Proper diagnosis is essential in all phases of health care, and dentistry certainly is no exception. Without a proper diagnosis, effective treatment may never be rendered and the patient’s suffering and costs will continue to escalate. Dentists who treat patients who have temporomandibular disorders (TMDs) and orofacial pain also must strive to stay abreast of the latest treatment options. This article summarizes the current recommended treatment options for TMDs. Because it would be virtually impossible to cover every type of treatment available, only standard recognized types of treatment will be presented.

Within the confines of general practice, dentists today may be as limited or as diverse concerning available treatment modalities as they choose. Regardless of the type of practice today’s dentist may develop, the need to accurately diagnose those disorders that affect the temporomandibular joints (TMJs) remains an issue at the foundation of every practice. The decision to subsequently provide treatment is a second issue that must be addressed but proper diagnosis is most important. Otherwise, patients will either suffer from supervised neglect or seek help from other doctors, a quest that often results in increased health care costs and chronic suffering and frustration for the patient and his or her family.

The term temporomandibular disorders (TMDs) is a collective term that includes a number of clinical diagnoses involving the TMJ, the masticatory musculature, and associated structures excluding pain of dental origin. TMDs are considered to be a subclassification of musculoskeletal disorders.1

This article is a general summary of initial TMD treatment, also known as Phase I Therapy or reversible treatment. Specific diagnostic procedures and definitive treatment, also referred to as Phase II Therapy (occlusal equilibration, orthodontics, occlusal reconstruction, overlay removable partial dentures, joint and/or orthognathic surgery), will not be discussed.

**Standard of care**

What is the standard of care concerning TMDs? For example, should the dentist who limits his or her practice to esthetics be held to the same standard as one who actively cares for TMD patients? What about those engaged primarily in implantology or any other type of dental practice?

A 1982 ADA Presidential Conference determined that all dental patients (emphasis added), not just TMD patients, should receive a review of medical and dental history, a thorough dental examination, and a brief screening history and examination relating to TMDs.2 For patients whose screening history and examination result in positive findings, a second and more comprehensive assessment also was recommended.

Eight years later, McNeill et al strengthened the ADA’s opinion by stating that screening is an essential part of the routine dental examination for all patients and that a TMD diagnosis is based on evaluation of patient history, clinical examination, and TMJ imaging, when appropriate.3

The American Academy of Craniofacial Pain (AACP) actively established the standard of care when screening patients for possible TMDs. As far back as 1990, the AACP published guidelines pertaining specifically to TMD, stating that routine examination of a dental patient should include a basic screening for TMD and that every dentist should be obligated to screen all new and all reevaluated patients.4

Another influential academy, the American Academy of Orofacial Pain (AAOP), recommended in 1993 that screening for TMD (consisting of a questionnaire, brief history, and examination) should be an essential part of the routine dental examination.5 Realizing the importance of this topic, the AAOP embellished their earlier recommendations in 1996 by stating that a TMD and orofacial pain screening evaluation (consisting of a questionnaire, brief history, and examination) is appropriate for all dental patients.4 Gremillion and Reams supported these recommendations in 1997 as “an essential component of routine dental or medical examination.”7

As a result of these recommendations, dentists, regardless of their specialty or type of practice, will be held to standards that include screening all patients for TMD and orofacial pain disorders, asking specific questions concerning a patient’s dental and medical histories, and performing a brief examination. If an examination for TMDs produces positive results, the dentist must perform a more thorough examination or refer the patient to a colleague who treats these disorders.8

**Treatment categories**

Treatment for TMDs has been discussed in the literature for at least two centuries but categories of treatment options have been established only during the last two decades.6,8 Disagreement and controversy remain among those who are active in diagnosing and treating TMDs and orofacial pain but such disagreements have been reduced in the last several years.

Initially, Weinberg divided TMD treatment into three general categories: palliative therapy, causative therapy, and adjunctive therapy.9 Other authors have suggested a fourth category, known as definitive therapy.10
Palliative therapy

Palliative therapy is used to reduce pain and improve mandibular function. This therapy includes procedures such as temporary intraoral appliances, medications, home remedies (for example, ice, moist heat, exercises, and a soft diet), and even voluntary disengagement of the teeth.

TEMPORARY APPLIANCES

The temporary use of intraoral appliances can help to reduce pain and establish an accurate diagnosis. With this type of therapy, an appliance is used to decrease symptoms, not to place the mandible in a new or therapeutic position. For example, if a patient suffers from articular disc displacement in one or both joints or if the pain symptoms are caused by muscle pain, an appropriate form of palliative therapy would involve a flat or superior repositioning appliance that does not alter the mandibular position but provides neuromuscular relaxation.

MEDICATIONS

Medications are very helpful in palliative treatment and can be the appropriate therapy for acute cases. Unnecessary treatments can be avoided by using the proper medication. The newer cyclo-oxygenase-2 (COX-2) inhibitors can attack inflammation aggressively and successfully. Rofecoxib (Vioxx, Merck, Whitehouse Station, NJ; 888.637.2502), celecoxib (Celebrex, Pfizer Inc., New York, NY; 800.223.0182), and valdecoxib (Bextra, Parafon Forte, Ortho-McNeil Pharmaceutical, Raritan, NJ; 800.682.6532) are another effective muscle relaxant.

A tricyclic antidepressant, used in low doses, can assist in reducing musculoskeletal spasms and pain. Nortriptyline (Pamelor, Novartis Pharmaceuticals, East Hanover, NJ; 800.257.3273) and amitriptyline are effective in reducing TMD pain and increasing overall effectiveness of other modalities of treatment.12,13

Prescription medications are not the only pharmacological aids available; integrative medicine (the combination of traditional training and alternative medicine) has had a great impact on all areas of medicine and dentistry, including TMD therapy. The use of herbs, supplements, vitamins, and even essential oils is recommended and taught by many reputable institutes and continuing education sponsors. Magnesium (400 mg) is very effective at reducing muscle pain and tightness without the potential side effects of prescription medication. Glucosamine and chondroitin sulfate used in combination with vitamin C and increased water consumption are beneficial for reducing the pain and swelling of joint inflammation; dentists can use glucosamine sulfate, chondroitin sulfate, or both in combination in lieu of anti-inflammatory medications such as ibuprofen, thus reducing the possible side effects of gastrointestinal irritation, decreased platelet aggregation, and liver damage.14–16

MOIST HEAT AND ICE

Moist heat (for inflammation) and ice (for swelling) are simple yet effective forms of palliative therapy. Because the effectiveness of these modalities is transitory, prolonged problems also may require the use of anti-inflammatory medications. Moist heat opens the capillary beds to promote increased blood flow; in addition, it is excellent as a muscle conditioner prior to exercise or physical therapy. However, moist heat should be withheld for approximately 72 hours after an acute injury, while ice is quite effective for reducing muscle swelling and pain, especially in acute situations.17

ETHYL CHLORIDE

Ethyl chloride spray can reduce musculoskeletal pain and myospasms and is very effective at reducing or eliminating myofascial trigger points when used in conjunction with moist heat.18 These tiny areas of hypercontraction within muscles produce pain and limit motion when active. A common example seen by dentists involves a chronic clenching who, during an episode of increased stress, develops sudden masseteric pain, especially when attempting to open his or her mouth for any normal mandibular activity. Applying ethyl chloride in fine, parallel sweeps over the skin of the muscle (followed by the application of moist heat) often eliminates the masseteric trigger points, removing the need for further treatment.

EXERCISES

Home exercises are an excellent method for treating a patient’s symptoms, getting the patient and family members actively involved in the patient’s therapy. Fast, active, aerobic exercises should be avoided; passive stretching—that is, keeping the muscle fibers relaxed while slowly stretching the muscle, preventing it from tightening via the stretch reflex—in conjunction with moist heat (followed by the application of ice) is beneficial for decreasing muscle and joint pain and for improving ranges of motion.

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Table. Examples of medications effective in palliative treatment for TMD.*

<table>
<thead>
<tr>
<th>Medication</th>
<th>Category</th>
<th>Standard use</th>
<th>Approximate dosage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metaxalone</td>
<td>Muscle relaxant</td>
<td>Reduces muscle hyperactivity and pain</td>
<td>400–800 mg every six hours</td>
</tr>
<tr>
<td>Chlorozoxane</td>
<td>Muscle relaxant</td>
<td>Reduces muscle hyperactivity and pain</td>
<td>500 mg every six hours</td>
</tr>
<tr>
<td>Rofecoxib</td>
<td>COX-2 inhibitor</td>
<td>Reduces inflammation and pain</td>
<td>25–50 mg every day</td>
</tr>
<tr>
<td>Celecoxib</td>
<td>COX-2 inhibitor</td>
<td>Reduces inflammation and pain</td>
<td>100–200 mg every day</td>
</tr>
<tr>
<td>Valdecoxib</td>
<td>COX-2 inhibitor</td>
<td>Reduces inflammation and pain</td>
<td>10 mg every day</td>
</tr>
<tr>
<td>Nortriptyline</td>
<td>Antidepressant</td>
<td>Improves quality of sleep (in low doses)</td>
<td>10–25 mg at bedtime</td>
</tr>
<tr>
<td>Amitriptyline</td>
<td>Antidepressant</td>
<td>Improves quality of sleep</td>
<td>10–25 mg at bedtime</td>
</tr>
</tbody>
</table>

*These represent a random sample of available medications; this list is not inclusive.
Causative therapy

Eliminating the etiological factors that contribute to TMDs is the goal of causative therapy. For most dentists, such therapy involves treating intra-articular disorders (for example, capsulitis, displaced articular discs, and osteoarthritis) or one of the various muscle disorders that affect the mastication muscles.

Anterior repositioning appliance

Anterior repositioning appliances have been advocated by the scientific, peer-reviewed literature for more than 50 years. These appliances are used to treat TMJ internal derangements, which Dolwick defined as “an abnormal relationship of the articular disc to the mandibular condyle, fossa, and articular eminence with the disc usually displaced in an anteromedial direction.” Since these types of orthopedic devices were popularized by Farrar in 1977 and Gelb in 1983, the theory behind this appliance has been taught in continuing education programs. The recent literature is replete with articles and studies concerning the use and efficacy of anterior repositioning appliances for treating anteriorly displaced articular discs of the TMJs. Based upon clinical experience and the literature, anterior repositioning appliances appear to be more effective than the flat-plane occlusal splint in eliminating joint clicking, joint and headache pain, and muscle pain from a dislocated joint.

TMJ clicking generally indicates discal dislocation. Dislocations that do not require treatment include those that have developed very slowly over a period of years, those that do not lock, and those that do not produce headaches, TMJ pain, ear pain (and occasional ear pressure), reduced range of mandibular motion, and masticatory muscle pain.

A reciprocal click is a click in the joint that occurs upon opening and closing. This type of clicking (compared to an opening click with no closing click) can be treated successfully with an anterior repositioning appliance, especially if the clicking occurs early in the opening phase. It appears that such therapy offers more success to younger patients. The diagnosis of an anteriorly displaced articular disc usually is confirmed by medical history, various imaging techniques, and successful reduction of the dislocation by placing the mandible in an anterior position. Historically, joint clicking occurs most often after a traumatic episode, such as blunt trauma to the mandible or head, intubation during general anesthesia, prolonged opening in the dental office, or even indirect trauma during a motor vehicle accident. In addition, many young females have developed a displaced articular disc with no known cause and ligament laxity—a condition that affects load-bearing joints as well as the TMJ—as the only common factor.

Some type of joint image is necessary to confirm an anterior discal displacement with subsequent posterior and superior displacement of the mandibular condyle. Magnetic resonance imaging (MRI) is the finest method for viewing the position of the articular disc, although the cost often is prohibitive. A panoramic radiograph is appropriate for identifying fractures, lesions in the maxilla and mandible, and gross degenerative TMJ changes; however, this type of imaging is totally inaccurate when evaluating condylar position because it artificially displaces the mandible into an anterior position to keep it in focus.

Computerized tomography (CT) is the most accurate radiographic technique but it is rather complicated and the equipment is cost-prohibitive unless the dentist treats many TMD patients. The transcrania1l lateral oblique technique is the simplest and most reasonable way for dentists to image the TMJ in the office. This technique is valuable but limited because of the image distortion and superimposition of bony structures; however, these limitations are more a function of interpretation than of the technique itself. Although transcranial radiography requires training in radiographic technique and interpretation, it is accurate and fulfills the standard of care for imaging the joint. In addition, the equipment is inexpensive and additional office space is not required.

Manipulating the mandible is the most reliable method for diagnosing a discal dislocation. A click that occurs upon opening the mouth is the point at which the articular disc actually goes back into place; from an orthopedic standpoint, this is the point when the discal dislocation is reduced. If a click is heard frequently when the patient closes, it means that the disc is being displaced and the discal dislocation has developed once again.

To confirm a distal dislocation, instruct the patient to open his or her mouth until a click is heard or felt; at that point, the patient should close, bringing the mandible slightly forward until the incisors are almost at an end-to-end position. The discal dislocation has been reduced successfully when the patient can open and close at this mandibular position without hearing or feeling joint clicking. Holding the mandible in this anterior position with an anterior repositioning appliance can eliminate clicking and locking and provide partial or total pain relief within a few days.

Summer and Westesson reported such relief in a 1997 study, noting that of 75 patients, 92% found relief by using an anterior repositioning appliance. Such an orthopedic device must either cover all the teeth of one arch or incorporate the anterior determinants of occlusion (such as anterior guidance and canine disclusion) to avoid intrusion or overeruption of teeth. Patients must wear this appliance at all times, even while eating.

While some authors have questioned the efficacy of anterior repositioning appliances, it appears that if one does not use joint sounds as the criterion for successful treatment, patients report a success rate of up to 75% in the reduction of joint locking/pain, headaches, and ear pain.

Since many patients treated with anterior repositioning therapy are comfortable only in the anterior mandibular position, some ultimately will require Phase II (definitive, irreversible) therapy, such as orthodontic treatment, restorative treatment, orthognathic surgery, or a combination. The doctor must inform each patient who uses the anterior repositioning appliance that such definitive treatment may be necessary and document such disclosure in the patient’s record.

Some authors maintain (and clinical experience confirms) that not all chronically dislocated joints need treatment, especially those that do not lock or cause pain. The ones that manifest pain symptoms and joint clicking and/or locking do not appear to improve spontaneously without treatment; the disappearance of joint clicking does not necessarily

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indicate that joint healing has occurred. In such cases, palliative therapy may be appropriate. If unresolvable symptoms persist, the patient may require splint therapy.

The pivot appliance is another type of repositioning appliance; it is used to unlock articular discs. It usually is fabricated over the mandibular posterior teeth so that only the maxillary first or second molars contact the splint. In theory, the anterior teeth tend to move closer together when the maxillary first molars contact the pivot or the appliance’s raised acrylic stop, creating a fulcrum around the acrylic contact. This contact causes the condyles to pivot down and away from the mandibular or glenoid fossa, which ultimately unlocks the joint. After discal reduction, the pivot appliance is converted into an anterior repositioning appliance. This appliance should only be used under strict supervision and for only a few weeks to prevent orthodontic movement of maxillary teeth.

Superior Repositioning Appliance

Known by numerous names, including gnathologic appliance, centric relation splint, stabilization splint, flat-plane splint, anti-bruxism appliance, and occlusal appliance, the superior repositioning appliance is used to treat bruxism, muscle hyperactivity, and muscle pain. Regardless of the name, the appliance’s major purpose is to provide neuromuscular relaxation via the trigeminal afferent neurons, first through the mesencephalic nucleus and then through the motor nucleus. Through this complex reflex, the motor innervation to the elevator muscles (that is, the temporalis, masseter, superior head of the lateral pterygoid and the zygomandibularis) is adjusted, producing a neuromuscular relaxed position of the mandible that is independent from the occluding surfaces of the opposing teeth.

The superior repositioning appliance covers all of the teeth in either the maxilla or mandible. Mechanically, there is no difference which arch is used as long as all of the teeth in the arch are covered, the determinants of occlusion (anterior guidance, posterior discusion of the teeth in lateral mandibular movements, and canine disclusion) are in the splint’s construction, and the vertical thickness is kept to a minimum (1.0–2.0 mm).

Some dentists prefer to cover the mandibular teeth so as not to impinge or reduce the rhythmic motion of the cranial bones. Regardless of which arch is used, the goals are the same; namely, neuromuscular relaxation and the reduction of muscle hyperactivity, pain, and the effects of chronic bruxism.

Noxious Trigeminal Inhibition Appliance

Although the superior repositioning appliance has been shown to be safe and effective in reducing muscle pain and the effects of bruxism, some patients still clench intensely, often producing all types of pain (such as migraine headaches) while literally destroying even the most rigidly constructed appliance.

The development of the noxious trigeminal inhibition appliance (NTI-TSS, Inc., Mishawaka, IN; 877.468.4877) appears to overcome this problem. This appliance has received FDA approval for bruxing, as well as for migraine and tension-type headaches. Regardless of the specific etiology of headache pain, pericranial muscle tenderness and the development of myofascial trigger points in the mandibular elevator muscles appear to be two common characteristics. The noxious trigeminal inhibition appliance is designed to reduce or eliminate these probable causes of headache pain, demonstrating how treating TMDs can help improve the quality of life for numerous patients.

The noxious trigeminal inhibition appliance reduces or eliminates the tendency to clench and permits lateral and protrusive movements of the mandible without engaging the canines. It provides an anterior midline stop; like the superior repositioning appliance, it eliminates the occluding surface that is required to generate intense clenching for the posterior or canine teeth in any mandibular position. Anatomically, this midline anterior stop activates the jaw opening reflex and activates the mandibular depressors while inhibiting the elevator muscles, prohibiting intense clenching as a result. If the muscle spindles are unable to clench, the elevator muscles are prevented from becoming hypersensitive. Chronic sympathetic irritation (such as clenching) makes these elevator muscles very susceptible to pain and, in the presence of various triggers (for example, stress, overactivity, alcohol, hormonal changes, food additives, and so forth), to the subsequent development of migraine and tension-type headaches. In the FDA study of the efficacy of this appliance, there was statistically significant reduction in migraine episodes (61.9%), tension-related headache episodes (37.3%), reduced use of rescue medication (46.8%), phonophobia (68.4%), photophobia (65.6%), and nausea (78.0%).

Obviously, not all headaches can be reduced or eliminated with the use of any type of device but the superior repositioning appliance and the noxious trigeminal inhibition appliance can affect the lives of patients and their families.

Adjunctive Therapy

Adjunctive therapy consists of treatment modalities that augment and assist definitive or causative types of treatment for TMD. This category is vast and varied, consisting of both traditional and nontraditional modes of therapy. As with the discussion of causative therapy earlier in this article, only the more popular and widely used types of therapy are listed.

Physiotherapy

In the United States, physiotherapy is a combination of physical therapy, massage therapy, and electromodality (for example, ultrasound, low-intensity laser, and so forth). In Canada and Australia, physiotherapy is synonymous with physical therapy.

Successful adjunctive (and palliative) treatment often is achieved by utilizing a chiropractor, craniosacral therapist, osteopathic physician, massage therapist, or physical therapist. Each of these disciplines has its own technique(s) for reducing dysfunction and musculoskeletal pain. These techniques are very effective at providing palliative relief of pain when used in a combination with intraoral appliance therapy and medications.

Electrotherapy

Electrotherapy is another category of adjunctive therapy that can be administered in the dental office. Modalities include electrogalvanic stimulation, ultrasound, low-level laser, and infrared, all of which are useful for decreasing swelling and pain by opening the capillaries in the area and increasing circulation. Each of these types of electrotherapy accomplishes
Electrogalvanic stimulation utilizes negative polarity over the painful, swollen area. This negative charge produces an alkaline effect within the tissues, denaturing proteins and producing vasodilatation of the capillaries; this in turn permits the outward flow of metabolites and tissue fluids.

Ultrasound is a mechanical vibration that produces heat and vasodilatation by increasing the tissue temperature, thus increasing metabolic activity. This mechanical vibration also decreases pain by activating large myelinated peripheral neurons that attenuate pain or nociception stimulation at the spinal cord and trigeminal (pons) levels. The effects of ultrasound may be enhanced when used in conjunction with massage and exercise.70,71

Iontophoresis
Iontophoresis is the process in which ions in solution are driven through intact skin by using a direct current between two electrodes. It is a safe and effective method of electrotherapy that uses ultrasonic energy to drive a medication deep into the tissues.72,73 This is especially useful for directing anti-inflammatory medications into the TMJ. The current is so low that the patient perceives little or no sensation.

Low-level laser
Dentists have utilized laser therapy in various applications for years.74,75 Low-level laser treatment is beneficial for reducing the pain of TMD by causing endorphin release.76 Laser therapy induces nitric oxide synthesis, which causes the endothelial linings of capillaries to dilate, improving circulation in the area.77,78 Laser therapy also may return injured tissues to a more optimum energy level, improving circulation and decreasing pain and swelling as a result.

Infrared
Like most forms of electrotherapy, infrared produces vasodilatation of the capillary beds by initiating the synthesis of nitric oxide, improving circulation and decreasing swelling as a result.79 This small neurotransmitter improves circulation by opening the endothelial linings of capillaries.

Capsaicin
Capsaicin is a topical analgesic that has been approved for pain relief by the FDA.80,81 It releases substance P and pain-related neuropeptides to reduce pain perception and inflammation and must be applied multiple times every day for at least 14 days before analgesic effects are noted. Side effects include local burning and warming and reddening of the skin; these side effects diminish with time and eventually disappear.82

Botulinum toxin
Botulinum toxin has been advocated for treating chronic myofascial trigger points and headache pain.83 This type of therapy presents three problems. First, treatments last only 9–12 months at most and require multiple toxin injections. Second, this type of therapy is aimed at symptoms in most cases, rather than at the cause of the trigger points’ perpetuation. Third, a session of these injections can be costly and uncomfortable for the patient.

Psychological counseling
It might be appropriate to administer some type of psychological survey to TMD patients; the literature is replete with studies reporting the effects of one’s psychological outlook and health on TMDs and orofacial pain in general. Two such ADA-approved psychological batteries have been devised specifically for dentists. The TMJ Scale and Chronic Pain Battery (Pain Resource Center, Durham, NC; 800.542.7246) both were developed by a psychiatrist and a biostatistician, using the input of several dentists who treat TMD patients. These surveys can be administered and graded in the office, providing accurate answers and helping the doctor to predict psychological trends that might affect treatment outcomes.84-86 These tests also help dentists to refer patients to the appropriate psychologist or counselor.

Hypnosis, biofeedback, acupuncture, nutritional counseling, supplements and vitamin usage, and alternative types of therapy all are reasonable and often-recommended types of adjunctive therapy.

Definitive therapy
Definitive therapy (also referred to as Phase II treatment) generally is irreversible and should be considered only if the patient is almost or completely symptom-free most of the time or when lingering symptoms can be eliminated by using a splint or anesthetic blockade. It often is not required when a patient responds favorably to a splint or other types of treatment.

Quality of life issues must be addressed if a patient is without pain while wearing a splint but finds that symptoms return as soon as the splint is removed. If it is reasonable to suggest that the patient must wear a splint 24 hours a day for the remainder of his or her life in order to be symptom-free, definitive treatment must be considered. Such treatment may consist of occlusal adjustment, occlusal reconstruction, orthodontic therapy, orthognathic surgery, cast overlay removable partial dentures, restoring the vertical dimension of existing dentures (at the therapeutic or splint position), or replacing the dentures.

When all other treatment modalities for continuous TMJ pain fail, dentists can inject a local anesthetic without vasoconstrictor into the joint. If the local anesthetic reduces or eliminates pain, the patient should be referred to an oral and maxillofacial surgeon for consultation; however, it should be remembered that if the patient requires joint surgery of any type, a superior repositioning appliance should be fabricated and placed for immediate use after surgery and adjusted within 24 hours of the surgery.

Summary
Dentists can make a tremendous impact in the lives of people suffering from TMJ pain; however, dentists must learn to recognize these disorders as contributors to facial and head pain. Otherwise, many of these patients will have to undergo unnecessary treatment that often is invasive and irreversible. Money will be spent and the patient will be no better and may even be worse.

Dentists who choose not to treat these disorders should make an appropriate and timely referral to a colleague who is trained in such diagnostic and treatment modalities. Not all dentists need to treat TMDs but all dentists must take an active part in recognizing the causes of such suffering.
Author information
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References
25. Williamson EH, Varela JG. Correction of mandibular asymmetry with the ligated anterior repositioning splint. Cranio 1998;8:30-34.


1. TMD pain may result from malfunction of which of the following?
   1. Muscles
   2. Carious teeth
   3. Bones
   4. Ligaments
      A. 1, 2, and 3 only
      B. 1, 2, and 4 only
      C. 1, 3, and 4 only
      D. 2, 3, and 4 only

2. The American Academy of Orofacial Pain recommends TMD screening that includes history, examination, and __________.
   A. questionnaire
   B. diagnosis
   C. prognosis
   D. use of devices

3. Which of the following is not included in palliative therapy?
   A. Temporary intraoral appliances
   B. Heat
   C. Anterior positioning appliances
   D. Medication

4. Which of the following best describes Phase I therapy?
   A. Reversible
   B. Irreversible
   C. Diagnostic
   D. Orthognathic

5. Applying moist heat immediately following acute temporomandibular joint (TMJ) injury can benefit the patient. To be most effective, the heat must be applied within 72 hours of the injury.
   A. Both statements are true.
   B. The first is true; the second is false.
   C. The first is false; the second is true.
   D. Both statements are false.

6. Which of the following usually indicates dislocation of the articular disc?
   A. Clicking
   B. Ear pain
   C. Headache
   D. Masticatory muscle pain

7. Discs usually are displaced in what direction?
   A. Posterior-lateral
   B. Posterior-medial
   C. Anterior-lateral
   D. Anterior-medial

8. Which of the following is not useful in diagnosing displaced articular discs?
   A. History
   B. Panoramic radiograph
   C. Transcranial radiograph
   D. CT scan

9. An opening click occurs when the disc is displaced from the condyle. A closing click occurs when the disc returns to the condyle head.
   A. Both statements are true.
   B. The first is true; the second is false.
   C. The first is false; the second is true.
   D. Both statements are false.

10. Which of the following types of appliances can be used to treat TMD?
    1. Anterior positioning appliance
    2. Nociceptive trigeminal inhibition (NTI) appliance
    3. Centric relation splint
    4. Pivot appliance
       A. 1, 2, and 3 only
       B. 1, 2, and 4 only
       C. 2, 3, and 4 only
       D. 1, 2, 3, and 4

11. The NTI appliance activates the mandibular elevator muscles; it also eliminates canine guidance.
    A. Both statements are true.
    B. The first is true; the second is false.
    C. The first is false; the second is true.
    D. Both statements are false.

12. Which of the following adjunctive therapies is the most problematic?
    A. Electrotherapy
    B. Ultrasound
    C. Laser therapy
    D. Botulinum toxin injections

13. Which of the following are possible side effects of anti-inflammatory medications?
    1. Gastrointestinal irritation
    2. Decreased platelet aggregation
    3. Liver damage
    4. Increased neutrophil count
       A. 1, 2, and 3 only
       B. 1, 2, and 4 only
       C. 1, 3, and 4 only
       D. 2, 3, and 4 only

14. Temporary appliances can be used to diagnose a cause of TMD. Medication is very helpful for making such a determination.
    A. Both statements are true.
    B. The first is true; the second is false.
    C. The first is false; the second is true.
    D. Both statements are false.

15. A chronic clencher experiences masseter pain while attempting to open his or her mouth. Which of the following treatments can be efficacious?
    A. Glucosamine sulfate and chondroitin sulfate
    B. Anterior repositioning appliance
    C. Ethyl chloride sweeps and moist heat
    D. Superior repositioning appliance

Reading the article and successfully completing this exercise will enable you to:
- determine the sources of temporomandibular disorders (TMDs);
- categorize the treatment phases of TMD;
- choose the most appropriate type of therapy for an individual patient; and
- determine if the dentist should treat or refer the patient.