Assessing Leg Length Discrepancy Post-Total Hip Arthroplasty for Neck of Femur Fractures: A Retrospective Analysis

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ABSTRACT

Total hip arthroplasty (THA) for neck of femur (NOF) fractures may lead to leg length discrepancy (LLD), affecting patient satisfaction and functional recovery. This retrospective study (2019–2021) reviewed 58 NOF fracture patients treated with THA to identify postoperative LLD and assess functional outcomes. Radiographic vertical and horizontal offsets were measured and compared with the contralateral side. Clinically, no patient reported LLD, and all achieved full mobilization. Mean vertical offset difference was 0.47 cm and horizontal offset difference was 0.51 cm. Despite measurable radiological variations, no functional limitations were documented. Findings support that appropriate surgical technique and implant selection can minimize clinically significant LLD.

INTRODUCTION

Leg length discrepancy is a known concern after THA and can negatively influence gait, biomechanics, and patient satisfaction. Accurate restoration of vertical offset (leg length) and horizontal offset (femoral offset) is essential to restore normal hip mechanics and prevent complications such as instability, back pain, and limited function. NOF fracture patients, often elderly with multiple comorbidities, are at particular risk of postoperative complications.
This study aimed to determine the presence of LLD following THA for NOF fractures and to assess the clinical impact on postoperative recovery.

METHODOLOGY

A retrospective review was conducted of all NOF fracture patients undergoing THA at Derby & Burton NHS Trust between January 2019 and December 2021.
Data sources included electronic patient records, postoperative notes, radiographs, and physiotherapy assessments.
Radiological analysis used standardized AP pelvic radiographs:

Vertical offset: distance between teardrop line and lesser trochanter compared bilaterally.

Horizontal offset: distance from teardrop to femoral head center on each side.

Demographic variables, implant details, and postoperative mobility were recorded. Descriptive statistics and t-tests were used to compare offsets between operated and normal hips.

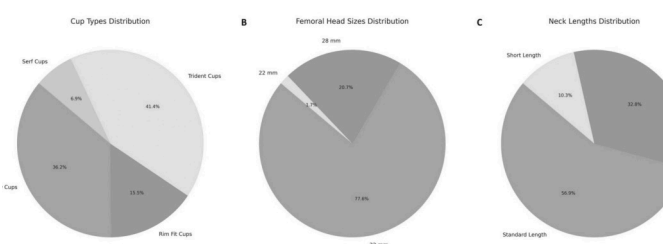
RESULTS

58 patients (17 male, 41 female), mean age 75.6 years. Most injuries were low-energy.
79% of operations were consultant-performed.
Implants: 29 cemented and 29 hybrid THA, all using Exeter stems; cup sizes 45–56 mm, 62% ceramic.

Clinical outcomes:
- No patient reported postoperative LLD.
- All patients achieved full mobilization.
- One case of foot drop, treated conservatively.

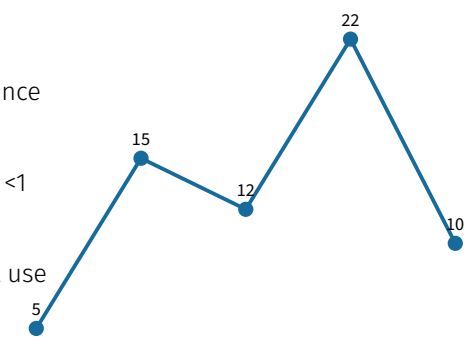
Radiographic findings:
- Mean vertical offset difference: 0.47 cm.
- Mean horizontal offset difference: 0.51 cm.

Both differences were statistically significant but not clinically impactful.
Patient satisfaction was 100%.



DISCUSSION

LLD after THA is well-documented in the literature, with reported incidence ranging from 6–20%. Prior studies show that discrepancies >10 mm can affect gait, biomechanics, and quality of life. In this cohort, no patient perceived or reported LLD despite measurable radiographic differences <1 cm, indicating these small variations were not functionally significant.



Effective surgical technique, appropriate implant choice, and consistent use of the Exeter stem likely contributed to minimizing LLD. The findings support previous evidence that careful restoration of offsets improves stability, mobility, and satisfaction.

Limitations include small sample size, absence of standardized patient-reported outcome measures, and short-term follow-up. Larger prospective studies would better clarify long-term biomechanical impact.

CONCLUSION

THA for NOF fractures resulted in no clinically significant LLD.

Radiographic discrepancies in offsets were small and did not correlate with functional deficits.

Proper surgical technique and implant selection reduced LLD risk.

Longer-term follow-up is needed to evaluate biomechanical implications of minor radiographic LLD.

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