

National Academy of Medicine Holds Second TMD Meeting



We have reported in recent issues about the decision of the prestigious National Academy of Medicine (NAM) to convene a committee of experts to examine all aspects of temporomandibular disorders (TMD). Terrie Cowley, The TMJ Association (TMJA) President, spoke at the initial meeting open to the public, and she and others from the TMJA attended a second 2-day meeting, also open to the public, held on March 28-29, 2019, in Washington, DC. Stakeholders from the patient, caregiver, and research communities as well as representatives of federal agencies, insurers, and manufacturers were invited to provide their perspectives.

The agenda was organized into five panels: TMD scope and definition; public health burden; basic and preclinical research; clinical and translational research; and care pathways. Each panel included testimony from a TMJ patient, as well as speakers addressing the panel theme, with a discussion period following the presentations. Each day concluded with a public comment period with attendees given 3-5 minutes to share their perspectives with the Committee.

For a you-are-there experience we invite you to view the online video recording of the meeting, along with the presenters' slides:

<http://nationalacademies.org/hmd/Activities/PublicHealth/TemporomandibularDisorders/2019-MAR-28/Videos/S0/1.aspx>

Importantly, if you were not able to participate in the public comment period, you are able to share your valuable perspectives on your TMJ experience with the Committee in writing to TMDstudy@nas.edu. They are grateful for patient input to the study. The NAM committee will continue to meet throughout 2019. The committee's recommendations and the study findings will be summarized in a final report in the spring of 2020.

The third meeting of the NAM TMD Committee will be closed to the public and will convene on May 1-2, 2019.

We are frequently asked about the feasibility of stem cells and regenerative medicine options for replacement of the temporomandibular joint as an alternative to the currently available devices. Dr. Kyriacos Athanasiou and his team have been at the forefront of this research for over a decade. He recently had an article published in *Trends in Molecular Medicine* in which he identified the hurdles to be overcome before it can be applied at the clinical level. The following is taken from a press release on March 20, 2019 by the University of California, Irvine.

* * *

Irvine, Calif., March 20, 2019 - Here's something to chew on: One in four people are impacted by defects of the temporomandibular - or jaw - joint. Despite the pervasiveness of this affliction, treatments are lacking, and many sufferers resort to palliative measures to cope with the pain and debilitation it causes.

"The TMJ is central to chewing, talking and so many other daily activities, so when this crucial joint is impaired, there are significant negative effects on quality of life," said Kyriacos A. Athanasiou, Distinguished Professor of biomedical engineering at the University of California, Irvine (UCI). "The problem may start with slight pain and clicking and get progressively worse to the point where it's not just impacting the jaw but the entire body."

Athanasiou is senior author on a paper published recently in the Cell Press journal [Trends in Molecular Medicine](#) that examines the causes of temporomandibular disorders, past failures in treating them, and new approaches based on tissue-engineering innovations developed in his laboratory. Co-authors are Ryan Donahue, UCI graduate student researcher in biomedical engineering, and Jerry Hu, UCI principal development engineer in biomedical engineering.

Temporomandibular disorders can be the result of sudden injuries or wear and tear over time. The cartilage disc between the mandible and the temporal bone is subject to thinning or perforation. The condition usually affects patients between the ages of 20 and 50. Most strikingly, premenopausal women are eight times more likely to experience jaw joint problems than men - which Athanasiou calls the TMJ gender paradox.

Typical treatments include physical therapy, splints and adjustments, corticosteroid injections and pain medications. Only about 5 percent of sufferers are candidates for surgical interventions. The TMJ is a joint like many others in the body, and surgeries to repair knees, elbows, hips and shoulders are commonplace, so why are operations on the jaw so rare?

"It has to do with the proximity of the TMJ to the brain," Athanasiou said. "Back in the 1980s, many patients - primarily women - came forward with issues they had with the TMJ. The solution at the time was to insert a spacer between the two bones articulated in the jaw." The spacer was made of Teflon, a material approved by the U.S. Food and Drug Administration.

"It turns out that Teflon was an absolute catastrophe for all of those women," Athanasiou said. "Because of the large mechanical forces generated in the jaw, the Teflon broke up into pieces, and because of the proximity of the TMJ to the brain, those pieces somehow found their way into the brain."

This fiasco set back therapies for temporomandibular disorders for decades, but now Athanasiou and his colleagues in UCI's Department of Biomedical Engineering are working on new approaches that eschew synthetic materials entirely. They're developing biological TMJ discs in the laboratory that will be suitable for implantation in humans.

"The end product that we aspire to use for treating afflictions of TMJ discs is a tissue-engineered product that's fully alive, biological and mechanically comparable to the real thing," Donahue said. "So even if it breaks down, it will be like any other biological component, without having pieces of foreign material entering the brain."

In work detailed in a study published in [Science Translational Medicine](#) in June 2018, Athanasiou's team successfully took cells from the rib cartilage of a Yucatan miniature pig,

grew them in their laboratory and implanted the tissue-engineered construct into a separate animal.

Whereas some researchers may place bioengineered cells in some other part of an animal's body - on the back of a mouse, for example - Athanasiou said a key aspect of his group's work is to put the new disc in the exact place as the old one so it will be subject to all the normal stresses of the joint.

"In eight weeks, we saw complete functionality of the TMJ disc, whereas the ones we left untreated deteriorated completely, developing full osteoarthritis in the joint," Hu said. "So we were able to show that by using our tissue-engineering approach in a large-animal model, we could achieve exceptional healing."

Athanasiou said his team's goal now is to conduct trials in more large-animal models to determine if their solution will ultimately work in humans. A major hurdle will be gaining regulatory approval from the FDA, but Athanasiou recently received some encouraging signals from the agency.

"The FDA has asked if we could help them figure out how to go about developing processes for bringing TMJ products to the market," he said. "We would be delighted to help create that pathway."

Funding for this work was provided by the National Institutes of Health ([National Institute of Dental and Craniofacial Research](#)).

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We asked Dr. Athanasiou and his team to write some supplementary information for *TMJ News Bites* and we thank them for providing us with this information.

Quotes from the Authors:

"This article discusses the remaining hurdles for clinical translation of TMJ disc tissue engineering. Our group has recently generated significant preclinical data toward healing of the disc in the porcine model; however, as we move closer to first-in-human studies, a number of limitations in the regulatory and clinical spaces need to be addressed." - Ryan P. Donahue

"As compared to the knee, the TMJ severely lags behind in general knowledge, quantity of approved products, and number of practicing surgeons. Likewise, there are established treatment algorithms for the knee, whereas the TMJ treatment algorithms are not as well defined. This presents a unique challenge for upcoming TMJ products in the tissue engineering realm." - Dr. Kyriacos A. Athanasiou

"Recently, our group successfully healed the porcine TMJ disc using a tissue engineered construct. Our group showed successful regeneration of a partial thickness in the TMJ disc; however, future studies will aim to replace the entire disc." - Dr. Kyriacos A. Athanasiou

"On the regulatory side, the FDA has seen a limited number of products for treating TMDs. Notably, the infamous Proplast-Teflon discs showed disastrous outcomes, sometimes perforating the brain cavity. The TMJ's proximity to the brain and other crucial sensory structures is one additional detail that needs to be considered when translating TMJ tissue engineering." - Dr. Jerry C. Hu

"Due to differences in device and biologic regulations, tissue engineered products will be approved differently compared to current TMJ products like alloplastic (inert materials such as plastic or metal) joint prostheses. Additionally, lack of previous biologic [living tissue] products for the TMJ obscure the regulatory pathway. As we get closer to preclinical animal studies and human clinical trials, communication and guidance from the FDA regarding the requirements

to demonstrate safety and efficacy of TMJ biologics will be crucial to streamline the approval process." - Ryan P. Donahue

Biographies of Authors:



Ryan P. Donahue is a second year PhD student in the Biomedical Engineering department at the University of California, Irvine (UCI). He is passionate about tissue engineering, specifically TMJ tissue engineering, because he believes it is the next generation of therapeutics for chronic diseases, such as TMDs. Under the guidance of Dr. Kyriacos Athanasiou during his dissertation, Ryan will generate significant preclinical data in large animal models. His work will direct the field closer to clinical translation of TMJ

therapeutics.

Dr. Jerry C. Hu is the innovator and creator behind the core technology of Driving Engineering and Life-science Advances @ Irvine (DELTA_i), the self-assembling process. Since then, his work has resulted in over 80 full-length publications, many on the TMJ. Working under Dr. Athanasiou for 18 years, Jerry advises and mentors the graduate students and postdoctoral fellows on a day-to-day basis.



Dr. Kyriacos A. Athanasiou has been a leader in the biomedical engineering field for over two decades. He is currently a Distinguished Professor at UCI, but his career has spanned both industry and academia. This has resulted in a number of commercially available medical products. The breadth of work that DELTA_i performs covers a wide range of tissues from hyaline articular cartilage of the knee to the TMJ. His group first got into TMJ tissue engineering while at Rice University.

Source Article:

Donahue, Ryan P., Hu, Jerry C., and Athanasiou, Kyriacos A. (2019) [Remaining Hurdles for Tissue-Engineering the Temporomandibular Joint Disc](#). *Trends in Molecular Medicine*. 25(3), pg. 241-256.

Press Release:

University of California, Irvine press announcement- [UCI engineers aim to pioneer tissue-engineering approach to TMJ disorders Solutions have been hampered by past failures, proximity of jaw joint brain](#).

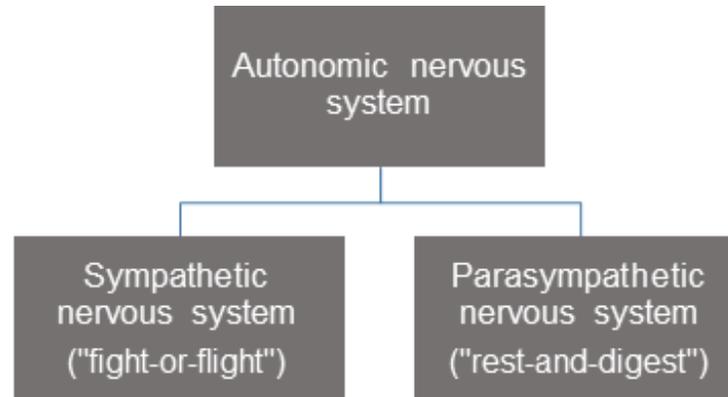
What Does Blood Pressure Have to Do with Chronic Pain?

By Sophia Stone, TMJA contributing author

To understand this possible connection, you have to consider how blood pressure is normally controlled by the nervous system. Barring the lifelong habits of some Buddhist monks or yogis, people normally have no conscious ability to control their blood pressure. That is the job of the *autonomic nervous system* (ANS) which encompasses two complementary branches: the sympathetic and parasympathetic nervous systems.

The sympathetic branch is popularly known as the "fight-or-flight" system, which drives up your heart rate and blood pressure in tense or stressful situations. The parasympathetic, in contrast, is the "rest-and-digest" system that helps you relax and enjoy a hearty dinner. Normally the two systems operate as checks on each other so that neither one over-reacts.

However, if that happens, or if one or the other system consistently fails to respond to stimuli appropriately, it could mean your ANS is dysfunctional. A common example of this is *orthostatic hypotension*, the failure of the sympathetic nervous system to ramp up blood pressure in a reflex response to a change in position when you move from lying down or sitting to a standing position. Without the reflex increase in pressure, the low blood pressure you experience when you stand can cause you to feel dizzy or even faint.



Now researchers think there might be a relationship between chronic pain and the sensory nerve cells, called baroreceptors, that trigger that reflex. "Baro" is the same root as in barometer, the device used to measure atmospheric pressure. Baroreceptors in arterial walls and at other circulatory sites react to changes in the mechanical forces exerted by the blood circulating through the vessels. In their review paper *Contribution of Baroreceptor Function to Pain Perception and Perioperative Outcomes*, Heberto Suarez-Roca and colleagues examine the evidence for how baroreceptors may contribute to chronic pain.

Hypertension and Hypoalgesia

To begin with, the authors note that there's a sizeable body of evidence linking high blood pressure (hypertension) to reduced pain sensitivity (hypoalgesia). A number of experiments have also shown that inducing hypertension in animal models (sometimes by providing high salt diets) can lower their perception of pain, and that this is reversed by restoring their blood pressure to normal. Moreover, patients with chronic hypertension have also been shown to have higher pain thresholds. It's also not uncommon for hypotensive individuals (people with normally low blood pressure) to experience *thermal hyperalgesia*-a heightened sensitivity to pain at high temperatures.

That said, there are questions surrounding this relationship that have yet to be answered. For example, it's been shown that hypoalgesia persists in patients even after hypertension has been corrected with blood pressure medication. A possible explanation could be that the mechanisms that improve pain tolerance are maintained even after blood pressure is reduced in hypertensive patients. Other studies have shown that hypoalgesia may *precede* hypertension, such as one interesting report that pain sensitivity at age 14 is predictive of blood pressure later in life. One explanation here is that venous pressure, not just arterial pressure measured in blood pressure readings, may be in part responsible.

Baroreceptor Sensitivity

While the mechanisms are not well understood, the authors make the case that baroreceptors are the mediators of hypertension-induced hypoalgesia. During systole (the upper reading in a blood pressure measurement), blood is expelled from the heart into the arteries, causing blood pressure to rise and the arterial walls to stretch to accommodate the greater volume of blood. The arterial wall stretching stimulates the baroreceptors to act to restore pressure to a resting pressure, essentially to maintain "homeostasis," a balance in pressure neither too high or too low. Baroreceptors orchestrate these pressure changes by signaling the parasympathetic nervous system to relax the arterial walls to relieve the strain and lower blood pressure or, when blood pressure is too low, signaling arteries to constrict so that the circulating blood will exert mechanical forces on the arterial walls and increase pressure. Normally baroreceptor function involves subtle adjustments in both arms of the ANS.

Interestingly, hypoalgesia associated with hypertension peaks during systole (coinciding with maximum blood pressure) as opposed to diastole (the bottom measurement of blood pressure when the heart relaxes and there is minimum blood pressure). Thus, pain sensitivity is reduced in the systolic phase of the cardiac cycle during *maximum* baroreceptor load, suggesting that altered pain perception may be a function not only of absolute blood pressure, but also of the sensitivity of baroreceptors that regulate blood pressure. A failure of baroreceptors to respond appropriately to arterial stretch is a form of early autonomic dysfunction, and it has also been linked to greater sensitivity to pain.

It's complicated. A number of factors affect baroreceptor function. The receptors' sensitivity varies by age, sex, phase of the menstrual cycle, pregnancy, and circadian rhythms. For example, cardiac baroreceptor sensitivity is 50% lower in women, where it is thought to be due to estrogen's effects on the central nervous system and peripheral arteries. More relevant to chronic pain, reduced baroreceptor sensitivity has been shown to be associated with greater sensitivity to pain. The finding that baroreceptor *activation* elicits hypoalgesia further suggests that baroreceptors may explain the causal relationship between hypertension and attenuated pain sensitivity.

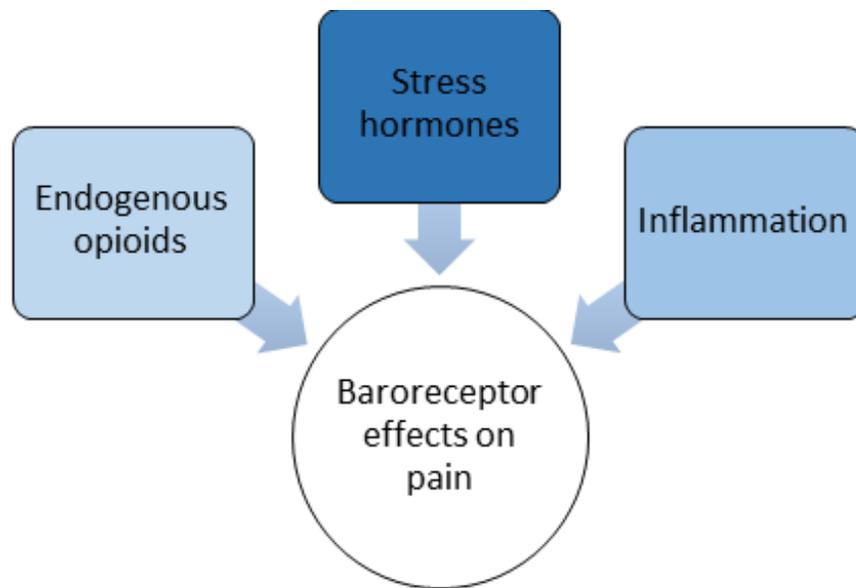
Baroreceptors and Chronic Pain: Possible Mechanisms

Three mechanisms have been proposed to explain baroreceptors' effects on pain perception: endogenous opioids (i.e., the brain's own pain-relieving molecules), adrenergic receptors in the brain, and the process of inflammation.

Endorphins. In the first camp, it's thought that baroreceptor stimulation may activate opioid networks in the brain, which is supported by the finding that hypertensive patients have higher circulating levels of endogenous opioids. (called endorphins) in the brain, particularly in response to stresses like pain or exercise. This endorphin rush helps mask physical pain and is also thought to explain the euphoric feeling of a runner's high. It turns out that baroreceptor stretching may be a less painful means of opening the endorphin floodgates!

Stress hormones. Another possible mechanism is the activation of receptors for epinephrine and norepinephrine (also known as adrenaline and noradrenaline) in the brain. These are stress hormones produced by sympathetic nervous system activation of the adrenal glands in response to short-term stress. Norepinephrine levels have been shown to be elevated, along with pain tolerance, in people with high blood pressure. In other words, high levels of stress hormones in hypertensive individuals may be acting on receptors in the brain to blunt their perceptions of pain.

Inflammation. According to a third mechanism, baroreceptors' effects on pain perception may be explained by the close relationship between ANS dysfunction and chronic inflammation. Reduced baroreceptor sensitivity, has been shown to correlate with markers of inflammation that are a likely source of pain. While chronic inflammation is normally thought of as a *cause* of ANS dysfunction, the reverse relationship has also been shown in some autoimmune and inflammatory conditions. For instance, those at risk of rheumatoid arthritis (an autoimmune condition) are more likely to show signs of autonomic dysfunction and over-activation of the sympathetic nervous system before they develop arthritis, and reducing sympathetic over-activity in hypertensive individuals also reduces inflammation. There is also extensive evidence that activating baroreceptor reflexes can attenuate inflammatory pathways, and conversely that baroreceptor and autonomic dysfunction trigger inflammation in part by activating sympathetic nerves that release painful inflammatory chemicals. That is to say that when baroreceptors don't work properly, our sympathetic nervous system gets fired up and releases inflammatory molecules that cause pain.



Postoperative pain. Baroreceptor and ANS dysfunction are predictive of postoperative pain in surgical patients and have also been associated with a number of chronic conditions, including hypertension, diabetes, atherosclerosis, obesity, obstructive sleep apnea, cardiovascular disease, and chronic kidney disease, many of which are associated with chronic pain. An existing model for these associations is that increased sympathetic nervous system activity promotes a state of chronic inflammation and pain, which is associated with elevated inflammatory mediators and stress hormones. Chronically elevated levels of stress hormones may desensitize baroreceptors, making them less effective and setting the stage for ANS dysfunction.

Baroreceptors and TMD. Heightened pain and baroreceptor dysfunction are also more prevalent in chronic musculoskeletal pain conditions such as temporomandibular disorder (TMD), fibromyalgia, and chronic back pain. These chronic pain states are frequently associated with signs of autonomic dysfunction. For example, orthostatic hypotension is common among fibromyalgia patients, whose reduced baroreceptor sensitivity has been shown to correlate with the severity of their symptoms and to be about 35% lower compared to healthy women. It may not be a coincidence that women have both lower baroreceptor sensitivity and a greater incidence of chronic pain conditions like TMD and fibromyalgia; such disparities in baroreceptor or autonomic function may help explain sex differences in chronic pain incidence and treatment responses.

Given this evidence, the authors pose the important question: can baroreceptor function and blood pressure status be considered risk factors for chronic pain and perioperative outcomes? Currently, there are a few things that can be done to improve baroreceptor function. Vagal nerve stimulation is one option, and other interventions (e.g., fluid management, acupuncture, cardiovascular conditioning, biofeedback, etc.) are also being explored. More research-and less invasive treatment-are crucially needed, as it appears that baroreceptor function may represent a promising link between autonomic dysfunction and chronic pain, and quite possibly could pave the way for new approaches to treating chronic conditions.

Source: Heberto Suarez-Roca, Rebecca Y. Klinger, Mihai V. Podgoreanu, Ru-Rong Ji, Martin I. Sigurdsson, Nathan Waldron, Joseph P. Mathew, William Maixner; [Contribution of Baroreceptor Function to Pain Perception and Perioperative Outcomes](#). *Anesthesiology* 2019;130(4):634-650. doi: 10.1097/ALN.0000000000002510.

Swallowing Changes Related to Chronic Temporomandibular Disorders

Fassicollo, Carlos & Machado, Barbara & Garcia, Denny & de Felício, Cláudia Maria. (2018). [Swallowing changes related to chronic temporomandibular disorders](#). *Clinical Oral*

ABSTRACT

Objectives: To investigate whether chronic temporomandibular disorder (TMD) patients showed any changes in swallowing compared to a control group. Moreover, it was examined whether swallowing variables and a valid clinic measure of orofacial myofunctional status were associated.

Material and methods: Twenty-three patients with chronic TMD, diagnosed with disc displacement with reduction (DDR) and pain, according to the Diagnostic Criteria for Temporomandibular Disorders (DC/TMD), and 27 healthy volunteers (control group) were compared. Surface electromyography (EMG) of the temporalis, masseter, sternocleidomastoid, and suprahyoid muscles was performed during swallowing tasks of thin liquid (10 and 15 mL) and spontaneous saliva. Data were normalized.

Results: Compared to the control group, TMD patients showed a prolonged duration of swallowing for liquid and saliva and required a longer time to reach the activity peak and half the integral. While the overall mean value of the relative peaks was similar for the groups, the suprahyoid peak was significantly lower in the TMD group during swallowing of liquid. Moreover, TMD patients recruited the jaw elevator muscles proportionally more than controls. The orofacial myofunctional status was moderately correlated with EMG parameters.

Conclusion: Patients with chronic TMD showed temporal prolongation and changes in the relative activity of the muscles during the swallowing tasks.

Clinical relevance: The present results contribute additional evidence regarding the reorganization of muscle activity in patients with chronic TMD.

NIH Funding Opportunities

Basic and Clinical Research

In an effort to promote greater understanding of TMD and to develop safe and effective evidence-based diagnostics and treatments, The TMJ Association promotes and encourages basic and clinical research on Temporomandibular Disorders. [Click here to view the latest National Institutes of Health \(NIH\) funding opportunities for scientists interested in advancing TMJ research.](#) The following NIH research opportunities are currently available:

New Funding Opportunities:

- Limited Competition: Dental, Oral and Craniofacial Tissue Regeneration Consortium (U24 Clinical Trial Not Allowed)
- Request for Information (RFI): Identification of Potentially High Value Biomarkers for Predicting Acute to Chronic Pain Transition and Resilience
- Achieving Tissue Robustness Through Harnessing Immune System Plasticity (R21) (R01)
- HEAL Initiative: Translational Development of Devices to Treat Pain (U18)
- HEAL Initiative: Translational Devices to Treat Pain (UG3/UH3)
- HEAL Initiative Translational Devices to Treat Pain (U44I)
- HEAL Initiative: Clinical Devices to Treat Pain (UH3)
- HEAL Initiative: Stimulating Peripheral Activity to Relieve Conditions (SPARC): Anatomical and Functional Mapping of Pain-Related Visceral Organ Neural Circuitry (U01)
- Mechanisms, Models, Measurement, and Management in Pain Research (R01)(R21)
- Global Brain and Nervous System Disorders Research Across the Lifespan (R21)
- NIDCR Small Research Grants for Data Analysis and Statistical Methodology Applied to

Genome-wide Data (R03)

- Mechanisms Underlying the Contribution of Sleep Disturbances to Pain (R01)(R21)
- Research on the Health of Women of Understudied, Underrepresented and Underreported (U3) Populations an ORWH FY19 Administrative Supplement

Additional Funding Opportunities:

- Research on Chronic Overlapping Pain Conditions (R01)(R21)
- Analytical and/or Clinical Validation of a Candidate Biomarker for Pain (R61/R33)
- Clinical Validation of Candidate Biomarkers for Neurological Diseases (U01)
- Discover and Validation of Novel Targets for Safe and Effective Pain Treatment (R01) (R21)
- Factors Underlying Differences in Female and Male Presentation for Dental, Oral, and Craniofacial Diseases and Conditions (R01) (R21)
- NIDCR Small Research Grants for Secondary Analysis of FaceBase Data (R03)
- Tailoring Dental Treatment for Individuals with Systemic Diseases that Compromise Oral Health (R01) (R21)
- Blueprint Neurotherapeutics Network (BPN): Small Molecule Drug Discovery and Development for Disorders of the Nervous System (UH2/UH3) (U44)
- Population Health Interventions: Integrating Individual and Group Level Evidence (R01)
- Family-Centered Self-Management of Chronic Conditions (R21) (R01)
- mHealth Tools for Individuals with Chronic Conditions to Promote Effective Patient-Provider Communication, Adherence to Treatment and Self-Management (R01) (R21)
- The Biomarkers Consortium
- Blueprint Neurotherapeutic Network Applications Directed at Small Molecule Drug Discovery and Development of Disorders of the Nervous System

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Research E-Newsletter

Cutting Edge - COPCs Research Advances, is an electronic newsletter published by the Chronic Pain Research Alliance, an initiative of The TMJ Association. Developed to keep the medical-scientific community abreast of recent research advances, this publication contains abstracts of recently published studies on the epidemiology, pathophysiology, and clinical management of Chronic Overlapping Pain Conditions. These conditions include **temporomandibular disorders**, chronic low back pain, chronic migraine and tension-type headache, endometriosis, myalgic encephalomyelitis/chronic fatigue syndrome, fibromyalgia, vulvodynia, irritable bowel syndrome, and interstitial cystitis/painful bladder syndrome.



CUTTING EDGE a publication of **CHRONIC PAIN Research Alliance**
COPCs Research Advances

The most current issues are now available for your review at:

http://www.cpralliance.org/New_Findings. If you would like to receive future issues of *COPCs Research Advances*, [click here to register](#).

Educational Brochures on Chronic Overlapping Pain Conditions

This brochure addresses Chronic Overlapping Pain Conditions (COPCs), how COPCs are diagnosed, the complexity of the chronic pain experience, and how to work with your health

care provider to develop a treatment plan. It is available by [postal mail](#) or as a [PDF on our website](#).

Educational Brochures on TMD

Your Guides for Temporomandibular Disorders - This brochure, written by The TMJA, is a straightforward, easy-to-read booklet that guides patients in how to make health care decisions. It is available by [postal mail](#) or as a [PDF on our website](#), and we encourage you to share it with your friends, health care professionals, and family members.

TMJ Disorders - This brochure is produced and distributed by the National Institute of Dental and Craniofacial Research in partnership with the Office of Research on Women's Health, components of the National Institutes of Health (NIH) in Bethesda, Maryland. Part of the U.S. Department of Health and Human Services, NIH is one of the world's foremost medical research centers and the federal focal point for medical research in the United States. This booklet is available in English and Spanish at: <https://www.nidcr.nih.gov/OralHealth/Topics/TMJ/TMJDisorders.htm>.

Dental Care Guide

Temporomandibular Disorders, Dental Care and You

The TMJ Association developed this guide to provide you with oral hygiene self-care tips that you can do at home, as well as suggestions for future dental appointments. Routine maintenance of your teeth and gums should reduce the risk of dental disease and the need for invasive dental treatments. [Click here to view on our website](#).

TMJ Science Journal

Our latest issue of *TMJ Science*, which includes the summary and recommendations from our 8th scientific meeting-*How Can Precision Medicine Be Applied to Temporomandibular Disorders and Its Comorbidities*---is now available. We hope you're impressed with how far the science of Temporomandibular Disorders has come.

[We invite you to read this new publication which is available in the publication section of our website as a pdf file.](#)

Support Our Work

The TMJ Association (TMJA) is the only patient advocacy organization fighting for the best science that will lead to a greater understanding of Temporomandibular and related disorders, as well as safe and effective treatments. We cannot *change the face of TMJ* without YOU.

[Click HERE to make a tax-deductible online contribution today!](#)



About The TMJ Association

Changing the Face of TMJ

The TMJ Association, Ltd. is a nonprofit, patient advocacy organization whose mission is to improve the quality of health care and lives of everyone affected by Temporomandibular Disorders (TMD). For over 30 years, we have shared reliable information on TMD with people like you. We invite you to visit our website, www.tmj.org.

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The TMJ Association, Ltd., P.O. Box 26770, Milwaukee, WI 53226
info@tmj.org www.tmj.org

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