

The Effect of Microcurrent Stimulation on Postoperative Pain After Patellar Tendon-Bone Anterior Cruciate Ligament Reconstruction

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PURPOSE: The purpose of this study was to determine the effectiveness of microcurrent electrical therapy in providing pain relief to a selected post-operative patient population.

SUBJECTS: Subjects were 19 females and 22 males (mean age of 21.1) who received arthroscopic bone-patellar tendon-bone anterior cruciate ligament (ACL) reconstruction.

METHODS AND MATERIALS: Subjects were randomly assigned to one of two treatment groups ("Microcurrent" or "Placebo" Groups) in a double blind experimental design. Using a portable microcurrent device (Alpha-Stim 100 by Electromedical Products International, Inc, Mineral Wells, Texas), the Microcurrent Group received 100 microamperes of microcurrent at 0.5 Hz with a 50% duty cycle, which was below the subject's perception threshold. The Placebo Group followed the same protocol with a placebo stimulator. All subjects were instructed to use the microcurrent unit as needed for pain relief in one-hour sessions, with at least 30 minutes between sessions. The 10 days postoperative microcurrent protocol accompanied a standardized physical therapy rehabilitation program. The subjects made daily entries into a logbook, recording frequency of microcurrent use, pain medication intake, and constant pain levels on a visual analog scale (0 to 10).

ANALYSIS AND RESULTS: The subjects' pain levels (dependent variable), which decreased over time, were lower for all 10 post-operative days in the Microcurrent Group (n=25) compared to the Placebo Group (n=16). A 2 ("Treatment Group") x 10 ("Post-Operative Time") ANOVA (with repeated measures on "Post-Operative Time") demonstrated a significant between-subjects main effect for the "Treatment Group" factor [$F(1,39)=9.29$, $p=0.004$], indicating that a statistically lower degree of post-operative pain was experienced by the subjects receiving microcurrent. In addition, a significant within-subjects main effect for the "Post-Operative Time" factor ($[F(9,9)=18.672$, $p<0.0001]$) was obtained.

CONCLUSION: These results indicate that Alpha-Stim microcurrent electrical therapy is beneficial for post-operative pain control after ACL reconstruction.