EXPLORING THE CHANGE-MECHANISMS RELATED TO USING A CLINICAL SUPPORT TOOL IN MANAGING ADOLESCENTS WITH NON-TRAUMATIC KNEE PAIN: A REALIST EVALUATION

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INTRODUCTION Patient decision aids can support patient-clinician shared decision-making, yet little is known about the underlying change-mechanisms which facilitates patient-clinician collaboration in clinical settings. The MAP-Knee Tool was developed with GPs and adolescents with non-traumatic knee pain. It incorporated different components (diagnosis tool, credible explanations, prognostic factors, and an option grid) to support the consultation process and enhance patient-clinician collaboration. Our study was a Realist Evaluation of the effectiveness of the MAP-Knee Tool tested in a stepped-wedge randomised cluster trial in hospital settings.

METHODS AND MATERIALS The Realist Evaluation investigates how, why, for whom and under which circumstances adolescents with knee pain and clinicians (GPs, physiotherapists, surgeons) benefitted from the MAP-Knee Tool through a theory-gleaning process. Data comprised intervention documents, survey data and qualitative realist interviews with researchers, adolescents, and clinicians. Thematic Realist Analysis of the qualitative data was applied, and findings were integrated with quantitative findings to establish an initial program theory and identify context-mechanism-outcome configurations.

RESULTS Data indicated that absence of observable symptoms in adolescents increased the complexity of treatment situations, heightened diagnostic uncertainty, and complicated shared decision-making. However, clinicians employed various strategies to mitigate this complexity. Five context-mechanism-outcome configurations were identified, relating to clinicians’ confidence, recognizing patients pain experience, diagnostic uncertainty, credible explanations, defensive actions, and systemic barriers.

CONCLUSION Theory-gleaning indicated that the MAP-Knee tool likely facilitates shared decision-making by reducing the complexity within the treatment situation. However, additional data is needed to refine and expand the identified change-mechanisms, providing a more comprehensive understanding of their impact.

LONGITUDINAL CHANGES IN MUSCLE STRENGTH AND RATE OF FORCE DEVELOPMENT USING HHD IN THE EARLY PHASES OF ACL REHABILITATION

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INTRODUCTION Understanding muscle strength and Rate of Force Development (RFD) changes after a cruciate ligament reconstruction rehabilitation is crucial for return to sport. The Limb Symmetry Index (LSI) offers a standardized measure to compare the injured limb’s function to the uninjured side. While force and RFD are commonly measured using an expensive isokinetic device, new research shows that a handheld dynamometer (HHD) can be used to measure them reliably. Only a few studies have used HHD and described longitudinal changes of the force and RFD during early rehabilitation.

MATERIALS AND METHODS Using an HHD, 25 participants were assessed pre-surgery, two- and four-months post-surgery. We focused on peak force, early-phase RFD (100ms), and late-phase RFD (200ms). Effect sizes (ES) are reported to compare the injured and contralateral legs. RESULTS Pre-surgery, the injured quadriceps peak force was 383 ±138 newtons with an LSI of 0.81±0.26%. Two months post-surgery, the participants’ force dwindled to 257±105 (ES -1.50; LSI 0.55±0.25). By the fourth month, it rebounded to 322±145 (ES -1.01; LSI 0.67±0.26). The hamstring’s peak force at pre-surgery was 225±78.9. At two months post-surgery, the peak force was 162±75.2 (ES -1.52; LSI 0.59±0.29), which improved to 225±103 at four months (ES -1.02; LSI 0.72±0.27). The RFD metrics followed a similar trajectory.

CONCLUSION Post-surgery, the injured limb’s muscle strength, and RFD decline, with some recovery by the fourth month, but as expected - still lower than the contralateral limb. Using an HHD can be valuable for clinicians as it offers insights outside the lab.

ACL and Hamstring Injuries

HIGHER ECCENTRIC HAMSTRING MUSCLE FATIGUE AFTER PARTICIPATION IN A SOCCER MATCH IN YOUNG FEMALE ATHLETES

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INTRODUCTION Hamstring strength deficits have been identified as risk factors for ACL and muscular injuries, with hamstring strain being the most prevalent muscle injuries in soccer. The aim of this study was to investigate hamstring eccentric strength before and after a soccer match in soccer athletes.

MATERIAL AND METHODS Hamstring eccentric strength was measured in 64 healthy male and female competitive football athletes (14-25 years) during the execution of the Nordic hamstring exercise (NHE test) before and after a soccer match. Anterior-knee laxity (AKL) was quantified as well.

RESULTS Mean and absolute eccentric hamstring peak torque decreased by 24.5 Nm (p<0.005) and 21.9 Nm (p<0.0005) in females, whereas males improved by 19.9 Nm (p=0.01) and 20.9 Nm (p=0.02), respectively. Hamstring’s total work in females decreased by 831.1 J (p<0.0005) compared to the males’ reduction of 235.3 J. Both pre- vs. post-match intersex mean and absolute eccentric HS peak torque changes were significant (p<0.0005), as the changes in HS total work (p=0.007). Pre- vs. post-match AKL difference and dominant
HAMSTRINGS ISOMETRIC STRENGTH VS. ECCENTRIC FUNCTION IN FEMALES WITH HISTORY OF ANTERIOR CRUCIATE LIGAMENT RECONSTRUCTION WITH A SEMITENDINOSUS GRAFT


Introduction Harvesting a graft from the semitendinosus for reconstruction of the anterior cruciate ligament (ACL) may negatively influence morphology and performance of the hamstrings. This study aimed to contrast maximal performance of knee flexors during an isometric, unilateral task and a dynamic task requiring bilateral lower limb effort after ACL reconstruction (ACLR) and return-to-sports (RTS).

Materials and Methods Female athletes with a history of ACLR (n=49) were recruited for the study. After a standardized 20-minute warm-up, isometric knee flexor strength of each lower limb was measured separately, after which participants performed the Nordic hamstrings (NH) task at maximal effort. The peak torque (Nm) for each task was used for statistical analysis using mixed model analysis of variance with sex, as measured by the NHE test. Mean peak, absolute peak, and total work showed greater reductions in females than in males. The 14- to 19-year-old female athletes subgroup experienced the highest reduction.

RESULTS

A significant main effect of limb was found due to overall lower peak torque of the surgical side across both tasks (p<0.001). However, a significant interaction of limb by sex (p=0.027) reflected greater asymmetry during the bilateral NH performance (lower peak torque of the surgical side (p<0.001)) compared to the isometric test (n.s.), with no influence of time from surgery.

Conclusion Strength testing of knee flexors in athletes who have undergone ACLR using a graft from the semitendinosus may indicate adequate limb symmetry for them to RTS but fail to identify athletes’ tendencies to rely on the uninjured limb when possible. Throughout rehabilitation athletes should be challenged to activate and rely on their injured side.

SECONDARY COGNITIVE TASKS ALTER DROP VERTICAL JUMP LANDING MECHANICS AND REDUCE JUMP HEIGHT IN INDIVIDUALS WITH ANTERIOR CRUCIATE LIGAMENT INJURY

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Introduction Secondary cognitive tasks alter the mechanics of uninjured athletes when performing athletic movements. Individuals with anterior cruciate ligament (ACL) injury similarly show deficits in postural control and gait for dual-task paradigms. It is however unclear if and how secondary cognitive tasks during athletic movements influence the mechanics of athletes with ACL injury.

Materials and Methods Thus far, 15 athletes with ACL reconstruction (33 ± 14 months post-surgery; age 26 ± 5 years) performed drop vertical jumps in a randomised order with and without added cognitive tasks targeting rapid decision-making, inhibitory control, and working memory. We assessed trunk, hip, knee, and ankle mechanics during the first 100 ms of the first landing and jump height using 3D motion capture and force platforms. We analysed the motion data as complete curves using functional paired t-tests and adjusted P-values.

RESULTS The secondary cognitive tasks significantly reduced trunk (0-100 ms), hip (18-27 ms) and knee flexion (2-62 ms), increased ankle dorsiflexion (38-43 ms), knee abduction angle (4-72 ms) and moment (54-94 ms), and increased knee (53-75 ms) and ankle (14-28 ms) power. Jump height was also reduced by 8% (mean 3 cm; P=.002).

Conclusion Initial analyses from our ongoing study show that our secondary cognitive tasks altered drop vertical jump landing mechanics and reduced the jump height of athletes with ACL injury. Many of the observed alterations have been suggested to increase ACL injury risk. Interventions are required to better prepare athletes with ACL injury for a return to cognitively demanding sporting environments.