Neurogenic pain can be debilitating and result in low quality of life. Targeted muscle reinnervation (TMR) is a technique developed by the senior author to prevent and treat neurogenic pain caused by painful neuromas. We developed and launched mobile application to monitor pre- and post-operative pain, medication use, and quality of life among patients with neurogenic pain. We hypothesize that mobile application use to monitor pre- and post-operative pain can provide granular data that can allow providers to assess pain outcomes.

Methods

• Subjects were recruited from the clinics of the senior authors.
• Patients were asked to complete weekly surveys and medication logs via the mobile application.
• Survey questions were selected based on the biopsychosocial approach to pain assessment.
• Data was collected from August 1, 2020 to June 1, 2021.
• Exploratory data analysis was performed to assess retention rate and fitness data.
• A subset of patients who met the following criteria was evaluated: at least one pre-op survey, underwent surgical treatment, and at least one post-operative survey.

Results

• A total of 97 patients were recruited.
• The retention rate at the end of the study period was 30.7%, demonstrating a decrease over time.
• 28 surgical patients completed a pre-op survey and a post-op survey.
  • In this group, median (IQR) age was 46.9 (39.0, 55.5), 25 (89.3%) participants were white, and 15 (53.6%) were never smokers.
  • Most patients suffered from anxiety (n = 11, 39.3%) and depression (n = 7, 25.0%).
  • 10 patients had amputation-related pain, 4 occipital nerve pain, 4 trunk nerve pain, 3 groin nerve pain, and 7 non-amp limb pain.
• Mean number of survey entries per patient was 11.3, with a mean response time of 23.5 days between surveys per patient.
• Pain increased in the immediate post-operative period, with a steady downtrend thereafter. A similar trend was demonstrated with post-operative medication use.
• Depression and anxiety scores were low and did not demonstrate a transient effect with surgery.

Conclusions

• This study utilizes a mobile application to assess neurogenic pain.
• User retention can be improved with personalized alerts and gamification.
• Granular pain data can provide important information regarding patients' post-operative courses and guide appropriate post-operative counseling.
• Additional recruitment to increase sample sizes in subgroups is needed for future studies.

Figure #1. Screen capture of Zing PainApp assessment tool.

Figure #2. Screen capture querying 7-day recall of medication use.

Figure #3. App retention (blue) during study period.

References