Comparing two methodologies of knee flexor strength assessment in patients one-year following primary ACL reconstruction

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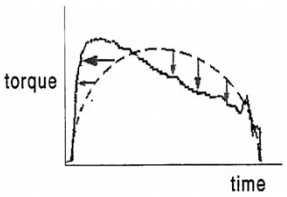
STG: Angle specific torque

Contribution of differing hamstring components may vary through ROM

Compensatory adaptations of BF and SM may preserve peak knee flexion

Shift in torque/angle relationship with deficits in deep knee flexion



Ohkoshi et al (1998) Arthrosc 14(6): 580-584.

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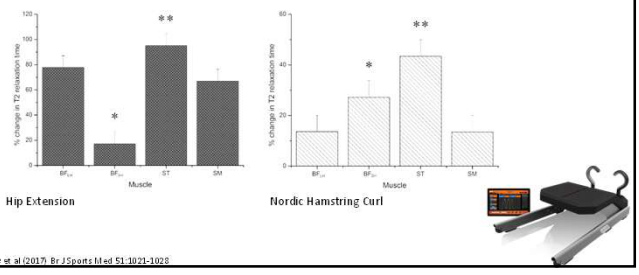
Varying muscular contributions across exercises



Bourne et al (2017) Br J Sports Med 51:1021-1028

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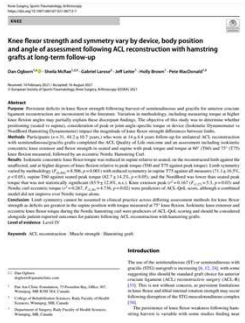
Knee Flexor Strength after ACLr

Persistent deficits in knee flexor strength are inconsistent in the literature

Methodology may explain discrepancy as most studies finding no deficit

Compensations from other hamstring muscles may mask weak semitendinosus



Knee flexor strength and symmetry vary by device, body position and angle of assessment following ACL reconstruction with hamstring grafts at long-term follow-up

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Received: 14 February 2021 / Accepted: 16 August 2021

Abstract

Introduction

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Knee flexor torque was:

Lower in supine than seated

Lower with greater knee flexion

Limb symmetry index was:

Lowest in supine at greater flexion

Nordbord also sub-threshold (*nsd*)

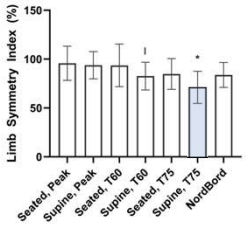

Fig. 1 Limb symmetry index (mean ± standard deviation) by device, position, and angle. * denotes $p < 0.05$ against all other measures, † denotes $p < 0.05$ against seated peak torque

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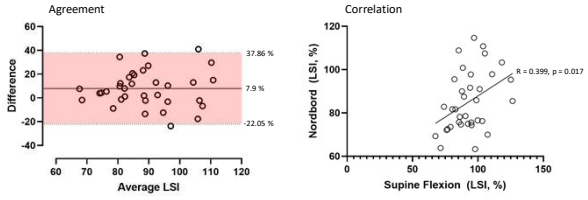
Cannot assume LSI across devices



Ogborn et al (2021) KSSTA doi 10.1007/s00167-021-06712-7

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Purpose

To compare two knee flexor strength methodologies in patients at one year post ACLr with either an STG, BPTB or QT graft alongside a standardized measure of quality of life (ACL-QoL)

Hypothesis

Deficits in knee flexor strength will be greater in those with STG grafts, when measured at higher degrees of knee flexion in supine with isokinetic dynamometry, and greater on the NordBord dynameter overall

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Methods

Patients at one year following primary, unilateral ACLr with either BPTB, QT or STG graft

Patients completed five repetitions of isokinetic knee flexion and extension (Biodex System 3) in the seated and supine position (90º/s)

Three eccentric repetitions of the Nordic Hamstring Curl (Nordbord, Vald)

ACL-QoL questionnaire completed thereafter

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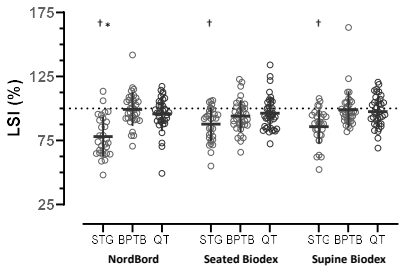

Reduced LSI following STG ACLr

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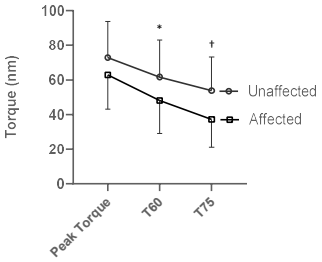

Reduced torque in deep knee flexion

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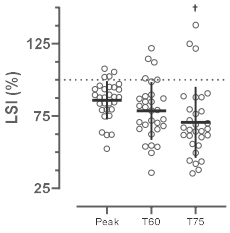

Reduced LSI in deep knee flexion

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Do these deficits matter?

Previously shown that deficits in angle-specific torque do not explain ACL-QoL score at long-term follow-up

Comparable ACL-QoL scores between graft types in the present study despite differing deficits

Isokinetic quad strength and nordbord do partially explain ACL-QoL (long-term)

Editorial Commentary: Anterior Cruciate Ligament Autograft Morbidity: Who Needs Strong Hamstrings in Greater Than 90° of Knee Flexion?

Alex C. DiBartola, M.D., M.P.H., Robert A. Magnussen, M.D., M.P.H., and David C. Flanigan, M.D.

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Conclusion

Deficits in knee flexor strength persist at one year post ACLr in those with STG grafts as measured with angle-specific dynamometry or the NordBord

Use of angle-specific torque measurements may accurately quantify knee flexor recovery, but may not predict ultimate outcomes

Clinical significance of persistent deficits in STG groups remain to be determined (controlling for test and contraction type)

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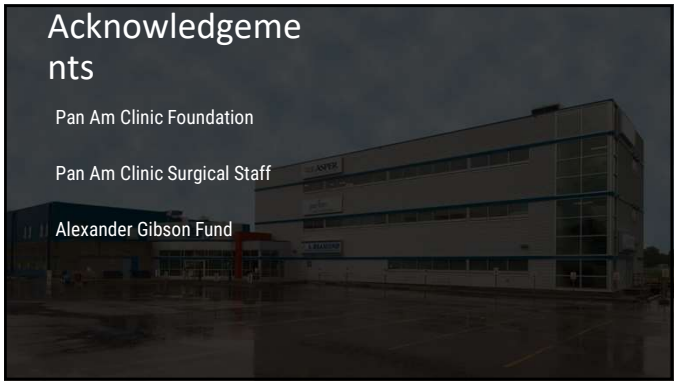
Acknowledgements

Pan Am Clinic Foundation

Pan Am Clinic Surgical Staff

Alexander Gibson Fund



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