

# The Journal of Pain

## Table of Contents

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### Critical Reviews

#### 699 Ecological Momentary Assessment Methodology in Chronic Pain Research: A Systematic Review

Marcella May, Doerte U. Junghaenel, Masakatsu Ono, Arthur A. Stone, and Stefan Schneider

Self-reported pain intensity assessments are central to chronic pain research. Ecological Momentary Assessment (EMA) methodologies are uniquely positioned to collect these data, and are being utilized in the field. However, EMA protocols are complex, and many decisions are necessary in the design of EMA research studies. A systematic literature review identified 105 articles drawing from 62 quantitative EMA research projects examining pain intensity in adult chronic pain patients. In this article, recommendations are provided for reporting to improve reproducibility, comparability, and interpretation of results, and for opportunities to clarify the importance of design decisions.

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### ON THE COVER

Pain after spinal cord injury (SCI-Pain) is often characterized as relentless, excruciating pain that is largely refractory to treatments. While it is generally agreed that SCI-Pain results from maladaptive plasticity in the pain processing pathway that includes the spinothalamic tract and somatosensory thalamus, the specific mechanisms underlying the development and maintenance of such pain are yet unclear. This research discusses mechanisms that may influence SCI-Pain. See Park, et al, <https://doi.org/10.1016/j.jpain.2018.02.002>.

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717

### **Research Design Characteristics of Published Pharmacologic Randomized Clinical Trials for Irritable Bowel Syndrome and Chronic Pelvic Pain Conditions: An ACTION Systematic Review**

Jennifer S. Gewandter, Jenna Chaudari, Katarzyna B. Iwan, Rachel Kitt, Sawsan As-Sanie, Gloria Bachmann, Quentin Clemens, H. Henry Lai, Frank Tu, G. Nicholas Verne, Katy Vincent, Ursula Wesselmann, QiQi Zhou, Dennis C. Turk, Robert H. Dworkin, and Shannon M. Smith

Chronic pain conditions occurring in the lower abdomen and pelvis are common, often challenging to manage, and can negatively affect health-related quality of life. Methodological challenges in designing randomized clinical trials (RCTs) for these conditions likely contribute to the limited number of available treatments. This article summarizes entry criteria and outcome measures and the clarity of reporting of these important design features in RCTs of irritable bowel syndrome and 3 common chronic pelvic pain conditions. These results can be used to improve design of future trials of these largely unaddressed pain conditions.

### **Original Reports**

727

### **Pain After Spinal Cord Injury Is Associated With Abnormal Presynaptic Inhibition in the Posterior Nucleus of the Thalamus**

Anthony Park, Olivia Uddin, Ying Li, Radi Masri, and Asaf Keller

Pain after spinal cord injury (SCI-Pain) is one of the most debilitating sequelae of SCI, characterized as relentless, excruciating pain that is largely refractory to treatments. While it is generally agreed that SCI-Pain results from maladaptive plasticity in the pain processing pathway that includes the spinothalamic tract and somatosensory thalamus, the specific mechanisms underlying the development and maintenance of such pain are yet unclear. However, accumulating evidence suggests that SCI-Pain may be causally related to abnormal thalamic disinhibition, leading to hyperactivity in the posterior thalamic nucleus. This research discusses mechanisms that may influence SCI-Pain. Given the difficulty of treatment, a better understanding of the underlying neurobiological systems is critical, and may allow development of better treatment modalities.

728

### **Concurrent Assessment of the Antinociceptive and Behaviorally Disruptive Effects of Opioids in Squirrel Monkeys**

Sarah L. Withey, Carol A. Paronis, and Jack Bergman

Although the clinical application of opioids for pain management is often hindered by undesired behavioral impairment, preclinical assays of antinociception typically do not provide information regarding the behaviorally disruptive effects of opioids that may accompany their antinociceptive effects. To address this, the authors modified a warm water tail withdrawal procedure to determine concurrently the effects of opioids on tail withdrawal latency (antinociception) and indices of food-maintained operant behavior (rates of responding and reinforcement density) in squirrel monkeys. Six opioid agonists were tested, and all produced dose-dependent antinociception and impairment of operant behavior. Results demonstrate that the 3 tail withdrawal assay in squirrel monkeys can provide a useful index of the behavioral selectivity with which opioids produce antinociception.

## **741** Randomized Controlled Trial of Online Acceptance and Commitment Therapy for Fibromyalgia

Heather D. Simister, Gregg A. Tkachuk, Barbara L. Shay, Norah Vincent, Joseph J. Pear, and Ryan Q. Skrabek

In this study, 67 participants (95% female) with fibromyalgia (FM) were randomly assigned to an online acceptance and commitment therapy (online ACT) + treatment as usual (TAU) protocol, or a TAU control condition. Assessments were completed at pretreatment, post-treatment, and three-month follow-up periods and included measures of FM impact (depression, sleep, physical activity, mindfulness). The results indicated that online ACT + TAU participants significantly improved in FM impact, relative to TAU. Reductions in FM impact were mediated by improvements in pain acceptance. Online ACT appears to be a promising intervention for FM.

## **754** The Long-Term Footprint of Endometriosis: Population-Based Cohort Analysis Reveals Increased Pain Symptoms and Decreased Pain Tolerance at Age 46 Years

Saara Vuontisjärvi, Henna-Riikka Rossi, Sauli Herrala, Laure Morin-Papunen, Juha S. Tapanainen, Salla Karjula, Jaro Karppinen, Juha Auvinen, and Terhi T. Piltonen

Previous studies have shown increased pain sensitivity in fertile-aged women with endometriosis in response to mechanical stimuli. As yet, population-based studies on the association of endometriosis with pain sensation and pain symptoms in late fertile age are lacking. The main objective was to investigate whether a history of endometriosis is associated with altered pain sensation and musculoskeletal pain symptoms at age 46. Findings show decreased pain threshold and maximal pain tolerance in women with endometriosis until age 46. The pain was also found to be more bothersome and intense compared with controls.

## **764** Opposing Roles of Estradiol and Testosterone on Stress-Induced Visceral Hypersensitivity in Rats

Yaping Ji, Bo Hu, Jiyun Li, and Richard J. Traub

Chronic stress produces maladaptive pain responses, manifested as alterations in pain processing and exacerbation of chronic pain conditions including irritable bowel syndrome. Female predominance, especially during reproductive years, suggests a role of gonadal hormones, but modulation of stress-induced pain hypersensitivity is not well understood. This study tested the hypothesis that estradiol is pronociceptive and testosterone is antinociceptive in rats. Findings indicate that estradiol facilitates and testosterone attenuates stress-induced visceral hypersensitivity by modulating spinal excitatory and inhibitory glutamatergic receptor expression. This could partially explain the greater prevalence of certain chronic visceral pain conditions in women. Pharmaceutical interventions targeting this molecule could provide promising alleviation of SIVH in women.

777

### **Symptoms of Fibromyalgia According to the 2016 Revised Fibromyalgia Criteria in Chronic Pain Patients Referred to Multidisciplinary Pain Rehabilitation: Influence on Clinical and Experimental Pain Sensitivity**

Karin Bruun Plesner and Henrik Bjarke Vaegter

Fibromyalgia (FM) is a condition with chronic widespread pain and signs of generalized pain hypersensitivity. FM has previously been classified according to the ACR1990 criteria, where the presence of hypersensitivity is estimated by a tender point examination. Due to limitations, new criteria have been proposed, abandoning this examination. This cross-sectional study investigated the prevalence of FM according to the revised 2016 FM criteria. More than one third of patients were classified as FM, and patients classified demonstrated increased clinical and experimental pain profiles. As no data were collected on whether the included patients had a clinical FM diagnosis, future studies validating the ACR-2016 criteria in a cohort of patients with chronic non-malignant pain are warranted.

787

### **Pain, Please: An Investigation of Sampling Bias in Pain Research**

Kai Karos, Jessica M. Alleva, and Madelon L. Peters

Experimental pain research frequently relies on the recruitment of volunteers. Because such research often involves unpleasant and painful sensations, it may be especially susceptible to sampling bias. That is, volunteers might differ from nonvolunteers on several relevant variables that could affect the generalizability and external validity of the research. The authors conducted two studies to investigate potential sampling bias in experimental pain research, and report that intention to participate in experimental pain research is associated with less fear of pain, higher sensation seeking, and older age. Actual participation was associated with higher sensation seeking. This potential sampling bias could limit external validity and generalizability of pain research.

797

### **Chronic Pain, TBI, and PTSD in Military Veterans: A Link to Suicidal Ideation and Violent Impulses?**

Shannon M. Blakey, H. Ryan Wagner, Jennifer Naylor, Mira Brancu, Ilana Lane, Meghann Sallee, Nathan A. Kimbrel, VA Mid-Atlantic MIRECC Workgroup, and Eric B. Elbogen

The polytrauma clinical triad refers to the co-occurrence of chronic pain, traumatic brain injury (TBI), and posttraumatic stress disorder (PTSD). Despite research implicating dyadic relationships between these conditions and adverse outcomes, scant research has examined the polytrauma clinical triad's relation to suicide or violence. This study sought to examine whether this complex clinical presentation increases risk of suicidal ideation and violent impulses after accounting for other established risk factors. The authors advise that healthcare professionals should assess for pain interference, TBI, posttraumatic stress disorder, depression, and alcohol/drug abuse when conducting risk assessments with this population.

## Transcranial Alternating Current Stimulation at Alpha Frequency Reduces Pain When the Intensity of Pain is Uncertain

Laura J. Arendsen, Siobhan Hugh-Jones, and Donna M. Lloyd

Alpha activity directly before pain onset has been implicated in pain experience with higher pre-stimulus alpha associated with lower reported pain. However, expectations about pain intensity also seem to affect pre-stimulus alpha activity. To date, evidence for a relationship between alpha activity and pain experience has been largely correlational. The authors considered whether transcranial alternating current stimulation at alpha frequency (alpha tACS) could reduce pain experience and whether this was influenced by uncertainty about pain intensity. Findings show that interventions targeting alpha activity may have the potential to alleviate chronic pain. However, a patient's expectation about the intensity of upcoming pain must also be taken into account.

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