EARLY FUNCTIONAL EFFECT OF THE SPAIRE (SAVE PIRIFORMIS AND INTERNUS, REPAIR EXTERNUS) TECHNIQUE ON FUNCTIONAL OUTCOMES AND GAIT ANALYSIS

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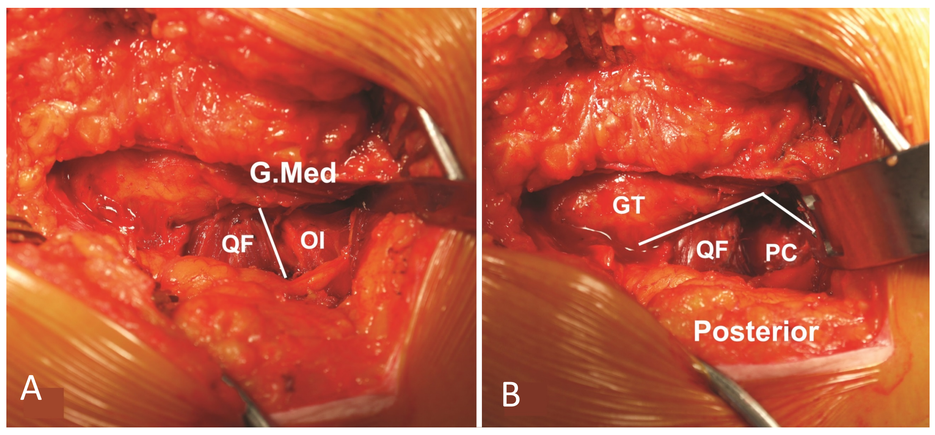
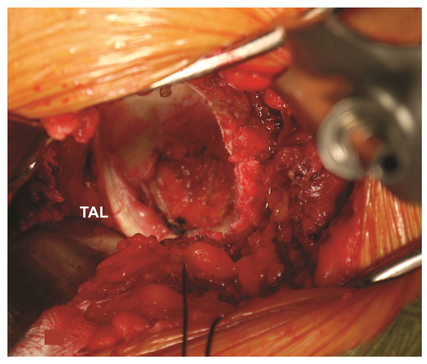
INTRODUCTION: The Sparing Piriformis and Internus, Repair Externus (SPAIRE) technique, a tendon sparing approach described by the Exeter Hip Unit, is an adaptation of the familiar posterior approach (PA) in which the only tendon released is obturator externus.

The use of portable 3D gait analysis and formal measurement of muscle power using a Dynamometer is currently being used to define thresholds for minimum clinically important differences (MCID) post THA in our Unit. This nested cohort study assessed the influence of preserving the quadriceps coxae with the SPAIRE technique on functional outcomes, muscle power and gait analysis.

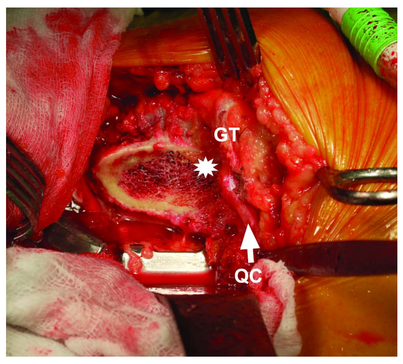
METHODS: 55 patients were included in this feasibility project. The posterior approach (PA) and the Saving Piriformis and Internus, Repair Externus (SPAIRE) technique were utilised. Assessments were replicated pre-operatively and 6-weeks post-operatively. PROMs, gait analysis using a portable 3D gait analysis system, and muscle power were the primary outcomes. The authors hypothesised that preservation of the quadriceps coxae when using the SPAIRE technique would be advantageous for post-operative gait and muscle power. The correlation of muscle power and kinematic parameters with PROMs was assessed.



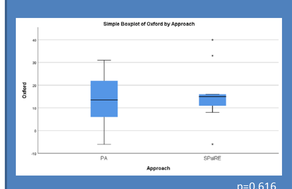
Deep extra-capsular dissection (left hip). (A) The line indicates the interval for capsular exposure between quadratus femoris (QF) and obturator internus (OI) with its conjoined gemelli. (B) The lines indicate the intended capsulotomy of the posterior capsule (PC) deep to the retracted quadriceps coxae.



The acetabulum is exposed in readiness for preparation with a clear view of the transverse acetabular ligament (TAL) and bony margin for anatomical referencing. The thigh is flexed, abducted and the limb is supported in neutral rotation. Use of a dedicated offset, self-retaining retractor facilitates socket exposure.



Femoral exposure. The insertion of the quadriceps coxae (QC) anteriorly and superiorly on the medial surface of the greater trochanter (GT) doesn't impede the intended posterolateral femoral entry point marked by the star.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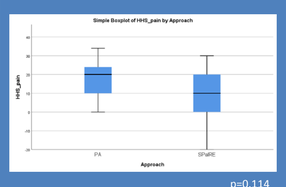
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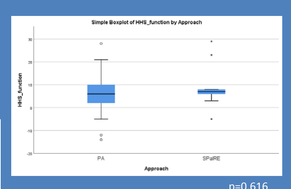
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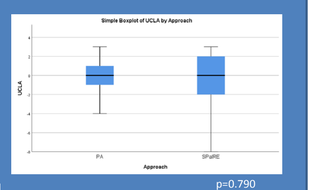
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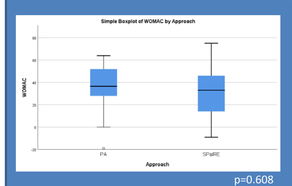
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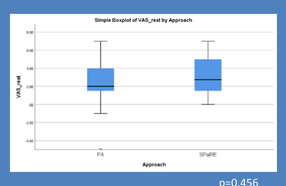
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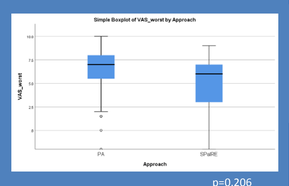
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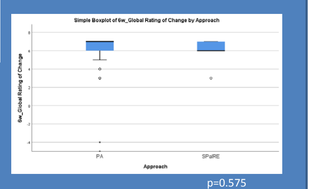

p=0.575

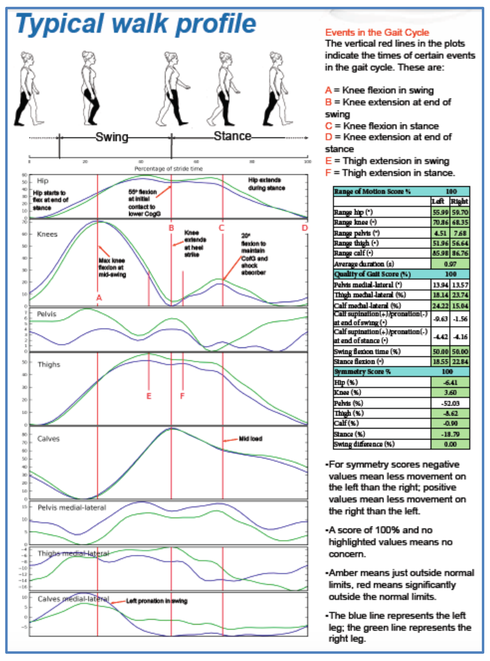
Change in PROMs (Mann-Whitney U-test)

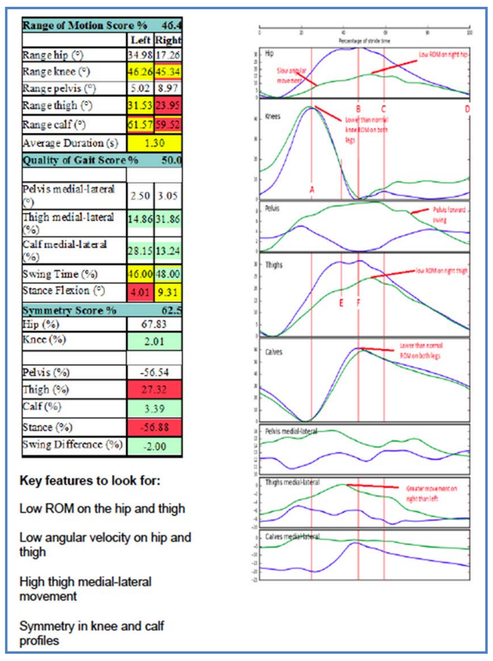
Portable system for measuring Gait

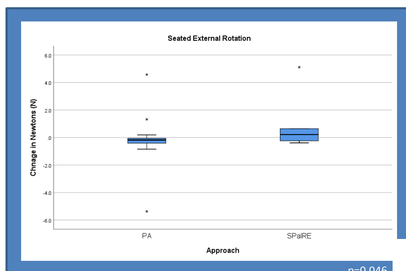
6 Inertial Measurement Units (IMUs):

Accelerometers Gyroscopes

Measurements taken with patients sitting, lying and with wedge (30°)







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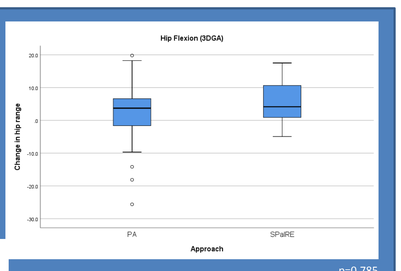

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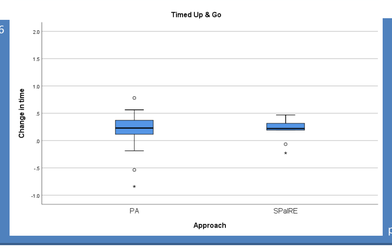

p=0.767

Seated external rotation (power), Timed Up & Go and Hip Flexion (3DGA)

RESULTS SUMMARY: 46 patients underwent THA with PA, and 9 patients had the SPAIRE technique. Improvement in PROMS, kinematic parameters, functional gait tasks, and muscle power showed equivalence between the 2 techniques. There was a significant improvement in external rotation muscle power in the SPAIRE group (p=0.046) when the quadriceps coxae is preserved.

CONCLUSIONS: Interpretation of the effect of surgical approach on post-operative gait abnormalities and functional outcome has been limited by methodological heterogeneity. Despite small numbers, the SPAIRE approach yielded a similar profile of improvement in gait ROM, functional gait tasks, and PROMs when tested 6-weeks post-op. The significant difference in seated external rotation muscle power demonstrates objectively the effect of preservation or sacrifice of the quadriceps coxae. None of the parameters tested had returned to normal at this stage of convalescence and further studies are required to differentiate longer term outcomes.

This proof of concept has informed the protocol for an ongoing RCT to be undertaken in the Exeter Hip Unit to further assess approach related functional outcomes.

This small study shows encouraging results for the SPAIRE technique and that alternative outcome measurements may be able to identify more subtle differences between groups than PROMs.

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