Correlation of Knee and Hindfoot Deformities in Advanced Knee OA: Compensatory Hindfoot Alignment and Where It Occurs

Adam A. Norton BA, John J. Callaghan MD, Annunziato Amendola MD,
Phinit Phisitkul MD, Siwadol Wongsak MD, Steve S. Liu MD,
Catherine Fruehling-Wall BA

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膝OA患者における膝と後足部変形の関連性：代償的な後足部のアライメントについての解釈

対象：TKAが施行された324例、401膝を対象とした。
測定項目：後足部のアライメントと膝のアライメント。

Fig. 1 Saltzman hindfoot angle is shown. We defined a middiaphyseal point of the tibial shaft by bisecting the tibia at a distance of 15 cm proximal to the tibiotalar joint (Point A). Point B is defined as the center of the talar dome. Point C is defined as the most distal point of the calcaneus that intersects a line parallel to the reference block (ie, the floor).

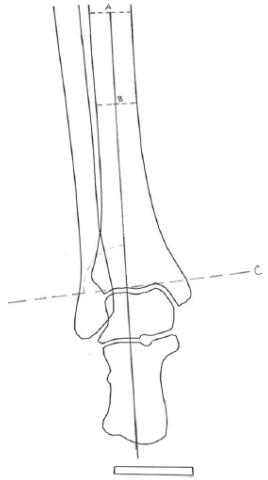


Fig. 2 Anatomic lateral distal tibial angle is shown. We defined the middiaphyseal axis of the tibia by bisecting the tibia at a distance of 15 cm proximal to the tibiotalar joint (Point A) and at a distance of 10 cm proximal to the tibiotalar joint (Point B) and extended the line distally. Line C is defined as the tibial joint line axis.

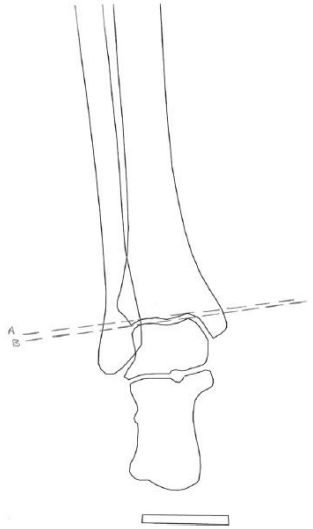
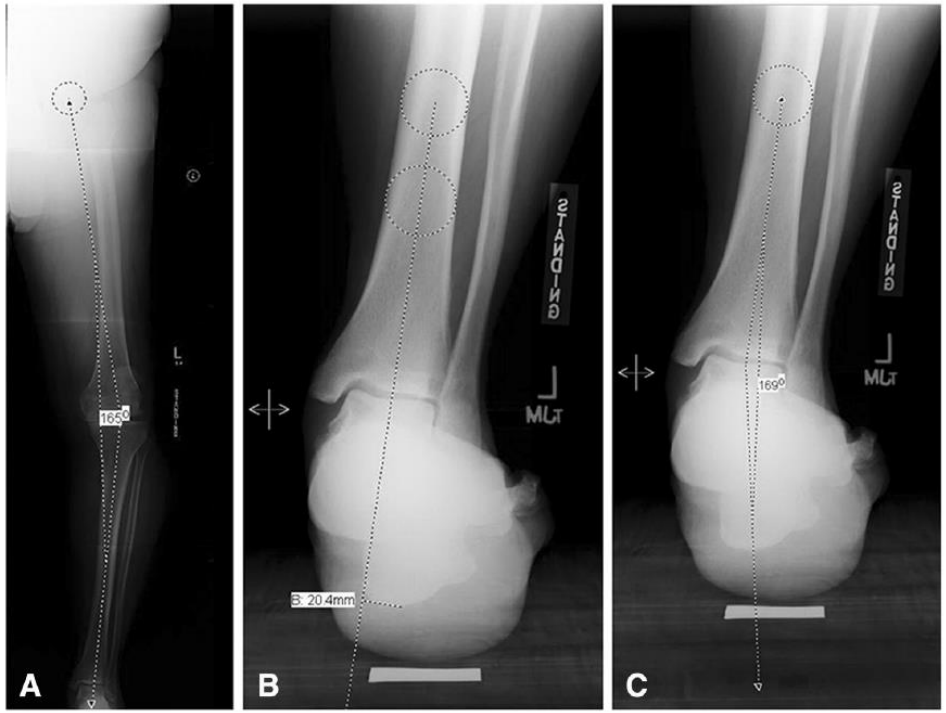


Fig. 3 Ankle line convergence angle is shown. The ankle JLCA is defined as the angle formed between the tibial joint line axis and the talar joint line axis. Line A is defined as the tibial joint line axis. Line B is defined as the talar joint line axis.

Table 4. Relationship of mechanical axis and hindfoot angle

Mechanical axis	Total	Saltzman (mm) correlation (p value)	Hindfoot angle correlation (p value)
Knee deformity†	401	−0.464* (< 0.001)	−0.413* (< 0.001)
≥ 10° knee deformity	185	−0.610* (< 0.001)	−0.536* (< 0.001)
≤ 9° knee deformity	216	−0.125 (0.066)	−0.093 (0.174)

* Correlation is significant at the 0.01 level; †all deformities.



15°varus　　20.4 mm valgus　　11°valgus

Fig. 6A–C (**A**) Mechanical axis alignment shows varus knee deformity. (**B**) Saltzman hindfoot measurement, in the same patient as **A**, shows valgus hindfoot compensation. (**C**) Saltzman hindfoot angle, in the same patient as **A**, shows valgus hindfoot compensation.

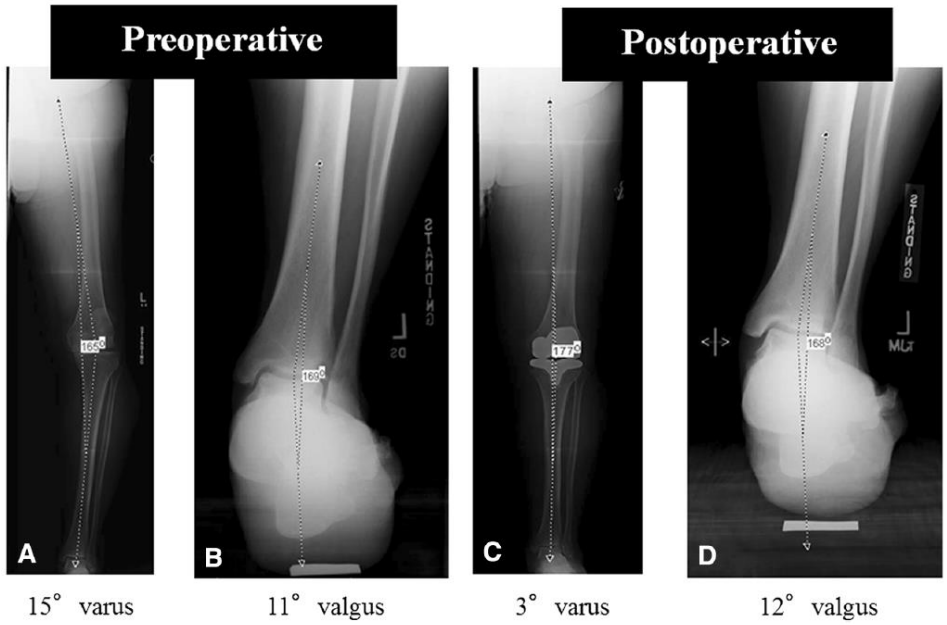
内反膝に対しては後足部は外反、外反膝に対しては後足部は内反の相関を認めた。特に変形が10度以上のOAに関して相関係数が高かった。

Table 5. Correlation of the hindfoot angle with anatomic lateral distal tibial angle, ankle line convergence angle, and the subtalar joint

Variable	Total	Anatomic lateral distal tibial angle correlation	Ankle line convergence angle correlation	Subtalar joint correlation
Hindfoot angle†	378	0.450*	0.319*	0.848*

* Correlation is significant at the 0.01 level; †all deformities.

後足部の角度とST関節の関連性が最も高かった。後足部の変形にはST関節が最も関連している。



後足部は中間位がいい理由は？
筋出力は？外反拇趾との関連性は、内側縦アーチとの関連性は？

Fig. 7A–D This patient has varus preoperative deformity (**A**, preoperative), valgus hindfoot deformity (**B**, preoperative), and a stiff subtalar joint. Post-TKA (**C**, postoperative) demonstrates persistent subtalar valgus deformity (**D**, postoperative), which became more clinically apparent and symptomatic.