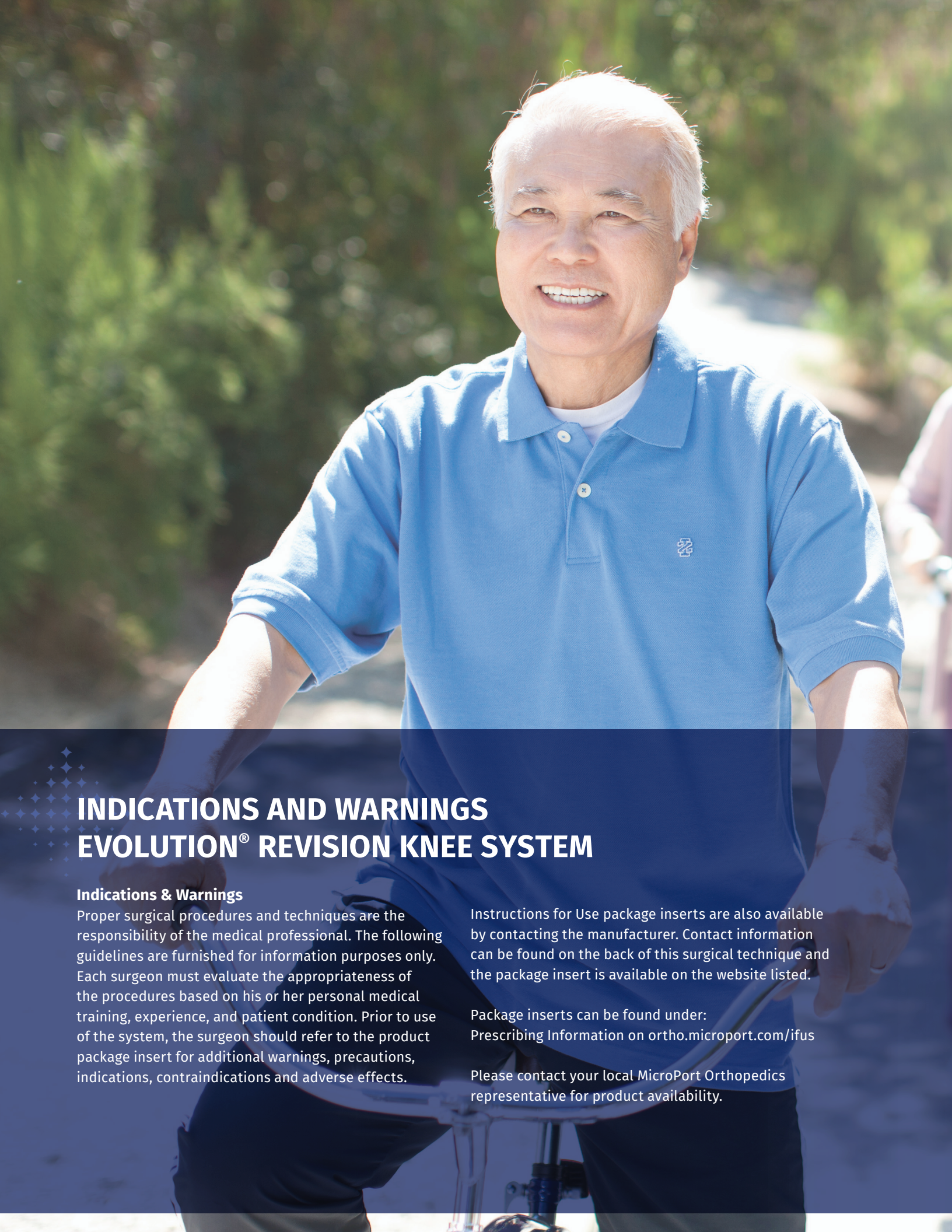
MicroPort

Evolution®

REVISION KNEE SYSTEM

Technical Monograph



INDICATIONS AND WARNINGS EVOLUTION® REVISION KNEE SYSTEM

Indications & Warnings

Proper surgical procedures and techniques are the responsibility of the medical professional. The following guidelines are furnished for information purposes only. Each surgeon must evaluate the appropriateness of the procedures based on his or her personal medical training, experience, and patient condition. Prior to use of the system, the surgeon should refer to the product package insert for additional warnings, precautions, indications, contraindications and adverse effects.

Instructions for Use package inserts are also available by contacting the manufacturer. Contact information can be found on the back of this surgical technique and the package insert is available on the website listed.

Package inserts can be found under:
Prescribing Information on ortho.microport.com/ifus

Please contact your local MicroPort Orthopedics representative for product availability.

Table of contents

Introduction

The EVOLUTION® Revision Knee System is built on a 20-year, clinically established heritage of patient satisfaction and survivorship.[1] The system maintains the published kinematic benefits of a Medial-Pivot design, while also offering surgeons intra-operative flexibility to meet patient needs.[1]

Surgeon design team

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Design overview

INTELLIGENT DESIGN

Canal filling stems

- Contain splines and flutes to provide immediate fixation and torsional resistance
- Flexible coronal slot provides dynamic structure to address long-term endosteal bone changes
- Diameters of 10-24mm in 1mm increments
- Lengths of 100 and 150mm

Offset adapters

- 360° of offset rotation for optimal bone coverage
- 4 and 8mm offset
- 25mm length
- Femoral offset has a boss at the top of the taper to prevent mating with the tibia

Extension adapters

- Extend total length of the stem for additional fixation
- 25 and 50mm lengths

CCK and Stemmed CS femoral implant

- Trunnion height is 35mm
- Stem housing at 5° valgus

Distal and posterior femoral augments

- Available in 4, 8, and 12mm thicknesses
- Attach with single threaded screw

CCK tibial insert

- One-up and one-down size interchangeability
- +/-4° of internal-external rotation and +/-2° of varus-valgus constraint
- Allows up to 125° range-of-motion
- Pass-through locking screw provides additional fixation and stability

CS tibial insert

- Asymmetric to position mating femur more posterior
- One-up and one-down size interchangeability
- Soft tissue friendly patellar tendon relief
- 15° of permissible femoral rotation
- For use with EVOLUTION® Primary CS or Stemmed CS femur

Revision tibial base implant

- Asymmetric for improved bone coverage
- 0° posterior slope
- Enhanced locking mechanism angled in direction of the incision

Tibial augments

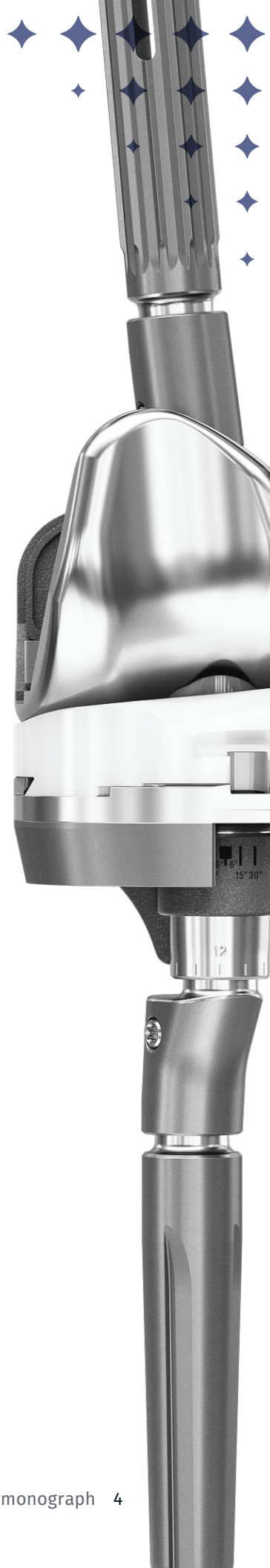
- 5, 10 and 15mm thick, medial and lateral options
- 10 and 15mm augments taper to match the natural tibial geometry

Modular keel

- Three sizes to optimize rotational stability
- +/- 30° rotation without augments
- +/- 6° rotation with augments

Cemented stems

- 17mm diameter in lengths of 25 and 50mm
- 10, 12, 14, 16, and 18mm diameters in a length of 75mm



Choose the revision option that works for your patient

CS AND CCK FEMORAL IMPLANTS

- Sizes 3-8
- 35mm trunnion height

CANAL-FILLING STEMS

- Diameters of 10-24mm in 1mm increments
- Lengths of 100 and 150mm
- Can be used on both femur and tibia

FEMORAL OFFSET ADAPTERS

- 4 and 8mm offset
- 25mm length

FEMORAL AUGMENTS

- Distal and posterior
- 4, 8, and 12mm thicknesses

CS AND CCK TIBIAL INSERTS

- 10, 12, 14, 17, 20, 22, and 24mm thicknesses

TIBIAL AUGMENTS

- Medial and lateral
- 5, 10, and 15mm thicknesses

TIBIAL OFFSET ADAPTERS

- 4 and 8mm offset
- 25mm length

CEMENTED STEMS

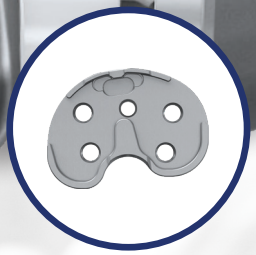
- 17mm diameter in 25 and 50mm lengths
- 10, 12, 14, 16, and 18mm diameters in 75mm length
- Can be used on both femur and tibia

MODULAR KEELS

- Small, medium, and large sizes

STEM EXTENSION ADAPTERS

- 17mm diameter in 25 and 50mm lengths
- Can be used on both femur and tibia



REVISION TIBIAL BASE IMPLANTS

- Sizes 1-8+
- 25mm trunnion height

Join the Evolution®

KINEMATIC THEORY
Single-axis Rotation

1990

IMPLANT DESIGN
Single-radius Knees

KINEMATIC THEORY
“Four-Bar Link” Theory

1980

1970

IMPLANT DESIGN
Multi-radius Knees

IMPLANT DESIGN

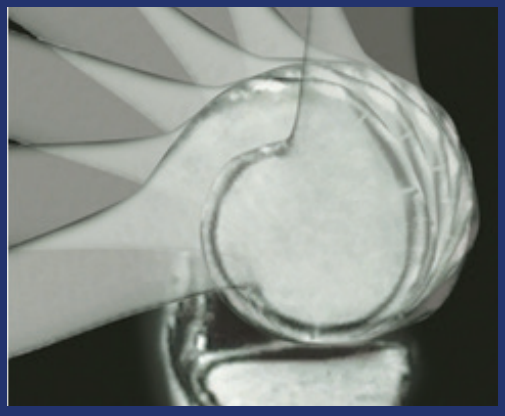
The Medial-Pivot Knee

2000

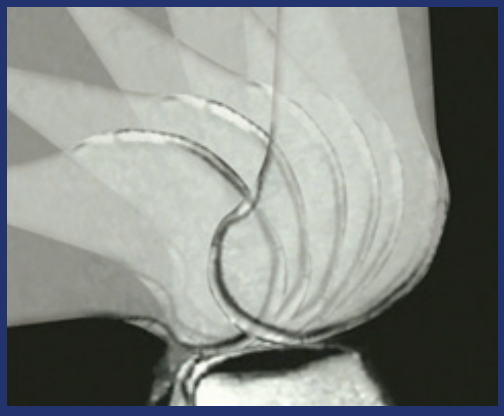
KINEMATIC THEORY

Medial-Pivoting Kinematics

For many years, orthopedists have clung to the concept of a J-curve, multi-radius knee that rolls back in flexion. Recent kinematic and radiographic studies support Medial-Pivoting kinematics and their impact on stability of the knee. These studies demonstrate that the normal knee exhibits a fixed flexion-extension axis with a stable medial compartment and a mobile lateral compartment.[2]



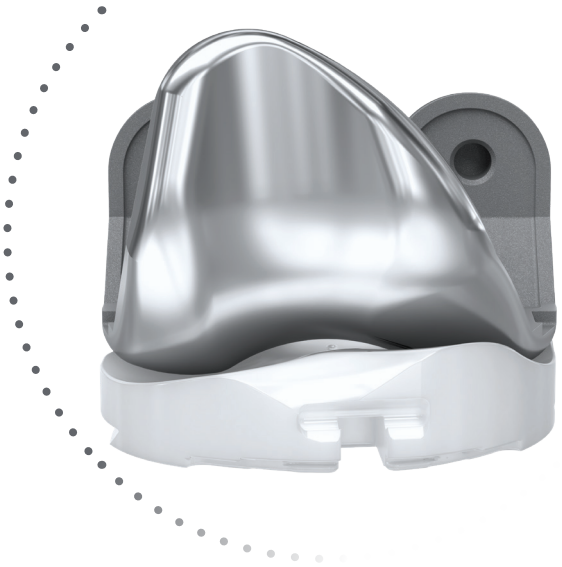
Stable medial compartment



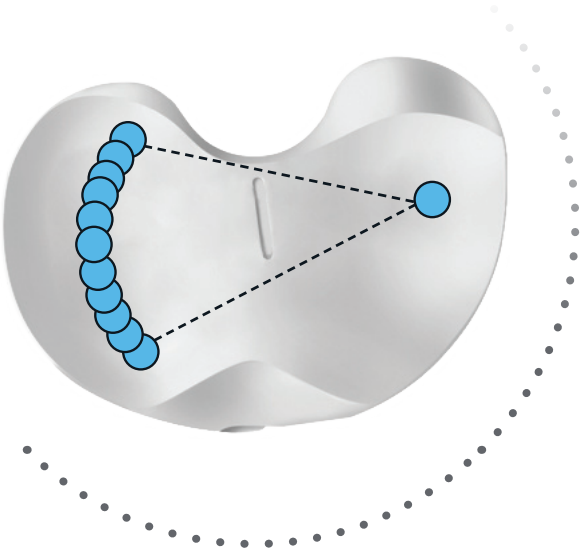
Mobile lateral compartment

The EVOLUTION® Revision Knee System represents the ideal balance of natural medial stability and lateral mobility.

Stemmed CS



- High medial conformity creates ball-in-socket articulation to maximize stability throughout range of motion[3]
- Same constant femoral radius as the primary femoral component allows deeper flexion and promotes enhanced quadriceps efficiency[4]
- Accepts all femoral stems, augments and adapters of the EVOLUTION® Revision Knee System, providing a bone sparing full revision system due to the elimination of resecting for the box

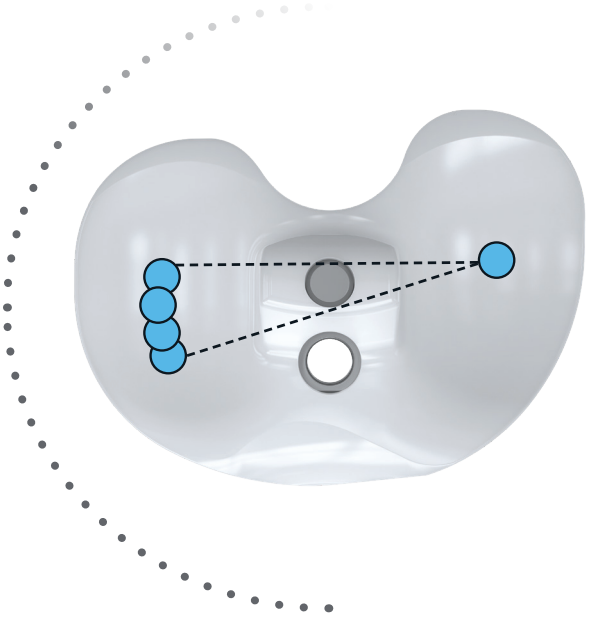


- 15° arcuate path on the lateral side allows for tibial internal/external rotation
- High conformity of the medial side provides stability throughout the range of motion[3]

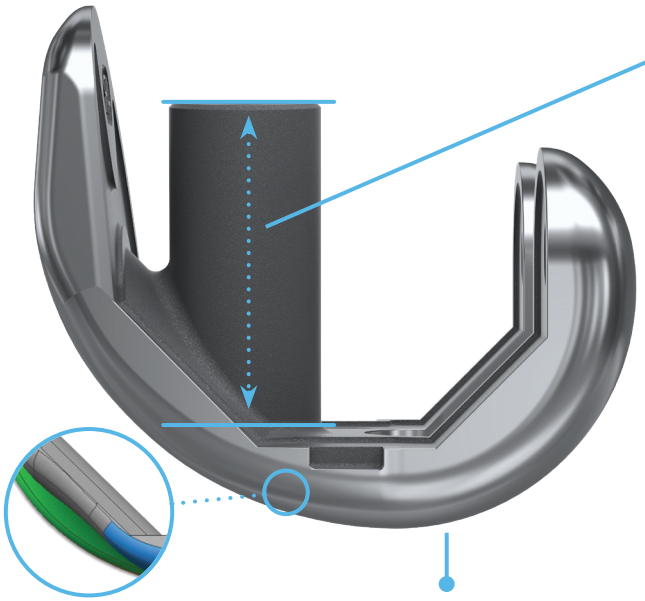
CCK

- Same high medial conformity as the Stemmed CS and Primary Femoral components creates ball-in-socket articulation to maximize stability throughout range of motion
- Same constant femoral radius as the Primary and Stemmed CS components to allow deeper flexion and promote enhanced quadriceps efficiency [4,6]

- The lateral side of the insert has a toroid path that allows ±4° of axial rotation before cam engages with the post



Stemmed CS femoral implant

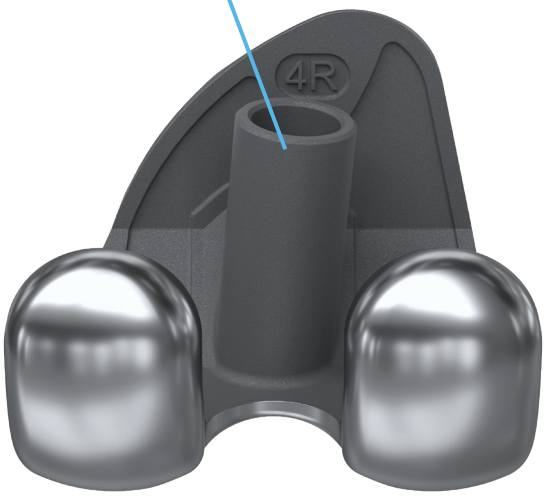


Trunnion height is 35mm

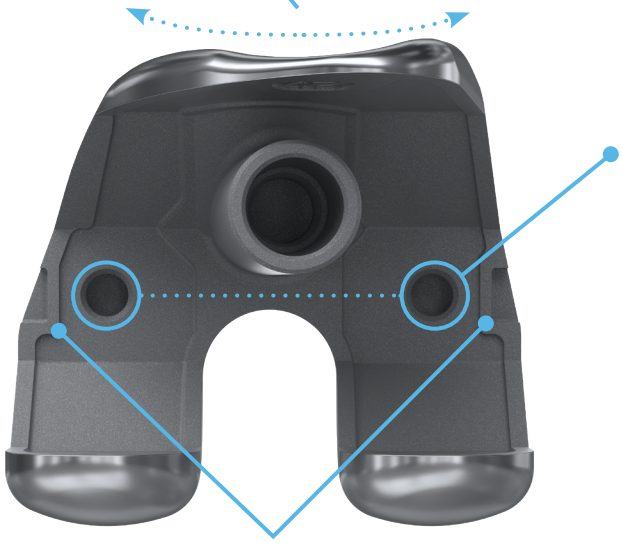
Extension relief on medial side to reduce impingement in extension [3, 5]

Spherical sagittal and coronal profile allows for greater range of motion[3]

5° valgus stem housing with internal taper to accept stem extensions, offset stem adapters, and/or multiple stem lengths



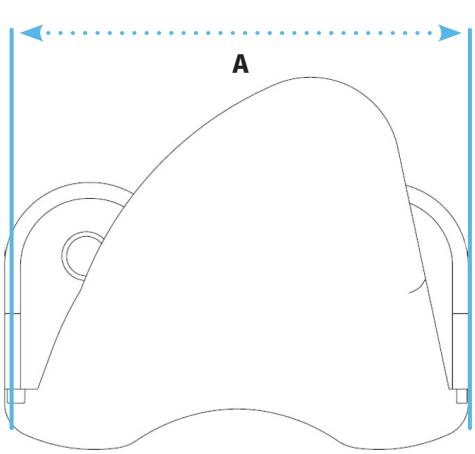
Extended trochlear groove to increase patellar contact area in deep flexion

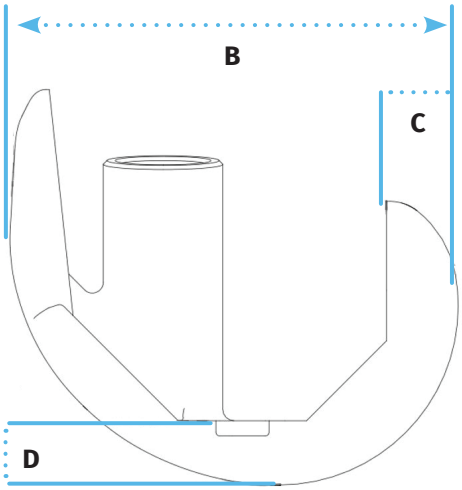


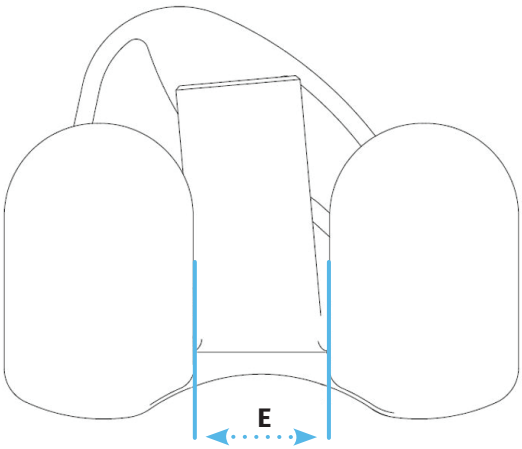
Threaded holes for distal and posterior augments

Notches for EVOLUTION® Femoral Impactor/Extractor

Specifications



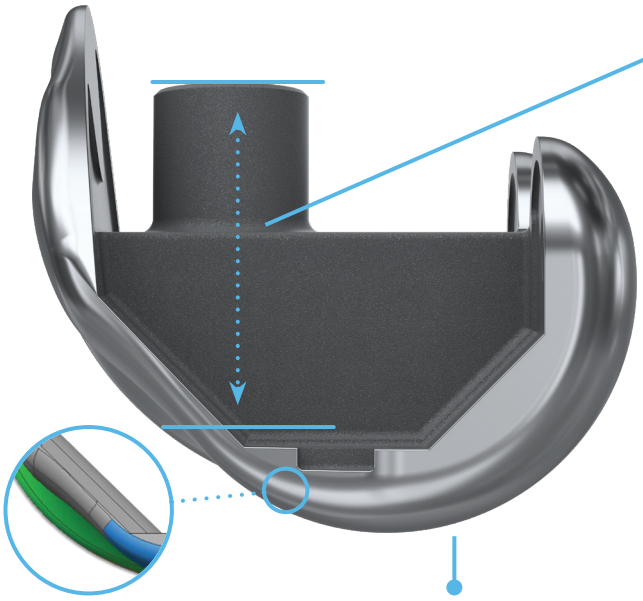




SIZE	A	B	C	D	E
3	64	57	10	9	18
4	66	60	10	9	18
5	69	64	11	9	18
6	73	68	11	9	18
7	77	72	11	9	20
8	80	76	11	9	20

*All dimensions in mm

CCK femoral implant



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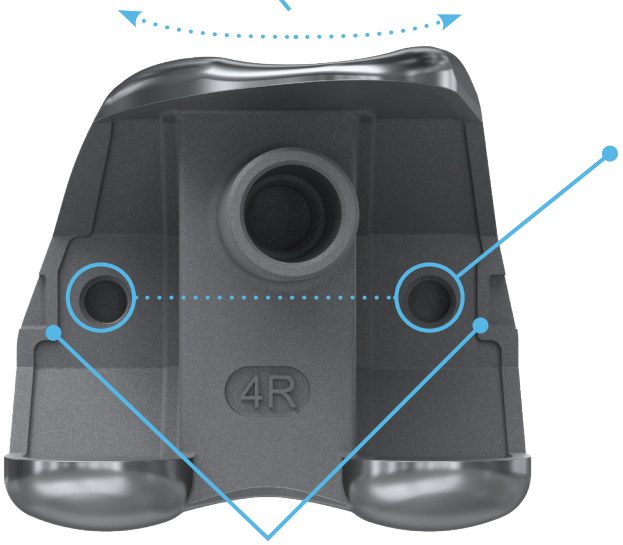

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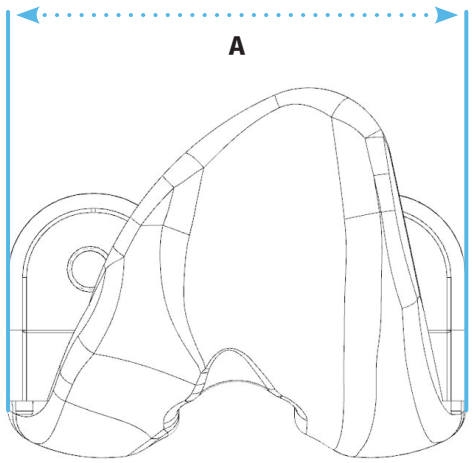
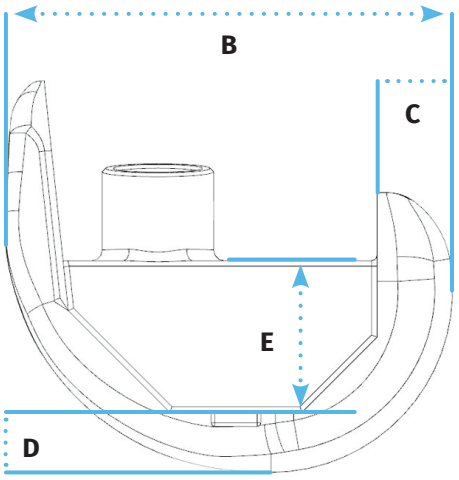
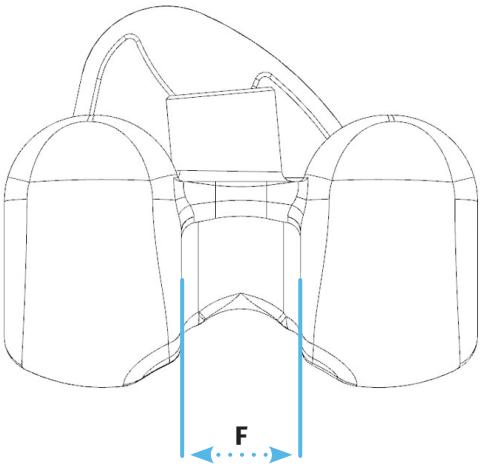
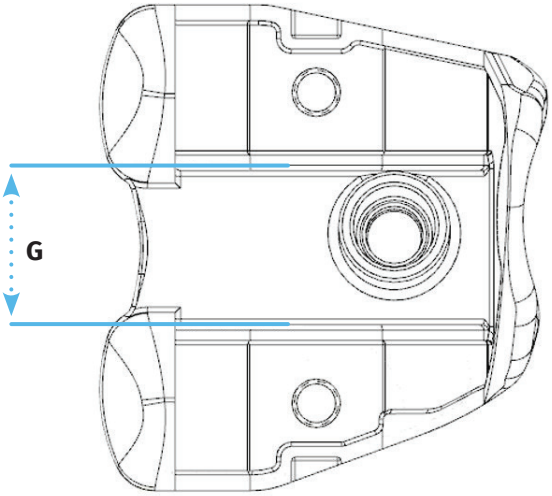




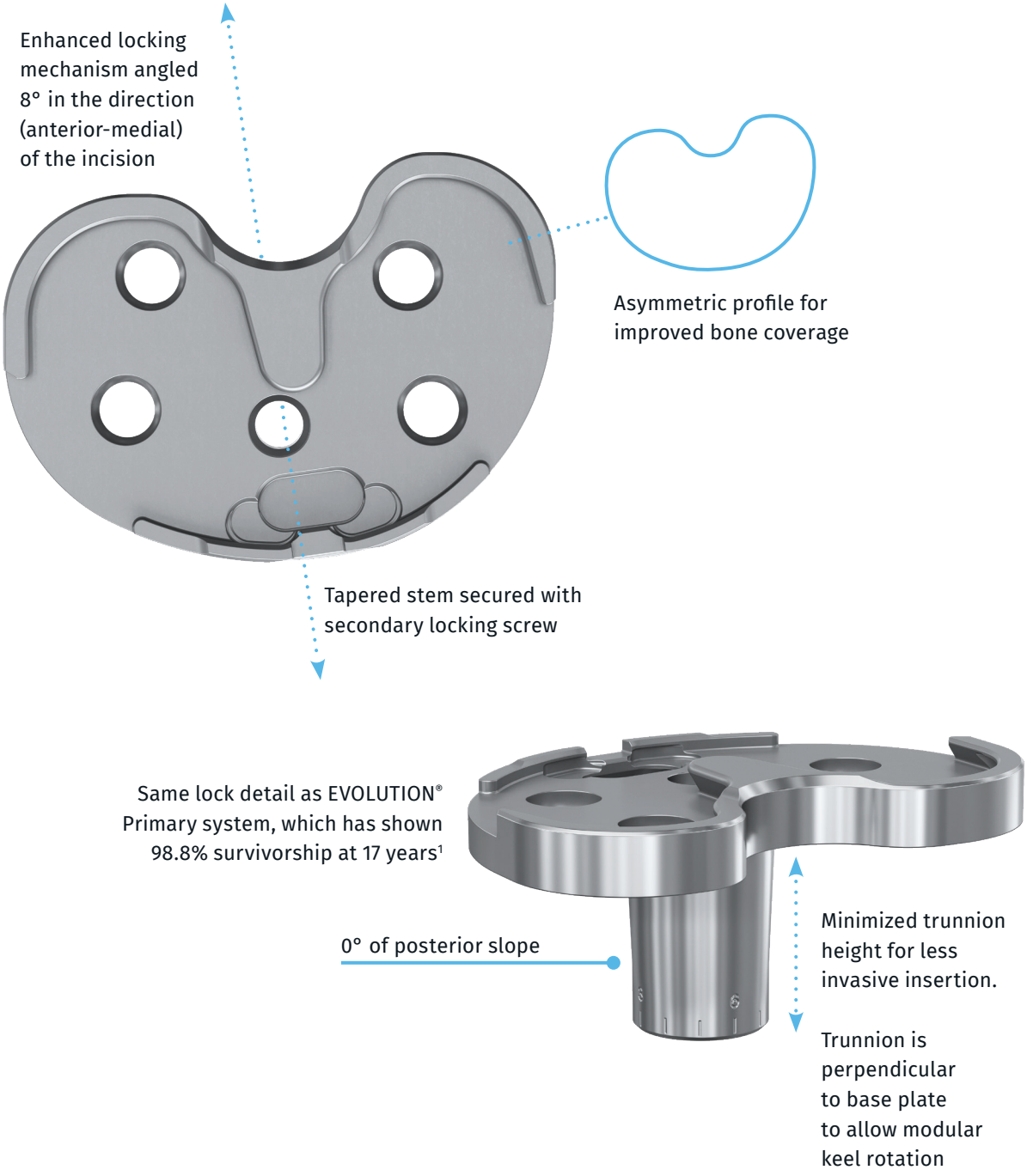




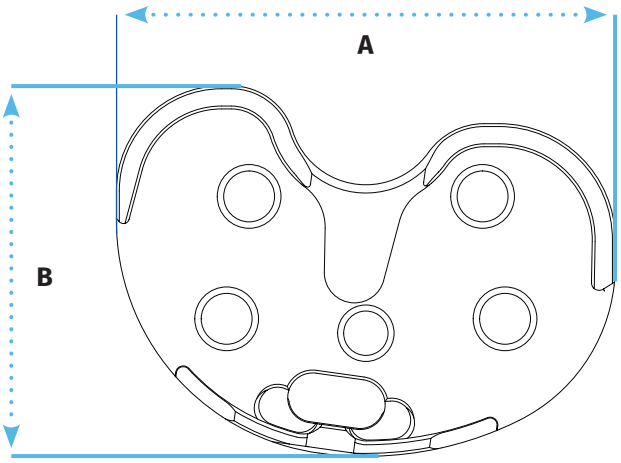
SIZE	A	B	C	D	E	F	G
3	64	57	10	9	19	18	22
4	66	60	10	9	21	18	22
5	69	64	11	9	22	18	22
6	73	68	11	9	23	18	22
7	77	72	11	9	25	20	25
8	80	76	11	9	26	20	25

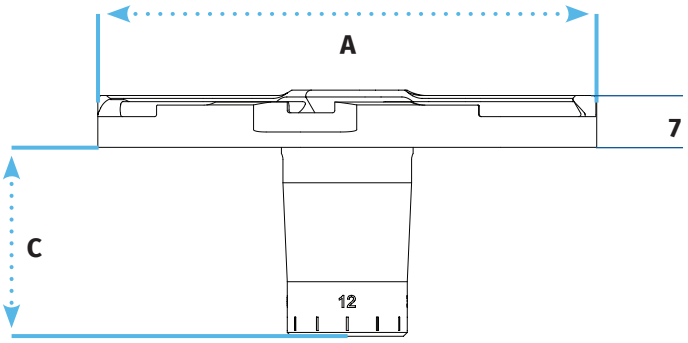
*All dimensions in mm

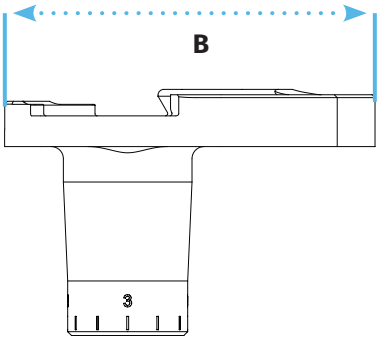
Revision tibial base implant



Specifications





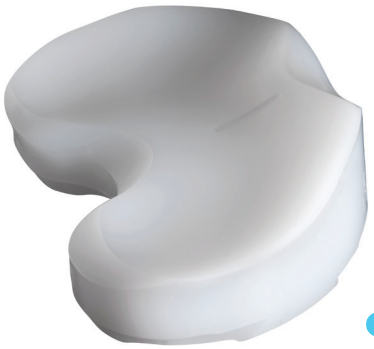


SIZE	A	B	C
1	54	40	25
2	58	43	25
2+	62	46	25
3	62	46	25
4	66	49	25
5	70	52	25
6	74	55	25
6+	78	58	25
7	78	58	25
8	82	61	25
8+	86	64	25

*All dimensions in mm

Medial-Pivot inserts

One-up and one-down size interchangeability



Anterior cut-out to avoid patellar tendon conflict

- 15° arcuate path on the lateral side allows for tibial internal/external rotation[7]
- Allows -8° to 135° extension/flexion range of motion

Post features:

- Reinforcing titanium alloy stabilizing pin
- ±4° of internal/external rotation
- ±2° of varus-valgus constraint
- Screw hole for pass-through locking screw, which provides additional insert fixation
- Allows -5° to 125° extension/flexion range of motion[7]

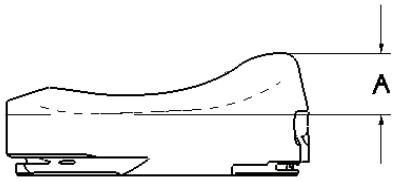
CS sizing insert chart

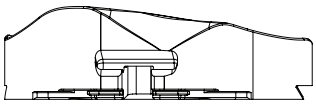
TIBAL BASE \ FEMUR	3	4	5	6	7	8
3	3	3+				
4	4	4	4+			
5		5	5	5+		
6			6	6	6+	
6+				6		
7					7	7+
8					8	8
8+						8

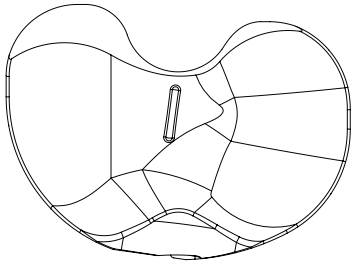
CCK sizing insert chart

TIBAL BASE \ FEMUR	3	4	5	6	7	8
3	3	3				
4	4	4	4			
5		5	5	5		
6			6	6	6+	
6+				6		
7					7	7
8					8	8
8+						8

Insert specifications





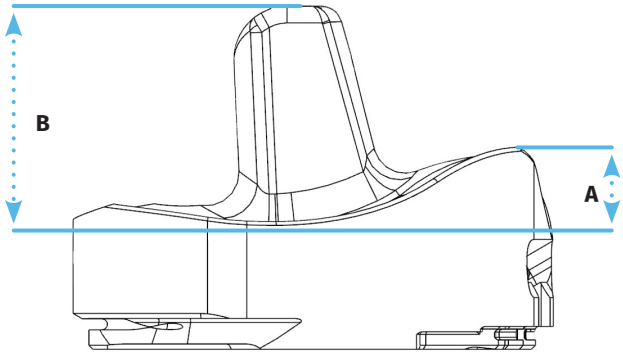


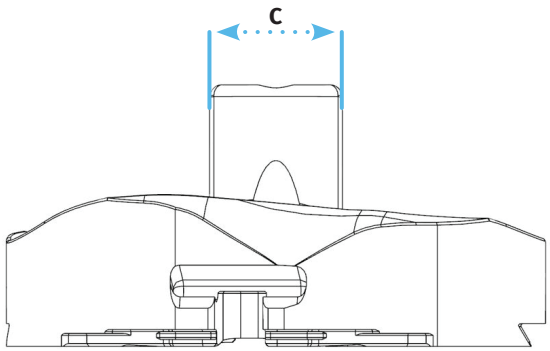
EVOLUTION® CS

Insert available thicknesses
10, 12, 14, 17, 20, 24mm

CS	A
1	11
1+	11
2	11
2+	11
3	11
3+	11
4	11
4+	11
5	11
5+	11
6	11
6+	11
7	11
7+	11
8	12

*All dimensions in mm





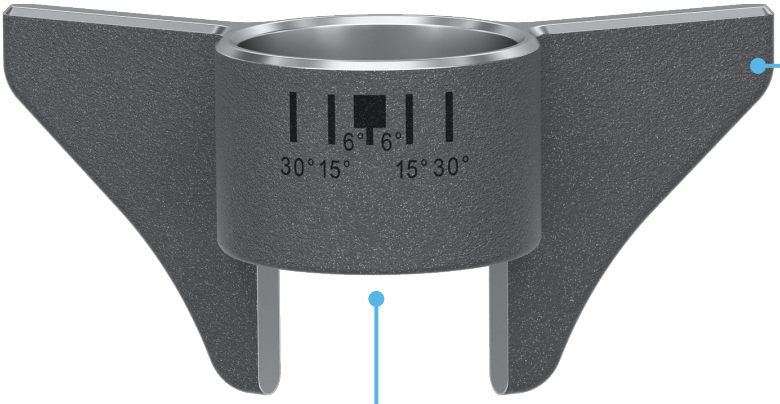
EVOLUTION® CCK

Insert available thicknesses
10, 12, 14, 17, 20, 22, 24mm

SIZE	A	B	C
3	9	23	17
4	10	23	17
5	10	24	17
6	10	25	17
6+	10	26	20
7	10	26	20
8	10	27	20

*All dimensions in mm

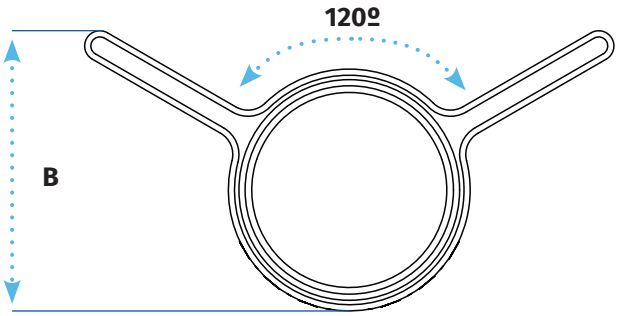
Modular keel

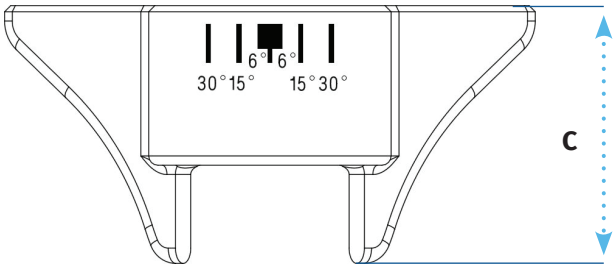


+/- 30° rotation without augments

+/- 6° rotation with augments

Offered in three sizes to optimize rotational stability

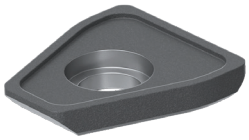
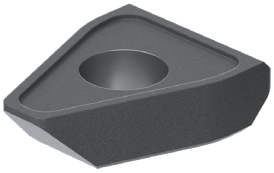
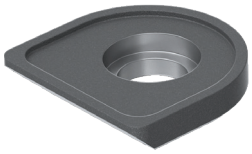
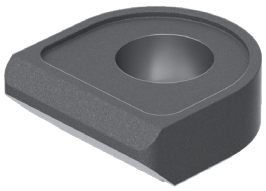
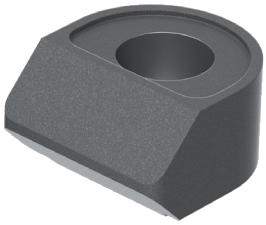




SIZE	B	C
Small	21	17
Medium	23	21
Large	22	23

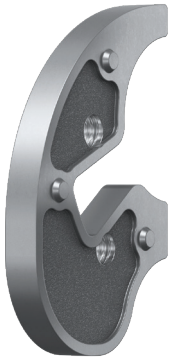
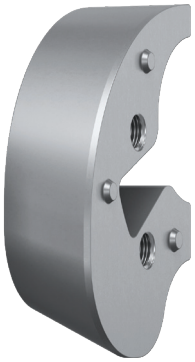
*All dimensions in mm

Femoral augment

	4mm	8mm	12mm
Distal augments Universal for medial/lateral and left/right			
Posterior augments Universal for medial/lateral and left/right			

Secured to femoral component with single, universal, threaded screw

Tibial augment

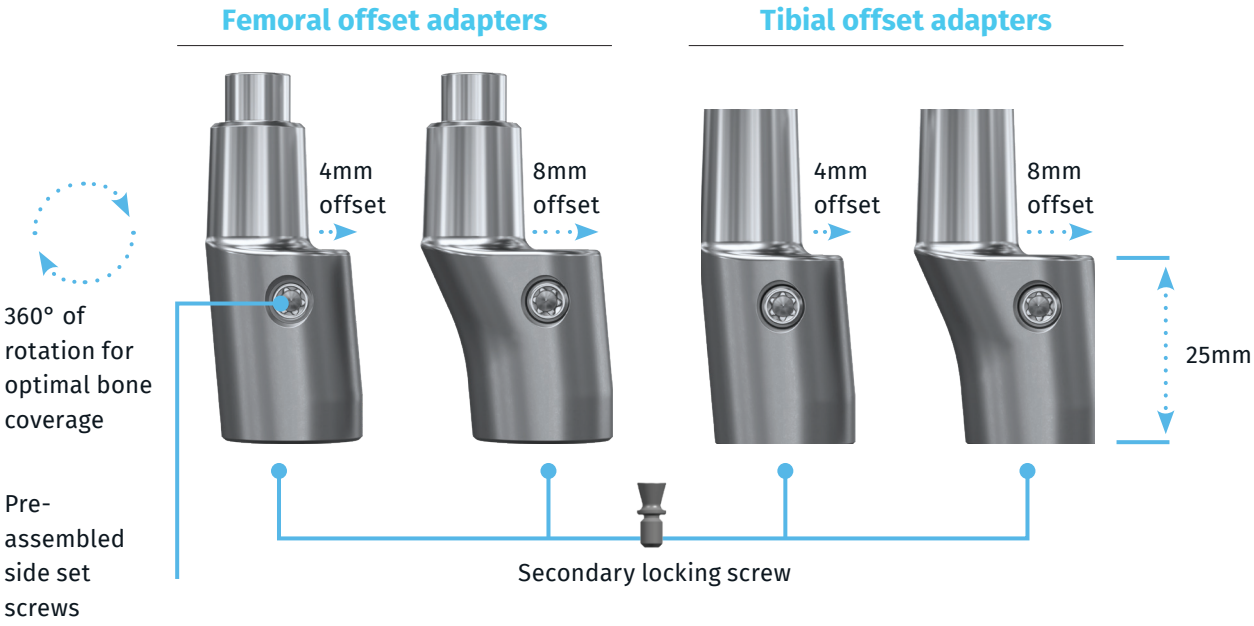
5mm	10mm	15mm
		
Universal left/right, medial-lateral options	Medial/lateral and left/right options	

Can be independently placed to address varying degrees of bone loss

10 and 15mm augments taper to match natural tibial geometry

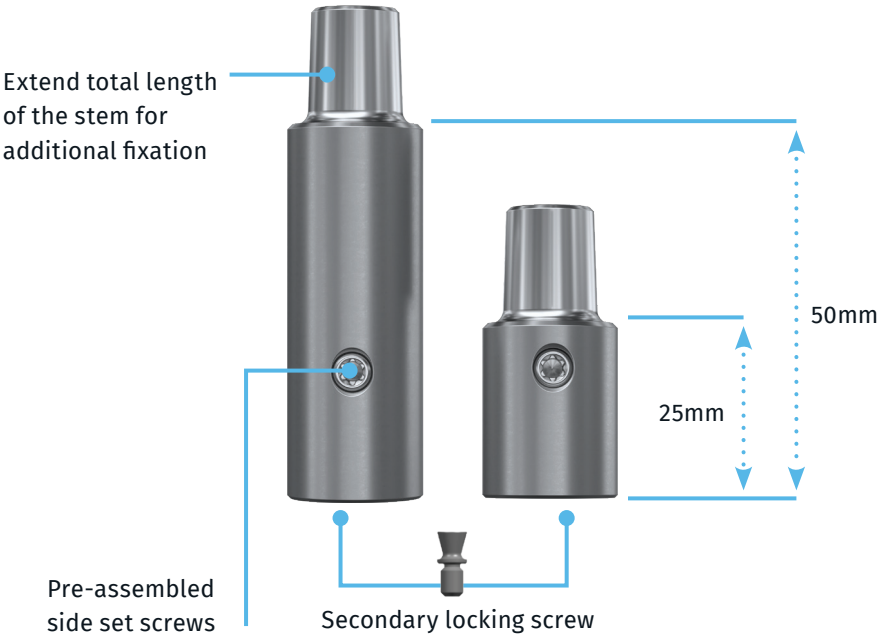
- Taper to 1 size smaller for 10mm augment
- Taper to 2 sizes smaller for 15mm augment

Femoral and tibial offset adapter



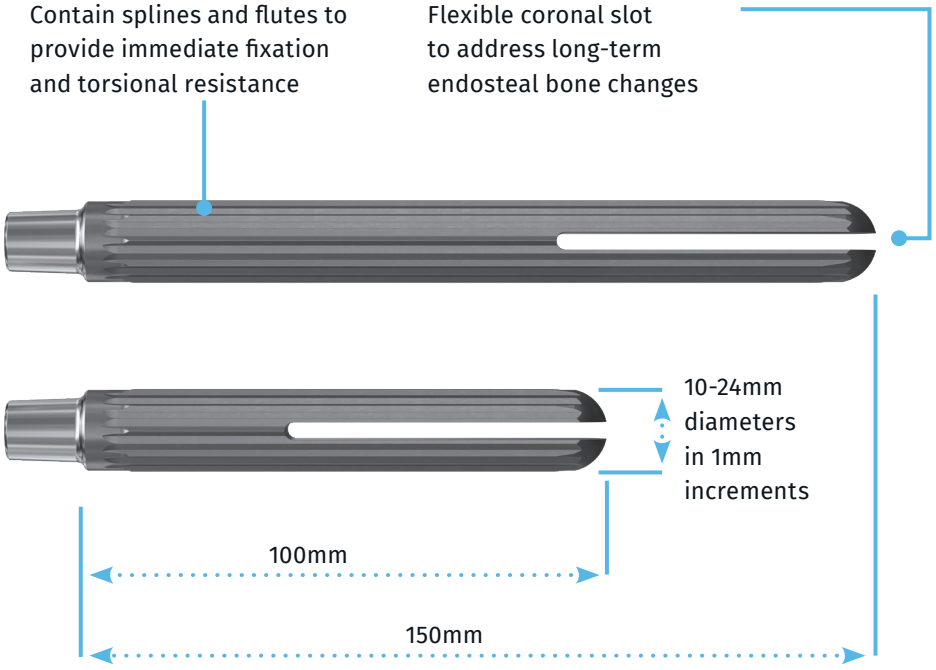
***Note: The femoral and tibial offset adapters are not cross-compatible.**

Extension adapter

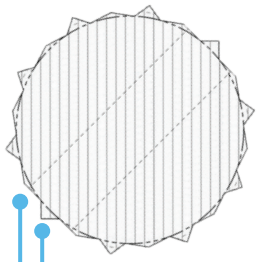


*All dimensions in mm

Canal filling stem



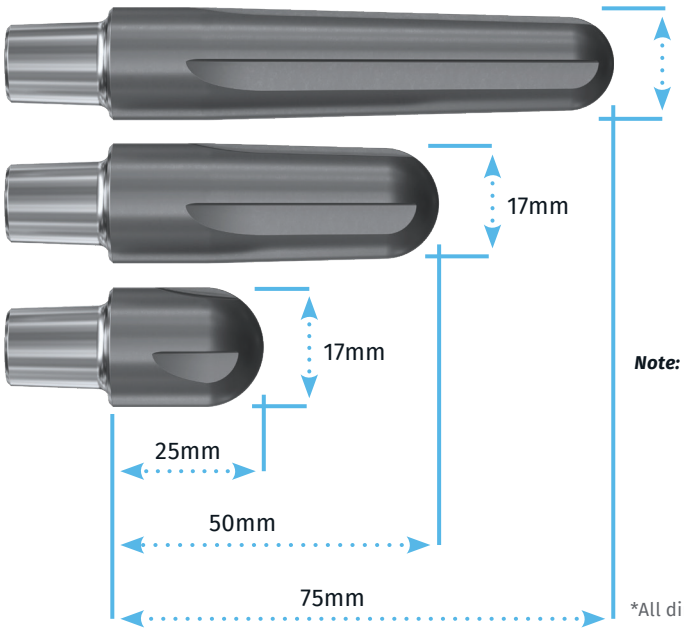
CANAL FILLING STEM CROSS SECTION



Major peak
Major diameter of the splines is 1mm greater than the stated diameter

Minor peak
Minor diameter of the splines is the stated diameter

Cemented stem



Note: The cemented stems taper to match the canal

*All dimensions in mm

Overall construct length

Overall construct length with a 35mm trunnion

OFFSET/EXTENSION ADAPTER LENGTH

STEM LENGTH

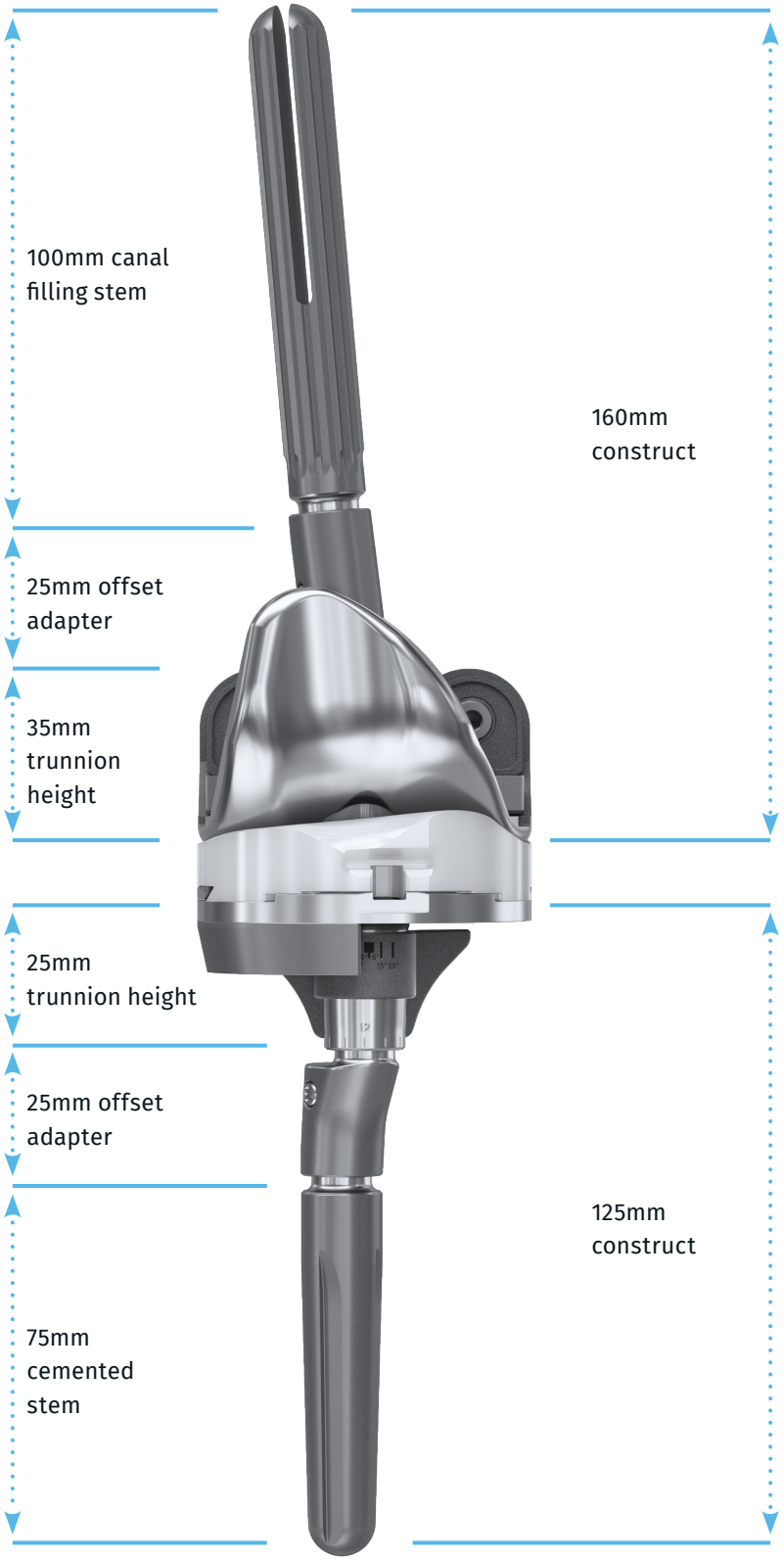
	NONE	25MM	50MM
25mm	65mm	85mm	110mm
50mm	85mm	110mm	135mm
75mm	110mm	135mm	160mm
100mm	135mm	160mm	185mm
150mm	185mm	210mm	235mm

Overall construct length with a 25mm trunnion

OFFSET/EXTENSION ADAPTER LENGTH

STEM LENGTH

	NONE	25MM	50MM
25mm	50mm	75mm	100mm
50mm	75mm	100mm	125mm
75mm	100mm	125mm	150mm
100mm	125mm	150mm	175mm
150mm	175mm	200mm	225mm


100mm canal filling stem
25mm offset adapter
35mm trunnion height
25mm trunnion height
25mm offset adapter
75mm cemented stem
160mm construct
125mm construct

Reference:
1. Based on a retrospective study of Advance® Medial-Pivot. Macheras GA et al A long term clinical outcome of the Medial Pivot Knee Arthroplasty System. Knee. 2017 Mar;24(2):447-453

2. Freeman MA, Pinskerova V. The movement of the knee studied by magnetic resonance imaging. Clin Orthop Relat Res. 2003;410:35-43.

3. Blaha JD "The rationale for a total knee implant that confers anteroposterior stability throughout range of motion" J Arthroplasty 2004 Jun;19(4 Suppl 1):22-6

4. LaMontagne M, et al. Quadriceps and Hamstring Muscle Activation and Function Following Medial Pivot and Posterior Stabilized TKA: Pilot Study

5. Fan CY et al "Primitive Results After Medial-Pivot Knee Arthroplasties" The Journal of Arthroplasty Vol. 25 No. 3 2010

6. Samy DA, Wolfstadt JI, Vaidee I, Backstein DJ. A Retrospective Comparison of a Medial Pivot and Posterior-Stabilized Total Knee Arthroplasty With Respect to Patient-Reported and Radiographic Outcomes. J Arthroplasty. 2018 May;33(5):1379-1383. doi: 10.1016/j.arth.2017.11.049. Epub 2017 Dec 7. PMID: 29276117.

7. MPO benchtop test data on file.

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