

Effect of TECAR Therapy on Pain Reduction, Improvement in Range of Motion and Functional Recovery in Athletes after Anterior Cruciate Ligament Reconstruction: A Pilot Study

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ABSTRACT

Introduction: Anterior Cruciate Ligament (ACL) reconstruction using hamstring tendon grafts is commonly performed in young athletes to restore knee stability and function. However, post-operative pain, limited Range of Motion (ROM), and delayed functional recovery often pose challenges during rehabilitation. Transfer of Energy Capacitive and Resistive (TECAR) therapy has gained attention as an adjunct modality in musculoskeletal rehabilitation, though evidence following ACL reconstruction remains limited.

Aim: To evaluate the effect of TECAR therapy on pain reduction, improvement in joint range of motion, and functional recovery in athletes following ACL reconstruction.

Materials and Methods: This pilot study was conducted as a single-blind, randomised, parallel-group, active-controlled trial. Twelve athletes (male and female), aged 18–25 years, who underwent hamstring tendon graft ACL reconstruction, were randomly allocated into two groups (n=6 each). The intervention commenced 15 days post-operatively. The experimental group received TECAR therapy along with conventional physiotherapy, while the control group received conventional physiotherapy alone. Both groups underwent a six-week rehabilitation programme. Pain was assessed using the Numerical Pain Rating Scale (NPRS), knee joint ROM using a goniometer, and functional ability using the

Lower Extremity Functional Scale (LEFS). Pre and post-analysis of outcome measures were compared to baseline, with significance set at $p < 0.05$.

Results: After six weeks of intervention, both groups demonstrated significant within-group improvements in pain intensity, knee joint range of motion, and functional ability ($p < 0.05$). In the control group, NPRS scores reduced from 6.33 ± 0.52 to 2.67 ± 0.52 , knee joint ROM increased from $34.17^\circ \pm 2.86^\circ$ to $106.67^\circ \pm 2.94^\circ$, and LEFS scores improved from 39.67 ± 2.58 to 56.67 ± 2.16 . In the experimental group, greater improvements were observed, with NPRS scores decreasing from 6.17 ± 0.75 to 1.17 ± 0.41 , knee joint ROM increasing from $34.50^\circ \pm 3.45^\circ$ to $127.00^\circ \pm 2.37^\circ$, and LEFS scores improving from 38.17 ± 2.56 to 68.50 ± 2.17 . Between-group analysis demonstrated statistically significant superiority of the experimental group over the control group for all outcome measures at six weeks ($p < 0.05$).

Conclusion: This pilot randomised controlled trial suggests that TECAR therapy, when combined with conventional physiotherapy, leads to superior improvements in pain, joint ROM, and functional recovery following ACL reconstruction. Larger trials are warranted to confirm these findings.

Keywords: Lower extremity functional scale, Numerical pain rating scale, Rehabilitation.

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