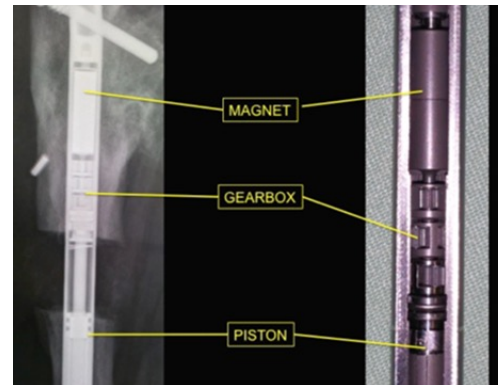
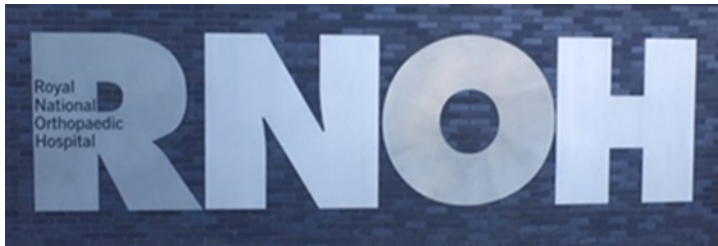


Impact on Muscle Strength following Femoral Lengthening with a Precice Nail

Peter Calder, Grace Crook, Lisa Aston, Elizabeth Tissingh, Jonathan Wright, David Goodier

Royal National Orthopaedic Hospital, London, UK

LLRS, Montreal, Canada, July 17th & 18th 2026



Historical Evidence and Aims

Muscle Strength Following Distraction

Journal of Pediatric Orthopaedics
15:212-216 © 1995 Raven Press, Ltd., New York

Muscular Strength After Callotasis Limb Lengthening

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“Function impaired for some time and always weaker than normal side”

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The Effect of Lengthening of the Femur on the Extensors of the Knee

AN ELECTROMYOGRAPHIC STUDY*

BY ÜLLAR KALJUMÄE, M.D.†, AARE MÄRTSON, M.D.†, TIIT HAVIKO, M.D., PH.D.†,
AND OSMO HÄNNINEN, M.D., PH.D.†, TARTU, ESTONIA

Investigation performed at the Department of Orthopaedics, University of Tartu Hospital, Tartu

“Lengthening effects had a permanent effect on neuromuscular tissues”

ORIGINAL ARTICLE

Recovery of Muscle Strength and Power After Limb-Lengthening Surgery

Karen L. Barker, PhD MCSP, Sallie E. Lamb, DPhil, Hamish R.W. Simpson, FRCS

ABSTRACT. Barker KL, Lamb SE, Simpson HRW. Recovery of muscle strength and power after limb-lengthening surgery. Arch Phys Med Rehabil 2010;91:384-8.

LIMB LENGTHENING U allows correction of limb- that may arise because of nonu

“Continued improvement from 6 months, within 3% pre-op by 2 years”

OPEN ACCESS

Acta Orthopaedica 2017; 88 (2): 179-184

179

Muscle strength and knee range of motion after femoral lengthening

2- to 5-year follow-up

Anil BHAVE¹, Lior SHABTAI¹, Erik WOELBER², Arman APELYAN³, Dror PALEY⁴, and John E HERZENBERG¹

¹International Center for Limb Lengthening, Rubin Institute for Advanced Orthopedics, Sinai Hospital of Baltimore, Baltimore, Maryland, USA;

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Submitted 2015-12-03. Accepted 2016-10-07.

“Majority required 11 months post frame removal to regain muscle strength”

No declarations of interest

Historical Evidence and Aims Muscle Strength Following Distraction



■ LOWER LIMB

Outcomes following femoral lengthening

AN INITIAL COMPARISON OF THE PRECICE INTRAMEDULLARY LENGTHENING NAIL AND THE LRS EXTERNAL FIXATOR MONORAIL SYSTEM

M. Laubscher,
C. Mitchell,
A. Timms,
D. Goodier,
P. Calder

Aims
Patients undergoing femoral lengthening by external fixation tolerate treatment less well when compared to tibial lengthening. Lengthening of the femur with an Intramedullary device may have advantages.

Patients and Methods

“Better outcomes with intramedullary lengthening nails”
 “Better tolerated by patients”
 “Faster regenerate healing”
 “Improved joint range of motion”

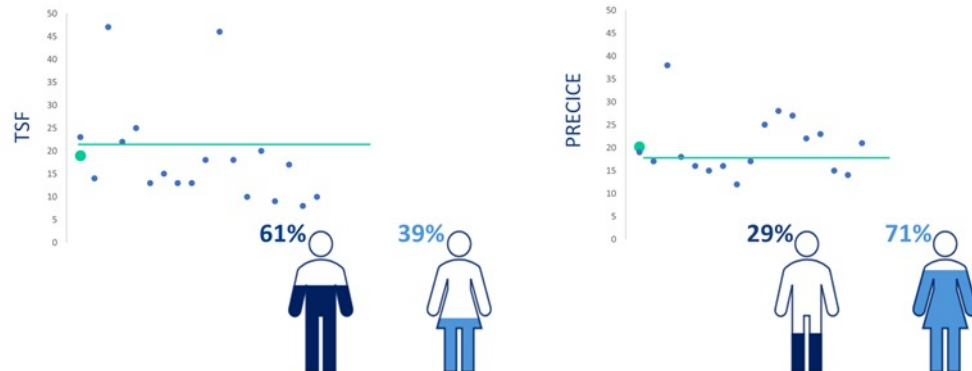
What is the effect on muscle strength following intramedullary limb lengthening?

Impact on muscle strength following intramedullary lengthening

- Prospective observational study
- Femoral Precice Intramedullary Lengthening Nails
- Control group – Tibial Lengthening/Deformity Correction using a TSF

Demographics

Total of 18 data sets for TSFs, and 17 data sets for patients with PRECICE nails.



Muscle strength assessment of Lengthened Leg's
Quadriceps and Hamstrings using **Hand held dynamometry**



Quadriceps Testing

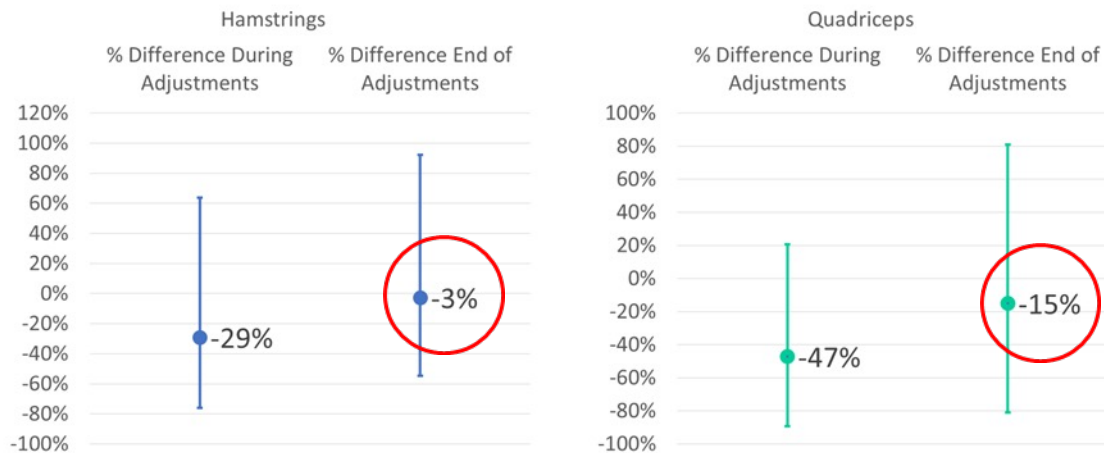


Hamstring Testing

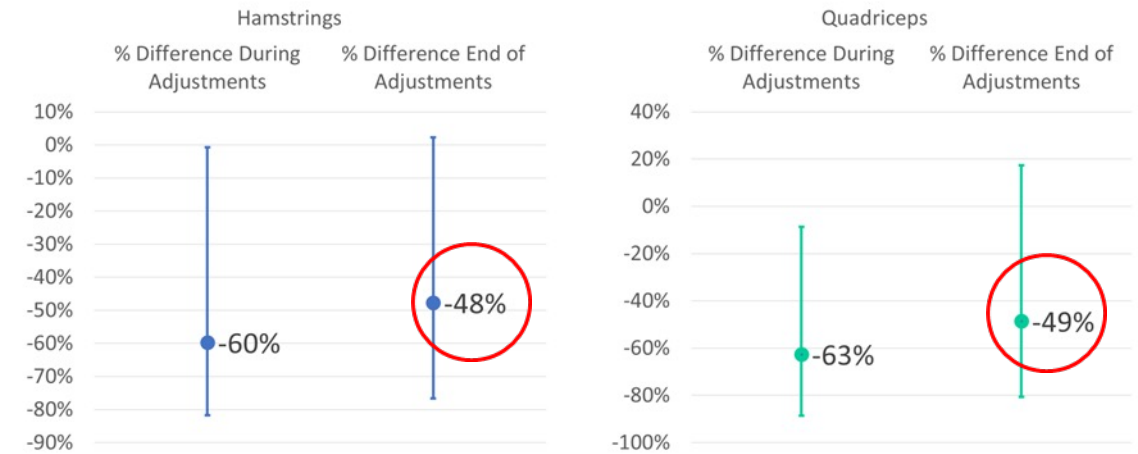
Taken at intervals –
Pre-op, during distraction, completion of lengthening,
(frame removal), 3 months post

Strength Data Analysis

Strength Data Analysis- PRECICE Nails



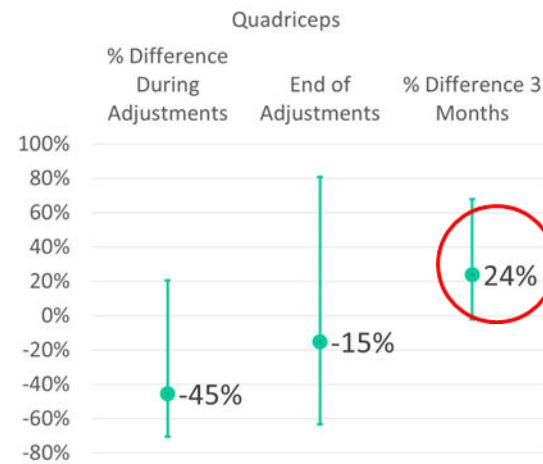
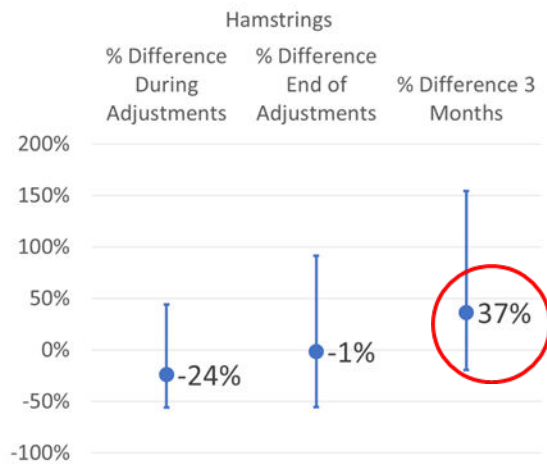
Strength Data Analysis- TSF



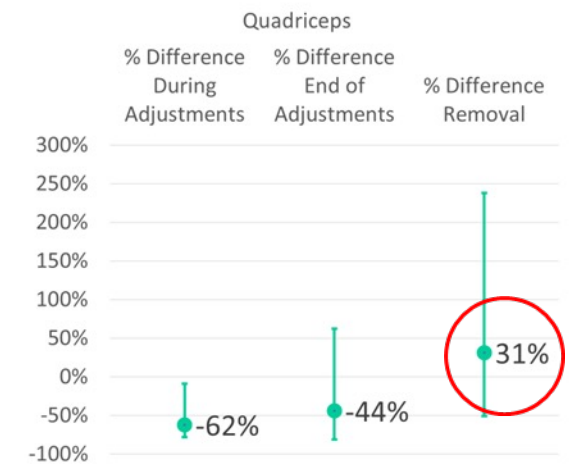
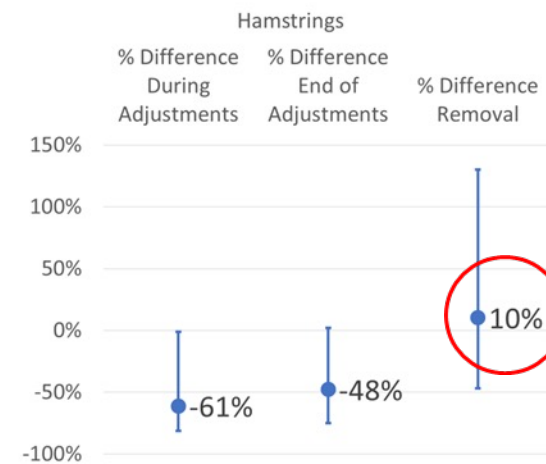
Weakness noted in both muscle groups at end of distraction.

Muscle Strength Recovery

Preliminary Data- PRECICE Nails



Preliminary Data- TSF



Muscle strength recovery noted by 3 months post distraction

Discussion

- Initial weakness noted during distraction
- Precise nail
 - Apparent gain in strength by 3 months after completion of lengthening
 - Focused rehabilitation
- Control
 - Weakness thought to be pain inhibition
 - Improvement throughout consolidation period, normal values by frame removal

Conclusion

- Historical weakness associated with limb lengthening
- Neurogenic versus Myogenic aetiology
- Extended time for strength to return
- Intramedullary lengthening appears to offer a superior rate of rehabilitation and return of muscle strength
- Focused joint range of motion and muscle strengthening programme recommended