Rediscover normal

Smith+Nephew

JOURNEY◊ II
Total Knee Arthroplasty

Product overview

JOURNEY◊ II
Total Knee Arthroplasty

Rediscover normal:
JOURNEY◊ II TKA

JOURNEY II TKA is designed to restore normal shapes, position and motion[1-5] to help patients rediscover their normal through a smoother recovery[+*6,7], improved function[*7-11] and higher patient satisfaction.[*7-9,12]

- **+ Normal shapes**
- **+ Normal position**
- **+ Normal motion**

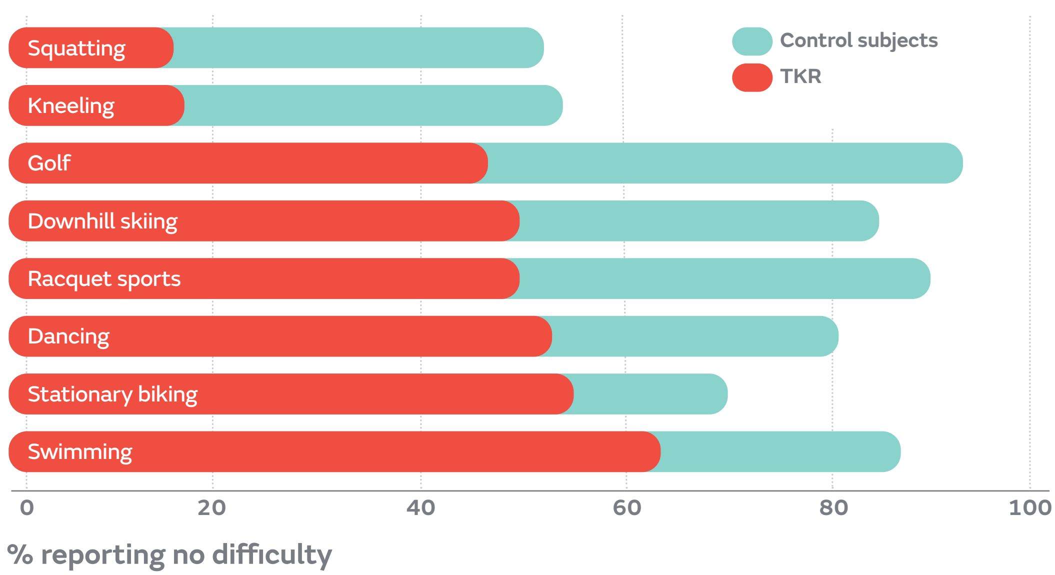
Patient dissatisfaction after total knee replacement

Although total knee replacement has proved to be a successful treatment for improving pain and function, patients still report unmet levels of satisfaction, experience functional limitations and demonstrate increased difficulties doing daily activities compared to a healthy cohort. These deficits in patient satisfaction are even higher with more athletic and demanding activities.[13,14]

>50%

report **some degree of limitation** to their functional activities.[13]

Patient difficulties in daily activities post-TKR[13]



20%

of total knee replacement patients report **unmet levels of satisfaction.**[14]

Implant design impacts satisfaction and performance

Through studying patient outcomes and performance, it has been observed that the motion, or kinematics, of the knee changes after total knee replacement. The differences found in the kinematics between normal knees and today's TKA designs have a direct impact on the feel, function, and performance of a patient's knee replacement.[15-18]

Today's TKA designs simply do not recreate the kinematics found in the normal knee, leading patients to experience functional limitations and feel their "artificial" knee.[18]

The fact that many patients are unable to return to prior levels of function is partly attributable to differences in kinematics between the normal knee and current TKA designs[17]

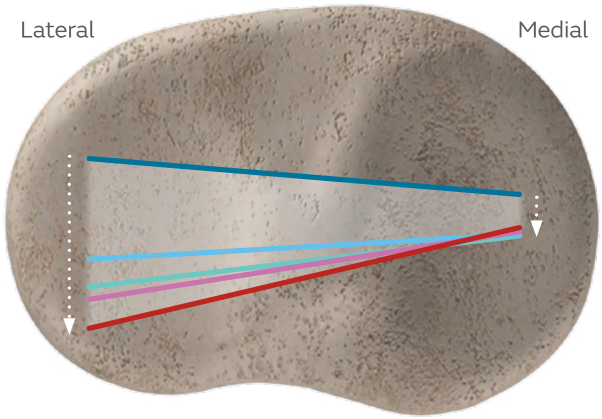
80%

of TKA patients report their knee feels **"Artificial"**[18]

Normal knee kinematics

In order to understand patient dissatisfaction in total knees, it is important to understand what the normal knee looks like and how it works. The normal, healthy knee has unique shapes and positions that allow it to move and function the way it does.[4,19]

Studies on knee kinematics show that as the knee flexes, the femur externally rotates on the tibia. This external rotation is a result of the geometries of the medial and lateral sides of the tibia. The medial surface of the tibia is concave and restricts the amount of translation, causing the **medial femoral condyle to demonstrate a pivot-like motion.** However, the lateral surface of the tibia is convex and allows **the lateral femoral condyle to rollback posteriorly.**[4,19]

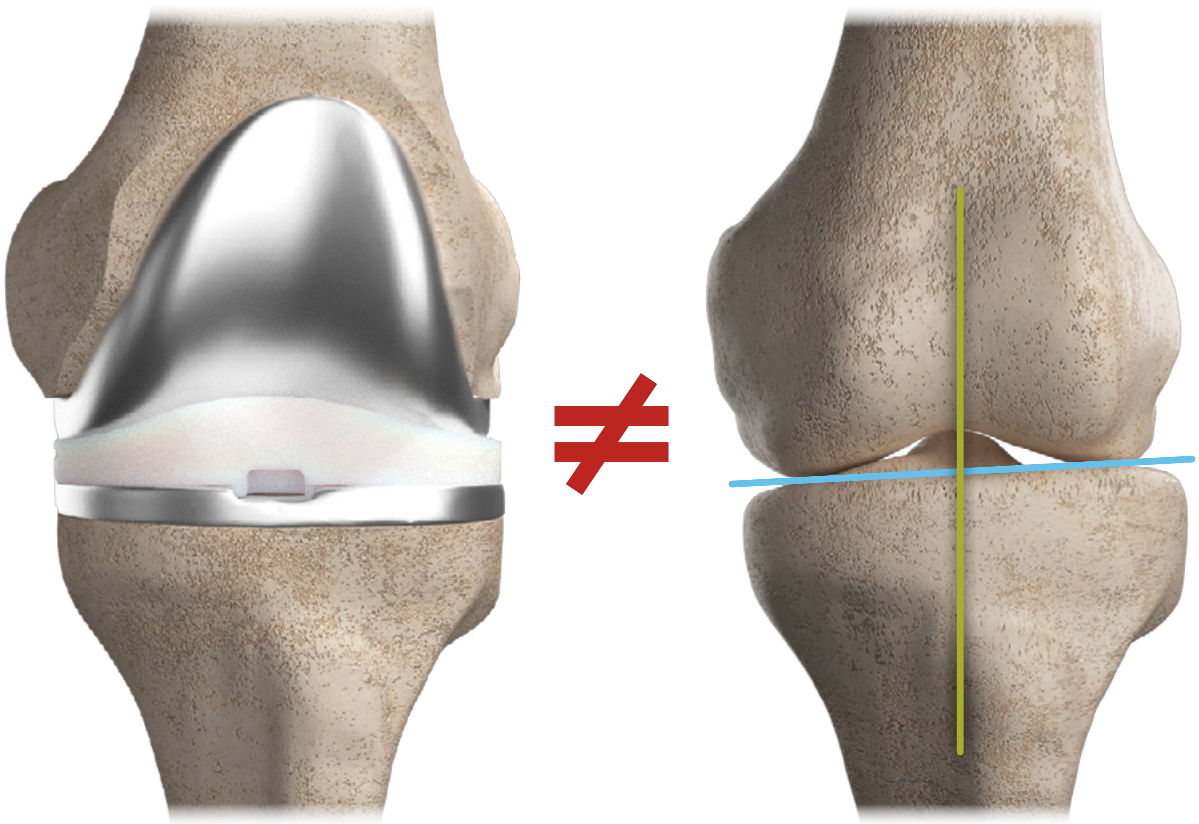


Why do the kinematics change after total knee replacement?

Implant design.

All TKA designs are essentially the same: symmetric and non-anatomic. These designs do not replicate the kinematics found in the normal knee because they do not replicate the shapes or positions of the normal knee.[20-22]

- Symmetric shapes and thicknesses (distal and posterior) of the femoral component lead to a non-anatomic, 0° joint line.[20-22]
- Femoral component sits in a non-anatomic posterior position on the tibia resulting in paradoxical motion and decreased muscular efficiency.[20-22]
- Lateral surface of the tibia insert has non-anatomical concave shape.[20-22]

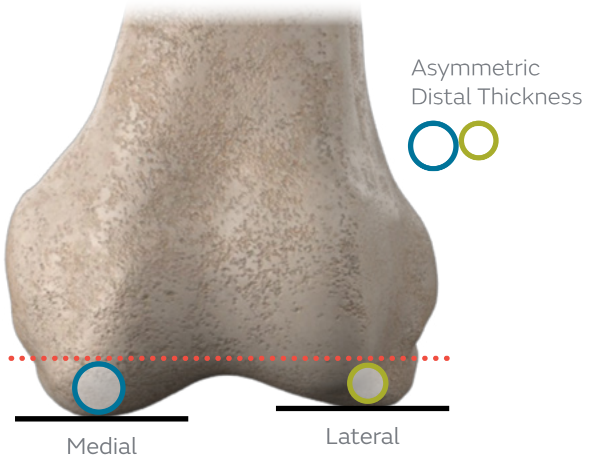


Normal Knee vs Current TKA
Shape

Normal knee[4,19]

Femur

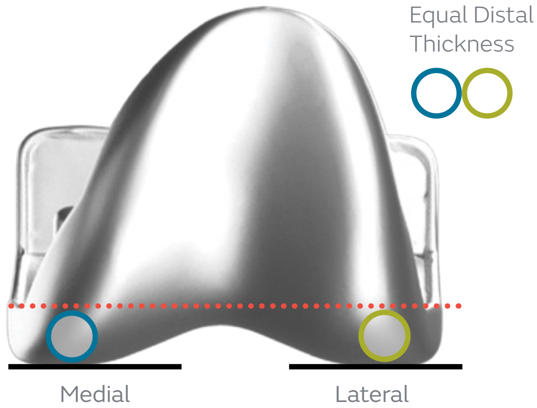
The **medial condyle is thicker and rounder** than the lateral condyle



Current TKA[7,20-23]

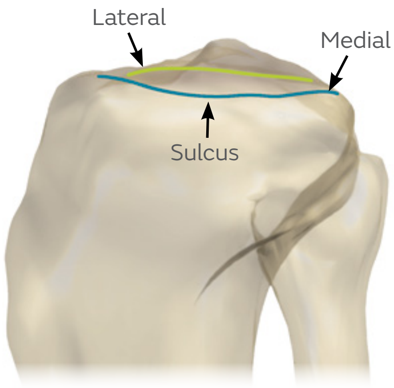
Femur

The medial and lateral sides of the femoral component have **symmetric** distal and posterior condyles that are identical in thickness.



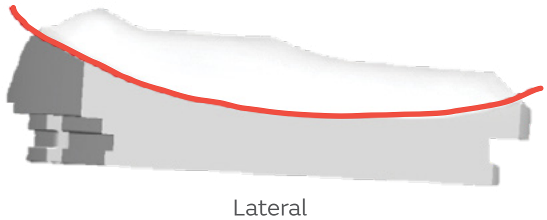
Tibia

- Opposite of the femur, the lateral side of the tibia is thicker than the medial side
- Medial surface of the tibia is **concave** while the lateral surface is **convex**



Tibia

- Medial surface the **same thickness (symmetric)** as lateral surface
- Lateral surface of the tibia has **non-anatomical concave shape**

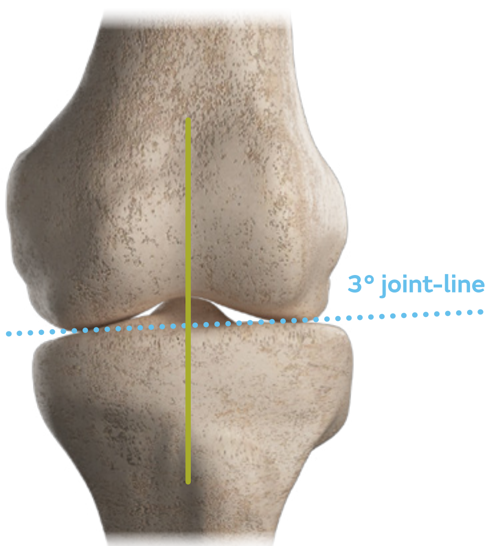


Normal Knee vs Current TKA Position

Normal knee[4,19]

Joint line

When the asymmetric shapes of the femur and tibia are combined, they create a natural 3° varus joint line in the average knee.



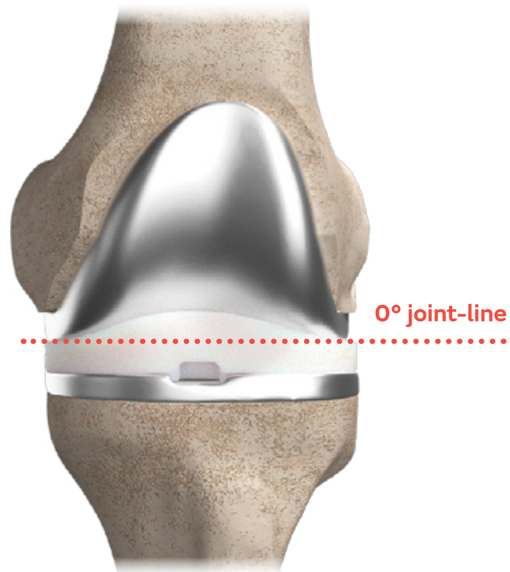
A/P Position

The tibia has a **midline sulcus position** that causes the posterior femur to sit in-line with the posterior tibia with little to no overhang.

Current TKA[7,20-23]

Joint line

Non-anatomic, 0° joint line created by the symmetric shapes and thicknesses of the femur and tibia.



A/P Position

Tibial insert has been designed with a more **posterior sulcus position** in order to get better flexion. This causes the femur to overhang the tibia.

Normal

DePuy Attune™

Normal Knee vs Current TKA Motion

Because TKA designs do not replicate the shapes and position of the normal knee, it is not possible to replicate the motion of the normal knee. These TKA designs experience:

- Paradoxical motion[15,24]
- Little to no external rotation throughout flexion[15,24]

Normal knee[4,19]

0° (Full extension)

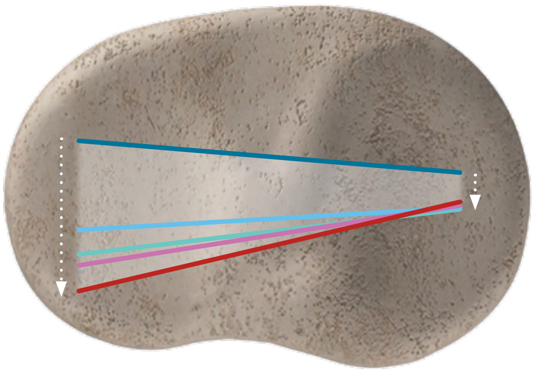
- Screw-home (5° femoral internal axial rotation)
- No posterior femoral overhang

1-90° (Mid flexion)

- Minimal medial translation (medial pivot)
- Lateral posterior rollback and external rotation

90-155° (Full flexion)

- Posterior femoral translation
- External axial rotation retained



Current TKA[20-23]

0° (Full extension)

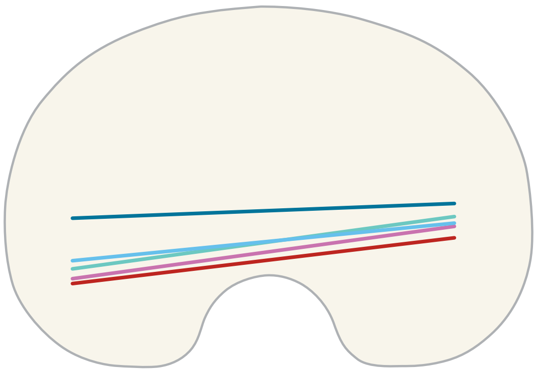
- No Screw-home to provide stability in extension
- Posterior sulcus position causes the femur to overhang the tibia posteriorly

1-90° (Mid flexion)

- **Paradoxical motion** is caused by the posterior position of the femoral component
- Femoral external axial rotation resisted by the concave surfaces of both the medial and lateral tibia (limited lateral rollback)

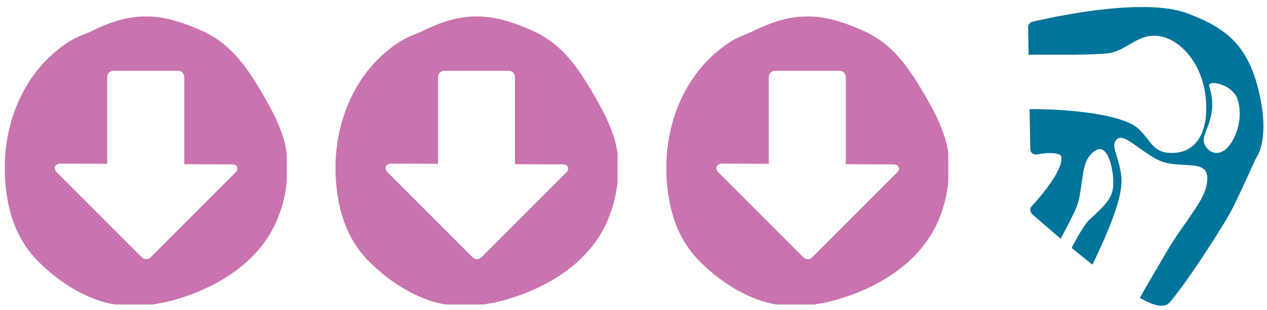
90-155° (Full flexion)

- Femoral component abnormally rotates internally and aligns with symmetric insert



Symmetric, non-anatomic shapes and positions lead to changes in:

Gait cycle[9,25-29]



Velocity

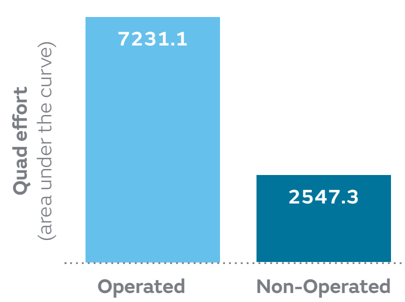
Stride length

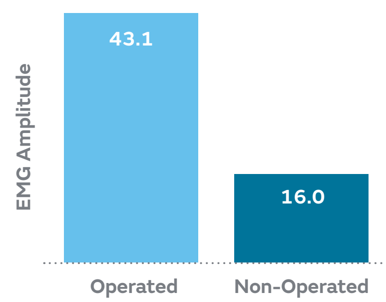
Max knee flexion
during stance and swing phases

Mid-stance knee flexion
(Quad avoidance gait)

Muscle efficiency[30]

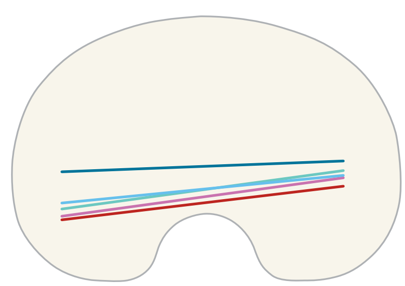
3x
more quad effort on operated side





Knee kinematics[15,24]

- More Posterior starting position than normal knee
- Paradoxical motion -> mid-flexion instability
- Little to no external rotation during flexion



Rediscover normal: JOURNEY◊ II TKA

Van Onsem et al. stated, "Reproduction of optimal kinematic patterns during TKA could be instrumental in improving patient satisfaction after total knee replacement."[16] The solution to providing patients with better overall satisfaction and functionality is to design an implant as close to the normal knee as possible. JOURNEY II was designed to do just that.

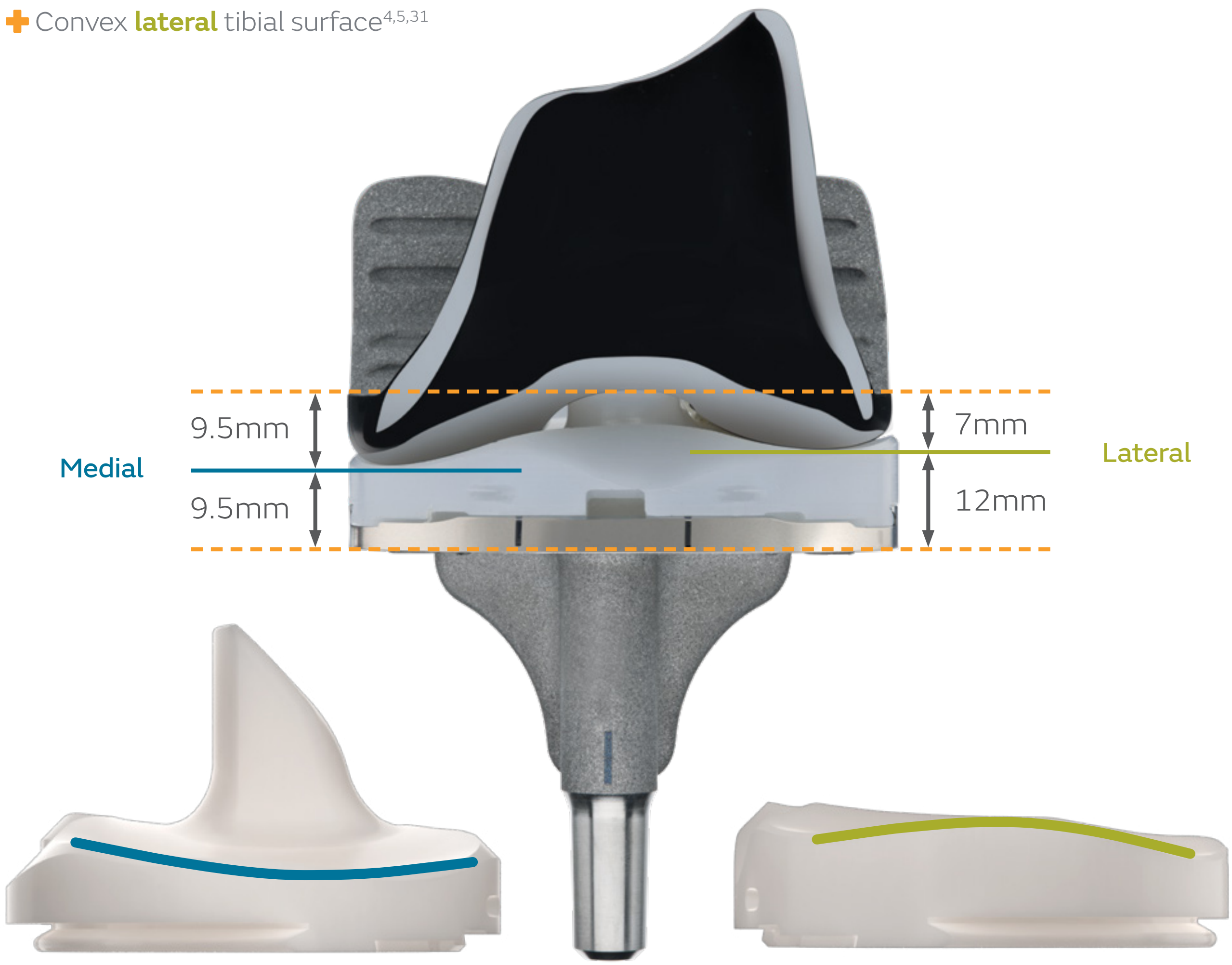
Normal shapes + Normal position = Normal motion

JOURNEY II TKA has been demonstrated to restore anatomical shape, position and motion.[1-5] This anatomical restoration can provide superior clinical outcomes and higher patient satisfaction.[*6-9,11,13]

Normal shapes[4,5,8,31,32]

JOURNEY II TKA is designed to replicate the anatomic shapes found in the normal, healthy knee. These unique shapes include:

- Anatomic, asymmetric Femur/Tibia[4,5,8,31,32]
- Concave **medial** tibial surface[4,5,31]
- Convex **lateral** tibial surface[4,5,31]



Medial concavity promotes medial pivot motion patterns[4,5,31,32]

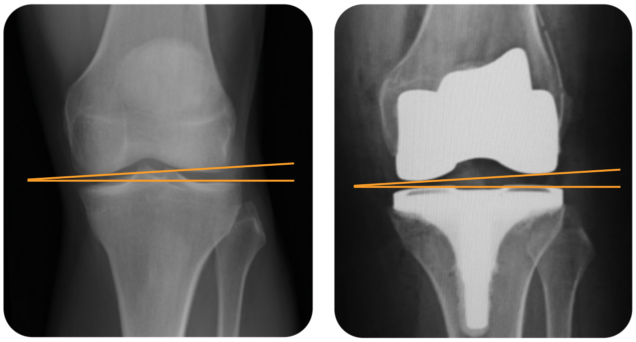
Lateral convexity promotes native rollback[4,5,31,32]

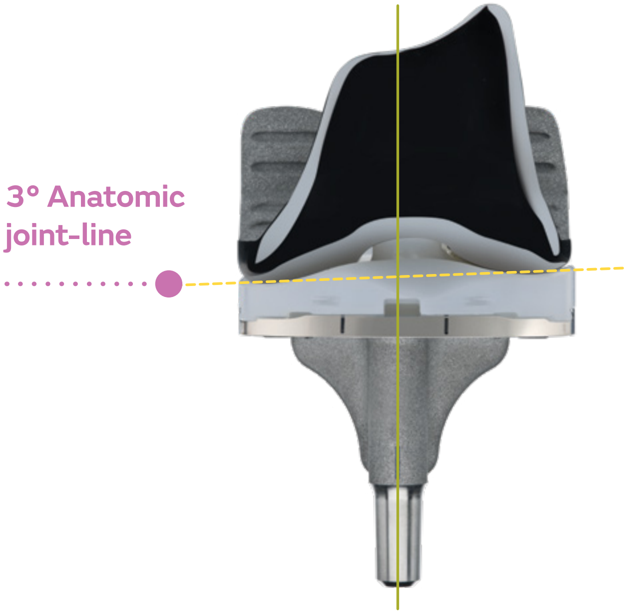
Normal position[3-5,7,9,31,33-36]

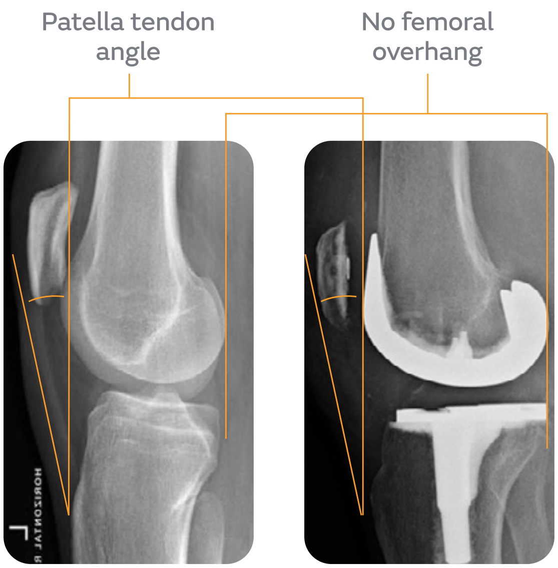
JOURNEY II TKA has also been designed to replicate the mid-line A/P position and 3° varus joint-line found in the normal healthy knee.

The replication of these positions:

- Helps prevent paradoxical motion[4,5,33]
- Promotes muscular efficiency throughout the range of motion[9,33-35]
- Enables natural patellar tracking[+3,7]
- Allows for more normal ligament tension[4,5,36]



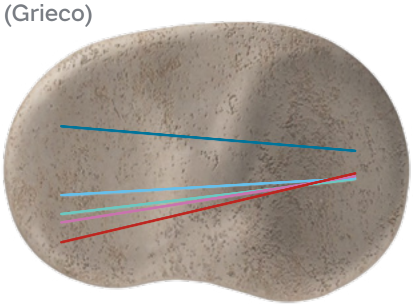




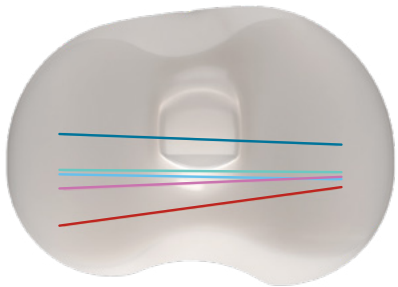
Normal
motion[1-5,8,31,33]

Combining the anatomical shapes and position of the normal knee, JOURNEY II TKA has been able to demonstrate the motion found in the normal knee.

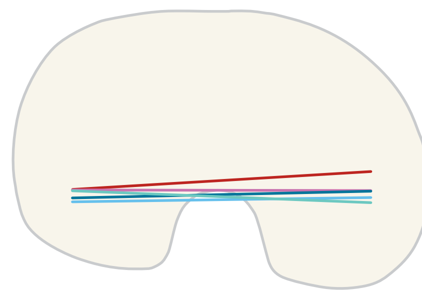
Native knee (left)
(Grieco)



JOURNEY II BCS (left)

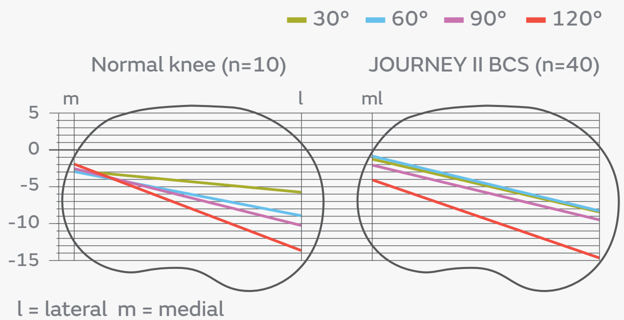


Persona™ MC (left)[20]



Grieco et al. published that JOURNEY II BCS exhibited:[4]

- Normal-like kinematic patterns and moved as designed under in vivo observation
- Similarities in early and late kinematic patterns with normal asymptomatic knees



Medial and lateral anterior-posterior positions exhibited in JOURNEY II BCS and normal knee subjects during a deep knee bend (mm) [+Anterior, -Posterior]

Iriuchishima et al. demonstrated that JOURNEY II BCS had no significant difference in rollback ratio or active knee flexion when compared to asymptomatic control knees and Oxford UKA knees.[1]

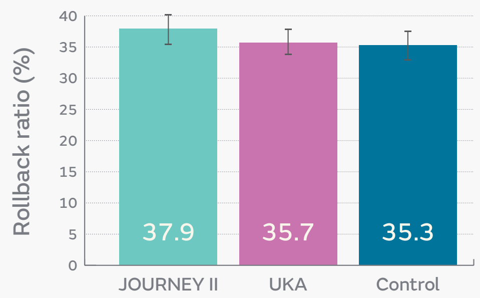


Figure. Rollback ratio (%) for JOURNEY II BCS, Oxford UKA and asymptomatic control knees

Rediscover normal: JOURNEY◊ II TKA

The anatomical shape of JOURNEY II TKA is designed to help patients rediscover their normal through a smoother recovery[+*6,7] improved function[*7-11] and higher patient satisfaction.[*7-9,12]

Smoother recovery

Improved function

Higher patient satisfaction

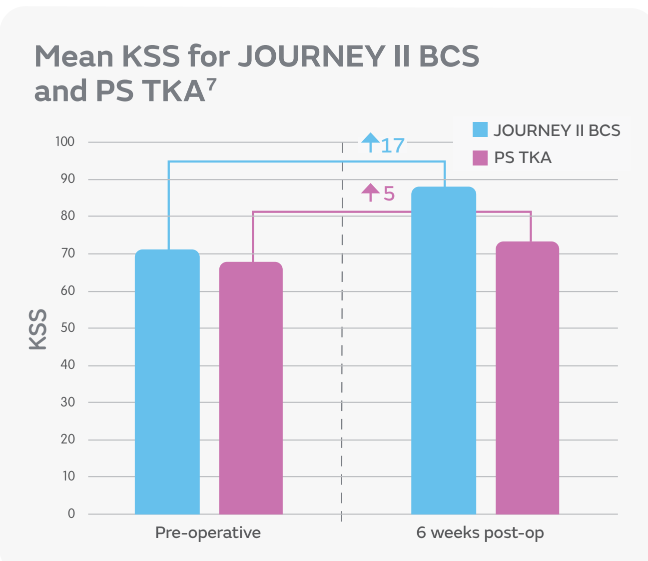
Smoother recovery[*6,7]

41% less likely to be discharged to a skilled nursing facility (p<0.0001)[*+6]

35% more likely to be discharged to home (p=0.0008)[*+6]

Significantly reduced hospital stay (p<0.0001)[*+6]

Improvements in Mean KSS for JOURNEY II BCS and PS TKA at 6 weeks.



Improving quadriceps function is important for limiting post-TKA functional deficits[37]

Compared to Attune® CR, JOURNEY II CR has shown improved muscle activation and muscle strength in the early recovery period[9]

Improved function[4-10]

Gait

JOURNEY II has demonstrated **significant improvements in gait** compared to other TKA designs.[9,34]

Significantly **longer step length** (p=0.03)[34]

Significantly **faster gait speed** (p=0.03)[34]

Significantly **greater maximum knee extension** moment (p=0.04)[34]

Significantly **improved knee flexion** during walking at 3 months post-TKA (p<0.01)[9]

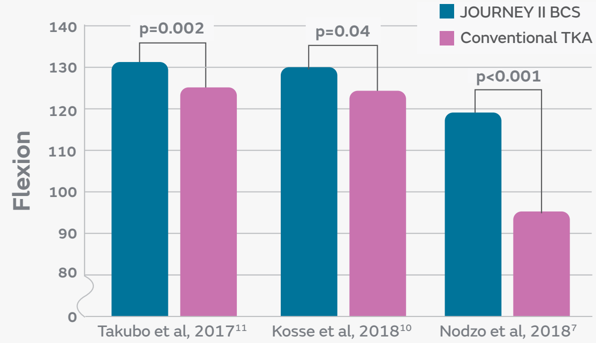
Significantly **improved external rotation** during walking at 3 months post-TKA (p<0.01)[9]

Physiological activation timing of investigated muscles at 3 months.[9]

Flexion

JOURNEY II BCS has shown greater maximal flexion than current TKA designs (Conventional TKA) at 1-year in several studies and a high mean range of motion in a multi-center case study.

Maximal flexion at 1-year compared with Conventional TKA



131°

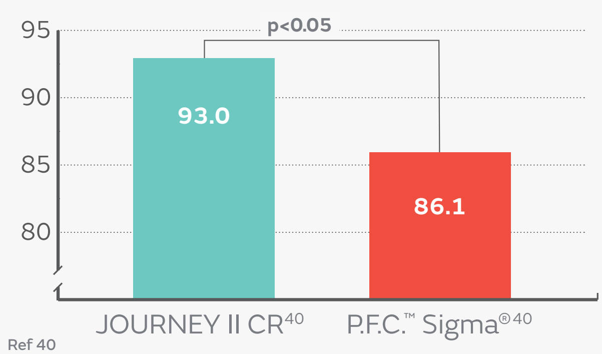
mean range of motion at 2 years post-op.[38]

Higher patient satisfaction[6,7,9,12]

"Patients reporting their artificial joint as 'natural' as opposed to 'artificial' are more likely to report higher rates of satisfaction and have higher outcome scores."[39]

JOURNEY II has shown significant improvements in Knee Society Scores at 1-year compared to other TKA designs.[7,40]

Mean Knee Society Scores at 12 months



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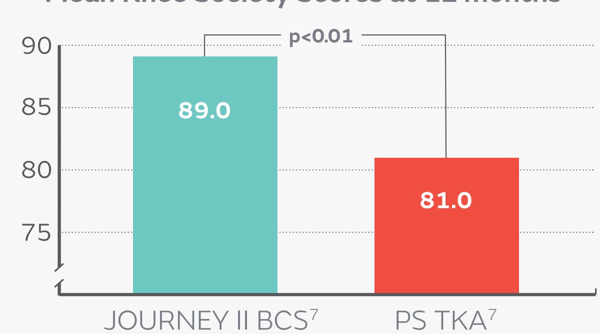
Mean Knee Society Scores at 12 months



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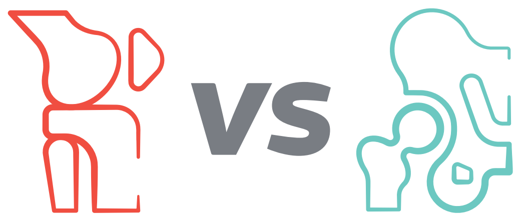
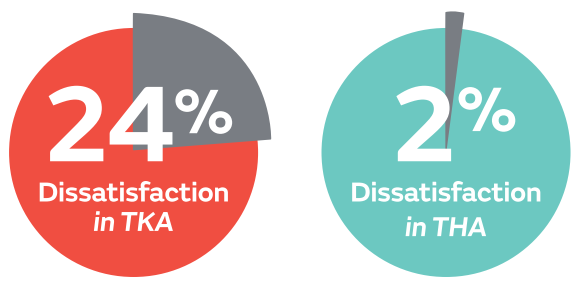


A recent study confirmed that patient satisfaction following TKA remains significantly ($p = 0.003$) lower when compared with THA[39]



Conversely, JOURNEY II has shown **similar outcomes and satisfaction** when compared with clinically similar **THA patients**[41]

No marked difference in...

- Overall satisfaction at 3 months or 1 year[41]
- Patient quality of life measures at 3 months or 1 year[‡41]

‡Time to return to work, time to return to activities of daily living or time to return to sport

*Compared to non-JOURNEY II knees
+Based on BCS evidence

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