

Preoperative Behavioral Pain Management Strategies in Total Joint Arthroplasty: A Prospective Randomized Controlled Trial Comparing Mindfulness, Hypnosis and Cognitive-Behavioral Psychoeducation

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Introduction: To better support patients' recovery after total joint arthroplasty (TJA), we introduced evidence-based, preoperative behavioral pain management strategies to our existing multi-modal pain management protocol. This study examined the effect of three different adjunctive interventions (mindfulness meditation, hypnotic suggestion, cognitive-behavioral psychoeducation) on preoperative pain and anxiety as well as physical function in early recovery following primary TJA.

Methods: This was a three-arm, prospective randomized controlled trial conducted in a university-based orthopaedic practice. Patients (N=288: knee=185, hip=103) attending a preoperative education class were randomized to one of three 15-minute interventions: mindfulness (n=108), hypnosis (n=90), or psychoeducation (n=90). A brief survey measured pain-at-rest, desire for pain medication, and anxiety immediately before and 15 minutes after the preoperative intervention. Additionally, preoperative and 6-week postoperative PROMIS Physical Function (PF) scores were compared.

Results: Linear mixed modeling, adjusted for age, BMI, and comorbidities, revealed that mindfulness and hypnosis significantly reduced preoperative pain intensity by 24% and 26% respectively ($p<0.001$), pain unpleasantness by 29% and 33% ($p<0.001$), and anxiety by 43% and 29% ($p<0.001$). Preoperative mindfulness training significantly increased PROMIS PF scores from patients' preoperative to 6-week postoperative visit (+5.62, $p<0.001$, MCID 3.34) relative to hypnosis and psychoeducation, which showed no significant change from preoperative to 6 weeks.

Conclusions: Findings from this study suggest that a single, 15-minute mindfulness or hypnosis intervention immediately reduced preoperative pain intensity, pain unpleasantness, and anxiety in patients preparing for TJA. Historically, we have found no significant improvement in PROMIS PF scores 6 weeks after TJA; whereas, with preoperative mindfulness training, we found clinically and statistically significant improvements in self-reported physical function at 6-weeks postoperatively. These findings suggest that brief, preoperative mindfulness training may be an effective adjunct that can be easily disseminated in clinical settings, provide immediate preoperative pain and anxiety relief, and may improve postoperative physical function.