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Increasing age does not influence hip-specific functional outcome or health-related quality of life following total hip arthroplasty

A FIVE-YEAR PROSPECTIVE COHORT STUDY

N. D. Clement, K. M. Smith, Y. J. Baron, H. McColm, D. J. Deehan, J. Holland

From The Freeman Hospital, Newcastle, UK

Aims

The primary aim of our study was to assess the influence of age on hip-specific outcome following total hip arthroplasty (THA). Secondary aims were to assess health-related quality of life (HRQoL) and level of activity according to age.

Methods

A prospective cohort study was conducted. All patients were fitted with an Exeter stem with a 32 mm head on highly cross-linked polyethylene (X3RimFit) cemented acetabulum. Patients were recruited into three age groups: < 65 years, 65 to 74 years, and ≥ 75 years, and assessed preoperatively and at three, 12, 24, and 60 months postoperatively. Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC), Harris Hip Score (HHS), and Hip disability and Osteoarthritis Outcome Score (HOOS), were used to assess hip-specific outcome. EuroQol five-dimension five-level questionnaire (EQ-5D-5L) and 36-Item Short Form Survey (SF-36) scores were used to assess HRQoL. The Lower Extremity Activity Scale (LEAS) and Timed Up and Go (TUG) were used to assess level of activity.

Results

There were no significant ($p > 0.05$) differences in the WOMAC scores, HSS, HOOS, or EQ-5D-5L at any postoperative timepoint between the age groups. Patients aged ≥ 75 years had significantly lower physical function ($p \leq 0.010$) and physical role ($p \leq 0.047$) SF-36 scores at 12, 24, and 60 months, but were equal to that expect of an age-matched population. No differences according to age were observed for the other six domains of the SF-36 ($p > 0.060$). The ≥ 75 years group had a lower LEAS ($p < 0.001$) and longer TUG test times ($p \leq 0.032$) compared to the < 65 years group, but older age groups had significant ($p < 0.001$) improvement relative to their preoperative baseline measures.

Conclusion

Age did not influence postoperative hip-specific outcome or HRQoL (according to the EQ-5D) following THA. Despite a significant improvement, older patients had lower postoperative activity levels compared to younger patients, but this may be reflective of the overall physical effect of ageing.

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Correspondence should be sent to Nick D. Clement; email: nickclement@doctors.org.uk

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Introduction

Total hip arthroplasty (THA) was declared the operation of the last century, and is associated with improved functional outcome and heath-related quality of life (HRQoL) following surgery for end-stage arthritis.[1,2] Increasing age of the patient following THA is associated with a longer length of hospital stay, greater postoperative mortality, and risk of perioperative complications.[3] There is, however, conflicting evidence as to whether age influences hip-specific function or HRQoL following THA, with some studies reporting equal patient-reported outcomes,[4-7] and other reporting greater benefit in younger patients.[8-12]

The reason for these contrasting findings in the literature with regard to the influence of age on functional outcome may related to how the effect of age was assessed. Some studies dichotomized age into groups such as octogenarians[5] or nonagenarians[6] and compared them to those less than 80 or 90 years old, respectively, which may not highlight potentially better outcomes in younger age groups younger, such as those less than 65 years old.[10,13] The measures used to assess outcome also vary between studies, with some using joint-specific measures and others using HRQoL measures,[4-12] the former often showing no difference[5,6] and the latter being associated with a better outcome in younger patients.[13,14] The timepoint of assessment also varies in the reported literature from three months to two years, which may influence the findings of the studies.[10,15] For those studies demonstrating a difference between age groups, such as Joly et al,[10] who compared hip-specific and HRQoL scores between those younger than 55 years old and those older than 55 years, they may find a statistically significant difference but this may not be clinically significant, being less than the minimal clinically important difference (MCID).[16,17] Finally, due to age-related differences in bone stock and implant survival,[18] this may influence the type of prosthesis used for primary THA, with older patients being more likely to receive a cemented prosthesis in contrast to younger patients, who are more likely to receive uncemented designs.[19] This choice of implant may also potentially influence the functional outcome of patients where different implants have been employed across the different age groups assessed.[20]

In a previous study, we demonstrated no significant difference in hip-specific outcome two years following the same THA for all patients, but a significantly worse HRQoL and level of activity with increasing age was observed.[15] The aim of the current study was to assess whether there was a clinically significant effect on the hip-specific outcomes, HRQoL and activity level up to five years following THA using the same implant across three different age groups. The primary aim was to assess the influence of age on hip-specific outcome following THA. Secondary aims were to assess HRQoL and level of activity according to age. The null hypothesis was that age did not influence hip-specific outcome following TKA.

Methods

This prospective study reports the five-year outcomes of a previously reported cohort that assessed stem migration according to patient age; the methodology used can be found in that publication, but for clarity is also described below and expanded to include five outcomes.[15] A total of 200 patients listed for a THA were recruited over a 22-month period (July 2012 to April 2014). Inclusion criteria were: primary THA, primary diagnosis of non-inflammatory degenerative joint disease, and admitted to the study centre under the care of participating surgeons. Exclusion criteria were: refusal or inability to provide informed consent, revision THA, inflammatory joint disease, morbidly obese (BMI > 40 kg/m^2), patients unsuitable for a standard rim-fit socket design, neuromuscular dysfunction of the trunk and lower limbs that may increase the dislocation rate and would limit the ability to assess the performance of the device (in which case the clinician may also prefer another device), inability to answer questionnaires for cognitive reasons, or a patient request for an alternative implant. Patients were originally categorized into four groups: < 55 years, 55 to 64 years, 65 to 74 years, and ≥ 75 years. The recruitment into the < 55 years age group was slow, due to limited numbers and 'other' implants being required; therefore, this group was combined with those aged 55 to 64 years, and resulted in three groups: < 65 years, 65 to 74 years, and ≥ 75 years. Functional and activity outcomes were assessed preoperatively and postoperatively at three, 12, 24, and 60 months.

Functional outcomes measured. The Western Ontario and MacMaster Universities Osteoarthritis Index (WOMAC),[21,22] Harris hip score (HHS),[23] and the Hip disability and Osteoarthritis Outcome Score (HOOS) quality of life component[24] were used to assess hip-specific outcome. The WOMAC was reported from 0 (worst) to 100 (best),[22] and the function component was defined as the primary outcome measure to assess hip-specific function. The HHS is a combined subjective and objective assessment that ranges from 0 (maximum disability) to 100 (no disability).[23] The HOOS was calculated as the sum and transformed into a 0 (worst) to best (100).[24]

HRQoL was assessed using the EuroQoL five-dimension (EQ-5D)[25] general health questionnaire and the 36-Item Short Form Survey (SF-36) health questionnaire.[26] The UK population-specific five level (5L) version of the EQ-5D was used, which is based on a time trade-off technique. This index is on a scale of -0.594 to 1, where 1 represents perfect health, and 0 represents death. Negative values represent a state perceived as worse than death. SF-36 has eight subscales (physical function, role limitations due to physical health, bodily pain, general health, vitality, social function, role limitations due to emotional health, and

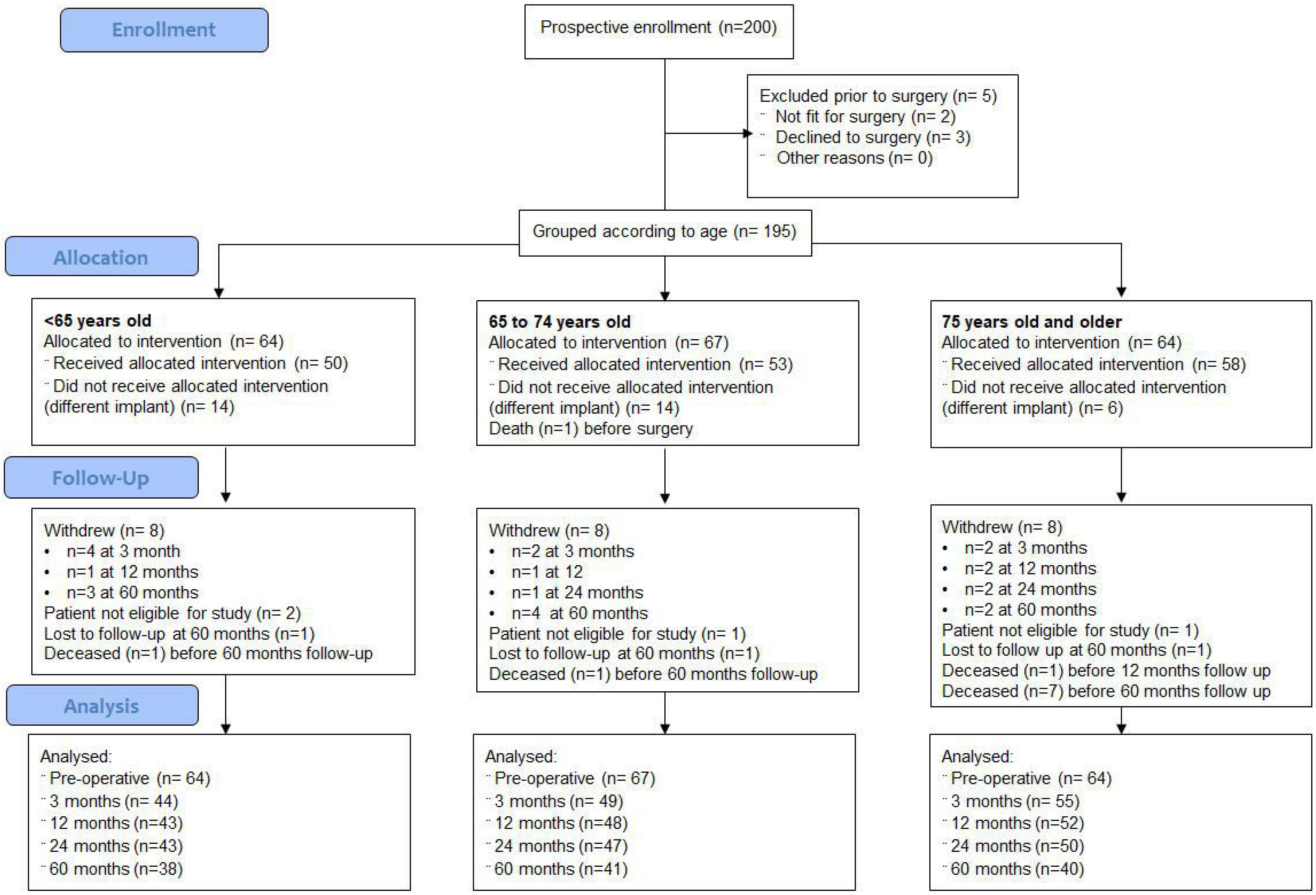

Fig. 1

STrengthening the Reporting of OBservational studies in Epidemiology flow diagram for the study cohort.

mental health) that rank health from 0 (worst) to 100 (best).

Activity outcomes measured. The Lower Extremity Activity Scale (LEAS) offers the patient one of 18 options that best describes their level of activity.[27] This ranges from “I am confined to my bed all day”, which increases to “I am up and about at will in my house and outside. I also participate in vigorous physical activity such as competitive level sports daily”. The Timed Up and Go (TUG) test was performed as originally described,[28] and the patient had a practice walk before the assessment to become familiar with the test. A faster time indicates a better functional performance.[28]

Surgical procedure and implant. Surgery was performed or supervised by one of seven consultant surgeons (JH, CG, DW, MH, NB, AM, AG). A posterior approach was used to approach the hip joint. A cemented Exeter stem was used for all with a 32 mm femoral head and a X3 (RimFit) cemented polyethylene socket (Stryker Orthopaedics, USA). A standardized rehabilitation protocol was used for all patients, with active mobilization on the first day postoperatively.

Statistical analysis. Data analysis was performed using SPSS v. 17.0 (SPSS, USA). A *t*-test, paired and independent-samples, and one-way analysis of variance (ANOVA) or Kruskal Wallis, with post hoc Bonferroni correction for multiple testing, were used to compare linear variables between groups. Dichotomous variables were assessed using a chi-squared or Fisher's exact test. A p-value of < 0.05 was defined as significant.

The study was powered to the WOMAC function component (primary outcome), which has a defined MCID of 22.6 points.[16] To achieve a power of 0.90 and an α of 0.05 with correction for multiple testing (Bonferroni) of the three groups using a known standard deviation (SD) of 18, it was calculated that a minimum of 35 patients would need to be recruited to each group at 60 months.

Results

There were 200 patients enrolled to the study, of whom 115 females and 85 males with a mean age of 69.9 years (SD 9.5, 42 to 92). Five patients were excluded prior to surgery (Figure 1). Of the remaining 195 patients, 64

Table I. Health-related quality of life measures pre- and postoperatively according to age group.

Mean score (SD)	< 65 yrs	65 to 74 yrs	≥ 75 yrs	p-value*
HOOS QoL				
Preoperative	24.4 (15.3)	28.9 (17.4)	27.8 (16.3)	0.280
3 mths	62.9 (22.3)	62.5 (17.7)	63.5 (18.8)	0.971
12 mths	77.8 (21.1)	76.1 (19.7)	81.3 (20.2)	0.458
24 mths	79.8 (18.1)	78.4 (19.9)	80.0 (25.2)	0.932
60 mths	89.1 (17.0)	82.9 (22.4)	86.2 (16.6)	0.370
EQ-5D-5L				
Preoperative	0.29 (0.12)	0.32 (0.11)	0.46 (0.23)	0.528
3 mths	0.79 (0.16)	0.82 (0.17)	0.63 (0.13)	0.380
12 mths	0.66 (0.14)	0.84 (0.19)	0.79 (0.22)	0.531
24 mths	0.84 (0.22)	0.66 (0.14)	0.60 (0.13)	0.568
60 mths	0.83 (0.20)	0.77 (0.22)	0.81 (0.14)	0.457

*Analysis of variance.
EQ-5D-5L, EuroQol five-dimension five-level index; HOOS, Hip disability and Osteoarthritis Outcome Score; QoL, quality of life; SD, standard deviation.

were aged < 65 years, 67 were aged between 65 and 74 years, and 64 were 75 years or older; there were no significant (p = 0.242, chi squared test) differences in sex between the groups (males n = 32, n = 43, and n = 40, respectively). A total of 34 patients received a different implant(s), one died prior to surgery, and four were found not to be eligible following inclusion and were removed; therefore, the cohort consisted of 156 patients (Figure 1). Ten patients (6.4%) died during the 60-month follow-up period, 24 (15.3%) withdrew from the study, and three (1.9%) were lost to follow-up, which left 119 patients (76.3%) who were followed up at 60 months (Figure 1). There were five dislocations (two in the 65 to 74 year group and three in the ≥ 75 years), which was not significantly different according the age group (p = 0.250, Fisher's exact test).

Hip-specific outcomes. All age groups had significant improvements in all the functional outcomes measures assessed relative to preoperative scores (p < 0.001, ANOVA) Table I. There were no significant differences in the postoperative WOMAC components scores or the HSS at any postoperative timepoint (Table II). There was a trend towards significance for a worse HSS at 12 and 24 months in older age groups following surgery, however no difference was noted at 60 months (Table II).

HRQoL outcomes. All age groups had significant improvements in postoperative HRQoL measures relative to preoperative scores (p < 0.001, ANOVA) (Tables I and III). There were no significant differences in the postoperative HOOS QoL or EQ-5D-5L at any postoperative timepoint (Table I). In contrast, older patients (≥ 75 years) had significantly worse physical function (Figure 2) and physical role (Figure 3) domains of the SF-36 survey, compared to younger patients at 12 and 24 months, that persisted at 60 months postoperatively (Table III). However, no other postoperative differences according to age were observed for the other six domains of the SF-36 (Table III).

Activity outcomes. All groups had significant improvements in all the activity outcome measures assessed relative to preoperative scores (p < 0.001, ANOVA) (Table IV). The ≥ 75 years group had a significantly lower (worse) LEAS and longer TUG test times compared to those in the < 65 years group (Figure 4, Table IV). Those patients younger than 65 years increased their activity by three levels according to the LEAS by 12 months, which was maintained at 60 months. Those aged between 75 and 74 years, and ≥ 75 years, however, had smaller increased activity of two levels and one level, respectively. There was a trend towards a significantly (p = 0.051, ANOVA) greater improvement in TUG test in the < 65 years group at 60 months (8.2 seconds), relative to their preoperative time, compared to the 65 to 74 years (2.3 seconds) and the ≥ 75 years (2.2 seconds) groups.

Discussion

This study has shown no differences in the hip-specific outcome of THA according to age groups assessed. The improvement in HRQoL was also not influenced by age following THA, except for generic physical function and role, which were worse in the ≥ 75 years group. However, they had a clinically significant improvement in both of these outcomes postoperatively, at all timepoints, relative to their preoperative status. The subjective (LEAS) assessment of activity demonstrated a lower level of activity in those aged ≥ 75 years up to 60 months following THA, and a longer TUG test when compared to those < 65 years old. Despite the lower level of physical activity and longer TUG test times postoperatively, older age groups nonetheless had significant improvements relative to their preoperative baseline measures that were maintained at five years.

A limitation of this study was using the predefined age groups to assess the effect on outcomes. This may have potentially missed better functional outcomes in

Table II. Hip-specific functional measures pre- and postoperatively according to age group.

Mean score (SD)	< 65 yrs	65 to 74 yrs	≥ 75 yrs	p-value*
WOMAC Function				
Preoperative	32.8 (17.5)	37.2 (21.1)	39.1 (17.2)	0.162
3 mths	76.5 (20.5)	80.4 (15.2)	75.3 (17.4)	0.390
12 mths	87.8 (15.5)	84.1 (17.3)	81.6 (20.4)	0.244
24 mths	86.8 (20.4)	84.0 (19.8)	81.5 (21.5)	0.483
60 mths	89.8 (16.5)	86.7 (18.7)	89.9 (14.9)	0.665
WOMAC Pain				
Preoperative	31.3 (17.2)	37.8 (21.3)	39.5 (18.50	0.052
3 mths	79.7 (22.4)	87.4 (14.3)	85.7 (15.7)	0.132
12 mths	89.3 (13.6)	88.8 (15.0)	91.5 (14.2)	0.620
24 mths	89.5 (18.6)	92.8 (11.8)	84.7 (22.1)	0.111
60 mths	90.9 (15.1)	90.8 (15.2)	92.3 (14.9)	0.910
WOMAC Stiffness				
Preoperative	34.1 (21.0)	38.5 (24.1)	44.9 (23.3)	0.030†
3 mths	71.4 (20.2)	78.6 (14.7)	76.4 (17.7)	0.149
12 mths	84.2 (18.5)	83.8 (18.4)	82.8 (19.0)	0.933
24 mths	81.4 (23.9)	86.6 (19.0)	80.3 (23.7)	0.371
60 mths	84.1 (20.1)	86.7 (18.0)	89.5 (17.8)	0.464
HHS				
Preoperative	47.7 (12.8)	50.1 (15.0)	45.4 (13.3)	0.193
3 mths	79.2 (15.8)	78.5 (15.8)	72.2 (13.4)	0.154
12 mths	88.8 (14.0)	85.4 (14.6)	80.3 (19.2)	0.060
24 mths	87.9 (17.8)	89.2 (11.0)	81.4 (18.1)	0.070
60 mths	87.3 (13.1)	81.5 (15.7)	83.2 (11.2)	0.234

*Analysis of variance.
†Between < 65 years and ≥ 75 years only.
HHS, Harris Hip Score; SD, standard deviation; WOMAC, Western Ontario and McMaster Universities Osteoarthritis Index.

younger patients, such as those younger than 55 years old, due to combining their outcomes with slightly older patients, that have been observed by other authors.[10,13] The original study protocol had four age groups with the aim of recruiting 260 patients, but due to slow recruitment to the < 55 years old group, these were combined with the 55 to 65 years old group. This was due to the limited number of patients in this age group (< 55 years) undergoing THA, not meeting inclusion criteria, and the preference of some of the recruiting surgeons to choose an alternative prosthesis in these younger patients. One advantage of the three age groups used was the equal split of those patients presenting for a THA in the UK, with a recognized mean age of 70 years (SD 10).[29] Therefore, five years either side of 70 years (65 to 75 years) would capture approximately one-third of patients, leaving one-third of patients either side of this age group. A second limitation was the dropout rate of 26% (n = 52) after recruitment, however the main reason for this was either that the patient did not undergo surgery (n = 5) or did not receive the allocated implant (n = 34). Of the 156 patients who received the correct implants and were eligible for the study, only 27 (17.3%) withdrew or were lost to follow-up at 60 months (Figure 1). Another limitation was using the WOMAC as the joint-specific outcome measure, which has limitations and an observed ceiling effect;[30] potentially using a measure such as the Forgotten Joint Score, which does not demonstrate a ceiling effect postoperatively, may have shown a difference according to age.[31] The final limitation was using the MCID defined by Quintana et al[16] of 22.6 points in the WOMAC score to power the study. More recently (after recruitment to the current study), the MCID has been shown to be nine points following total knee arthroplasty,[32] which may have resulted in the study being under-powered to show a difference in function according to age groups. Whether this lower MCID is observed following THA is not clear. However, there was no observed trend in difference in the WOMAC scores according to the age groups, and the differences in the were less than nine points.

The current study showed no difference in HRQoL according to age following THA when assessed using the EQ-5D, which is in contrast to several studies.[10,14,33] Again, the difference found in these other studies may not be clinically significant when considering the defined MCID of 0.08 or more.[17] Furthermore, despite Rolfson et al[33] demonstrating less of an improvement in HRQoL with increasing age, older patients were just as likely to achieve their expected age- and sex-matched population normal HRQoL following THA. The significant differences found in the physical function and role dimensions of the SF-36 in the current study, with older patients

Table III. 36-Item Short Form Survey measures pre- and postoperatively according to age group.

Mean component score (SD)	< 65 yrs	65 to 74 yrs	≥ 75 yrs	p-value*
Physical function				
Preoperative	22.7 (15.4)	28.1 (20.2)	19.3 (18.0)	0.020†
3 mths	63.8 (26.1)	65.3 (25.1)	47.1 (24.6)	0.004‡
12 mths	74.2 (27.7)	63.4 (30.3)	50.5 (31.4)	0.001§
24 mths	72.7 (28.0)	64.5 (30.0)	54.2 (29.1)	0.010§
60 mths	73.1 (31.4)	59.0 (31.7)	62.5 (29.1)	0.010§
Physical role				
Preoperative	27.2 (24.3)	30.7 (26.5)	30.1 (25.3)	0.712
3 mths	57.6 (28.6)	58.9 (26.8)	52.3 (26.7)	0.741
12 mths	79.1 (28.6)	70.6 (29.9)	59.4 (32.3)	0.007§
24 mths	77.7 (31.1)	65.6 (34.4)	59.0 (33.5)	0.030§
60 mths	79.6 (31.1)	66.5 (31.2)	62.5 (29.1)	0.047§
Bodily pain				
Preoperative	20.4 (13.1)	30.2 (22.0)	28.1 (20.2)	0.010¶
3 mths	58.8 (24.0)	67.8 (21.0)	63.3 (22.8)	0.182
12 mths	70.9 (27.1)	67.1 (25.40	62.9 (29.5)	0.371
24 mths	68.4 (30.1)	63.5 (27.1)	58.7 (28.8)	0.311
60 mths	70.7 (31.1)	66.5 (31.2)	67.0 (29.1)	0.636
General health				
Preoperative	57.7 (24.8)	67.6 (24.8)	62.6 (19.4)	0.070
3 mths	71.2 (20.3)	72.6 (17.0)	69.0 (14.2)	0.579
12 mths	67.2 (22.6)	65.0 (23.1)	67.9 (17.6)	0.810
24 mths	68.6 (24.6)	68.5 (22.8)	65.2 (22.0)	0.741
60 mths	74.2 (29.0)	70.8 (23.5)	69.1 (20.6)	0.617
Vitality				
Preoperative	33.2 (22.9)	45.8 (23.1)	40.2 (21.9)	0.060¶
3 mths	53.4 (21.5)	59.0 (21.5)	53.0 (17.9)	0.301
12 mths	63.4 (23.1)	58.2 (21.5)	54.0 (23.6)	0.143
24 mths	63.5 (22.6)	62.9 (21.3)	56.2 (19.7)	0.201
60 mths	64.8 (22.3)	58.7 (23.7)	52.9 (20.1)	0.065
Social function				
Preoperative	45.8 (26.7)	54.3 (31.2)	45.1 (29.4)	0.141
3 mths	76.9 (27.6)	80.5 (27.9)	70.8 (30.4)	0.252
12 mths	83.8 (27.3)	84.2 (26.0)	72.6 (32.9)	0.080
24 mths	82.1 (27.2)	80.4 (30.0)	72.9 (31.7)	0.293
60 mths	89.8 (20.3)	87.1 (19.6)	82.2 (23.1)	0.292
Emotional role				
Preoperative	64.3 (32.5)	67.1 (38.4)	59.8 (37.8)	0.537
3 mths	75.6 (30.8)	81.7 (27.3)	73.8 (29.4)	0.401
12 mths	90.7 (18.5)	85.6 (25.5)	79.2 (27.7)	0.080
24 mths	85.4 (27.9)	80.3 (31.9)	74.6 (29.5)	0.282
60 mths	93.5 (17.6)	85.7 (24.2)	85.1 (24.1)	0.193
Mental health				
Preoperative	64.2 (21.4)	71.8 (20.3)	70.0 (20.0)	0.104
3 mths	72.7 (19.7)	78.5 (18.5)	75.9 (16.0)	0.341
12 mths	77.9 (20.9)	79.3 (16.7)	76.4 (18.6)	0.761
24 mths	78.1 (15.4)	77.5 (18.7)	77.2 (17.3)	0.980
60 mths	81.8 (15.8)	80.9 (19.5)	80.3 (15.2)	0.971

*Analysis of variance.
†Between 65 to 74 years and ≥ 75 years.
‡Between < 65 years and 75 years and older, and between 65 to 74 years and ≥ 75 years.
§Between < 65 years and ≥ 75 years only.
¶Between < 65 years and 65 to 74 years only.
SD, standard deviation.

Table IV. Activity assessments pre- and postoperatively according to age group.

Activity assessment	< 65 yrs	65 to 74 yrs	≥ 75 yrs	p-value*
Mean LEAS (SD)				
Preoperative	8.7 (2.4)	7.9 (2.6)	7.5 (2.2)	0.020†
3 mths	10.0 (2.6)	8.9 (2.3)	7.9 (2.0)	< 0.001†
12 mths	12.5 (2.8)	11.5 (2.9)	8.7 (2.9)	< 0.001†
24 mths	12.0 (3.1)	11.6 (3.2)	9.0 (3.0)	< 0.001†
60 mths	11.7 (2.6)	10.4 (2.8)	8.8 (2.4)	< 0.001†
Mean TUG, seconds (SD)				
Preoperative	16.0 (11.7)	14.9 (6.1)	26.5 (35.9)	0.032†
3 mths	11.8 (6.2)	12.3 (4.1)	14.9 (6.5)	0.032†
12 mths	9.9 (2.0)	11.9 (4.1)	17.1 (12.6)	0.001†
24 mths	9.0 (1.8)	11.3 (2.9)	13.3 (4.0)	0.010‡
60 mths	10.3 (4.6)	12.8 (5.7)	13.9 (4.6)	0.023†

*Analysis of variance.
†Between < 65 years and ≥ 75 years.
‡Between all groups.
LEAS, Lower Extremity Activity Scale; SD, standard deviation; TUG, Timed Up and Go test.

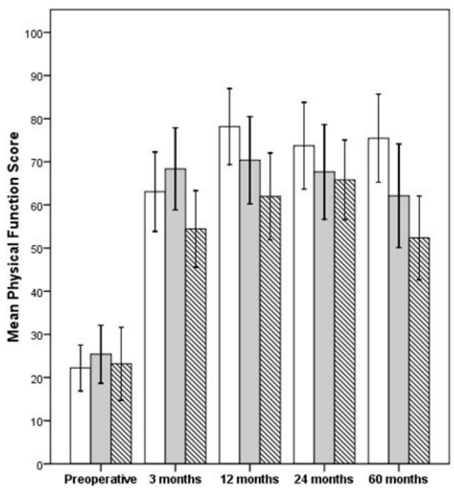

Fig. 2

Physical function domain of the 36-Item Short Form Survey preoperatively, and at three, 12, 24, and 60 months for those aged < 65 years (white), 65 to 74 years (grey), and ≥ 75 years and older (stripe). The error bars represent 95% confidence intervals around the mean.

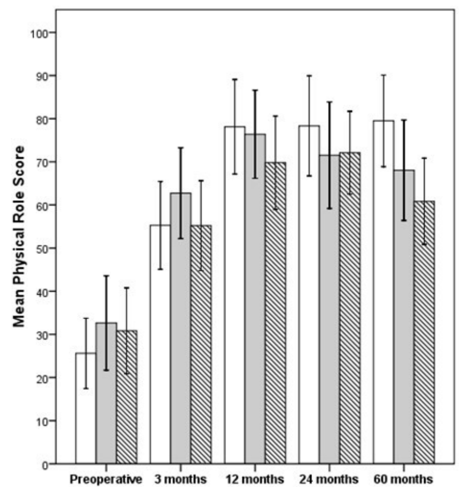

Fig. 3

Physical role domain of the 36-Item Short Form Survey preoperatively and at three, 12, 24, and 60 months for those aged < 65 years (white), 65 to 74 years (grey), and ≥ 75 years and older (stripe). The error bars represent 95% confidence intervals around the mean.

having worse scores, have been demonstrated by other studies.[5,13,34] The observed difference likely reflects the change in overall physical health expected with ageing, as these measures (SF-36) have been shown to deteriorate in the normal population with age.[35] Although older age is associated with poorer overall general physical health, the ≥ 75 year group had both clinically[16] and statistically significant improvement in their physical health that was maintained at five years postoperatively.

There is contradictory evidence as to whether age influences hip-specific functional outcome after THA, with some studies showing no difference,[4-7] and others demonstrating a better outcome with younger age.[8-12] This may relate to the measures used to assess outcome, with studies using the WOMAC score as their measure demonstrating a better outcome with younger age,[10-12] and those using the Oxford Hip Score finding no difference.[5,6] However, in contrast to the studies using the WOMAC score, the current study did not find a significant difference.[10-12] This may be due to the fact that these other studies included large sample sizes and found a statistical difference,[10-12] but it could be argued that these differences were not clinically significant, as they were less than the MCID. For example, the study by Joly et al[10] found a statistically significant 1.9-point advantage in the WOMAC score for patients younger than 55 years, but this is below MCID for the WOMAC function component, which has a MCID of 22.6 points.[16] Therefore, it may be acceptable to suggest that age does not have a clinically meaningful influence on hip-specific outcome after THA.

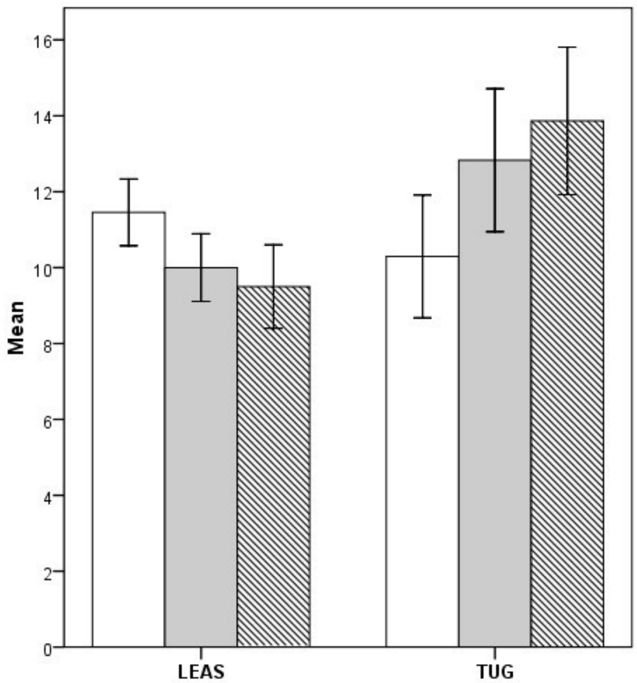

Fig. 4

Lower Extremity Activity Scale (LEAS) and Timed Up and Go (TUG) test 60 months following surgery for those aged < 65 years (white), 65 to 74 years (grey), and ≥ 75 years (stripe). The error bars represent 95% confidence intervals around the mean.

Older patients were less active than younger patients following THA, which again is likely related to overall physical health and social/employment changes associated with ageing, rather than a limitation relating to their THA. On average, patients aged ≥ 75 years defined their activity as: "I am up and about at will in my house and can go out and walk as much as I would like with no restrictions" on their LEAS assessment, which was persistent from 12 to 60 months. The < 65 years group, on average, defined their activity as four levels higher: "I am up and about at will in my house and outside. I also work outside the house in an extremely active job", which again was persistent from 12 to 60 months. The 65 to 75 year age group, on the other hand, demonstrated a slight decline in their LEAS over the 12- to 60-month follow-up, equal to the < 65 years group, and then declined by two levels at 60 months. The response to this subjective questionnaire may be biased toward working age patients, with questions specifically related to activity in relation to their "job", and some will retire as they get older. However, the objective TUG test does support the LEAS findings with older groups having longer test times. This probably reflects overall deterioration in physical function rather than their hip-specific function, which is supported by the SF-36 physical function and role scores that were lower with increasing age and have been shown to correlate with the TUG test.[36]

In conclusion, age did not influence postoperative hip-specific outcome or HRQoL (according to the EQ-5D) following THA. Despite a significant improvement, older patients had lower postoperative activity levels compared to younger patients, but this may be reflective of the overall physical effect of ageing.

Take home message

- Age did not influence postoperative hip-specific outcome or health-related quality of life following total hip arthroplasty, but older patients had lower postoperative activity levels compared to younger patients, which may be reflective of the overall physical effect of ageing.

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Author information:
- N. D. Clement, MBBS, MD, PhD, FRCS Ed(Tr&Orth), Orthopaedic Consultant, Department of Orthopaedics, The Freeman Hospital, Newcastle, UK; Edinburgh Orthopaedics, Royal Infirmary of Edinburgh, Edinburgh, UK.
- K. M. Smith, MSc, BSc, Research Team Lead
- Y. J. Baron, MSc, BSc, PhD, Research Physiotherapist
- H. McColm, Research Data Manager
- D. J. Deehan, MD, MSc, FRCS (Tr&Orth), DSc, Professor of Orthopaedics
- J. Holland, FRCS (Orth), Orthopaedic Consultant
Department of Orthopaedics, The Freeman Hospital, Newcastle, UK.

Author contributions:
- N. D. Clement: Formal analysis, Writing – original draft.
- K. M. Smith: Investigation, Writing – review & editing.
- Y. J. Baron: Investigation, Writing – review & editing.
- H. McColm: Investigation, Writing – review & editing.
- D. J. Deehan: Writing – review & editing.
- J. Holland: Conceptualization, Methodology, Resources, Writing – original draft.

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