02.01.21 Temporomandibular Joint (TMJ) Dysfunction: Diagnosis and Treatments

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Related Policies:

- 02.01.14 Low Level Laser Therapy
- 02.01.82 High Intensity Laser Therapy
- 08.01.20 Manipulation under Anesthesia
- 07.01.85 Orthognathic Surgery*
- 02.01.32 Platelet-Rich Plasma and Autologous Protein Solution for Orthopedic Applications
- 02.01.18 Prolotherapy
- 06.01.16 Thermography and Temperature Gradient Studies

Summary

Description

Note: *Some group health plans may not have a temporomandibular joint (TMJ) benefit. Please refer to the member's benefit booklet for availability of benefits. Member's benefits may vary according to benefit design: therefore, member benefit language should be reviewed before applying the terms of this medical policy.*

For group health plans that offer benefits for temporomandibular joint (TMJ) as a covered benefit, the following criteria will be utilized to establish ***investigational and medical necessity*** *and determine whether the procedure(s)/treatments is/are eligible for reimbursement under the member's medical health insurance benefits.*

Temporomandibular joint disorder (TMJD) refers to a group of disorders characterized by pain in the temporomandibular joint and surrounding tissues. Initial conservative therapy is generally recommended; there are also a variety of nonsurgical and surgical treatment possibilities for individuals whose symptoms persist.

Summary of Evidence

For individuals with suspected temporomandibular joint disorder (TMJD) who receive ultrasound, surface electromyography, or joint vibration analysis, the evidence includes systematic reviews of diagnostic test studies. Relevant outcomes are test validity and other performance measures. None of the systematic reviews found that these diagnostic techniques accurately identified individuals with TMJD, and many of the studies had methodologic limitations. The evidence is insufficient to determine that the technology results in an improvement in the net health outcome.

For individuals with a confirmed diagnosis of TMJD who receive non-surgical treatments such as acupuncture, biofeedback, mechanical stretching devices, iontophoresis, orthodontic/neuromuscular orthodontics, percutaneous nerve stimulation, platelet concentrations, prolotherapy, transcutaneous electrical nerve stimulation (TENS) or ultrasound the evidence includes randomized controlled trials (RCTs), systematic reviews of these RCTs, and observational studies. Relevant outcomes are symptoms, functional outcomes, quality of life (QOL), and treatment-related morbidity. Systematic reviews evaluating acupuncture for TMJD have found inconsistent improvement in outcomes compared with sham or active controls. A 2023 meta-analysis of 22 RCTs failed to find improved pain or maximum mouth opening with acupuncture compared with active controls. Systematic reviews evaluating hyaluronic acid have found similar outcomes to corticosteroids or placebo. Platelet-rich plasma has been compared with hyaluronic acid in a number of systematic reviews and RCTs, but the studies are small and have methodologic limitations. The evidence is insufficient to determine that the technology results in an improvement in the net health outcome.

For individuals with a confirmed diagnosis of TMJD who receive arthrocentesis or arthroscopy, the evidence includes RCTs, systematic reviews of RCTs, and observational studies. Relevant outcomes are symptoms, functional outcomes, QOL, and treatment-related morbidity. One review, which included 3 RCTs, compared arthrocentesis or arthroscopy with nonsurgical interventions for TMJD. Pooled analyses of the RCTs found that arthrocentesis and arthroscopy resulted in superior pain reduction compared with control interventions. A network meta-analysis, which included 36 RCTs, revealed that arthroscopy and arthrocentesis improve pain control and maximum mouth opening. Two recent meta-analyses identified RCTs comparing arthrocentesis to various conservative management strategies. At 6 months, one analysis found improved maximum mouth opening with arthrocentesis while the other found similar outcomes between arthrocentesis and conservative treatments. Similarly, pain was improved with arthrocentesis in one analysis, but not the other. For individuals who receive arthrotomy (disc surgery, arthroplasty, joint replacement) which is considered the most invasive surgical technique used to treat TMJD, invasive surgical treatment should only be considered when all appropriate conservative treatment has failed, and minimally invasive surgery such as arthrocentesis or arthroscopy is not indicated. The

evidence is sufficient to determine that the technology results in an improvement in the net health outcome.

For individuals with a confirmed diagnosis of temporomandibular joint (TMJ) fracture or dislocation receiving manipulation under general anesthesia as a surgical treatment, the evidence includes a single uncontrolled study with limited follow-up (Foster et al 2000). No RCTs or systematic reviews were found. Relevant outcomes are symptoms, functional outcomes, QOL, and treatment-related morbidity. The evidence is insufficient to determine that the technology results in an improvement in the net health outcome. While there may be a paucity in the scientific evidence regarding manipulation under general anesthesia for the treatment for reduction of fracture or dislocation of the TMJ in certain carefully selected individuals this treatment is widely considered to be in accordance with generally accepted standards of medical practice in the United States and will be considered medically necessary when the criteria below are met, see Policy.

Additional Information

Not applicable.

OBJECTIVE

The objective of this evidence review is to evaluate whether diagnostic testing and therapeutic interventions improve the net health outcome for individuals with temporomandibular joint disorder (TMJD).

PRIOR APPROVAL

Not applicable.

POLICY

Note: *Some group health plans may not have a temporomandibular joint (TMJ) benefit. Please refer to the member's benefit booklet for availability of benefits. Member's benefits may vary according to benefit design: therefore, member benefit language should be reviewed before applying the terms of this medical policy.*

For group health plans that offer benefits for temporomandibular joint (TMJ) as a covered benefit, the following criteria will be utilized to establish ***investigational and medical necessity*** *and determine whether the procedure(s)/treatments is/are eligible for reimbursement under the member's medical health insurance benefits.*

Diagnostic Procedures

The following diagnostic procedures are considered **investigational** in the diagnosis of temporomandibular joint disorder (TMJD) because evidence is insufficient to determine that the technology results in an improvement in the net health outcome:

- Arthroscopy when performed for diagnostic purposes
- Electromyography (EMG) including surface electromyography (sEMG)
- Kinesiography
- Joint vibration analysis
- Muscle testing to include computerized mandibular scan (measures and records muscle activity related to movement and positioning of the mandible and is intended to detect deviations in occlusion and muscle spasms related to TMJD)
- Neuromuscular junction testing
- Range of motion measurements
- Standard dental radiographic procedures – use of flat plane films
- Somatosensory testing (quantitative sensory testing [QST])
- Thermography
- Ultrasound imaging/sonogram

Non-Surgical Treatments

The following non-surgical treatments are considered **investigational** for the treatment of TMJD because evidence is insufficient to determine that the technology results in an improvement in the net health outcome:

- Acupuncture
- Biofeedback
- Devices promoted to maintain joint range of motion and to develop muscles involved in jaw function to include but not limited to the following mechanical stretching devices:
    - TheraBiteJaw Motion Rehabilitation System
    - OraStretchJaw Motion Rehabilitation System
    - Dynasplint Trismus System
- Iontophoresis
- Orthodontic services/neuromuscular orthodontics
- Percutaneous electrical nerve stimulation
- Platelet concentrations
- Prolotherapy
- Transcutaneous electrical nerve stimulation (TENS)
- Ultrasound

Note: *For non-surgical treatment of temporomandibular joint disorder (TMJD) using Botox or Viscosupplementation refer to following pharmacy policies:*

- 05.01.02 Neuromuscular Blocking Agents
- 02.1.12 Viscosupplementation for Osteoarthritis

Surgical Treatments

The following surgical procedures listed below may be considered **medically necessary** for the treatment of TMJD when criteria A and B below are met:

- Arthrocentesis; **or**
- Arthroscopic surgery; **or**
- Open surgical procedures (arthrotomy) including the following when the temporomandibular joint disorder (TMJD) is the result of congenital anomalies, disease, or trauma:

- Arthroplasty
- Condylectomy
- Modified condylectomy
- Disc or meniscus plication
- Disc removal

Criteria A and B

A. Temporomandibular joint internal derangement or other structural joint disorder is documented as evidenced by **BOTH** of the following:

1. Completion of skeletal growth for individuals under age 18 with long bone x-ray or serial cephalometrics showing no change in facial bone relationships over the last 3- to 6- month period (***Note****: individuals aged 18 and older do not require this documentation*); **and**
2. Computed tomography (CT), magnetic resonance imaging (MRI), or x-ray of the temporomandibular joint document's joint pathology (for example, arthritis, bone cyst, fracture, meniscal abnormality, or tumors);

B. Temporomandibular joint pain is due to a maxillary or mandibular skeletal deformity **OR** the individual has a clinically significant functional impairment refractory to at least 6 months of non-surgical treatment that included at least **ONE** of the following:

1. Pharmacologic therapy (that is, analgesics, nonsteroidal anti-inflammatory drugs, muscle relaxants)
2. Physical therapy
3. Reversible, removable, intraoral appliances such as removable splints
4. Therapeutic injections.

The following surgical treatment may be considered **medically necessary** in the treatment of TMJD:

- Manipulation for reduction of fracture or dislocation of the temporomandibular joint (TMJ)

Surgical treatments for the management of temporomandibular joint disorder (TMJD) not meeting the above criteria and for all other indications are considered **investigational** because evidence is insufficient to determine that the technology results in an improvement in the net health outcome.

POLICY GUIDELINES

Coding

See the Codes table for details.

BACKGROUND

Diagnosis of Temporomandibular Joint Disorder

In the clinical setting, temporomandibular joint disorder (TMJD) is often a diagnosis of exclusion and involves physical examination, patient interview, and a review of dental records. Diagnostic testing and radiologic imaging are generally only recommended for individuals with severe and chronic symptoms. Diagnostic criteria for TMJD have been developed and validated for use in both clinical and research settings.

Symptoms attributed to TMJD vary and include, but are not limited to, clicking sounds in the jaw; headaches; closing or locking of the jaw due to muscle spasms (trismus) or displaced disc; pain in the ears, neck, arms, and spine; tinnitus; and bruxism (clenching or grinding of the teeth).

Treatment

For many individuals, symptoms of TMJD are short-term and self-limiting. Conservative treatments (e.g., eating soft foods, rest, heat, ice, avoiding extreme jaw movements) and anti-inflammatory medication are recommended before considering more invasive and/or permanent therapies (e.g., surgery).

Regulatory Status

Since 1981, several muscle-monitoring devices have been cleared for marketing by the U.S. Food and Drug Administration (FDA) through the 510(k) process. Some examples are the K6-I Diagnostic System (Myotronics), the BioEMG III™ (Bio-Research Associates), M-Scan™ (Bio-Research Associates), and the GrindCare Measure (Medotech A/S) (see Table 1). These devices aid clinicians in the analysis of joint sound, vibrations, and muscle contractions when diagnosing and evaluating TMJD. FDA product code: KZM.

Table 1. Muscle-Monitoring Devices Cleared by the U.S. Food and Drug Administration

Devices	Manufacturer	Date Cleared	Indication
K7X Evaluation System	Myotronics, Inc	Nov 2000	Electromyography
BioEMG IIITM	Bio-Research Associates, Inc	Feb 2009	Electromyography, Joint Vibration Recording
GrindCare Measure	Medotech A/S	Apr 2012	Electromyography, Nocturnal Bruxism
M-ScanTM	Bio-Research Associates	Jul 2013	Electromyography
TEETHAN 2.0	BTS S.P.A.	Dec 2016	Electromyography
GrindCare System	Sunstar Suisse S.A.	Sep 2017	Electromyography, Sleep Bruxism
Nox Sleep System	Nox Medical	Nov 2019	Electromyography, Sleep Bruxism

RATIONALE

This evidence review was created in October 1995 and has been updated regularly with searches of the PubMed database. The most recent literature update was performed through April 2026.

Evidence reviews assess the clinical evidence to determine whether the use of technology improves the net health outcome. Broadly defined, health outcomes are the length of life, quality of life, and ability to function, including benefits and harms. Every clinical condition has specific outcomes that are important to individuals and managing the course of that condition. Validated outcome measures are necessary to ascertain whether a condition improves or worsens; and whether the magnitude of that change is clinically significant. The net health outcome is a balance of benefits and harms.

To assess whether the evidence is sufficient to draw conclusions about the net health outcome of technology, 2 domains are examined: the relevance, and quality and credibility. To be relevant, studies must represent one or more intended clinical use of the technology in the intended population and compare an effective and appropriate alternative at a comparable intensity. For some conditions, the alternative will be supportive care or surveillance. The quality and credibility of the evidence depend on study design and conduct, minimizing bias and confounding that can generate incorrect findings. The randomized controlled trial (RCT) is preferred to assess efficacy; however, in some circumstances, nonrandomized studies may be adequate. RCTs are rarely large enough or long enough to capture less common adverse events and long-term effects. Other types of studies can be used for these purposes and to assess generalizability to broader clinical populations and settings of clinical practice.

For treatment of temporomandibular joint disorders (TMJD), literature searches have focused on studies comparing novel treatments with conservative interventions and/or placebo controls (rather than no-treatment control groups) and reporting pain reduction and/or functional outcome improvements (e.g., jaw movement).

Diagnosis of Temporomandibular Joint Disorder

Clinical Context and Test Purpose

TMJD (also known as temporomandibular joint syndrome) refers to a cluster of problems associated with the temporomandibular joint and musculoskeletal structures. The etiology of TMJD remains unclear and is believed to be multifactorial. TMJD is often divided into 2 main categories: articular disorders (e.g., ankylosis, congenital or developmental disorders, disc derangement disorders, fractures, inflammatory disorders, osteoarthritis, joint dislocation) and masticatory muscle disorders (e.g., myofascial pain, myofibrotic contracture, myospasm, neoplasia).

The purpose of specific diagnostic tests in individuals who have suspected TMJD is to provide an option that is an alternative to or an improvement on existing diagnostic approaches, such as a comprehensive history and physical exam and alternative diagnostic tests.

The following PICO was used to select literature to inform this review.

Populations

The relevant population of interest is individuals with suspected TMJD.

Interventions

The diagnostic tests being considered are the following:

- Arthroscopy when performed for diagnostic purposes
- Electromyography (EMG) including surface electromyography (sEMG)
- Kinesiography
- Joint vibration analysis
- Muscle testing
- Neuromuscular junction testing
- Range of motion measurements
- Standard dental radiographic procedures
- Somatosensory testing (quantitative sensory testing [QST])
- Thermography
- Ultrasound imaging/sonogram

Comparators

The following practice is currently being used to diagnose TMJD: a comprehensive history and physical exam and alternative diagnostic tests. Alternative diagnostic tests can include routine dental x-rays, panoramic radiographs, computed tomography, magnetic resonance imaging (MRI), and scintigraphy.

Outcomes

The general outcomes of interest are test validity and other test performance measures. The existing literature evaluating diagnostic tests for suspected TMJD has varying lengths of follow-up. At least 1 year of follow-up is considered necessary to demonstrate efficacy.

Study Selection Criteria

Methodologically credible studies were selected using the following principles:

- To assess efficacy outcomes, comparative controlled prospective trials were sought, with a preference for RCTs;
- In the absence of such trials, comparative observational studies were sought, with a preference for prospective studies.
- To assess long-term outcomes and adverse events, single-arm studies that capture longer periods of follow-up and/or larger populations were sought.
- Studies with duplicative or overlapping populations were excluded.

Clinically Valid

A test must detect the presence or absence of a condition, the risk of developing a condition in the future, or treatment response (beneficial or adverse).

Review of Evidence

Arthroscopy When Performed for Diagnostic Purposes

Arthroscopy of the temporomandibular joint (TMJ) is sometimes used as a diagnostic procedure for symptoms and signs as well as a therapeutic measure for TMJ dysfunction. Arthrography was widely used in the past but has been largely replaced by MR imaging.

Electromyography and Surface Electromyography

Electromyography (EMG) measures and analyzes the electrical activity in the muscles that move the jaw at rest and during function. In health muscles rest with low levels of electrical activity and function with high levels of balanced activity. Electrodiagnostic testing is commonly used to assist in diagnosing disorders involving the nerves, muscles, and neuromuscular junction. A review on surface electromyography by Klasser et al (2006) found a lack of literature on the accuracy of this method of diagnosis, compared with a criterion standard (i.e., comprehensive clinical examination and history-taking). Reviewers concluded there was insufficient evidence that electromyography can accurately distinguish people with facial pain from those without pain, but that the technique may be useful in a research setting.

Kinesiography

In a systematic review by Costantinides et. al. (2020) evaluating the accuracy and the diagnostic reliability of kinesiography and magnetic resonance imaging (MRI) in the diagnosis of temporomandibular disorders. A literature survey carried out through PubMed, SCOPUS, LILIACS, and the Cochrane Library from the inceptions to the last access on August 18, 2016, was performed to locate randomized clinical trials, controlled trials, prospective cohort studies, or retrospective studies (with or without a control group), that examined the diagnostic reliability of recording devices of mandibular movements in comparison to MRI. From the results, it was found that a significant correlation between these electronic devices and MR images could not be detected in case of disc displacement. The authors concluded the scientific evidence does not support the usefulness in clinical practice of the jaw-tracking devices to diagnose TMJ disorders because their diagnostic reliability is poor.

Joint Vibration Analysis

Sharma et al (2013) published a systematic review on joint vibration analysis for diagnosis of TMJDs. Reviewers identified 15 studies that evaluated the reliability and/or diagnostic accuracy of joint vibration analysis compared with a reference standard. Methodologic limitations were identified in all studies and included the absence of well-defined diagnostic criteria, use of a non-validated system for classifying disease progression, variability within studies in the reference standard used, and lack of blinding. In the 14 studies reporting on diagnostic accuracy, there was a wide range of reported values, with sensitivity ranging from 50% to 100% and specificity ranging from 59% to 100%.

Muscle Testing

TMJ is related to different muscles that have the function to move and protect the joint itself. The muscles that function to close the jaw are masseter, temporal, lateral or external pterygoid. The muscles that open the jaw are medial or internal pterygoid, geniohyoideus, mylohyoideus; digastric.

Muscle testing is the art of applying pressure to a muscle and looking for either a yes/no, or stress response. Although evaluation and treatment of patients using muscle testing have been investigated through randomized controlled trials (RCTs), prospective (cohort) studies, retrospective studies, single-subject case series and case reports many questions related to muscle testing remain unanswered. There is a lack of RCTs to substantiate or refute the clinical utility i.e., efficacy or effectiveness) of muscle testing.

Range of Motion Measurements

Range of motion (ROM) is the amount of motion available at the joint. ROM at temporomandibular joint is affected by osteoarthritis, dislocation of mandible, and derangement of articular disc. The type of motion available at a joint varies according to age, sex, and strength of joint. Temporomandibular joint dysfunction, a common disorder that affects more women than men, initially causes hypermobility of the joint but later may cause limitation of motion.

Determinates of range of motion for TMJ are the following:

- Shape of the Bone and cartilage
- Muscle power and tone
- Muscle bulk
- Ligaments and joint capsule laxity
- Extensibility of the skin and subcutaneous tissue
- Race
- Sex
- Age
- Genetic make up

Although ROM measurements are a routine part of the examination of individuals with TMJ disorders (Therabite Ruler), few studies have examined the validity of these measures for identifying pathology of the TMJ.

Standard Dental Radiographic Procedures

The use of standard dental radiography is of limited interest. The use of flat plane films for TMJ pathology is not sufficient, because the joint requires three-dimensional imaging views.

Somatosensory Testing (Quantitative Sensory Testing [QST])

Somatosensory testing (Quantitative Sensory Testing; QST) is a protocol to examine thermal and mechanical sensory function offering insight on potential mechanisms contributing to an individual's experience of pain, by assessing their perceived response to standardized delivery of stimuli and has been used in measurement of various aspects of TMJ related pain.

Somatosensory testing using quantitative sensory testing (QST) has been used primarily in the research setting and the current evidence is insufficient in determining the safety and efficacy of QST in the diagnosis of TMJ, further randomized clinical trials are needed to standardize QST protocols across pain conditions.

Ultrasound

Systematic Reviews

Almeida et al (2019) evaluated the diagnostic efficacy of ultrasound to assess TMJDs such as disc displacement (DD), joint effusion (JE), and condylar changes, with 3D imaging as the reference standard (Table 2). The authors identified 28 studies with a total of 2829 joints. Combined sensitivities of ultrasound for diagnosing DD, JE, and condylar changes all fell within the "acceptable" range as defined by the authors (see Table 3). "Excellent" combined specificity was reported for ultrasound to diagnose JE, but specificity for DD was in the "acceptable" range, and condylar changes specificity fell below acceptable. Heterogeneity across studies was high (I^2 range, 83.35 to 96.12), as were the ranges of sensitivity and specificity seen across studies. The variation in the sensitivity and specificity across the 3 pathologies could be related to the diagnostic parameters used to detect the TMJD, or it could be due to the different transducer frequencies used, probe design, examination methods, and skill of the sonographers and image readers. Considering the limitations and cost of MRI, the lower cost, accessibility, and non-invasive and non-ionizing radiation of ultrasound make it a good screening method, especially for DD and JE. Future studies should be conducted to determine if dynamic 3D ultrasound with high-resolution transducer increases the reliability of the examination.

Tables 2 and 3 summarize the results of the meta-analysis by Almeida et al (2019).

Table 2. Characteristics of Systematic Review and Meta-Analysis of Studies Assessing Ultrasound to Diagnose Temporomandibular Joint Disorder

Study	Dates	Trials	Participants	N (Range)	Design	Reference Standards
Almeida et al (2019)	1997-2016	28	Patients with suspected TMJ disc displacement, joint effusion, or condylar changes	1204 (3 to 100)	27 cohort; 1 case-control	MRI or CT imaging

CT: computed tomography; MRI: magnetic resonance imaging; TMJ: temporomandibular joint.

Table 3. Summary of Combined Sensitivity and Specificity of Ultrasound to Diagnose Temporomandibular Joint Disorder

Almeida et al (2019)	Combined Sensitivity[1]			Combined Specificity[2]		
TMJD	Percent	95% CI	Range, %	Percent	95% CI	Range, %
DD	79	70-87	22-95	85	76-91	17-97
JE	70	52-84	20-84	96	45-100	53-100
CC	73	50-88	15-94	72	63-80	20-100

CI: confidence interval; CC: condylar change; DD: disc displacement; JE: joint effusion.
[1] Acceptable sensitivity defined by authors as 70%-80%; excellent sensitivity as >80%.
[2] Acceptable specificity defined by authors as 80%-90%; excellent specificity as >90%.

A literature review by Manfredini et al (2009) included 20 studies evaluating ultrasound for diagnosing TMJDs; all studies evaluated DD, and several also considered osteoarthrosis and/or joint effusion.[5,] The reported sensitivity of ultrasound to detect DD, compared with the reference standard (MRI in most studies), ranged from 31% to 100%, and the specificity ranged from 30% to 100%. Reviewers stated that even when changes in ultrasound technology over time were taken into account, study findings were contradictory. The reviewers noted unexplained differences between studies conducted by the same group of researchers. Reviewers concluded that additional advances are needed to standardize the ultrasound assessment of TMJD before it can be considered an accurate diagnostic tool.

Clinically Useful

A test is clinically useful if the use of the results informs management decisions that improve the net health outcome of care. The net health outcome can be improved if patients receive correct therapy, or more effective therapy, or avoid unnecessary therapy, or avoid unnecessary testing.

Direct Evidence

Direct evidence of clinical utility is provided by studies that have compared health outcomes for patients managed with and without the test. Because these are intervention studies, the preferred evidence would be from RCTs.

Chain of Evidence

Indirect evidence on clinical utility rests on clinical validity. If the evidence is insufficient to demonstrate test performance, no inferences can be made about clinical utility.

Section Summary: Diagnosis of Temporomandibular Joint Disorder

Current evidence is insufficient or imprecise to support the use of the following to diagnose TMJD.

- Arthroscopy when performed for diagnostic purposes
- Electromyography (EMG) including surface electromyography (sEMG)
- Kinesiography
- Joint vibration analysis
- Muscle testing
- Neuromuscular junction testing
- Range of motion measurements
- Standard dental radiographic procedures
- Somatosensory testing (quantitative sensory testing [QST])
- Thermography Ultrasound imaging/sonogram

Nonsurgical Therapies for Temporomandibular Joint (TMJ) Disorder

Clinical Context and Therapy Purpose

The purpose of nonsurgical therapies in individuals with a confirmed diagnosis of TMJD is to provide a treatment option that is an alternative to or an improvement on existing therapies, such as alternative nonsurgical intervention.

The following PICO was used to select literature to inform this review.

Populations

The relevant population of interest is individuals with confirmed TMJD.

Interventions

The nonsurgical therapies being considered are:

- Acupuncture
- Biofeedback
- Devices promoted to maintain joint range of motion and to develop muscles involved in jaw function to include but not limited to the following mechanical stretching devices:
    - TheraBiteJaw Motion Rehabilitation System
    - OraStretchJaw Motion Rehabilitation System
    - Dynasplint Trismus System
- Iontophoresis
- Orthodontic services/Neuromuscular orthodontics
- Percutaneous electrical nerve stimulation
- Platelet concentrations
- Prolotherapy
- Transcutaneous electrical nerve stimulation (TENS)
- Ultrasound

Note: *For non-surgical treatment of temporomandibular joint disorder (TMJD) using Botox or Viscosupplementation refer to following Pharmacy Policies:*

- 05.01.02 Neuromuscular Blocking Agents
- 02.01.12 Viscosupplementation for Osteoarthritis

Comparators

The following therapy is currently being used to make decisions about the treatment of TMJD: alternative nonsurgical intervention, such as:

- Soft foods, applying heat or ice, and avoiding extreme jaw movements (e.g., wide yawning, gum chewing). Other conservative treatments may include:
- Pharmacological pain control: Nonsteroidal anti-inflammatory drugs (NSAIDs), opiates, muscle relaxants and low-dose antidepressants may be useful for symptom management.
- Physical therapy: A variety of modalities may be employed, including active or passive jaw movement, application of heat/ice and vapocoolant spray followed by gentle stretching.
- Mechanical stretching devices (see below information)
- Intra-oral appliances: The two most common intra-oral appliances are stabilization splints and anterior positioning appliances. Stabilization splints may be used to provide joint stabilization, reduction of pressure within the joint and relaxation of elevator muscles. These appliances should not create major alteration in occlusion since these changes may be irreversible and lead to other problems. Anterior positioning appliances, also called orthopedic repositioning appliances, are

used for acute joint pain, painful crepitus and symptoms associated with acute limitation of motion caused by an anteriorly displaced disc without reduction (closed lock).

Outcomes

The general outcomes of interest are symptoms, functional outcomes, QOL, and treatment-related morbidity.

The existing literature evaluating nonsurgical therapies as a treatment for confirmed TMJD has varying lengths of follow-up. At least 1-year of follow-up is considered necessary to demonstrate efficacy

Study Selection Criteria

Methodologically credible studies were selected using the following principles:

- To assess efficacy outcomes, comparative controlled prospective trials were sought, with a preference for RCTs;
- In the absence of such trials, comparative observational studies were sought, with a preference for prospective studies.
- To assess long-term outcomes and adverse events, single-arm studies that capture longer periods of follow-up and/or larger populations were sought.
- Studies with duplicative or overlapping populations were excluded.

Review of Evidence

Acupuncture

A systematic review and meta-analysis by June et al (2011) identified 7 sham-controlled randomized trials evaluating acupuncture for treating TMJD. The studies included a total of 141 patients. Sample sizes of individual studies ranged from 7 to 28 patients. Four studies used a single acupuncture session, and the other 3 used 6 to 12 sessions. All 7 studies reported a change in pain intensity as assessed by VAS. In 6 of the studies, pain intensity was measured immediately after treatment; the seventh measured pain after 16 weeks. A pooled analysis of findings from 5 studies (n=107 patients) found a statistically significant reduction in pain intensity, as measured by VAS. The pooled weighted mean difference (MD) in pain intensity was -13.63 (95% CI, -21.16 to -6.10; p<.001). A pooled subgroup analysis of 4 studies (n=89 patients) found acupuncture to be superior to a nonpenetrating sham acupuncture (weighted MD, -13.73; 95% CI, -21.78 to -5.67; p<.001). A pooled analysis of 2 studies (n=18 patients) did not find a significant difference in efficacy between acupuncture and a penetrating sham acupuncture (weighted MD, -12.95; 95% CI, -34.05 to 8.15; p=.23). The latter analysis might have been underpowered. Reviewers noted that previous studies had found that a 24.2-mm change in pain assessed by a 100-mm VAS represents a clinically significant difference and that only 2 of the selected studies had a change of 24.2 mm or more.

Liu et al (2021) conducted a systematic review and meta-analysis of 10 RCTs (N=670) that used warm needle acupuncture for the treatment of TMJD. In this analysis, acupuncture was more effective than several other treatments (including acupuncture alone, drug therapy, and ultrasonic therapy) in achieving an effective rate (relative risk [RR], 1.20; 95% CI, 1.06 to 1.35; p=.003; I^2=71%) and cure rate (RR, 1.82; 95% CI, 1.46 to 2.28; p<.00001; I^2=8%).

Park et al (2023) included 22 RCTs (N=471) in a meta-analysis evaluating acupuncture for adults with TMJD. The effective rate was improved with acupuncture (RR, 1.19; 95% CI, 1.12 to 1.27; p<.00001; I^2=66%) compared with active controls (e.g., physical therapy, pharmacologic therapy, splinting). However, pain (mean difference (MD), -0.41; 95% CI, -0.91 to 0.10; p=.12; I^2=40%) and maximum mouth opening (MD, 1.05; 95% CI, -2.36 to 4.46; p=.55; I^2 not assessed as information based on 1 trial) were not different between groups. The quality of evidence was low to very low.

Biofeedback

Systematic Reviews

List and Axelsson (2010) published a review of systematic reviews on treatments for TMJD published through August 2009. They identified 30 reviews; there were 23 qualitative systematic reviews and 7 meta-analyses. Eighteen of the systematic reviews included only RCTs, 3 included only case-control studies, and 9 included a mix of RCTs and case series. TMJDs were defined inconsistently in the primary studies and systematic reviews, and several reviews addressed the related diagnoses of bruxism, disc replacements, and myofascial pain. Twenty-nine of the systematic reviews had pain intensity or pain reduction as the primary outcome measure, and 25 reported clinical outcome measures such as jaw movement or jaw tenderness on palpation. Reviewers divided the treatments into 5 categories (some studies were included in >1 category). These categories and the main findings are listed in Table 4.

Table 4. Categories of Treatment

Categories	No. of Articles	Findings
Occlusal appliances, occlusal adjustment, and orthodontic treatment	10	Six systematic reviews did not find significant benefit versus other treatments, 4 found no benefit versus a placebo device, and 3 found occlusal therapy was better than no treatment.
Physical treatments including acupuncture, TENS, exercise, and mobilization	8	Four reviews found no significant benefit of acupuncture over other treatments, 1 found no difference between acupuncture and placebo treatment, and 3 found acupuncture was better than no treatment. One review found active exercise and postural training were effective for treating TMJD-related pain.
Pharmacologic treatment	7	Treatments found to be superior to placebo were analgesics (2 reviews), clonazepam or diazepam (3 reviews), antidepressants (4 reviews), and hyaluronate (1 review). One review found effects of hyaluronate and corticosteroids to be similar.
Maxillofacial surgery	4	Three reviews evaluated surgery for patients with DD and 1 addressed orthognathic surgery in patients with TMJD. Reviews of surgical treatments generally included lower-level evidence (e.g., case series), and did not always compare surgery with a control condition. One review of patients with DD with reduction reported similar treatment effects for arthrocentesis, arthroscopy, and discectomy, and another review in patients in DD without reduction found similar effects of arthrocentesis, arthroscopy, and physical therapy (used as a control intervention). Due to the lack of high-quality controlled studies, conclusions could not be drawn about intervention equivalence.
Behavioral therapy and multimodal treatments	6	Two reviews found biofeedback to be better than active control or no treatment, 1 review found a combination of biofeedback and CBT to be better than no treatment, and 2 found a combination of biofeedback and relaxation to be better than no treatment. One review found the effects of biofeedback and relaxation to be similar.

Adapted from List and Axelsson (2010).
CBT: cognitive-behavioral therapy; DD: disc displacement; TENS: transcutaneous electrical nerve stimulation; TMJD: temporomandibular joint disorders.

Overall, reviewers concluded there was insufficient evidence that electrophysical modalities and surgery would be effective for treating TMJD. They found some evidence that occlusal appliances, acupuncture, behavioral therapy, jaw exercises, postural training, and some medications could be effective at reducing pain for patients with TMJDs. However, reviewers noted that most of the systematic reviews examined included primary studies with considerable variation in methodologic quality and, thus, it was not possible to draw definitive conclusions about the effectiveness of any of the treatments.

Yao et al (2023) published a systematic review and network meta-analysis of therapies for TMJD-associated chronic pain. A total of 153 trials (N=8713) evaluating 59 interventions (or combinations of interventions) were included. Three interventions were considered to be most effective for pain relief based on moderate certainty evidence: manual trigger point therapy, cognitive behavioral therapy with biofeedback or relaxation, and therapist-assisted jaw mobilization. Four interventions were considered to probably improve physical function: supervised jaw exercises/stretching, manipulation, acupuncture, and supervised jaw exercise/mobilization. The certainty of evidence for orthotics and all included pharmacologic treatments was considered low to very low. This network meta-analysis served as the evidence base for 2023 clinical practice guidelines.

Iontophoresis

Iontophoresis is a non-invasive method of using electrical current to deliver medication through the skin to relieve inflammation and pain (dexamethasone iontophoresis [DIP]) and has been investigated in the treatment of TMJD. There is limited evidence on the use of iontophoresis in the treatment of TMJD which may be used as part of physical therapy modality. The majority of the information found are review articles/opinion pieces. There were two small RCTs Shiffman et al 1996 and Reid et al 1994 which did not find that iontophoresis was more effective than placebo. Further RCTs are needed with long-term following up to determine the safety and efficacy of this therapy in the treatment of TMJD.

Mechanical Stretching Devices

Lee et al (2018) conducted a randomized, open-label, controlled, three-center feasibility study to compare the efficacy of the Therabite® jaw motion rehabilitation system (Atos Medical) with that of wooden spatulas to relieve and prevent trismus in patients who have had radiotherapy for stage three and four oral and oropharyngeal cancer. Secondary aims were to assess the feasibility and the impact of exercise on health-related quality of life (QoL), and the use of health services after treatment. This study was to compare the effectiveness and cost of the Therabite® and wooden spatulas. The authors studied compliance with exercises and health related QoL, assessed cost using three health economics measures, and conducted semi-structured interviews with patients. Patients were randomized into two groups: the Therabite® group (n=37) and the wooden spatula group (n=34). All patients had some sense of jaw tightening before the study started. Mean mouth opening after six months increased in both groups, but the difference between the groups was not significant (p=0.39). Completion rates for the three economic measures were good. The authors concluded there was no significant difference between the two groups in frequency of contact with care services or in QoL. Exercises during and after radiotherapy can ameliorate trismus in patients with stage three and four oral and oropharyngeal cancers, but differences between groups in efficacy, compliance, QoL, or use of hospital or community health services, were not significant. Furthermore, the findings from this specific population may not apply to all patients with TMJD.

Zatarain et al. (2018) conducted a study to assess the feasibility of incorporating the use of the Jaw Dynasplint into a standard program of self-care for the prevention of trismus in head and neck cancer patients undergoing primary or adjuvant radiation. Study participants (n = 40) were randomized using a

permuted block design to conventional stretching or stretching plus use of the Jaw Dynasplint 3 times per day for 30 minutes. Patients were instructed to record maximum interincisal opening each day as well as logging use of the Jaw Dynasplint. The results showed 6 months after initiation of the preventative regimen, 50% of patients in the Dynasplint arm and 75% in the conventional stretching arm remained on their assigned therapy. Trismus was diagnosed in 2 patients in the control arm and in 4 patients in the Dynasplint arm. Only 25% (95% confidence interval = 11.1, 46.9) of patients in the Dynasplint arm used the device as prescribed. The authors concluded that the addition of the Jaw Dynasplint therapy decreased compliance compared with conventional stretching, and it is unlikely that the regimen will prove efficacious as a preventative measure due to low compliance.

Kraaijenga et al. (2014) conducted a randomized controlled clinical trial (RCT) to compare the application of the TheraBite® (TB) Jaw Motion Rehabilitation System with a standard physical therapy (PT) exercise regimen for the treatment of myogenic temporomandibular disorder (TMD). Patients with myogenic TMD were randomized for the use of the TB device or for standard PT. Mandibular function was assessed with the mandibular function impairment questionnaire (MFIQ). Pain was evaluated using a visual analog scale, and maximum inter-incisor (mouth) opening (MIO) was measured using the disposable TB range of motion scale. Of the 96 patients randomized (46 TB, 50 standard PT exercises), 38 actually started with the TB device and 41 with the standard PT exercises. After six-week follow-up, patients using the TB device reported a significantly greater functional improvement (MFIQ score) than the patients receiving regular PT exercises. At 6 weeks, no significant differences in pain, and active or passive MIO were found between the two groups. At 3 months, patients in both treatment groups did equally well, and showed a significant improvement in all parameters assessed. The authors concluded that this RCT on myogenic TMD treatment, comparing standard PT with passive jaw mobilization using the TheraBite® Jaw Motion Rehabilitation System®, shows that both treatment modalities are equally effective in relieving myogenic TMD symptoms, but that the use of the TB device has the benefit of achieving a significantly greater functional improvement within the first week of treatment. Further research with randomized controlled trials is needed to validate these findings.

Orthodontic Services/Neuromuscular Orthodontics

See Biofeedback above for evidence review regarding orthodontic services. There is no reliable evidence available for orthodontic services for the treatment of TMJD.

Platelet Concentrations

Hyaluronic Acid versus Platelet-Rich Plasma

Systematic Reviews

Tsai et al (2025) conducted a meta-analysis comparing platelet-rich plasma for treatment of TMJD to other treatment options, including HA, arthrocentesis, and corticosteroids. Thirty-one prospective controlled trials (N=1359) were included in analysis. Compared to arthrocentesis, platelet-rich plasma significantly reduced pain at 6 months (MD, -1.56; 95% CI, -2.68 to -0.44) and improved mandibular movement at 3 months (MD, 2.16; 95% CI, 0.30 to 4.02) and 6 months (MD, 2.56; 95% CI, 0.76 to 4.35). Compared to HA, platelet-rich plasma significantly reduced pain at 3 months (MD, -2.18; 95% CI, -3.70 to -0.66) and improved mandibular movement at 6 months (MD, 3.67; 95% CI, 1.26 to 6.07). Compared to corticosteroids, platelet-rich plasma reduced pain at 1 month (MD, -0.41; 95% CI, -0.81 to -0.02), 3 months (MD, -2.18; 95% CI, -3.70 to -0.66), and 6 months (MD, -1.25; 95% CI, -1.52 to -0.97), and improved mandibular movement at 6 months (MD, 1.46; 95% CI, 0.27 to 2.64).

Li et al (2023) conducted a systematic review and meta-analysis comparing platelet-rich plasma with adjunctive HA as in arthrocentesis. The analysis of 7 RCTs (N=243) failed to find differences between groups in maximum mouth opening at 1 month (mean difference (MD), 0.21; 95% CI, -1.29 to 1.70), 3 months (MD, 0.92; 95% CI, -2.96 to 4.80), or 6 months (MD, -0.05; 95% CI, -2.08 to 1.97). Pain scores were similar between groups through 6 months (MD, 0.06; 95% CI, -0.92 to 1.04). The analysis is limited by high heterogeneity (I^2≥81%), small sample sizes of the individual trials, and lack of placebo comparator.

Xu et al (2023) conducted a network meta-analysis of 12 RCTs comparing HA, platelet-rich plasma, and platelet-rich fibrin with or without arthrocentesis in patients (N=421) with TMJD. Platelet-rich plasma was determined to be the most effective agent for pain through 6 months; however, it was only significantly better than placebo (mean difference (MD), -1.17; 95% CI, -1.82 to -0.51) and no other active treatments. For the outcome of maximum mouth opening, platelet-rich fibrin was significantly better than platelet-rich plasma (MD, -11.01; 95% CI, -16.17 to -5.86), HA (MD, 8.72; 95% CI, 3.64 to 13.80), and placebo (MD, 11.12; 95% CI, 6.45 to 15.79) at 6 months. Although there was low risk of bias, limitations of the analysis included inconsistency and imprecision.

Al-Hamed et al (2021) compared platelet concentrates with HA or saline/Ringer's solution for treating patients with temporomandibular osteoarthritis in a systematic review and meta-analysis of 9 RCTs (N=407). Compared with HA, platelet concentrates decreased pain VAS scores by -1.11 (95% CI, -1.62 to -0.60; p<.0001) at 3 months and by -0.57 (95% CI, -1.55 to 0.41; p=.26) at 12 months. Compared with saline, platelet concentrates decreased pain VAS scores by -1.33 (95% CI, -2.61 to -0.06; p=.04) at 3 months and -2.71 (95% CI, -4.69 to -0.72; p=.008) at 12 months. For maximum mouth opening, platelet concentrates had similar outcomes compared with HA and improved outcomes compared with saline at 3 months (2.9 mm; 95% CI,1.47 to 4.3; p<.0001) and 6 months (1.69 mm; 95% CI, 0.13 to 3.25; p=.03).

Randomized Controlled Trials

Liu et al (2023) randomized 70 patients with temporomandibular joint osteoarthritis to HA or platelet-rich plasma at a single center in China. The HA group received 2 treatments given 2 weeks apart while the platelet-rich plasma group received a single injection. Numerous VAS scores including maximum VAS, mean VAS, sleeping VAS, and opening VAS were compared between groups; however, the only significant difference between groups was greater improvement on VAS opening at 1 month with platelet-rich plasma (VAS improvement, 2.42 vs 1.00; p=.037). Maximum mouth opening was greater with platelet-rich plasma at 1 month (4.39 vs 1.28; p=.005), 3 months (7.03 vs 2.38; p=.004), and 6 months (9.12 vs 3.72; p=.002). The study is limited by lack of blinding of the patient and treatment administrator.

Dasukil et al (2022) conducted a double-blind RCT in 90 patients undergoing arthrocentesis for temporomandibular osteoarthritis. Patients were randomized to 2 doses of platelet-rich plasma, HA alone, or control upon completion of arthrocentesis. The groups had similar VAS scores with the exception of platelet-rich plasma recipients having significantly improved pain at 6 months vs control (1.7 vs 3.3; p<.001). Mouth opening was significantly improved with platelet-rich plasma at all timepoints compared with control. Hyaluronic acid significantly improved mouth opening at 6 months compared with control. No significant differences between HA and platelet-rich plasma were found.

In their randomized trial, Gokçe Kuyuk et al (2019) compared platelet-rich plasma, HA, and intra-articular corticosteroids to treat patients with temporomandibular joint pain and those diagnosed with temporomandibular osteoarthritis. Patients were evaluated in 2 groups: those who felt pain on lateral palpation (n=31) and those who felt pain on posterior palpation (n=43). The patients were then randomized to receive either platelet-rich plasma, HA, or corticosteroids. Temporomandibular joint pain

(using a 5-point VAS), the presence of crepitation, loss of function, and loss of strength were assessed before treatment and monthly for 3 months following treatment. For patients who had lateral temporomandibular joint pain, statistically significant VAS score changes were seen in the platelet-rich plasma and HA groups (p<.0028 for both groups). In terms of crepitation, function, and strength, some changes were observed in the platelet-rich plasma, HA, and corticosteroids groups, but they were not statistically significant (p>.0028). For patients with posterior temporomandibular joint pain, the VAS scores showed significant improvements for platelet-rich plasma, HA, and corticosteroids (p<.0028 for all groups). Some improvements were found in crepitation, function, and strength, but they were not significant. Overall, all 3 treatments significantly improved palpation pain, but the greatest improvement was with platelet-rich plasma.

Hyaluronic Acid plus Platelet-rich Plasma

Hegab et al (2023) conducted a single center, single-blind RCT in 90 patients undergoing arthrocentesis for temporomandibular osteoarthritis. Patients were randomized to platelet-rich plasma alone, HA alone, or the combination of HA and platelet-rich plasma upon completion of arthrocentesis. Combination treatment generally had significantly greater maximum mouth opening than single-agent treatment throughout 12 months postoperative with the exception of similar outcomes between platelet-rich plasma and combination at 12 months (41.4 mm vs 41.9 mm). Significantly lower VAS scores were found in patients treated with combination treatment than either single agent therapy. VAS scores were lower with HA than platelet-rich plasma at 1, 3, and 6 months, but at 12 months, platelet-rich plasma resulted in lower VAS versus HA. The small sample size, lack of blinding, and lack of placebo group are notable limitations of this study.

Prolotherapy

Systematic Reviews

Sit et al (2021) conducted a systematic review and meta-analysis of 5 RCTs that compared the efficacy of hypertonic dextrose prolotherapy injections to placebo in patients with TMJD. The primary outcome, pain intensity as measured by VAS, was improved with dextrose prolotherapy compared to placebo at 12 weeks (3 studies, n=89; SMD, -0.76; 95% CI, -1.19 to -0.32; I^2=0%). No differences were seen between treatments in maximum mouth opening or temporomandibular joint dysfunction.

Randomized Controlled Trials

Haggag et al (2022) conducted an RCT comparing the efficacy of 25% dextrose prolotherapy injections to saline solution injections in 30 patients with bilateral disc displacement (N=60 joints) due to TMJD. Outcomes measured included pain intensity (measured by VAS), maximum mouth opening, and joint sounds. Patients were evaluated at 1 week after each injection, and 3 months and 6 months after the last injection. The average number of dextrose injections per session for each patient was 3.4. Patients who received dextrose injections had significantly lower pain at 1 week after the fourth injection (p=.015), 3 months after the last injection (p<.001), and 6 months after the last injection (p<.001) compared to those who received saline injections. Additionally, maximum mouth opening was significantly greater in those who received dextrose injections at 1 week post each injection (post-injection 1 p=.002; post-injection 2 p=.001; post-injection 3 p=.005; post-injection 4 p=.041), 3 months after the last injection (p<.001), and 6 months after the last injection (p<.001) compared to those in the saline group. There was no significant difference in joint sounds at any time point between groups. Patients in the dextrose group reported higher satisfaction scores at 6 months compared to patients receiving saline injections (p<.001).

Transcutaneous electrical nerve stimulation (TENS)

Randomized Controlled Trial

A randomized placebo-controlled trial by Ferreira et al (2017) evaluated TENS in the treatment of individuals with temporomandibular disorder; 40 patients (30 female, 10 male) were randomized into 2 groups (placebo or active TENS). The trial used both high- and low-frequency TENS, allotting to the active TENS patients 25 minutes of 4 Hz followed by 25 minutes of 100 Hz; measuring pain intensity and pressure pain threshold immediately after treatment and again 48 hours later. When compared with baseline values, pain intensity was reduced for patients in the active TENS group, and pressure pain threshold was significantly increased ($p<.05$). For those in the placebo group, there were no significant improvements for either primary outcome. Limitations of the trial included the short duration of the assessment, and the absence of control groups either receiving no treatment or evaluating the same treatment in patients without the temporomandibular disorder.

Ultrasound

Ultrasound therapy has been studied and utilized in the treatment of TMJD to relieve pain and improve function of the temporomandibular joint. This therapy may be utilized during physical therapy modality to include home use. While review of the peer reviewed medical literature may show some promise, there are limitations in the evidence to include limited number of participants, patients were also not stratified for treatments at different doses and were not followed for more than 6 months. RCTs are needed to include larger numbers of participants, standardized treatment protocols and longer follow-up to determine the safety and efficacy of this therapy for TMJD.

Section Summary: Nonsurgical Treatments

The evidence on acupuncture is limited by the small number of studies, small sample sizes, and in most studies, efficacy assessment only immediately posttreatment. The evidence on the use of HA to treat TMJD is inconclusive, given the methodologic issues with the systematic reviews and RCTs conducted (e.g., small sample sizes) and better surgical options. Limited evidence suggests that platelet concentrates and dextrose prolotherapy may improve TMJD pain. No reliable evidence is available for biofeedback TENS, or orthodontic services for TMJD.

Surgical Techniques

Clinical Context and Therapy Purpose

The purpose of surgical techniques in individuals with a confirmed diagnosis of TMJD is to provide a treatment option that is an alternative to or an improvement on existing therapies, such as nonsurgical intervention.

The following PICO was used to select literature to inform this review.

Populations

The relevant population of interest is individuals with confirmed TMJD.

Interventions

The surgical therapies being considered are:

- Arthrocentesis
- Arthroscopic surgery
- Manipulation for reduction of fracture or dislocation of the temporomandibular joint (TMJ)
- Open surgical procedures (arthrotomy) including the following when the temporomandibular joint (TMJ) disorder is the result of congenital anomalies, disease, or trauma:
    - Arthroplasty
    - Condylectomy
    - Modified condylectomy
    - Disc or meniscus plication
    - Disc removal

Comparators

The following therapies are currently being used to make decisions about treatment of TMJD: alternative nonsurgical intervention, such as:

- Pharmacological pain control: Nonsteroidal anti-inflammatory drugs (NSAIDs), opiates, muscle relaxants and low-dose antidepressants may be useful for symptom management.
- Physical therapy: A variety of modalities may be employed, including active or passive jaw movement, application of heat/ice and vapocoolant spray followed by gentle stretching.
- Mechanical stretching devices (see below information)
- Intra-oral appliances: The two most common intra-oral appliances are stabilization splints and anterior positioning appliances. Stabilization splints may be used to provide joint stabilization, reduction of pressure within the joint and relaxation of elevator muscles. These appliances should not create major alteration in occlusion since these changes may be irreversible and lead to other problems. Anterior positioning appliances, also called orthopedic repositioning appliances, are used for acute joint pain, painful crepitus and symptoms associated with acute limitation of motion caused by an anteriorly displaced disc without reduction (closed lock).

Outcomes

The general outcomes of interest are symptoms, functional outcomes, QOL, and treatment-related morbidity.

The existing literature evaluating surgical procedures as a treatment for confirmed TMJD has varying lengths of follow-up of up to 6-months. While the systematic reviews described below all reported at least 1 outcome of interest, longer follow-up was necessary to fully observe outcomes. Therefore, at least 6-months of follow-up is considered necessary to demonstrate efficacy.

Study Selection Criteria

Methodologically credible studies were selected using the following principles:

- To assess efficacy outcomes, comparative controlled prospective trials were sought, with a preference for RCTs;

- In the absence of such trials, comparative observational studies were sought, with a preference for prospective studies.
- To assess long-term outcomes and adverse events, single-arm studies that capture longer periods of follow-up and/or larger populations were sought.
- Studies with duplicative or overlapping populations were excluded.

Review of Evidence

Arthrocentesis and Arthroscopy

Systematic Reviews

In a systematic review, Vos et al (2013) identified 3 RCTs (N=222 patients) that compared the efficacy of lavage of the temporomandibular joint (i.e., arthrocentesis or arthroscopy) with nonsurgical temporomandibular joint treatment. Although reviewers assessed the quality of the studies to be adequate, only one stated that allocation to treatment group was concealed; 2 did not explicitly state use of an intention-to-treat analysis. The 2 primary outcomes considered were change in pain and maximal mouth opening at 6 months compared to baseline. The pain was measured by VAS. Pooled analysis of data from the 3 trials found a statistically significant reduction in pain at 6 months with surgery plus lavage versus nonsurgical therapy (SMD, -1.07; 95% CI, -1.38 to -0.76). There was no statistically significant difference in the efficacy between the 2 treatments for the other outcome variable, maximal mouth opening (SMD, 0.05; 95% CI, -0.33 to 0.23).

In a network meta-analysis, Al-Moraissi et al (2020) compared different treatment options (placebo/control; muscle exercises and occlusal splint therapy; splint therapy alone; intraarticular injection of HA or corticosteroid; arthrocentesis with or without HA, corticosteroid, and platelet-rich plasma; arthroscopy with or without HA and platelet-rich plasma; open joint surgery; physiotherapy) for arthrogenous TMJD in 36 RCTs for reducing pain and 33 RCTs for improving maximum mouth opening. For short-term follow up of at most 5 months, injections of HA (SMD, -2.8; 95% CI, -3.7 to -1.8) and corticosteroids (SMD, -2.11; 95% CI, -2.9 to -1.2) achieved greater pain control compared with placebo/control. For follow up of at least 6 months and longer, arthroscopy with platelet-rich plasma (SMD, -3.5, 95% CI, -6.2 to -0.82), arthrocentesis with platelet-rich plasma (SMD, -3.08; 95% CI, -5.44 to -0.71), arthroscopy with HA (SMD, -3.01; 95% CI, -5.8 to -0.12), temporomandibular joint surgery (SMD, -3; 95% CI, -5.7 to -0.28), injection with HA (SMD, -2.9; 95% CI, -4.9 to -1.09), arthroscopy-alone (SMD, -2.6; 95% CI, -5.1 to -0.07) and arthrocentesis with HA (SMD, -2.3; 95% CI, -4.5 to -0.18) significantly improved pain compared with placebo/control. For improving maximum mouth opening, various arthroscopy procedures (with and without platelet-rich plasma and HA injections) followed by arthrocentesis with platelet-rich plasma or HA were the most efficacious treatment approaches. Treatments such as occlusal splint therapy, physical therapy, muscle exercises with occlusal splint therapy, and placebo/control yielded the lower quality outcomes for reducing pain and improving maximum mouth opening. Most of the evidence included in the network meta-analysis was rated as low-quality or very low-quality, except the evidence for arthrocentesis with HA injections was of moderate quality.

Hu et al (2022) conducted meta-analyses to compare arthrocentesis to conservative therapies such as analgesic, splints, or lifestyle modifications in individuals with TMJD. Seven RCTs and 1 quasi-RCT were included. Analyses demonstrated that at 1 month and 6 months, but not at 3 months, arthrocentesis used as a first line treatment significantly reduced pain scores in individuals compared to conservative therapies. They found no difference in maximal mouth opening between arthrocentesis and conservative therapy groups at 1 month, 3 months, or 6 months.

Thorpe et al (2023) compared arthrocentesis to conservative treatment in a meta-analysis of RCTs.[50,] A total of 7 RCTs (N=448) evaluated pain (VAS) and maximum mouth opening at 6 months. Conservative management was variable among the trials, but the majority (n=6) included occlusal splints as part of the conservative treatment plan. Maximum mouth opening was improved with arthrocentesis, but pain scores were not significantly different between groups. Significant heterogeneity was found among the studies resulting in wide confidence intervals. Differences in conservative treatments may have contributed to this finding. Irrigation solutions and volumes of these solutions also contributed to variability in the arthrocentesis procedures among the RCTs.

Tables 5 and 6 include descriptive information on these reported systematic reviews and Table 7 reports results for each.

Table 5. Comparison of Studies Included in Systematic Reviews & Meta Analysis on Surgical Techniques

Study	Vos et al (2013)	Al-Moraissi et al (2020)	Hu et al (2023)	Thorpe et al (2023)
Stegenga et al (1993)	●			
Fridrich et al (1996)		●		
Goudot et al (2000)		●		
Carmeli et al (2001)		●		
Holmlund (2001)		●		
Minakuchi et al (2001)		●		
Shi et al (2002)		●		
Venancio et al (2005)		●		
Bjørnland et al (2007)		●		
Ismail (2007)		●		
Politi et al (2007)		●		
Schiffman et al (2007)	●	●		
Diraçoglu et al (2009)	●		●	●
Haketa et al (2010)		●		
Antônio et al (2012)		●		
Craane et al (2012)		●		
Huddleston Slater et al (2012)		●		
Manfredini et al (2012)		●		
Sahlström et al (2013)			●	
de Carli et al (2013)		●		
Vos et al (2014)			●	●
Gencer et al (2014)		●		
Tabrizi et al (2014)		●		
Cömert Kiliç et al (2015)		●		

Study	Vos et al (2013)	Al-Moraissi et al (2020)	Hu et al (2023)	Thorpe et al (2023)
Hanc el at (2015)		●		
Hegab et al (2015)		●		
Cömert Kiliç (2016)		●		
Fernández Sanromán et al (2016)		●		
Korkmaz et al (2016)		●		
Patel and Idrees (2016)		●		
Bouloux et al (2017)		●		
Fernández-Ferro et al (2017)		●		
Gorrela et al (2017)		●		
Gurung et al (2017)		●		
Ozdamar et al (2017)		●		
Tatli et al (2017)		●	●	●
Hosgor et al (2017)			●	●
Yapici-Yavuz et al (2018)		●		
Isacsson et al (2019)		●		
Bergstrand et al (2019)		●		
Ohrnell Malekzadeh et al (2019)		●	●	●
Abbasgholizadeh et al (2020)				●
Altaweel et al (2021)			●	
Ritto et al (2022)			●	●

Table 6. Systematic Reviews & Meta Analyses on Surgical Techniques Characteristics

Study	Dates	Trials	Trial/Patient inclusion	N (Range)	Design	Duration
Vos et al (2013)	1993-2009	3	Trials comparing lavage to nonsurgical therapy for the treatment of TMJ arthropathy were included	222 (21 to 120)	RCTs	6 month follow-up
Al-Moraissi et al (2020)	1996-2019	36	Adults with arthrogenous TMJDs based on institution protocol or clear diagnosis including signs and symptoms of TMJD involved in studies comparing 2 or more of the following treatments were included: (1) conservative (splint, exercise, and self-care), (2) physical therapy (manual, low-laser), (3) HA, (4) corticosteroid, (5) arthrocentesis, (6) arthrocentesis plus HA, (7) arthroscopy, (8) arthrocentesis plus growth factors, (9) arthrocentesis plus corticosteroids, (10) arthroscopy with growth factor, (11) arthroscopy with HA, (12) open joint surgery, (13) control	NR	RCTs	1 week to 4 years
Hu et al (2023)	2009-2022	8	Patients with any TMJD in studies comparing arthrocentesis to conservative, non-invasive therapy (ie, analgesics, splints, exercises, diet modifications)	395 (20 to 110)	RCTs and 1 quasi-RCT	up to 12 months

Study	Dates	Trials	Trial/Patient inclusion	N (Range)	Design	Duration
Thorpe et al (2023)	Through May 2022	7	Patients with any TMJD in studies comparing arthrocentesis to conservative therapy	448 (24 to 120)	RCTs	6 month follow-up

HA: hyaluronic acid; NR: not reported; RCT: randomized controlled trial; TMJD: temporomandibular joint disorders; TMJ: temporomandibular joint

Table 7. Systematic Reviews & Meta Analyses on Surgical Technique Results

Study	Change in pain from baseline	Maximal mouth opening
Vos et al (2013)		
Total N	222	222
Pooled SMD (95% CI)	-1.07 (-1.38 to -0.76)	0.05 (-0.33 to 0.23)
I^2 (p)	0.0%	0.0%
Al-Moraissi et al (2020)		
Total N	36 studies	33 trials
Short-term (≤5 months) vs control/placebo		
Arthroscopy alone, pooled SMD (95% CI)	NS	1.70 (0.50 to 2.91)
Arthroscopy with growth factor, pooled SMD (95% CI)	NS	2.62 (0.87 to 4.36)
Arthroscopy with HA, pooled SMD (95% CI)	NS	2.31 (0.81 to 3.82)
Intermediate-term (≥6 months) vs control/placebo		
Arthroscopy with growth factor, pooled SMD (95% CI)	-3.5 (-6.2 to -0.82)	3.22 (1.72 to 4.72)
Arthrocentesis with growth factor, pooled SMD (95% CI)	-3.08 (-5.44 to -0.71)	1.73 (0.44 to 3.02)
Arthroscopy with HA, pooled SMD (95% CI)	-3.01 (-5.8 to -0.12)	3.05 (1.62 to 4.47)
Open TMJ surgery, pooled SMD (95% CI)	-3.95 (-5.7 to -0.28)	NS
Corticosteroids, pooled SMD (95% CI)	-2.97 (-4.90 to -1.05)	2.11 (0.70 to 3.52)
Arthroscopy alone, pooled SMD (95% CI)	-2.6 (-5.1 to -0.07)	2.75 (1.40 to 4.11)
Arthrocentesis with HA, pooled SMD (95% CI)	-2.3 (-4.5 to -0.18)	1.53 (0.36 to 2.70)
HA, pooled SMD (95% CI)	NS	2.23 (1.16 to 3.29)
Arthrocentesis with corticosteroids, pooled SMD (95% CI)	NS	1.55 (0.29 to 2.81)
Arthrocentesis alone, pooled SMD (95% CI)	NS	1.41 (0.26 to 2.55)
Hu et al (2023)		
1 month vs conservative treatment		
Total N	321	321
SMD (95% CI)	-0.82 (-1.43 to -0.20)	-0.06 (-3.67 to 3.54)
I^2 (p)	56% (.06)	88% (<.00001)
3 months vs conservative treatment		
Total N	336	336
SMD (95% CI)	-0.66 (-1.68 to 0.37)	-0.35 (-3.95 to 3.25)
I^2 (p)	82% (<.0001)	89% (<.00001)

Study	Change in pain from baseline	Maximal mouth opening
6 months vs conservative treatment		
Total N	291	291
SMD (95% CI)	-1.38 (-2.45 to -0.32)	0.00 (-3.34 to 3.34)
I^2 (p)	86% (<.0001)	86% (<.0001)
Thorpe et al (2023)[50],		
6 months vs conservative treatment		
Total N	448	448
SMD (95% CI)	-1.09 (-2.19 to 0.01)	1.12 (0.45 to 1.78)
I^2 (p)	100% (<.00001)	87% (<.00001)

CI: confidence interval; HA: hyaluronic acid; NS: not significant; SMD: standardized mean difference; TMJ: temporomandibular joint.

Observational Study

In a retrospective cohort study, Hossameldin and McCain (2018) assessed the efficacy of an office-based temporomandibular joint arthroscopic technique. The researchers assessed the following outcomes of the procedure: improvement in painless range-of-motion in the mandible, reduced pain on loading, and improvement in functional jaw pain. The cohort included an initial 363 patients, excluded 41, and an analysis was performed on the joints of the remaining 322 that were compromised. Within the 322 patients, 452 joints were operated on with a 66.6% (n=301 joints) success rate (p=.001). It is stated within the outcome variable section that the primary outcome variable of success or failure was determined by the reduction of joint pain postoperatively. This could be subjective. When the operation failed (n=151 joints, 33.3%), 141 joints were involved in a subsequent procedure that ranged from more advanced arthroscopy to a total joint replacement.

Arthrotomy

While there is inadequate guidance in published peer reviewed medical literature regarding patient selection for these procedures through arthrotomy (arthroplasty, condylectomy, modified condylectomy, disc or meniscus plication, disc removal) invasive surgical treatment to treat TMJD should only be considered when all appropriate conservative treatment has failed and minimally invasive surgery such as arthrocentesis or arthroscopy is not indicated.

Rajkumar and Sidebottom (2022) reported on long-term outcomes and complications of patients (n=74) who underwent total joint replacement with the TMJ Concepts prosthesis. At ten years post-implant, forty-three patients were evaluated. Overall, there were significant improvements in pain scores (decreased from 7.4 to 1.7 on a 10-point visual analog scale); maximum mouth opening (increased from 21.0 millimeters [mm] to 34.7 mm); and in dietary scores (increased from 4.1 to 9.5 on a 10-point visual analog scale) (p<0.0001 each). There were two reported joint failures requiring revision, though neither case was due to wear on the prosthesis. The authors concluded the TMJ Concepts prosthesis provided long-term improvement in pain and joint function. The study was limited by considerable loss to follow up (42%).

There is a lack of randomized trials comparing the three prosthetic temporomandibular joint replacement (TJR) systems approved by the FDA, although meta-analyses have been completed (Zou, et al., 2018a; Johnson, et al., 2017). The meta-analysis by Zou et al. included 20 studies with 1262 patients. Case reports and cases series of fewer than 10 cases or a follow-up time shorter than one year were excluded.

Outcome measurements were changes in maximal incisal opening (MIO), pain, dietary limitations, and functional deficiencies from before to after TJR. Comparison of the TJR systems showed no real difference for pre- versus postoperative MIO, pain, diet, and function. MIO and functional efficiency decreased gradually over time, but effective pain relief and improvements in dietary limitations were stable with no relevant differences during follow-up. Comparison of the custom and stock devices showed similar results for pre- and postoperative MIO, pain, function, and diet.

Manipulation for Reduction of Fracture or Dislocation of the TMJ

Foster et al (2000) evaluated in a prospective study of the temporomandibular joint (TMJ) receiving manipulation under general anesthesia the success rate to reduce the number of patients referred for invasive surgery. Fifty-five patients were included. This study reported 15 patients improved, 15 did not improve, 6 showed partial improvement and 19 were not treated. The median pre-treatment opening was 20 mm (range 13-27). Among those patients who improved after manipulation, the median opening after treatment was 38 mm (range 35-56). Some of the patients that improved experienced return of TMJ clicking but not of joint or muscle tenderness. The authors concluded “manipulation under general anesthesia helps some patients with disc displacement without reduction.” See also Practice Guideline and Position Statements.

Section Summary: Surgical Techniques

Meta-analyses of RCTs have reached conflicting conclusions regarding the efficacy of surgical techniques in patients with TMJD. Two recent meta-analyses each identified RCTs comparing arthrocentesis to various conservative management strategies. At 6 months, one analysis found improved maximum mouth opening with arthrocentesis while the other found similar outcomes between arthrocentesis and conservative treatments. Similarly, pain was improved with arthrocentesis in one analysis, but not the other. However, a 2020 network meta-analysis did find various arthroscopic procedures to be the most efficacious treatment approach for patients with TMJD.

Foster et al (2000) in a prospective study which included 55 individuals with TMJD and evaluated the effectiveness of manipulation under general anesthesia, 15 patients showed improvement and 6 individuals showed partial improvement. The median pre-treatment opening was 20mm (range 13-27) with an improvement of those individuals responding after treatment to an opening of 38mm (range 35.36). Fifteen individuals did not show improvement and 19 were not treated. The available evidence for manipulation under general anesthesia for TMJD is limited to a single uncontrolled study with limited follow-up. See Practice Guidelines and Position Statements.

SUPPLEMENTAL INFORMATION

The purpose of the following information is to provide reference material. Inclusion does not imply endorsement or alignment with the evidence review conclusions.

Practice Guidelines and Position Statements

Guidelines or position statements will be considered for inclusion in ‘Supplemental Information' if they were issued by, or jointly by, a US professional society, an international society with US representation, or National Institute for Health and Care Excellence (NICE). Priority will be given to guidelines that are informed by a systematic review, include strength of evidence ratings, and include a description of management of conflict of interest.

American Association for Dental, Oral and Craniofacial Research (AADOCR)

In 2010 (reaffirmed in 2015), the American Association for Dental Research (now the American Association for Dental, Oral, and Craniofacial Research) policy statement recommended the following for the diagnosis and treatment of temporomandibular joint disorders (TMJDs):

1. "It is recommended that the differential diagnosis of TMDs or related orofacial pain conditions should be based primarily on information obtained from the patient's history, clinical examination, and when indicated TMJ radiology or other imaging procedures. The choice of adjunctive diagnostic procedures should be based upon published peer-reviewed data showing diagnostic efficacy and safety. However, the consensus of recent scientific literature about currently available technological diagnostic devices for TMDs is that except for various imaging modalities, none of them shows the sensitivity and specificity required to separate normal subjects from TMD patients or to distinguish among TMD subgroups."
2. "It is strongly recommended that, unless there are specific and justifiable indications to the contrary, treatment of TMD patients initially should be based on the use of conservative, reversible and evidence-based therapeutic modalities. Studies of the natural history of many TMDs suggest that they tend to improve or resolve over time. While no specific therapies have been proven to be uniformly effective, many of the conservative modalities have proven to be at least as effective in providing symptomatic relief as most forms of invasive treatment."

American Association of Oral and Maxillofacial Surgeons (AAOMS)

In 2024. The American Association of Oral and Maxillofacial Surgeons (AAOMS) updated the clinical condition statements on temporomandibular disorders that includes the following in the management of patients presenting for care by oral and maxillofacial surgeons:

- "Non-surgical management:
    - Medication (e.g., NSAIDs, muscle relaxants, sedatives, antidepressants, local analgesic trigger point injections)
    - Orthotic appliance
    - Physical therapy
    - Dietary modifications
    - Psychological counseling
- Surgical treatment:
    - Manipulation under anesthesia (e.g., brisement)
    - Arthrocentesis
    - Non-arthroscopic lysis and lavage and manipulation
    - Arthroscopic surgery
        - Diagnostic
        - Operative
    - Open arthroplasty with or without autograft
    - Open arthroplasty with alloplast
    - Disc repair or removal, with or without replacement
    - Coronoidectomy
    - Condylectomy
    - Mandibular Condylotomy
    - Myotomy
    - Orthognathic Surgery
    - Partial or total joint reconstruction (e.g., autogenous graft, allogeneic graft, and alloplastic implant)

American Society of Temporomandibular Joint Surgeons (ASTMJS)

In 2001, the American Society of Temporomandibular Joint Surgeons (ASTMJS) issued a consensus clinical guideline focused on TMJD assisted with internal derangement and osteoarthritis. For diagnosis of this type of TMJD, a detailed history and, when indicated, a general physical examination was recommended. Imaging of the temporomandibular and associated structures was also recommended. Options for basic radiography to provide information on temporal bone and condylar morphology included the use of plain films, panoramic films, and tomograms. Also recommended was imaging of the disc and associated soft tissue with magnetic resonance imaging or arthrography. Other diagnostic procedures indicated included computed tomography, magnetic resonance imaging (MRI), arthrography (for selected cases) and isotope bone scans.

Nonsurgical treatment was recommended as first-line therapy for all symptomatic patients with this condition. Recommended treatment options included a change in diet, nonsteroidal anti-inflammatory drugs, maxillomandibular appliances, physical therapy, injections of corticosteroids or botulinum toxin, and behavior modification. If adequate symptom relief did not occur within 2 to 3 weeks, surgical consultation was advised. The guideline stated the following surgical procedures were considered accepted and effective for patients with TMJDs associated with internal derangement or osteoarthritis:

- Arthrocentesis;
- Arthroscopy;
- Condylotomy;
- Arthrotomy (prosthetic joint replacement may be indicated in selected patients who have severe joint degeneration, destruction or ankylosis);
- Coronoidotomy/coronoidectomy
- Styloidectomy

BMJ Rapid Recommendations

The BMJ Rapid Recommendations panel developed guidelines in 2023 for the management of patients with chronic pain (≥3 months) associated with TMJD. The international expert panel included representation from an academic center in the United States.

The panel favored the following therapies:

- Cognitive behavior therapy (strong recommendation);
- Therapist-assisted mobilization (strong recommendation);
- Manual trigger point therapy (strong recommendation);
- Supervised postural or jaw exercise (strong recommendation);
- Usual care including home exercises, stretching, reassurance, and education (strong recommendation);
- Manipulation (conditional recommendation);
- Supervised jaw exercise with mobilization (conditional recommendation);
- Cognitive behavior therapy with non-steroidal anti-inflammatory drugs (conditional recommendation);
- Manipulation with postural exercise (conditional recommendation);
- Acupuncture (conditional recommendation).

The panel recommended against the following therapies:

- Reversible occlusal splints (conditional recommendation);
- Arthrocentesis (conditional recommendation);
- Cartilage supplement with or without hyaluronic acid injection (conditional recommendation);
- Low level laser therapy (conditional recommendation);
- Transcutaneous electrical nerve stimulation (conditional recommendation);
- Gabapentin (conditional recommendation);
- Botulinum toxin (conditional recommendation);
- Hyaluronic acid (conditional recommendation);
- Relaxation therapy (conditional recommendation);
- Trigger point injection (conditional recommendation);
- Acetaminophen (conditional recommendation);
- Topical capsaicin (conditional recommendation);
- Biofeedback (conditional recommendation);
- Corticosteroid injection (conditional recommendation);
- Benzodiazepines (conditional recommendation);
- Beta-blockers (conditional recommendation);
- Irreversible oral splints (strong recommendation);
- Discectomy (strong recommendation);
- Non-steroidal anti-inflammatory drugs with opioids (strong recommendation).

Ongoing and Unpublished Clinical Trials

Some currently ongoing and unpublished trials that might influence this review can be located at clinicaltrials.gov.

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CODES

To report provider services, use appropriate CPT codes, HCPCS codes, Revenue codes, and/or ICD diagnosis codes.

Codes	Number	Description
CPT		

	20605	Arthrocentesis, aspiration and/or injection; intermediate joint or bursa (e.g., temporomandibular, acromioclavicular, wrist, elbow or ankle, olecranon bursa)
	20606	Arthrocentesis, aspiration and/or injection, intermediate joint or bursa (e.g., temporomandibular, acromioclavicular, wrist, elbow or ankle, olecranon bursa); with ultrasound guidance, with permanent recording and reporting
	20999	Unlisted procedure, musculoskeletal system, general
	21010	Arthrotomy, temporomandibular joint
	21050	Condylectomy, temporomandibular joint
	21060	Meniscectomy, partial or complete, temporomandibular joint
	21073	Manipulation of temporomandibular joint(s) (TMJ), therapeutic, requiring an anesthesia service (i.e., general or monitored anesthesia care)
	21240	Arthroplasty, temporomandibular joint, with or without autograft (includes obtaining graft)
	21242	Arthroplasty, temporomandibular joint, with allograft
	21243	Arthroplasty, temporomandibular joint, with prosthetic joint replacement
	21299	Unlisted craniofacial and maxillofacial procedure
	29800	Arthroscopy, temporomandibular joint, diagnostic, with or without synovial biopsy (separate procedure)
	29804	Arthroscopy, temporomandibular joint, surgical
	64999	Unlisted procedure nervous system (when specified as implantation of electrodes or a pulse generator whether for trial or permanent placement of a peripheral subcutaneous field stimulation or target field stimulation)
	70250	Radiologic examination, skull; less than 4 views
	70260	Radiologic examination, skull; complete, minimum of 4 views
	70300	Radiologic examination, teeth; single view
	70310	Radiologic examination, teeth; partial examination, less than full mouth

	76499	Unlisted diagnostic radiographic procedure
	76999	Unlisted ultrasound procedure (e.g., diagnostic or interventional) (may be utilized for high intensity focused ultrasound for the treatment of TMJD)
	77077	Joint survey, single view, 2 or more joints (specify)
	95851	Range of motion measurements and report (separate procedure); each extremity (excluding hand) or each trunk section (spine)
	95867	Needle electromyography; cranial nerve supplied muscle(s), unilateral
	95868	Needle electromyography; cranial nerve supplied muscles, bilateral
	95927	Short-latency somatosensory evoked potential study, stimulation of any/all peripheral nerves or skin sites, recording from the central nervous system; in the trunk and head
	95937	Neuromuscular junction testing (repetitive stimulation, paired stimuli); each nerve, any 1 method
	96002	Dynamic surface electromyography, during walking or other functional activities 1-12 muscles
	97033	Application of modality to one or more areas; iontophoresis, each 15 minutes
HCPCS		
	D0220	intraoral - periapical first radiographic image
	D0230	intraoral - periapical each additional radiographic image
	D0270	bitewing - single radiographic image
	D0272	bitewings - two radiographic image
	D0273	bitewings - three radiographic image
	D0274	bitewings - four radiographic image
	D0373	Intraoral tomosynthesis – bitewing radiographic image
	D0374	Intraoral tomosynthesis - periapical radiographic image

	D0388	intraoral tomosynthesis - bitewing radiographic image - image capture only
	D0389	intraoral tomosynthesis - periapical radiographic image - image capture only
	D7830	Manipulation under anesthesia
	D7840	Condyletomy
	D7860	Arthrotomy
	D7865	Arthroplasty
	D7870	Arthrocentesis
	D7872	Arthroscopy – diagnosis with or without biopsy
	D7873	Arthroscopy – lavage and lysis of adhesions
	D7874	Arthroscopy – disc repositioning and stablization
	D7875	Arthroscopy - synovectomy
	D7876	Arthroscopy - discectomy
	D7877	Arthroscopy - debridement
	D7899	Unspecified TMD therapy, by report
	D7999	Unspecified oral surgery procedure, by report
	E0720	Transcutaneous electrical nerve stimulation (TENS) device, two-lead localized stimulation
	E0730	Transcutaneous electrical nerve stimulation (TENS) device, four or more leads, for multiple nerve stimulation
	E1399	Durable medical equipment miscellaneous
	E1700	Jaw motion rehabilitation system
	E1701	Replacement cushions for jaw motion rehabilitation system, package of 6
	E1702	Replacement measuring scales for jaw motion rehabilitation system, package of 200
	S3900	Surface electromyography (sEMG)
Type of Service	Medical	

Place of Service	Outpatient/Physician's Office/Dentist Office	

POLICY HISTORY

Date	Action	Action
April 2026	Annual Review	Policy Renewed
May 2025	Annual Review	Policy Renewed
May 2024	Annual Review	Policy Revised
April 2023	Annual Review	Policy Renewed
January 2023	Annual Review	Policy Revised
June 2022	Interim Review	Policy Revised
January 2022	Annual Review	Policy Revised
July 2021	Interim Review	Policy Revised – the content regarding biofeedback for TMJD was moved to medical policy 02.01.04 Biofeedback
January 2021	Annual Review	Policy Revised
January 2020	Annual Review	Policy Revised
January 2019	Annual Review	Policy Revised
January 2018	Annual Review	Policy Revised
January 2017	Annual Review	Policy Revised
January 2016	Annual Review	Policy Revised
January 2015	Annual Review	Policy Revised
February 2014	Annual Review	Policy Revised
May 2013	Annual Review	Policy Revised
May 2012	Annual Review	Policy Renewed
July 2011	Annual Review	Policy Revised

New information or technology that would be relevant for Wellmark to consider when this policy is next reviewed may be submitted to:

Wellmark Blue Cross and Blue Shield
Medical Policy Analyst
PO Box 9232
Des Moines, IA 50306-9232

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