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A Proposed Diagnostic Classification of Patients With Temporomandibular Disorders: Implications for Physical Therapists

The term *temporomandibular disorder* (TMD) was adopted by the American Dental Association in 1983 to describe pathologies or conditions affecting the temporomandibular joint (TMJ), masticatory muscles, and closely related structures.[68] Successful management of people with long-standing TMDs often requires the integrated approach of dental practitioners, physical therapists, and psychologists. Dental practitioners were introduced to the concept of TMD as early as 1934, due, in part, to the complex and debatable role of dental occlusion in TMD.[61] Physical therapists became important members of the care team because of the central role of the neuromusculoskeletal system in people with TMDs.[36,71] The complex interplay between the sympathetic and trigeminal nervous systems and an increased understanding of the centralization of pain have resulted in an important role for behavioral scientists, such as psychologists, in successful management of chronic pain related to TMDs. Such complexities present obstacles to accurate diagnosis, resulting in diagnostic classifications such as "headache" or "TMJ pain," and leave the discerning practitioner without enough information to appropriately guide treatment.

The objectives of this paper were (1) to characterize the epidemiology and pathophysiology of TMDs most commonly seen in the outpatient clinic, (2) to describe a systems screen to be used in the physical therapy examination to determine the need for interprofessional referral, and (3) to propose an approach for physical therapists to examine, evaluate, and classify patients with TMDs, based on previously validated methodologies and that will inform treatment approaches.

Based on a summary of epidemiological studies, Okeson[61] estimated that physical signs and symptoms of TMDs occur in 35% or more of population samples, representing people of all ages; however, only 5% to 10% of these individuals require, or actually seek, treatment.[55,61,65] Those who seek treatment are more likely to be between the ages of 20 and 40 years. TMDs are more prevalent in women than in men, and research related to genetic and hormonal contributions is emerging.[19,55,61,65]

SYNOPSIS: Physical therapists have an important role on the interprofessional team to provide care for people with temporomandibular disorders (TMDs). Diagnostic classification is a challenge in this population, given the complexities inherent in presentations of headache and orofacial pain, and is critical to selecting the appropriate intervention. The objectives of this paper were (1) to characterize the epidemiology and pathophysiology of the TMDs most commonly seen in the outpatient clinic, (2) to describe a systems screen to be used in the physical therapy examination to determine the need for interprofessional referral, and (3) to propose an approach for physical therapists to examine, evaluate, and classify patients with TMDs, based on previously validated methodologies. A modification of the diagnostic framework of the International Headache Society has provided the basis for the systems screen of people presenting with orofacial pain. The physical therapy examination and evaluation is based on the Diagnostic Criteria for TMD, developed and validated by a consortium of specialists from the American Academy of Orofacial Pain.

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TABLE 1 Axis I Diagnostic Classifications of Physical Conditions, Modified From the Diagnostic Criteria/Temporomandibular Disorders[74,75]

Group I: Masticatory Muscle Disorders	Group II: Disc Displacements	Group III: Joint Dysfunction
(Ia) with normal opening	(IIa) disc displacement with reduction	(IIIa) arthralgia
(Ib) with limited opening	(IIb) disc displacement without reduction with limited opening	(IIIb) osteoarthritis
	(IIc) disc displacement without reduction without limited opening	(IIIc) osteoarthrosis

DIAGNOSTIC CLASSIFICATION

Diagnostic classification is critical in determining appropriate treatment. The International Headache Society[33] classifies headache (HA) into 3 broad categories: (1) primary HA (migraine, tension type, cluster, other primary), (2) secondary HA caused by another disorder (increased intracranial pressure, cranial neoplasm, TMD, medication reaction, eyes, ears, nose, sinuses, teeth, psychiatric, infection, trauma, cervical), and (3) cranial neuralgias.[63] TMD, as defined by the International Headache Society, is classified as a secondary HA that results from disorders of the TMJ or related tissues (ICD-10, G44.846).[33] This generic diagnostic classification of TMD does not provide adequate specificity to guide physical therapy management for people with a TMD, but the overall framework enables the development of a systems screen to rule in or out the need for interprofessional referral. In an attempt to develop consistency and specificity for clinical and research diagnoses specific to TMDs, Dworkin and LeResche[22] developed the Research Diagnostic Criteria for Temporomandibular Disorders, a classification system based on an integration of impairments and symptoms. Recently, an interprofessional consortium revised the criteria to improve reliability, validity, sensitivity, and specificity of the examination algorithms of the original Research Diagnostic Criteria for Temporomandibular Disorders, resulting in the Diagnostic Criteria/Temporomandibular Disorders (DC/TMD) (**TABLE 1**).[8,44,74,75,78] The basic elements of the DC/TMD provide a valid diagnostic classification for TMDs, based on the more common body structure/function impairments and activity limitations seen in this clinical population in the outpatient clinic.

The DC/TMD criteria describe 2 axes of focus for examination. Axis I encompasses physical examination of body structure/function impairments in the muscle and joint domains, with diagnostic classification as the outcome. Axis II measures focus on identifying psychosocial characteristics that play a foundational or indirect role in the primary complaints.[58] Axis I contains 3 broad classification groups: group 1 masticatory muscle disorders; group 2, joint disorders related to temporomandibular disc derangements (disc displacement with reduction [DDWR], disc displacement without reduction [DDWOR]); and group 3, joint disorders related to TMJ arthralgia, arthritis, and arthrosis (**TABLE 1**).[21,44,74,78] In this article, we integrate the Axis I classification algorithms with the physical therapy examination and evaluation, with the goal of appropriately selecting optimal interventions for people with TMDs.

Several studies have been conducted to determine the reliability and validity of the DC/TMD Axis I classification examination algorithms.[44,74,75,78] Expert diagnoses of 614 individuals with clinical symptoms of TMD and 91 controls were established by 2 TMD clinical experts who were blinded to each other's findings. The clinical examination included the items of the original Research Diagnostic Criteria examination criteria; additional clinical tests that emerged since the original Research Diagnostic Criteria; and panoramic radiographs, magnetic resonance imaging (MRI), computed tomography imaging, and radiologist assessment. The updated classification algorithms were developed using data from 352 patients. The other 353 patients were used to test the validity of the algorithms.[44,74,75,78] The examination algorithms leading to clinical classification of "any muscle disorder" and "any joint pain" have excellent interexaminer reliability.[44,74,75,78] Sensitivity and specificity data were based on the ability of the classification algorithms to establish a diagnosis, using the expert-driven diagnosis as the gold standard (**TABLE 2**). Studies conducted in orofacial pain clinics have demonstrated that approximately 45% of patients with TMDs have masticatory muscle disorders, with the second-most common diagnosis being joint pain related to DDWR. Many patients have both masticatory muscle and joint disorders.[44,61,73-75,78]

Masticatory Muscle Disorders

The masticatory muscles include the lateral pterygoid (functionally divided into superior and inferior sections), the masseter, the temporalis, and the medial pterygoid (**FIGURES 1** through **3**).[40,41] Masticatory muscles may be directly injured through overuse and/or tensile strain, and indirectly through muscle guarding and centrally mediated myalgia. Prolonged guarding or delayed healing may result in muscle shortening or contracture, and the presence of trigger points can result in referred pain in tissues outside of the muscle.[21]

Overuse of masticatory muscles occurs with parafunctions, such as gritting, clenching, bruxing, grinding, nail biting, and gum chewing. Overuse also occurs with muscle guarding in response to conditions such as TMJ inflammation, sinusitis, or dental pathology. Overstretch-

TABLE 2 Diagnostic Accuracy and Reliability of the Clinical-Exam Algorithms Used for Axis I Diagnostic Classification, as Determined by Expert Clinician Researchers From the American Academy of Orofacial Pain*

Diagnostic Classification	Sensitivity/Specificity of Clinical-Exam Algorithm to Predict Diagnostic Group†	Interrater Reliability (κ) Between Examiners' Diagnoses‡
Any group I: muscle disorders	0.91/1.00	0.83
Any group II: disc displacements	0.71/0.67	0.84
IIa: disc displacement with reduction without limited opening	0.46/0.90	0.70
IIb: disc displacement without reduction with limited opening	0.80/0.97	0.63
IIc: disc displacement without reduction without limited opening	0.53/0.80	0.72
III: any joint pain (arthralgia, osteoarthritis)	0.92/0.96	0.85
Any arthrosis: osteoarthritis, osteoarthrosis	0.52/0.86	0.87

**Modified with permission from Schiffman et al,[74] Table 1. ©Quintessence Publishing Company Inc.*
†Using expert-driven diagnosis as the gold standard.
‡Based on the clinical-exam algorithm.

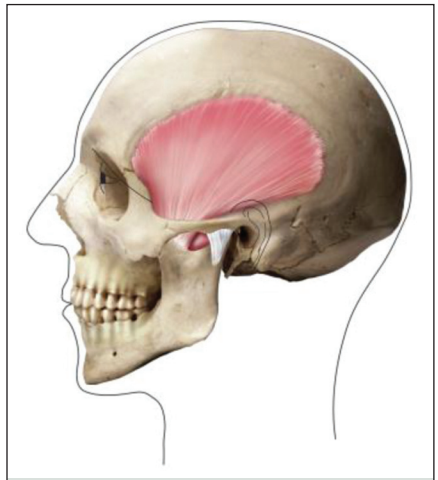

FIGURE 1. Temporalis muscle. Palpation may reveal trigger points[77] that cause pain-referral patterns to the upper teeth, the temporal area, and/or the area around the eye.

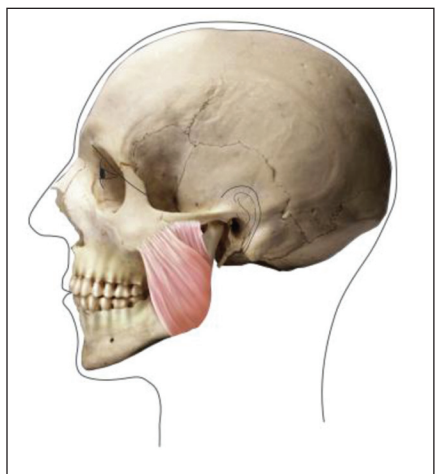

FIGURE 2. Masseter muscle. Palpation may reveal trigger points[77] that cause pain-referral patterns to the lower teeth, the lateral face, and/or the area around the eye.

ing may occur during dental procedures, blows to the mandible, or other macrotrauma to the region. The result can be musculotendinous strain, delayed-onset muscle soreness,[41] muscle guarding, and/or tendinopathy.[49,57] In addition to pain, muscle disorders can result in reduced or altered range of motion and/or alterations in the occlusal relationship of the maxillary and mandibular teeth during rest or mouth closure.[61] An example of this would be muscle guarding of the lateral pterygoid placing an anteriorly directed force on 1 or both sides of the mandible.

Centrally mediated myalgia is a process that involves chronic overactivation of muscle, as a result of central sensitization.[86] Central sensitization results when repetitive nociceptive input causes an increase in the excitability of the spinal cord neurons receiving the noxious input and adjacent spinal cord neurons receiving nonnoxious input. The result is amplification of pain information in the brain, resulting in what has been termed a *wind-up* in both central and peripheral nervous system processes, which causes pain and a reduction in the normal central inhibitory mechanisms that help to balance activation of pain centers.[32] Increased facilitation and reduced inhibition of central nervous system pain-processing centers can cause muscle pain through a combination of altered central pain perception and possible antidromic effects.[61] Centrally mediated myalgia is often exacerbated by increased sympathetic nervous system activity.[17,32] It is important for the physical therapist to recognize the role of the central nervous system in centrally mediated myalgia because, in this scenario, treatment targeting only the peripheral site of pain is not likely to be effective.

Central sensitization can also result in referred pain located outside the local tissue causing the pain. Muscles with sustained nociceptive input or with prolonged muscle guarding may develop trigger points that, when palpated, result in regional, dull, achy pain distal from the muscle itself (**FIGURES 1** through **3**).[28] Trigger points are thought to form when a local energy crisis occurs at the cellular level of muscle from overactivation of acetylcholine input at the neuromuscular junction, resulting in local sustained engagement of actin and myosin cross-bridges, which inhibits blood flow and activates nociceptors.[51] Earache, toothache, TMJ pain, other facial and HA pain, and vertigo may result, which highlights the need for, and challenge of, differential diagnosis.

Joint Dysfunction

Joint impairments may involve the temporomandibular disc, joint surfaces, joint capsule, ligaments, or synovium, or a combination of these structures. The

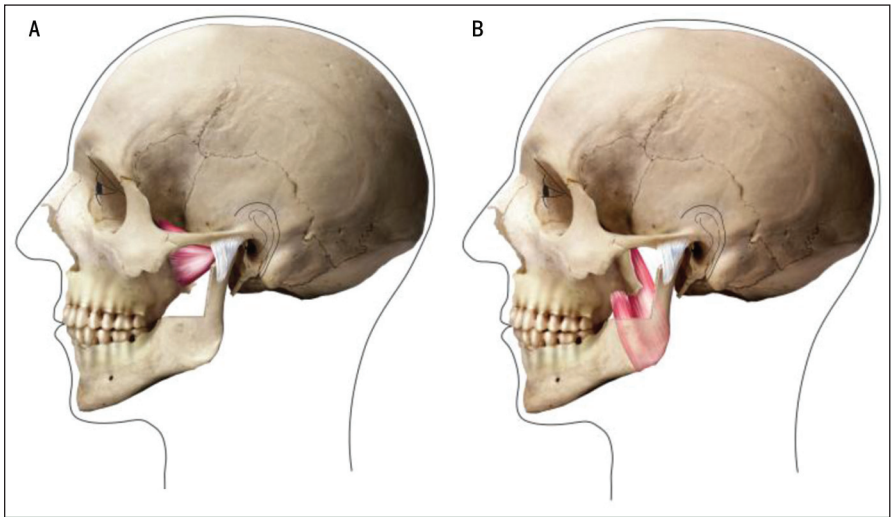

FIGURE 3. (A) The lateral pterygoid muscle. Though not directly palpable, trigger points in the lateral pterygoid may refer pain to the ear, the preauricular area, and/or the anterior/lateral face. (B) The medial pterygoid muscle. Only the inferior portion is directly palpable on the internal aspect of the inferior mandible. Trigger points[77] in the medial pterygoid may refer pain to the ear and preauricular area, and/or to the cervical area just posterior to the mandibular angle.

DC/TMD categories of group II (disc displacement) and group III (joint dysfunction) are integrated here, because disc disorders become problematic for patients primarily when these result in joint pain (arthralgia) or functional motion restrictions.

Structural impairments of the disc-condyle complex may involve faulty kinematics of the TMJ disc, classified as DDWR (**FIGURE 4**) or DDWOR (**FIGURE 5**). The disc is anchored to the posterior portion of the TMJ by the retrodiscal tissue, which is well innervated and vascularized. Macrotrauma, as may occur from opening the mouth for dental procedures, intubations, and blows to the face, can result in plastic deformation and injury to the retrodiscal tissue and/or the collateral ligaments that anchor the disc to the condyle. Alternately, repeated microtrauma, as occurs with parafunctional activities of gritting, grinding, and bruxing, can cause excessive force on the disc, resulting in disc thinning or perforations and disc displacement. Anterior disc displacement is the most common type of disc displacement.[17,61] In a DDWR, a click or pop occurs when the condyle glides onto the middle aspect of the displaced disc during mouth opening ("with reduction"), and a reciprocal click, sometimes muted, occurs during mouth closing as the condyle slips posteriorly on the anteriorly displaced disc (**FIGURE 4**). This may result in excessive loading of joint structures, such as the retrodiscal tissue, causing injury, inflammation (eg, retrodiscitis), and joint pain in the preauricular area. This may or may not be accompanied by muscle guarding. Treatment should be provided when the patient experiences pain or dysfunction. It is important to note that most people with joint sounds do not have pain or dysfunction, which suggests that the disc has the potential for healthy remodeling in response to the altered condylar positioning. People whose chief complaints are joint sounds, but who do not have pain or dysfunction, should be treated conservatively with education about the remodeling process, the maintenance of healthy joint function (eg, reduction of parafunction), and the role of stress in overactivation of the masticatory muscles.[17,61]

Although most people with joint sounds in the absence of pain or dysfunction never progress to more severe impairments, it is possible that the disc may continue to migrate anteriorly, and the DDWR may progress to a DDWOR (**FIGURE 5**).[17,61] Once this progression to DDWOR occurs, a reciprocal click no longer exists, but decreased mandibular motion (mouth opening less than 40 mm) can result from the inability of the condyle to glide anteriorly. Preauricular pain may result from retrodiscal tissue inflammation or excessive joint loading. As inflammation resolves and tissue remodeling advances, range of motion may improve and pain may lessen, even though the altered biomechanics of DDWOR remain.[16,47]

Joint pain can be caused by inflammation of the soft tissue around areas such as the capsule, ligaments, synovium, and retrodiscal tissue, or it can occur due to structural changes to the joint surface. These pathologies of the joint are classified in the DC/TMD Axis I as arthralgia, osteoarthritis, and osteoarthrosis (**TABLE 1**). Differentiating among synovitis, capsulitis, or retrodiscitis will not alter physical therapy interventions, which will be guided instead by the chronicity of the inflammation, the level of irritability, mobility impairments, and the coexistence of masticatory muscle disorders.

Osteoarthritis and osteoarthrosis represent degeneration of the articular surface of the TMJ, with the former being associated with inflammatory processes. The degeneration occurs in response to excessive loading and/or prolonged chemical irritation (ie, inflammation), as may occur with disc derangements or chronic, excessive parafunctional activities. The patient may report joint pain and "crepitus" or a grating feeling throughout the entire joint movement. It is important to note that the TMJ does demonstrate normal age-related changes such as slight flattening of the condyle, but age-related adaptive processes do not predispose one to pain or dysfunction in this region.[15,17]

Axis II: Psychological Contributions

Researchers and expert clinicians in orofacial pain have long acknowledged the

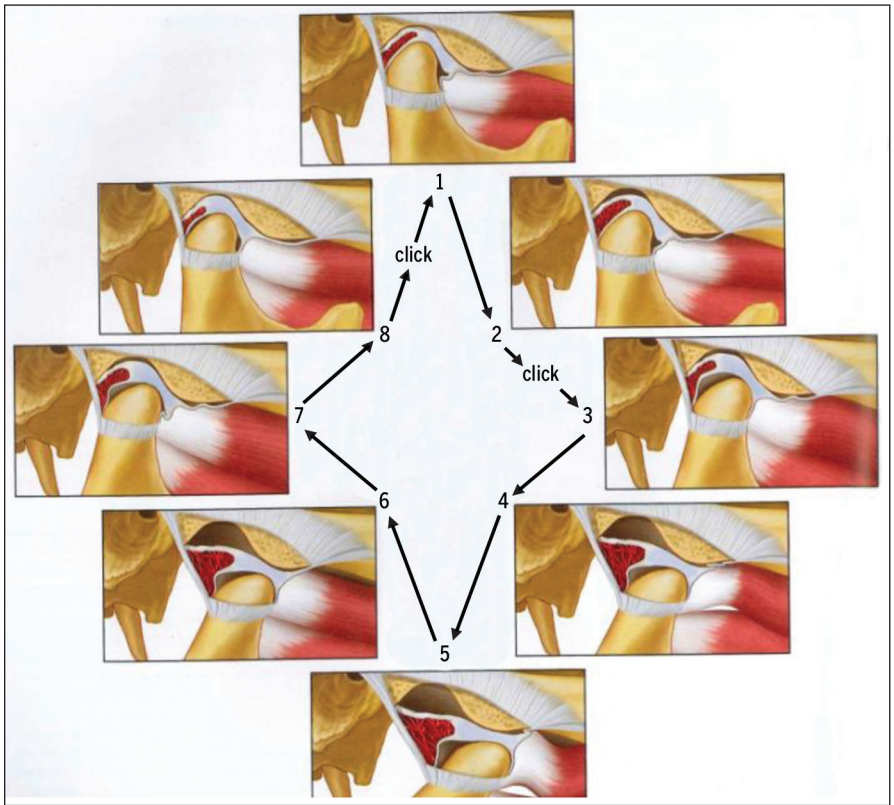

FIGURE 4. Disc dislocation with reduction.[61] The disc is displaced anteriorly (1), creating a click (2-3) during mouth opening (2-5) as the condyle glides anteriorly, and a reciprocal click (8) during mouth closing (6-8) as the condyle glides posteriorly. Copyright ©Elsevier 2013

importance of the psychological domain in causing and/or maintaining pain, and in upregulating peripheral and central neural structures involved in nociception.[22,32,74,75] Central nervous system differences in the trigeminal nucleus and limbic structures have been demonstrated in people with myofascial pain, and chronic pain results in sympathetic nervous system overactivation.[88] Carlson et al[12] summarized research demonstrating that people with chronic TMDs are physiologically overreactive to their environment and tend to have substantial psychosocial stressors compared to people without TMDs. Okeson[61] described the relationship of Axis I (physical) and Axis II (psychological) domains as shifting in balance as the time lengthens in which the individual's pain persists, with Axis II domains (eg, anxiety, depression, anger, fear) becoming more dominant over time.

Differential Diagnosis

In addition to the musculoskeletal structures (TMJ and the masticatory muscles) and the psychological factors discussed, orofacial pain may result from or be exacerbated by (1) primary HAs (migraine, cluster, tension type, other primary); (2) secondary HAs related to systemic problems such as cardiovascular and rheumatoid disorders and disorders related to the cervical spine, ears, sinuses, eyes, medications, and dental structures; and (3) cranial and peripheral neuralgias and central nervous system disorders. The following provides an overview of the physical therapy examination for people presenting with HAs and/or orofacial pain. The examination will consist of the history, screens for contributing psychological factors, a systems screen, cervical spine screen, and specific examination of the TMJ and masticatory muscles.

PHYSICAL THERAPY EXAMINATION

History

A thorough history will help identify the possible source(s) of the orofacial pain and provide a screen for other causative or contributing factors.[17,22,61,74,75] Red flags related to cardiac history (eg, angina or history of myocardial infarction) and brain function (eg, sudden-onset severe HAs, weakness, or slurred speech) must be investigated early in the history taking. Information about the nature of the pain will be critical in determining the possibility of primary HAs (migraine, cluster) (**TABLE 3**) and secondary HAs related to the eyes, ears, sinus, dental structures, medication complications, and/or neurologic types of pain. Unrelenting pain unrelated to musculoskeletal function is an indication for referral. Information about cervical dysfunction is essential to determine whether the cervical spine is causing or exacerbating the HA/facial pain. Medication history is important to determine potential negative interactions, rebound HAs from overuse (as occurs with nonsteroidal anti-inflammatory drugs), or withdrawal.

Key questions have been examined and determined to have strong sensitivity and specificity in incriminating TMDs as the source of pain.[22,29] The initiating question is, "Have you had pain or stiffness in the face, jaw, temple, in front of the ear, or in the ear in the past month?" A positive response should be followed with a question about whether the symptoms are altered by any of the following jaw activities: chewing, talking, singing, yawning, kissing, moving the jaw.[22,29,74,75] The other key inquiry is directed toward identifying the presence of a disc displacement[22,74]: "Have you ever had your jaw lock or catch so that it would not open all the way? If so, was this limitation in jaw opening severe enough to interfere with your ability to eat? Have you ever noticed clicking, popping, or other sounds in your joint?"[74]

Parafunctional activities (eg, clenching, chewing pencils, chewing gum, chewing fingernails, or grinding teeth) must be explored, and patients should be asked if their teeth are touching at times other than when chewing and occasionally during swallowing and speaking. Excessive parafunctional activities during sleep may be identified by significant others, or by wear patterns of the teeth, and may be associated with masticatory muscle pain upon waking.

Psychological Screen Psychological screening begins in the history or in the waiting room as the patient completes questionnaires. The practitioner should listen for reports of psychological stress overload, malaise, anxiety, sleep problems, changes in eating patterns, weight changes, unexplained fatigue, and other signs of depression, which might exacerbate pain through central mechanisms.[89] The Patient Health Questionnaire for Depression and Anxiety is a brief, 4-item self-report screen validated for anxiety and depression and shown to predict functional impairment, health care usage, and disability days. A score of 3 to 5 suggests mild anxiety/depression, 6 to 8 is moderate, and 9 to 12 is severe.[39]

Fellows of the American Academy of Orofacial Pain also recommend the Graded Chronic Pain Scale as a screen for the presence of psychologically maintained pain in people with facial pain.[8,59,80,89] This is a self-report survey with items that cluster to represent 3 domains: characteristic pain intensity, pain interference in daily activities, and number of days of substantial activity limitation due to pain in the last 6 months. Graded Chronic Pain Scale scoring may place patients in the following categories: grade 1, low pain intensity and low disability; grade 2, high pain intensity and low disability; grade 3, moderate disability due to pain; and grade 4, severe disability due to pain.[80] Both the Patient Health Questionnaire for Depression and Anxiety and the Graded Chronic Pain Scale have been shown to have good validity and responsiveness, and both can be readily accessed through a search on the Internet.[39,59,80] Moderate to severe anxiety/depression and/or pain-related disability are an indication for referral to a behavioral health specialist.

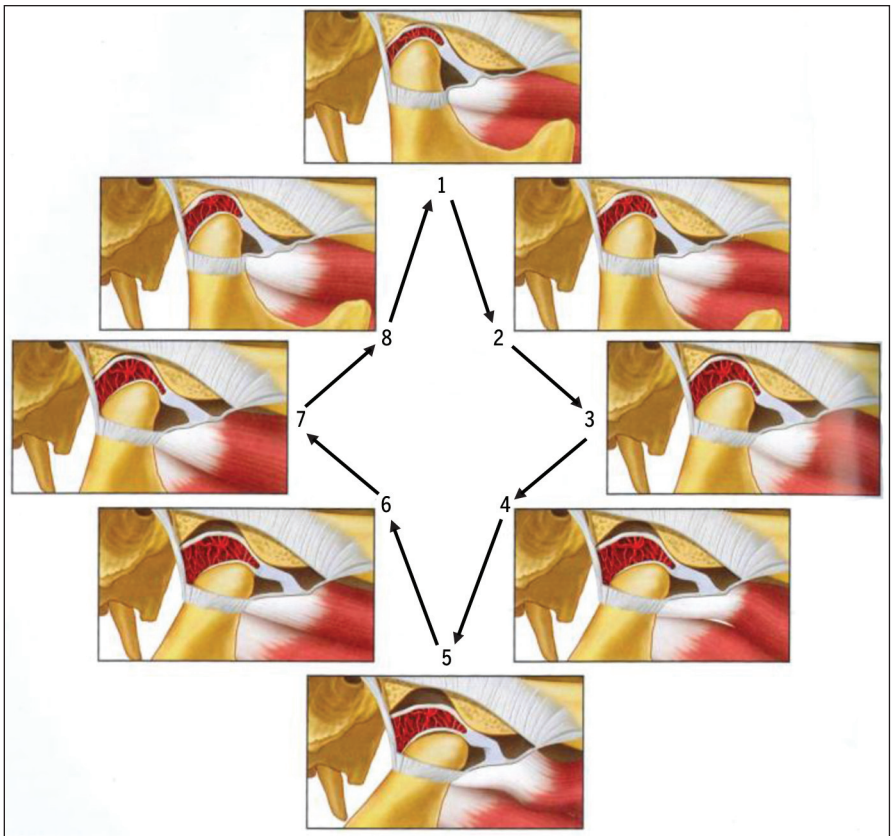

FIGURE 5. Disc dislocation without reduction.[61] The disc is dislocated anteriorly in relation to the condyle, impeding the normal anterior glide of the condyle during opening (1-5), and preventing the condyle from gliding onto the disc. This may result in pain due to increased joint and tissue loading, and mobility impairments.

TABLE 3 Comparison of Location, Duration, and Clinical Manifestations in Patients Presenting With 3 Types of Primary Headaches: Migraine, Tension Type, and Cluster

Type of Headache	Pain Location	Duration	Clinical Manifestations
Migraine	Unilateral side of head; may shift	4-72 h	More prevalent in women than men. Nausea, vomiting, throbbing, light-headedness, aura, photophobia, phonophobia interfere with everyday life
Tension type (unknown cause)	Bilateral tight band encircling head at the level of the temples	30 min to 7 d	Head and neck pain, muscle tightness, dull pressure like tight band
Cluster	Severe unilateral orbital pain	Occurs in cyclical patterns; 15 min to 2 h	More prevalent in men than women; sudden onset, tearing, rhinorrhea, "alarm clock" headache during morning sleep

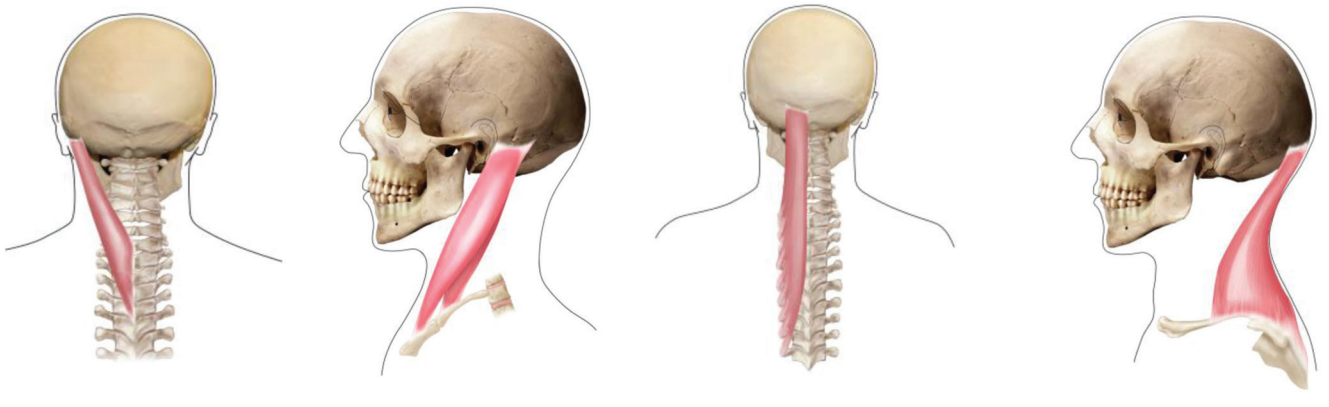

FIGURE 6. Posterior cervical muscles. Palpation may reveal trigger points[77] that cause pain-referral patterns to the posterior cranium, the temporal area, the lateral face, and/or the area around the eye or the ear. From left to right: splenius, sternocleidomastoid, semispinalis, upper trapezius.

Physical Exam: Systems Screen

Primary HA Primary HA, as defined by the International Headache Society (migraine, cluster, tension type, other primary), is neurological or vascular in origin.[33] Some people with primary HA may have cervical musculoskeletal dysfunction concurrently, which may trigger primary HA.[84] **TABLE 3** provides characteristics of primary HA related to quality, location, and timing. People with primary HAs should be referred to an HA specialist, such as a neurologist or an orofacial pain specialist.

Secondary HA and Other Orofacial Symptoms Symptoms of cardiovascular origin, such as angina pectoris or myocardial infarction, may be expressed in atypical patterns, particularly in women. Blood pressure and pulse must be part of the systems screen. Patients complaining of facial pain described as sudden onset of intermittent burning, tingling, or pressure, unrelated to jaw function and in the presence of relevant cardiac history or signs, should be referred immediately for medical screening.[26,37]

Rheumatoid arthritis and systemic lupus erythematosus can cause TMJ degeneration and arthralgia, resulting in pain with jaw function.[5,38,87] Rheumatoid arthritis occurs more commonly in women in their third and fourth decades of life and increases in frequency again in older age. Symptoms of bilateral pain in multiple joints suggest the need for referral to a rheumatologist or the patient's primary care physician, and physical therapists must use caution to avoid exacerbating a reactive joint.[11,38,69]

Fibromyalgia is diagnosed by presentation of pain in 2 of 4 bodily quadrants (above and below waist and right and left side of the body) for at least 3 months, tenderness in 11 or more of 18 specified sites, and normal electromyography.[25,30] While diagnosing fibromyalgia can be complex, therapists should consider a referral to a rheumatologist for additional diagnostics when patients present with undiagnosed bilateral chronic pain accompanied by fatigue, sleep, and mood disturbances.[52]

Cervical spine disorders can result in complaints of HAs and orofacial pain.[7,17,34,84] Trigger points in the cervical muscles may refer pain to the temporal, mandibular, frontal, retro-orbital, preauricular, and posterior and superior cranial areas (**FIGURE 6**).[77] Cervical facet joints and upper cervical neuronal structures can cause orofacial pain.[9,23,27] Cervical spine disorders may exacerbate TMDs as a result of the convergence of sensory information from the cervical spine influencing the trigeminal nucleus at the spinal cord level.[10,61] McNeely and colleagues[50] cited evidence describing an increase in cervical spine problems in those presenting with TMDs. Jull and colleagues[34] provided a cluster of examination findings to discern cervicogenic HAs from primary HAs. The combination of reduced cervical range of motion, painful upper cervical segmental manual examination, and reduced strength in the cervical cranioflexor muscles delineated people with cervicogenic HAs from those with primary HAs with 100% sensitivity and 90% specificity.[34] In addition to cervical range of motion, segmental provocation, and strength testing, palpation of cervical muscles will help discern the presence of trigger point pain-referral patterns. Because of the possibility of facilitation between the cervical and trigeminal systems, a complete cervical spine examination is warranted if a cervical disorder is suspected, even if the cervical exam does not directly reproduce the facial pain. Treating cervical disorders in addition to treating TMDs may help to reduce the overall burden caused by peripheral pain input, not the least of which is the centralization of pain that may occur with long-standing pain.

Patients should be asked about dental history, aching teeth, pain with eating, and procedures that could have traumatized the temporomandibular structures and resulted in guarding of the masticatory muscles.[61] The muscles of mastication can also cause pain-referral patterns to the teeth and be mistaken for dental pathology, necessitating a thorough pal-

TABLE 4 Synopsis of International Headache Society Criteria for People Presenting With Trigeminal Neuralgia[89]

A. Facial or frontal pain occurs as paroxysmal episodes, which last from a few seconds up to 2 minutes
B. Pain exhibits the following characteristics:
   1. Occurs along 1 or more divisions of the trigeminal nerve
   2. Sudden, severe, sharp, superficial, stabbing, or burning
   3. Initiates from trigger areas, or functional or parafunctional activities
C. Asymptomatic between paroxysmal episodes
D. Neurologically intact
E. Episodes are stereotyped in the individual patient
F. Differential diagnosis excludes other causes of facial pain through client history, physical examination, and specialist input

pation exam when tooth pain is present.[77] While the role of occlusion in causing TMDs is inconclusive, physical therapists should visually screen for obvious malalignment, underbite, overbite, open bite, and observe the health of the gums. Dental practitioners with specialty certification in orofacial pain are key collaborators or team coordinators in managing complex orofacial pain problems and can be identified through the American Academy of Orofacial Pain.[6]

Ear disorders, such as an inner or outer ear infection, can produce preauricular symptoms in and around the TMJ.[61,82] Conversely, hyperactivity of the masticatory and tensor tympani muscles can cause ear pain, tinnitus, and feelings of fullness in the ear.[66] An otoscope allows the physical therapist to view the tympanic membrane for signs of redness and edema, and visual examination of the tragus, the mastoid, and the auricle may reveal redness, edema, or scaliness. Pressure on the tragus may reproduce pain if the ear is the source of the symptoms.[61,79]

Patients with sinusitis complain of acute facial pain or pressure-type HAs and may present with nasal congestion, reduced sense of smell, postnasal drip, fever or malaise, and aching teeth associated with certain weather conditions or times of the year.[4] Referral to an ear, nose, and throat specialist or primary care physician will help clarify this common diagnosis.

Patients with eye disorders may experience pain around the eye, numbness, HA, and other symptoms similar to TMD, cervicogenic HA, or primary HA. Optic neuritis, sometimes associated with multiple sclerosis, produces ocular pain with eye movement and may result in progressive acute monocular vision loss. Temporal arteritis, a form of giant cell arteritis, results from inflammation of blood vessels to the face and can cause acute facial pain and vision loss. It is more common in older adults and in women, and is associated with polymyalgia rheumatica.[54,89] To differentiate temporal arteritis from TMDs, physical therapists should palpate the temporal artery anterior to the ear and superior to the posterior portion of the zygomatic arch. Pressure to this area will provoke severe eye pain in patients with temporal arteritis.[11] Patients with ocular pain that is increased with eye movement or focused vision or patients with acute vision loss should be referred to an ophthalmologist.

Cranial and Peripheral Neuralgias and Central Nervous System Disorders Peripheral neuralgias involve disorders affecting the peripheral nerve structures and include herpes zoster, postherpetic neuralgia, optic neuritis (discussed previously), trigeminal neuralgia, and occipital neuralgia. When a rash is not present, as in the early development of herpes or postherpetic neuralgia, screening is through symptom presentation consistent with neuralgia, such as tingling, shooting, burning sensations, or, in some cases, reduced sensations. The greater occipital nerve (C2-3) provides sensory innervation to the posterior cranium and is irritated in occipital neuralgia. The greater occipital nerve is examined by its palpation at the greater occipital notch, located midway between the external occipital protuberance and the mastoid process.

A cranial nerve screen should be completed on each patient presenting with orofacial pain. Particular attention should focus on the fifth cranial nerve, the trigeminal nerve, which supplies motor and sensory innervation to the masticatory region, is implicated in trigeminal neuralgia, and is examined by a light-touch sensory screen to the facial areas supplied by the nerve (**TABLE 4**).[2]

Neuropathic pain is described as pain with its origin in the neural tissue, either centrally or peripherally. A causal event may be associated, such as trauma to a tooth, but neuropathic pain continues even when there is no longer a clear source of nociception and normal healing times have passed.[62] Musculoskeletal examination typically does not reproduce the patient's chief complaint. Patients with neuropathic pain describe symptoms as burning, hyperalgesia (similar to electric shock), paresthesia, and anesthesia, and the symptoms may be episodic or continuous. Episodic neuropathic pains include paroxysmal neuralgia pain (eg, trigeminal neuralgia) and neurovascular pain. Continuous neuropathic pains include peripherally mediated pain, centrally mediated pain, and metabolic polyneuropathies.[17,60-62] A patient with suspected neuropathic pain should be referred to an appropriate orofacial pain specialist or neurologist.

Meningitis results from bacterial or viral infection of the meninges, produces edema of the brain with bleeding, and can lead to death. Clinical manifestations include nuchal rigidity, fever, photophobia, nausea, and vomiting. Primary brain

TABLE 5 Systems Screen Used to Determine the Need for Interprofessional Referral

Classification	Screen
Primary headaches	History and symptoms (**TABLE 3**)
Secondary headaches	
Cardiac, angina	Cardiac history, blood pressure, heart rate, sudden onset, burning, tingling
Systemic: rheumatoid arthritis, fibromyalgia, systemic lupus erythematosus	Medical history, bilateral pain, multiple joints
Cervical	History, posture, range of motion, segmental motion, palpation, craniocervical flexor strength
Dental	Dental history, observation of oral cavity, teeth, bite
Ear	History, observation, otoscope, pressure over tragus
Sinus	History, sinus pain, nasal congestion, reduced smell
Eye	Acute vision loss, eye pain with eye movement, palpation temporal artery
Cranial neuralgia, CNS	
Peripheral neuralgia	History, burning, tingling, shooting pains, cranial and cervical nerve exam, palpation occipital nerve
Neuropathic pain	History (possible causal event), burning, tingling, hyperalgesia, paresthesias, cranial/cervical nerve exam
CNS disorder	History, sudden-onset severe headache, vomiting, nausea, altered mentation, altered muscle tone and function (gait), paralysis, bilateral weakness or sensory loss, slurred speech
Psychological disorders	History, affect, malaise, life stressors, fatigue, Patient Health Questionnaire for Depression and Anxiety,[39] Graded Chronic Pain Scale[80]

Abbreviation: CNS, central nervous system.

FIGURE 7. Joint palpation. The temporomandibular joint is palpated in the preauricular area. The posterior aspect of the joint is palpated in the same area with the mouth open.

FIGURE 8. Temporalis tendon palpation. The tendon is palpated intraorally, with the mouth open to expose the insertion of the temporalis tendon on the coronoid process from its location deep to the zygomatic arch. The therapist follows the anterior ramus of the mandible superiorly to the coronoid process.

tumors are rare but must be considered. Subarachnoid hemorrhage can be caused by rupture of an intracranial aneurysm or an arteriovenous malformation, and is associated with severe, sudden-onset HA and brief episodes of loss of consciousness.[11] Stroke may involve manifestations related to HAs, facial and extremity paralysis, and slurred speech. Changes in mentation, vomiting, nausea, visual changes, seizures, ataxia, or speech impairment warrant a detailed neurological exam and referral for immediate medical care.[11]

Medical experts have created the acronym SNOOP for diagnosis of red flags in those presenting with HAs who need immediate attention. SNOOP stands for systemic (eg, fever, chills, night sweats), neurological (eg, abnormal neurological findings), onset sudden (HA peaks within 1 minute of onset), onset after age 50, pattern change (increasing in frequency, associated with Valsalva maneuver, aggravated by postures that change cranial or eye pressure).[48]

TMJ and Muscle Examination

The systems screen will differentiate problems outside the masticatory structures and identify the need for interprofessional referral and/or further cervical spine examination (**TABLE 5**). Examination and evaluation of the TMJ and related structures will further delineate TMDs and classify the problem as either masticatory muscle or joint disorder, or both, which will then determine the plan of care. Examination of the masticatory structures includes a thorough mobility and palpation exam to identify impairments and functional limitations.

Palpation Exam A graded palpation scale, ranging from 0 to 4, with 0 being no pain and 4 being withdrawal to touch, allows differentiation among varying amounts of tenderness.[46] Schiffman and colleagues[74] found that a range of about 1 to 1.8 kg (approximately 2 to 4 lb of force) is appropriate for masticatory joint and muscle palpation examination. Clinicians should use slight blanching of the pad of the distal phalanx as a guideline for appropriate amounts of pressure during the palpation exam.

The TMJ should be palpated at rest and during mandibular motion. The joint is palpated just anterior to the tragus of the ear (**FIGURE 7**). During mouth opening, the lateral pole of the condyle is the most palpable osseous structure, and the indentation posterior to the condyle (during mouth opening) is the posterior aspect of the joint. Palpation around the lateral pole had excellent interrater reliability for pain reproduction ($\kappa = 0.89$)[74] and is part of the DC/TMD classification algorithm for "any joint pain," with sensitivity and specificity of 0.92 and

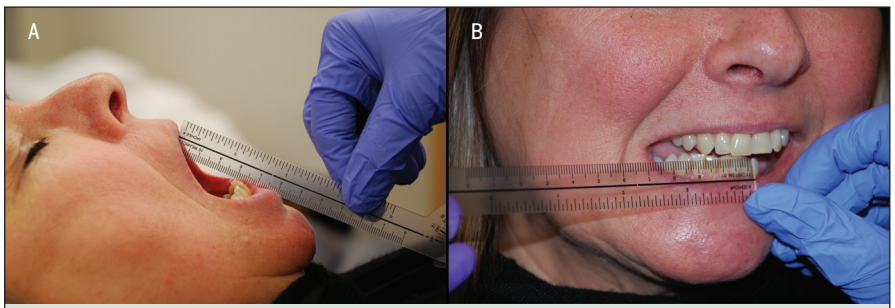

FIGURE 9. (A) Measurement of mouth opening: the distance (mm) from the bottom of the top middle incisor to the top of the bottom middle incisor. (B) Measurement of lateral excursion: the distance (mm) from the middle of the top incisors to the middle of the bottom incisors at the end range of lateral excursion (assuming middle of top and bottom incisors are aligned in neutral jaw position before motion).

0.96 when using the expert-driven diagnosis as the gold standard.[74] Accuracy in palpation is essential to diagnostic classification.

The 2 primary positive findings with muscle palpation exam are local tenderness and pain referral. It is difficult to reliably discern if muscle pain is the primary source of the problem or a secondary condition contributing to the overall pain condition.[75] Trigger point referral patterns should be delineated. Pain from an active trigger point should be reproducible with 4 to 5 seconds of palpation using 1 to 1.8 kg of force.[77] Diagnostic injections of trigger points with local anesthetics are used by some orofacial pain practitioners for diagnosis as well as management.

The DC/TMD classification algorithm for muscle pain specifies a positive finding as reproduction of the primary complaint when palpating muscle and tendons of the masseter or temporalis muscles.[74] The temporalis muscle can refer pain to the teeth, the joint, and the retro-orbital area (**FIGURE 1**).[77] This broad muscle has anterior vertical, middle oblique, and posterior horizontal fibers and should be palpated accordingly. The tendon can be palpated intraorally and extraorally during mandibular depression to bring the coronoid process inferior to the zygomatic arch (**FIGURE 8**).[61] Palpation of the masseter muscle begins at its superior attachment along the zygomatic arch and continues inferiorly along the muscle belly to its inferior attachment on the ramus of the mandible. Trigger points in the masseter muscle can refer pain to the teeth, ear, and sinus areas (**FIGURE 2**).[77] The clinician should try to discern the underlying cause of the trigger point impairment (eg, parafunction, chronic inflammation, chronic muscle guarding, or centrally mediated myalgia), because a temporary reduction in trigger point sensitivity may not eliminate the trigger point.

The medial and lateral pterygoids are muscles of mastication, but the depth of their location and adjacent overlying structures prevent accurate palpation and valid interpretation (**FIGURE 3**).[61,75] Schiffman and colleagues[74] found that palpation of submandibular muscles does not improve the reliability of the DC/TMD classifications. Okeson[61] recommends activating the inferior portion of the lateral pterygoid through resisted protrusion, and the superior portion of the lateral pterygoid through a power stroke (clenching teeth together). The medial pterygoid muscle is also activated with the power stroke, but is also stretched with mouth opening (unlike the lateral pterygoid muscle). To reduce joint loading during the power stroke, the therapist should place a tongue depressor between the back molars on each side during clenching, which prevents the joints from compressing during a power stroke. If this maneuver is painful, it may be due to masticatory myalgia rather than joint inflammation. Masticatory myalgia will be painful during the power stroke, with and without tongue depressors placed on the back molars.

Mobility Exam Mouth opening is measured as the distance between the edges of the top and bottom incisors using an instrument such as a ruler marked in millimeters (**FIGURE 9**). Opening range of motion is examined by asking the person to open the mouth as wide as possible without causing pain or discomfort. The patient then is asked to open as wide as pain will allow, which enables the clinician to discern between pain-free and painful opening. A third measure of assisted opening is useful in discriminating the end feel. Normal motion is 40 to 50 mm with a firm capsular end feel.[31,35,56,83]

Linear ruler measurement of mandibular opening has good intrarater and interrater reliability (intraclass correlation coefficient = 0.70-0.99 and 0.90-1.00, respectively).[43,83] Pain with stretching or inability to elongate the mandibular elevator muscles due to muscle guarding or contracture may reduce mandibular depression and thus mouth opening. Mouth opening may be limited by the inability of the condyle(s) to glide anteriorly, due to DDWOR and/or capsular adhesions, and may result in a deflection toward the side of restriction at end range of mouth opening. A lateral deviation during opening with a return of the mandible to midline at full range of opening indicates an asymmetry of right and left joint motion. This could be due to asymmetrical muscle activation or asymmetrical joint structure relationships, such as a DDWR on 1 side only. Pain at end range of mouth opening implicates joint or muscle, depending on the location of the pain.[35,61]

Protrusion and retrusion typically are not measured during the clinical exam, but quality of protrusion is observed. If the mandibular teeth are able to protrude past the top teeth, this is considered sufficient range.[35] Protrusion may be limited by the inability of the condyle(s) to glide anteriorly, which can occur due to DDWOR and/or capsular adhesions. A deflection may be present toward the side of the restriction at the end range of

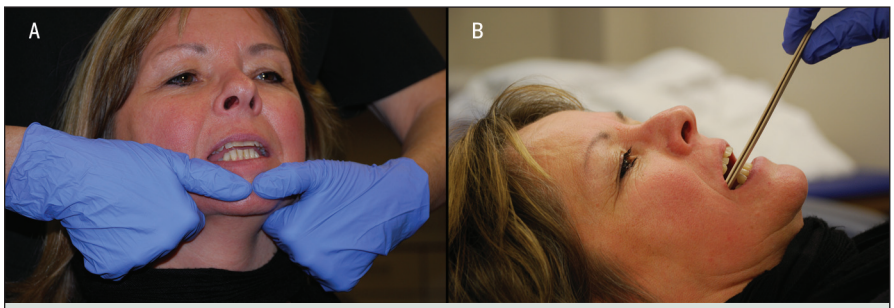

FIGURE 10. Loading the temporomandibular joints to reproduce arthralgia: (A) therapist places a superior force through the ramus of the mandible bilaterally; (B) loading of the left joint by having patient bite on a separator (tongue depressor) between right molars. If separators are placed bilaterally during biting, then both joints remain unloaded, suggesting masticatory myalgia if the chief complaint of pain is reproduced.

protrusion, similar to what is seen with mouth opening.[35,61]

Normal lateral excursion occurs when the mandible moves laterally in relationship to the maxilla. This motion is assessed by measuring the horizontal distance between the interspace of the top and bottom central incisors at the end of this lateral movement. The normal range is 8 to 11 mm (**FIGURE 9**).[35,61] Lateral excursion requires an anterior condylar glide on the side contralateral to the side of the excursion, and a slight spin ipsilaterally.[70] Capsular adhesions or DDWOR may limit contralateral lateral excursion as a result of limiting the anterior glide of the condyle.[36]

Joint Sounds Discrete joint sounds known as pops or clicks are associated with DDWR. The clinician places the palpating finger over the joint externally, while the patient actively opens and closes the mouth and performs lateral excursion and protrusion. Disc displacement diagnoses commonly are identified by a clicking, snapping, or popping sound during opening, closing, or both (ie, reciprocal click), either reported by the patient or observed by the clinician.[22,74] This audible or palpable click is a component of the DC/TMD classification algorithm.[74] An MRI has good reliability for diagnosis of any disc displacement (κ = 0.84).[3] Using MRI as the gold standard to diagnose DDWR, reciprocal clicking had sensitivity and specificity of 0.51 and 0.83, respectively, for diagnosing DDWR.[64] Similarly, using the expert-driven diagnosis (which included MRI) as the gold standard, the DC/TMD clinical algorithm (joint clicking/popping) had sensitivity and specificity of 0.46 and 0.90, respectively, to identify DDWR.[74] The stronger specificity implies that if clicking is detected (positive test), then DDWR is likely present, whereas weaker sensitivity indicates that, if the clicking is not detected, DDWR cannot be ruled out. This is consistent with the modest interrater reliability (κ = 0.70) in the determination of joint clicking. This is complicated by research demonstrating that 9% to 31% of asymptomatic people have disc displacements on MRI,[17] highlighting the importance of a thorough clinical exam to determine the source of pain.[13,61] Moreover, clicking of the TMJ is relatively common in the pain-free population, and the presence of joint sounds is not predictive of progression to a nonreducing disc, more severe condition, or pain.[16,47] These facts and the multifactorial nature of the disorder result in problems when trying to use more traditional gold standards, such as imaging, to validate the clinical exam among those presenting with orofacial pain.[67] For people with TMDs of joint origin (disc or joint surface or structure), physical therapists will focus intervention on the impairments of joint pain and reduced joint range of motion, because conservative management will not substantially alter disc displacement or joint surface degeneration.

Based on the DC/TMD algorithm, if the patient has a positive history of joint catching or locking but no click, then the likely diagnosis is DDWOR with limited opening (less than 40 mm) or without limited opening (greater than 40 mm). Using this diagnostic algorithm to identify a DDWOR with limited opening has been shown to have sensitivity and specificity, respectively, of 0.80 and 0.97.[22,74] The therapist is interested in treating impairments associated with pain and dysfunction and, in the absence of these, should choose a conservative approach of educating the patient about the remodeling process, with reassurance that joint motion and sounds should normalize over time.

TMJ arthralgia may be due to inflammation and/or degeneration of the joint structures. Joint crepitus suggests a degenerative process.[22,74] If joint palpation is painful but joint crepitus is not reported by the patient during any of the joint movements, then arthralgia without degeneration is suspected.[74] While identification of crepitus is reliable (κ = 0.85),[74] a computed tomography scan is recommended as the gold standard for diagnosing osseous pathologies (osteoarthritis, osteoarthrosis).[3,64,74,85] If no joint noise or pain with palpation is reported or observed, then the clinician should consider that joint pathology is not present or may not need intervention.

Special Tests Though not part of the DC/TMD, special tests of joint loading to discern joint pain are described by clinical experts.[17,35,61] These include manual loading (**FIGURE 10A**) and biting on a separator (**FIGURE 10B**) to load the joint contralateral to the side of the separator. Positive reproduction of joint pain contralateral to the separator suggests arthralgia, and further confirmation is associated with positive joint palpation. When having the patient bite on separators bilaterally, the joints are essentially unloaded, and muscle should be suspected if pain is reproduced.

Participation Examination

Rollman et al[72] validated the patient-specific approach for quantifying the impact

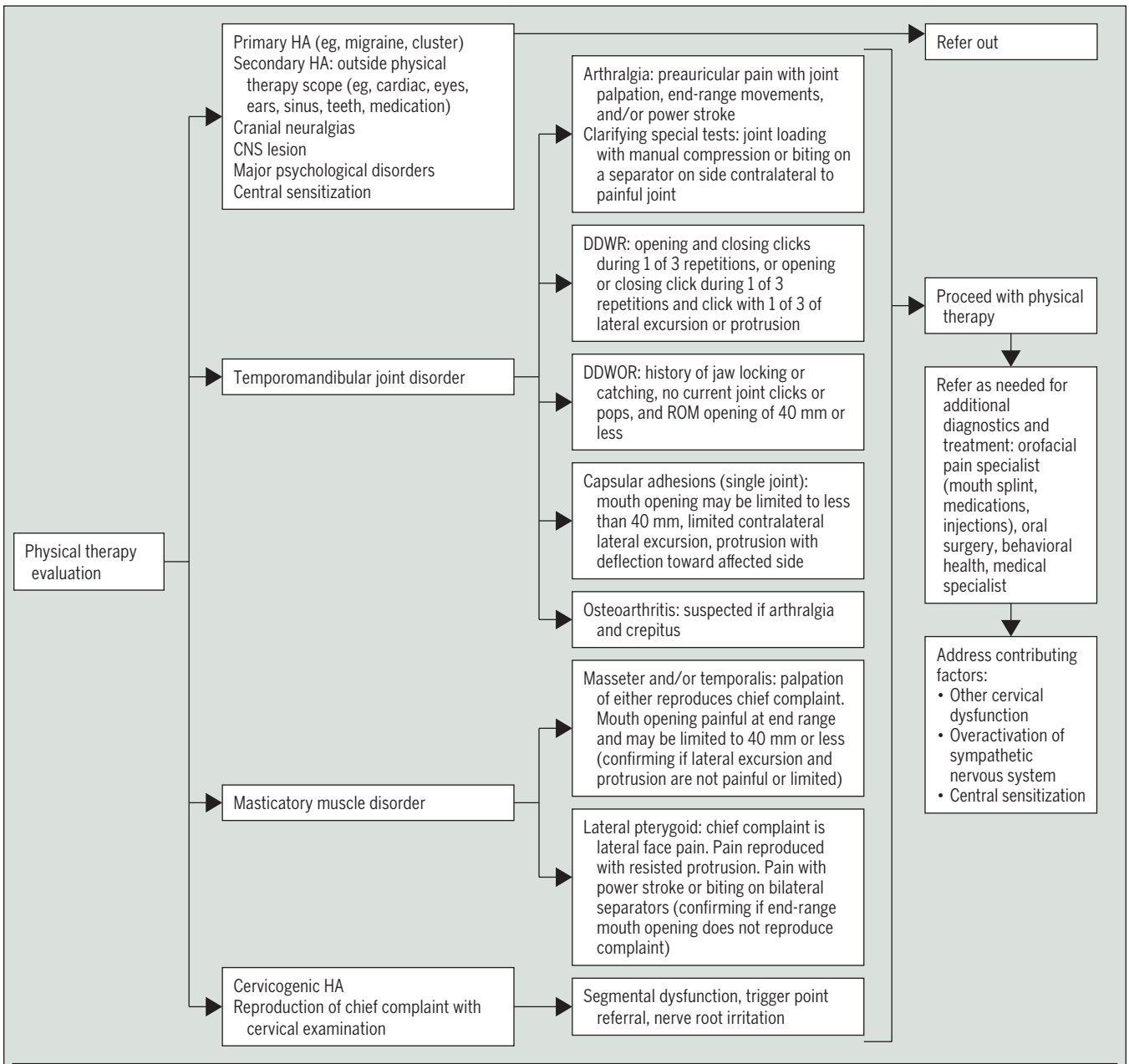

FIGURE 11. Physical therapy evaluation and diagnostic classification of patients with orofacial pain. Abbreviations: CNS, central nervous system; DDWOR, disc displacement without reduction; DDWR, disc displacement with reduction; HA, headache; ROM, range of motion.

of TMDs on participation in life. With this approach, the patient identifies the most important participatory functions affected by the TMD and quantifies the extent of the impact with a visual analog scale. This relatively new instrument has been shown to be valid, reliable, and responsive to change, and provides an approach that does not exclude important life areas.[72]

EVALUATION

Interprofessional Referral

Figure 11 provides a summary of the evaluation process, beginning with the outcomes of the systems screen and integrating the DC/TMD classification algorithms. The first consideration in the evaluation is whether referral to other practitioners is needed. Immediate referral is required in the case of sudden-onset severe HA; weakness; slurred speech; central nervous system signs, such as unexplained altered functions in gait and balance; and symptoms and history suggesting cardiac pathology, which may cause referred pain in the orofacial region. If a patient verbalizes suicidal

ideation, then immediate referral to an appropriate health care practitioner is warranted. Other indications for interprofessional referral include symptoms associated with primary HA or secondary HA related to rheumatological disorders, cardiac, eye, ear, dental, or sinus disorders. These may coexist with a musculoskeletal TMD or cervical problem that can be addressed in tandem with the referral.

Emotional responses to pain are normal. However, if signs of moderate to severe depression, anxiety, or pain-related disability are found in the history and/or psychological screening, then referral to a psychologist or other behavioral specialist with expertise in pain management is optimal.

Once the need for immediate referral has been ruled out, the therapist then determines whether a diagnostic classification within the scope of physical therapy practice is identified. In the case of orofacial pain, the most common classifications to be addressed by physical therapy are masticatory muscle disorder, TMJ disorder, and cervical spine dysfunction. Patients may have 1, 2, or all 3 of these problems, which may coexist with other types of HA.

If a patient has excessive parafunctional activities that are not reduced through educational approaches provided by the physical therapist (eg, conscious awareness of reduction of parafunction and relaxation techniques), then referral to an orofacial pain specialist, often a dental practitioner, skilled in making occlusal resting splints is appropriate. If joint inflammation or trigger points are not responsive to physical therapy, then referral to a specialist for anti-inflammatory medication and/or trigger point injections may be warranted. In the case of the person with a disc displacement and arthralgia that is not responsive to physical therapy, a referral to a specialist for additional medications, occlusal splints (eg, a splint to reposition the mandible anteriorly), or further diagnostic testing is appropriate.

Masticatory Muscle Disorder

A positive history of pain in the area of the muscle in the past month, reproduction of the chief pain complaint during palpation of the masseter or temporalis, and/or reproduction of muscle pain (as the chief complaint) with unassisted maximum opening provide a valid classification of masticatory muscle pain.[44] According to clinical experts, involvement of the lateral pterygoid muscle may be suspected if the patient complains of preauricular pain, if the power stroke and/or resisted protrusion are painful, and careful joint and muscle palpation have ruled out pain from the temporalis muscle, masseter muscle, and the TMJ itself.[35,61]

It is often challenging to discern centrally mediated myalgia from myalgia caused by peripheral sources. Okeson[61] described characteristics of centrally mediated myalgia, which include prolonged and uninterrupted muscle pain (longer than 1 month in duration), pain in multiple masticatory muscles, pain present at rest, and pain made worse with function. Masticatory muscle pain that is unresponsive to peripheral interventions or to education of the patient about pain-modulating strategies[45] is an indication for referral to an orofacial pain specialist.

TMJ Disorders

Based on the DC/TMD, a positive history of joint clicking, popping, snapping, palpation of a reciprocal click in 1 of 3 trials, and maximum assisted opening of 40 mm or greater are indicative of DDWR. A history of the jaw "catching" with mouth opening of less than 40 mm implicates a DDWOR.[44,61] Joint arthralgia is implicated if the chief complaint is in the preauricular area and palpation of the joint line is positive for the presenting pain. Pain with special tests that load the joint may be confirmatory. Palpation of crepitus during opening suggests joint-surface irregularities, as in osteoarthritis. A computed tomography scan or MRI can clarify diagnoses related to joint and disc dysfunction if such clarification alters the therapeutic approach. The clinician must use the musculoskeletal exam to clarify whether pain and/or limitations of motion are related to joint or to muscle structures, or both, to target therapies appropriately.

Cervical Disorders

Reproduction of the chief facial-pain complaint through cervical examination indicates cervicogenic HA. Delineating HA due to muscle (ie, trigger point) or cervical segmental problems is essential to correctly target treatment. Cervical spine dysfunction may not directly cause the chief complaint, but substantial cervical problems should be addressed by the physical therapist because they can exacerbate TMDs, contribute to central sensitization, and add to problems resulting from chronic pain.

TREATMENT CONSIDERATIONS

The most common problems in people with TMDs to be addressed by physical therapists are masticatory muscle and TMJ pain, TMJ functional limitations, cervical spine dysfunction, and contributing factors involving psychological or behavioral influences. While a review of the evidence for intervention is beyond the scope of this paper, physical therapists' knowledge about managing joint and muscle problems in other regions can be integrated with current research in the area of TMDs[1,14,18,24,35,42,50,53] to inform the plan of care. This is possible only after adequate diagnostic classification has been established.

In terms of joint inflammation, therapists should apply principles of protected motion (soft foods), cryotherapy, iontophoresis or phonophoresis, and prevention of further impairment during healing (pain-free active range of motion). In treating reduced joint mobility caused by muscle or joint structures, joint mobilizations and passive and active range-of-motion exercises are appropriate, although caution must be used when capsulitis is suspected.

Modalities and manual therapies to reduce pain, muscle guarding, and trigger point activation and to increase mandibular range of motion are important considerations.[14,24,34] The evidence for dry needling to reduce the sensitivity of trigger points is growing.[20,24] Addressing the cervical spine is critical if cervical dysfunction is causing or contributing to orofacial pain.[36,81]

Education related to the science of pain, such as information about the sensitization of the brain in response to pain and the upregulation of pain centers in response to increased sympathetic nervous system activation, has been shown to help reduce pain and disability in people with chronic pain.[45] Physical therapists can provide this education and can help patients develop pain-modulation strategies, including improved sleep hygiene, progression of physical activity, practice of diaphragmatic breathing, methods for reducing stress, and approaches for relaxation of the mandibular elevators ("teeth apart and breathe").[12]

SUMMARY

This paper describes an approach for examination and evaluation of the most frequently encountered TMDs that is based on the DC/TMD methodologies validated by fellows of the American Academy of Orofacial Pain.[74] The International Headache Society classification scheme[33] supported a modified framework for the systems screen to determine the need for interprofessional referral. The American Academy of Orofacial Pain guidelines provided additional examination techniques for diagnosing TMDs, as recommended by expert orofacial pain clinicians.[17,35,61] An assessment of cervicogenic contributions is also critical in determining an appropriate physical therapy plan of care. The determination of the need for referral and the development of an appropriate plan of care are predicated on understanding screening strategies and valid examination and diagnostic classification approaches. These will then inform the physical therapy plan of care for the patient presenting with orofacial pain. ◉

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