

Clinical and Cost Effectiveness of Pre-Operative Physiotherapy for Patients Undergoing Anterior Cruciate Ligament Reconstruction in Riyadh, Saudi Arabia

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Anterior cruciate ligament (ACL) injury is associated with pain, muscle weakness, functional impairment, poor quality of life (QoL), loss of productivity due to absence from work and a great source of financial burden to individuals and healthcare systems. ACL reconstruction is the main intervention for this type of injury. Before ACL reconstruction surgery is considered, patients are expected to meet certain conditions, including normal knee range of motion (ROM), reduced effusion, normal gait, and acceptable levels of knee proprioception and muscle strength. The reduced strength, ROM and joint instability encountered by patients with an ACL injury may be improved by an appropriate pre-operative rehabilitation protocol involving the use of physiotherapy. Thus, a pre-operative rehabilitation programme is proposed for patients undergoing ACL reconstruction to achieve the following outcomes: (1) restoring full range of motion in the injured knee, (2) improving muscle strength and proprioception, and (3) restoring normal gait.

A pre-operative physiotherapy rehabilitation programme was developed following a systematic review of international literature, review of clinical guidelines and a survey of expert opinion for the management of ACL injury in Saudi Arabia. A pragmatic RCT was conducted to test the developed protocol. The control group underwent surgery without pre-operative rehabilitation while the intervention group received the

developed physiotherapy protocol before surgery. Primary and secondary health outcome measures were used to compare ACL management outcomes in 84 patients (45 in the Control group and 39 in the Intervention group) 14 days post-reconstruction surgery. The primary health outcomes were based on the knee injury and osteoarthritis outcome score (KOOS) and the secondary outcome measures included: assessment of ROM, muscle strength, pain, health state (mobility, self-care, usual activity, anxiety/depression and pain/discomfort), and quality of life (QoL). To assess the cost-effectiveness of the intervention, the incremental cost-effectiveness ratio (ICER) was used based on resource use (cost) and quality of life measured as quality-adjusted life years (QALY).

Overall, patients in the intervention group showed significant improvement in the primary outcomes than the control group as indicated by KOOS scores ($p < 0.001$). In addition, QoL was also significantly better in the intervention group compare with the controls ($p < 0.001$). The measured ICER indicated that the intervention is cost-effective (£1150 per QALY gained).

Keywords: Anterior cruciate ligament (ACL) injury, pre-operative physiotherapy, physiotherapy intervention, health outcome measures, quality of life, cost-effectiveness.