

Diagnosis and Treatment of Temporomandibular Disorders (TMD)

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Background & Etiology

- TMD affects approximately 10-15% of the population, but only 5% seek treatment.
- Incidence peaks from ages 20-40 years old, 2:1 female to male ratio.
- Studies have shown a positive association with depression, anxiety, and smoking
- Major financial burden due to loss of work
- **Most common causes of TMD are myofascial pain syndrome, disk derangement disorders, osteoarthritis, and autoimmune conditions.**
- Etiology is multifactorial: biologic, environmental, social, emotional, cognitive components.
- Many other conditions associated with TMD including fibromyalgia, autoimmune disorders, sleep apnea, and psychiatric illness.

Table 1: Conditions resembling symptoms associated with TMD

| Condition | Location | Pain characteristics | Aggravating factors | Typical findings |
|-------------------------------|--|--|---|--|
| Dental conditions | | | | |
| Caries | Affected tooth | Intermittent to continuous dull pain | Hot or cold stimuli | Visible decay |
| Cracked tooth | Affected tooth | Intermittent dull or sharp pain | Biting, eating | Often difficult to visualize crack |
| Dry socket | Affected tooth | Continuous, deep, sharp pain | Hot or cold stimuli | Loss of clot, exposed bone |
| Giant cell arteritis | Temporal region | Sudden onset of continuous dull pain | Visual disturbance, loss of vision | Scalp tenderness, absence of temporal artery pulse |
| Migraine headache | Temporal region, behind the eye, cutaneous allodynia | Acute throbbing, occasionally with aura | Activity, nausea, phonophobia, photophobia | Often normal, aversion during ophthalmoscopic examination, normal cranial nerve findings |
| Neuropathic conditions | | | | |
| Glossopharyngeal neuralgia | Most often ear, occasionally neck or tongue | Paroxysmal attacks of electrical or sharp pain | Coughing, swallowing, touching the ear | Pain with light touch |
| Postherpetic neuralgia | Site of dermatomal nerve and its distribution | Continuous, burning, sharp pain | Eating, light touch | Hyperalgesia |
| Trigeminal neuralgia | Unilateral trigeminal nerve | Paroxysmal attacks of sharp pain | Cold or hot stimuli, eating, light touch, washing | Pain with light touch |
| Salivary stone | Submandibular or parotid region | Intermittent dull pain | Eating | Tenderness at gland, palpable stone, no salivary flow |
| Sinusitis | Maxillary sinus, intraoral upper quadrant | Continuous dull ache | Headache, nasal discharge, recent upper respiratory infection | Tenderness over maxillary sinus or upper posterior teeth |

(Gauer & Semidey, 2015)

Diagnosis

- Diagnosis based on detailed history and physical examination.
- The most common S/S found in patients experiencing TMD were facial pain (96%), ear discomfort (82%), headache (79%), and jaw discomfort or dysfunction (75%).
- Other symptoms include: dizziness, or pain in the neck, eye, arm, or back.
- Chronic TMD = defined as pain lasting over 3 months.
- Joint noises (i.e. clicking, popping, grating, crepitus) may occur in TMD but also occur in 50% of asymptomatic patients
- Physical exam findings that support TMD include: abnormal mandibular movement, decreased range of motion, tenderness of masticatory muscles, pain with dynamic loading, signs of bruxism, and neck or shoulder muscle tenderness.
- Positive CN examination findings should not be attributed to a diagnosis of TMD.

How do you assess clicking, crepitus, or locking?

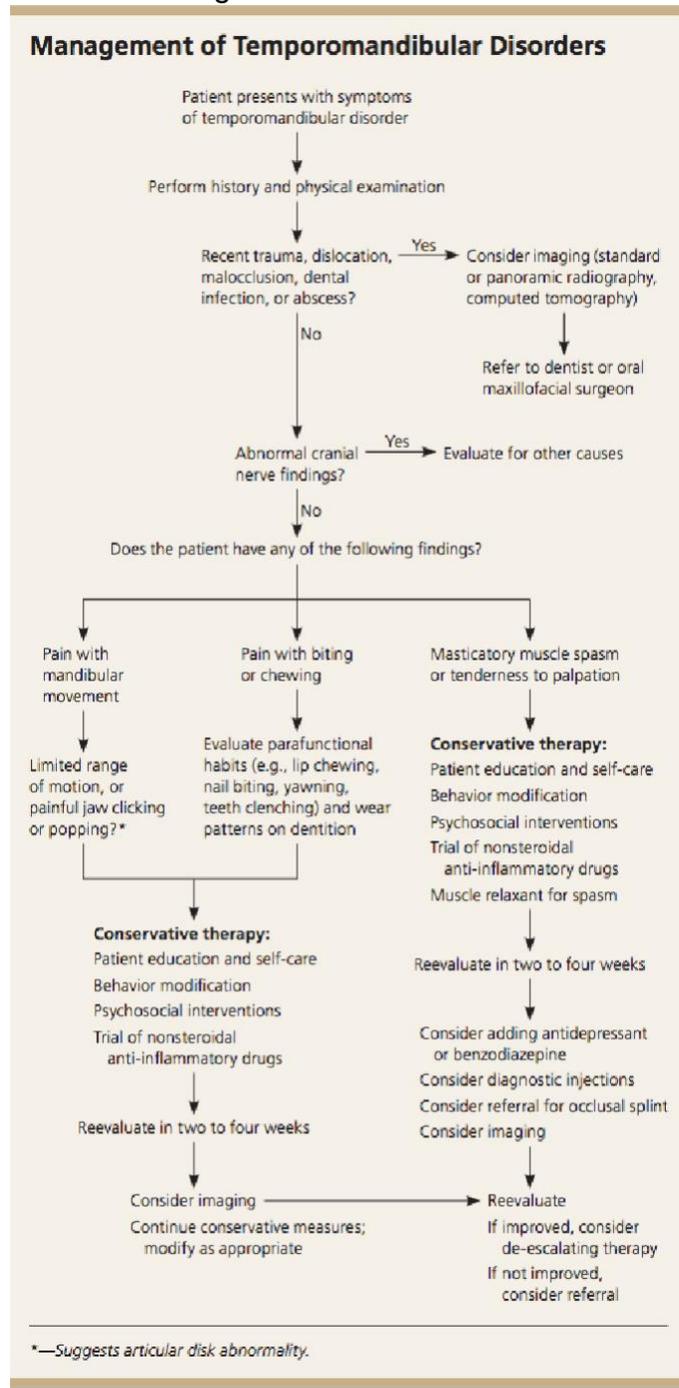
- Single click during mouth opening may be associated with anterior disk displacement
- Second click during closure results in the disk being recaptured: anterior disk displacement with reduction
- If patient cannot open fully, the disk is blocking the translational path of the condyle: closed lock
- Crepitus = articular surface disruption which is likely attributable to osteoarthritis.
- Tenderness to palpation of muscles of masseter, temporalis, and surrounding neck muscles may distinguish between myalgia, myofascial trigger points, or referred pain syndrome.
- Mandible deviation upon opening indicative of anterior articular disk displacement on the same side.

Imaging

- Plain radiography i.e. Panoramic can reveal acute fractures, dislocations, or severe degenerative disease
- CT allows for closer view of subtle bony morphology
- **MRI = optimal modality of imaging TMJ. 78-95% correlation between imaging findings and joint morphology in symptomatic patients.**
 - Typically reserved for patients who have persisting symptoms despite conservative therapy efforts
- Ultrasound is a non-invasive, low-cost, aid to diagnose internal derangement of TMJ when MRI is not available.

Management

Table 2: Management of TMD



(Gauer & Semidey, 2015)

Treatment

- 5-10% of patients require treatment for TMD; 40% of cases resolve spontaneously.
- **Study estimates of the effectiveness of conservative therapy is 50-90%.**
- Surgical interventions are normally reserved for patients whose symptoms did not respond to conservative therapies.

| Treatment | Description |
|----------------------------------|--|
| Nonpharmacologic Management | <ol style="list-style-type: none"> 1. Patient Education <ul style="list-style-type: none"> - Jaw rest, soft diet, warm compress, passive stretching exercises. - TMJ immobilization has shown to be ineffective 2. Physical therapy (PT) <ul style="list-style-type: none"> - Goal to improve range of motion, muscle strength, coordination, and relaxation. - Specialized PT i.e. ultrasound, electrotherapy has lack of evidence to support their use. 3. Acupuncture <ul style="list-style-type: none"> - Used to treat myofascial pain. 2 systematic reviews concluded that it is a reasonable adjunct to provide short- term analgesia for patients with painful TMD 4. Biofeedback <ul style="list-style-type: none"> - Cognitive behaviour therapy and biofeedback therapy are supported for the short and long-term management of TMD. - Examples include: stress modification, sleep hygiene, elimination of parafunctional habits, and avoiding excessive md movements. |
| Pharmacologic therapy | See Table 3 for details |
| Occlusal splints and adjustments | <ul style="list-style-type: none"> - Thought to alleviate forces placed on TMJ, articular disk and dentition. - May benefit patients with bruxism or clenching - Questionable support of occlusal devices relieving TMD symptoms. - Occlusal adjustments have no benefit in the management of TMD. |
| Referral | <ul style="list-style-type: none"> - Referral to a TMJ specialist is recommended if patient has a a history of trauma, has suffered a fracture to the TMJ complex, or pain with an unidentifiable source lasting more than 3-6 months. - Surgery i.e. arthrocentesis, arthroscopy, discectomy, condylotomy, reserved for correction of anatomic or articular abnormalities |

- Surgical treatments have shown to alleviate TMD symptoms and increasing joint mobility.
- Referral to a dentist indicated for patients who have poor oral hygiene, caries, wear, which may be contributing to TMD symptoms.

Table 3: Pharmacological agents used in treatment of TMD

| Medication | Dosage | Evidence | Study |
|---|---|--|---|
| Anticonvulsant: gabapentin (Neurontin) | 300 mg per day, increased by 300 mg incrementally | Statistically significant reduction in pain | Double-blind, placebo-controlled RCT (n = 44) ³⁸ |
| Benzodiazepines | | | |
| Clonazepam (Klonopin) | 0.25 mg every night, increased by 0.25 mg each week to a maximum of 1 mg per day | Conflicting data showing benefit for reduction in pain | Double-blind, placebo-controlled RCT (n = 20) ³⁹ |
| Diazepam (Valium) | 2.5 mg four times per day for one week, then 5 mg four times per day for three weeks | Statistically significant reduction in pain | Double-blind RCT (n = 39) ⁴⁰ |
| Triazolam (Halcion) | 0.125 mg every night | Improved sleep function, but no statistically significant reduction in symptoms | Double-blind RCT, two-period crossover study (n = 20) ⁴¹ |
| Corticosteroids | | | |
| Intra-articular injection (e.g., triamcinolone, methylprednisolone) | Injection of 0.5 mL local anesthetic and 5 to 20 mg steroid using 23- to 27-gauge 0.5- to 1-inch needle | Limited evidence of improved joint function and reduction in pain; should be reserved for severe cases because of reports of articular cartilage destruction | Systematic review of seven double-blind RCTs and two single-blind RCTs ^{42,43} |
| Systemic | Short course (five to seven days), with or without tapering | Limited evidence; should be reserved for patients with severe joint inflammation associated with autoimmune syndromes | None ⁴⁴ |
| Hyaluronate (avian) | Single-dose vial, with second injection in two weeks | Inconclusive evidence | Systematic review of seven RCTs ⁴⁵ |
| Muscle relaxant: cyclobenzaprine (Flexeril) | 10 mg every night | More effective than clonazepam and placebo for reduction in pain | Double-blind, placebo-controlled RCT (n = 39) ⁴⁶ |
| Nonsteroidal anti-inflammatory drugs | | | |
| Celecoxib (Celebrex) | 100 mg two times per day | No statistically significant reduction in pain | Double-blind, placebo-controlled RCT (n = 68) ⁴⁷ |
| Diclofenac | 50 mg three times per day | No statistically significant reduction in pain | Double-blind, placebo-controlled RCT (n = 32) ⁴⁸ |
| Ibuprofen | 600 mg four times per day | No statistically significant reduction in pain; combination of ibuprofen and diazepam was more effective than placebo | Double-blind, placebo-controlled RCT (n = 39) ⁴⁰ |
| Naproxen (Naprosyn) | 500 mg two times per day | Statistically significant reduction in pain | Double-blind RCT (n = 68) ⁴⁷ |
| Piroxicam (Feldene) | 20 mg per day | No statistically significant reduction in pain | Double-blind, placebo-controlled RCT (n = 41) ⁴⁹ |
| Tricyclic antidepressant: amitriptyline | 25 mg per day | Statistically significant reduction in pain | Double-blind RCT (n = 12) ^{46,50} |

(Gauer & Semidey, 2015)

Take Home Message

- TMD is a multifactorial condition that has various etiologies. Along with a detailed history and physical examination, multiple diagnostic imaging modalities to help diagnose TMD.
- Initial treatment should include conservative, reversible, and evidence-based modalities. Invasive therapies should be initiated only after noninvasive options have been exercised
- Cochrane review of NSAIDs, benzodiazepines, anti-convulsants, and muscle relaxants concluded that there was insufficient evidence to support or refute the effectiveness of any drug for the treatment of TMD. Only naproxen, gabapentin, and diazepam had evidence to support a reduction of pain associated with TMD.
- There are many treatments indicated for TMD; however, there is not one that is uniformly superior for the treatment of pain and oral dysfunction.
- Quality of life can be affected by TMD. Referrals to specialists are necessary when cases fail to respond to conservative measures.

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