

National Institute of Dental and Craniofacial Research
FY 2015 Significant Items

Topics:

- [Temporomandibular Disorders \(TMD\)](#)
- [Dental Materials Research](#)

Please note that the text under each topic heading is the written request from the congressional committee ('The Committee'). NIDCR's response is included under the heading '[Action taken or to be taken](#)'.

Temporomandibular Disorders (TMD)

The Committee appreciates the advances that have been made as a result of NIDCR funding of research on TMD pain and urges the Institute to continue to lead this effort. Major findings that have emerged confirm that TMD is one of several chronic pain conditions co-occurring in some patients at odds greater than chance. The Committee strongly urges NIDCR to collaborate with other ICs to address these comorbid conditions. The Committee commends the Institute for working with NIAMS and NIBIB to organize the Temporomandibular Joint Working Group, which is charged with assessing the state of the science on the temporomandibular joint and identifying research gaps and future scientific opportunities.

Action taken or to be taken

Temporomandibular disorders (TMDs) are a group of conditions that cause pain and dysfunction in the jaw joint and the associated muscles and supporting tissues. TMD is often present in individuals with other chronic pain conditions, suggesting common mechanisms linking these conditions. The National Institute of Dental and Craniofacial Research (NIDCR) supports research on TMDs and other orofacial pain conditions with the goal of improving the prevention, diagnosis, and treatment of these disorders. NIDCR focuses on understanding the mechanisms underlying the development and maintenance of chronic orofacial pain and also the transition from acute to chronic pain. Additionally, NIDCR supports research on the development of new behavioral and pharmacological treatments for these conditions.

The National Institutes of Health (NIH) Pain Consortium is leading a trans-NIH effort to coordinate research on chronic overlapping pain conditions and bring researchers together to explore new areas of investigation. Several prospective studies addressing overlapping conditions are being conducted by member Institutes of the Pain Consortium, including NIDCR, the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK), and the National Institute of Neurological Disorders and Stroke (NINDS).

NIDCR funded a follow-up study, Orofacial Pain: Prospective Evaluation and Risk Assessment II (OPPERA-II), which will identify risk factors that predict whether acute TMD will transition to chronic TMD and whether TMD will develop as a single condition or in conjunction with other chronic pain conditions such as headache, low back pain, irritable bowel syndrome, and widespread body pain. The NIDDK Multidisciplinary Approach to the Study of Chronic Pelvic Pain (MAPP) Research Network is exploring the underlying etiology, natural history, and risk factors for the urologic chronic pelvic pain syndromes (UCPPS) interstitial cystitis/painful bladder syndrome and chronic prostatitis/chronic pelvic pain syndrome, as well as the possible relationships between UCPPS and several co-morbid chronic pain disorders, to develop a basis for future clinical studies and improved management of these conditions. NIDCR is working with NIDDK to determine other studies which will mutually complement the research of OPERA II and the Network and lead to a better understanding of these conditions overlapping with TMD. NIDCR also supports NINDS' research effort to fund a multidisciplinary project which focuses on multiple complex persistent pain conditions (CPPCs), including episodic headache, fibromyalgia, temporomandibular joint disorders, irritable bowel syndrome, and vulvar vestibulitis.

In May of 2013, NIDCR co-sponsored a roundtable meeting with NIAMS and NIBIB on the “Temporomandibular Joint in Health and Disease”. The meeting brought together scientists with expertise in areas related to the structures/tissues of the temporomandibular joint and along with patient advocates, applied their knowledge to explore new research approaches to advance understanding of temporomandibular joint function. A meeting summary and a comprehensive set of research recommendations are available (<http://www.nidcr.nih.gov/NewsAndFeatures/Announcements/TMJRoundtable.htm>).

As another example of collaborative efforts, NIDCR has recently approved the funding of a grant that will apply novel quantitative imaging technologies to assess changes in bone structure of the temporomandibular joint during the initiation and development of joint osteoarthritis. This project is being co-funded by NIBIB and takes advantage of the expertise available in their National Centers for Biomedical Computing program.

Dental Materials Research

The United Nations (UN) Environmental Programme, International Negotiating Committee completed deliberations in January 2013 on a global legally binding treaty on mercury. The UN agreement contains provisions for the reduction in the use of dental amalgam, as a mercury added product, and calls for increased dental research into alternative materials. Given the global commitment to reduce all uses of mercury, the NIH Director is expected to make the development of alternative dental restorative materials a high priority.

Action taken or to be taken

The National Institute of Dental and Craniofacial Research (NIDCR) has a long-standing commitment to improve the properties of materials used in dental restorations. Dental amalgam, a type of dental filling material, is a mixture of mercury, silver, tin and copper. The use of dental amalgam has been declining in developed countries for several decades in favor of tooth-colored dental materials called composite resins. About two-thirds of all restorations placed by dentists in the U.S. are composite resins. Although composite resins have improved esthetics, interactions between oral bacteria and the composite resin may result in recurring tooth decay around the filling, thus shortening the restoration's life span.

A new, longer-lasting alternative dental restorative material could substantially benefit the public's oral health. In 2013, NIDCR awarded \$2.8 million to fund six research projects to design and develop novel dental composite restorative systems that double the current average service life of fillings. The five year studies will develop innovative new materials that are compatible with the oral environment, esthetically appropriate, structurally strong, and resistant to the degradation caused by exposure to saliva and bacteria. Given the complexity of the problem, each project will bring together materials scientists, polymer chemists, and microbiologists in a collaborative effort to address associated challenges; awardees will share research approaches, successes, roadblocks, and data. The diversity of NIDCR-funded dental materials research underscores the Institute's commitment to developing alternative dental restorative materials that substantially improve oral health.