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Effect of TECAR Therapy on Pain and Range of Motion in Athletes after Anterior Cruciate Ligament Reconstruction

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ABSTRACT

Introduction: Anterior Cruciate Ligament (ACL) reconstruction using hamstring tendon autografts is frequently performed in young athletes to restore knee stability, mobility, and functional performance. Despite surgical advancement, postoperative rehabilitation is often complicated by pain and restricted Range of Motion (ROM). Transfer of Energy Capacitive and Resistive (TECAR) therapy has recently emerged as a promising adjunctive modality in musculoskeletal rehabilitation; however, evidence regarding its effectiveness following ACL reconstruction remains limited.

Aim: To investigate the effects of TECAR therapy on pain and knee joint ROM in athletes following ACL reconstruction.

Materials and Methods: This study was designed as a single-blind, randomised, parallel-group, active-controlled trial. A total of 78 male and female athletes aged 18-25 years who underwent ACL reconstruction using hamstring tendon grafts were randomly assigned to either an experimental group or a control group (n=39 per group). Rehabilitation was initiated 15 days after surgery. The experimental group received TECAR therapy in addition to conventional physiotherapy, whereas the control group received conventional physiotherapy alone. The TECAR intervention consisted of capacitive and resistive modes delivered at a frequency of 448 kHz, with an intensity ranging from 90 to 120 watts for 20-30 minutes per session, administered 2-4 times weekly over a six-week rehabilitation period. Pain intensity was assessed using the Numerical Pain Rating Scale (NPRS), while knee ROM was measured using a goniometer. Pre- and post-intervention outcomes were analysed, with statistical significance set at $p<0.05$.

Results: Between-group comparisons revealed significant improvements in the experimental group with respect to pain reduction and knee flexion ROM ($p<0.05$). Post-intervention NPRS scores were substantially lower in the experimental group (1.13±0.34) compared with the control group (2.49±0.56), indicating enhanced pain relief. Likewise, knee flexion ROM was greater in the experimental group (127.74°±2.05°) than in the control group (115.18°±1.39°), reflecting superior restoration of knee mobility. However, no statistically significant between-group difference was observed for knee extension ROM following intervention ($p=0.53$), as both groups achieved near-complete restoration of knee extension.

Conclusion: The findings indicate that TECAR therapy combined with conventional physiotherapy is more effective than conventional physiotherapy alone in improving pain and knee ROM following ACL reconstruction. The addition of TECAR therapy may therefore serve as a valuable adjunctive rehabilitation modality for enhancing postoperative recovery and functional outcomes in athletes undergoing ACL reconstruction.

Keywords: Numerical pain rating scale, Range of motion, Transfer of Energy Capacitive and Resistive.

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