

AN EVIDENCE-BASED GUIDELINE FOR PHYSICAL THERAPY MANAGEMENT OF TEMPOROMANDIBULAR JOINT DYSFUNCTION (TMD)

Physical therapists have an important role on the interpersonal team to provide care for people with temporomandibular disorders (TMDs). The purpose of this guideline is to provide the clinician with a variety of evidence based methods to effectively evaluate and manage TMD.

Patient reported outcome measures

- The recommended patient reported outcome measure is the TMD Disability Index
- The TMD Disability Index (also referred to as the Steigerwald Maher TMD Disability Index) was created in 1997 and involves 10 functionally related questions associated with TMD. The scale is a self-report, disease-specific instrument with five possible selections for each question, each with increasing severity. (6)
- A study in 2015 at European School of Osteopathy, University of Greenwich suggests that the TMD Disability Index offers sufficient external validity and could be integrated into practice life as a quick, accessible, and easy tool to monitor patients' progress and assess levels of inflammation, without the need for repetitive imaging. (6)

Dietary considerations

- Dietary considerations include soft foods to minimize over stretching of the mastication muscles such as beans, steamed vegetables or fruits, cheese or cottage cheese, fish, fruit smoothies, oatmeal or other soft, hot breakfast cereals, mashed potatoes, scrambled eggs, soup, or yogurt (3)
- Refrain from eating any foods that require one to open too wide, sticky or chewy items such as caramel apples or candy bars, hard or crunchy foods, apples, pretzels, or raw carrots, crunchy cereals, or tough steak
- One can progress to foods that initially were painful or difficult to consume
- Once symptoms have decreased to a manageable level, harder foods can be periodically tested for provocation and reintroduced when appropriate (3)

Considerations for manual therapy

- Consider implementation of joint mobilization (grade I or II) for pain including distraction, anterior glide, anterior glide with pre-positioned mouth opening (5)
- medial/lateral glides, caudal-anterior-medial (CAM) glide and CAM with pre-positioned mouth opening (5)
- Joint mobilization should be applied when a movement restriction is evident but should be avoided if joint hypermobility is suspected or verified unless a low-grade technique is utilized (5)
- Joint mobilization dosage should be guided by an informed decision that takes into account the patient's irritability level and can include cervical manual techniques
- Consider implementation of intraoral and extraoral soft tissue mobilization
- At a minimum, the temporalis, masseter, medial pterygoid, and lateral pterygoid muscles must be considered (8)
- Accessory muscles of mastication and cervical spine musculature may also require management through soft tissue mobilization (8)
- Utilizing one digit or one reinforced digit to contact a myofascial trigger point or the general muscle belly can be helpful
- Friction massage can be applied in a variety of directions and are easily applied to the masseter and temporalis muscle bellies
- Intra-oral techniques directed at the medial and lateral pterygoid muscles are useful as well (consideration of patient gag reflex is recommended) (9)



- Trigger Point Dry Needling could be considered when TMD associated muscle pain is related to trigger points (must be sufficiently trained to implement) (5)

Considerations for therapeutic exercise

- Perhaps the most widely known exercise routine for TMD is the Rocabado 6 x 6 program which utilizes six exercises six times per day (see table 1)
- The program has only been studied once for effectiveness and suggests the program adds no extra benefit to the rehabilitation process
- Kraus' temporomandibular joint exercises include those to inhibit excessive masticatory muscle activity, target both neuro-muscular control of mandibular movement, and address joint clicking, muscle asymmetry, deviations in active ROM patterns, and spasms that limit opening via isometrics (see table 2)

Patient education

- Patient education is a central component of TMD management and should include reducing parafunctional habits, addressing psychosocial factors, and providing pain science education
- Functional habits are generally limited to caloric intake, breathing, and yawning
- Parafunctional habits can include bruxism and lip biting
- The clinician should educate the patient with regard to food consistency, laterality of chewing (ie chewing on both sides if able to promote symmetry or unilaterally initially if chewing is too uncomfortable), symptom behavior, and pain variables
- Harder, drier foods require an increased number of chewing cycles and longer times in the mouth before swallowing
- Those with hypermobility may require education to avoid end range positions such as with yawning
- To avoid overstretching and irritating joint structures with yawning, the patient should be taught not to depress their mandible farther than the position that permits the tip of the tongue to maintain contact with the hard palate just posterior to the upper incisors
- Refrain from weight bearing through the joint (ie: resting the hand on the mandible if sitting at a desk)

Modalities

- Electrical stimulation has been recommended for the management of TMD
- Both interferential current and transcutaneous electrical nerve stimulation (TENS) have been shown to produce an analgesic effect in pain-free volunteers provoked by ischemic conditions
- In this study, stimulation was applied for 30 minutes, which may exceed dosage times commonly utilized in clinical settings
- The utilization of biofeedback has also been recommended for the management of TMD during which surface electrodes are typically placed over the masseter or anterior temporalis
- Iontophoresis with dexamethasone has been recommended for use in the management of TMD; however, evidence supporting this approach is mixed
- Studies have shown that iontophoresis can deliver dexamethasone between eight and 17 mm deep and that long duration (3 hours) application via low current is more effective than more traditional delivery by higher currents over 10-30 minutes
- There is an abundance of evidence suggesting little benefit from therapeutic ultrasound in managing TMD, and is not recommended by the authors who conducted the studies (10)



Multimodal approaches

- A series of studies demonstrated that over a minimum of five 30-minute sessions, multimodal management of TMD including soft tissue mobilization, muscle stretching, gentle isometric tension exercises against resistance, guided opening and closing, manual joint distraction, disc/condyle mobilization, postural corrections, and relaxation techniques are helpful in reducing symptoms associated with TMD (4)

Cervical spine management

- The clinician should take care to address any cervical spine range deficits, accessory movement restrictions, and altered muscle recruitment patterns



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Appendix



Figure 1 Distraction of the temporomandibular joint (TMJ); large arrow: distraction force placed through the ipsilateral lower molars and premolars with the first digit while the second and third digits provide a counterforce on the inferior aspect of the ipsilateral and contralateral mandibular bodies, respectively; medium arrow: posteriorly directed stabilization force applied through the ipsilateral aspect of the patient's forehead; small arrow: the examiner palpates the joint line to assess for movement of the mandibular condyle.



Figure 2 Anterior glide of the temporomandibular joint (TMJ); large arrow: anterior glide force with mild caudal bias placed through the mandible via gripping the ipsilateral lower molars and premolars with the first digit while the second and third digits provide a counterforce on the inferior aspect of the ipsilateral and contralateral mandibular bodies, respectively; medium arrow: posteriorly directed stabilization force applied through the ipsilateral aspect of the patient's forehead; small arrow: the examiner palpates the joint line to assess for movement of the mandibular condyle.





Figure 3 Medial/lateral glide of the temporomandibular joint (TMJ); large arrow: medial glide force placed through the mandibular condyle and/or mandibular ramus; small arrow: the contralateral hand provides a stabilizing force either through the contralateral zygomatic arch of the temporal bone and/or the contralateral mandibular condyle, depending on the patient's experience.



Figure 4 Caudal-anterior-medial (CAM) glide of the temporo- mandibular joint (TMJ); large arrow: combined caudal, anterior, and medial glide force placed through the mandibular condyle and/or mandibular ramus; small arrow: the contralateral hand provides a stabilizing force either through the contralateral zygomatic arch of the temporal bone and/or the contralateral mandibular condyle, depending on the patient's experience.



Figure 5 Caudal-anterior-medial (CAM) glide of the temporomandibular joint (TMJ) with pre-positioned mouth opening; large arrow: medial glide force placed through the mandibular condyle and/or mandibular ramus; small arrow: the contralateral hand provides a stabilizing force either through the contralateral zygomatic arch of the temporal bone and/or the contralateral mandibular condyle, depending on the patient's experience.



Figure 6 Self-mobilization of the temporomandibular joint (TMJ); large arrow: medial glide force placed through the mandibular condyle and/or mandibular ramus; small arrow: the contralateral hand provides a stabilizing force either through the contralateral zygomatic arch of the temporal bone and/or the contralateral mandibular condyle, depending on the patient's experience.



Figure 7 Self-mobilization of the temporomandibular joint (TMJ) with pre-positioned mouth opening; large arrow: medial glide force placed through the mandibular condyle and/or mandibular ramus; small arrow: the contralateral hand provides a stabilizing force either through the contralateral zygomatic arch of the temporal bone and/or the contralateral mandibular condyle, depending on the patient's experience



Figure 8 Soft tissue mobilization of the temporalis muscle utilizing one digit for contact and one hand for contralateral stabilization. Palpation of an MTrP or the general muscle belly by the tip of one digit (second digit shown) to apply soft tissue mobilization to the temporalis muscle. Switching between different digits can be helpful in prolonging technique application time before the onset of fatigue. Note that a contralateral hand provides a counterforce to stabilize the head and prevent inadvertent head motion. In this instance, the therapist begins at the anterior margin of the muscle and moves posteriorly while focusing on areas of the muscle that require treatment.





Figure 9 Bilateral soft tissue mobilization of the temporalis muscle utilizing reinforced digits for contact. Palpation of an MTrP or the general muscle belly by the tips of the second digits with reinforcement by the third digits to apply soft tissue mobilization to the temporalis muscles. Note that both hands provide simultaneous treatment and therefore serve as both the treating and stabilizing forces. In this instance, the therapist begins at the anterior margin of the muscles and moves posteriorly.

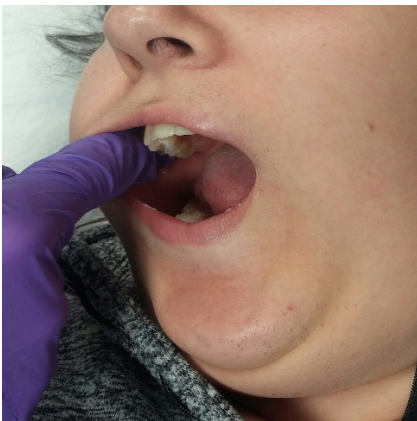


Figure 10 Soft tissue mobilization of the medial pterygoid muscle. Palpation of the muscle belly by the tip of the second digit to apply soft tissue mobilization to the medial pterygoid muscle. For treatment purposes, having the patient relax so that the mouth is not opened widely can be advantageous. The open mouth position is utilized here for visualization purposes.

Table 1 Rocabado's 6X6 exercise program

Name	Exercise description/purpose
Rest position of the tongue	The anterior 1/3 of the tongue is placed at the palate with mild pressure, which rests the tongue and jaw musculature and promotes diaphragmatic breathing
Control of TMJ rotation	The jaw is repeatedly opened and closed with the anterior 1/3 of the tongue on the palate, which decreases initiating jaw movements (e.g. protrusive movement in opening, talking, or chewing)
Rhythmic stabilization technique	Gentle isometrics in the resting position are performed for jaw opening, closing, and lateral deviation to promote muscular relaxation via reciprocal inhibition, which promotes an improved resting position of the jaw through proprioceptive input
Axial extension of the neck	Combined upper cervical flexion with lower cervical extension, allowing reduction of tension in the cervical musculature
Shoulder posture	Shoulder girdle retraction and depression to facilitate postural corrections
Stabilized head flexion	Upper cervical spine distraction via chin tuck (without additional cervical flexion), during which it is recommended that the fingers be laced behind the neck to stabilize C2-7 while the head nods



Table 2 Kraus' temporomandibular joint exercises

Name	Exercise description/purpose
Tongue position at rest	The patient is instructed to maintain a resting tongue position except during function, which involves the tip of the tongue sitting on the palate with the tip resting just posterior to the upper incisors
Teeth apart	The patient is educated that maintaining the teeth apart can be therapeutic, which facilitates the resting tongue position
Nasal-diaphragmatic breathing	The patient is instructed in nasal breathing to facilitate function of the diaphragm, which reinforces positioning of both the tongue and teeth
Tongue up and wiggle	Patients who brace but whose teeth do not touch or grind while doing so are instructed to routinely assume the resting position and gently oscillate the mandible side-to-side to interrupt the bracing contractions. If clicking or popping occurs, intensity is decreased
Strengthening	Resisted closing via self-manual resistance of lower incisors: 5–10-second contractions, 10 repetitions, 3–56/day
Touch and bite	Proprioceptive re-education: Lateral deviation – the patient touches the contralateral maxillary canine with the fingertip (with affected right lateral deviation touch left canine) and then bites the finger, which requires lateral deviation toward the finger. Protrusion – repeat with finger touching the outer surface of maxillary incisors.
Neuro-muscular control	When excessive anterior movement of the mandibular condyle is noted, instruct the patient to define end range opening by placing the tip of the <i>tongue</i> on the anterior palate while the <i>fingers</i> gently palpate the chin and mandibular condyle. Repeatedly open and close to that range. Progression: incrementally remove <i>feedback</i> .
Isometric exercises	Reciprocal click: isometrics are performed immediately before the closing click. Weakness or AROM deviations not believed to be from a structural anomaly: isometrics are performed in any position. Muscle inhibition to improve ROM: agonists or antagonists can be contracted gently.

