	1 week	No	No
Wooten et al. (23)	M	19	R	Local	N/A	Yes	No

M: male, F: female, L: left, R: right, LA: local anesthesia, GA: general anesthesia, N/A: not assessed

Prognosis

The prognosis of PHB varies depending on the severity of symptoms, the presence of underlying anatomical variations, and the treatment approach employed. With accurate diagnosis and appropriate intervention, most patients experience significant relief from symptoms and an improved quality of life.

Short-Term Outcomes

In cases managed conservatively, short-term outcomes are generally favorable, with many patients reporting a reduction in pain and improved function within weeks of initiating therapy. However, recurrence rates are higher in patients with anatomical abnormalities or unresolved underlying conditions.

Long-Term Outcomes

Surgical intervention, particularly hamulus resection, offers excellent long-term outcomes for patients with refractory PHB. Studies indicate that over 90% of patients undergoing surgery achieve sustained pain relief and functional restoration (13). Potential complications, such as postoperative infection or scarring, are rare and can often be managed effectively with appropriate perioperative care.

Factors Influencing Prognosis

Several factors influence the prognosis of PHB, including the duration of symptoms prior to diagnosis, the presence of systemic inflammatory conditions, and the skill and experience of the treating clinician. Early diagnosis and a multidisciplinary approach are critical for optimizing outcomes and minimizing complications.

CONCLUSION

PHB remains an underdiagnosed cause of orofacial pain, with significant implications for patients' quality of life. Despite its rarity, PHB should be considered in the differential diagnosis of patients presenting with atypical orofacial pain, particularly when symptoms involve the posterior oral cavity or adjacent regions.

Advances in imaging and a growing understanding of the condition have improved diagnostic accuracy, enabling clinicians to identify PHB more effectively. Conservative management remains the first line of treatment, offering symptomatic relief for many patients. However, surgical intervention provides a definitive solution for cases unresponsive to conservative measures, with excellent long-term outcomes reported in the literature.

Future research should focus on standardizing diagnostic criteria, evaluating the efficacy of novel treatment modalities, and exploring the underlying pathophysiology of PHB in greater detail. By increasing awareness among clinicians and promoting interdisciplinary collaboration, the burden of misdiagnosis and delayed treatment can be significantly reduced.

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