

Large Reduction in Postoperative Posterior Tibial Slope Risks Anterior Collapse of The Tibial Component in Fixed-Bearing Unicompartmental Knee Arthroplasty

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Disclosures

Consultant and/or Speaker

Kyocera, MicroPort, DePuy Synthes,
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Research Support

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Introduction

- The posterior tibial slope (PTS) of tibial component in unicompartmental knee arthroplasty (UKA) is recommended to be between 3° and 7°.
- However, variations in the preoperative PTS are wide. In particular, Asian patients have a higher PTS than Western patients.

Purpose

- To evaluate the influence of the changes in pre and postoperative PTS on clinical outcomes.



Materials & Methods

Medial UKA (OA, ON) 190 knees in 170 subjects



Excluded



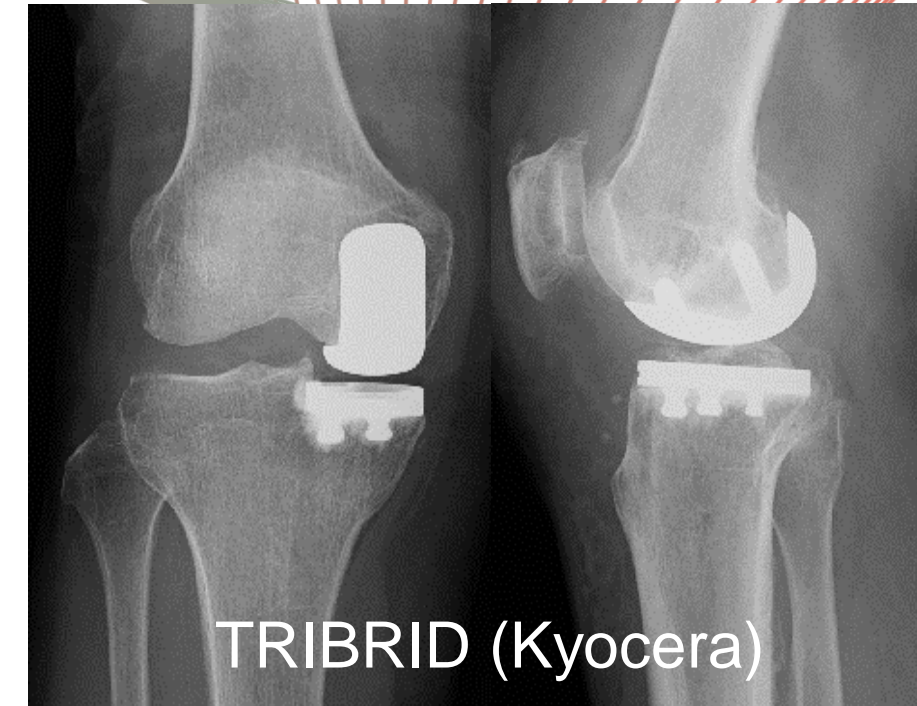
7 knees: Lost follow-up

1 knees: Death

182 knees in 162 subjects (61 male and 101 female)

Mean age at surgery: **73.6** years (54 to 87 years)

Mean follow-up: **36.5** months (24 to 63 months)

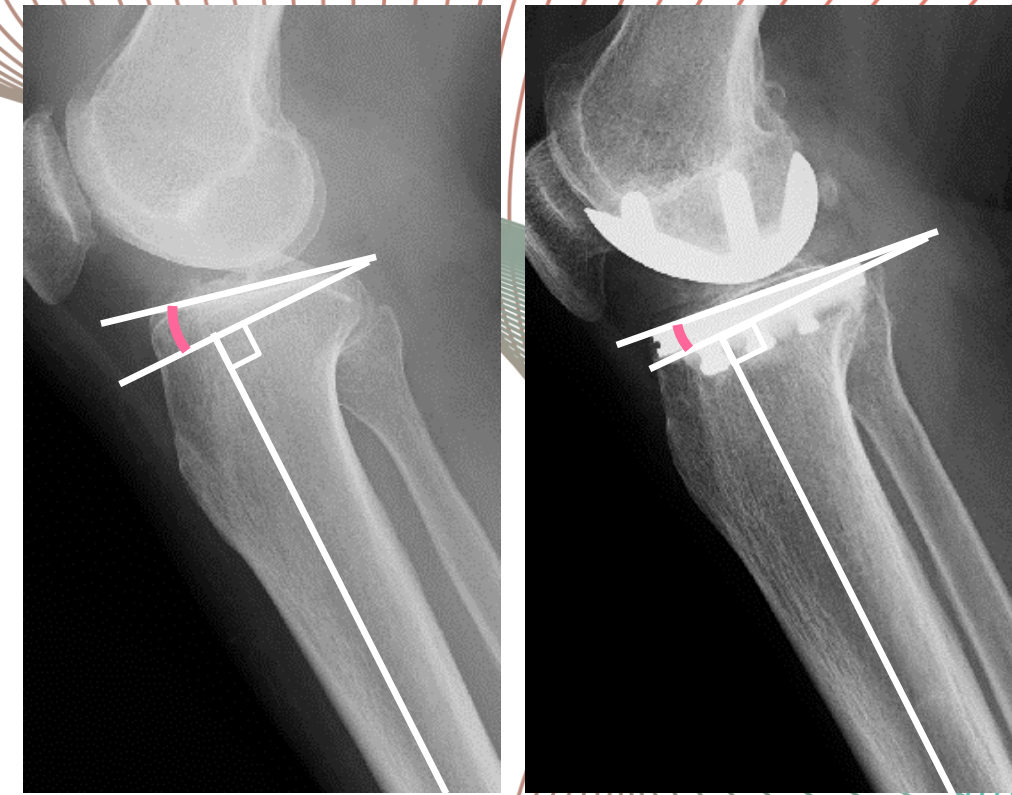


Materials & Methods

- ✓ Preoperative and postoperative PTS
- ✓ Postoperative reduction in PTS

Large reduction group: $\geq 5^\circ$ reduction

Small reduction group: $< 5^\circ$ reduction



- ✓ Clinical outcome (ROM & KSS 2011) at last follow-up

- ✓ Radiographic follow-up

@ 3 weeks, 3 months, 6 months, 1 year, and subsequently ever year after surgery

- ✓ Statistical analysis were performed using SPSS software (version 21.0: IBM).

Student's t-test, Mann-Whitney U-test, χ^2 test, Fisher's exact test

Spearman's rank correlation coefficient

Results ①

Demographic data

		Large reduction group (N = 33)	Small reduction group (N = 149)	P value
Age (y)		73.3 (58 to 82)	73.6 (54 to 87)	NS
Sex (Male/Female)		11/22	56/93	NS
Diagnosis (OA/ON)		20/13	110/39	NS
Height (kg)		156.6 (144 to 175)	154.9 (138 to 176)	NS
Body weight (kg)		63.9 (46 to 87)	62.8 (42 to 104)	NS
BMI (kg/cm ²)		26.1 (19.9 to 34.9)	26.1 (19.9 to 39.2)	NS
PTS	Preop. (°)	10.9 (0 to 14.9)	7.7 (-1.1 to 14.0)	<0.001
	Postop. (°)	3.6 (-2.5 to 8.0)	7.1 (-0.3 to 14.6)	<0.001

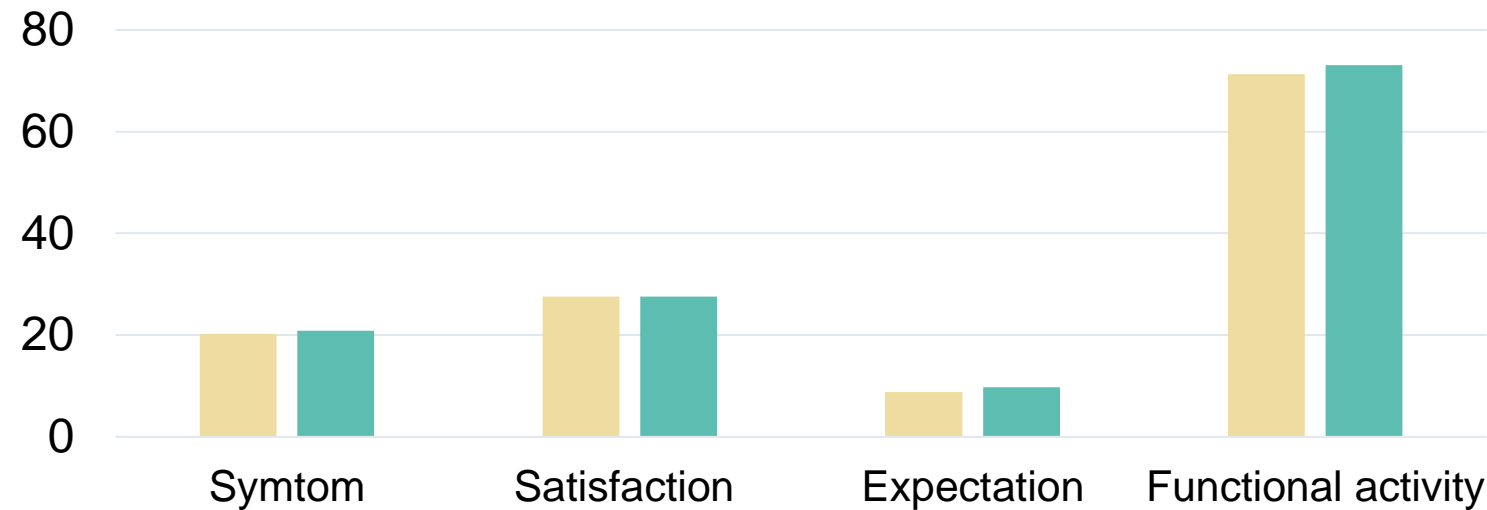


Results ②

Comparison of Clinical outcomes

		Large reduction group (N = 33)	Small reduction group (N = 149)	P value
Knee flexion angle	Preop. (°)	135.5 (105 to 153)	138.4 (95 to 153)	NS
	Postop. (°)	138.3 (116 to 160)	139.7 (120 to 158)	NS
No. of knees with anterior collapse of the tibial component (knees)		4 (12.1%)	1 (0.7%)	<0.001

KSS 2011



Large reduction

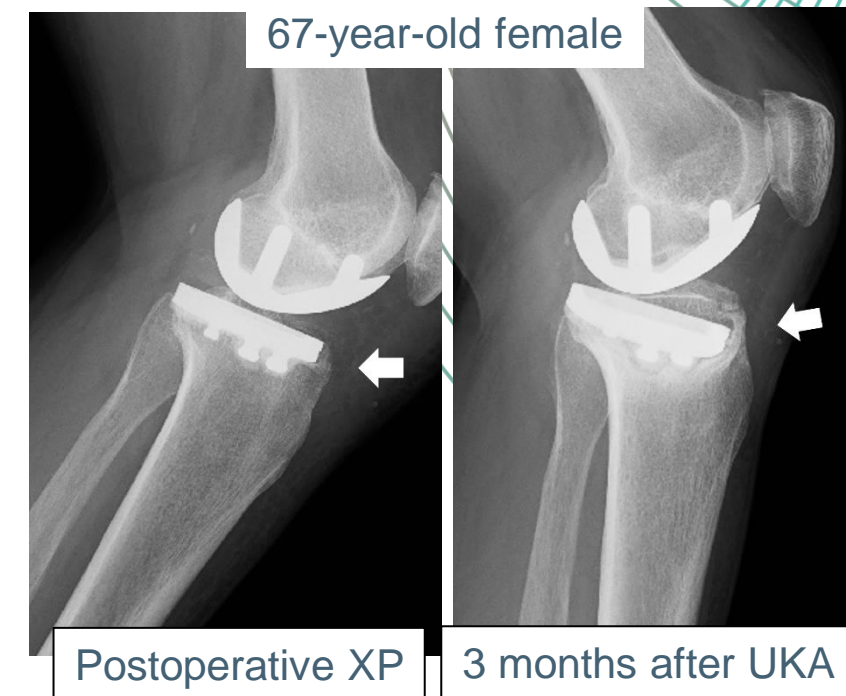
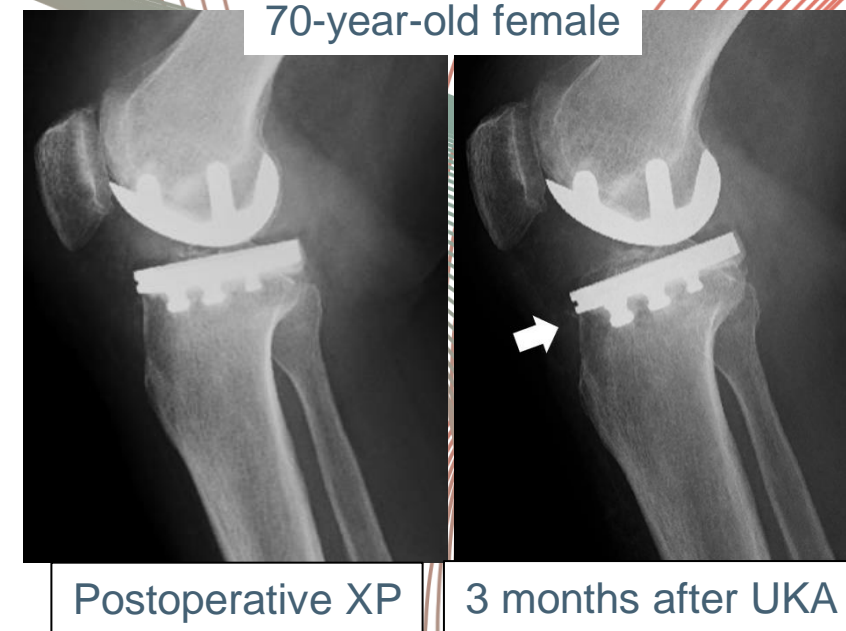
N.S.

Results ③

Anterior collapse of the tibial component

5/182 knees (2.7%)

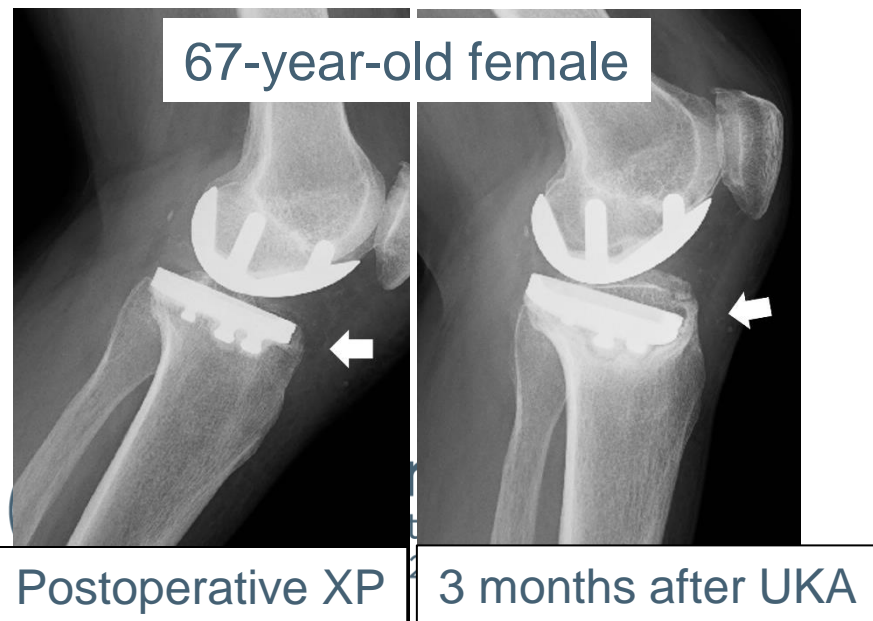
Case	Age (y)	Sex	Diag.	BMI (kg/cm ²)	Preop. PTS	Postop. PTS	Reduction in PTS	Date identified on radiograph
1	65	F	OA	28.6	14.0	2.6	11.4	3 weeks to 3 months
2	67	F	ON	27.3	10.0	11.1	-1.1	Within 3 weeks
3	79	F	ON	25.9	10.4	3.3	7.1	Within 3 weeks
4	70	F	OA	29.3	13.7	6.8	6.9	3 weeks to 3 months
5	82	F	OA	26.4	11.5	5.9	5.6	3 weeks to 3 months



All patients were female.

Results ③

	Anterior collapse (N = 5)	No collapse (N = 177)	P value
Age (y)	72.6 (65 to 82)	73.6 (54 to 87)	NS
Preoperative PTS (°)	11.5 (10 to 14)	7.9 (-1.1 to 15.5)	0.005
Postoperative PTS (°)	5.9 (2.6 to 11.1)	6.5 (-2.5 to 14.6)	NS
Reduction in PTS (°)	6.0 (1.1 to 11.4)	1.6 (-8.1 to 12.6)	0.028



Anterior cortical support was not achieved in 2 of 5 collapsed knees.

Discussion ①

- ✓ **Knee flexion angle and KSS at the last follow-up were not significantly different between the large reduction group and the small reduction group.**



In this series, UKA was performed using a spacer block technique.

If the flexion gap was tighter than the extension gap due to a small PTS than the native slope, the posterior femoral condyle cut was made 1 or 2 mm thicker than the standard procedure, thereby widening the flexion gap.

This procedure may prevent a decrease in the knee flexion angle, and there is no difference in PROMs between the groups.

Discussion ②

- ✓ **The incidence of anterior collapse of the tibial component in the large reduction group was significantly higher than that in the small reduction group.**



Cortical coverage is recommended for the prevention of the collapse of the tibial component. In the present study, anterior cortical support was not achieved in 2 of 5 collapsed knees.

In contrast, in 3 of 5 collapsed knees, anterior cortical coverage was achieved. The postoperative PTS of these 3 knees was reduced by more than 5° compared with the preoperative value.

The proximal tibial cut with a smaller PTS than the preoperative PTS results in a larger anterior tibial bone cut than the posterior tibial bone cut. Anterior collapse of the tibial component may be caused by inferior bone quality of the anterior bone cutting surface due to the larger anterior bone cut.



Conclusion

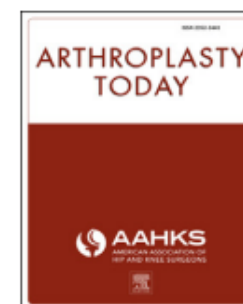
- The knee flexion angle and PROMs at the last follow-up were not significantly different between the groups.
- However, large reduction in postoperative posterior tibial slope may be associated with anterior tibial collapse in UKA.
- Therefore, This study shows one potential benefit for matching native slope.



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