

# Comparison of TFMT Femoral Stems in Revision Hip Arthroplasty

Rajesh Pawar<sup>1</sup>, Rye yap, Jody Blow, Mohanrao Garabadi, Hasnat Minhas, Mark Rowsell, Prasad Antapur<sup>2</sup>

Lincoln county hospital, Pilgrim hospital, United Lincolnshire hospitals NHS Trust.



## Background

TFMT(Tapered Fluted Modular Titanium) stems are modular porous coated stems widely used in revision hip arthroplasty. Although TFMT stems are popular due to its proven advantage in the setting of severe bone deficiency, subsidence is a concern with such designs. we used TFMT stems ARCOS(Zimmer Biomet) and Reclaim(Depuy Synthes). We reviewed our results and compared these stems. The primary aim was to look at early to mid-term stem survival and measure radiological subsidence, secondary aim was to measure proximal femoral bone stock changes.

## Methods

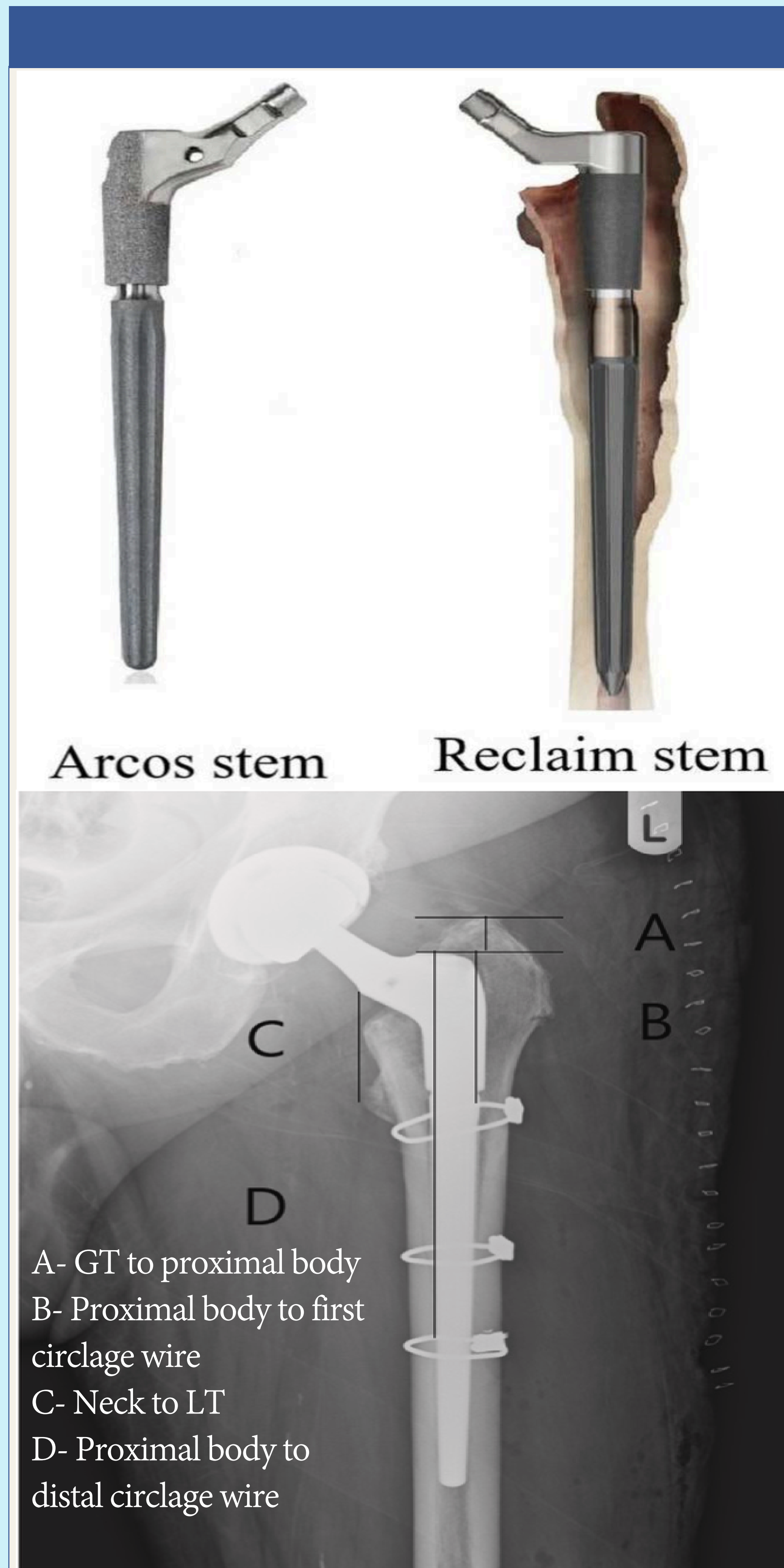
We carried out a retrospective cross-sectional cohort comparison of 108 patients operated with one of the two femoral component designs between August 2013 and November 2019. Patient demographic data were collected and compared including age at the time of revision, gender, side, body mass index (BMI), and indications for revision surgery. Data was also collected regarding extended trochanteric osteotomy, paprosky grading cables used and stem length. Implants were chosen according to surgeon's preference and familiarity. All data were obtained using hospital episode statistics and theatre registry.

	Arcos (N=51)	Reclaim(N=57)	P value	
Age	78.03(54-93)	73.75(36-97)	0.03	*
Sex(M/F)	22/29	22/35	0.63	*
Side (R/L)	27/24	37/20	0.20	#
BMI	29.04(19-36)	28.3(21-41)	0.19	*
ETO( Y/N)	12/39	14/43	0.90	#
Paprosky Defect			0.25	#
I	1	1		
II	8	13		
IIIA	21	31		
IIIB	20	11		
IV	1	1		
Revision indication			0.67	#
Periprosthetic fracture	27	24		
Aseptic loosening	16	22		
Infection	4	7		
Instability/Dislocation	4	4		
Stem length			0.50	#
<150 mm	29	36		
>150mm	22	21		

\* = Independent t test  
# = Chi-squared test

All Patients had pre-operative grading of the femoral defects using Paprosky method and Proximal femoral bone quality grading according to Bohm et al. Subsidence and proximal femur bone quality was measured from initial post-operative radiograph and compared with the most recent radiographs The subsidence was measured at 4 different points on the AP radiographs and an average was obtained, modified from the technique described by Girard et al.

The stems are made of titanium minimizing stress shielding due to lower modulus of elasticity. The tapered geometry achieves axial stability and rotational stability is achieved by cutting flutes. Arcos stem proximal cone is porous plasma sprayed for initial scratch fit and biological fixation. Distal stem is grit blasted with 3 degree spline taper. In Reclaim stem both proximal cone and distal stem are grit blasted for bony apposition. The distal stem has a 2.5 degree spline taper.



## Results

There were 51 patients in Arcos and 57 patients in Reclaim cohort. The mean follow up in the Arcos cohort was 34 months (12-56) and 47 months(12-56) in the Reclaim cohort. Minimum follow up period in both cohorts was 12 months to identify maximal subsidence. We found a statistical difference in the maximal subsidence between two cohorts. The mean subsidence in Arcos cohort was 2.3 (0-12 mm) as compared to 4.5 (0-25 mm) in Reclaim cohort with p value of .017. We further analyzed subgroups to find the cause for difference in subsidence.

Sub Groups			P value
Indication	Periprosthetic	Others	
	Arcos N=51	27	24
Reclaim N=57	24	33	0.30
ETO	Yes	No	
	Arcos N=51	12	39
Reclaim N=57	14	43	0.49
BMI	<30	>30	
	Arcos N=51	28	23
Reclaim N=57	30	27	0.16
Stem length	<150	>150	
	Arcos N=51	29	22
Reclaim N=57	36	21	0.6

We found no statistical difference (p=0.11) in restoration of proximal bone stock, 43/51 (84%) in Arcos cohort and 40/57(70%) in Reclaim cohort. Both had excellent restoration of bone stock at final follow up. At final follow up none of Arcos stems were revised for any reason in with 100% survival and 2 stems had to be revised in Reclaim cohort with survivorship of 96.4% for reasons other than subsidence

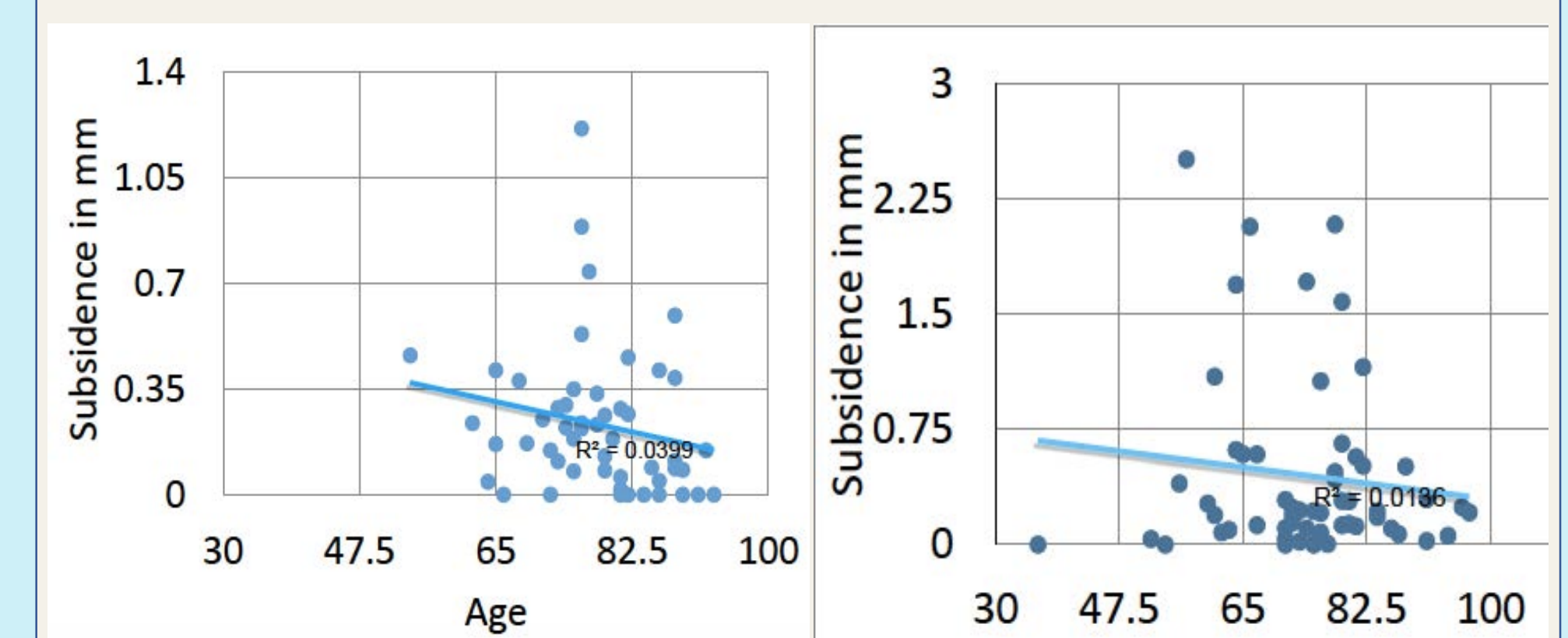
## Results

Paprosky Defect	Arcos	Reclaim
I	1	1
II	8	13
IIIA	21	31
IIIB	20	11
IV	1	1
P value	0.14	0.08

Proximal femoral bone stock	Arcos	Reclaim	P value
			0.11
Increasing defects	3	11	
Constant defects	5	6	
Osseous restoration	43	40	

Since there was significant difference in age group between groups we performed Linear regression analysis for association between the age and subsidence which showed no correlation with R2 of .03 in Arcos group and .01 in Reclaim group.



## Discussion

Choice of femoral stem in revision THA is vital owing to bone loss and distorted anatomy. Implants are designed and engineered so as to maximize primary host bone contact fixation, early secondary biological fixation and long term implant survival without significant subsidence. Factors that influence subsidence include age, gender, BMI, postoperative weight bearing protocol, preoperative bone loss, periprosthetic fractures, stem length, ETO and stem designs.

In our study we observed subsidence, 5/51(10%) patients in Arcos cohort and 17/57 (30%) patients in Reclaim cohort had subsidence more than 5mm. We could not explain the differences in subsidence to any variables other than stem geometry. Pierson et al. compared stems with two spline configurations (Narrow 0.4-0.5mm and Broad 0.9-1.0mm) and five taper angle groups per spline configuration (2.5, 3.0, 3.5, 4.0, 5.0). They measured resistance to stem subsidence and axial stability and concluded that higher degrees of taper angle and broad spline geometry were superior. Haddad et al. reported good osseous integration and low subsidence (4.5%) using a 3 degree tapered femoral stem at 4 years in 23 patients with type III paprosky defects

## Conclusion

Our study shows excellent mid-term survivorship and restoration of proximal femoral bone stock with both TFMT stems and is recommended in revision THR. Subsidence was observed in both cohort, Comparison revealed a statistically significant increased subsidence in Reclaim cohort which could not be attributed to any other variables apart from stem geometry. Further studies are needed to compare stem designs.

## Contact

Dr Rajesh Pawar  
Lincoln county hospital (ULHT),greetwell road,  
ln25qy. Lincoln  
e mail: rajeshpawar2001@yahoo.com  
ph no : 07808050932