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Impact of Preoperative Limb Alignment and Deformity on Postoperative Limb Alignment in Unicompartmental Knee Arthroplasty

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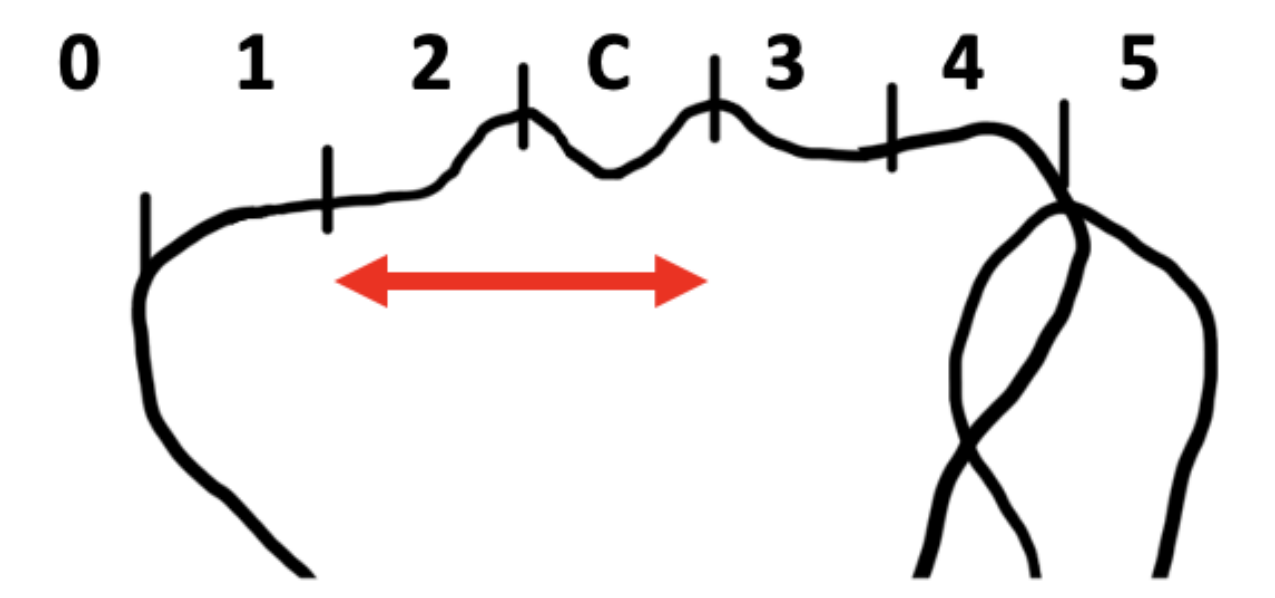
Faculty Disclosure Information

Nothing to disclosure.

Postoperative limb alignment in UKA



Post weight bearing line(WBL) should pass between ZONE 2 or C

Kennedy RW, et al. Clin Orthop Relat Res. 1987

Preoperative indications are not clear

Purpose of this study

Lower limb alignment

Knee deformity

Post WBL

Study Design, Patient Selection, Surgical Procedure

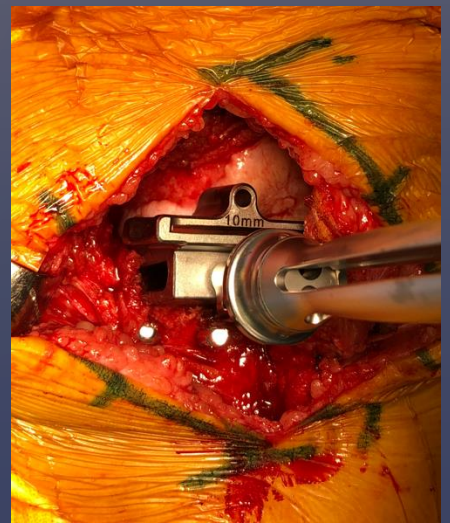
- Retrospective analysis: 92 primary UKA (2019-2022)
- The indication: medial OA or ON , flexion contracture<10°
- Male 27 Female 65 Age 75.2 (56 - 92)

Implant: Zimmer Biomet Persona partial knee (PPK)

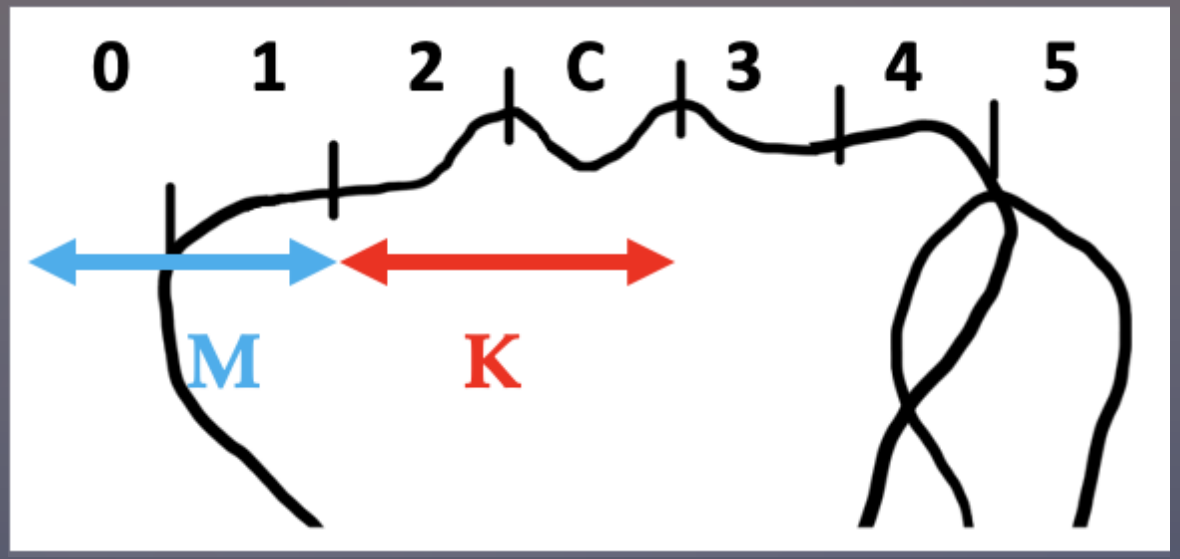
●tibial cut
PS7° v/v 0°

4mm under the surface

●distal femoral cut
Spacer block technique



Classification of post WBL



Kennedy RW, et al. Clin Orthop Relat Res. 1987

Zone 0 or 1: Group M

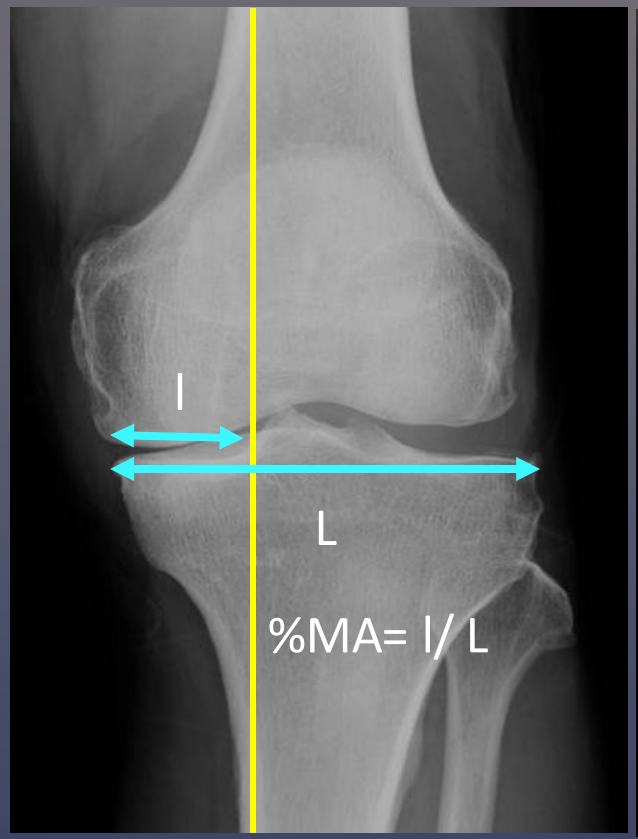
Zone 2 or C: Group K

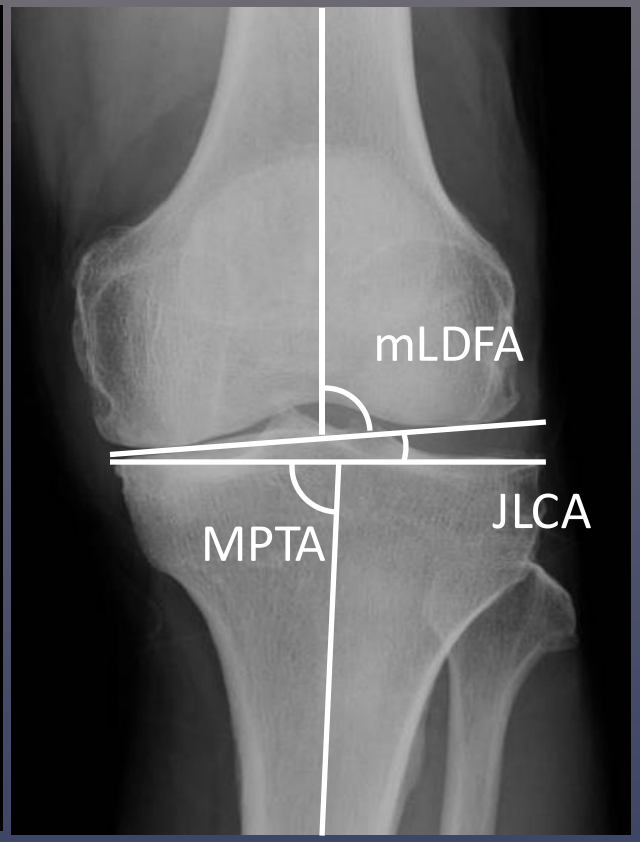
Analyzed Parameters

Patient's demographics

- Age
- Sex
- BMI
- range of motion

X-ray parameters





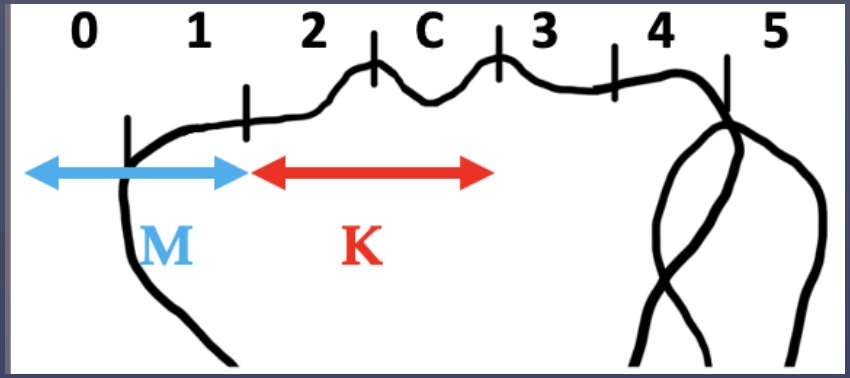
Results

Patient's demographics

	Group M n=42	Group K n=50	*P*
Gender, % male	28.6	30.0	n.s. [a]
Age, yrs	76.2±8.9	74.4±6.7	n.s. [b]
BMI, kg/m^2	24.9±3.8	25.5±4.1	n.s. [b]
Pre extension angle	-3.8±3.3	-3.3±4.1	n.s. [b]
Pre flexion angle	134.5±7.8	135.6±9.3	n.s. [b]

Imaging Parameters

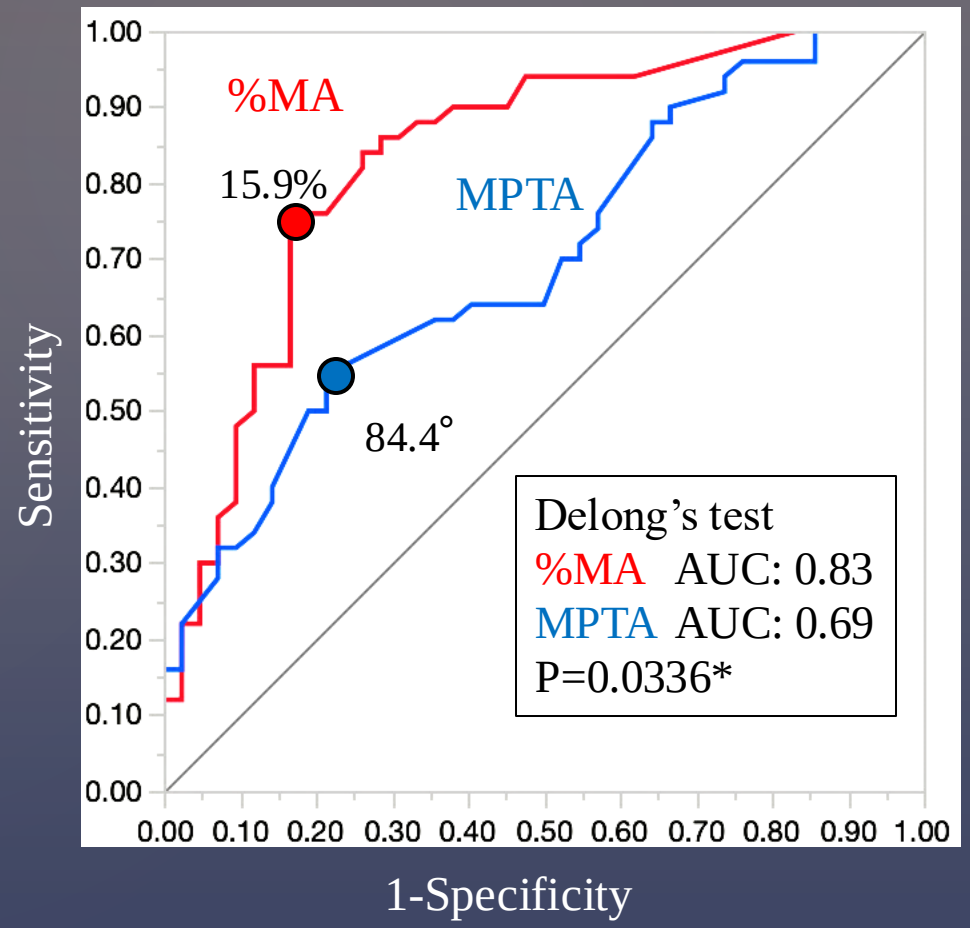
	Group M n=42	Group K n=50	*P*
pre %MA	7.3±11.5	23.5±12.3	< 0.01*[b]
pre JLCA	4.9±1.9	4.2±1.6	n.s. [b]
pre mLDFA	84.7±2.1	84.1±2.7	n.s. [b]
pre MPTA	82.1±3.4	84.3±2.5	< 0.01*[b]



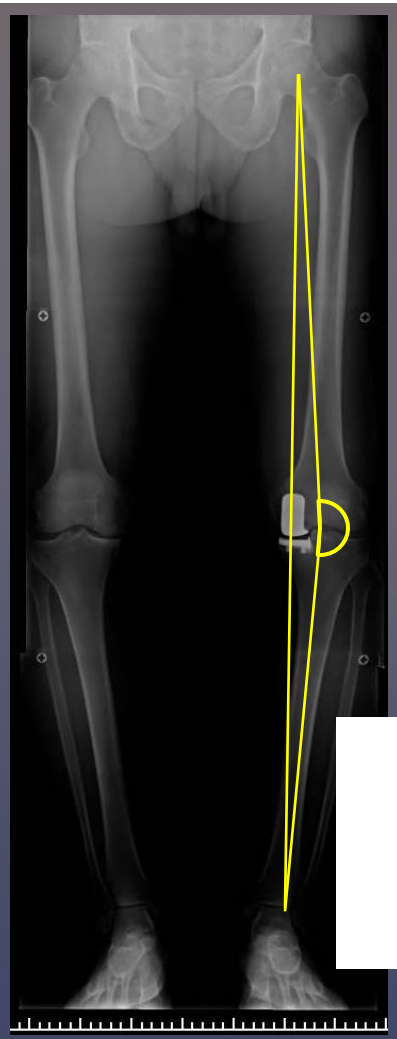
Mean ±SD; a, Fisher's exact test; b, Wilcoxon signed-rank test
*$P < 0.05$, statistically significant
BMI, body mass index
HKA angle, hip knee ankle angle; %MA, % mechanical axis;
JLCA, joint line convergence angle; mLDFA, mechanical lateral distal femoral angle
MPTA, medial proximal tibial angle

Logistic regression analysis

	Univariate		
	OR	95% CI	*P*
Gender, % male	1.1	0.43- 2.64	0.88
Age, yrs	0.97	0.92- 1.02	0.28
BMI, kg/m^2	2.51	0.93- 1.16	0.47
pre extension angle	1.44	0.92- 1.16	0.51
pre flexion angle	0.54	0.94- 1.03	0.53
pre %MA	1.12	1.06- 1.17	<0.01
pre JLCA	0.80	0.63- 1.02	0.07
pre mLDFA	1.11	0.93- 1.33	0.23
pre MPTA	1.33	1.11- 1.58	<0.01



Postoperative lower limb alignment using %MA

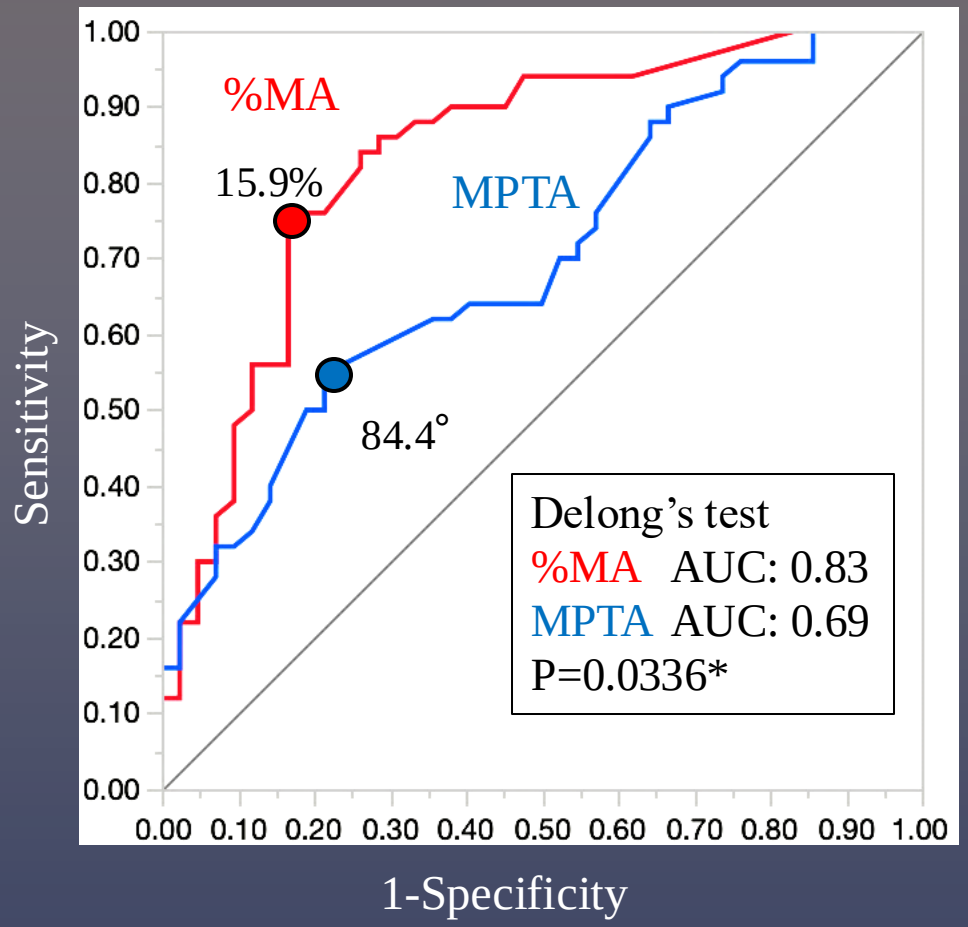


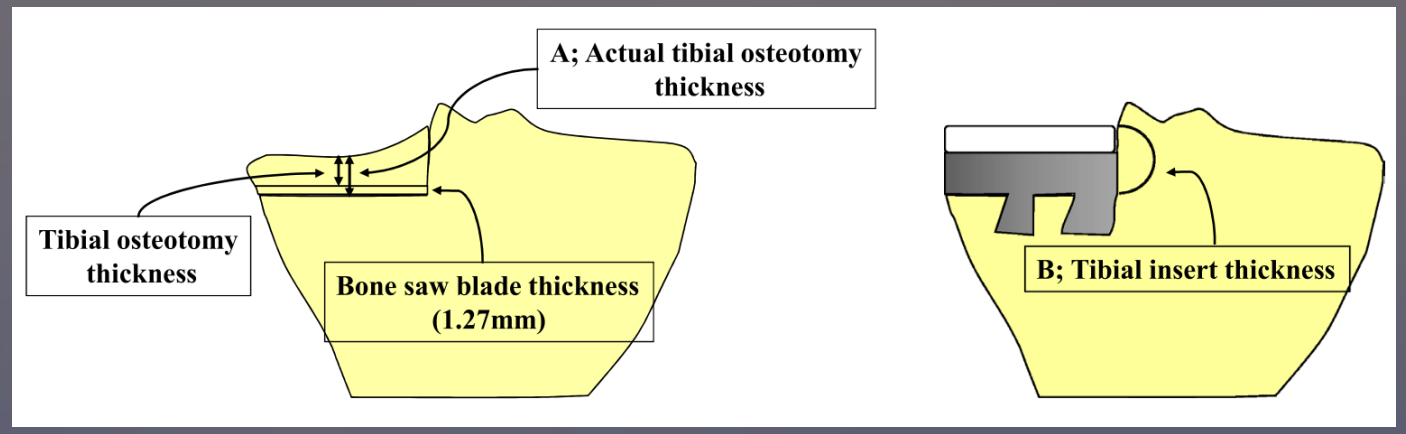
170cm
HKA angle 4° varus
%MA 7%(Group M)

151cm
HKA angle 4° varus
%MA 29%(Group K)

Postoperative HKA within 4° of varus is considered optimal, however the point the functional axis passes through the knee varies.

The effect of the knee deformity



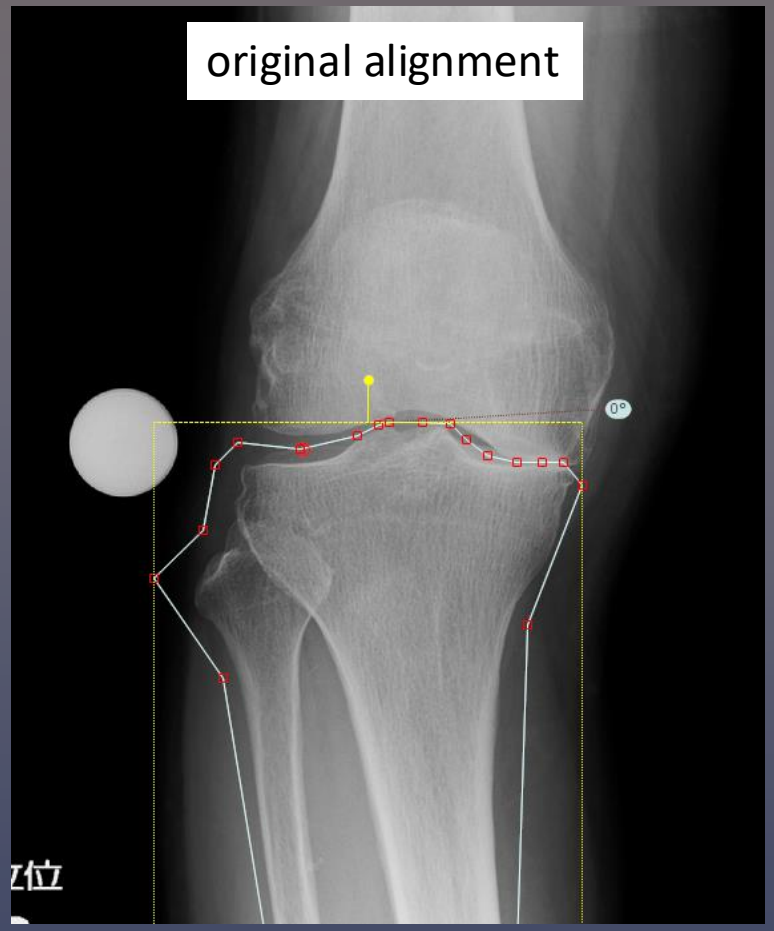


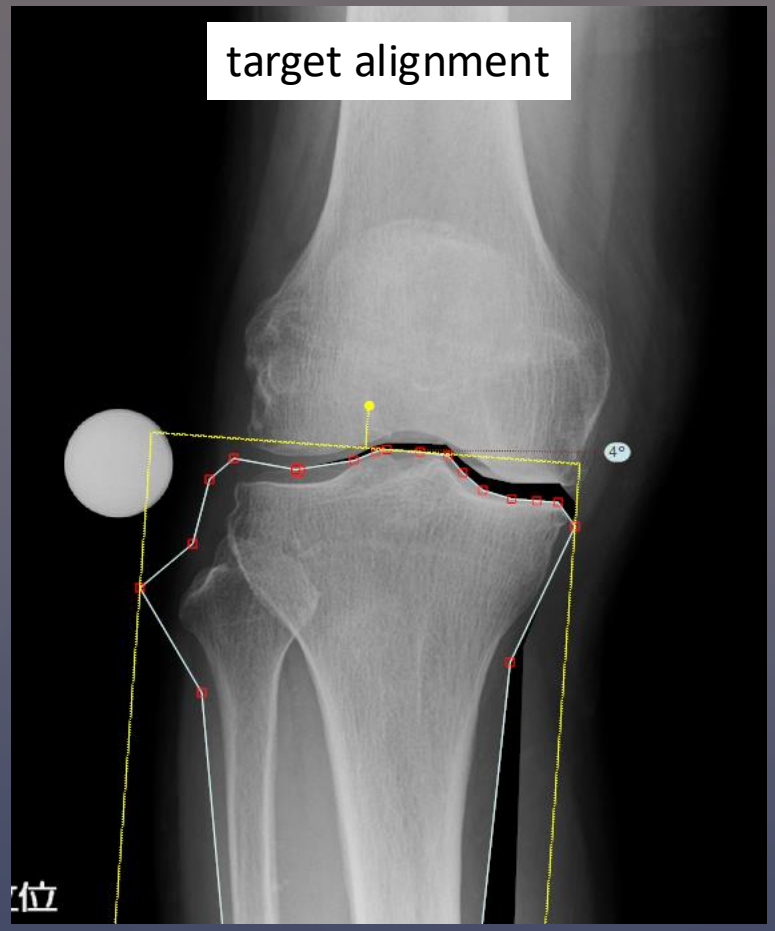
Changes in the height of the medial tibial articular surface affect postoperative limb alignment.

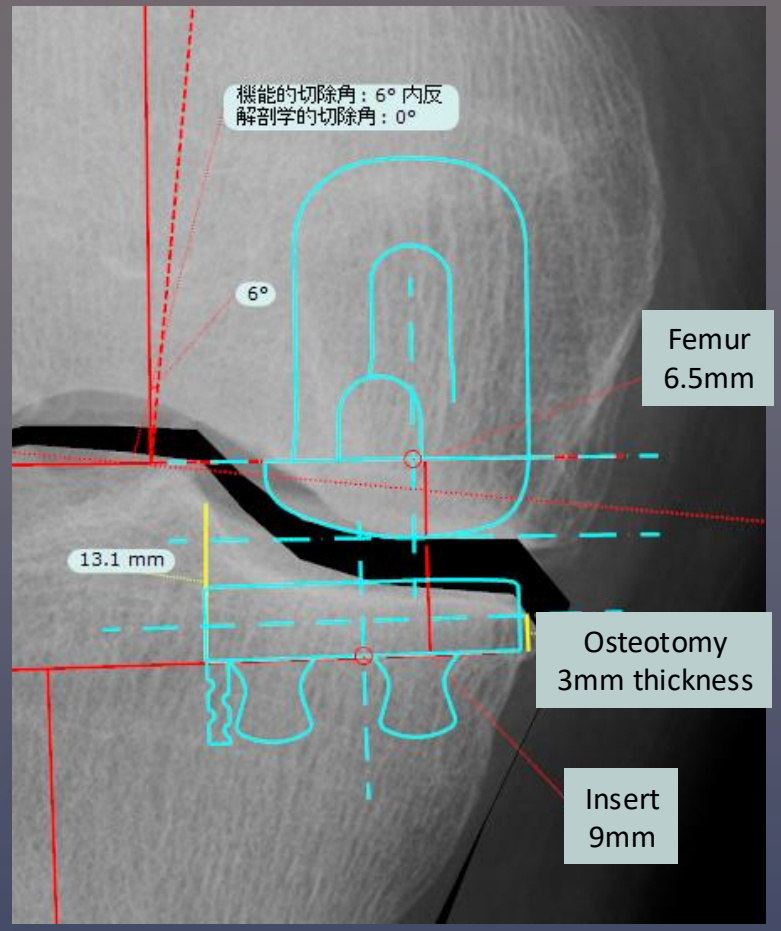
Kuroda Y, et al. Knee Surg Sports Traumatol Arthosc. 2018
Nakano N, et al. J Orthop Sci. 2022

Plan to elevate the medial articular surface for small MPTA.

UKA plan for small MPTA







The amount of tibial resection and insert thickness are estimated based on the target alignment.

Conclusion

In patients with preoperative %MA< 15.9
and MPTA< 84.4 degrees,
UKA may not achieve the target lower limb alignment,
and the amount of tibial osteotomy and insert thickness
will need to be adjusted.