Patellar medial-lateral position can be used to correct the effect of leg rotation on preoperative planning in total knee arthroplasty for varus knees

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Limb rotation

Patellar position is a valuable landmark for limb rotation

Lateral position of patella

↓

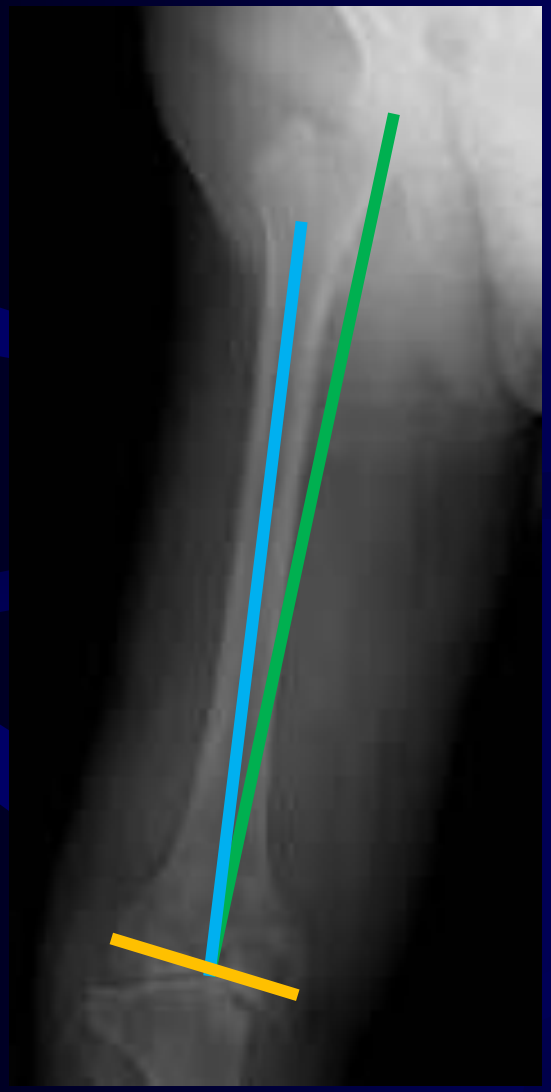
External rotation of limb

Medial position of patella

↓

Internal rotation of limb

Femoral valgus angle



External rotation of femur

↓

Greater than true angle

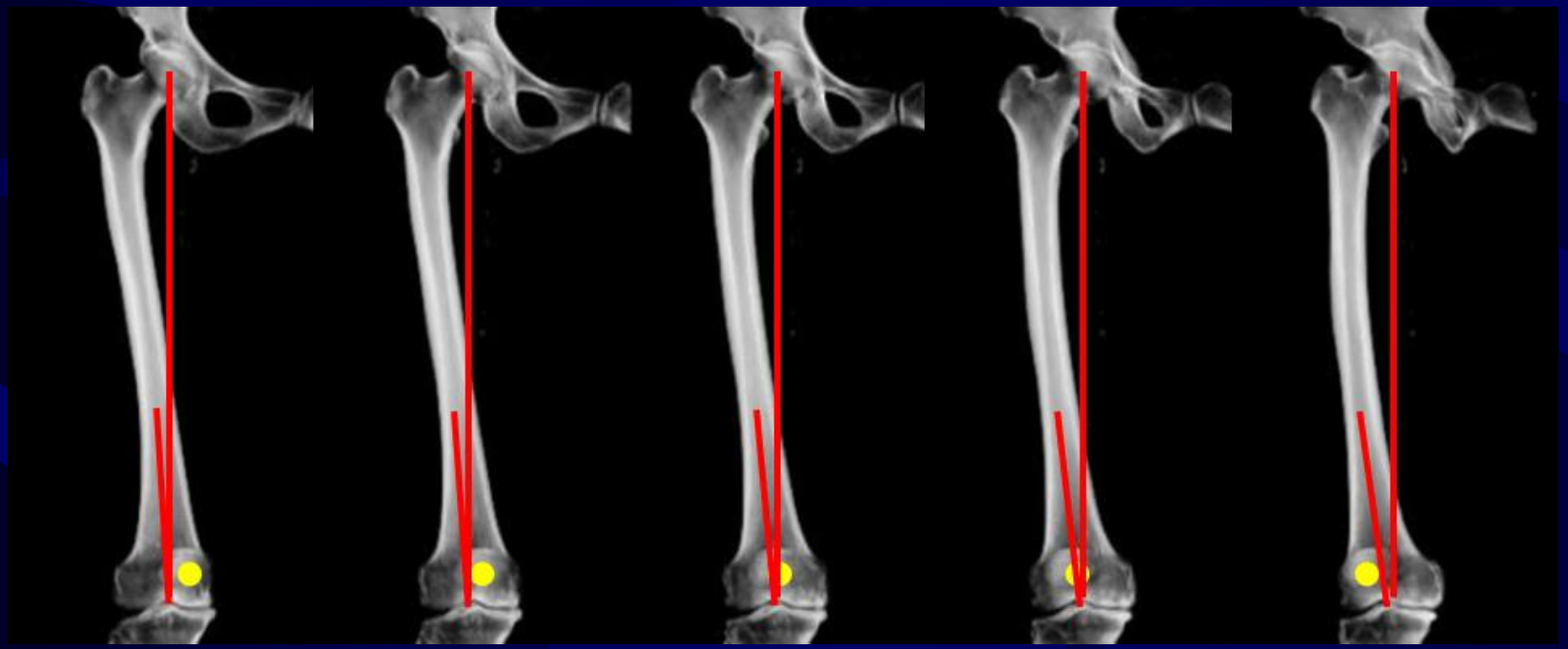
Internal rotation of femur

↓

Smaller than true angle

Purpose

To evaluate the accuracy of the corrected angle in femoral valgus angle based on the patellar ML position



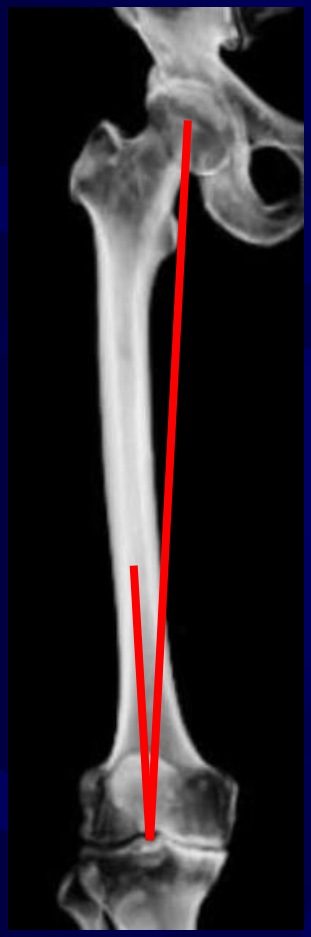
Materials and methods

100 consecutive knees with varus deformity using digitally reconstructed CT

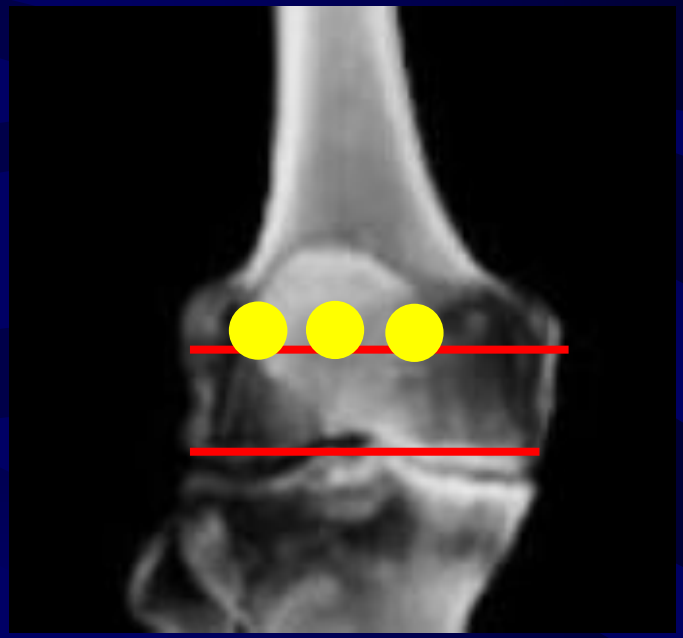
20° IR | 10° IR | Neutral | 10° ER | 20° ER

Measurement

Valgus angle of femur



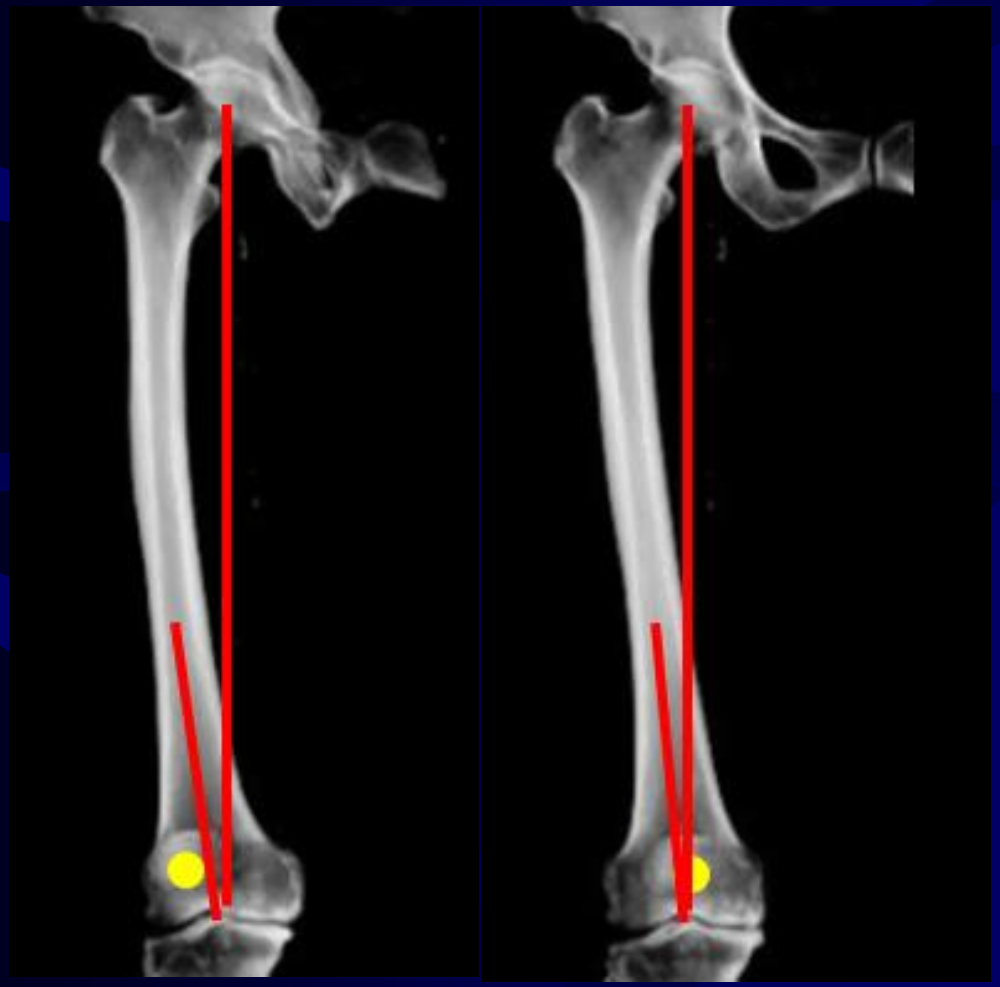
Patellar center position



Medial epicondyle (0%)
Lateral epicondyle (100%)

Measurement

20° ER Neutral

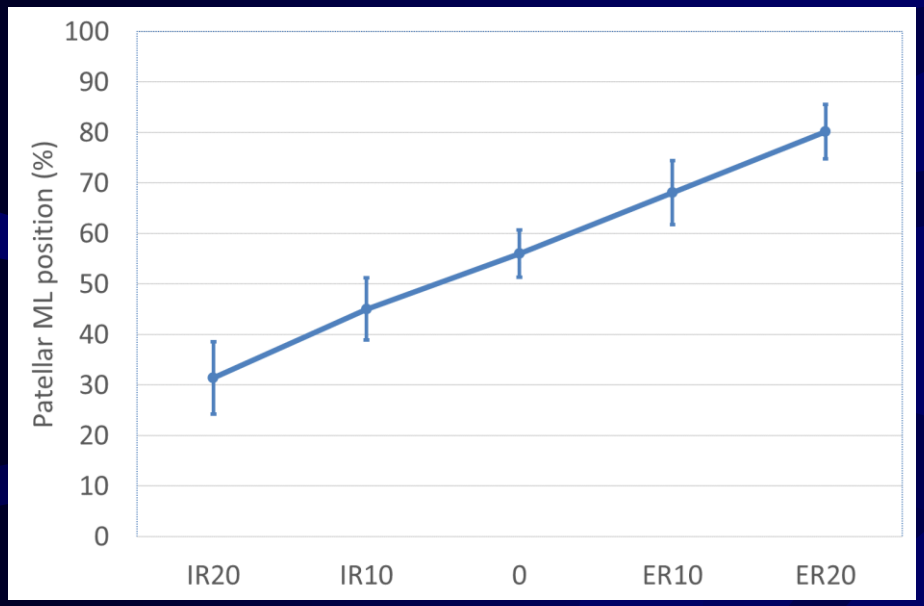


Femoral valgus angle was corrected based on the patellar ML position

Calculation of the error

Results

Patellar ML position

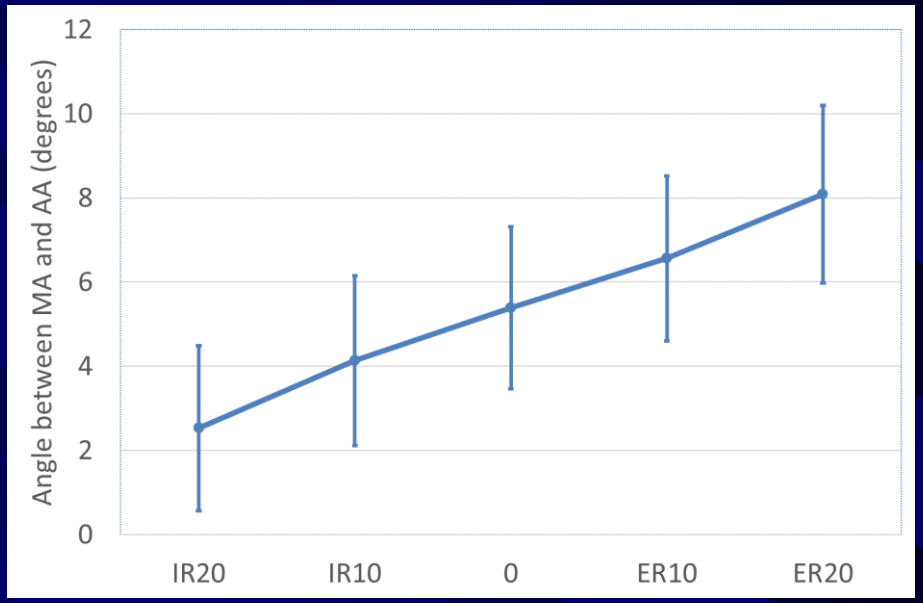


Neutral: 56.1%

10˚ limb rotation

12% translation

Femoral valgus angle



20˚ IR

2.9 ˚ decrease

20˚ ER

2.7 ˚ increase

Correction based on patellar ML position

Translation from 20˚ IR to 20˚ ER

Patellar position	48.8%
Femoral valgus angle	5.5 ˚

Femoral valgus angle was translated by 1.13 ˚ with 10% migration of patellar ML position

Corrected valgus angle = (56.1-x) × 0.113 + y

x: patellar ML position (%)

y: measured angle (degrees)

Error in femoral valgus angle (Uncorrected)

	IR20	IR10	0	ER10	ER20
＜2°	21%	75%		79%	30%
2–3°	39%	18%		15%	33%
＞3°	40%	7%		6%	37%

Error in femoral valgus angle (Corrected)

	IR20	IR10	0	ER10	ER20
＜2°	91%	93%	100%	92%	88%
2–3°	6%	6%	0%	8%	11%
＞3°	3%	1%	0%	0%	1%

Conclusion

1 The patellar ML center and the angle between the mechanical and anatomical axes are altered with limb rotation.

2 The method to correct the angle according to the patellar ML position can be used to reduce the measurement error, which reflects the proper angle in the true AP view.

References

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