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

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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

  - 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)

https://ubwp.buffalo.edu/rdc-tmdinternational
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:
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

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*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.
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
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**