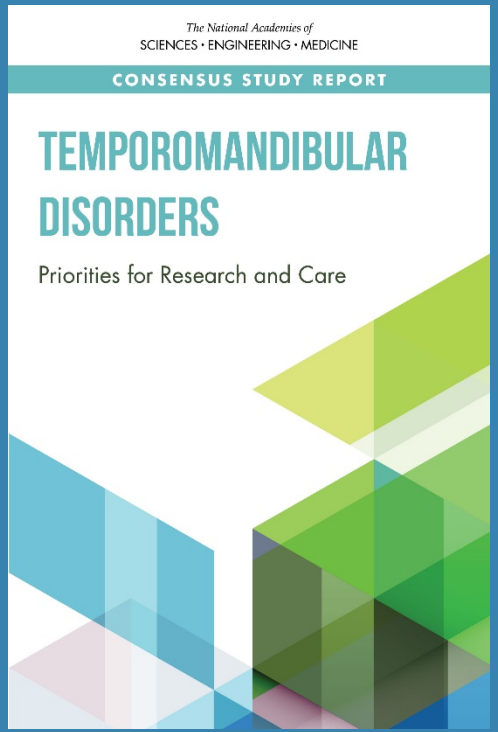
The National Academies of SCIENCES ENGINEERING MEDICINE



Temporomandibular Disorders: Priorities for Research and Care

Committee on Temporomandibular Disorders (TMDs): From Research Discoveries to Clinical Treatment

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Abbreviated Statement of Task

An ad hoc committee of the Health and Medicine Division of the National Academies will convene to address the current state of knowledge regarding TMD research, education and training, safety and efficacy of clinical treatments, and burden and costs association with TMDs. Specifically, the committee will:

- Review and estimate the public health significance of TMDs;
- Evaluate the evidence base for assessment, diagnosis, treatment, and management of acute and chronic TMDs;
- Identify barriers to appropriate patient-centered TMD care;
- Review the state of the science for TMDs;
- Identify opportunities and challenges for development, dissemination, and implementation of safe and effective clinical treatments for TMDs;
- Identify scientific and clinical disciplines needed to advance TMD science, treatments, and education and training in these disciplines;
- Identify multidisciplinary/interdisciplinary research approaches necessary in the short- and long-term to advance research and improve diagnosis and treatment of TMDs.

Input from Individuals with TMDs: Challenges in Care

- **Lack of coordinated care and abandonment**
- **Over-treatment and harmful treatment**
- **Impact on quality of life**
- **Financial burden – often out-of-pocket**
- **Challenges in identifying qualified health care professionals**
- **Living with multiple comorbidities**

Patient Voices

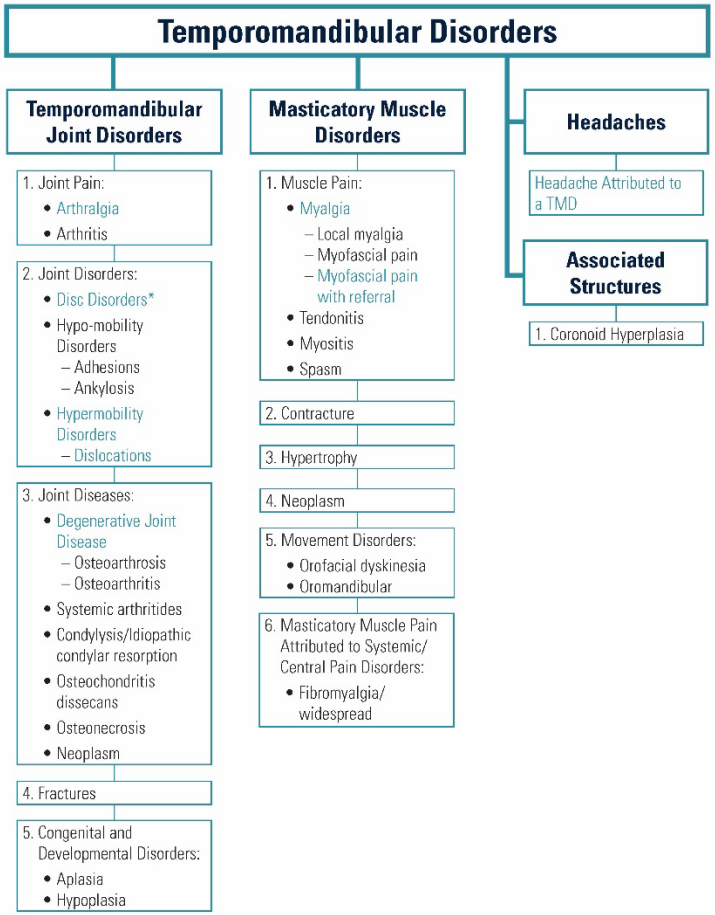
"*Because of the severity of the pain it is sometimes impossible to eat or talk. The pain from simply smiling can reduce me to tears*" – **Betty**

"*TMD has affected every aspect of my life: physically, emotionally, financially, psychologically, professionally, and it has affected my relationships, my passions, my independence, and at times my dignity. It cut me off at the knees and changed the landscape of my life, and what I imagined my life would be*. - **Adriana V.**

"What I want to see going forward is research on just what TMDs are – research that validates the safety and effectiveness of every treatment for TMDs. [….] There is no reason we should not have the research on the TM joint that exists on every other joint in the body." – **Lutricia M.**

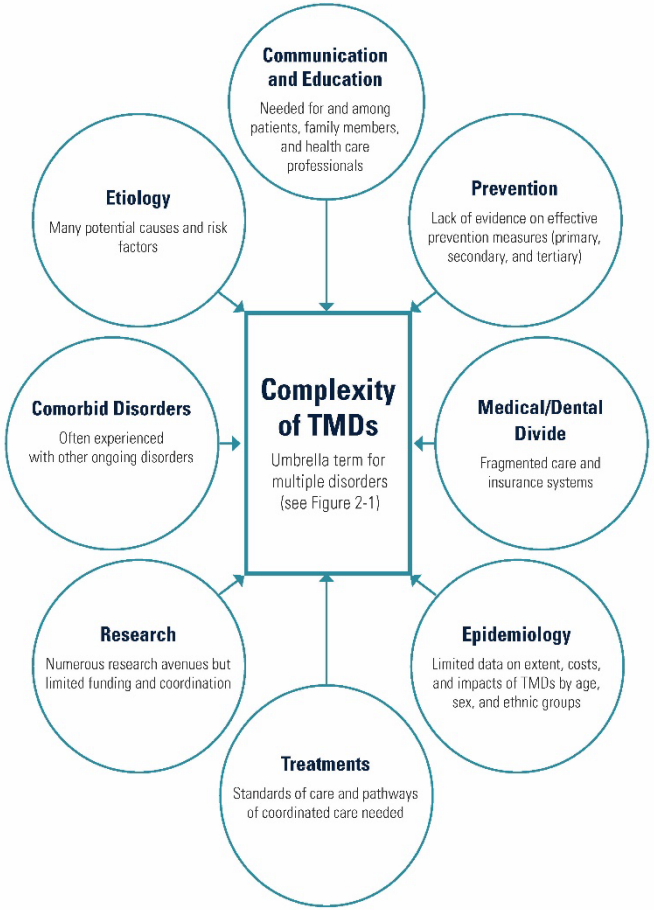
Findings

- TMDs are a **set of diverse and multifactorial conditions** that can occur at different stages in an individual's life with a range of manifestations, impacts on quality of life, and comorbidites.
- TMDs are **highly prevalent** – one analysis finds an estimated 4.8 percent of U.S. adults (11.2 to 12.4 million U.S. adults in 2018) had pain in the region of the TMJ that could be related to a TMD. The prevalence of high-impact chronic pain was nearly fourfold (26.9 versus 7.0 percent) in people with orofacial pain symptoms.
- TMDs have a **significant public health impact** and are a health, social, financial, and emotional burden on many individuals and families.


Temporomandibular Disorders
Temporomandibular Joint Disorders
1. Joint Pain:
• Arthralgia
• Arthritis
2. Joint Disorders:
• Disc Disorders*
• Hypo-mobility Disorders
– Adhesions
– Ankylosis
• Hypermobility Disorders
– Dislocations
3. Joint Diseases:
• Degenerative Joint Disease
– Osteoarthrosis
– Osteoarthritis
• Systemic arthritides
• Condylysis/Idiopathic condylar resorption
• Osteochondritis dissecans
• Osteonecrosis
• Neoplasm
4. Fractures
5. Congenital and Developmental Disorders:
• Aplasia
• Hypoplasia
Masticatory Muscle Disorders
1. Muscle Pain:
• Myalgia
– Local myalgia
– Myofascial pain
– Myofascial pain with referral
• Tendonitis
• Myositis
• Spasm
2. Contracture
3. Hypertrophy
4. Neoplasm
5. Movement Disorders:
• Orofacial dyskinesia
• Oromandibular
6. Masticatory Muscle Pain Attributed to Systemic/Central Pain Disorders:
• Fibromyalgia/widespread
Headaches
Headache Attributed to a TMD
Associated Structures
1. Coronoid Hyperplasia

Findings *(cont'd)*

- TMDs have been **compartmentalized as a dental issue for too long**. Further, the **divide between medical and dental care is currently vast** and profoundly affects care systems, payment mechanisms, and professional education and training.
- The committee supports a **biopsychosocial model of TMDs** that is interdisciplinary and can be used across medicine and dentistry to focus on the total person's health and well-being.
- **Outdated and non-evidence based beliefs** about TMD therapies have been and continue to be harmful.
- **Evidence-based clinical practice guidelines** for TMD care are needed as well as efforts to enhance accessibility to high-quality, patient-centered care.


Communication and Education
Needed for and among patients, family members, and health care professionals
Etiology
Many potential causes and risk factors
Prevention
Lack of evidence on effective prevention measures (primary, secondary, and tertiary)
Comorbid Disorders
Often experienced with other ongoing disorders
Complexity of TMDs
Umbrella term for multiple disorders (see Figure 2-1)
Medical/Dental Divide
Fragmented care and insurance systems
Research
Numerous research avenues but limited funding and coordination
Epidemiology
Limited data on extent, costs, and impacts of TMDs by age, sex, and ethnic groups
Treatments
Standards of care and pathways of coordinated care needed

Action Areas

- Build and Sustain Collaborative and Multidisciplinary **Research**
  (Recommendations 1 – 4)
- Improve Access to and Quality of TMD **Health Care**
  (Recommendations 5 – 8)
- Improve Health Care **Professional Education** about TMDs
  (Recommendations 9 and 10)
- Raise **Awareness**, Improve Education, and Reduce Stigma
  (Recommendation 11)

Research

- Despite investment in research directly and indirectly related to TMDs, researchers have yet to unravel the etiologies and pathophysiologies of TMDs or to meaningfully translate research findings into improved clinical practice.
- Engagement by multiple stakeholders will be required to dismantle the siloes keeping research fields isolated and to advance TMD research and care.
- An organized research approach for TMDs is needed to bring together public and private stakeholders to focus future research efforts on filling key evidence gaps in TMD research and care and to ensure that clinically meaningful, patient-centered outcomes are prioritized.

Build and Sustain Collaborative & Multidisciplinary Research

Recommendation 1: Create and Sustain a National Collaborative Research Consortium for TMDs

A National Collaborative Research Consortium for TMDs should be established and sustained to coordinate, fund, and translate basic and clinical research (including behavioral, population-based, and implementation research) to address evidence gaps, generate clinically-meaningful knowledge, identify safe and effective treatments, and improve the quality of TMD care. The consortium would:

- Establish and implement a national research framework for TMDs;
- Provide infrastructure for the implementation of research projects;
- Establish milestones and timelines;
- Facilitate research collaborations;
- Develop public-private partnerships;
- Develop and test evidence-based strategies for knowledge transfer;
- Support the development of a multidisciplinary research workforce for TMDs through existing and new training center initiatives; and
- Evaluate progress and disseminate research findings.

The NIH Office of the Director and NIDCR should lead an effort to establish the National Collaborative Research Consortium for TMDs. Specific actions detailed in bullet points that follow the recommendation.

Build and Sustain Collaborative & Multidisciplinary Research

Recommendation 2: Strengthen Basic Research and Translational Efforts

The National Collaborative Research Consortium for TMDs along with other funders should fund basic research efforts and ensure its translation as part of a patient-focused, multidisciplinary research agenda on TMDs to address evidence gaps, generate clinically meaningful knowledge, identify effective treatments, and improve quality of care.

Recommendation 3: Strengthen Population-Based Research on the Public Health Burden of TMDs

The National Collaborative Research Consortium for TMDs along with other funders should expand and strengthen the collection, assessment, and dissemination of population-based data on the burden and cost of TMDs and the effects of TMDs on patient outcomes in order to improve the prevention (primary, secondary, and tertiary) and management of TMDs.

Recommendation 4: Bolster Clinical Research Efforts to Build the Evidence Base for Patient-Centered TMD Care and Public Health Interventions

The National Collaborative Research Consortium for TMDs along with other funders should fund clinical and implementation research to clearly define effective treatments and continuously improve the quality of care for patients with a TMD.

Health Care

- Currently there is a **minimal amount of high-quality data** to guide clinical decision making, particularly regarding what treatment approaches are best for each specific type of TMD.
- **Self-management** and patient education can be important components of care of TMDs. Some elements of **physical therapy**—including exercise and manual therapy—have been shown to improve pain and functional outcomes.
- Although considerable research has been conducted in **occlusal adjustment and equilibration** for TMDs, these treatments have not been found to be effective.
- **Evidence-based clinical practice guidelines** from a trusted source are needed.
- **Insurance coverage** for care of TMDs is not consistent and may not provide coverage for low-risk effective treatments (such as self-management and physical therapy), while higher-risk treatments (such as some medications and surgery) are covered.

Improve Access to and Quality of TMD Health Care

Recommendation 5: Improve the Assessment and Risk Stratification of TMDs to Advance Patient Care

Diagnostic tools and resources for TMDs should be improved for the initial assessment by primary care clinicians and dentists and for referrals to specialists as needed. These efforts should include the development of decision criteria for risk stratification to aid in identifying patients who are likely to escalate from self-limiting and localized symptoms to a systemic pain condition and then to high-impact pain. Initial instruments will be based on the current understanding of TMD science, though limited, and should be informed by the science as it evolves.

Recommendation 6: Develop and Disseminate Evidence-Based Clinical Practice Guidelines and Quality Metrics for TMD Care

Clinical practice guidelines should be developed and widely disseminated that provide evidence-based pathways for the initial recognition and stepped care management of TMDs and for specialty care for patients with TMDs. Once clinical practice guidelines are developed, clinical performance measures should be deployed in quality improvement initiatives.

Improve Access to and Quality of TMD Health Care

Recommendation 7: Improve Reimbursement and Access to High-Quality Assessment, Treatment, and Management of TMDs

Insurers and health care systems across dentistry and medicine should provide consistent, fair, equitable and appropriate insurance coverage for safe and effective treatments for TMDs.

Recommendation 8: Develop Centers of Excellence for TMDs and Orofacial Pain

Centers of Excellence for TMDs and Orofacial Pain should be established to provide comprehensive evaluations and treatment of individuals with TMDs; to serve as a resource for clinicians (including interprofessional consultations and telehealth opportunities); to contribute to the research base for TMDs; and to provide onsite and virtual education and training, particularly continuing education, for a range of health care professionals. Centers should involve a range of specialists across medicine, dentistry, and other areas of health care and should include patient representatives in the planning and implementation.

Professional Education

- Some dentists continue to use **harmful or costly treatment approaches** that are known to be ineffective for temporomandibular disorders (TMDs).
- Due to education, training, and financing mechanisms, there is often a **lack of collaboration between clinicians**, particularly dentists and physicians, and this divide can make it challenging for patients with temporomandibular disorders (TMDs) to access and coordinate care.
- Most general dentists and many specialists receive **inadequate education and training** in temporomandibular disorders (TMDs) and orofacial pain.

Improve Health Care Professional Education About TMDs

Recommendation 9: Improve Education and Training on TMDs for Health Care Professionals

Health professional schools and relevant professional associations and organizations across medicine, dentistry, nursing, physical therapy, and all other relevant areas of health care should strengthen undergraduate, graduate, pre- and postdoctoral, residency, and continuing education curricula in pain management, orofacial pain, and TMD care for health professionals and work to ensure interprofessional and interdisciplinary training opportunities.

Recommendation 10: Establish and Strengthen Advanced/Specialized Training in Orofacial Pain and TMD Care

The number and quality of health professionals with specialized training in pain management, orofacial pain, and TMDs should be increased, recognizing the existence of such barriers as reimbursement and recognition of the practice of orofacial pain.

Awareness, Public Education, and Stigma

Key Messages for the General Public:

- Not all TMDs are the same.
- Avoid harm.
- Explore options for care.
- Be empowered to ask questions, seek person-centered care, and get multiple opinions.
- The knowledge base underlying the biology of TMDs and the care of patients is in its infancy.

Raise Awareness, Improve Education, and Reduce Stigma

Recommendation 11: Raise Awareness, Improve Education, and Reduce Stigma

Evidence-based communications and patient-focused tools related to TMDs should be strengthened, promoted, and widely disseminated through multiple avenues for adults and youth of all health literacy levels and in multiple languages to raise public awareness about TMDs, improve the resources available to patients and families, and reduce the stigma related to TMDs.

Multiple Stakeholders Need to Engage

- Patient advocacy and patient-focused organizations
- Health care professionals - across many areas of dentistry, health, medicine
- Research funders and researchers
- Health professional associations and organizations
- Health care professional schools
- Health care systems and private and public dental and medical insurers

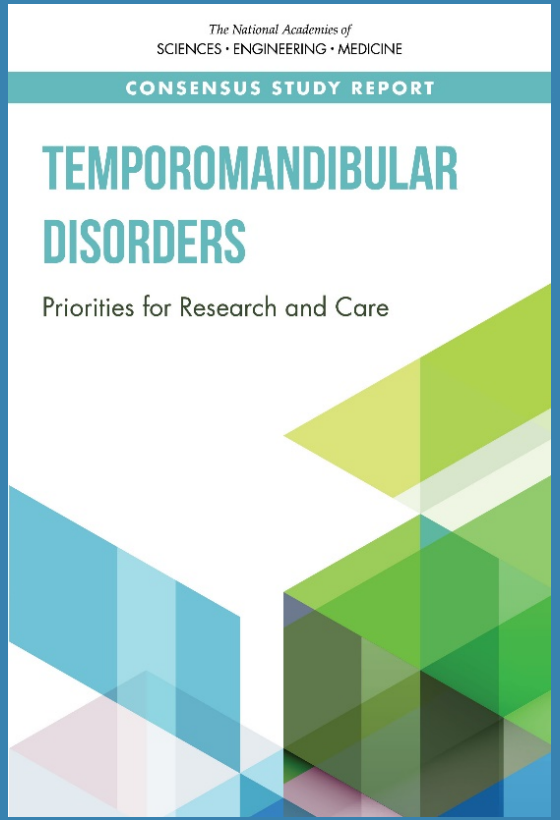
Moving Forward

Key to making a difference in improving care for individuals with a TMD will be

- **pioneering pathways** that span medicine, dentistry, physical therapy, and other fields of health care to provide holistic, comprehensive approaches to care—interprofessional and interdisciplinary efforts are of critical importance,
- willingness of health care agencies, organizations, and professionals to **commit the resources** needed to address this long-neglected and often dismissed area of health care, and
- openness and commitment to **using and strengthening the evidence base** on TMD treatment and changing practice as needed.

Thank You!

- **Public Release – March 12th**
  - 11 a.m. ET web release (resources become available online; email announcement)
  - 3 p.m. ET – Committee-hosted webinar (register to attend)
- **Dissemination materials (**available online on March 12th)
  - Complete prepublication report
  - 4-page report highlights
  - Slide set
- **Free PDF of the report** (available at the time of public release)
  - nationalacademies.org/tmdstudy



Supplementary Slides

Opportunities for Action – Research Funders & Researchers

- Establish and sustain a National Collaborative Research Consortium for TMDs to coordinate and translate basic and clinical research
- Strengthen basic research focused on improving clinical outcomes
- Expand population-based research to further understand the burden and costs of TMDs and identify areas for improving prevention and access to care
- Conduct pragmatic trials and other comparative effectiveness research on TMD treatments
- Develop a set of common data elements for clinical research on TMDs
- Test novel self-management strategies and disseminate effective interventions
- Develop and implement a national TMD patient registry
- Explore communications research needs for improving patient and public awareness of TMDs and evidence-based care

Opportunities for Action – Health Professional Associations and Organizations and Licensing Boards

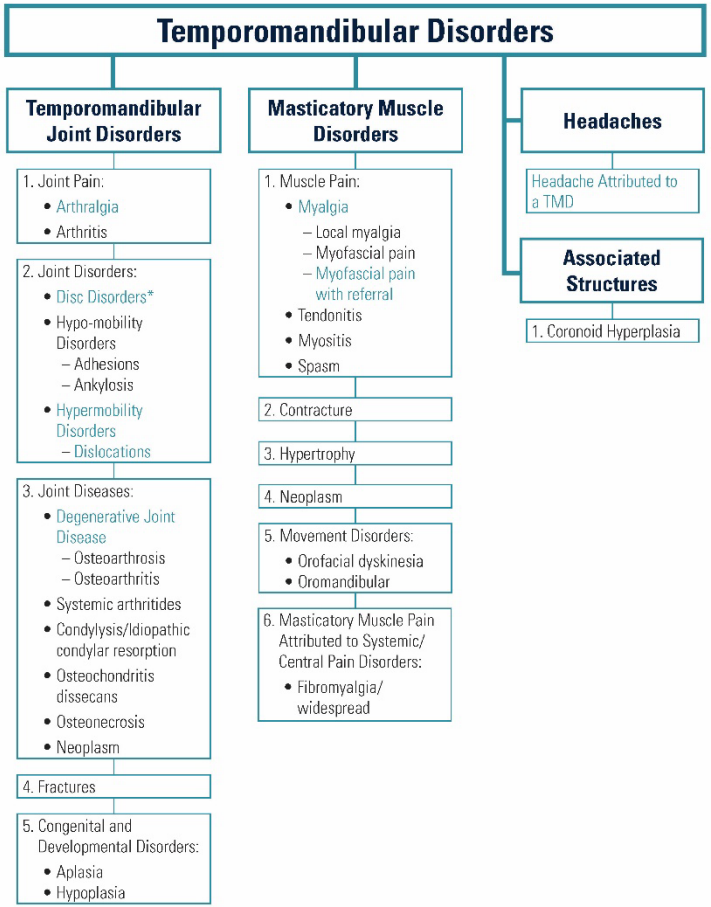
- Recognize orofacial pain as a dental specialty
- Expand and improve licensing exam questions about pain management and TMDs
- Ensure that continuing education programs on TMD care are evidence-based
- Develop and disseminate evidence-based information and resources on TMDs for patients and families and explore the feasibility of a public awareness campaign in collaboration with patient advocacy organizations
- Work with academic health centers to establish Centers of Excellence for TMDs and Orofacial Pain
- Improve TMD diagnostic and risk stratification tools

Opportunities for Action – Health Care Professional Schools

- Assess and improve curricula on TMD and pain management and care
- Promote interprofessional education and practice
- Ensure that continuing education programs on TMD care are evidence-based
- Improve opportunities in many health professions for clinical rotations and fellowships in pain management, orofacial pain, and TMD care
- Work to establish Centers of Excellence for TMDs and Orofacial Pain

Opportunities for Action – Health Care Systems and Private and Public Dental and Medical Insurers

- Develop mechanisms for providing access to consistent, fair, equitable, and appropriate insurance coverage for safe and effective treatments for TMDs
- Explore new delivery and payment models for Medicare, Medicaid, and CHIP to improve access, quality, and coverage for TMD care
- Explore—through pilot projects in health systems that integrate medicine and dentistry and other opportunities—effective TMD care pathways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Public Health Research Priorities

Research on

- Directionality of the relationship between TMDs and comorbidities.
- Current costs of TMD care disparities, including costs that result from health care use, lost work or educational opportunities, and the use of disability and other benefits.
- Diverse population studies, including longitudinal studies to better understand
  - the risk and natural history of specific types of TMDs; risk factors and comorbidities of TMDs; severity and chronicity of TMDs
  - the impact of TMDs, the treatment of TMDs, and the trajectories of these disorders on health, function, economic productivity, and quality of life
  - the life course of TMDs

Development and use of common data standards and definitions

Resolution of differences in medical and dental coding to facilitate interprofessional and multidisciplinary TMD research.

Clinical Trials of TMDs: Challenges and Opportunities

Challenges

- Current limited understanding of the mechanisms of TMDs, a lack of and poor translation of preclinical and clinical
- Lack of validated biomarkers to predict treatment response and stratify patients into clinically meaningful and mechanistically-based subgroups
- Lack of a national patient registry

Opportunities

- Adoption of a universal TMD case classification system, such as DC/TMD
- Innovative methodologies—pragmatic trials (e.g., cluster-randomized stepped-wedge blinded controlled trials)