

## Introduction

Appropriate femoral stem anteversion is an important factor in maintaining stability and maximising the performance of the bearing after total hip replacement (THR). The anteversion of the native femoral neck has been shown to have a significant effect on the final anteversion of the stem, particularly with a uncemented femoral component.

The aim of this study was to quantify the variation in native femoral neck anteversion in a population of patients requiring total hip replacement.

## Results

The median femoral anteversion across all 1215 subjects was 14.4° (-27.1°–54.5°, interquartile range (IQR) 7.4°–20.9°). The distribution across patients is shown in Fig 2.

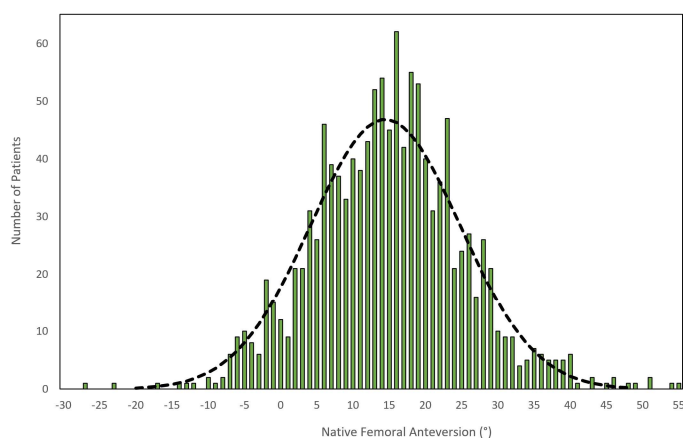


Fig 2. Distribution of native femoral anteversion for 1215 patients undergoing THR

## Methods

Pre-operatively, 1215 patients received CT scans as part of their routine planning for THR. Within the 3D planning, each patient's native femoral neck anteversion, measured in relation to the posterior condyles of the knee, was determined, Fig 1.

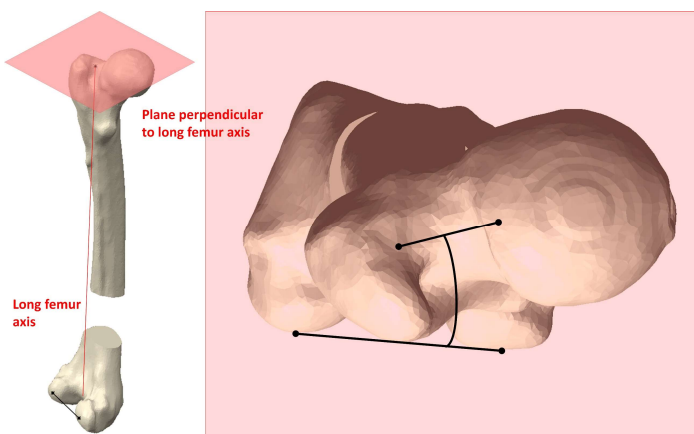


Fig 1. The femoral anteversion angle between the neck axis and the posterior condylar axis, when projected onto a plane perpendicular to the long axis of the femur

Patients were separated into eight groups based upon gender and age. Males and females were divided by those under 55 years of age, those aged 55 to 64, 65 to 74 and those 75 or older.

## Results

The median anteversion in males was 12.7° (-27.1°–45.5°, IQR 6.0°–19.1°), compared to female anteversion of 16.0° (-14.0°–54.5°, IQR 9.7°–22.4°), Fig 3. These gender differences were statistically significant,  $p < 0.0001$ . Femoral anteversion in young males (<55) was significantly higher than in older males (>75),  $p = 0.002$ . This age-related difference approached significance in females,  $p = 0.06$ . 14% of patients had extreme anteversion (<0° or >30°)

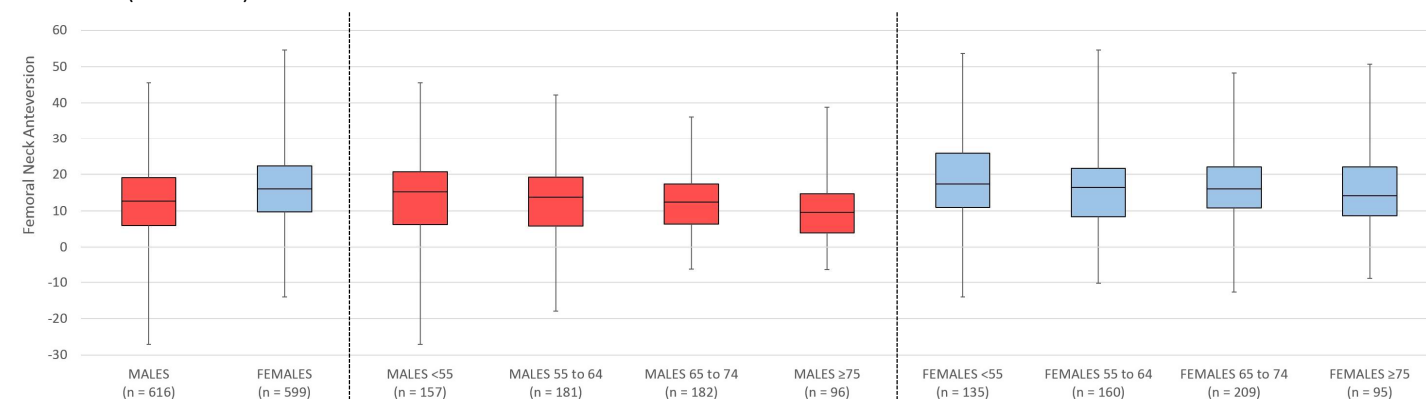


Fig 3. Femoral neck anteversion for gender for 1215 patients undergoing THR

## Conclusions

- The Native femoral neck anteversion in patients requiring THR is widely variable, with a range of over 80°.
- Females have more anteverted femurs than males.
- Femoral anteversion in young males was significantly higher than in older males. This age-related difference approached significance in females.
- Having an understanding of 3D patient morphology can greatly assist in pre-operative planning of THR, as post-op stem anteversion is likely influenced by the anteversion of the native femoral neck.