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Orofacial Pain Overview: Getting Rid of the Riddles

Andrew Young, DDS, MSD

ABSTRACT While most pains that find their way to the dental office are dental in origin, some have less familiar roots: muscular, joint, neurological, headache, sinus or psychological. All of these roots can at times masquerade as a toothache. The purpose of this article is to alert the dentist to the select features of each root that distinguish it from the rest, resulting in efficient and appropriate treatment.

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Pain in the face and mouth is a frequent problem. A survey of 45,711 households in the United States found that nearly 22 percent of the population experienced pain in the orofacial region more than once in six months. This pain is particularly pertinent to the dentist. Approximately 55 percent of those pains were dental in origin and 24 percent were in the TMJ region. The remainders were facial pain, burning mouth or oral sores.¹

Most orofacial pains originate from one of the seven following general categories: dental (including conditions managed by periodontics and oral medicine), muscular, joint, neurological, headache, sinus and psychological. Dentists are comfortable and skillful in treating dental pain, but vary in their abilities to recognize and manage the other causes of orofacial pain. A sizeable proportion of dentists can diagnose and treat temporomandibular disorders (i.e., muscular and joint pain) of mild to moderate complexity. And in American

health care as a whole, temporomandibular disorders (TMD) are primarily the responsibility of the dentist.² A smaller proportion of dentists can recognize neuropathic pain and headaches, yet both conditions can masquerade as dental pain or TMD and, therefore, frequently find their way into the dental office.³

The aim of this article is to help dentists who are presented with pain to recognize which of the seven categories it falls into. Included in this article is a table that summarizes the points, and may also be used as a quick reference in the office (**TABLE**). The results of accurate recognition are obvious: appropriate management, as quickly and completely as possible, and an impressed patient. Conversely, the results of inaccurate recognition are regrettable: prolonged pain at the least, but sometimes (particularly when the pain is intraoral) unnecessary, inappropriate and irreversible treatment, worsening prognosis and sometimes prompting litigation.

TABLE

Select, Distinctive Features in Orofacial Pain Differential Diagnosis

	Dental	Muscular	Joint	Neuropathic	Headache	Sinus	Psychogenic
Lesion	Usually present	None	Sometimes flattening of TMJ condyle	None	None	Thickening of sinus lining	None
	Usually large						
Location	Specific to a tooth	Region of a muscle or several muscles May refer to teeth	Directly over TMJ	May be a tooth or tooth site May be the distribution of a nerve branch	Involves upper half of head May also involve jaw	Multiple maxillary teeth	Any location possible May not correspond to any anatomical structure(s)
Quality	Dull, sharp or throbbing	Usually dull	Usually sharp	Electric, burning, tingling, numb, dull, sharp or throbbing	Dull, sharp or throbbing	Ache, pressure, tender	Any quality possible
		Sometimes sharp	Sometimes dull				
Intensity	Mild to severe	Mild to moderate	Mild to moderate	Mild to severe	Mild to severe	Mild to moderate	Mild to severe
Aggravators	Hot, cold, air, pressure to the tooth	Prolonged opening, chewing	Any jaw movement (even small opening, laterotrusion)	May be spontaneous	May be spontaneous	Bending forward	Often follows no established trigger pattern
		Opening widely	Pressing joint	May be continuous	May be continuous	Percussion, cold and intraoral palpation may worsen	
		Pressing muscle		May have no triggers	May have no triggers		
				Light touch to skin may trigger	Light or sound may trigger		
Alleviators	Dental procedure	Rest	Rest	Relief from dental procedure lasts months at most	Analgesics may provide minimal to full relief	Decongestants	Often follows no established treatment regimen
	Antibiotics	Massage and heat	Analgesics			Corticosteroids	
	Analgesics	Muscle relaxants Analgesics	Night guard (if bruxing at night)	Analgesics, antibiotics ineffective		Antihistamines	
		Night guard (if bruxing at night)				Antibiotics Recovery from illness Removal of allergens	
History	Fully resolved with dental procedure	Usually resolves by 12-18 months if untreated	Usually resolves by 12-18 months if untreated	Often has history of multiple failed dental procedures	May come and go	Pain matches onset and fluctuations of sinus symptoms	Often follows no established pattern
	If untreated, lesion and pain will grow			May come and go	May persist stably for lifetime		
				May persist stably for lifetime	May worsen or improve over lifetime		
				May worsen over lifetime			
Prevalence	Very common	Common	Common	Rare	Common	Common	Very rare

The characteristics of each pain category vary greatly beyond what are listed in this table. The few features selected for this table are those that are more distinctive for their pain category. They are listed here to alert the dentist to look deeper into the possibility of that type of pain when present.

Masticatory Muscle Disorders

The category called temporomandibular disorders encompasses pain and/or dysfunction of the TMJ and supporting structures. It can thus be divided into joint pain and muscular pain.

When a patient points to a region above his or her ear as the location of the pain, the diagnosis is relatively simple. Diagnosis becomes more challenging when the patient points to the preauricular region, which is common. There, the TMJ and several muscles are in close proximity. Muscles, the joint or both may be the cause. To further complicate the diagnostics, both muscle and joint conditions have sharp and/or dull qualities, can limit maximum opening, hurt with jaw movement⁴ and frequently occur together.⁵

Range of Motion — A helpful difference between muscle and joint pains is their effects on excursive jaw movements. Muscle pain generally does not limit small movements, such as laterotrusion and protrusion. When a muscle such as the masseter is capable of stretching 40 mm to 55 mm (when healthy) to open,⁶ stretching 7 mm for a lateral movement is relatively insignificant. Disorders of the TMJ, by contrast, do often limit these excursive movements.⁴

Palpation — If the pain is muscular in origin, palpation should aggravate the pain. Palpating for muscle or joint pain requires more force than that used for head and neck cancer screenings. When palpating for pain, roughly one to two pounds of pressure should be applied with two fingers for two seconds per site.⁴ If this does not reproduce the chief complaint, headaches should also be considered as a possible explanation. However, the lateral pterygoid is difficult to palpate, and its involvement in TMDs is not infrequent. When this muscle is painful, and the patient points to it as the location of the pain, the clinician

may misinterpret this as TMJ pain. Yet palpation of the TMJ will not reproduce the pain (unless the TMJ is also inflamed).

Intensity — While muscle pain, particularly when chronic and constant, can significantly degrade quality of life, it very rarely is severe in intensity (i.e., 9-10 on the visual analog scale).⁷ A report of such an intensity warrants investigating for possible headache, dental infection or neuropathic pain.

Medication — Muscle pain responds well to muscle relaxants. It also responds to NSAIDs, but not

Although the TMJ can be visualized by radiographs, MRI and ultrasound, painful joints do not always present with visual findings.

as well as joint pain does and not as well as it does to muscle relaxants.⁷

Referral — Painful muscles may also refer pain to remote sites.⁸ For example, pain in the anterior temporalis is known to cause pain in the maxillary incisors. The masseters can refer pain to the posterior teeth.⁹ When the source of a patient's dental pain is unclear, muscular origin should, therefore, be considered. It can be ruled out simply by palpating the painful masticatory muscles and asking the patient to indicate if any site worsened the dental pain.⁹

TMJ Disorders

Although the TMJ can be visualized by radiographs, MRI and ultrasound, painful joints do not always present with visual findings.

Patients generally can localize joint pain well¹⁰ and will take one finger to point precisely to the TMJ. Yet as mentioned earlier, several muscles lie close to that area, so range of motion testing should be done to differentiate between muscle and joint pain. While a 7 mm laterotrusion is a relatively insignificant movement for the masseter muscle, for the TMJ it requires translation to its maximum distance. For this reason, pain or blockage in the TMJ will reduce the jaw's excursive movements and muscle pain will not.

TMD pain is usually worsened with jaw movement.¹⁰ When the doctor is contemplating a primary headache versus a TMD, this characteristic is helpful. It is also helpful when contemplating the cause of a diagnostically challenging painful tooth site.

Neuropathic Pain

Dental, muscular and joint pain are all somatic or "normal" pain. They hurt because of the presence of excess inflammatory and/or analgesic agents. Therefore, they usually respond predictably to NSAIDs, at least for the short term. Somatic pain is the type of pain that dentists encounter, diagnose and treat the vast majority of the time.

Neuropathic pain is pain that is initiated by a lesion or dysfunction of the nervous system itself, whether peripheral, central or both.¹¹ It can follow a traumatic event, such as a dental procedure, or develop spontaneously.¹¹

Neuropathic pain differs from somatic pain in its presentation, its response to treatment and its chronicity. A variety of neuropathic conditions exist, and the possible characteristics range from seconds to constant in duration, rare to constant in frequency and minimal to excruciating in intensity.¹² But some other characteristics are more unique to neuropathic pain, which when present can greatly help the clinician in diagnosing.

Location — The location of pain for trigeminal neuralgia follows the nerve distribution of the trigeminal nerve divisions. It may involve a single division, or two or three, but is unilateral the vast majority of the time.¹³⁻¹⁶ Yet while such a description would make a correct diagnosis easy, clinicians do not often become aware of the full and exact extent of the patient's pain location. Patients may just mention the tooth, or the intraoral portion, but not mention the extraoral portions. The reasons for this incomplete description vary by patient. For some, the pain is more intense at the tooth or dental quadrant. For others, they assume their dentist would not have reason to be interested in areas beyond the mouth. Allowing enough time in the dental appointment for thorough discussion can allow for the discovery of such critical information.

Many neuropathic pain conditions, however, do involve only a single tooth or tooth site, leading to many misdiagnoses and improper dental treatments.¹⁷

Duration and Frequency — The intermittent sharp and intense pain of trigeminal neuralgia often comes to mind at the mention of neuropathic pain, but many neuropathic conditions actually range from many hours per attack to constant.⁷

Aggravators — Neuropathic pain conditions also respond to stimuli in atypical fashions. Atypical odontalgia, formerly known as phantom tooth pain, and with a suggested renaming to persistent dentoalveolar pain,¹⁸ generally is not worsened with pulp vitality testing (cold, heat, percussion, apical palpation and bite) and should raise suspicion that the pain is not odontogenic.¹⁹ Trigeminal neuralgia, by contrast, responds in an exaggerated manner to stimuli for some patients. For example, a cold draft of air on the skin may trigger severe pain. While dental conditions obviously do not behave in this manner, dentists

sometimes mistake this response for the cold sensitivity in pulpitis. A patient report of cold drinks triggering pain may seem to reinforce the diagnosis of pulpitis, but more precise questioning would reveal that the cold drink triggers the attack at the point of contact on the lip, before the cold ever reaches the tooth.^{13,20}

Quality — Like dental and TMD pain, neuropathic pain can be dull, aching,²¹ throbbing or sharp¹² in quality. However, it can also have the more uncommon qualities of burning²² or electric.²³

Natural History — Each neuropathic pain condition has its own typical natural

Although not appropriate, dental treatment for a neuropathic pain condition will initially provide relief, typically for weeks to months.

history. Trigeminal neuralgia worsens over the course of weeks to years.²⁴ However, it often occurs in clusters, during which pain attacks occur multiple times per day. Clusters are separated by remission periods of days to years, during which no attacks occur.¹⁴ In contrast, atypical odontalgia fluctuates, but often overall does not change in a lifetime.²⁵ Burning mouth disorder has a slight chance of improving after several years.^{26,27} But most patients who are diagnosed with neuropathic pain will have it for a lifetime. A dentist who is presented with such a history should know that a dental diagnosis would not be appropriate for such pain. But the dentists who see the patient shortly after the pain onset would not have such a history to analyze, which

increases the risk for misdiagnosis.

Anesthetic — The pain of some neuropathic conditions, such as trigeminal neuralgia, can be eliminated for the duration of topical and/or injected local anesthetic or longer.²⁸ However, others, such as atypical odontalgia, may be reduced, but not eliminated, for the duration of the anesthetic agent.²⁹ Such responses should raise suspicion for possible neuropathic pain, as well as referred pain and primary headaches.

Misdiagnosis — Despite the above distinguishing features, neuropathic pain involving the mouth is still frequently misdiagnosed as odontogenic. It may then mistakenly be treated by endodontic therapy, crowns or extractions, even multiple times in multiple teeth, before arriving at the proper diagnosis.^{29,30} Several factors contribute to this misfortune:

- The location of the pain at a tooth site.
- Imprecise or inaccurate history from the patient (e.g., the patient reports constant pain, when in reality the attacks last 10 seconds but occur repeatedly throughout the day).
- Inadequate familiarity with neuropathic pain.^{7,30}
- Initial favorable response to dental treatment.

Response to Dental Treatment — Although not appropriate, dental treatment for a neuropathic pain condition will initially provide relief, typically for weeks to months. Subsequently, the pain returns with equal or greater severity. But the initial response is misinterpreted as proof that the problem is dental, and further treatment is then done to the same tooth (e.g., endodontic therapy is followed by an extraction) or to adjacent teeth under the assumption that those teeth are also problematic when the pain returns. After one or more unsuccessful attempts to

resolve the pain with dental treatment, the dentist typically refuses to perform further dental treatment and refers to a specialist. However, when faced with such a refusal, the patient often changes dental providers until one is found who will perform more dental procedures. The persistent pain, resistant to analgesics and antibiotics, creates the desperation that drives repeated dental interventions. This pattern continues, often until several teeth have been treated/extracted, either within the spread of the neuropathic pain location or as the location of the pain migrates.¹¹ Unnecessary dental treatment should be avoided,⁷ as it worsens the condition and its prognosis.³¹

Headache

Headaches can be roughly grouped as primary or secondary. When the headache is a symptom of another condition, such as TMD, this is classified as a secondary headache. Examples of primary headaches include migraine and cluster headaches.³²

Primary headaches are contemplated mostly on the differential for TMDs but should also be considered on the dental differential.

Primary headaches and TMDs are often confused for a number of reasons. First, they overlap in locations. Many of the headache regions are masticatory or cervical muscles.⁷ Secondly, they often occur together,³³⁻³⁵ with 80 percent of TMD patients also reporting recurrent headaches³⁶ compared to 20 to 23 percent of the general population.³⁷ They also share common aggravators, such as stress and inadequate sleep.

Primary headaches can be distinguished by several features. They usually are not worsened with palpation or jaw usage, while TMDs are. They also do not limit range of motion.³ The following associated signs and symptoms also greatly increase the likelihood of a headache:³⁸

- Unilateral autonomic features (nasal congestion, nasal discharge, reddening of the eye, tearing of the eye, flushing of the face) only on the same side as the headache, occurring only during the headache or during an exacerbation of a continuous headache.
- Phonophobia.
- Photophobia.
- Nausea.
- Vomiting.
- Aura (visual shapes or voids, tingling, numbness, speech or motor disturbances).

True odontogenic pain, however, will be relieved by intraoral local anesthetic, while sinus pain will not.

While headaches are contemplated mostly on the differential for TMDs, some headaches do involve the lower half of the head, which includes the mouth. The likelihood increases if the patient's dental pain worsens when the rest of the head hurts more or in conjunction with the above associated signs and symptoms.⁷

Sinus

Eleven percent of patients with sinusitis report maxillary toothache.³⁹ To further confuse the diagnostic process, tenderness to percussion,⁴⁰ hypersensitivity to cold and intraoral mucosa tenderness, edema and erythema in the area overlying the inflamed sinus⁴¹ can accompany sinusitis. The PDL may even appear widened because of the

underlying sinus space.⁴² And while sinusitis pain increases when bending forward so that the head is below the heart, a dental abscess will also become more painful with the same maneuver.

True odontogenic pain, however, will be relieved by intraoral local anesthetic injections, while sinus pain will not.⁴¹ And pain will generally be focused on a single tooth, but sinusitis will aggravate several teeth. Sinusitis may also show thickening of the floor of the sinus on a panoramic radiograph due to fluid accumulation and mucosal thickening.⁴³ And sinusitis-related dental pain will resolve with the sinusitis, whether by decongestants, antihistamines, antibiotics, recovery from the causative illness or the removal of allergens.

Psychogenic Pain

True psychogenic pain (originating in the mind, with no physiological explanation) is extremely rare.⁴⁴ It is being described here to help the dentist who is contemplating this as a possibility and will then most often rule it out.

Psychogenic pain has no lesion, whether in the mouth or the nervous system. If there is a lesion, no matter how small, the pain response may be exaggerated, but it is not psychogenic.

The anatomical spread of the pain may not follow any muscle, joint or nerve distribution. The triggers may not follow any known trigger pattern — not even those of the neuropathic conditions. Likewise, the history does not follow a known pattern, such as progressive worsening (in the case of infection) or pain coming in clusters (in the case of some neuralgias and headaches). Any quality and any intensity is possible.

Despite this wide range of characteristics, the one common theme is that the pain does not match any of the previously mentioned conditions'

descriptions. But the clinician must be careful not to definitively diagnose or dismiss unusual pains as psychogenic, because the pain could actually be a neuralgia or headache that the clinician is simply unaware of. It is best to refer such unusual pain to an orofacial pain dentist or a neurologist to first assess for those possibilities.

While purely psychogenic pain is extremely rare, psychologically affected pain is extremely common.⁴⁴ In fact, because all pain signals are processed and interpreted through the conscious portion of the brain, all pain is actually psychologically affected, either being intensified by it or reduced by it.⁴⁵

One psychological condition that patients may encounter from time to time is persistent occlusal awareness (also known as phantom bite syndrome or occlusal dysesthesia), which is “a persistent hyperawareness of their occlusion with few or no objective findings to support their beliefs.”⁴⁶ When considering making occlusal adjustments specific to the patient’s request, the dentist should exercise caution, as such adjustments may not satisfy the patient and may worsen the condition.⁴⁶ The condition should first be addressed by a psychologist or psychiatrist.⁴⁷⁻⁵¹

Conclusion

With a modest amount of instruction, either from dental school or continuing education, dentists can effectively treat mild to moderate TMDs.

This article hopefully sheds some light on those other causes of pain in the face and mouth. Dentists are not expected to achieve mastery in the diagnosis of all the above causes of oral and facial pain. However, because dentists are performing usually irreversible treatment in the oral cavity, sometimes for the purpose of

alleviating pain, they must be able to recognize a nondental pain presentation as such. Forty-four percent of patients with nonodontogenic orofacial pain have at least one root canal treatment or extraction prior to the appropriate referral.¹⁷ It is our hope that with articles such as this, and increased dental school and continuing education sessions, that percentage will be greatly reduced.

The average dental practice is busy, with numerous pressing issues to attend to. Nonodontogenic conditions are relatively rare, and so do not need to be seriously considered for all pain complaints. But when no visible hard or soft tissue lesion exists, the dentists must be especially thorough in the history and examination.

When unsure, delayed invasive treatment is better than being hasty. In such cases, if the true cause is dental (e.g., pulpal necrosis), palliative care (e.g., medication) could keep symptoms at bay until the follow-up visit, at which time the dental cause may be more clear (e.g., formation of an abscess) with no appreciable loss. If the true cause is nonodontogenic, that too will become more evident with time, followed by the appropriate referral. Both are far preferable to premature dental treatment for a nonodontogenic pain, with no resultant relief and possible worsening. The cautious, contemplative dentist can thereby spare some patients unnecessary suffering.

The age-old adage even holds true for dentistry: “Slow and steady wins the race.” ■

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