

Study evaluates risk factors for chronic TMJD

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Thousands of Americans this year will be diagnosed with a common disorder of the jaw area called temporomandibular joint and muscle disorders (TMJD, formerly called TMJ). Because of the inherent biological complexity of TMJD, their healthcare providers will have no way to determine whether their patients will get better in time or battle chronic disease.

But research help is on the way. Scientists affiliated with a large, seven-year study supported by the National Institute of Dental and Craniofacial Research (NIDCR), part of the National Institutes of Health, have published the preliminary results of the most comprehensive and [systematic analysis](#) to date of risk factors associated with chronic TMJD. The findings are found in a special issue of the *Journal of Pain*, which now is available online to subscribers.

These initial results from the Orofacial Pain: Prospective Evaluation and [Risk Assessment](#) (OPPERA) study provide a voluminous body of high-quality data that confirms many previous discoveries and adds several new possibilities for risk. These include:

In women, the risk for chronic TMJD increases between the ages of 18 and 44, the age range evaluated in the study. Previous studies have suggested that the risk was greatest during a woman's early childbearing years and decreased thereafter. In young men (ages 18-44), age was unrelated to TMJD incidence.

Chronic TMJD incidence does not correlate with low socio-economic status. This finding is in stark contrast to trends seen in other chronic pain conditions. Socio-economic status, for instance, has been shown to have a profound effect on musculoskeletal pain, sciatica, ulcer, and neuropathic pain.

Chronic TMJD seems to be associated with alterations in some parts of the nervous system that control [pain perception](#). Researchers found that TMJD patients, when compared to healthy study volunteers, were much more sensitive to a variety of stimuli that evoke mildly [painful sensations](#). They also show elevated heart rate responses at rest and during mild physical and psychological stress.

Genetic variability contributes to chronic TMJD. Researchers found that chronic TMJD patients had alterations in several genes, including some known to influence stress response, psychological well-being, and inflammation. These findings may help to explain the origins of TMJD and provide new targets for drugs to treat chronic pain.

Several clinical findings also were reported. TMJD patients frequently experienced many more [chronic pain conditions](#), such as lower back pain, headaches, and fibromyalgia. Evidence of abnormal jaw function associated with teeth grinding and clenching was also observed. Future investigations will attempt to unravel whether grinding and clenching is a cause of consequence of the condition.

"These initial results from the OPPERA Study mark an important preliminary first step in providing a clearer, more definitive accounting of the risk factors associated with TMJD and related conditions," said Martha Somerman, D.D.S, Ph.D., director of NIDCR. "The OPPERA Study has a lot more data in the pipeline. The next few years will be extremely interesting and should greatly improve the diagnosis of TMJD."

TMJD is an umbrella term for a group of conditions that affect the area in and around the temporomandibular joint, or TMJ. These two large, ball-and-socket joints connect the jaw to the skull on both sides of the head. Common TMJD symptoms include: persistent pain in the jaw muscles, restricted jaw movement, jaw locking, and abnormal popping and clicking of the joint.

It is not known how many people have TMJD. But the main symptoms – pain and restricted jaw movement – occur in 5-15 percent of Americans and more frequently affect women. Although some cases can be linked physical trauma, in most cases the cause is unknown.

One reason that treatment can be so difficult is the chronic pain associated with TMJD results from a highly complex biological interplay. The interplay involves myriad factors, ranging from the intricacies of pain transmission and its possible rewiring and overamplification en route to the brain to the complicating and frequent presence of other painful conditions, such as fibromyalgia and chronic fatigue, which mask or modify the symptoms of the TMJD.

With so many variables, some researchers have suggested that the best scientific entry point to examine TMJD is during its earliest stages, before the full-blown complexity of advanced disease clouds the investigative picture.

This thinking and progress in studying the basic biology of pain led to the launch of OPPERA in September 2005. It marks the first-ever, large prospective (meaning, looking forward in time) clinical study of TMJD and, more broadly, a chronic pain condition.

The OPPERA Study involves four investigative units: University of Florida in Gainesville, directed by Dr. Roger Fillingim; University of Buffalo-SUNY, directed by Dr. Richard Ohrbach; University of

Maryland at Baltimore, overseen by Drs. Joel Greenspan and Ronald Dubner; and the University of North Carolina Chapel Hill, directed by Drs. Gary Slade, Eric Blair, Shad Smith, Luda Diatchenko, and William Maixner, who is also OPPERA's program director. Mr. Charles Knott, with the Battelle Memorial Institute in Columbus, Ohio, served as the director of the Data Coordination Center.

Investigators at the four study sites now have completed tracking 3,200 healthy male and female volunteers, ages 18-44, from three to five years. As expected, a subset of approximately 200 volunteers developed their first bout(s) of TMJD, and researchers are currently analyzing the study data to determine the factors associated with the disease's onset.

The publications in the *Journal of Pain*, however, stem from an associated but distinct baseline study at OPPERA's launch. In this investigation, researchers enrolled 192 individuals with chronic TMJD and 3,200 volunteers enrolled in the prospective study. Both groups underwent state-of-the-art tests that evaluated comprehensively a range of biological, psychological, and genetic factors, another first for a large clinical pain study.

The results provided in-depth baseline profiles at opposite ends of the disease spectrum. These profiles provide invaluable reference points from which to better evaluate the data from the longitudinal study. But the chronic TMJD profile in particular charts fresh scientific ground.

"The profile offers the most quantitative and thus complete picture to date of who has chronic TMJD and who is at risk," said Dr. William Maixner, the principal investigator of OPPERA and a scientist at the University of North Carolina. "While the current results are preliminary, they should be of immediate value to practitioners who treat patients with TMJD."

In addition to the new discoveries highlighted above, Maixner said he and his colleagues confirmed many previous findings in TMJD research and have placed them into a clearer conceptual context for further study. Maixner noted that these findings have gone far to validate the broad conceptual model of TMJD causation that underlies OPPERA's longitudinal study. The model, like a compass to a traveler, predicts the route ahead in the development of a specific disorder. In this case, Maixner and colleagues predicted that psychological distress and pain amplification are the two broad factors that contribute to the onset and persistence of TMJD.

"Within the broad headings of demographics, pain amplification, psychological distress, genetics, and life history of physical and psychological trauma lies a complex web of causation," said Maixner. "Our hope with the larger longitudinal study is to pull out specific factors within this web and also determine if there is interplay between them. Whatever we learn likely will have an impact on the diagnosis and, hopefully, treatment of TMJD."

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