

Pain Psychology and Pain Catastrophizing in the Perioperative Setting

A Review of Impacts, Interventions, and Unmet Needs



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KEYWORDS

- Pain psychology • Psychological • Outcomes • Catastrophizing • Perioperative • Surgical • Surgery

KEY POINTS

- Psychological factors, including pain-related psychological factors, have a significant influence on surgical outcomes.
- Pain catastrophizing (psychological responses to actual or anticipated pain) predicts postsurgical pain intensity, opioid use, function, and the persistence of pain.
- A convergence of evidence suggests that treating pain catastrophizing and pain-related anxiety before surgery may improve recovery from surgery.
- Research on perioperative psychological interventions is sparse and limited by methodological issues, including significant variation in the timing and content of the interventions.
- Recommendations for future research include presurgical delivery of interventions (psychological prehabilitation), and standardization of outcomes to include metrics of recovery and postsurgical medication use.

INTRODUCTION

Surgical outcomes are known to be influenced by the medical complexity of the patient. An accumulation of evidence similarly shows that psychological factors affect postsurgical outcomes, thus setting the stage for the integration of psychology into models of care. Within the context of psychology, pain-specific psychological factors have emerged as particularly powerful determinants of postsurgical outcomes, at times surpassing medical characteristics or surgical variables in their predictive value. In the perioperative setting, pain

is a highly salient stimulus, and psychological reactions to pain directly influence the patient experience and patients' responses to medical treatment. Accordingly, in an era of patient-centered care that focuses on cost containment and optimizing outcomes, there has been a surge of interest in the psychology of surgical patients, with a particular focus on pain psychology.

This article provides a brief overview of the literature on perioperative pain psychology in terms of relevant factors and treatments. Where possible, the content emphasizes hand surgery or hand trauma populations, although this literature is

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notably limited, as well as the relevant musculoskeletal surgery literature. In addition, gaps in understanding and patient care are identified and discussed.

In the perioperative setting, the most studied psychological factors related to pain include pain-related anxiety, general anxiety, depression, post-traumatic stress disorder, and pain catastrophizing. Although all of these psychological factors are known to correlate with pain, pain-related anxiety and pain catastrophizing are distinctly specific to the experience of pain. Pain catastrophizing is a negative mental set brought to bear in the context of actual or anticipated pain.¹ Pain catastrophizing is typically measured with the catastrophizing subscale of the Coping Skills Questionnaire² or with the 13-item Pain Catastrophizing Scale.³ The Pain Catastrophizing Scale contains 3 subscales: magnification of pain, rumination of pain, or feelings of helplessness about pain. Catastrophizing is a form of pain-specific psychological distress and it powerfully predicts outcomes for pain, including chronic pain intensity,⁴ postsurgical pain intensity,^{5–7} disability,⁴ poor response to opioids,⁸ greater use of perioperative opioids,⁵ misuse of opioids,⁹ persistent use of opioids 2 months after surgery,¹⁰ and persistent postsurgical pain at 4-month follow-up.¹¹ In outpatient chronic pain samples, research suggests that pain catastrophizing has greater predictive value for treatment outcomes than disease characteristics, pain intensity, or various medical interventions.^{9,12–14} A vast and varied literature has described pain catastrophizing in outpatient chronic pain. However, the number of studies that have investigated pain catastrophizing in the perioperative context remains small.

PAIN-RELATED PSYCHOLOGICAL FACTORS AND MUSCULOSKELETAL SURGERY OUTCOMES

Two systematic reviews have examined pain-related psychological predictors and correlates for chronic postsurgical pain. The first was a meta-analysis of 29 studies that examined preoperative anxiety and pain catastrophizing in patients with a postsurgical follow-up between 3 and 12 months (N = 6628).¹⁵ Eighteen of the studies (N = 4963) involved musculoskeletal surgery, 1 of which involved shoulder surgery,¹⁶ and none involved hand surgery. The investigators of the review noted the typical limitations of cross-study comparison with variability of constructs measured and instruments used. The types of anxiety assessed across studies varied and included state and trait anxiety, kinesiophobia (fear of movement), fear of pain, and

pain-related anxiety. In general, kinesiophobia was not a significant predictor of chronic postsurgical pain. However, the investigators reported at least moderate evidence that preoperative anxiety and pain catastrophizing were associated with the development of postsurgical chronic pain. Pain catastrophizing emerged as the strongest predictor of chronic postsurgical pain, with a maximum pooled effect size of 2.37 based on 15 studies that included 5046 patients.

A meta-analysis of 15 studies and 5046 patients having musculoskeletal surgery revealed that presurgical pain catastrophizing was the strongest predictor of postsurgical chronic pain.¹⁵

The effect of psychological factors on likelihood for postsurgical chronic pain was greater in musculoskeletal surgeries compared with other surgery types (67% vs 36%, respectively). The investigators speculated that this might be caused by greater incidence of presurgical chronic pain (a known risk factor for postsurgical chronic pain) in the musculoskeletal surgery population. Most studies reported a direct association between psychological factors and chronic postsurgical pain, and no studies found reverse associations. Although results were not uniform (45% of studies found no association with psychological factors and surgical outcome) musculoskeletal surgery studies reported greater positive associations.

A systematic review examined psychological factors affecting outcomes in total hip and knee arthroplasty, the most studied surgeries with regard to pain.¹⁷ The review included prospective studies with a minimum 6-week postsurgical follow-up. The final analysis was conducted on 35 studies, and pain catastrophizing was the only pain-specific psychological construct assessed. The investigators concluded that low preoperative mental health and pain catastrophizing negatively affected surgical outcomes. In particular, the strongest evidence was found for the direct relationship between pain catastrophizing and postsurgical pain in total knee arthroplasty. Only 1 study quantified the association with an odds ratio (OR). In that study, controlling for confounding factors, patients with greater preoperative pain catastrophizing had greater likelihood for poor outcome (OR = 2.67; 95% confidence interval, 1.2, 6.1). The outcome was defined as chronic postsurgical pain, operationalized as less than

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