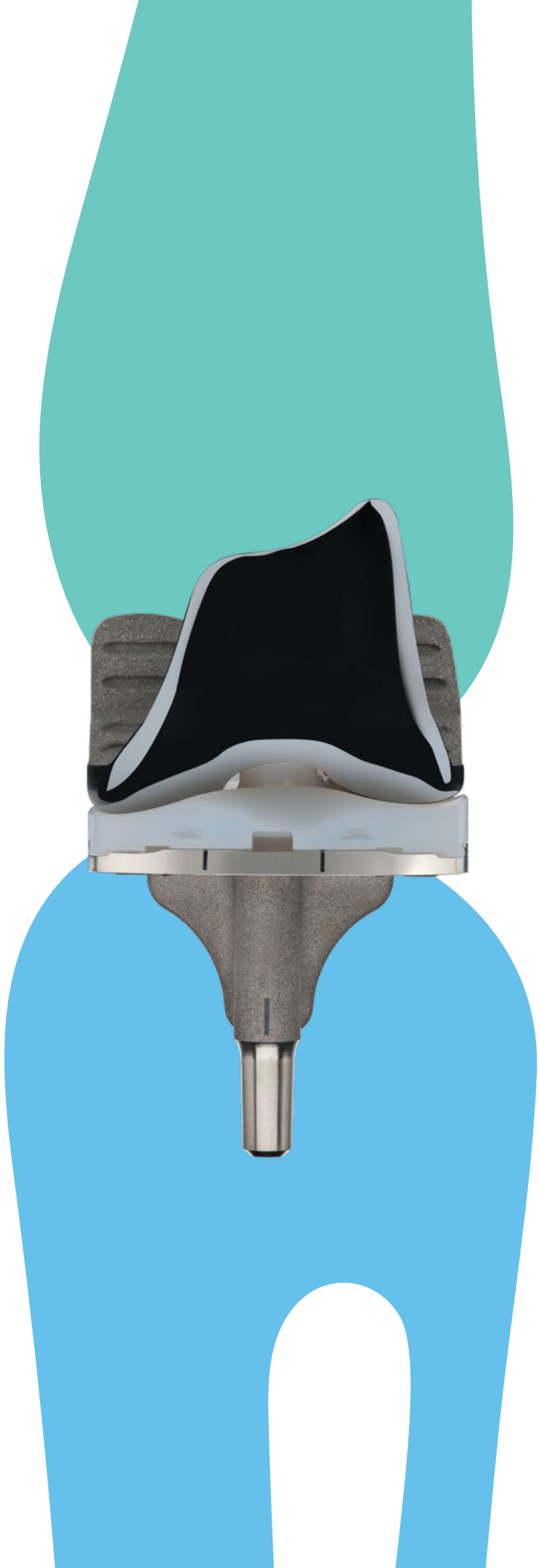


JOURNEY II TKA vs Kinematic alignment

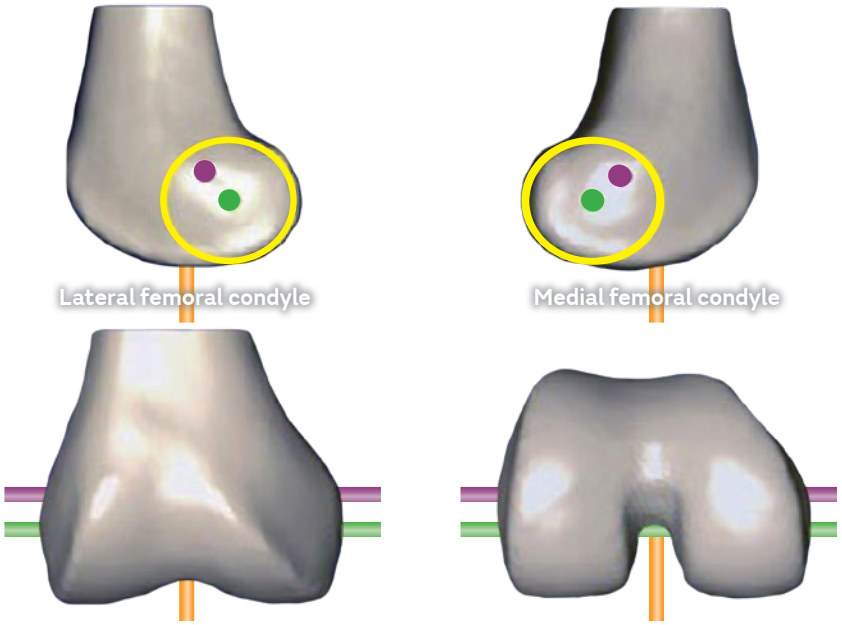
Smith+Nephew

JOURNEY◊ II TKA
Total Knee Arthroplasty

Kinematic Alignment 101

The use of kinematic alignment began in 2006 with the goal of improving patient outcomes by restoring the native anatomy and more closely matching the kinematics found in the normal knee. These improvements are thought to be done by aligning the implant with the three kinematics axes of the knee.[1,2]

Three kinematic axes of the knee



- Transverse axis in the femur about which the tibia flexes and extends (Green axis)
- Transverse axis in the femur about which the patella flexes and extends (Purple axis)
- Longitudinal axis in the tibia about which the tibia internally and externally rotates on the femur (Orange axis)

Figure A. Image taken from Howell et al, 2012[1]

Simply put, the goal of kinematic alignment is to "shape-match" the implant to the articular surface by way of Equal Measured Resection. This is when the thickness of the distal and posterior bone resections equal the thickness of the condyles of the femoral component.

This "shape-matching" is not possible when using traditional Mechanical Alignment with a symmetric implant. This is because the native knee does not have a neutral joint-line like a symmetric implant.[1,2]

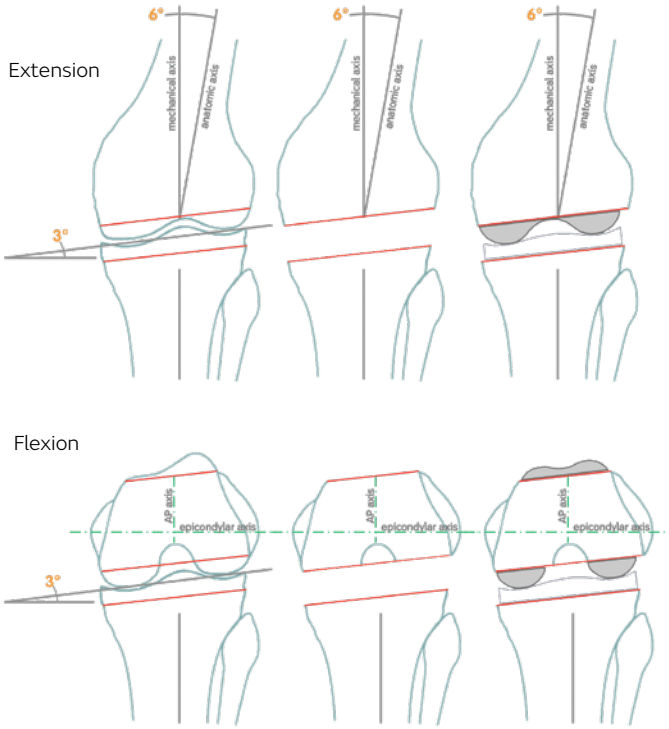
So what needs to happen in order to replicate the joint-line of the native knee with a symmetric implant?

Femur

- Cut in ~3° of valgus to replicate the normal, asymmetric joint-line of the femur[1]
- Rotate the femur 3° from epicondylar axis (or parallel to the Posterior Condylar Axis) to match the posterior offset found between the medial and lateral condyles[1]

Tibia

- Cut in 3° of varus to replicate the normal joint-line of the tibia[1]



While this theoretically sounds like a good solution, literature often warns of the risks associated with aligning the knee more than 3° from the mechanical axis and the epicondylar axis.[3-10]

Risks of malalignment (>3°)

Varus/valgus malalignment[3-6]
(>3° from mechanical axis)

Shows increased risks of:
- Collapse
- Instability
- Wear
- Pain
- Loosening

Femur malrotation[7-10]
(>3° from epicondylar axis)

Shows increased risks of:
- Pain
- Failure
- Patellar tracking issues
- Increased patellar contact forces

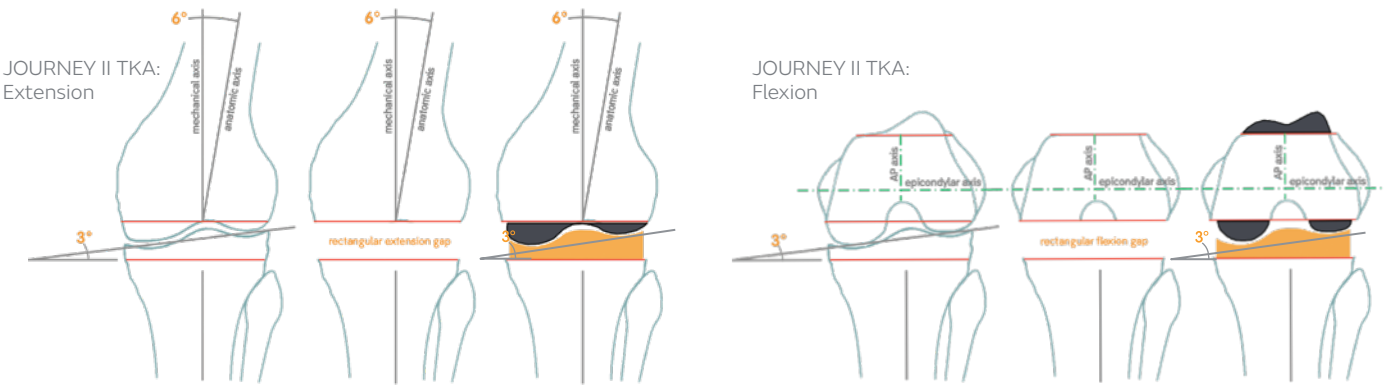
Does kinematic alignment actually improve the kinematics?

While the original goal of Kinematic Alignment was to improve the kinematics of the replaced knee, there is no literature that supports this. No matter how a symmetric implant is aligned, it simply cannot recreate the external rotation (medial pivot and lateral rollback) found in the normal knee. The only way to recreate the kinematics of the normal knee is to recreate both the Shapes and Position of the normal knee.

JOURNEY◊ II TKA – The marriage of kinematic and mechanical alignment

The unique features of JOURNEY II TKA are designed to restore the function of the normal knee by replicating the Shape, Position and Motion found in the normal human knee.[11-13] The normal Shapes and Position allow the surgeon to "shape match" without compromising on varus/valgus and rotational alignment because the design of the implant does the work instead of the cuts. The asymmetric thicknesses found in both the femur and tibia are designed to recreate the 3° varus joint-line while still aligning with the mechanical axis and setting femoral rotation off the epicondylar axis.[14] The Mechanical Axis has continued to be the gold standard in TKA since it was first recommended by Dr. John Insall in the 1980's.[15-16]

- Kinematic alignment: Achieves 3° joint line through cuts
- JOURNEY II TKA: Achieves 3° joint line through implant design



The above shows how JOURNEY II TKA "shape matches" without compromising on overall alignment. This can reduce the risks of early failure associated with malalignment that includes collapse, wear, loosening, instability, pain, patellar tracking issues and increased patellar contact forces.[3-10] In addition to restoring the joint-line and unlike other symmetrically designed implants, JOURNEY II TKA also provides the Shape and Position to restore normal kinematics.[11,12]

For detailed product information, including indications for use, contraindications, precautions and warnings, please consult the product's Instructions for Use (IFU) prior to use.

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