This manual is designed to enhance the dentist’s ability to efficiently evaluate and treat patients with temporomandibular disorder (TMD). Manual of Temporomandibular Disorders aims to integrate the scientific literature, clinical trials and clinical experiences into an effective strategy for the dentist. For ease of synthesis, only clinically relevant aspects for the vast majority of temporomandibular disorders are covered. User friendly and easy-to-use, the book is structured with five major parts: Initial Evaluation, Common Acute TMD Conditions and Treatments, Occlusal Appliance Therapy, Multi-disciplinary Treatment, and Case Scenarios.

The author’s considerable expertise in managing TMD patients has been condensed to provide a methodological approach to assessment and treatment of this challenging and diverse disorder. To support the organization of the clinical regimen, useful appendices are collected at the back of the book and are also available on-line. These include an initial patient questionnaire along with sample records and consultations.

Features include:

- Frequently Asked Questions
- Quick Consults, Technical Tips and Focal Points
- Coverage of disorders that mimic TMD and identification of factors which warrant referral
- Color photographs and line drawings

As a practical resource, this book is invaluable for students and practitioners working towards the resolution of TMD.

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Appendices from this book can be found at:
www.dentistry.blackwellmunksgaard.com/wright

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Manual of Temporomandibular Disorders

Edward F. Wright

Blackwell Munksgaard
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The last digit is the print number: 9 8 7 6 5 4 3 2 1
I dedicate this book to my wife, Barbara, for her love and understanding throughout my professional career.
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Preface

While teaching TMD to postgraduate residents, I commonly heard them complain that there was no concise clinically practical TMD book that (a) was written on the level for the average dentist or dental student, (b) taught evidence-based diagnosis and multidisciplinary treatment for the majority of patients with TMD, (c) taught how to rule out disorders that mimic TMD and identify medical contributing factors for which patients need to be referred, and (d) taught how to identify patients with complex TMD who are beyond the scope of most dentists.

The thrust of this book is to satisfy those complaints; it is the clinical implementation of my assimilated evidence-based TMD knowledge and experience. This book attempts to simplify the complexities of TMD for ease of clinical understanding and application, in addition to integrating the scientific literature, clinical trials, and clinical experiences into an effective strategy. To the degree possible, it provides a systematic guide for how the average dentist can most effectively diagnose and treat the different types of TMD patients.

The book directs how the information obtained from the patient interview and clinical exam can be used to select the most cost-effective evidence-based therapies that have the greatest potential to provide long-term symptom relief for each patient. Whenever possible, the information provided is based on current research findings. When conclusive evidence is not available, I attempt to present a consensus founded on a significant depth of experience and informed thought.

Since this is not a comprehensive textbook on TMD, it periodically warns that certain characteristics are suggestive of an uncommon disorder beyond the book’s scope. The book suggests that a practitioner may desire to refer a patient with these specific characteristics to someone with greater expertise in that area.

To speed the practitioner’s synthesis of this material, questions that students frequently ask are placed at the beginning of the applicable chapters, and important concepts are highlighted throughout the book. Important terms are in italic or bold, with those listed in the glossary in bold.

Edward Wright

Edward F. Wright
Introduction

Temporomandibular disorder (TMD) is a collective term used for a number of clinical problems that involve the masticatory muscle, temporomandibular joint (TMJ), and/or associated structures. It has plagued humanity throughout history, and treatment has been reported even during the time of the ancient Egyptians.1

The cardinal signs and symptoms for TMD are pain in the masseter muscle, TMJ, and/or temporalis muscle regions; mouth-opening limitation; and TMJ sounds.2 TMD pain is by far the most common reason patients seek treatment.3,4

FOCAL POINT
The cardinal signs and symptoms for TMD are pain in the masseter muscle, TMJ, and/or temporalis muscle regions; mouth-opening limitation; and TMJ sounds.

TMD is an extremely common disorder that is most often reported in individuals between the ages of 20 and 40. Approximately 33 percent of the population has at least one TMD symptom and 3.6 to 7 percent of the population has TMD with sufficient severity to cause patients to seek treatment.2,5

FOCAL POINT
TMD is an extremely common disorder that is most often reported in individuals between the ages of 20 and 40.

Approximately 33 percent of the population has at least one TMD symptom and 3.6 to 7 percent has TMD with sufficient severity that treatment is desired.

TMD symptoms generally fluctuate over time and correlate significantly with masticatory muscle tension, tooth clenching, grinding, and other oral parafunctional habits. TMD symptoms are also significantly correlated with an increase in psychosocial factors, e.g., worry, stress, irritation, frustration, and depression.6-10 It has also been demonstrated that TMD patients with poor psychosocial adaptation have significantly greater symptom improvement when the dentist’s therapy is combined with cognitive behavioral intervention.11

QUICK CONSULT
Observing TMD Symptom Correlations
TMD symptoms generally fluctuate over time and correlate significantly with masticatory muscle tension, tooth clenching, grinding, and other oral parafunctional habits. TMD symptoms are also significantly correlated with an increase in psychosocial factors, e.g., worry, stress, irritation, frustration, and depression.
INTRODUCTION

Women request treatment more often than do men, providing a female–male patient ratio between 3:1 and 9:1. Additionally TMD symptoms are less likely to resolve for women than for men. Many hypotheses attempt to account for the gender difference, but the underlying reason remains unclear.

QUICK CONSULT
Comparing the Response of Men and Women

TMD symptoms are less likely to resolve for women than for men.

Knowledge about TMD has grown throughout the ages. In general, treatment philosophies have moved from a mechanistic dental approach to a biopsychosocial medical model, comparable to the treatment of other joint and muscle conditions in the body.

Beneficial occlusal appliance therapy and TMJ disc-recapturing surgery were reported as early as the 1800s. During the same period, the understanding of the importance to harmonize the occlusion for the health of the masticatory muscles and TMJs developed as the skills to reconstruct natural teeth advanced. As enthusiasm grew for obtaining optimum health, comfort, and function, the popularity of equilibrating the natural dentition also developed.

In the 1930s, Dr. James Costen, an otolaryngologist, brought TMD into the awareness of physicians and dentists, and readers may still find TMD occasionally referred to as Costen’s syndrome. Dr. Costen reported that TMD pain and secondary otologic symptoms could be reduced with alterations of the occlusion.

Since TMD is a multifactorial disorder (having many etiologic factors), many therapies have a positive impact on any one patient’s symptoms. Throughout much of the 1900s, many beneficial therapies were independently identified. Physicians, physical therapists, chiropractors, massage therapists, and others treating the muscles and/or cervical region reported positive responses in treating TMD symptoms. Psychologists working with relaxation, stress management, cognitive-behavioral therapy, and other psychological aspects reported beneficial effects with their therapies. Orthodontists, prosthodontists, and general dentists working with the occlusion also observed the positive impact that occlusal changes provided for TMD symptoms.

Surgeons reported positive benefits from many different TMJ surgical approaches. Many forms of occlusal appliance were tried and advocated, from which studies reveal there is similar efficacy for different appliance forms. Medications as well as self-management strategies used for other muscles and joints in the body were also shown to improve TMD symptoms. During this observational period, TMD therapies were primarily based on testimonials and clinical opinions, according to a practitioner’s favorite causation hypothesis rather than scientific studies.

Different philosophies appeared, with enthusiastic nonsurgeons “recapturing” discs through occlusal appliances, whereas surgeons repositioned the discs or replaced discs with autoplasic materials. The eventual breakdown of the autoplasic materials led to heartbreaking sequelae that caused many to step back from their narrowly focused treatment regimens.
and recognize the multifactorial nature of TMD and the importance of conservative noninvasive evidence-based therapies.\textsuperscript{1,4}

In the latter part of the 20th century, much was learned about basic pain mechanisms and the shared neuron pool of the trigeminal spinal nucleus, other cranial nerves, and cervical nerves. This provided a better understanding of the influence that regional and widespread pain may have on TMD, the similarities between chronic TMD pain and other chronic pain disorders, and the need for chronic pain management from a psychosocial and behavioral standpoint.\textsuperscript{1,13,18,19}

Today, a large number of potentially reversible conservative therapies are available for our TMD patients. By using the information obtained from the patient interview and clinical exam, practitioners can select cost-effective, evidence-based therapies that have the greatest potential to provide long-term symptom relief. The treatment selected often reduces a patient’s contributing factors and facilitates the patient’s natural healing capacity. This management is consistent with treatment of other orthopedic and rheumatologic disorders.\textsuperscript{2,14,20}

\textbf{QUICK CONSULT}

\textbf{Selecting TMD Therapies}

Today, a large number of potentially reversible conservative therapies are available for our TMD patients.

\textbf{FOCAL POINT}

By using the information obtained from the patient interview and clinical exam, practitioners can select cost-effective, evidence-based therapies that have the greatest potential to provide long-term symptom relief for patients. The treatment selected often reduces a patient’s contributing factors and facilitates the patient’s natural healing capacity.

We do not fully understand TMD and the mechanisms causing or sustaining it. Practitioners should bear in mind that not all TMD therapies are equally effective, and no one treatment has been shown to be best for all TMD patients.\textsuperscript{4} Most TMD patients can be managed successfully by general practitioners.\textsuperscript{6} TMD patients who receive therapy obtain significant symptom relief, whereas patients who do not receive treatment have minimal symptom change.\textsuperscript{21}

\textbf{REFERENCES}

INTRODUCTION

Part I

Initial Evaluation

The goals of the initial examination are to identify a patient’s primary diagnosis; secondary, tertiary, etc., diagnoses; contributing factors; and symptom patterns.

**FOCAL POINT**
The goals of the initial examination are to identify a patient’s primary diagnosis; secondary, tertiary, etc., diagnoses; contributing factors; and symptom patterns.

The primary diagnosis is the diagnosis for the disorder most responsible for a patient’s chief complaint. This diagnosis can be of temporomandibular disorder (TMD) origin [e.g., myofascial pain, TMJ inflammation, or acute temporomandibular joint (TMJ) disc displacement without reduction] or from a different source (e.g., pulpal pathosis, sinusitis, or cervicogenic headache).

**FOCAL POINT**
The primary diagnosis is the diagnosis for the disorder most responsible for a patient’s chief complaint.

Secondary, tertiary, etc. diagnoses are diagnoses for other disorders that contribute to the primary diagnosis. Typically the primary diagnosis will be of TMD origin (e.g., myofascial pain), and the secondary and tertiary diagnoses will be other TMD diagnoses (e.g., TMJ inflammation and TMJ disc displacement with reduction) that contribute to a patient’s chief complaint. When non-TMD disorders (e.g., fibromyalgia) contribute to a TMD primary diagnosis, the non-TMD disorder is designated as a contributing factor to the TMD diagnosis and not as secondary or tertiary diagnosis.
PART I    INITIAL EVALUATION

FOCAL POINT
Secondary, tertiary, etc., diagnoses are diagnoses for other disorders that contribute to the primary diagnosis.

**Contributing factors** are elements that perpetuate the disorder (not allowing it to resolve), e.g., nighttime parafunctional habits, gum chewing, daytime clenching, stress, or poor posture.\(^1\)\(^2\) **Symptom patterns** include the period of the day in which the symptoms occur or are most intense (e.g., worse upon awaking) and the location pattern (e.g., begins in the neck and then moves to the jaw).

FOCAL POINT
Contributing factors are elements that perpetuate the disorder (not allowing it to resolve), e.g., nighttime parafunctional habits, gum chewing, daytime clenching, stress, or poor posture.

Symptom patterns include the period of the day in which the symptoms occur or are most intense (e.g., worse upon awaking) and the location pattern (e.g., begins in the neck and then moves to the jaw).

The initial evaluation involves interviewing the patient about his or her symptoms, potential contributing factors, and potential non-temporomandibular disorder (non-TMD). The interview most influences the patient’s final treatment approach and generally brings to light concerns that the practitioner will need to evaluate during the clinical examination.

The clinical examination will help to confirm or rule out the structures involved in the patient’s complaints and other suspected disorders that may contribute to these complaints. Imaging may be appropriate, but, in my experience, it rarely changes the treatment approach derived by the patient interview and examination.

In the late 1980s, an experience demonstrated that patients with TMD symptoms needed to be evaluated more thoroughly for potential non-TMD. A physician asked if I knew that one of the dentists who worked for me had diagnosed someone with TMD when the patient actually had meningitis. After reviewing the patient’s dental record, I found she had been referred by the emergency room physician for possible TMD. The patient told the dentist she had been previously diagnosed with TMD, had an occlusal appliance, and believed she was having a re-
lapse of this disorder. The dentist palpated her masticatory muscles and TMJs and found the muscles were tight and tender to palpation. The dentist confirmed for the patient that she had TMD, gave her TMD self-management instructions, and told her she should see her civilian dentist to have her appliance adjusted (as she was not an active-duty military patient). At the time, it appeared to me the dentist performed an appropriate evaluation and drew a fitting conclusion.

The emergency room record was then reviewed to obtain a better perspective of what had transpired. It was documented that the patient also told the emergency room physician that she had previously been diagnosed with TMD, had an occlusal appliance, and believed she was having a relapse of this disorder. The physician found she had firm masticatory and cervical muscles and a fever, and referred her to the dentist for a TMD evaluation and to a neurologist. When the patient saw the neurologist, he did a spinal tap and found she had meningitis.

This disheartening experience inspired me to research everything I could concerning disorders that mimic TMD. Lists were made of how their symptoms differed from TMD and a fairly brief list of questions was finally formulated that dentists can use to alert a practitioner that a patient may have a non-TMD condition that is mimicking TMD. This questionnaire has been used ever since, adding questions for characteristics that should cause suspicions for referred odontogenic pain and rheumatic disorders. This questionnaire is certainly not foolproof, but it helps me identify non-TMD patients, and to the best of my knowledge I have not missed a non-TMD patient since putting this into practice.

REFERENCES

Chapter 1

Patient Interview

FAQs

Q: What should be done if a patient reports having a TMJ Teflon-Proplast implant, or Silastic implant or total TMJ prostheses?

A: A specific protocol has been recommended for TMJ Teflon-Proplast and Silastic implants and total joint prostheses. Follow-up for these is beyond the scope of this book. If the practitioner is unsure of the implant type or management, it is recommended the practitioner refer the patient to, or work in conjunction with, someone who has greater expertise in this area.

Q: What is secondary gain and how common is it for TMD patients?

A: Secondary gain is a situation in which the patient is rewarded for having TMD; e.g., the patient receives disability payments or is excused from undesirable chores or work. Clinically this is not a commonly observed situation, but, if it is present, the patient may not relate improvement from any therapy.

Q: What should be done when a patient appears to have a tooth causing or contributing to the TMD symptoms?

A: A recommended approach to determine whether a tooth is causing or contributing to a patient’s TMD symptoms is provided in “Intraoral Examination” in Chapter 3.

A recommended “Initial Patient Questionnaire” is provided (Appendix 1) and may be reproduced for your patients to complete. The questionnaire is designed to efficiently use the time spent interviewing patients. The practitioner’s customary medical history form should be used in conjunction with this questionnaire.
Collecting Symptom History

The “Initial Patient Questionnaire” is designed to efficiently use the time spent interviewing patients and should be used in conjunction with the practitioner’s customary medical history form.

The practitioner may desire to add an additional page to obtain medical and dental insurance information and the name and address of the individual who recommended that the patient come to your office, in addition to the name and address of the patient’s physician and dentist. It is comforting to a referring provider to receive a letter acknowledging that the referral was appropriate and providing the practitioner’s findings and recommended treatment. This also tends to encourage the referring provider to recommend your office the next time a patient with a similar complaint needs treatment. A copy of this letter is often sent to the patient’s physician and dentist (if not the referring doctor); a release statement is included in the “Initial Patient Questionnaire” for this purpose.

The questionnaire appears to keep patients from elaborating in nonproductive discussions or becoming irritated by the number of questions asked, and prevents the practitioner from forgetting to ask relevant information. Clinical experience suggests a patient’s responses are not always accurate and the examiner needs to review the answers with the patient. For better patient recall, it appears best if the patient arrives 15 minutes prior to the appointment and completes the questionnaire just prior to the appointment.

Chapter 2, “Review of Initial Patient Questionnaire,” presents the key points for each of the questions and is designed to help a practitioner quickly evaluate a patient’s responses. Many of the questions are self-explanatory, but additional discussion for some of the questions as well as supplementary information are provided below:

Question 6 (What treatments have you received?), with additional inquiries, gives an indication of which treatments were previously beneficial for the patient. For example, if the patient found that an occlusal appliance (which the patient no longer has) resolved the symptoms, then fabricating another appliance should be very beneficial. Reinforce to the patient that using the treatments (e.g., application of heat) he or she previously found beneficial can again be beneficial. If the patient has previously received the therapies the practitioner traditionally provides, without satisfactory benefit, the practitioner may desire to refer the patient to someone with greater expertise in this area.

TMJ implants composed of Teflon-Proplast and Silastic have a history of fragmenting, causing a foreign-body response that results in progressive degeneration of the condyle and glenoid fossa. A specific protocol has been recommended for these implants and total joint prostheses.1 Follow-up for these is beyond the scope of this book. If a practitioner is unsure of the implant type or management, it is recommended the practitioner refer the patient to, or work in...
conjunction with, someone who has greater expertise in this area.

Question 7 (When are the symptoms the worst?) will often help identify the time when significant contributing factors are present. Patients with nighttime parafunctional habits usually have an increase in pain when they first awake, whereas patients with daytime parafunctional habits have an increase in pain during the day or evening. The examiner may be able to elicit more specific periods, e.g., during or after driving, or when using the computer.

**FOCAL POINT**
Patients with nighttime parafunctional habits usually have an increase in pain when they first awake, whereas patients with daytime parafunctional habits have an increase in pain during the day or evening.

**QUICK CONSULT**
Observing for Significant Contributing Factors

When discussing a patient’s symptom pattern, an examiner may be able to elicit specific periods when significant contributing factors are present, e.g., during or after driving, or when using the computer.

Question 8 (What does the pain keep you from doing?) gives the practitioner a sense for how much the pain is affecting the patient’s life. This may correlate with how motivated the patient will be to participate in therapy and the level of therapy the patient may be interested in receiving. Occasionally this answer is out of proportion with other features of the examination; e.g., the patient is unable to work, but has only minimal palpation tenderness. Additional questions may reveal the patient continues to participate in other activities, such as yelling at basketball games. This inconsistency may suggest that other factors are involved, commonly referred to as secondary gain.²

Question 9 (What is the quality of the pain?) helps identify some possible conditions for a patient’s pain. Patients most commonly characterize TMD pain as an ache, pressure, or dull pain. If throbbing is one of the components, generally the patient’s disorder falls within one or more of the following three situations:

First, some patients report their pain is an ache, pressure, or dull character and, when it worsens, its character changes to throbbing. The patient may have nausea, photophobia, and/or phonophobia associated with the throbbing pain. Clinically it appears that, if the ache, pressure, or dull pain can be satisfactorily reduced, it can be prevented from escalating to the throbbing level.

**QUICK CONSULT**
Reducing Throbbing Pain

Clinically it appears that, if a patient relates the ache, pressure, or dull pain worsens to throbbing and can be satisfactorily reduced, this prevents the pain from escalating to the throbbing level.

In a second situation, the patient does not report that an ache, pressure, or dull pain progresses into throbbing pain. This pain is sometimes due to a source that does not respond to TMD therapy. The practitioner may desire to perform an occlusal appliance therapy trial and, if it is not effective, consider a referral to the patient’s physician or neurologist for a probable migraine. Studies suggest some migraines respond to TMD therapy, but characteristics for identifying which migraines respond are not well established.³ ⁴

For other patients, the throbbing pain may be referred pain from an oral problem (most commonly a tooth). Sometimes the perceived painful site (e.g., masseter muscle and/or TMJ) appears as the source to the patient, whereas the actual source (e.g., a tooth) has minimal symptoms. This is simi-
lar to how a patient suffering from a heart attack may perceive pain only in the left arm, whereas the pain's source is the heart. Treatment for the pain must be directed toward the source, not the site where it is felt.

**QUICK CONSULT**

Observing for Throbbing Pain Sources

Throbbing pain may be referred pain from an acute pulpalgia.

A study of patients suspected of having TMD by their dentists, but whose TMD pain upon additional examination was found primarily to be referred odontogenic pain, reported that (a) none of the periapical radiographs revealed apical pathosis and (b) patients related that palpating the perceived painful site often reproduced the patient’s pain.

The study found four helpful characteristics for identifying patients who have a tooth causing or contributing to their TMD symptoms: (a) throbbing is a component of the pain, (b) the pain wakes the patient at night, (c) the pain increases when the patient lies down, and (d) the pain increases when the patient drinks hot or cold liquids. Evaluating and treating referred odontogenic pain are discussed further in Question 10 and in “Intraoral Examination” in Chapter 3.

Burning is infrequently reported by TMD patients, whereas most neuropathic pains include a burning quality. Sympathetically maintained neuropathic pain occurs from tissue injury and may occur from routine dental procedures, e.g., a simple tooth extraction. Clinical experience has shown that, if burning is combined with the typical TMD pain qualities (ache, pressure, or dull pain), usually the burning correspondingly resolves with the ache, pressure, or dull pain from TMD therapy. If burning has not resolved from initial TMD therapy or is the patient's most prominent pain quality, the practitioner may desire to refer the patient to someone with greater expertise in this area.

Along with those already discussed, many other pain qualities are possible, e.g., an electrical or stinging sensation. Knowledge of a patient's pain qualities will help a practitioner determine whether treatment for TMD has a high probability of benefiting the patient or whether this treatment may delay the evaluation for another, more probable, disorder.

**Question 10** attempts to identify whether the practitioner should be suspicious that sinus congestion or odontogenic pain may be contributing to the patient's complaint. Patients with sinus congestion tend to find an aggravation when they change their head position, i.e., lie down or bend forward. If the patient responds positively to this question, it is recommended that the practitioner further inquire as to whether sinus congestion appears to contribute to the pain; e.g., whether the patient finds decongestants or antibiotics help relieve the pain. If the patient is unaware of the impact decongestants or antibiotics have on the pain and the practitioner suspects sinus congestion involvement, the practitioner may desire to perform a trial treatment with one or both of these medications or to refer to a physician for evaluation and management. Some patients with masticatory muscle pain receive little relief with decongestants, but these symptoms are eliminated completely after administration of antibiotics for a sinus infection.

**QUICK CONSULT**

Observing for Sinus Congestion Contribution

Patients with sinus congestion tend to find an aggravation when they change their head position, i.e., lie down or bend forward.

Historically patients with odontalgia tend to report their pain wakes them at night, increases when they lie down, and/or increases...
when they drink hot or cold liquids. If a patient responds positively to one or more of these questions or has throbbing pain, this should raise a suspicion that a tooth may be causing or contributing to the TMD symptoms.5

**QUICK CONSULT**

**Observing for Odontalgia Contribution**

Historically patients with odontalgia tend to report their pain wakes them at night, increases when they lie down, and/or increases when they drink hot or cold liquids.

Sometimes patients incorrectly answer “Yes” to the question “Does your pain increase when you drink hot or cold liquids?” When these patients elaborate, it becomes apparent that cold only causes tooth discomfort rather than aggravating their facial pain.

When the practitioner suspects that a tooth may be causing or contributing to the TMD symptoms, further evaluation is indicated. A recommended evaluation approach and treatment considerations are provided in “Intraoral Examination” in Chapter 3.

**Questions 11, 12, and 13** attempt to quantify the pain, requiring the patient to delineate its intensity, frequency, and duration. The first two questions introduce patients to rating their pain intensity from 0 to 10 and give the practitioner a sense of the patient’s pain history. This numerical rating system is the most effective manner we have at this time for rating pain intensity.9 A concise and commonly used terminology for frequency is constant (always present), daily (occurs every day, but not constantly), weekly (occurs every week, but not daily), etc.

Duration may be momentary, the average number of seconds to hours, or constant. The pain may vary greatly and can be difficult to quantify accurately. For brevity, it is often clinically satisfactory to just document the average intensity and frequency in the patient’s record, but in some situations the practitioner may want to include the extremes and/or durations.

**Question 14** attempts to identify unusual symptoms, which may be suggestive of other disorders that could mimic or coexist with TMD. For example, a progressively increasing open bite of the anterior teeth may be from the TMJ losing its vertical height, generally due to severe TMJ osteoarthritis. As the condylar height collapses, the most posterior ipsilateral (affected side) tooth becomes the first tooth to contact, acts as a fulcrum, and progressively creates an open bite for the remaining dentition. The open bite generally begins on the contralateral (nonaffected side) anterior teeth and progressively spreads bilaterally until the only tooth that contacts is the most posterior ipsilateral tooth. This disorder and its treatment are complicated and beyond the scope of this book. Practitioners observing this complaint may desire to refer the patient to someone with greater expertise in this area.

It is not uncommon for a patient to relate autonomic changes, which are induced by central excitation produced by the pain. These can include the face becoming red, puffy, or having thermal changes near the area of the pain; the eye becoming bloodshot or tearing; and/or the nose running or becoming congested. These autonomic changes occur when the pain is aggravated and should resolve when it lessens or resolves.6 They are sometimes reproduced when the practitioner aggravates the pain during the palpation evaluation.

**Questions 15, 16, and 17** provide a rapid tool to screen for a non-TMD that may be the cause of the pain or negatively impact it.10,11 The practitioner can skip each question the patient answers with a “No,” but needs to inquire further and consider the comments in a “Review of Initial Patient Questionnaire” (Chapter 2) for each question with a “Yes” answer.

Two disorders that are moderately preva-
lent among TMD patients often negatively influence TMD symptoms and treatment, and the practitioner must be very observant to identify them. The first is **cervical dysfunction** (cervical pain and/or restricted movement); one study found that 23 percent of TMD patients had cervical dysfunction with a severity that warranted referral.\(^\text{12}\) Cervical dysfunction may not only directly affect the masticatory system and its ability to respond to therapy, but it may also cause referred pain to the masticatory structures, which can add to a patient’s TMD symptoms or be the sole cause of the TMD symptoms.\(^\text{11,13}\)

**QUICK CONSULT**

**Observing Cervical Dysfunction and Fibromyalgia Effects on TMD Therapy**

Cervical dysfunction and fibromyalgia often negatively influence TMD symptoms and treatment response.

Recommended cervical palpation techniques to identify referred pain from the cervical region to the head and face are provided in “Palpation” in Chapter 3. The scope of clinical practice for TMD has been determined to include the diagnosis and treatment of disorders affecting the entire head and neck. This is consistent with the historical precedent in dentistry and within the scope of current dental practice.\(^\text{14}\)

The other disorder that practitioners must be very astute in identifying is **fibromyalgia**. It is characterized by widespread pain, multiple tender points over the body, poor sleep, stiffness, and generalized fatigue. Only about 2 percent of the general population has fibromyalgia, whereas 18 to 23 percent of TMD patients have it.\(^\text{11,15}\)

It has been shown that TMD patients with fibromyalgia, widespread pain, or neck pain do not respond as well to TMD therapies as do those without these comorbid disorders.\(^\text{16-18}\) Therefore, it is important to identify patients with these disorders and inform them about the potential negative impact this may have on their treatment. If it appears a patient is not receiving adequate therapy for the coexisting disorder, it is recommended the patient discuss treatment alternatives with their medical provider or be referred to someone who specializes in the area.

It is recommended that patients suspected of having fibromyalgia be referred to a physician for definitive diagnosis and management. There have been instances in which patients diagnosed with fibromyalgia by rheumatologists have had their fibromyalgia advance to other disorders, such as multiple sclerosis.

**Questions 18, 19, and 20** ask about TMJ noise and the inability to open or close the mouth. The latter can be of muscle or TMJ origin. A “TMJ Disc Displacements” diagram is provided as Appendix 2 and may be reproduced for your patients. It is helpful for explaining the cause of their TMJ noise and/or inability to open or close.

**QUICK CONSULT**

**Explaining Mechanical Disorder**

A “TMJ Disc Displacements” diagram is provided as Appendix 2 and is helpful for explaining the cause of a patient’s TMJ noise and/or inability to open or close.

The diagram is broken into four sections, with the top left section providing a view of the skull with the zygomatic arch cut so the entire temporalis muscle can be visualized. This enables the provider to demonstrate how the temporalis muscle functions and how clenching or other oral habits can overuse this muscle, thereby causing pain similar to that caused by overuse of any muscle in the body. The zygomatic arch can be drawn in and the masseter muscle drawn over the ramus, and a similar discussion about mus-
cle-overuse pain can be provided. The lateral pterygoid muscle can also be drawn to explain the symptoms and treatment for lateral pterygoid myospasm (explained in Chapter 9, “Lateral Pterygoid Myospasm”). The articular eminence is also displayed so that condylar dislocation (the condyle catches or locks in front of the eminence) and its treatment may be demonstrated. Conservative therapies for dislocation are also provided in Chapter 11, “TMJ Dislocation.”

To orientate the patient for the next section of the diagrams, point to the ear on the skull and then to the ear in the top right section. This drawing provides an avenue to explain the “normal” disc-condyle alignment. If the patient has a TMJ click or pop, the most probable situation is that the elastic ligament (the retrodiscal tissue, in addition to its attachment complex) is stretched and the disc-condyle alignment looks like the top drawing in the bottom left section in which the disc is displaced. As the condyle translates forward (e.g., during opening), it moves into the center of the disc (the reduced position), and, as the individual closes, the condyle retrudes off the disc. This is commonly referred to as TMJ disc displacement with reduction, which is the terminology that is used in this book.

This section can visually explain the opening and/or closing click. Sometimes patients are also informed about how the tension in the closure muscles (temporalis, masseter, and medial pterygoid) brace the condyle in a superior position, which may promote a greater mechanical interference between the condyle and disc. Clinically patients report this effect by their TMJ click, catch, or lock occurring more frequently or with greater intensity when they are stressed, while eating, or after clenching their teeth.

For patients experiencing limited translation due to the disc blocking their normal opening (acute TMJ disc displacement without reduction), the bottom right diagram can help visually explain the mechanical problem and treatment. This is discussed in Chapter 5, “TMD Diagnostic Categories,” and in Chapter 10, “Acute TMJ Disc Displacement without Reduction.”

Many patients report the presence or history of TMJ noises (Question 18), since TMJ clicking or popping is very prevalent among the TMD and general populations. These noises may occur with opening and/or closing, can fluctuate in intensity, and occur sporadically. If a patient has TMJ clicking or popping, the most likely diagnosis is TMJ disc displacement with reduction. If the joint noise is course crepitus, then the most likely diagnosis is chronic TMJ disc displacement without reduction; see Chapter 5, “TMD Diagnostic Categories,” for an explanation of this terminology. A more accurate assessment of the disc-condyle alignment can be obtained by magnetic resonance imaging (MRI) of the TMJ, but the findings rarely change the treatment approach, and MRI is rarely indicated at the initial TMD evaluation. For more information on TMJ imaging, see Chapter 4, “Imaging.”

Quick Consult

Requesting MRIs

MRI findings rarely change the treatment approach, and MRI is rarely indicated at the initial TMD evaluation.

The inability to open wide (Question 19) is generally due to either a TMJ disorder (e.g., acute disc displacement without reduction) or a muscle disorder. Discussing the onset and its history is often beneficial and may aid in determining the cause. If this limitation is intermittent, patients with an acute disc displacement without reduction are usually aware that the TMJ is blocked at the opening where the TMJ normally clicks or pops. Typically they suddenly have a restricted opening, which just as abruptly releases, allowing them to obtain their normal opening once again. The acute disc displacement without reduction may be persistent,
but often has a history of being intermittent. Conversely an intermittent muscle disorder generally develops and resolves slowly for each episode.

**FOCAL POINT**
If a TMJ disc intermittently blocks a patient from opening wide, the patient is usually aware that the TMJ is blocked at the opening where the TMJ normally clicks or pops, it suddenly occurs, and just as abruptly releases; conversely an intermittent muscle disorder generally develops and resolves slowly for each episode.

If a patient has a restricted opening, the practitioner may be able to determine its origin by stretching the mouth wider. This is usually done by placing the index finger over the incisal edges of the mandibular incisors and the thumb over the incisal edges of the maxillary incisors and pressing the teeth apart by moving the fingers in a scissor-type motion (Figure 1-1). The patient will usually feel tightness or pain at the location of the restriction. From clinical experience, not all patients accurately point to the stretched discomfort location, and it is necessary to palpate the TMJ and musculature to reproduce the discomfort in order to identify its origin.

**TECHNICAL TIP**
**Determining Origin of a Patient’s Restricted Opening**
The practitioner may be able to determine a patient’s restricted opening origin by stretching the mouth wider and determining the location of the created discomfort.

It should be kept in mind that there are other potential, though less common, causes for patients having a restricted opening. Generally these patients complain only about a restricted opening, not pain. Some examples of these are TMJ ankylosis, myofibrotic contracture, and cornoid process impedance. These disorders are beyond the scope of this book, and if the practitioner suspects the patient may have one of them, he or she may desire to refer the patient to someone with greater expertise in this area.

Patients may report episodes of being unable to close their mouth (Question 20). From clinical experience, there are several common causes for a positive response to this question. If the patient reports the TMJ catches or locks at an opening of 45 mm or wider, the condyle has the potential of being in front of the eminence (TMJ dislocation). Among patients with this complaint, multiple disc-condyle relations have been observed, and investigators have postulated that the catching or locking is due to (a) the articular eminence obstructing the posterior movement of the disc-condyle unit, (b) the disc obstructing the posterior movement of the condyle, or (c) a combination of the two. Traditional TMD therapies have been shown to improve this condition. Conservative treatments for TMJ dislocation are provided in Chapter 11, “TMJ Dislocation.”
If the patient’s TMJ catches or locks during closure in a range of approximately 10 to 35 mm, the articular eminence should not be involved, and it would most probably be only the disc that is obstructing the posterior movement of the condyle. There is no consistent disc-condyle relationship for this interference, but it is speculated the most common scenario is that the patient has a TMJ disc displacement with reduction. The interference occurs during closure when the condyle is in the reduced position and the condyle has difficulty moving or is temporarily unable to move below the posterior band of the disc; this is the typical location of the closing click. This closing catch or lock occurs similarly to the way in which an opening click’s mechanical interference worsens to become an opening catch or lock. The bottom left diagram of the “TMJ Disc Displacements” handout (Appendix 2) may help to explain this mechanical interference visually to patients. From clinical experience, this problem resolves with traditional conservative TMD therapies.

A third common cause of patients reporting an inability to close is a lateral pterygoid myospasm. In this situation, the inferior lateral pterygoid muscle is in constant involuntary contraction at a partially shortened position. This is similar to the calf muscle cramp that has awakened many of us in the middle of the night.26 Upon awaking, the individual notes the calf pain and calf cramp in which he or she has difficulty and increased pain when attempting to move the foot up or down. A patient with a lateral pterygoid myospasm similarly has difficulty and increased pain when attempting to translate the condyle forward or retract the jaw so the teeth fit into maximum intercuspation. The patient usually complains of the inability to put the ipsilateral posterior teeth together without excruciating pain, the teeth are usually separated by a fraction of a millimeter to a few millimeters, and the first tooth contact is in the area of the contralateral canine (if the patient has normal tooth alignment). Since the patient has difficulty translating forward, he or she usually also has a marked limited opening. A diagnostic test and treatments are provided in Chapter 9, “Lateral Pterygoid Myospasm.”

Questions 21 through 27 ask about potential contributing factors to a patient’s TMD. Some contributing factors are not asked about in this questionnaire, but will become apparent when the provider or staff member reviews the “TMD Self-management Therapies” handout with the patient (e.g., gum chewing, caffeine consumption, or stomach sleeping). This handout is provided as Appendix 3.

Poor sleep may constitute the inability to fall asleep, stay asleep, or awake feeling rested (Question 21). Poor sleep has been shown to correlate with increased muscle pain and can be a predictor of patients who will respond poorly to TMD therapy.27-29 A good system to use to evaluate poor-sleep severity is to ask the patient to rate his or her sleep quality between 0 and 10. Intuitively, when most of us do not get adequate sleep, we tend to feel more aches and pain, be more irritable, etc. The effects of inadequate sleep tend to contribute to a TMD patient’s symptoms on both a physical and psychosocial basis.29 From clinical experience, when a patient relates that poor sleep is primarily due to TMD pain, it has been observed that, when the TMD pain resolves, generally the sleep problem also resolves. To ensure a patient’s needs and desires are met, when other causes of poor sleep are involved, the provider may ask the patient to discuss this with his or her physician, refer the patient for relaxation therapy, or refer the patient to someone who specializes in sleep disorders. A book reference is provided in “Sources for Additional TMD Information,” Appendix 12, which patients may find helpful for improving their sleep. If the patient has poor sleep and awakes with morning TMD pain, the practitioner may desire to prescribe amitriptyline...