

# Recovery from Surgery: How Do Psychosocial Factors Influence Outcomes in Lower Extremity Pediatric Orthopaedic Trauma

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## INTRODUCTION:

A child's unique postoperative pain experience involves a complex interplay between various biological, psychological, socio-environmental, and parental-specific factors. Effective postoperative analgesia requires both appropriate medication administration and adequate family education and supportive resources. The purpose of this study was to characterize the natural history of pain and analgesic consumption following lower-extremity fracture surgery in children. Additionally, we aim to determine how various parental and patient-specific psychosocial factors affect pain intensity, opioid use, and health-related quality-of-life (HRQOL).

## METHODS:

A prospective cohort study of children aged 5 and 17 years old undergoing operative fixation of an isolated lower extremity fracture of any type at a single children's hospital was performed. Exclusion criteria included open fractures, a neuromuscular and/or syndromic diagnosis, polytrauma, prolonged hospitalization >1 night and delayed presentation >2 weeks from injury to surgery. Baseline surveys were administered to patients and their parents prior to surgery assessing several psychosocial variables including anxiety (Generalized Anxiety Disorder [GAD7] scale for adults, PROMIS Anxiety scale for kids), pain catastrophizing, and pain self-efficacy. Real-time daily pain scores (via the Wong-Baker FACES Scale) and analgesic consumption were collected using an automated text message-based protocol on postoperative days (POD) 1 to 7, 10, 14, and 21. Additionally, HRQOL was assessed via the PROMIS Global Health scale on POD7 and 14, and functional recovery was assessed via PROMIS Mobility scale on POD10 and 21. Demographic and clinical data were abstracted from the medical record. Data was analyzed using descriptive and univariate statistics.

## RESULTS:

A total of 63 patients were enrolled. The mean age was 13 years old, and 70% (n=44) were male. The most common fractures included those of the ankle (49%), tibia (27%), and femur (16%). Mean daily pain scores peaked at 4.5/10 on POD1 and steadily decreased every day thereafter (**Figure 1**). By POD3, the majority of patients (32/55, 62%) had mild pain or less (numeric rating scale  $\leq 3/10$ ) and were no longer taking any opioids (n=28/53; 53%). By POD7, 79% (n=43/55) of patients had mild pain or less and only 16% (n=8/49) were still using opioids. However, 72% were still using NSAIDs and 88% reported persistent use of acetaminophen. No patient reported opioid use after POD14. HRQOL (PROMIS Global Health) reached population norms (mean 50.3) by POD7, while functional recovery (PROMIS Mobility) steadily improved from 25.2 on POD10 to 29.9 on POD21. With respect to preoperative psychosocial concerns, the majority of parents (n=34/61; 55%) and patients (n=31/55; 56%) reported pain-related anxiety of 6 or higher (on a scale of 1-10) prior to surgery, while only 76% of parents (n=48/63) and 56% of patients (n=31/55) were at least moderately confident in their ability to adequately manage their postoperative pain.

## DISCUSSION AND CONCLUSION:

This study contributes normative data for postoperative pain, analgesic consumption, and functional recovery following surgical treatment of lower extremity fractures in children that can be used to guide prescribing practices and preoperative family education. Additionally, by associating baseline familial psychosocial characteristics to postoperative outcomes, we hope to pinpoint opportunities for targeted, evidenced-based interventions for children and parents that surgeons can preemptively use to reduce the risk of poorly managed postoperative pain.

Mean Daily Pain Scores by Age Category

