

# The Journal of Pain

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### Focus Article

#### 1417 AAPT Diagnostic Criteria for Central Neuropathic Pain

Eva Widerström-Noga, John D. Loeser, Troels Staehelin Jensen, and Nanna Brix Finnerup

Central neuropathic pain is a serious consequence of spinal cord injury, stroke, multiple sclerosis and other conditions affecting the central nervous system. A collaborative effort between the Analgesic, Anesthetic, and Addiction Clinical Trial Translations, Innovations, Opportunities, and Networks (ACTION) public private partnership and the American Pain Society (APS), the ACTION-APS Pain Taxonomy (AAPT) initiative invited a working group to develop diagnostic criteria for central neuropathic pain. Consequently, this work provides a classification for central pain associated with spinal cord injury, stroke and multiple sclerosis. The diagnostic criteria are organized according to the AAPT multidimensional framework, specifically (1) core diagnostic criteria; (2) common features; (3) common medical and psychiatric comorbidities; (4) neurobiological, psychosocial, and functional consequences; and (5) putative neurobiological and psychosocial mechanisms, risk factors, and protective factors.

### Review Article

#### 1427 Using Screening Tests to Predict Aberrant Use of Opioids in Chronic Pain Patients: Caveat Emptor

Robert W. Bailey and Kevin E. Vowles

Screening tests represent a critical tool in chronic pain treatment for predicting aberrant opioid use, which has emerged as a significant public health issue. Nevertheless, there remains potential for the misapplication of screeners in this context. Difficulties in evaluating the diagnostic efficiency of screeners have been well established, particularly with regard to the impact that the prevalence of a disorder has on predictive value. This article highlights common metrics for evaluating the clinical utility of screening tests in predicting aberrant opioid use, and explores a series of considerations key to developing clinical guidelines for interpreting the results of screeners.

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#### ON THE COVER

Weight loss improves pain localized to weight bearing joints, but it is unknown how weight loss affects the spatial distribution of pain and associated somatic symptoms like fatigue. This research sought to determine if weight loss improves pain, affect, and somatic symptoms commonly associated with chronic pain conditions. Pain, symptom severity, depression and fibromyalgia scores improved following weight loss; men showed greater improvement than women on somatic symptoms and fibromyalgia scores. Weight loss may improve diffuse pain and comorbid symptoms commonly seen in chronic pain participants. See Schrepf et al, Page 1542.

## Original Reports

1437

### **Modulation of Itch by Conditioning Itch and Pain Stimulation in Healthy Humans**

Hjalte H. Andersen, Antoinette I. M. van Laarhoven, Jesper Elberling, and Lars Arendt-Nielsen

Little is known about endogenous descending control of itch. There are indications that patients with chronic itch may also exhibit reduced endogenous descending inhibition of itch and pain. This study aimed to investigate whether and the extent to which itch can be modulated by conditioning itch and pain stimuli. Results show a hierarchical prioritization favoring pain-induced central descending modulation of both itch and pain in humans. Future studies are warranted.

1451

### **Validity of the Visual Trajectories Questionnaire for Pain**

Kate M. Dunn, Paul Campbell, and Kelvin P. Jordan

Researchers have identified trajectories of pain derived using statistical techniques on longitudinal data. These trajectories have potential to be of clinical use, but the repeated data collection required is impractical for such situations. This study sought to investigate the validity of a self-report Visual Trajectories Questionnaire-Pain for pain. Variables such as pain intensity and pervasiveness, other symptoms, and psychological distress showed an increasing trend of severity across trajectory categories in line with the model. In conclusion, the self-report single item Visual Trajectories Questionnaire is acceptable to patients and supported by evidence of face, criterion and construct validity. Further research is needed to investigate the clinical usefulness of the question.

1459

### **Racial and Socioeconomic Disparities in Disabling Chronic Pain: Findings From the Health and Retirement Study**

Mary R. Janevic, Sara J. McLaughlin, Alicia A. Heapy, Casey Thacker, and John D. Piette

The US National Pain Strategy calls for increased research on “high impact chronic pain,” or longstanding pain that substantially limits participation in daily activities. Using data from the nationally-representative Health and Retirement Study (HRS), this study investigated the prevalence of high-impact chronic pain in adults over age 50, and within population subgroups. Sociodemographic variations in pain-related disability within specific activity domains were also explored. The authors report that high-impact chronic pain is unequally distributed among midlife and older US adults. Efforts to reduce the burden of disabling chronic pain should prioritize socioeconomically vulnerable groups, who may have the least access to multi-modal pain treatment to improve function.

1468

### **Chronic Opioid Therapy Modifies QST Changes After Ketamine Infusion in Chronic Pain Patients**

Dermot P. Maher, Yi Zhang, Shihab Ahmed, Tina Doshi, Charlene Malarick, Kristin Stabach, Jianren Mao, and Lucy Chen

The long-term effects of opioids on sensitization processes are believed to be mediated through the NDMA receptor. Quantitative sensory testing (QST) changes observed following a ketamine infusion have been previously described, but the effect that chronic opioids will have is not known. This randomized trial compared the thermal QST changes observed following a ketamine infusion or a saline placebo in chronic pain subjects who were either opioid-naïve or were chronically using opioids for pain treatment. The results indicate that low dose ketamine infusions produce subtle changes in QST phenotypes that are modified by the chronic use of opioids. This illustrates the potential diagnostic and therapeutic value of ketamine in the setting of chronic opioid use.

1476

### **The Effect of Preoperative Intra-Articular Methylprednisolone on Pain After TKA: A Randomized Double-Blinded Placebo Controlled Trial in Patients With High-Pain Knee Osteoarthritis and Sensitization**

Iben E. Luna, Henrik Kehlet, Claus M. Jensen, Thorbjørn G. Christiansen, Thomas Lind, Snorre L. Stephensen, and Eske K. Aasvang

In a randomized, placebo controlled trial, this work investigated the postoperative analgesic effect of a single intraarticular injection of 40 mg methylprednisolone acetate (MP) administered one week prior to total knee arthroplasty (TKA). Forty-eight patients with high pain osteoarthritis and sensitization were included. No difference in proportion of patients with moderate/severe pain was found between MP/placebo groups at 24 hours or at 48 hours, and no difference between groups in postoperative sensitization was found, despite reduced preoperative intra-articular inflammation in the MP group versus placebo. Alternative central or peripheral analgesic interventions in this high-risk group are required.

1488

### **Methodological Considerations for the Temporal Summation of Second Pain**

Nathanial R. Eckert, Charles J. Vierck, Corey B. Simon, Sachell Calderon, Yenisel Cruz-Almeida, Roland Staud, Roger B. Fillingim, and Joseph L. Riley, III

Temporal summation of second pain (TSSP) is an indication of a central pain encoding mechanism, potentially enhanced in pathological pain conditions. Low frequency repetitive stimulation of unmyelinated (C) nociceptors results in a progressive increase of pain intensity when thermal stimulation intensity remains constant. However, when using different methods of nociceptive delivery to the skin, both regularity and rate of pain enhancement varies between experiments. This study compared heat evoked TSSP during intermittent and constant stimulation, with findings that indicate the constant contact, ramp and hold stimulus may underestimate the level of TSSP pain. This suggests the re-evaluation of stimulation techniques utilized for temporal summation tests, especially within clinical models.

1496

**Loss of Temporal Inhibition of Nociceptive Information Is Associated With Aging and Bodily Pain**

Kelly M. Naugle, Yenisel Cruz-Almeida, Roger B. Fillingim, and Joseph L. Riley, III

An age-related decline in endogenous pain inhibitory processes likely places older adults at an increased risk for chronic pain. Limited research indicates that older adults may be characterized by deficient offset analgesia, an inhibitory temporal sharpening mechanism that increases the detectability of minor decreases in noxious stimulus intensity. This report studied age differences in community-dwelling younger, middle-aged, and older adults. An additional aim was to determine whether the magnitude of offset analgesia predicted self-reported bodily pain. Results show that older and middle-aged adults demonstrate reduced offset analgesia compared to younger adults. The magnitude of offset analgesia predicted self-reported bodily pain, with those exhibiting reduced offset analgesia reporting greater bodily pain. Dysfunction of this inhibitory system could increase the risk of developing chronic pain for middle-aged and older adults.

1505

**The Acquisition and Extinction of Fear of Painful Touch: A Novel Tactile Fear Conditioning Paradigm**

Emma E. Biggs, Ann Meulders, Amanda L. Kaas, Rainer Goebel, and Johan W. S. Vlaeyen

Fear is a core aspect of chronic pain. Fear of touch, due to allodynia and spontaneous pain, is not well-understood, and experimental methods to advance this topic are lacking. This research investigated the acquisition and extinction of fear of touch in a clinical analogue study, using a novel tactile fear conditioning paradigm. The results have implications for research on the development and treatment of chronic pain conditions characterized by allodynia and spontaneous pain fluctuations.

1517

**Chronic Pain and Telomere Length in Community-Dwelling Adults: Findings From the 1999 to 2002 National Health and Nutrition Examination Survey**

Alta M. Steward, Julia D. Morgan, Juan P. Espinosa, Dennis C. Turk, and Kushang V. Patel

Chronic pain is commonly associated with psychological distress, functional impairments, and age-associated comorbidity. Preliminary studies, based on relatively small sample sizes, suggest that the combination of chronic pain and stress is associated with telomere shortening, a widely recognized marker of cellular aging. This work aimed to determine the cross-sectional association of chronic pain with telomere length in 7,816 adults. Older age, male sex, obesity, and less physical activity were associated with shorter telomere length. However, there was no association of chronic pain with telomere length. The findings do not support the hypothesis that chronic pain accelerates cellular aging as measured by leukocyte telomere length. Additional population-based studies with more detailed assessments of pain and stress are needed.

1526

### **Novel Endomorphin Analogs Are More Potent and Longer-Lasting Analgesics in Neuropathic, Inflammatory, Postoperative, and Visceral Pain Relative to Morphine**

Amy K. Feehan, Jenny Morgenweck, Xing Zhang, Ariel T. Amgott-Kwan, and James E. Zadina

Activation of the mu-opioid receptor provides the gold standard for pain relief, but many opioids have adverse effects contributing to an epidemic of overdose deaths. The authors recently characterized mu-opioid receptor selective endomorphin (EM) analogs that provide potent antinociception with reduction or absence of side effects related to opioids. These include abuse liability, respiratory depression, motor impairment, tolerance, and inflammation. This study explored the effectiveness of EM analogs relative to morphine in four major pain models. Novel EM analogs show equal or greater potency and effectiveness relative to morphine in multiple pain models. Together with substantially reduced side effects, the compounds give promise for addressing pain relief and reducing the opioid overdose epidemic.

1542

### **Improvement in the Spatial Distribution of Pain, Somatic Symptoms, and Depression After a Weight Loss Intervention**

Andrew Schrepf, Steven E. Harte, Nicole Miller, Christine Fowler, Catherine Nay, David A. Williams, Daniel J. Clauw, and Amy Rothberg

Weight loss improves pain localized to weight bearing joints, but it is unknown how weight loss affects the spatial distribution of pain and associated somatic symptoms like fatigue. This research sought to determine if weight loss improves pain, affect, and somatic symptoms commonly associated with chronic pain conditions. Changes in inflammatory markers in serum before and after weight loss were also documented. Pain, symptom severity, depression and fibromyalgia scores improved following weight loss; men showed greater improvement than women on somatic symptoms and fibromyalgia scores. Weight loss may improve diffuse pain and co-morbid symptoms commonly seen in chronic pain participants, the authors conclude.

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