

b-one
ORTHO



MOBIO™
Total Knee System

" **MOBIO™** is the result of many years of clinical and engineering experience throughout the world. I strongly believe this system will represent the new "standard of care" in total knee reconstruction. The system incorporates the single radius design, which has proven its merits in the Rothman Institute and elsewhere over the past decade. It will achieve a knee that provides enhanced stability, good range of motion, and superb function. In my experience, this knee design will have a "natural feel" and good longevity. The manufacturing processes and standards have incorporated the highest level of quality control. The instruments are carefully designed and surgeon-friendly. They should result in superior outcome for our patients, which is our universal goal."



Richard Rothman, M.D., Ph.D
Founder, The Rothman Institute



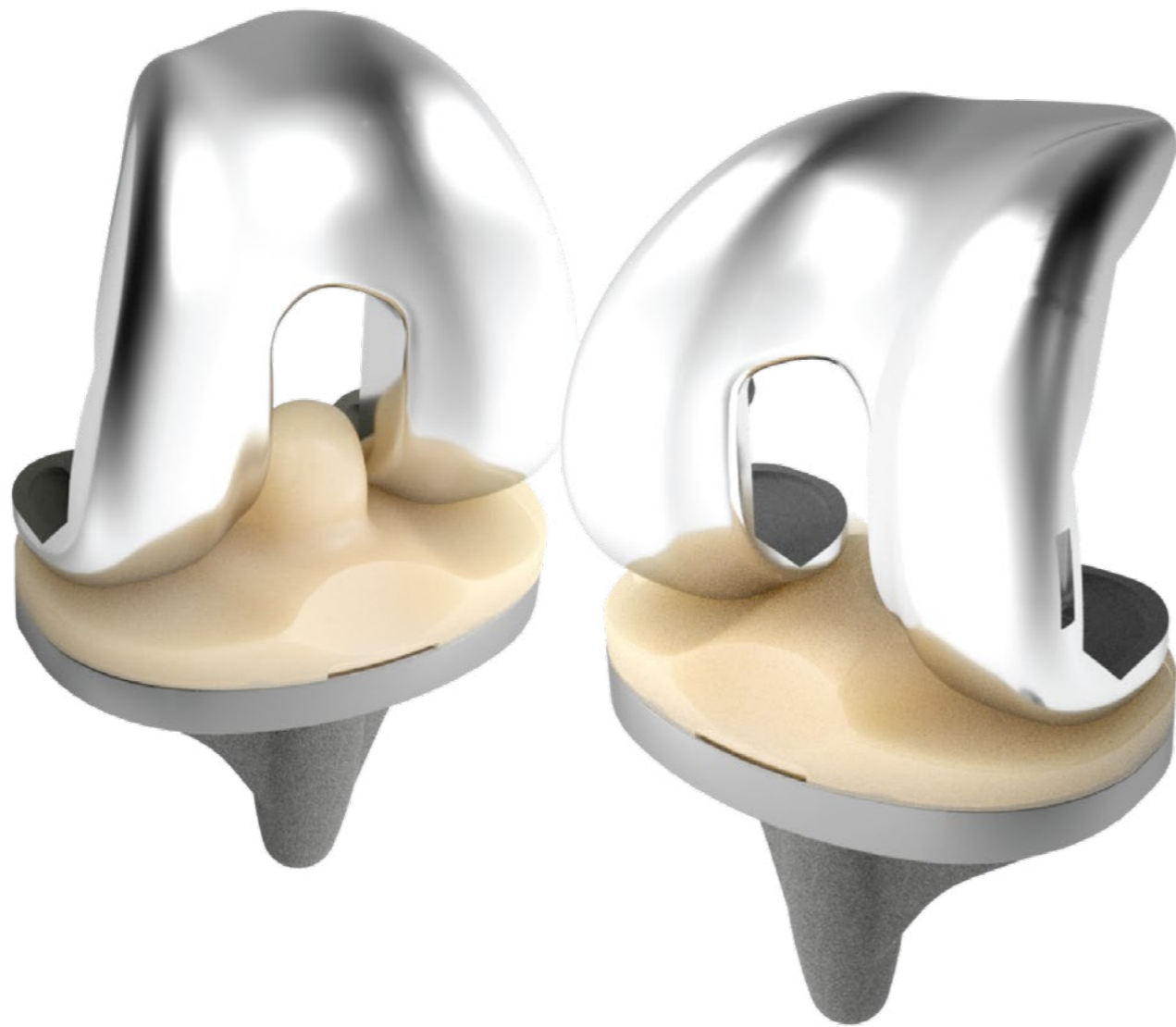
Design Goals of MOBIO™



Research shows that approximately 20% of the patients are still unhappy with their TKAs¹. **Mid-flexion instability** is one of the main contributing factors to dissatisfaction, resulting in unstable sensation during common daily activities such as stair climbing and raising from a chair. Patellofemoral complications, such as peripatellar pain and patella clunk, are also affecting post-op patient satisfaction in PS knees.

Apart from patient satisfaction, efficient, reliable and reproducible intra-operative experience, which is represented in the need of broad range of size options, size interchangeability, reduced risk of bone fracture, accurate bone resection and ease of use, have also been important factors for surgical outcome. **MOBIO™** Total Knee System aims to improve **both patient satisfaction** and **intra-operative surgeon experience**. Design objectives include:

- **Stable motion**
- **Better patellofemoral performance**
- **High level of interchangeability**
- **Accurate bone resection**
- **Efficient surgical procedure**



MOBIO™ Key Design Features



Single Radius Femur



Patello-Femoral Articulation



Bone-Conserving PS Box



Versatile Bearing Options



Robust Tibial Locking Mechanism



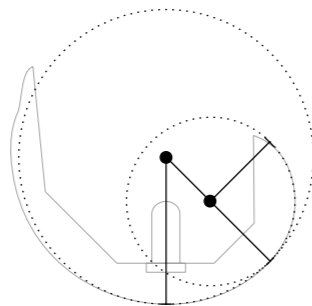
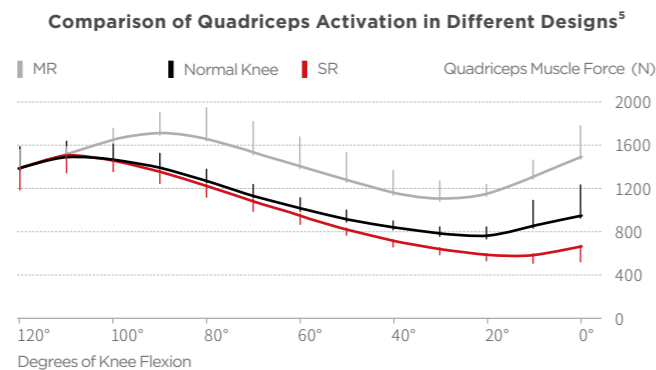
Extensive Tibiofemoral Compatibility



Efficient Instrumentation

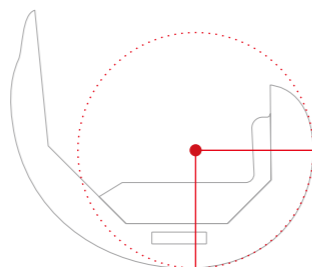
Theoretical Advantages of Single Radius Femur

Traditional theories believed that kinematics of the knee occurs in the sagittal plane and when viewed from an axis perpendicular to the sagittal plane, the instant center of rotation forms a **J-Curve**². Multi-Radius implants are developed with J-Curve as its underlying theory, which incorporates a larger radius at the distal part of the implant in order to provide stability in extension and smaller radius in flexion in order to provide rotational freedom, the stability of entire construct, however, is compromised due to the change in **geometry**³, which results in unstable sensation during daily activities such as gardening, stair-climbing and rising from a chair. In 1986, **Mark Kester (CSO of b-ONE)** et al. documented that the motion of the knee occurs about a fixed flexion/extension axis that is not perpendicular to the sagittal plane, the kinematics of the knee could be viewed as two somehow related motion of flexion/extension and **tibial rotation**⁴. Later studies confirmed that this axis coincides with epi-condylar axis. Compared to the traditional Multi-Radius knees, **MOBIO™** Single Radius design avoids change in ligament tension and resulting anterior shift of the femur, providing more **stable mid-flexion**. Meanwhile, single radius provides longer quadriceps lever arm which **enhances quadriceps muscle efficiency**, enabling patients to flex the knee more easily with reduced patellar pressure^{5,6}. Literature shows that patients with single radius knees show faster rehabilitation.



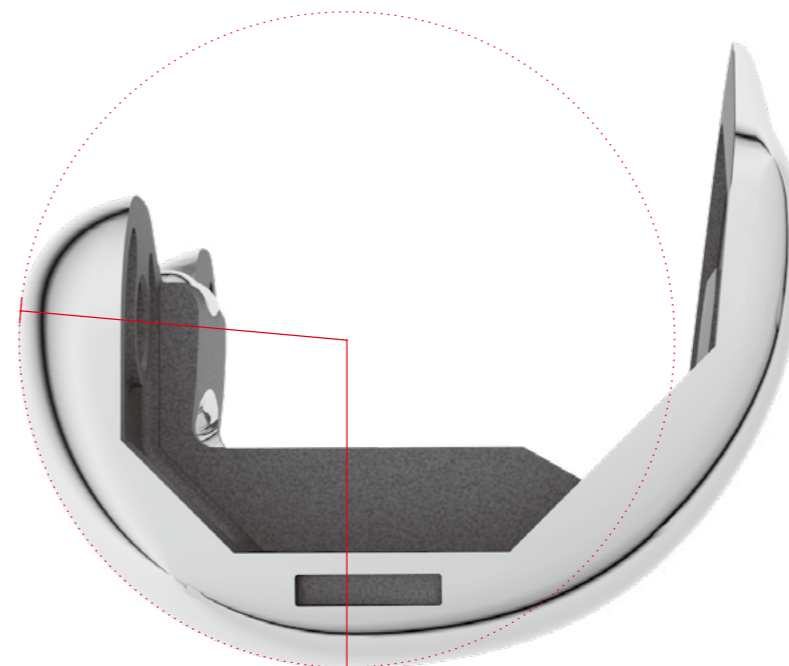
Multi-Radius (MR) Design

In an MR design, the ligament tension changes when the knee flexes from distal radii onto posterior radii - usually during mid-flexion. This sudden change in geometry could cause instability during flexion.



Single Radius (SR) Design

Due to the constant geometry of SR implants, the ligament tension remains more isometric, providing the patient with more consistent support.



Anterior flange incorporates a **7°** resection which reduces the risk of anterior notching and improves pressure transfer on implant-cement-bone interface when implanting. The amount of distal and posterior bone resections are equivalent, facilitating intraoperative gap balancing.

The short posterior condyles not only support **150°** of high flexion, but also maintain optimal contact surface. Its coronal geometry allows for internal/external rotation in deep flexion angles while providing sufficient contact surface, which are critical for restoring natural motion and improving wear performance.



Mark A. Kester, Ph.D.

CSO of b-ONE Ortho

The **b-ONE MOBIO™** Total Knee System was designed by partnering experienced engineers with input from international surgeons. It is an evolution of the best features from the state of the art prosthetic systems available today. We listened to surgeons and patients to design a knee system that is versatile, easy to use, and will exceed patient needs.

Patellofemoral Articulation

Guiding Patella Through Range of Motion

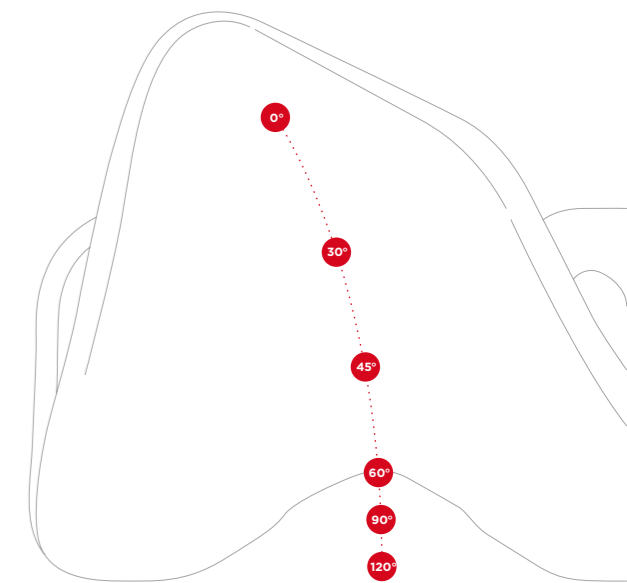
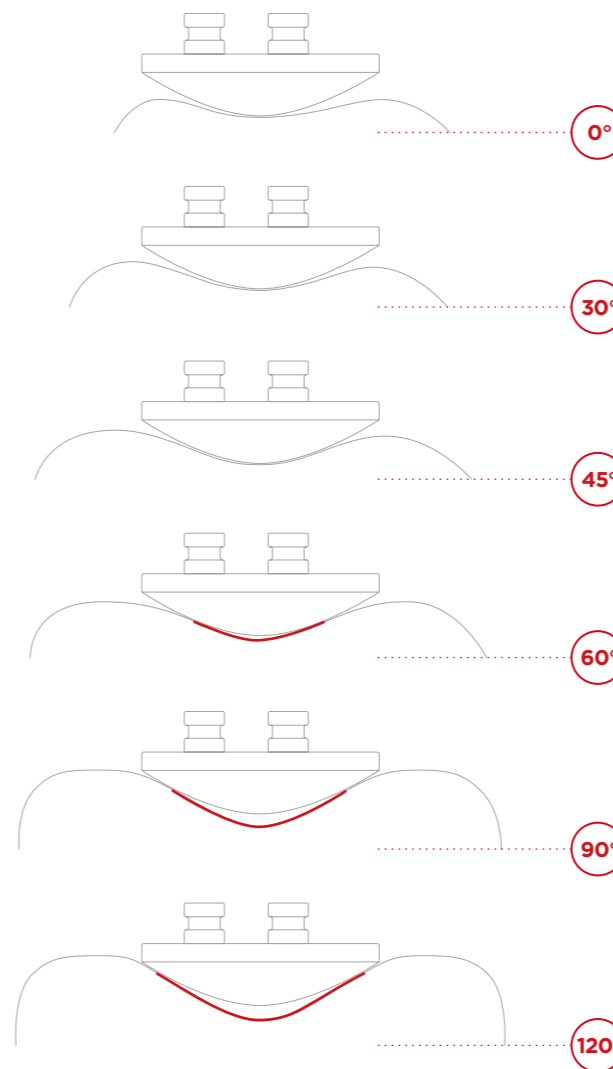
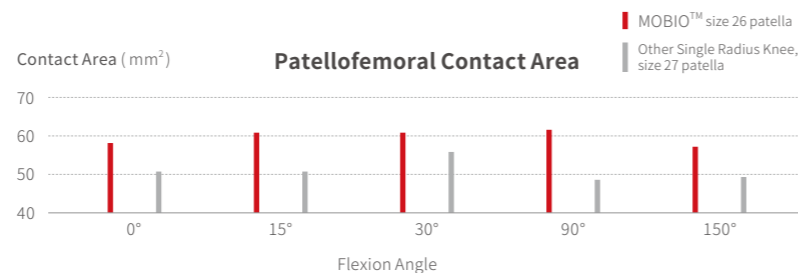
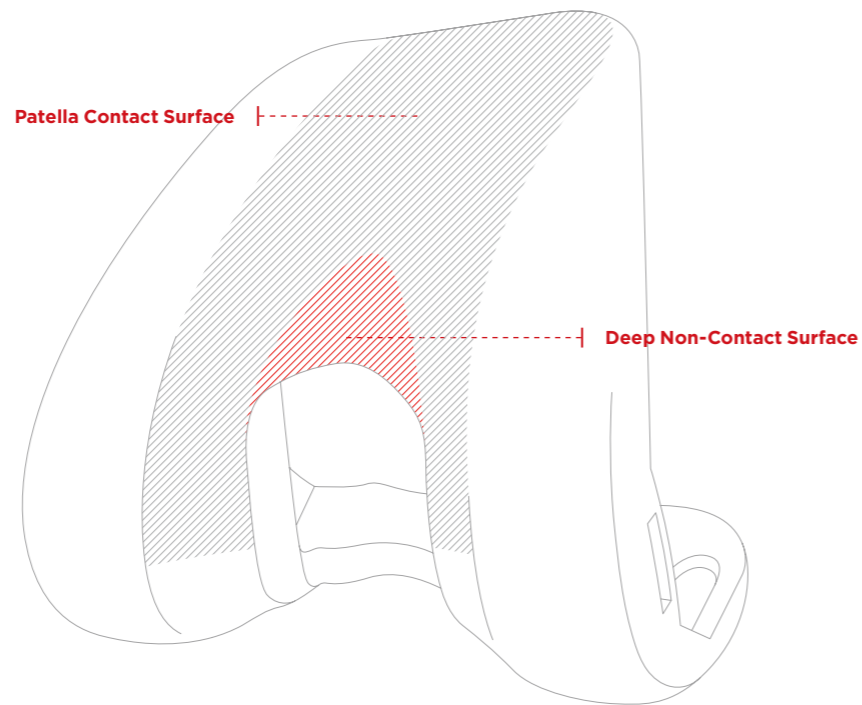
Patellofemoral complications are one of the main contributors to patient dissatisfaction after TKA in PS knee systems.

The design of patellofemoral articulation aims to reduce soft tissue irritation and reduce patellofemoral complication by providing natural soft tissue tension around patella and restoring natural patellar tracking in MOBIO™ total knee system.

➔ **Thin anterior flange design** reduces patellar pressure and soft tissue tension, meanwhile, anterior geometry contributes to reducing the risk of anterior overhang.

➔ **Gradually deepening patellar track** guides the patellar motion, which closely resembles that of natural knee. In the active flexion range, the patellofemoral contact area gradually increases, reducing patellar pressure and the incidence of anterior knee pain. Test results show that patellofemoral contact area of the MOBIO system is greater than that of Stryker Triathlon.

➔ **Non-contact area formed in further flexion** reduces the risk of patella clunk.



At 0° of flexion, the thin MOBIO™ anterior flange enables patella to move freely.

Along with the flexion from 0° to 45°, trochlea groove gradually deepens and guides patella in.

Contact area between patella and anterior flange gradually transitions from central contact to a constant linear contact of medial and lateral sides.

After 60° of flexion, trochlea groove further deepens and creates a "Boat" shaped groove, at this degree, the central part of patella does not make contact with the femur, decreasing soft tissue tension and the incidence of patella clunk.

Versatile Bearing Options

Accommodating a Wide Variety of Conditions

MOBIO™ Knee System offers multiple insert options to accommodate a wide variety of clinical conditions.



➔ PS insert is used for routine posterior stabilized arthroplasty, whereas PS+ insert offers more I/E and V/V stability compared to the PS insert.

➔ CR insert is used for cruciate retaining arthroplasty. CR+ insert is condylar stabilized option that is preferred where PCL is insufficient or absent.

Insert Type	I/E Rotation	V/V Constraint
CR	±15°	Free
CR+	±6° - ±10°	Free
PS	±15°	Free
PS+	±2.5°	±6°

Rich size options and greater interchangeability

Improving Bone Coverage

15x9

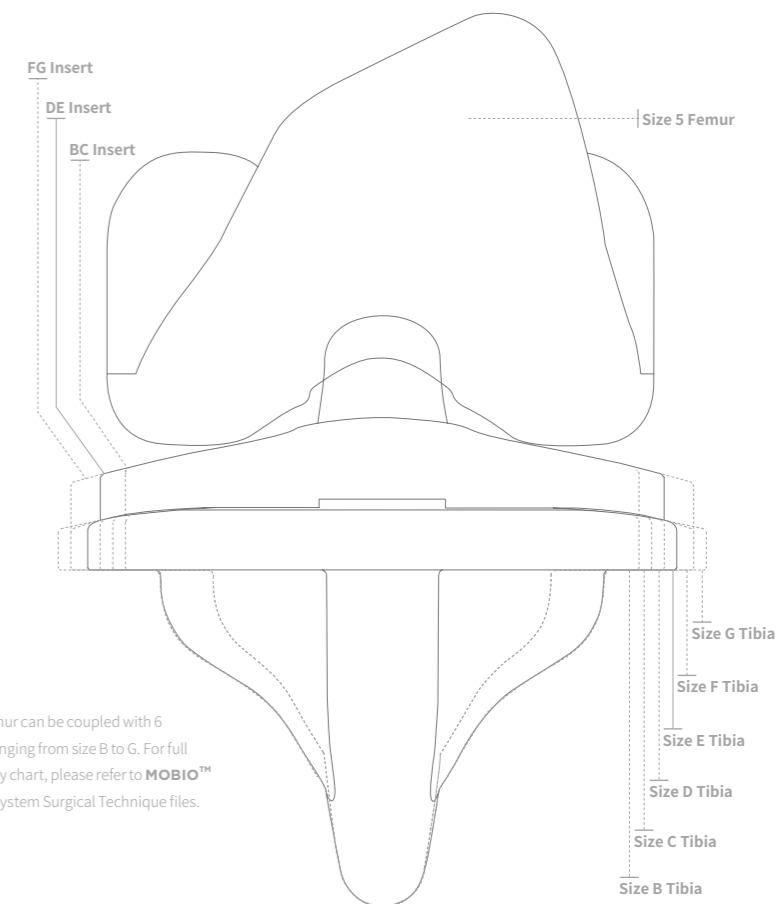
MOBIO™ offers 15 femur sizes and 9 tibia sizes, including 15 femur sizes, including 5 narrow options, are offered to provide excellent bone coverage and minimize overhang.

±2 Sizes

Allows for 2 up and 2 down sizing in core size femur and tibia. A femur is compatible with 5 different size tibial components.

±1mm

1mm thickness increment is offered in frequently used thickness ranges to fine tune ligament balancing.



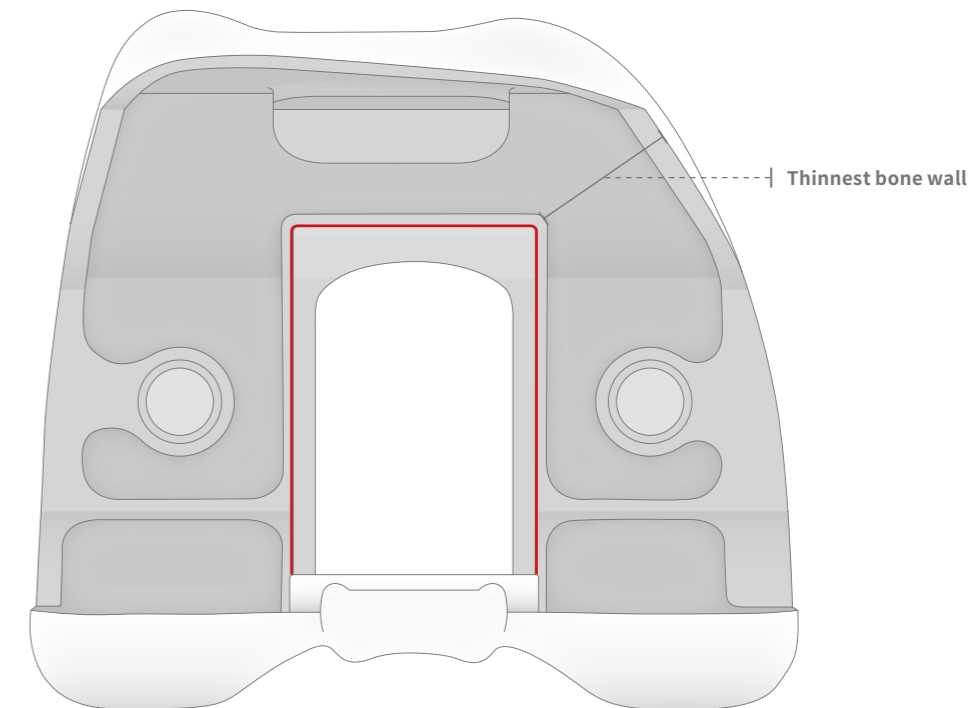
Size 5 PS femur can be coupled with 6 tibia sizes ranging from size B to G. For full compatibility chart, please refer to MOBIO™ Total Knee System Surgical Technique files.

MOBIO™ Total Knee System Insert Thickness Offerings									
9mm	10mm	11mm	12mm	13mm	14mm	16mm	19mm	22mm	25mm

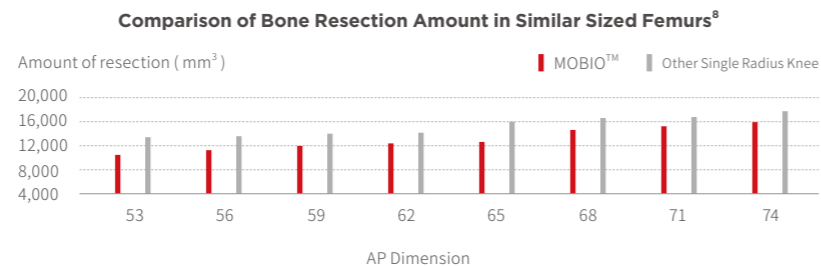
12&14 mm thickness is only offered for CR knee system

Open Shallow Box

Preserving More Bone, Reducing the Risk of Fracture

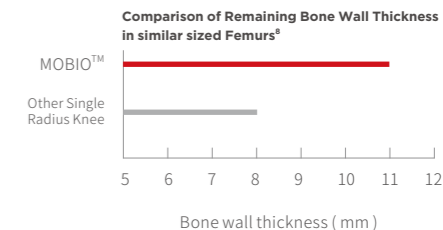


MOBIO™ features an open and shallow box whose size is tiered and coupled with the size of the implants. It preserves more bone while maintaining the strength. Test results show that **MOBIO™** System preserves up to 31% more bone in intercondylar region compared with other single radius knee.



MOBIO™ intercondylar box is further improved with maximizing the thickness of the remaining bone after resection, reducing the risk of

periprosthetic bone fracture. Test results show that there is at least 11 mm of bone wall left in its smallest size component.



> Reference

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4. Hollister, Kester et al, Knee Axes of Rotation: Determination and Implications, Orthopaedic Research Society, p 383, 1986.
5. Ostermeier S, Stukenborg-Colsman C. Quadriceps force after TKA with femoral single radius: an in vitro study[J]. Acta orthopaedica, 2011, 82(3): 339-343.
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7. Choi, W. C., Ryu, K.-J., Lee, S., Seong, S. C. & Lee, M. C. Painful patellar clunk or crepitation of contemporary knee prostheses. Clin. Orthop. Relat. Res. 471, 1512–1522 (2013).
8. b-ONE internal test data

