



Achieving normal
kinematics

 **smith&nephew**

JOURNEY[◊] II CR

Cruciate Retaining
Knee System

Supporting healthcare professionals

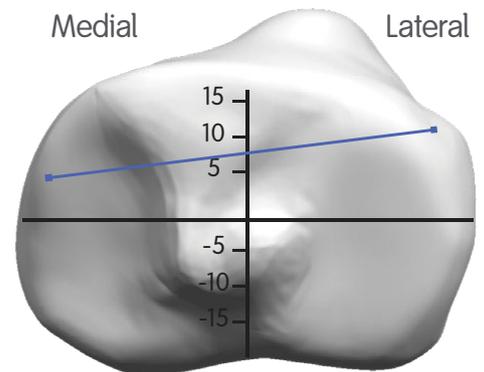


Can JOURNEY[◇] II CR achieve normal kinematics?

This is a common question asked in regards to JOURNEY II CR. But first we need to understand how the normal knee achieves its kinematics throughout its range of motion.^{1,2}

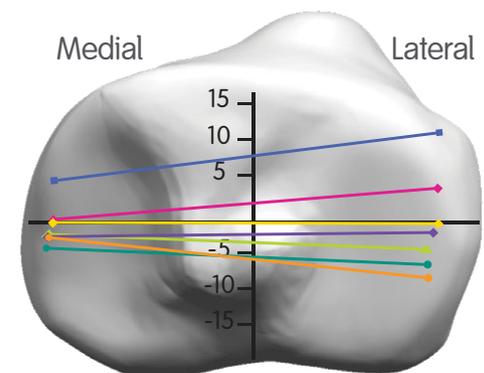
Extension: 0°

In extension the femur sits roughly in 5° of internal rotation relative to the tibia, this is known as Screw-home position and allows the knee to be very stable in extension. Also, the posterior condyles of the femur line up with the posterior edges of the tibia.



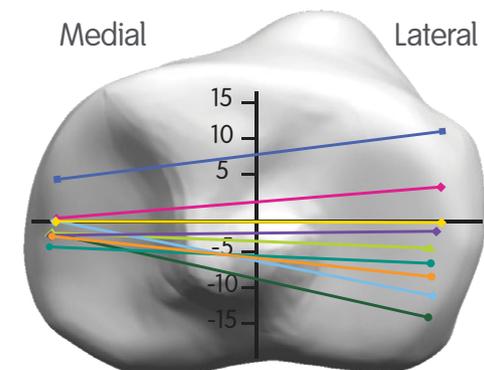
Mid-Flexion: 1-90°

As the knee flexes, the PCL becomes tighter causing the femur to start rolling back. The medial side of the femur pivots while the lateral side rolls back. The shapes of the condyles then become big driving forces behind the kinematics of the healthy knee. The concave shape of the medial side promotes the pivot while the convex shape of the lateral side allows the lateral condyle to rollback.



Deep Flexion: 90°+

As the knee gets past 90°, the condyles translate posteriorly allowing the knee to get into deeper flexion without the femur impinging on the tibia.



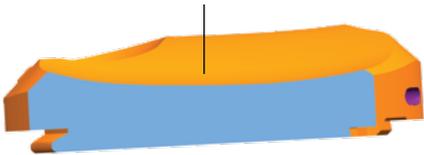


Now that we have an understanding of how the normal knee achieves its kinematics, let's look at how JOURNEY[◊] II CR achieves its kinematics.

Extension: 0°

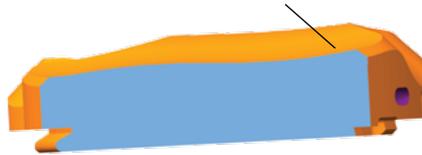
The JOURNEY II CR Insert is designed to allow the femur to sit in an anatomic AP position as well as in the Screw-home position similar to the normal knee.

Anatomically positioned medial sulcus

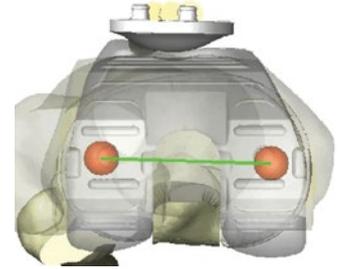


CR medial section
Medial insert sulcus positions femur anterior on tibia to prevent posterior overhang

Small anterior lateral lip



CR lateral section
Small anterior lateral lip designed to allow anterior translation of lateral femoral condyle for screw home



Mid-Flexion: 1-90°

As the knee begins to flex, a properly balanced PCL will start to get tighter and cause the femur to roll back.^{1,2} Because JOURNEY II CR was designed with concave medial and convex lateral plateaus, the knee starts to pivot on the medial side and rollback on the lateral side as it goes through its range of motion.

Posterior medial lip

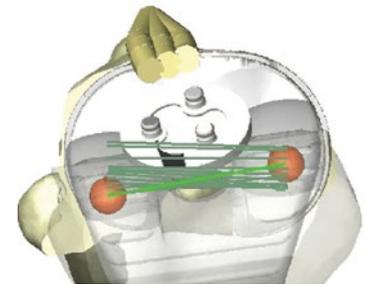


CR medial section
The design of the posterior medial lip provides resistance to femoral posterior medial rollback, allowing the medial side to pivot

Posterior lateral slope

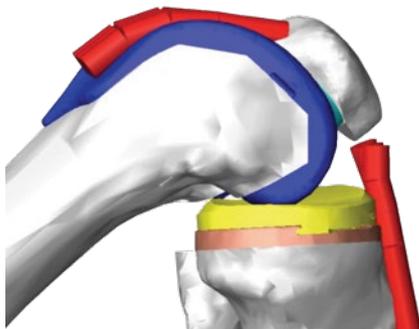


CR lateral section
The design of the posterior lateral slope encourages lateral posterior rollback and results in external femoral rotation

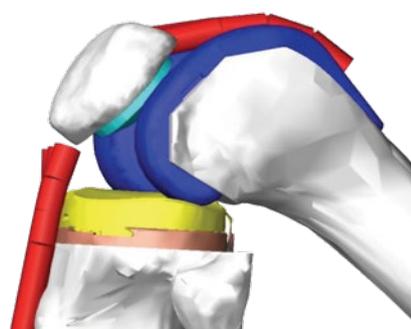


Deep Flexion: 90°+

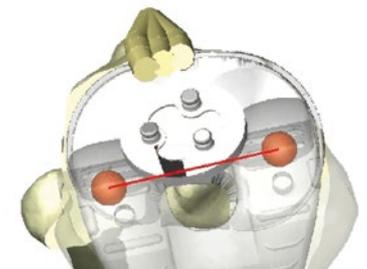
Past 90°, a properly balanced PCL causes posterior femoral translation of the condyles allowing the knee to achieve deep flexion.^{1,2} The 3° posterior offset allows the femur to retain proper external femoral rotation in deep flexion.



Medial View



Lateral View



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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References

1. Johal P, et al. "Tibio-femoral movement in the living knee." Journal of Biomechanics. 38(2): 269-76. 2005. 2. Harfe DT, et al. Elongation patterns of the collateral ligaments of the human knee. Clin Biomech. 1998 Apr;13(3):163-175.