TMD Professional Education, Research and Specialization: Perspectives from a Research Association

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IADR
International Association for Dental Research

MISSION

Drive dental, oral and craniofacial research for health and well-being worldwide.

VISION

Oral health for the world through discovery and dissemination.

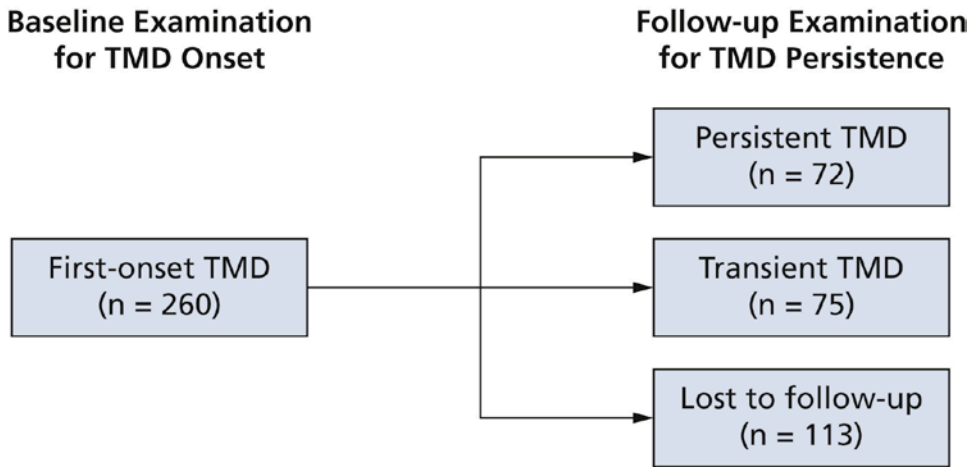
IADR Core Values:
Excellence * Responsibility * Community

Scientific Excellence: IADR values science conducted at the highest possible levels of rigor, innovation and ethics, across disciplines, from discovery science to clinical implementation to global population health.
Social Responsibility: IADR values the pursuit of science to improve health and well-being for all people, to reduce health inequalities and inequities, and proactively takes actions and positions to improve health.
Scientific Community: IADR values a diverse and inclusive scientific workforce, promotes work-life balance, and supports educational activities and mentoring networks to develop the next generation of scientists.

IADR INfORM

International Network for Orofacial Pain and Related Disorders Methodology

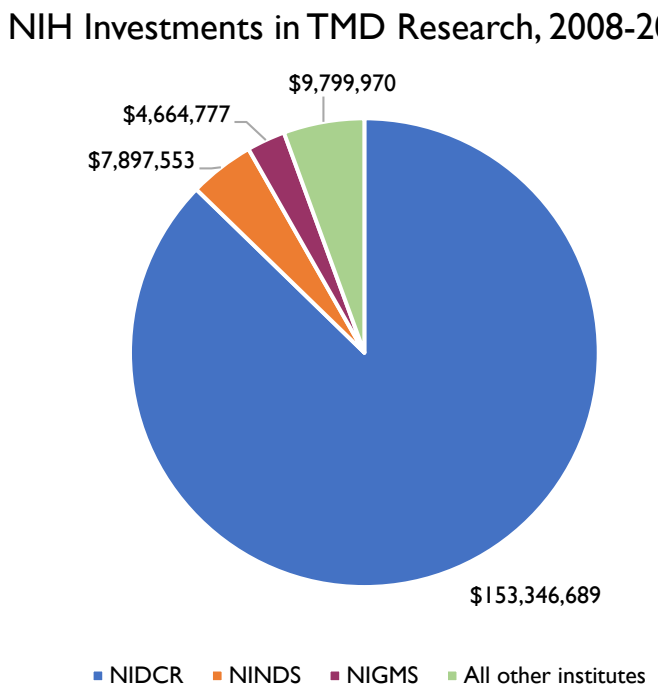
- Founded as IADR International RDC/TMD Consortium Network (2006), renamed INfORM (2017)
  - Diagnostic Criteria for TMD for clinical and research applications (Schiffman et al., JADA, 2016)
  - Clinical Predictors of Persistent Temporomandibular Disorder (Meloto et al., JADA, 2019)



TMD Studies in *Journal of Dental Research*

- 229 Articles from 1990 to 2019
  - Some of most cited from Special Issue on Orofacial Pain, Sept. 2016, Ron Dubner Guest Editor:
    - Slade, G.D. et al.: Painful Temporomandibular Disorder: Decade of Discovery from OPPERA Studies. (2016) *J Dent Res* 95(10):1084-1092.
    - Ohrbach, R. and Dworkin, S.F.: The Evolution of TMD Diagnosis: Past, Present, Future. (2016) *J Dent Res* 95(10):1093-1101.

NIDCR is the Largest Federal Funder of TMD Research



- Basic research†
  - Illuminating the cellular and molecular basis for chronic TMD and identifying potential pharmacologic targets for prevention, pain management or reversal
- Translational research - Tissue engineering and regeneration
  - DOCTRC – novel devices for TMJ reconstruction
  - Collaboration with NIBIB on research quantifying bone changes at the joint
- Clinical research
  - OPPERA - $36M - Increased understanding of TMD risk factors, including the role of sex differences, genetics and overlapping chronic pain conditions
- Building research capacity
  - 5-year (2013-2017) institutional career development awards to "expand and strengthen the community of investigators engaged in research on temporomandibular joint disorders" at University of Michigan, University of North Carolina - Chapel Hill and Columbia University

*Data from NIH RePORTER. **NIH TMD Research Projects, 2008-2018 search criteria**: FYs: 2008-2018; Agency/Institute/Center: All NIH Institutes and Centers; NIH Spending Category: Temporomandibular Muscle/Joint Disorder (TMJD); Award Type: New; Activity Code: Research project grants; **NIH Investments in TMD Research, 2008-2018 search criteria:** Repeated above with Award Type: All. Search completed 16 July 2019,

†From NIDCR Congressional Justifications FYs 2015-2020 and NIH RePORTER.

Key Advancements

- Molecular signatures of acute to chronic pain transition
  - Nerve cell surface proteins, TRPV4 and NMDA receptors
  - Lower level of expression of anti-inflammatory molecule, omentin-1
  - Potential therapeutic target, epidermal growth factor receptor
- Sex differences and increased risk for women to transition to chronic TMD
- Overlapping chronic pain conditions

TMD Clinical Trials

- U.S. - based
- Status
  - 28 completed; of those, 8 with results
  - 2 terminated with results
  - 2 recruiting; 1 by invitation
  - Remaining unknown, withdrawn or not yet recruiting
- Interventions
  - Pharmacologic, behavioral, device, procedural, other, etc.

Data from ClinicalTrials.gov. Search criteria: Condition or disease: Temporomandibular Joint Disorders; Study type: All Studies; Study Results: All Studies; Sex: All; Country: United States. Search completed 30 July 2019.

National Dental PBRN Studies

- Analysis of Management of Painful TMD
  - Identify treatment decisions, change in pain and function over time with different TMD pain treatments
- Treatment of TMD Pain in Dental Practices (conducted in all dental PBRN regions)
  - Dentists who treat patients with TMD pain treat ~3 patients/month
- Dentist Distress in the Management of Chronic Pain Control
  - Further studies are needed to decrease dentists' distress and to overcome the evidence-practice gap in TMD treatment

Opportunities for improving dental practice research

- Dental practitioners participate in DPBRN research studies in their dental offices with consenting patients
- Involves dental practitioners and their patients with a wide geographic distribution and from a variety of practice types and settings
- Data collected from practitioners about decision-making, treatment performed.
- Separately, data collected from patients about outcomes (e.g. pain, function) separate from the dental office visit
- Opportunity to develop unique patient population hub, which could link practitioners who treat orofacial pain/TMD patients

Priorities in research to enhance pain management strategies:

- Understand the biological underpinnings of chronic pain
- Understanding the mechanisms of acute to chronic pain transition (an NIH Common Fund effort)
- Accelerate the discovery and pre-clinical development of non-addictive pain treatments
- Advance new non-addictive pain treatments through the clinical pipeline
- Establish the best pain management strategies for acute and chronic pain conditions

https://www.nih.gov/research-training/medical-research-initiatives/heal-initiative/heal-initiative-research-plan

Opportunities for research and partnerships

- NIH
  - HEAL initiative
  - Apply findings from OPPERA to develop DPBRN studies
  - Apply findings from prospective cohort studies to build RCT
- PCORI
  - Comparative effectiveness research to inform decision-making for the best treatment outcomes
- AHRQ programs
  - Interaction between medical/dental PBRNs
  - National Guideline Clearinghouse (1997-2018); discontinued due to lack of federal funding, in search of new host
  - Effective Health Care Program
- Industry/federal partnerships