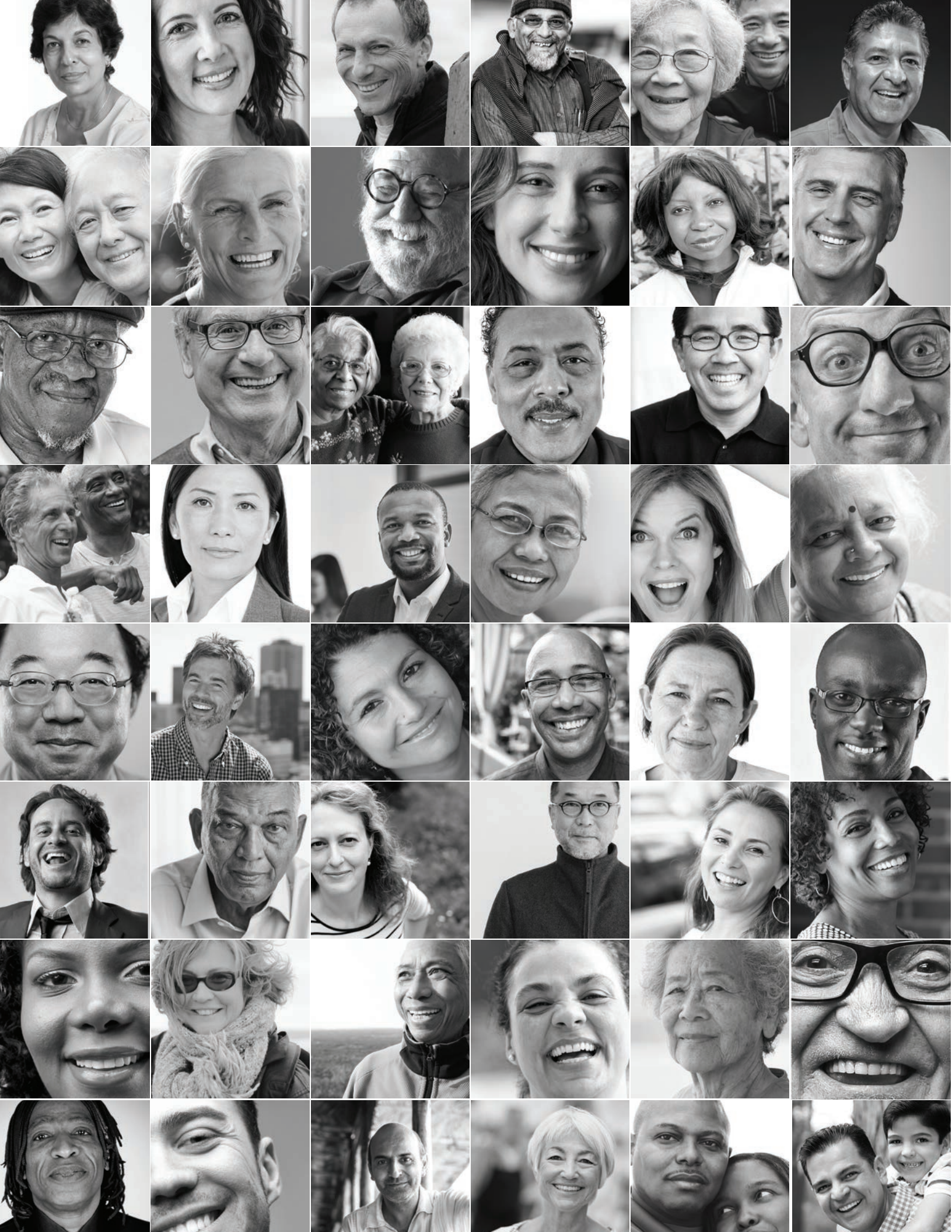
Persona®

THE PERSONALIZED KNEE

MEDIAL CONGRUENT® BEARING DESIGN RATIONALE

ZIMMER BIOMET

Your progress. Our promise.®



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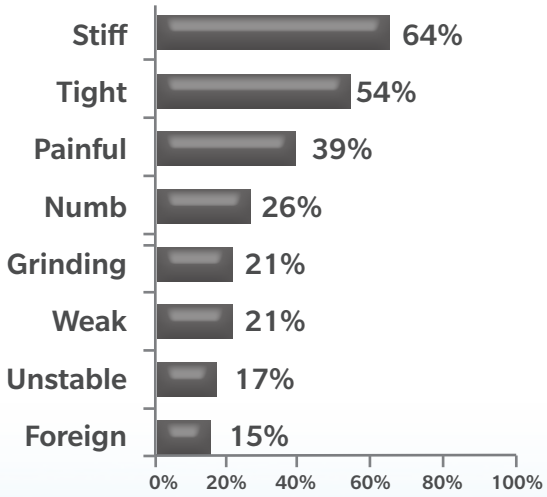
Recreating "the Feel" of a Healthy Knee

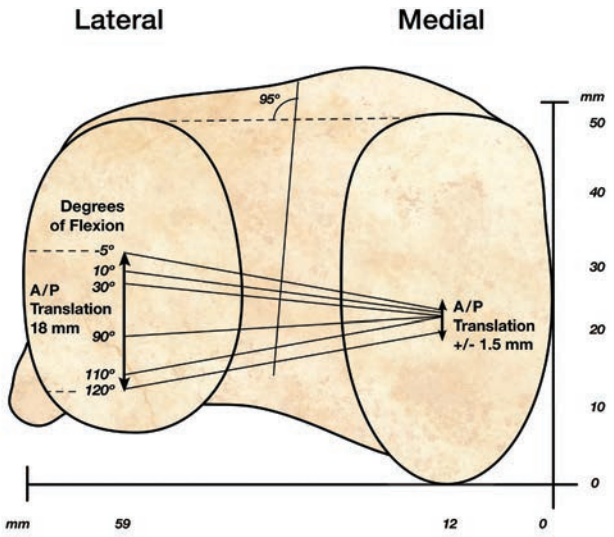
Although Total Knee Arthroplasty has long ranked among the most successful procedures in modern medicine, patients are becoming more demanding, and their definition of a successful knee surgery is evolving. **Studies suggest that one in four patients are not fully satisfied with their new knee.** Upon review of the literature, many patient complaints stem from the fact that their total knee replacement simply feels different than their healthy knee felt prior to surgery.[1,2,3]

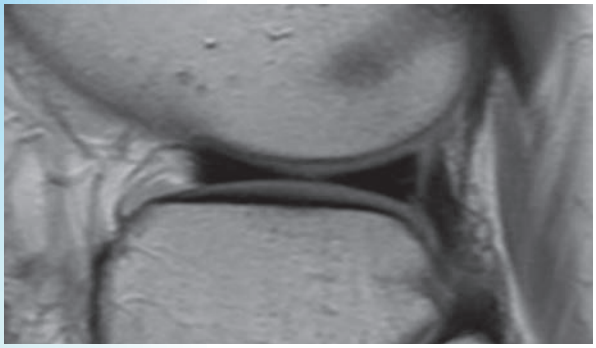


Adjectives dissatisfied patients use to describe their knee following TKA[3]

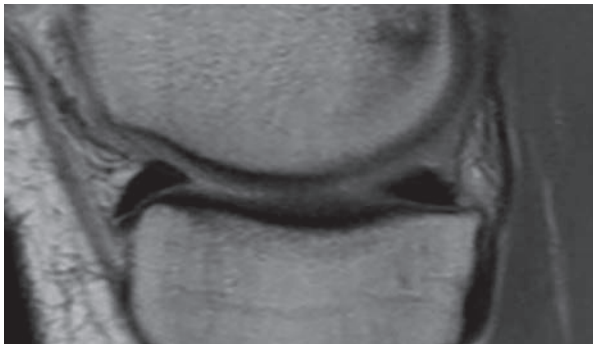
Healthy Knee: Stability and Motion

Historically, many TKA implant designs have prioritized pain reduction and survivorship ahead of restoring a natural feel. **Studies show that as a healthy knee travels through gait, it experiences limited medial translation as the femur externally rotates relative to the tibia.**[4,5] While the lateral condyle and meniscus move more freely atop the convex lateral tibial plateau, both in anteroposterior translation and along an arcuate path, the concave geometry of the medial tibia and a more rigid medial meniscus limit medial motion to stabilize the knee. **Many contemporary knee designs do not replicate this difference in motion between the two compartments, thus creating the need for an improved TKA design that more closely replicates the motion of a healthy knee.**[4, 5]



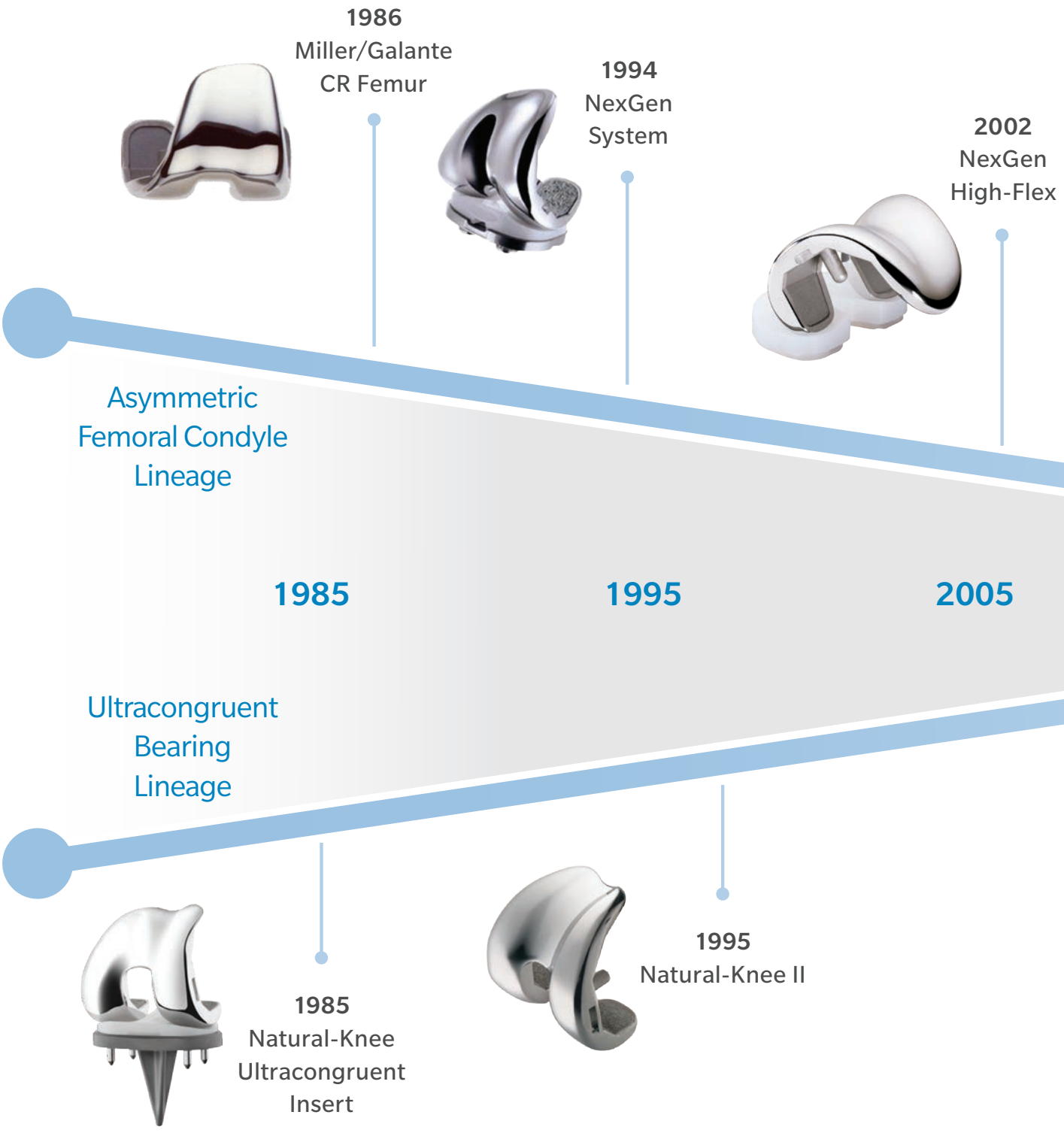


The convex lateral tibial plateau and a more mobile meniscus allow for more motion.



The concave medial tibial plateau and a more rigid meniscus provide stability.

Zimmer Biomet's STABILITY and MOTION Heritage



The introduction of the Persona Medial Congruent Bearing is an evolutionary step forward in Zimmer Biomet's long medial pivot heritage. In 1985, the Natural-Knee® System was launched with a UC bearing and introduced the concept of constraint through conformity. In 1986, the M/G® I CR Femur was released with asymmetric femoral condyles designed to simulate the medial pivot motion of a healthy knee. The NexGen® Knee System and the Natural-Knee II have continued to evolve these design attributes. The addition of the Medial Congruent Bearing to the Persona System combines these two philosophies to create the most natural feeling, kinematically driven bearing Zimmer Biomet has designed.

2015

2015
Persona Medial Congruent Bearing

2007
Natural-Knee High-Flex

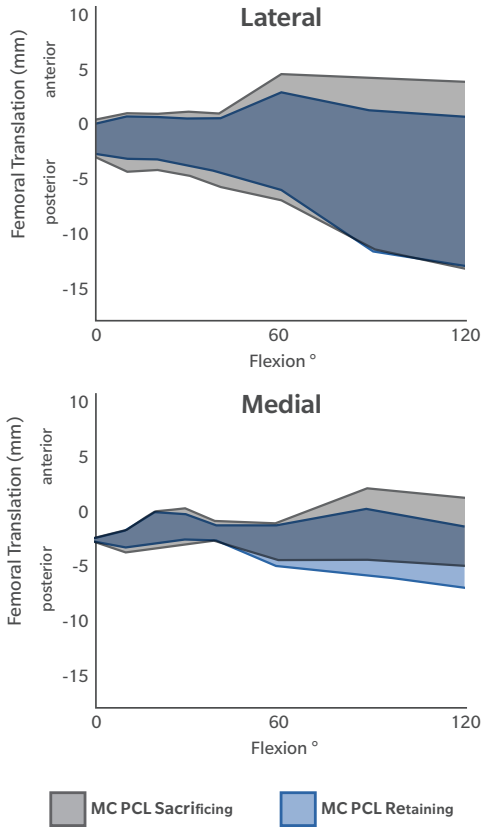
Stabilized Motion

Restores Confidence

The key to achieving a more natural feeling knee is developing implant geometries that function harmoniously with their native kinematics and more closely reproduce the motion and stability they had prior to knee arthritis. When striving to achieve such a goal with an implant design, one of the most difficult obstacles to overcome is achieving maximum stability throughout the full range of motion, and maintaining it while in full extension.

Many contemporary knee designs compromise motion to prioritize stability, while others compromise stability to prioritize motion. The Medial Congruent Bearing design incorporates both through the concept of stabilized motion. The system's medial conformity and anterior constraint stabilize the knee from full extension through deep flexion to restore patient confidence during daily activities. In contrast, the lateral condyle is designed to move more freely along an arcuate path to recreate the motion of a healthy knee. The PCL retention option may further enhance the patient experience by providing proprioceptive feedback.

A/P Laxity Envelopes

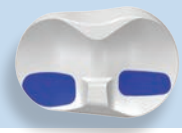
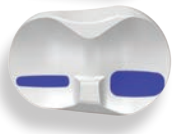
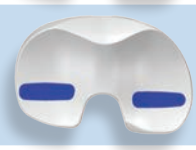
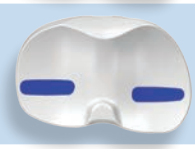
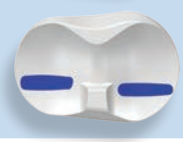


Medial, sagittal conformity of 1.1:1 or better minimizes medial translation to enhance stability, as the lateral condyle moves more freely.[6]

- Enhanced femorotibial conformity improves knee stability. The Persona Medial Congruent Bearing offers the best conformity within the Persona System. **Sagittal conformity of 1.1:1 or better is offered throughout the size range to achieve stability through conformity.**[6]

- **Increased conformity results in greater contact area to reduce contact stresses.** Medial contact area is maximized as the lateral condyle externally rotates around a stable medial femoral condyle.

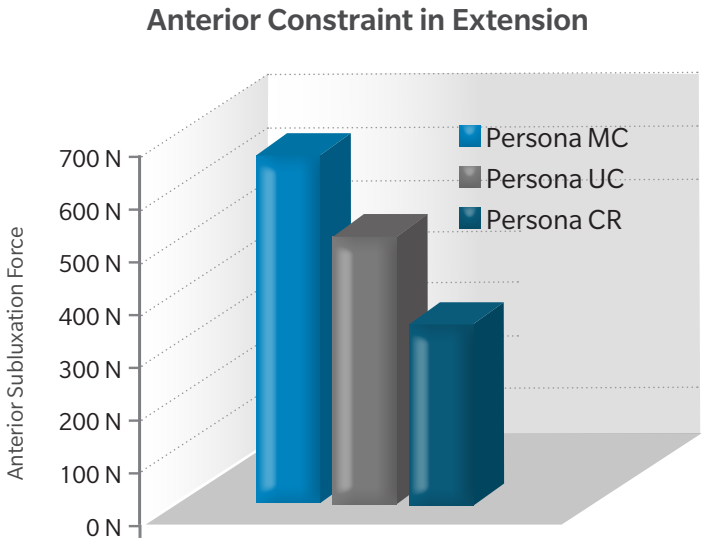
Contact Area Comparison

Flexion Angle	Persona MC		Persona UC		NK Flex UC	
	Lateral	Medial	Lateral	Medial	Lateral	Medial
0°						
45°						
90°						

MC's increased medial contact area equates to greater stability.

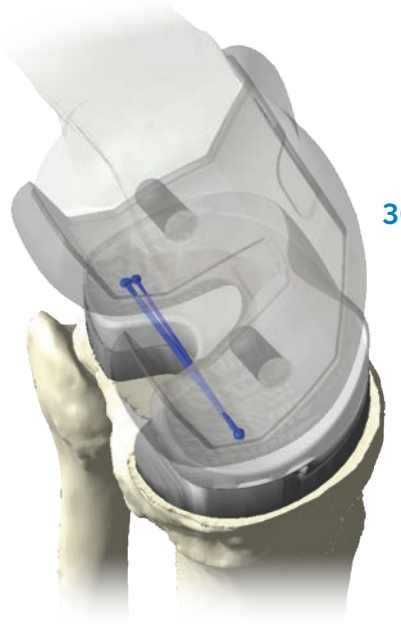
Stability Through Conformity: Empowers Mobility

Achieving stability in extension and during stair descent is essential for restoring patient confidence during daily activities. The Medial Congruent Bearing offers up to a 13 mm anterior lip height to provide greater anterior constraint and subluxation resistance.



Subluxation resistance for the Medial Congruent Bearing has been maximized to increase stability.[6]

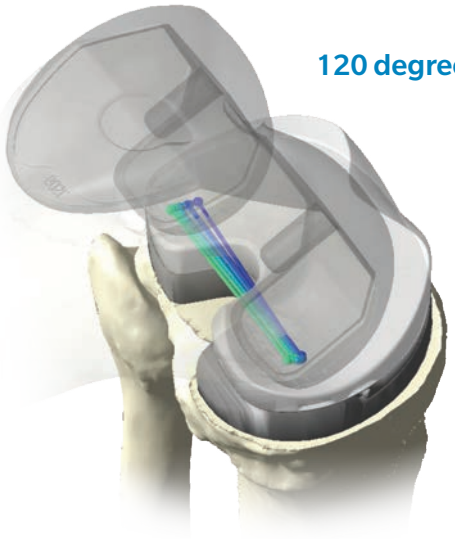
Full Extension



30 degrees

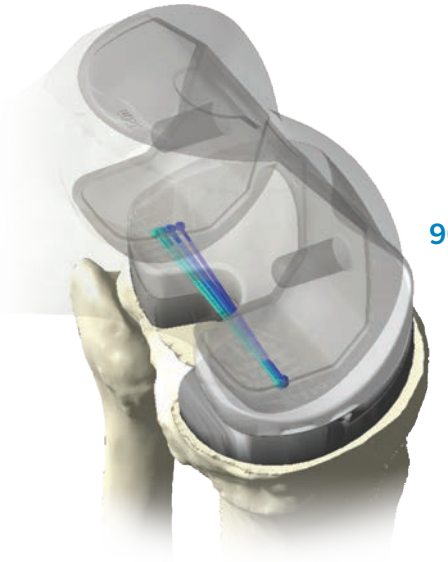
In full extension, stability is achieved by maximizing medial conformity.

120 degrees



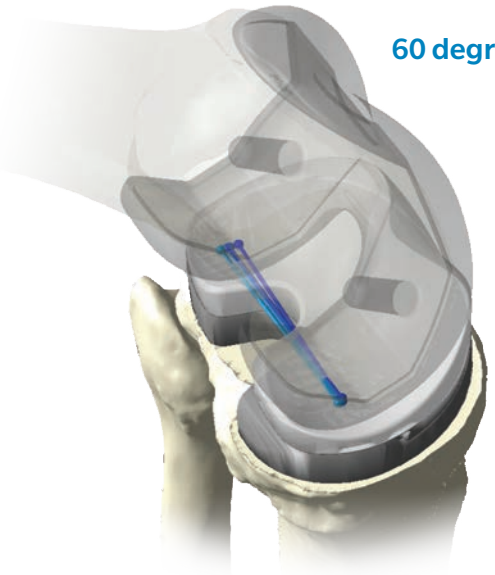
Entering into deep flexion, the lateral condyle pivots along an arcuate path. A more posterior dwell point permits deep flexion as medial conformity provides stability.

90 degrees

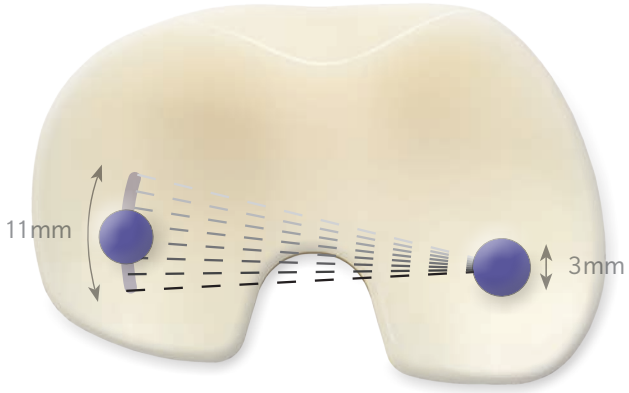


As the knee rotates and transitions into mid-flexion, stability is achieved medially via increased constraint and limited A/P translation.

60 degrees



Average A/P Laxity from 0 to 120 degrees

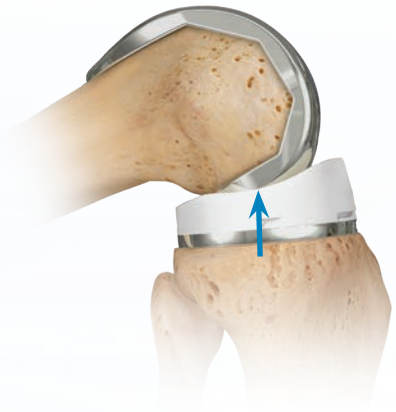


Medial femoral condyle remains more stationary as the lateral condyle follows a 14 degree arcuate path.

High-Flexion Design: Renews Life

The ability to achieve deep flexion is essential for performing daily activities in many cultures throughout the world. **The dwell points of the Persona Medial Congruent Bearing have been moved posterior to allow surgeons to restore a patient's full range of flexion.**

Competitor



Anterior Dwell Point

A more anterior dwell point may result in early posterior femoral bone impingement on the posterior lip of a tibial insert.

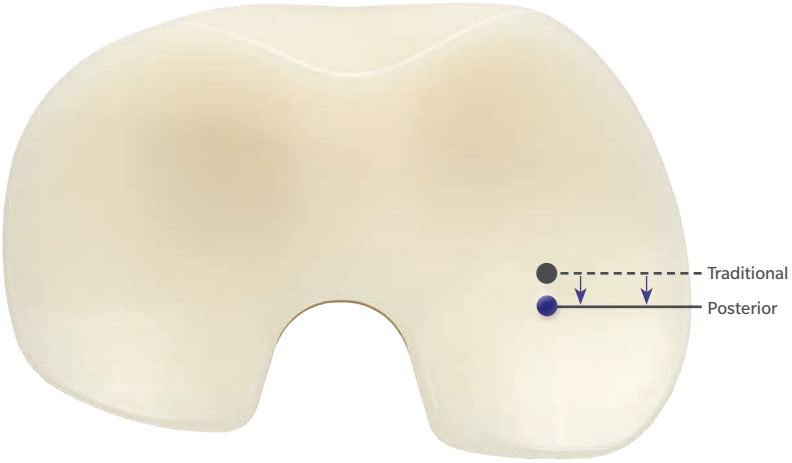
Persona MC

Posterior Dwell Point

A more posterior dwell point accommodates deeper flexion before posterior, femoral bone contacts the posterior lip of a tibial insert.

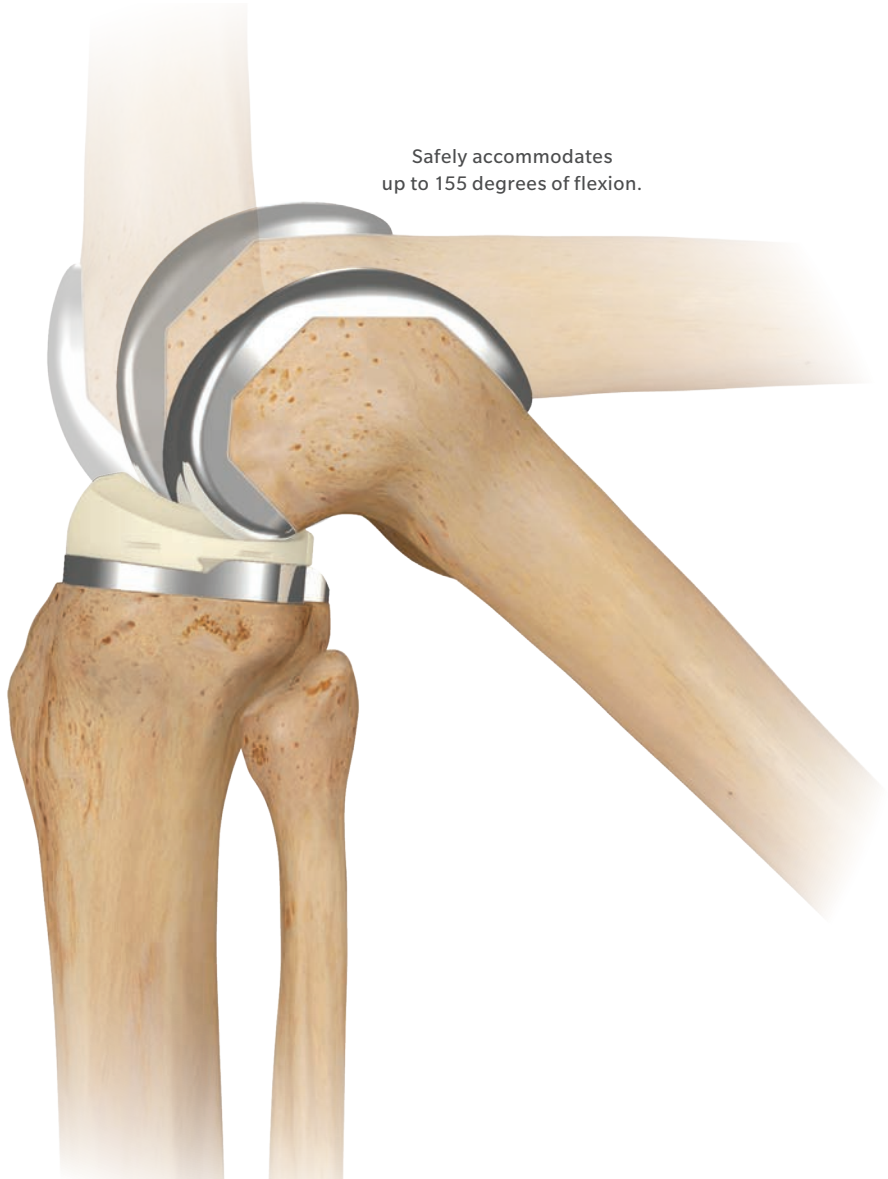
As the Persona CR Femur transitions into deep flexion, the lateral condyle is free to follow an arcuate path to facilitate external rotation, which is essential for achieving deep knee bend. When combined with Zimmer Biomet's high flex femoral heritage, the end result is a stable, natural feeling, medial pivot motion that safely accommodates up to 155 degrees of flexion.[7]

Posterior Dwell Point Location



When compared to traditional bearings, the medial congruent dwell point has been shifted posteriorly to assist in achieving flexion.

Deep Flexion in Motion



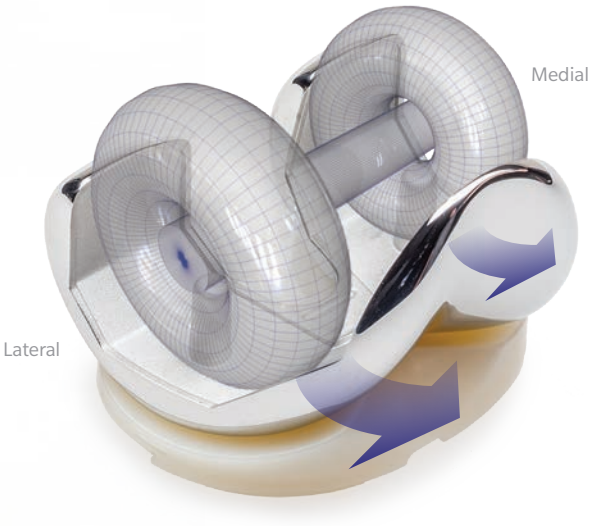
Proven Femoral Geometry: Facilitates Axial Rotation

The Persona CR femoral condyle dimensions are based upon the clinically proven Natural-Knee CR femoral design, a design that achieved 99.1% survivorship in 10 years.[8] By offering 21 distinct profiles, in 2 mm increments*, the Persona Femur is one of the most comprehensive femoral offerings on the market with the finest sizing increments.

*Size 11 to 12 is a 4 mm increment

Each Persona CR Femur features asymmetric condyles that assist in recreating the medial pivot motion of a healthy knee.[9] The lateral distal femoral condyle is larger than the medial to facilitate lateral, axial rotation along an arcuate path. As the femur transitions through the arc of motion, the asymmetric femoral condyles work in conjunction with the Medial Congruent Bearing to more closely replicate the medial pivot motion of a healthy knee.

The Persona Femur preserves the Zimmer Biomet proven patellofemoral articulation, including its depth, condylar dimensions, and aspect ratio. However, unlike previous generation designs, Persona chamfer cuts eliminate the extra step required to create a trochlear recess. **When compared to contemporary PS femoral designs, the exclusion of the trochlear recess and PS box cut steps not only improves operating room efficiency, but makes the Persona CR Femur our most bone-preserving design.**



Asymmetric femoral condyles assist in recreating a medial pivot motion.

Bone Conservation

A Persona CR femur preserves 32% more bone than a competitive PS femur design, which requires a box cutout.[10]

Persona Implant Options

Persona Bearing Compatibility

MC

Persona Tibial Size	Persona CR Femoral Size (AP Dimension)											
	1 (50 mm)	2 (52 mm)	3 (54 mm)	4 (56 mm)	5 (58 mm)	6 (60 mm)	7 (62 mm)	8 (64 mm)	9 (66 mm)	10 (68 mm)	11 (70 mm)	12 (74 mm)
A	1-2/AB		3-4/AB									
B												
C				4-5/CD		6-7/CD		8-9/CD				
D												
E				4-5/EF		6-7/EF		8-11/EF				
F												
G								8-11/GH				12/GH
H												
J												12/J

CR

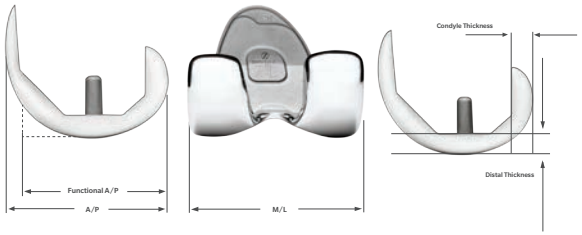
Persona Tibial Size	Persona CR Femoral Size (AP Dimension)											
	1 (50 mm)	2 (52 mm)	3 (54 mm)	4 (56 mm)	5 (58 mm)	6 (60 mm)	7 (62 mm)	8 (64 mm)	9 (66 mm)	10 (68 mm)	11 (70 mm)	12 (74 mm)
A	1-2/AB		3-6/AB									
B												
C	1-2/CD		3-9/CD									
D												
E			3-11/EF									
F												
G							7-12/GH					
H												
J									9-12/J			

UC

Persona Tibial Size	Persona CR Femoral Size (AP Dimension)											
	1 (50 mm)	2 (52 mm)	3 (54 mm)	4 (56 mm)	5 (58 mm)	6 (60 mm)	7 (62 mm)	8 (64 mm)	9 (66 mm)	10 (68 mm)	11 (70 mm)	12 (74 mm)
A	1-2/AB		3-4/AB									
B												
C	1-2/CD		3-7/CD									
D												
E				4-11/EF								
F												
G							7-12/GH					
H												
J									9-12/J			

PS

Persona Tibial Size	Persona PS Femoral Size (PS Dimension)											
	1 (50 mm)	2 (52 mm)	3 (54 mm)	4 (56 mm)	5 (58 mm)	6 (60 mm)	7 (62 mm)	8 (64 mm)	9 (66 mm)	10 (68 mm)	11 (70 mm)	12 (74 mm)
A	1-2/AB		3-5/AB									
B												
C	1-2/CD		3-5/CD			6-9/CD						
D												
E			3-5/EF			6-9/EF				10-11/EF		
F												
G						6-9/GH				10-12/GH		
H												
J										10-12/J		



Persona CR Femoral (Narrow) Dimensions

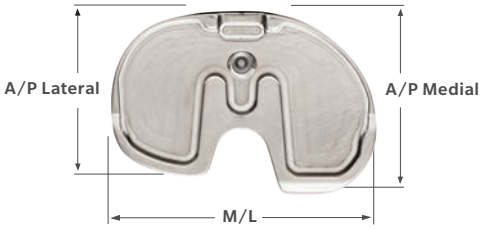
Size	Overall A/P (mm)	Functional A/P (mm)	Overall M/L (mm)	Distal Thickness (mm)	Condyle Thickness (mm)
1	**48.1**	**41.0**	**55.5**	**8**	**8**
2	**50.7**	**43.0**	**57.0**	**8**	**8**
3	**51.9**	**45.0**	**58.5**	**9**	**9**
4	**54.0**	**47.0**	**60.0**	**9**	**9**
5	**56.0**	**49.0**	**61.5**	**9**	**9**
6	**59.0**	**51.0**	**63.0**	**9**	**9**
7	**60.1**	**53.0**	**64.5**	**9**	**9**
8	**62.1**	**55.0**	**66.0**	**9**	**9**
9	**64.6**	**57.0**	**67.5**	**9**	**9**
10	**66.6**	**59.0**	**69.0**	**9**	**9**
11	**69.3**	**61.0**	**70.5**	**9**	**9**

Persona CR Femoral (Standard) Dimensions

Size	Overall A/P (mm)	Functional A/P (mm)	Overall M/L (mm)	Distal Thickness (mm)	Condyle Thickness (mm)
3	**53.2**	**45.0**	**62.5**	**9**	**9**
4	**55.6**	**47.0**	**64.3**	**9**	**9**
5	**57.2**	**49.9**	**66.0**	**9**	**9**
6	**59.6**	**51.0**	**67.8**	**9**	**9**
7	**62.1**	**53.0**	**69.5**	**9**	**9**
8	**63.8**	**55.0**	**71.3**	**9**	**9**
9	**66.2**	**57.0**	**73.0**	**9**	**9**
10	**68.5**	**59.0**	**74.8**	**9**	**9**
11	**71.1**	**61.0**	**76.5**	**9**	**9**
12	**75.2**	**65.0**	**77.5**	**9**	**9**

Persona Medial Congruent Dimensions

Size	Anterior Medial Lip Height	Posterior Medial Lip Height
4-5/CD	**10**	**3.2**
6-7/CD	**10**	**3.2**
8-9/CD	**10**	**3.1**
4-5/EF	**11**	**3.4**
6-7/EF	**11**	**3.4**
8-11/EF	**11**	**3.4**
8-11/GH	**12**	**3.3**
12/GH	**12**	**3.3**
12/J	**13**	**3.3**



Persona Stemmed Tibial Baseplate Dimensions

Size	Medial A/P (mm)	Lateral A/P (mm)	Overall M/L (mm)	Keel Medialization (mm)
A	**40.2**	**35.1**	**57.7**	**1**
B	**42.5**	**37.2**	**60.8**	**1**
C	**44.9**	**39.5**	**63.8**	**1**
D	**47.2**	**41.8**	**67.0**	**1.5**
E	**50.2**	**44.6**	**71.0**	**2**
F	**53.3**	**47.4**	**75.1**	**2.5**
G	**56.5**	**50.2**	**79.0**	**3**
H	**59.8**	**53.3**	**83.0**	**3.5**
I	**63.5**	**56.7**	**88.1**	**4**

Notes

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10. Zimmer Biomet package insert.

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