



Supplementary Material

10.1302/0301-620X.102B10. BJJ-2020-1166.R1

Table i. Definitions of anatomical points.

Centre hip (all)	The geometric centre of the femoral head.
Centre knee (all)	Centre of the surgical epicondylar axis.
Distal femoral condylar point (all)	The most distal point of the medial and lateral femoral condyles. ¹
Posterior femoral condylar point (all)	The most posterior point of the lateral femoral condyle, relative to the surgical epicondylar axis.
Medial femoral epicondyle (all)	Point at the deepest part of the medial femoral epicondyle sulcus.
Lateral femoral epicondyle (all)	Most prominent point of the lateral femoral epicondyle.
Femoral shaft (native knee)	Two peripheral outlines around the distal shaft of the femur – the most anterior points of these in the femoral anteroposterior (AP) axis were chosen and this defined the vectors of the femoral shaft.
Femoral pegs (TKA and bi-UKA)	Peripheral outline around the pegs at two points in the transverse plane; the centre of these two points define the direction of the pegs in three planes.
Medial tibial condyle centre (native knee)	The most distal part of the tibial joint surface. ²
Lateral tibial condyle centre (native knee)	The a) highest point in a convex lateral tibial joint surface, or b) lowest point in a concave lateral tibial joint surface, or c) geometric centre of the joint surface in a flat lateral tibial joint surface. ^{1,2}
Tibial slope, Medial and Lateral (native knee)	In the plane defined from the mechanical axis and anterior posterior (AP) axis of the tibia at the condyle centre, the highest points anteriorly and posteriorly define the native slope.
Medial tibial condyle (TKA)	Medial rim of the underside of the tibial tray at half the AP length.
Lateral tibial condyle (TKA)	Lateral rim of the underside of the tibial tray at half the AP length.
Tibial anterior (TKA)	Anterior edge of the bone interface on the inferior surface of the tibial tray.
Medial tibial condyle centre (bi-UKA)	The centre of the medial tibial tray, anterior to posterior and medial to lateral (in respect to the tray's orientation).
Lateral tibial condyle centre (bi-UKA)	The centre of the lateral tibial tray, anterior to posterior and medial to lateral (in respect to the tray's orientation).
Tibial intercondylar axis (all)	The line between the medial and lateral condyle centres (equivalent to posterior condylar axis in TKA).
Tibial implant plane (bi-UKA)	An AP axis for each tibial tray was defined from the inside straight edge. Four points (anterior, posterior, medial and lateral) were defined on the inside edges of the tibial tray. A plane was

	defined from these points and corrected to the AP line to define a reference system for the tibial trays.
Centre tibia (all)	The geometric centre of the tibia at the level of the proximal tip of the fibular head.
Centre ankle (all)	The geometric centre of talus at the level immediately distal to the distal tip of the medial malleolus.
Centre PCL (all)	Midline drawn through the PCL insertion.
Tubercle centre (all)	Centre of a peripheral outline of the tibial tubercle between the medial and lateral boundaries.

AP, anteroposterior; bi-UKA, bi-unicompartmental arthroplasty; PCL, posterior cruciate ligament; TKA, total knee arthroplasty.

Table ii. Definition of axes and angles used in determining coronal, sagittal and axial alignment.

Femoral coronal angle (MDFA)	The medial angle in the coronal plane between the femoral mechanical axis and the femoral joint line.
Femoral sagittal angle	Sagittal angle of the femoral shaft (native knee)/femoral peg (TKA, bi-UKA) with the mechanical axis of the femur. Peg angles were corrected for respective implant designs.
Femoral axial angle	Axial angle of the posterior condyle axis to surgical epicondyle axis
Tibial coronal angle (–MPTA)	The medial angle in the coronal plane between the tibial mechanical axis and the tibial joint line.
Tibial sagittal angle, medial or lateral	Sagittal angle of the tibial AP axis with respect to slope of medial or lateral condyle.
Tibial axial angle	The perpendicular of the tibial intercondylar axis to the tibial AP axis.
HKAA	MDFA + MPTA

AP, anteroposterior; bi-UKA, bi-unicompartmental arthroplasty; HKAA, hip-knee-ankle angle; MDFA, medial distal femoral angle; MPTA, medial proximal tibial angle; TKA, total knee arthroplasty

References

1. Fu J, Wang Y, Li X, et al. Robot-assisted vs. conventional unicompartmental knee arthroplasty: Systematic review and meta-analysis. *Orthopade*. 2018;47(12):1009–1017.
2. Paley D. Normal Lower Limb Alignment and Joint Orientation. In: Paley D, ed. *Principles of Deformity Correction*. Berlin, Heidelberg: Springer, 2002:1–18.