

THE EFFECT OF CONSERVATIVELY TREATED ACL INJURY ON KNEE JOINT POSITION SENSE

Nicola Relph, PhD¹

Lee Herrington, PhD²

ABSTRACT

Background: Proprioception is critical for effective movement patterns. However, methods of proprioceptive measurement in previous research have been inconsistent and lacking in reliability statistics making its applications to clinical practice difficult. Researchers have suggested that damage to the anterior cruciate ligament (ACL) can alter proprioceptive ability due to a loss of functioning mechanoreceptors. The majority of patients opt for reconstructive surgery following this injury. However, some patients chose conservative rehabilitation options rather than surgical intervention.

Purpose: The purpose of this study was to determine the effect of ACL deficiency on knee joint position sense following conservative, non-operative treatment and return to physical activity. A secondary purpose was to report the reliability and measurement error of the technique used to measure joint position sense, (JPS) and comment on the clinical utility of this measurement.

Study Design: Observational study design using a cross-section of ACL deficient patients and matched uninjured controls.

Methods: Twenty active conservatively treated ACL deficient patients who had returned to physical activity and twenty active matched controls were included in the study. Knee joint position sense was measured using a seated passive-active reproductive angle technique. The average absolute angle of error score, between 10°-30° of knee flexion was determined. This error score was derived from the difference between the target and repositioning angle.

Results: The ACL deficient patients had a greater error score ($7.9^\circ \pm 3.6$) and hence poorer static proprioception ability than both the contra-lateral leg ($2.0^\circ \pm 1.6$; $p=0.0001$) and the control group ($2.6^\circ \pm 0.9$; $p=0.0001$). The standard error of the mean (SEM) of this JPS technique was 0.5° and 0.2° and the minimum detectable change (MDC) was 1.3° and 0.4° on asymptomatic and symptomatic subjects respectively.

Conclusion: This study confirms a static proprioceptive deficiency exists in the knee joint following ACL injury and rehabilitation, potentially due to a reduction in functioning mechanoreceptors in the ligament over time. The differences between the ACL deficient knee and the control group were above the SEMs and MDCs of the measurement which suggests clinical relevance. Longitudinal studies are needed to evaluate if patients who return to activity with a joint position sense deficiency develop secondary injuries.

Levels of Evidence: Individual Cohort Study (2b)

Key Words: Anterior cruciate ligament, joint position sense, knee

CORRESPONDING AUTHOR

Nicola Relph, PhD

Senior Lecturer in Sport and Exercise

Kinesiology, Sports Injury Research Group

Department of Sport & Physical Activity,

Edge Hill University

Ormskirk, Lancashire, England

L39 4QP

E-mail: Nicola.Relph@Edgehill.ac.uk

Phone: + 441695574442

¹ Edge Hill University, Ormskirk, Lancashire, England

² University of Salford, Salford, England.