



- **FACT SHEET NO. 6**

Behavioral Risk Factors and Interventions, Including Hypnosis for Acute and Chronic Pain After Surgery

Medical observers have long pointed out that the stronger a patient's expectation for acute pain relief from an illness or procedure, the more likely such relief will occur [Benedetti F. *The Patient's Brain*. Oxford: Oxford University Press, 2011]. As the field of acute pain medicine began to differentiate from more general perioperative care, even the earliest studies emphasized the importance of behavioral factors for acute pain control. This continues through the present time [Schug SA, Palmer GM, Scott DA, Halliwell R, Trinca J; APM:SE Working Group of the Australian and New Zealand College of Anaesthetists and Faculty of Pain Medicine (2015), *Acute Pain Management: Scientific Evidence* (4th edition), ANZCA & FPM, Melbourne].

- Controlled trials from more than five decades ago reported that patients who participated more in community activities or felt a positive personal connection with the staff caring for them were more likely to enjoy a positive response to placebo pain medication after surgery [Lasagna L, Mosteller F, von Felsinger JM, Beecher HK. A study of the placebo response. *Am J Med* 1954; 16: 770-779].
- Nearly 50 years ago, controlled trials of preparing preoperative patients with detailed information about the operations and related procedures they were about to undergo, including the expected pain intensity and duration, reduced their need for morphine analgesia [Egbert LD, Battit GE, Welch CE, Bartlett MK. Reduction of postoperative pain by encouragement and instruction of patients. A study of doctor-patient rapport. *N Engl J Med* 1964; 270: 825-827].

The picture has emerged of a spectrum of patient preparation and attributes that influence the experience of acute pain after surgery.

- At one end are anxious patients: ill-informed, with few social supports, lacking confidence in the persons or system caring for them, focusing upon and catastrophizing about their pain, feeling little or no control over surgery and their recovery, and lacking commitment to return to their



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preoperative employment. In recent years, high-dose, long-term preoperative opioid therapy has been added to this list as increasing numbers of patients present for surgery after such exposure.

- At the other end are patients who trust their families and health-care providers, expect a good surgical outcome, feel in control (including being able to relax at will), turn their attention away from their pain, and are motivated to return to their previous level of function.

To some degree these attributes are traits, but they also are states that patients can learn to achieve. For decades, multiple trials have shown that behavioral modalities are effective in decreasing acute postsurgical pain and other symptoms such as anxiety [Peck CL: Psychological factors in acute pain management. Chapter 10 in Cousins MJ, Phillips GD (eds): *Acute Pain Management*. New York: Churchill Livingstone, 1986, 251-274; Kay E: Hypnosis and the relaxation response. Chapter 21 in Ferrante FM, VadeBoncoeur TR (eds). *Postoperative Pain Management*. New York: Churchill Livingstone, 1993, 477-484; Williams DA: Acute pain (with special emphasis on painful medical procedures). Chapter 10 in Gatchel RJ, Turk DC (eds). *Psychosocial Factors in Pain. Critical Perspectives*. New York: Guilford Press, 1999, 151-163].

In addition to patient education, these modalities include:

- Standard scripts for use during procedures that prepare patients to reframe sensory input in emotionally neutral rather than threatening terms (e.g., “warmth” or “discomfort,” rather than “needle stick”).
- Hypnotic suggestion or training in autosuggestion in advance of a procedure [Lang EV, Benotsch EG, Fick LJ, Lutgendorf S, Berbaum ML, Berbaum KS, Logan H, Spiegel D. Adjunctive non-pharmacological analgesia for invasive medical procedures: a randomised trial. *Lancet* 2000; 355: 1486-1490].
- Cognitive behavioral techniques such as guided imagery.
- Modification of attention including distraction, virtual reality, and music.
- Relaxation, including biofeedback and controlled breathing exercises.

Chronic Postsurgical Pain (CPSP)

CPSP affects 10 percent to 20 percent of patients. Estimates of its incidence and prevalence vary according to the methods used to identify it, the nature of the operation, and the population surveyed. The transition of acute postsurgical pain to CPSP is complex and reflects biological, psychological, and socioenvironmental factors.[3] Sensory pathways transmit information from damaged tissue to the central nervous system, where psychological factors modulate the experience of pain and individual pain responses.

Psychological factors that predict CPSP include:

- Preoperative depression [4]
- Preoperative anxiety [8]
- Preoperative pain catastrophizing [7, 8]



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- Preoperative posttraumatic stress disorder symptoms [9]
- Preoperative fear of surgery [5, 10]
- Early postsurgical kinesiophobia [2, 6]

The foregoing factors may coexist and synergize for greater effects. Younger age and female sex may increase their impact. The factors may vary according to the type of surgery. Social factors may mediate or moderate psychological influences.

Evidence-Based Treatments to Prevent CPSP

To date, there have been few well-designed, prospective randomized controlled outcome studies of psychological treatments that specifically target preoperative risk factors aimed at preventing or reducing CPSP. However, six-week cognitive-behavioral-based physical therapy appears to hold promise as an integrated treatment [1], and there is evolving evidence of the efficacy of mind-body interventions [11] and hypnosis [12] improving pain, disability, and mood in acute trauma and postoperative pain conditions respectively. Targeted, scalable, and widely accessible treatments are needed to meet the needs of the hundreds of millions of individuals across the globe who undergo surgery each year.

REFERENCES

- [1] Archer KR, Devin CJ, Vanston SW, Koyama T, Phillips SE, George SZ, McGirt MJ, Spengler DM, Aaronson OS, Cheng JS, Wegener ST. Cognitive-Behavioral-Based Physical Therapy for Patients With Chronic Pain Undergoing Lumbar Spine Surgery: A Randomized Controlled Trial. *The journal of pain : official journal of the American Pain Society* 2016;17(1):76-89.
- [2] Archer KR, Seebach CL, Mathis SL, Riley LH, 3rd, Wegener ST. Early postoperative fear of movement predicts pain, disability, and physical health six months after spinal surgery for degenerative conditions. *The spine journal : official journal of the North American Spine Society* 2014;14(5):759-767.
- [3] Katz J, Seltzer Z. Transition from acute to chronic postsurgical pain: risk factors and protective factors. *Expert Rev Neurother* 2009;9(5):723-744.
- [4] Lewis GN, Rice DA, McNair PJ, Kluger M. Predictors of persistent pain after total knee arthroplasty: a systematic review and meta-analysis. *Br J Anaesth* 2015;114(4):551-561.
- [5] Peters ML, Sommer M, de Rijke JM, Kessels F, Heineman E, Patijn J, Marcus MA, Vlaeyen JW, van Kleef M. Somatic and psychologic predictors of long-term unfavorable outcome after surgical intervention. *Annals of surgery* 2007;245(3):487-494.
- [6] Roelofs J, van Breukelen G, Sluiter J, Frings-Dresen MH, Goossens M, Thibault P, Boersma K, Vlaeyen JW. Norming of the Tampa Scale for Kinesiophobia across pain diagnoses and various countries. *Pain* 2011;152(5):1090-1095.
- [7] Sullivan M. The Pain Catastrophizing Scale User Manual. http://sullivan-painresearch.mcgill.ca/pdf/pcs/PCSManual_English.pdf, 2009.
- [8] Theunissen M, Peters ML, Bruce J, Gramke HF, Marcus MA. Preoperative anxiety and catastrophizing: a systematic review and meta-analysis of the association with chronic postsurgical pain. *The Clinical journal of pain* 2012;28(9):819-841.
- [9] Kleiman V, Clarke H, Katz J. Sensitivity to pain traumatization: a higher-order factor underlying pain-related anxiety, pain catastrophizing and anxiety sensitivity among patients scheduled for major surgery. *Pain Res Manag.* 2011; 16(3):169-177.
- [10] Theunissen M, Peters ML, Schouten EG, Fiddelers AA, Willemsen MG, Pinto PR, Gramke HF, Marcus MA. Validation of the surgical fear questionnaire in adult patients waiting for elective surgery. *PloS one* 2014;9(6):e100225.
- [11] Vranceanu AM, Hageman M, Strooker J, ter Meulen D, Vrahas M, Ring D. A preliminary RCT of a mind body skills based intervention addressing mood and coping strategies in patients with acute orthopaedic trauma. *Injury.* 2015 Apr;46(4):552-7.
- [12] Kendrick C, Sliwinski J, Yu Y, Johnson A, Fisher W, Kekecs Z, Elkins G. Hypnosis for Acute Procedural Pain: A Critical Review. *Int J Clin Exp Hypn.* 2016;64(1):75-115.

AUTHORS

Beth Darnall, PhD
Clinical Associate Professor
Stanford University School of Medicine
Department of Anesthesiology, Perioperative and Pain Medicine
Palo Alto, Calif., USA

Robert I. Cohen, MD
Pain Medicine Consulting
Newton Center, Mass., USA

REVIEWERS

Daniel B. Carr, MD, DABPM, FFPMANZCA (Hon)
Professor of Public Health and Community Medicine
Professor of Anesthesiology and Medicine
Founding Director, Tufts Program on Pain Research, Education, and Policy
Boston, Mass., USA

Martin D. Cheatle, PhD
Associate Professor and Director, Pain and Chemical Dependency Program
Department of Psychiatry
Perelman School of Medicine
University of Pennsylvania
Philadelphia, Pa., USA

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