

The Journal of Pain

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Volume 16, Number 11, November 2015

Original Reports

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Pain Catastrophizing and Fear of Pain Predict the Experience of Pain in Body Parts Not Targeted by a Delayed-Onset Muscle Soreness Procedure

Nils Georg Niederstrasser, Ann Meulders, Michel Meulders, P. Maxwell Slepian, Johan W. S. Vlaeyen, and Michael J. L. Sullivan

The aim of this research was to elucidate whether pain catastrophizing and pain-related fear predict the verbal report of pain in body parts contralateral to those targeted by a delayed-onset muscle soreness protocol. To date, experimental research has focused on bringing greater precision to the specification of processes underlying psychological influences on the experience of pain within the experimentally injured body parts. These results extend previous findings in showing that pain catastrophizing and pain-related fear, measured in a pain-free state, also augment the experience of pain in response to nonnoxious stimuli.

1077

Frequency of Hospitalizations for Pain and Association With Altered Brain Network Connectivity in Sickle Cell Disease

Deepika S. Darbari, Johnson P. Hampson, Eric Ichesco, Nadja Kadom, Gilbert Vezina, Iordanis Evangelou, Daniel J. Clauw, James G. Taylor VI, and Richard E. Harris

Sickle cell disease (SCD) is a hemoglobinopathy affecting more than 100,000 individuals in the United States. The disease is characterized by presence of sickle hemoglobin and recurrent episodes of pain. Some patients experience frequent hospitalizations and a high burden of pain. The role of central mechanisms in SCD pain was explored in this study. Altered connectivity patterns associated with high pain experience in patients with SCD suggest a possible role of central mechanisms. Resting state brain connectivity studies should be explored as an effective methodology to investigate pain in SCD.

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ON THE COVER

Acceptance and Commitment Therapy (ACT) aims to increase the behavioral flexibility of individuals facing painful situations. Pain acceptance is the willingness to experience pain while engaging in valued activities. It is often measured using the Chronic Pain Acceptance Questionnaire. Previous analyses identified three patient clusters which differed across measures of patient functioning in meaningful ways. In this issue, Rovner et al present clustering using Latent Class Analysis. This cover image, a collaborative piece between ACT psychologist and artist Rikke Kjølgaard and author Graciela Rovner, is metaphorically related to ACT. See Rovner et al, Page 1095.

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Manual Physical Therapy Versus Surgery for Carpal Tunnel Syndrome: A Randomized Parallel-Group Trial

César Fernández-de-las Peñas, Ricardo Ortega-Santiago, Ana I. de la Llave-Rincón, Almudena Martínez-Perez, Homid Fahandezh-Saddi Díaz, Javier Martínez-Martín, Juan A. Pareja, and Maria L. Cuadrado-Pérez

This randomized clinical trial investigated the effectiveness of surgery compared with physiotherapy for carpal tunnel syndrome (CTS). The study included 120 CTS patients. Interventions encompassed sessions of manual therapies that included desensitization maneuvers of the central nervous system. Analyses showed an advantage for physiotherapy at 1 and 3 months in mean pain and function. Changes in pain and function were similar between groups at 6 and 12 months. Both groups had similar improvements in symptom severity at all follow-ups. The authors conclude that, among women with CTS, physical therapy may result in similar outcomes on pain and function to surgery.

1095

Latent Class Analysis of the Short and Long Forms of the Chronic Pain Acceptance Questionnaire: Further Examination of Patient Subgroups

Graciela Rovner, Kevin E. Vowles, Björn Gerdle, and David Gillanders

Pain acceptance is the willingness to experience pain and to engage in activities even in the presence of pain, and is a useful behavioral process in rehabilitation. It is often measured using the Chronic Pain Acceptance Questionnaire. Previous analyses identified three patient clusters which differed across measures of patient functioning in meaningful ways. The aims of this study were to replicate the prior study in a new sample, using the more robust method of Latent Class Analysis. Results provide support for four discrete patient groups based on levels of acceptance: low, medium, and high, as well as a group with a high level of activity engagement and low willingness to have pain. Consistent with previous research, cluster membership based on patterns of pain willingness and activity engagement was significantly associated with patterns of psychological and physical function, in line with theoretical predictions.

1106

Characterization of Pain in Familial Amyloid Polyneuropathy

Sophie Ng Wing Tin, Violaine Planté-Bordeneuve, Hayet Salhi, Colette Goujon, Thibaud Damy, and Jean-Pascal Lefaucheur

Familial amyloid polyneuropathy (FAP) caused by transthyretin (TTR) mutation is a small-fiber predominant polyneuropathy, exposing patients with TTR-FAP to development of neuropathic pain. However, pain is an inconsistent feature of TTR-FAP, and questions about the nature of this condition have never been specifically addressed. The authors compared two groups of 16 patients with either painless or painful TTR-FAP. The results illustrate that pain in TTR-FAP includes several mechanisms that vary with the course of the disease and involve different types of nerve fibers. The progress of the disease and the loss of nerve fibers influence pain characteristics in patients who have painful polyneuropathy.

1115

Effects of a Guided Internet-Delivered Self-Help Intervention for Adolescents With Chronic Pain

Jessica S. Voerman, Sylvia Remerie, Tessa Westendorp, Reinier Timman, Jan J. V. Busschbach, Jan Passchier, and Cora de Klerk

Cognitive behavioral therapy is effective in reducing the frequency and intensity of chronic pain in adolescents. This study sought to evaluate the effects of a guided Internet-delivered self-help for adolescents with chronic pain. Pain intensity, interference caused by pain, rewarding of pain behavior by parents, and sleep problems significantly decreased during the intervention. Quality of life scores for pain, general behavior, mental health, family activities, and health changes also improved. These findings suggest this tool is effective in decreasing pain intensity in adolescents with chronic pain. However, contrary to expectations, this approach is difficult to employ in adolescents, as it suffers from treatment attrition and loss to follow-up.

1127

Evidence for Sustained Mechanical Pain Sensitization in Women With Chronic Temporomandibular Disorder Versus Healthy Female Participants

Phillip J. Quartana, Patrick H. Finan, and Michael T. Smith

Relative to pain-free controls, patients with temporomandibular disorder (TMD) show greater sensitivity to painful mechanical stimuli applied to affected as well as distal, unaffected anatomical sites. The authors indicate that studies have not yet investigated sensitization of patients with TMD to painful stimuli administered prospectively across consecutive days. The authors report that this study provides the first empirical evidence suggesting TMD patients manifest sustained mechanical pain sensitization compared to healthy female controls. These findings suggest that psychophysical methods can be used to uncover a protracted sensitization of the nociceptive system over consecutive days.

1136

The Role of Psychological Factors in Persistent Pain After Cesarean Delivery

Brice Richez, Lemlih Ouchchane, Aline Guttman, François Mirault, Martine Bonnin, Yves Noudem, Virginie Cognet, Anne-Frédérique Dalmas, Lise Brisebrat, Nicolas Andant, Sylvie Soule-Sonneville, Claude Dubray, Christian Dualé, and Pierre Schoeffler

This prospective cohort study recruited 391 patients to investigate the risk factors for persistent pain after elective caesarean section, focusing on psychosocial aspects as adjusted to other known medical factors. Persistent pain displays a relatively frequent neuropathic aspect, but this is less stable than that following other surgeries. Also, when comparing the risk factor analyses to published data for hysterectomy, the influence of preoperative psychological factors seems less important, possibly because of the different context and environment.

- 1147** **Out-Of-Pocket Expenditures on Complementary Health Approaches Associated With Painful Health Conditions in a Nationally Representative Adult Sample**
- Richard L. Nahin, Barbara J. Stussman, and Patricia M. Herman
- Using data from the 2007 National Health Interview Survey, the authors examined the financial impact of complementary health approaches in individuals with painful health conditions such as arthritis, back pain and fibromyalgia. The aim was to provide national estimates of all out-of-pocket (OOP) expenditures to treat or manage these issues, after accounting for other co-morbid conditions. Individuals using complementary approaches spent a total of \$14.9 billion OOP on approaches such as acupuncture, chiropractic manipulation, and herbal medicines. Total expenditures for back pain far outstripped that of any other condition.
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- 1163** **The Communal Coping Model of Pain Catastrophizing in Daily Life: A Within-Couples Daily Diary Study**
- John W. Burns, James I. Gerhart, Kristina M. Post, David A. Smith, Laura S. Porter, Erik Schuster, Asokumar Buvanendran, Anne Marie Fras, and Francis J. Keefe
- Pain catastrophizing is defined as a tendency to ruminate on, magnify and feel helpless about pain. One conceptualization of this phenomenon argues that catastrophizing is a response by which pain expressions prompt assistance or empathic responses from others. This Communal Coping Model (CCM) of pain catastrophizing emphasizes the social context in which pain and pain behavior is embedded, characterizing it as a coping tactic whereby exaggerated pain expression elicits assistance and empathic responses. Among the findings: patients reported greater pain intensity and catastrophizing when the spouses were present, and increases in catastrophizing were positively associated with perceptions of spousal support. These results support the CCM, which emphasizes interpersonal processes by which pain behavior and responses of significant others are intertwined.
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- 1176** **A Perspective-Taking Manipulation Leads to Greater Empathy and Less Pain During the Cold Pressor Task**
- Laura E. M. Leong, Annmarie Cano, Lee H. Wurm, Mark A. Lumley, and Angelia M. Corley
- Researchers have begun to explore methods of manipulating empathy and validation to improve health and well-being. The experimental evidence in this study suggests that empathic feelings can be induced in significant others with simple instructions. This manipulation leads to less pain experienced by partners undergoing a painful task. The results suggest that perspective taking, empathy, and validation should be further investigated as pain intervention targets.

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Short-Term Sleep Disturbance–Induced Stress Does not Affect Basal Pain Perception, but Does Delay Postsurgical Pain Recovery

Po-Kai Wang, Jing Cao, Hongzhen Wang, Lingli Liang, Jun Zhang, Brianna Marie Lutz, Kun-Ruey Shieh, Alex Bekker, and Yuan-Xiang Tao

Postsurgical pain control remains a challenge in approximately one-third of surgical patients. Among several factors known to affect postsurgical pain, sleep disturbances constitute a strong determinant. The authors' findings show that short-term sleep disturbance either pre- or post-surgery does not alter basal pain perception, but does exacerbate postsurgical pain hypersensitivity. The latter may be related to the reductions of mu and kappa opioid receptors in spinal cord and dorsal root ganglia caused by rapid eye movement sleep disturbance plus incision. Prevention of short-term sleep disturbance may help the recovery of postsurgical pain in patients.

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Contribution of Endogenous Spinal Endomorphin 2 to Intrathecal Opioid Antinociception in Rats Is Agonist Dependent and Sexually Dimorphic

Arjun Kumar, Nai-Jiang Liu, Priyanka A. Madia, and Alan R. Gintzler

Research consistently demonstrates a greater prevalence of chronic pain disorders among women than men, but the underlying basis remains unknown. Sex differences are also observed in the effectiveness of opioid analgesics. This report investigated the influence of spinal endomorphin 2 (EM2), an endogenous mu-opioid receptor (MOR) ligand, on spinal antinociception produced by intrathecally administered opioids. Activation of spinal MORs facilitated spinal EM2 release. This effect occurred in males but not females. The inferred diminished ability of females to utilize the spinal EM2 antinociceptive system could contribute to their greater frequency and severity of chronic pain syndromes. Collectively, the results suggest that the molecular and cellular elements required for MOR-mediated facilitation of spinal EM2 release are hard-wired and presumably sex-linked. This compromised functionality in females could serve as a novel pharmacological target for pain management in women.

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Effect of Milnacipran Treatment on Ventricular Lactate in Fibromyalgia: A Randomized, Double-Blind, Placebo-Controlled Trial

Benjamin H. Natelson, Diana Vu, Xiangling Mao, Nora Weiduschat, Fumiharu Togo, Gudrun Lange, Michelle Blate, Guoxin Kang, Jeremy D. Coplan, and Dikoma C. Shungu

Milnacipran, a serotonin/norepinephrine reuptake inhibitor (SNRI), is prescribed to treat fibromyalgia. This report presents the results of a randomized, double-blind, placebo-controlled trial of milnacipran. Patients treated with milnacipran showed decreases in both pain and ventricular lactate compared to those treated with placebo, but even after treatment, levels of ventricular lactate remained higher than in controls. The hypothesized mechanism for these decreases is via drug-induced reductions of a central inflammatory state.

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