knee system solutions

WRIGHT.

# ADVANCE®

## Medial-Pivot and Stemmed Medial-Pivot Knee Systems

THE ADVANCE® MEDIAL-PIVOT KNEE SYSTEM WAS DEVELOPED IN CONJUNCTION WITH:

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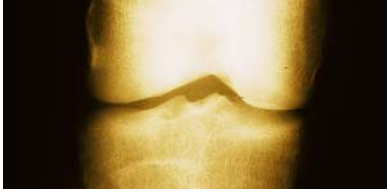
# ADVANCE®
## medial-pivot and stemmed medial-pivot KNEE SYSTEMS

RESTORING natural kinematics and stability



# The new standard in motion and performance.

Both cruciate retaining and substituting knee systems have demonstrated increased survivorship over the last few decades.[1-4] While implant designs and instrumentation have contributed to these improvements, there still exist complications such as irregular kinematics,[5-7] abnormal patellar tracking,[3-9] polyethylene wear,[10-14] and poor range of motion.[15,16]

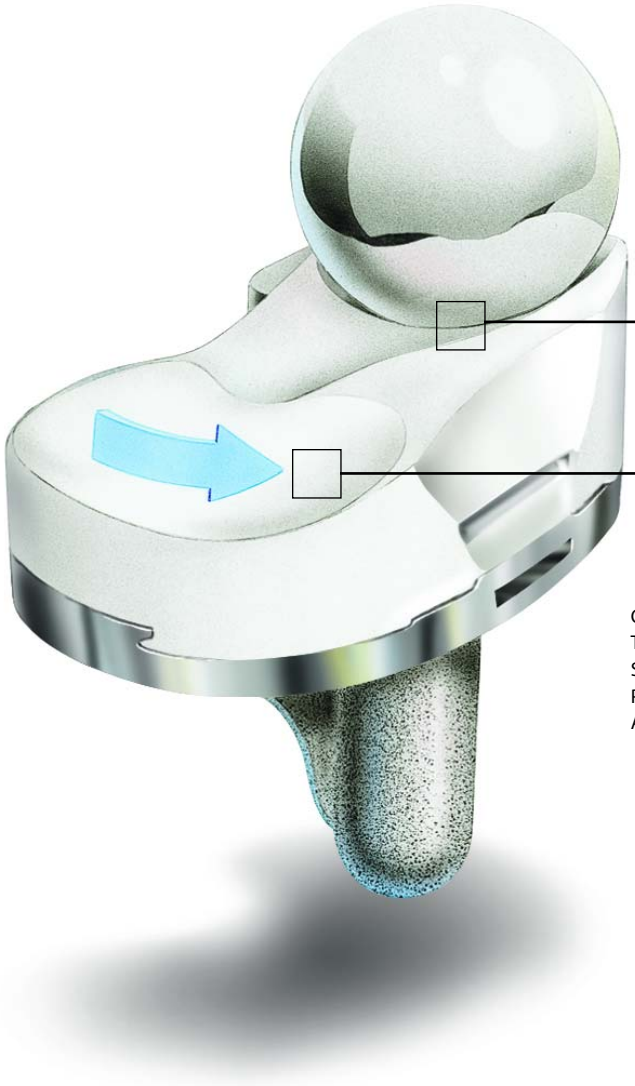
The ADVANCEfi Medial-Pivot and Stemmed Medial-Pivot Total Knee Systems were designed to address these issues by incorporating a breakthrough kinematic design with proven technologies. During development of the systems, the following measurable goals were established:

- RESTORE NORMAL KNEE KINEMATICS AND STABILITY
- IMPROVE CLINICAL WEAR RATES THROUGH INCREASED TIBIOFEMORAL CONTACT AREA AND PREDICTABLE TIBIOFEMORAL MOTION
- OPTIMIZE RANGE OF MOTION (ROM)

# Restoring the kinematics nature intended.

## Anatomic kinematics, minimized wear.

In the normal knee, the tibia pivots about the medial femoral articular surface in flexion. Studies have demonstrated after knee replacement this pivoting is substituted by coupled A/P sliding and rotation. [6,7] This can significantly increase wear and reduce ROM.



THE ADVANCE® MEDIAL-PIVOT TIBIAL INSERT RESTORES NORMAL MEDIAL-PIVOT MOTION BY CREATING A PARTIAL "BALL IN SOCKET" INTERFACE WITH THE ADVANCE® FEMORAL COMPONENT ON THE MEDIAL SIDE.

ON THE LATERAL SIDE, A/P TRANSLATION IS ALLOWED IN A SEMI-CONGRUENT ARCUATE PATH AROUND THE MEDIAL ARTICULATION.

# Implant longevity through lowered wear rates

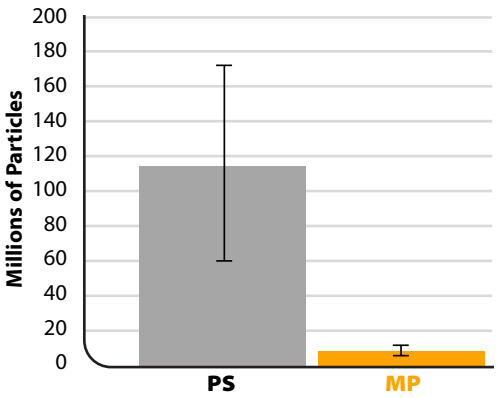



**FIGURE 1 |** Number of Polyethylene Wear Particles of ADVANCE® Medial-Pivot (MP), and Posterior Stabilized (PS) Knees

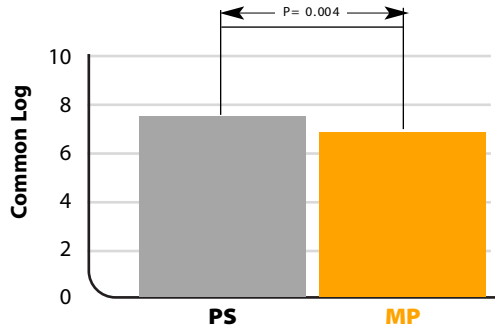



**FIGURE 2 |** Number of Polyethylene Wear Particles of ADVANCE® Medial-Pivot (MP), and Posterior Stabilized (PS) Knees (common log)

With decades of experience in compression molding, our polyethylene supplier's technique of producing a UHMWPE material is unequaled in the industry. Polyethylene products produced from this material by Wright exceed all current industry standards.

To maintain this high quality, after production, our polyethylene components are sterilized with ethylene oxide instead of gamma radiation. Previous studies have shown gamma radiation sterilization increases stiffness and decreases polyethylene toughness.[13] Our EtO sterilization process allows our DURAMER® polyethylene to retain its natural toughness and maximize its wear resistance.[13]

The ability of the ADVANCE® Medial-Pivot Knee to resist polyethylene wear has been verified in clinical studies. Researchers examined a group of total knee recipients implanted with either a standard posterior stabilized knee (Osteonics Scorpio® Knee or Zimmer IB® II Knee) or an ADVANCE® Medial-Pivot Knee. At one year post-implantation, aspirations were taken from the patient's knee joints; and the number of polyethylene particles in the fluid was analyzed. **| FIGURE 1** and **| FIGURE 2** The findings indicated the ADVANCE® Medial-Pivot Knee created

# Enhanced A/P congruency provides stability

## Stopping the slide, Increasing contact area.

Although designed to exhibit roll-back in flexion, traditional total knees instead exhibit a paradoxical slide forward.[6,7] | **FIGURE 3** As well as making the patient feel unstable, this sliding may reduce flexion and increase tibiofemoral sheer stresses.

**FIGURE 3 |** Anterior sliding of traditional total knee implant

Coupled with the constant radius of the femoral component, the raised anterior lip of the ADVANCE® Medial-Pivot Insert resists this paradoxical motion by providing complete medial A/P conformity throughout a range of motion. | **FIGURE 4**

Many contemporary femoral designs incorporate a decreasing radius of curvature throughout flexion, thus contact areas also decrease. | **FIGURE 5** The constant

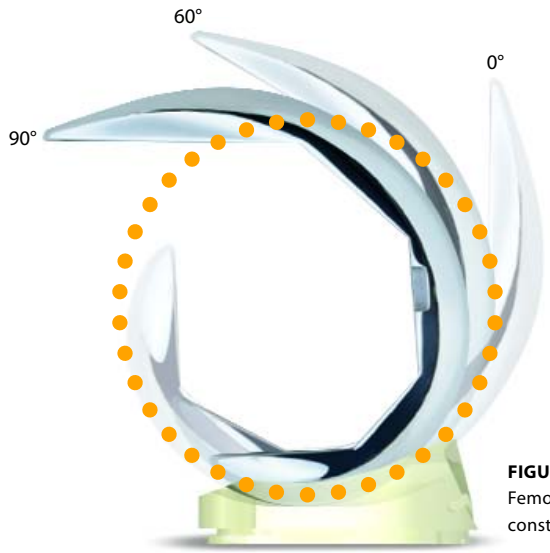
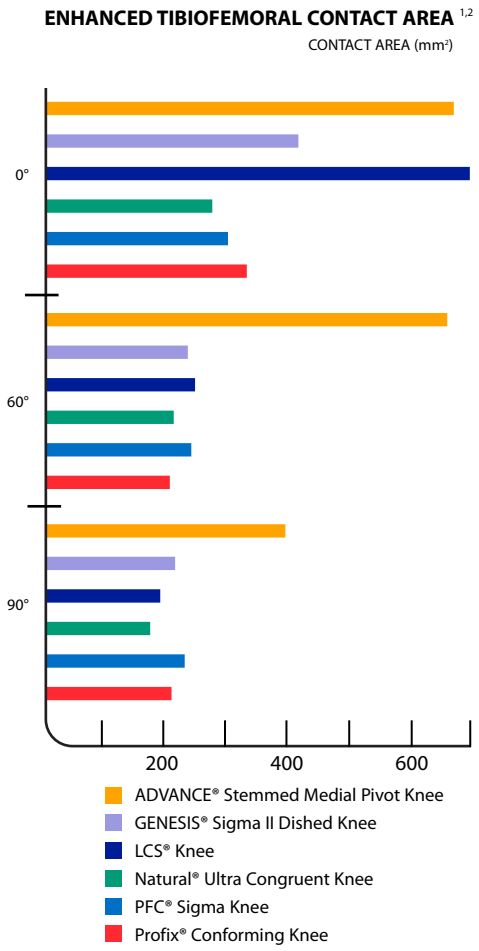



**FIGURE 4 |** ADVANCE® Medial-Pivot Femoral Component features a constant radius from 0° - 90°



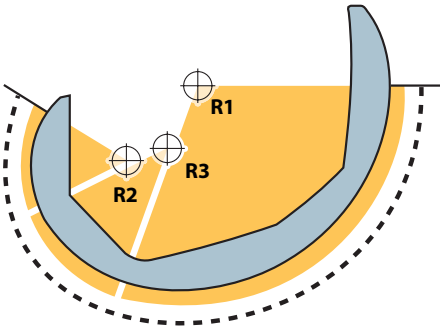




**FIGURE 5 |** Traditional "J-curve" femoral curvatures have contact areas that decrease significantly past 20-30 degrees of flexion.

# A/P stability with no tradeoffs

When the PCL is resected, traditional posterior stabilized prostheses require a spine/cam mechanism to resist the anterior forces that occur during gait. Disadvantages of this mechanism may include:

- DEEP FLEXION DISLOCATION[3,5]
- HIGH SPINE/CAM CONTACT STRESSES
- REMOVAL OF ADDITIONAL STRONG BONE FOR FEMORAL HOUSING
- INTERRUPTED PATELLA TRACK BY FEMORAL HOUSING

# Enhanced A/P and deep flexion stability

Conventional posterior stabilized and revision femorals with posterior stabilized inserts have a vertical jumping distance of 9 to 11mm which varies through ROM. Conventional horizontal jumping distance (the A/P length of the spine apex) may be as short as 1 to 3mm. **| FIGURE 6**

The ADVANCEfi Medial-Pivot and Stemmed Medial-Pivot vertical jumping distance is a constant 11mm through ROM. In addition, the ADVANCEfi horizontal jumping distance is 23 to 32mm, depending on component size. This stability is achieved without a spine and the related complications that may occur with a traditional cam/spine mechanism. **| FIGURE 7** and **| FIGURE 8**

The lowest point of the ADVANCEfi Medial-Pivot insert articular surface is located at the posterior 1/3 of the tibia. This maintains a long quadriceps lever arm through range of motion; avoiding impingement in full flexion. **| FIGURE 7A** and **| FIGURE 8B**

## PCL substitution with bone preservation

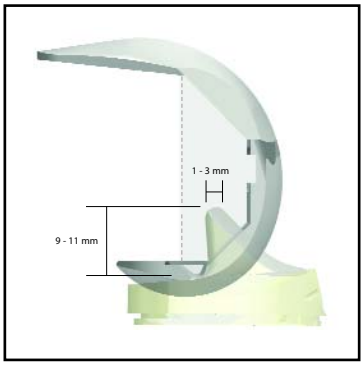



**FIGURE 6 |**

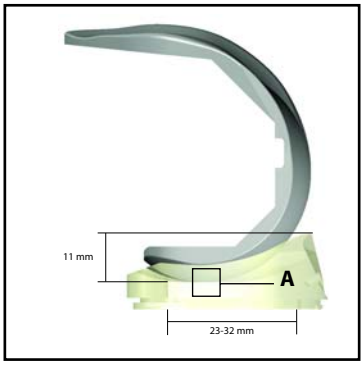



**FIGURE 7 |**

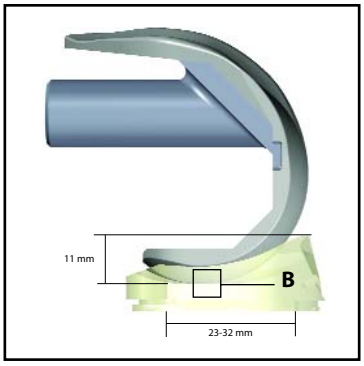



**FIGURE 8 |**

# Restoring anatomic patellofemoral kinematics


**FIGURE 9 |**

Patellofemoral problems contribute significantly to implant related complications. A number of design features have been incorporated into the ADVANCEfi Femoral Component to restore anatomic patellofemoral articulation and improve long-term outcomes.

Studies show the average anatomic trochlear groove is oriented 3.6 relative to the mechanical axis.[18] Traditional femoral implants incorporating a straight (0 ) trochlear groove may cause increased strain in the lateral retinacular tissues.

The ADVANCEfi Femoral Component trochlear groove is angled 3.6 to minimize strain in the lateral retinacular tissues, thus decreasing the need for lateral retinacular release. **| FIGURE 9**

The lateral anterior flange rises 3-4mm above the floor of the trochlear groove and provides resistance to lateral subluxation. **| FIGURE 10** The importance of a raised lateral flange has been previously cited as a necessary design feature to

**ANATOMIC PATELLOFEMORAL KINEMATICS**
To further restore normal patello-femoral kinematics, the sagittal curvature of the patellar groove is designed to closely match normal anatomy.

**INCREASED PATELLAR CONTACT**
The deepened and posteriorly extended trochlear groove of the ADVANCE® femoral component restores anatomic tracking, and maximizes contact through greater flexion angles, thereby reducing contact stress.


**FIGURE 10 |** The lateral anterior flange rises 2.5 to 3.5mm, depending on size

# Think outside the box, to save bone.

The ADVANCEfi Stemmed Medial-Pivot femoral components offer all the surgical options of a traditional revision femoral component such as augments, stem extensions and stability. However,

Porous left and right femoral components with standard 5° valgus angulation allow attachment of cemented or canal filling stem extensions.

Non-porous left and right femoral components with standard 5° valgus angulation allow attachment of cemented or canal filling stem extensions, along with posterior or distal augments.

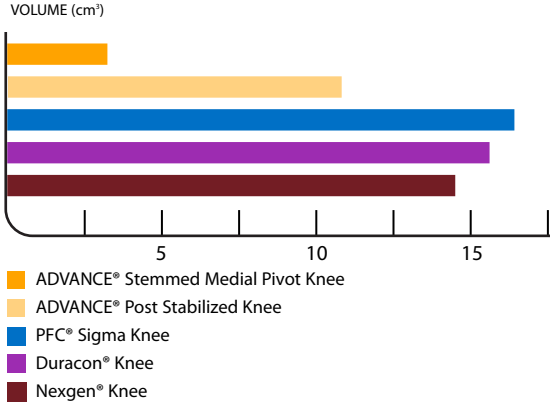
Tapered cemented stem extensions for both the femur and tibia are offered in a variety of diameters to meet specific patient needs.

Canal filling stems (1mm increments) with splines and flutes provide immediate rigid fixation and resistance to torsional movements. A flexible slot provides a dynamic structure to address long-term endosteal bone changes.

Posterior and distal femoral augments (5 and 10mm) can be placed independently to address loss of femoral bone stock.

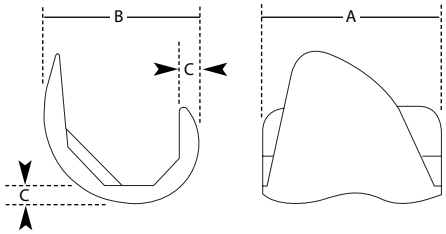
Block (5, 10 and 15mm) and wedge (15°) augments can be independently placed on the tibial base to address varying degrees of bone loss.

**VOLUME OF BONE REMOVED**[20]



# Advanced Components

## FEMORAL

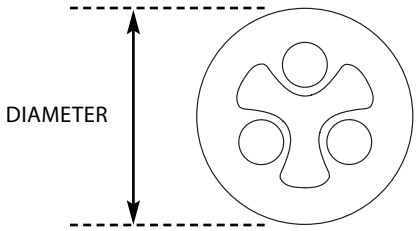



| SIZE | A | B | C |
|---|---|---|---|
| 1 | 60 | 52 | 8 |
| 2 | 65 | 57 | 8 |
| 3 | 70 | 62 | 8 |
| 4 | 75 | 66 | 8 |
| 5 | 80 | 71 | 8 |
| 6* | 85 | 76 | 9 |

* Not available for ADVANCE® Stemmed Medial-Pivot

Porous and Non-Porous CoCr femoral components accommodate patient anatomy, restore natural patellofemoral function, maximize fixation and enhance stress distribution.

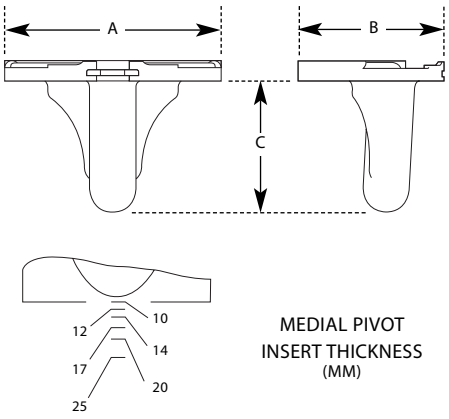
## PATELLAR




| SIZE DIAMETER | | SINGLE PEG | TRIPEG | THICKNESS (MM) |
|---|---|---|---|---|
| 25 | RECESSED | • | N/A | 7 OR 9 |
| 26 | | N/A | • | 8 |
| 28 | RECESSED | • | N/A | 7 OR 9 |
| 29 | | N/A | • | 8 |
| 32 | | • | • | 8 |
| 35 | | • | • | 8 |
| 38 | | • | • | 10 |
| 41 | | • | • | 11 |

All-Poly Patellar Components are offered in both single and tri-peg configurations. Patellar components are completely interchangeable with any size femoral component, improving the flexibility required to match patient anatomy and available bone with implant size. Both designs incorporate cement interlock features. The tri-peg design maintains a constant peg pattern easing intraoperative size changes.

## TIBIAL




| TRAY SIZE | A | B | C | INSERT SIZE |
|---|---|---|---|---|
| 1 | 60 | 41 | 35 | 1 |
| 1+ | 65 | 44 | 35 | 1 |
| 2 | 65 | 44 | 35 | 2 |
| 2+ | 70 | 48 | 43 | 2 |
| 3 | 70 | 48 | 43 | 3 |
| 3+ | 75 | 51 | 43 | 3 |
| 4 | 75 | 51 | 43 | 4 |
| 4+ | 80 | 54 | 50 | 4 |
| 5 | 80 | 54 | 50 | 5 |
| 5+ | 85 | 58 | 50 | 5 |
| 6 | 85 | 58 | 50 | 6 |

The CoCr Tibial Trays are available in 11 sizes (6 regular sizes, 5 “plus” sizes). The 3° posteriorly inclined keel is proportional by size and offers improved rotational control and fixation with less compromise of proximal tibial bone stock. Instrumentation allows control of cement mantle thickness around the stem.

# Advancing the art of reproducibility.

## DISTAL CUT FIRST TECHNIQUE

- Alignment options in 3°, 5° and 7° are available to meet specific patient anatomy.
- Standard and +4mm resection slots along with adjustable pin holes provide multiple distal resection options.

## ANTERIOR ROUGH CUT TECHNIQUE

- Variable distal femoral resection depths and re-cuts are made with a single instrument.
- Flexion-extension blocks provide confirmation of proper joint space prior to femoral chamfer resections.

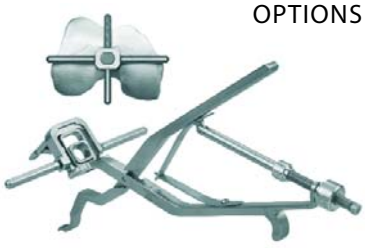
## SRP® TECHNIQUE

- 16 years of clinical use confirms it's accuracy and reproducibility.
- A single intramedullary rod maintains external rotation and valgus alignment for all femoral bone resections.

## TIBIAL OPTIONS

- Tibial guides are available in both left and right crossheads to prevent interference with the patellar tendon.
- A secondary alignment guide ensures proper anatomic positioning of the intramedullary guide.
- Recut block provides easy correction of varus/valgus malalignment.

## CROSSHAIR FEMORAL OPTIONS



- All instrumentation is based on intramedullary rod
- ADVANCE® Sulcus Clamp is first instrumented method to reference A/P axis for external rotation

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