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BEHAVIORAL THERAPY FOR ACUTE POST-SURGICAL PHANTOM LIMB PAIN IN A YOUNG ADULT WITH OSTEOSARCOMA

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To the Editor:

Phantom limb pain (PLP) is one of the most difficult chronic pain syndromes to treat. Pain intensity can be extremely high with profound effects on quality of life ¹. Unfortunately, pharmacologic interventions leave up to 50% of patients with chronic PLP ^{2,3}. Behavioral treatments such as motor imagery and mirror therapy are promising in reducing PLP ⁴, but are not customarily utilized during the acute post-surgical timeframe when symptoms first occur.

Here, we present a case of complete PLP resolution following a brief behavioral intervention administered during the acute post-surgical timeframe. The patient is a 22-year-old Caucasian male diagnosed with high-grade osteosarcoma of the left femur. Surgical intervention included a modified hemipelvectomy of the left leg. Pain was assessed using the Numerical Rating Scale-11 (NRS-11)⁵, with 0 = “no pain” and 10 = “most intense pain imaginable.” On post-operative day 4, the patient began to experience sharp, stabbing, shooting, intermittent, severe PLP (10/10) on his amputated left foot. Pharmacological management included oxycodone 5–15 mg every 4 hours as needed and gabapentin 600mg three times per day for approximately 1-week post-surgery. Pain medications were subsequently discontinued at patient’s request due to increased pain intensity and lack of perceived benefit to his PLP. Clinical psychology service was consulted to explore alternative pain management strategies. The patient participated in four 20-minute sessions

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CONFLICT OF INTEREST

The authors report no conflicts of interest.

beginning 9-days post-amputation. Behavioral treatments were delivered approximately every other day in a graded fashion, and consisted of relaxation training (diaphragmatic breathing and guided visual imagery), motor imagery, and mirror therapy (Table 1). The patient was encouraged to practice behavioral strategies between sessions. He also completed 1 self-guided mirror therapy session after hospital discharge. Our results showed a decrease in pain score of PLP from 10/10 to 2/10 over the course of 4 sessions. Patient's PLP completely resolved at 1-month follow-up (0/10). Pain reduction was maintained across 3 years after the operation (Figure 1).

Osteosarcoma patients are at particular risk for PLP due to increased nerve sensitivity from chemotherapy treatments, presence of pre-amputation pain, and use of amputation for cancer control ⁶. Application of behavioral therapy at the early stage after surgery may provide several key advantages such as reductions in pain-related anxiety, depression, and fear catastrophizing, which are often present in early-stage amputees that can trigger and worsen PLP ^{7,8}. Memory of painful experiences can also affect pain perceptions, predict greater distress at subsequent encounters, and explain how chronic pain behaviors become established ⁹. Thus, early behavioral interventions may also provide a preventative role in chronic PLP development. In this case, relaxation training was used to activate the parasympathetic nervous system by reducing the amount of pain signals carried to the brain ¹⁰ – a component that may serve as an important precursor to motor imagery and mirror therapy for long-term PLP relief. This case demonstrates the feasibility and potential effectiveness of a brief behavioral intervention for acute treatment of post-surgical PLP. Larger scale studies with control groups are needed to generalize the study findings. Future studies should also consider the role of patient characteristics in treatment outcomes.

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Figure 1. Patient-reported pain score of phantom limb pain over the course of the behavioral intervention. DB, diaphragmatic breathing; F1, follow-up visit 1; F2, follow-up visit 2; F3, follow-up visit 3; F4, follow-up visit 4; MI, motor imagery; MT, mirror therapy; VI, guided visual imagery.

Table 1.

Behavioral Intervention Components

Treatment Session	Diaphragmatic Breathing	Visual Imagery	Motor Imagery	Mirror Therapy
1	✓			
2	✓	✓		
3	✓	✓	✓	
4	✓	✓	✓	✓