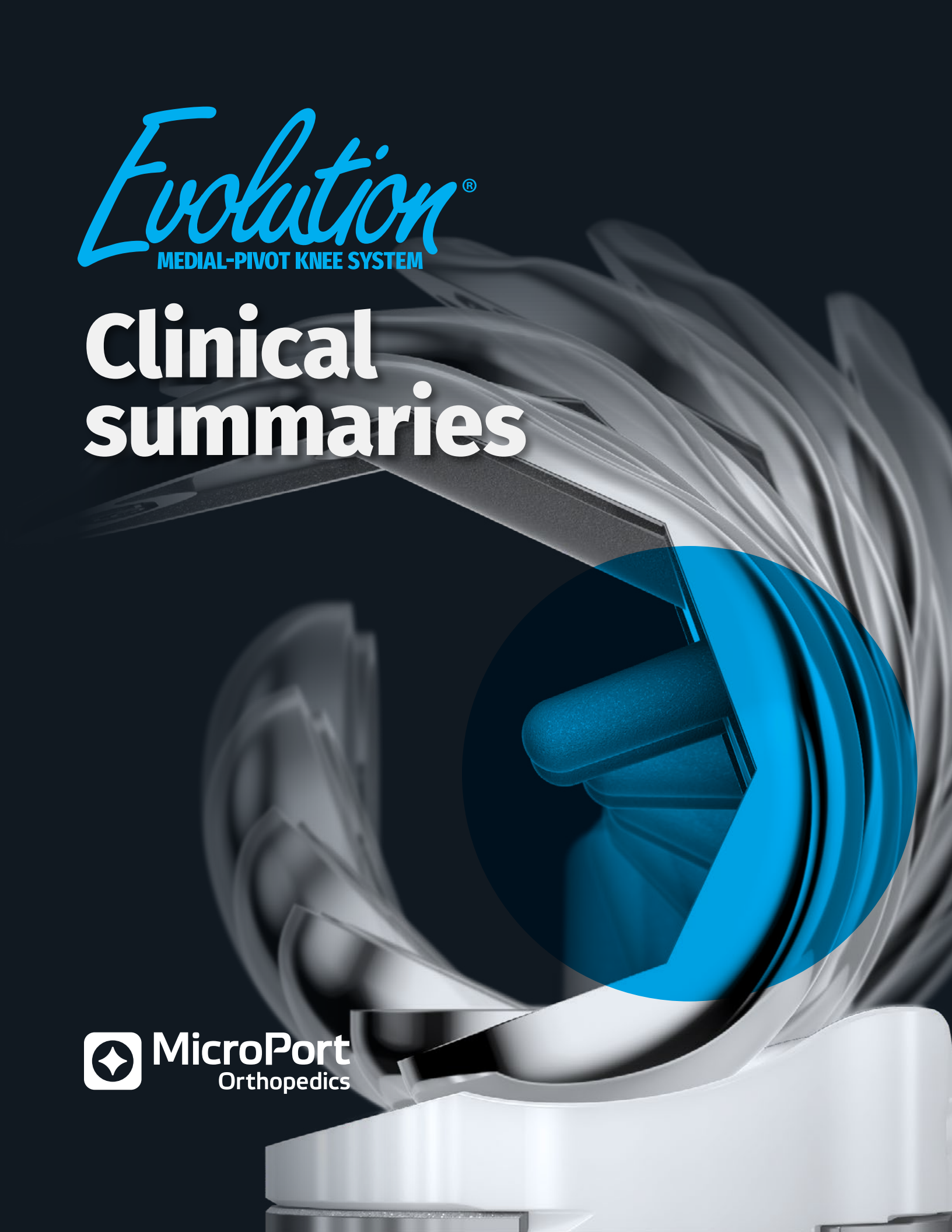
Evolution®

MEDIAL-PIVOT KNEE SYSTEM

Clinical summaries



MicroPort Orthopedics

Clinical summaries

The MicroPort Orthopedics **Evolution® medial-pivot Knee System** and its predessesor, the **Advance® medial-pivot Knee System,** have over 20 years of clinical history. Each of these clinical studies give specific insight into the novel medial-pivot design and it's impact on both patients and healthcare providers.

Important: Many of these clinical studies are specific to either the Evolution® medial-pivot Knee System or the Advance® medial-pivot Knee System. They have been combined in this synopsis based on the similar medial-pivot, ball-in-socket design of both knee systems.

Medial-pivot kinematics

Date	Author	Study Title	Page
2018	**Soeno**	No differences in objective dynamic instability during acceleration of the knee with or without subjective instability post-total knee arthroplasty.	1
2017	**Minoda**	Asymmetric tibial component improved the coverage and rotation of the tibial component in a medial pivot total knee prosthesis.	1
2017	**Mochizuki**	Association between anteroposterior laxity in midrange flexion and subjective healing of instability after total knee arthroplasty.	1
2011	**Barnes**	Kneeling is safe for patients implanted with medial-pivot total knee arthroplasty designs.	1
2011	**Miyazaki**	Analysis of the kinematics of total knee prostheses with a medial pivot design.	2
2005	**Freeman/ Pinskerova**	The movement of the normal tibio-femoral joint.	2
2003	**Komistek**	In vivo fluoroscopic analysis of the normal human knee.	2
2003	**Schmidt**	Fluoroscopic analyses of cruciate-retaining and medial pivot knee implants.	2
2003	**Blaha**	Kinematics of the human knee using an open chain cadaver model.	3
2000	**Freeman/ Pinskerova**	Tibiofemoral movement 1: the shapes and relative movements of the femur and tibia in the unloaded cadaver knee.	3
2000	**Hill**	Tibiofemoral movement 2: the loaded and unloaded living knee studied by MRI.	3
2000	**Nakagawa**	Tibiofemoral movement 3: full flexion in the living knee studied by MRI.	3

Enhanced quadriceps efficiency

Date	Author	Study Title	Page
2019	**Beach**	The effect of knee prosthesis design on tibiofemoral biomechanics during extension tasks following total knee arthroplasty.	4
2014	**LaMontagne**	Quadriceps and hamstring muscle activation and function following medial pivot and posterior stabilized TKA: Pilot study.	4
2012	**Blaha**	Assessment of a medial pivot total knee arthroplasty design in a cadaveric knee extension test model.	4
2002	**Mahoney**	The effect of total knee arthroplasty design on extensor mechanism function.	4

Patient satisfaction

Date	Author	Study Title	Page
2019	**Gill**	Comparison of functional outcome of medial pivot total knee arthroplasty with posterior stabilizing (PS) total knee arthroplasty - a randomized trial.	5
2019	**Nizam**	Early resumption of driving within 3 weeks following patient-specific instrumented total knee arthroplasty: an evaluation of 160 cases.	5
2017	**Samy**	A retrospective comparison of a medial pivot and posterior-stabilized total knee arthroplasty with respect to patient-reported and radiographic outcomes.	5
2016	**Van Overschelde**	Patient satisfaction at 2 months following total knee replacement using a second generation medial-pivot system; follow-up of 250 consecutive cases.	6
2014	**Yuom**	Total knee arthroplasty using a posterior cruciate ligament sacrificing medial pivot knee: Minimum 5-year follow-up results.	6
2014	**Schmidt**	Midterm clinical and radiographic results of the medial-pivot total knee system.	6
2013	**Pritchett**	A comparison of the noise generated from different types of knee prostheses	6
2011	**Pritchett**	Patients prefer a bicruciate-retaining or medial-pivot total knee prosthesis.	6

Wear Properties

Date	Author	Study Title	Page
2013	**Clem**	Long-term wear analysis of retrieved medially pivoting TKA patients.	7
2011	**Schmidt**	In vitro assessment of a cruciate retaining and cruciate sacrificing medially pivoting knee replacement.	7
2003	**Minoda**	Polyethylene wear particles in synovial fluid after TKA.	7

Survivorship

Additional studies

Medial-pivot kinematics

Soeno, 2018

No differences in objective dynamic instability during acceleration of the knee with or without subjective instability post-total knee arthroplasty.

Soeno, T et al.

PLoS ONE 13(3): e0194221

- 92 patients with medial pivot knee implants were examined with an accelerometer to investigate the accelerations along the vertical (VT), mediolateral (ML) and anteroposterposterior (AP) axes.
- There were no differences in dynamic instability, as indicated by acceleration of the knee, between the groups with or without subjective instability, as measured by a self-reported questionnaire.

Minoda, 2017

Asymmetric tibial component improved the coverage and rotation of the tibial component in a medial pivot total knee prosthesis.

Minoda, Y et al.

Journal of Knee Surgery 2018; 31(05): 416-421

- This study presented evidence that the tibial rotation parallel to the AP axis and maximizing coverage of the tibial surface conflict in the conventional symmetric tibial component, but are compatible in the newly introduced asymmetric tibial component.

Mochizuki, 2017

Association between anteroposterior laxity in mid-range flexion and subjective healing of instability after total knee arthroplasty.

Mochizuki, T et al.

Knee Surgery Sports Traumatology Arthr. 25(11) · Nov. 2016

- The objective of the current study was to use fluoroscopy and CT to accurately determine the three-dimensional, in vivo, weight-bearing kinematics of five normal knees in five activities.
- During all five activities, the lateral condyle experienced significantly more anteroposterior translation, leading to axial rotation of the tibia relative to the femur.

Barnes, 2011

Kneeling is safe for patients implanted with medial-pivot total knee arthroplasty designs.

Barnes CL et al.

JOA. 26(4): 549-554.

- Nine Advance® medial-pivot (MP) and 9 Advance® Double-High (DH) TKA's were analyzed under radiographic surveillance at standing, mid kneeling, and full kneeling.
- In vivo tibiofemoral contact positions were obtained using the 3- to 2-dimensional image registration technique.
- This study indicates that kneeling is safe in MP total knee arthroplasties even in the absence of a cam-post or posterior cruciate ligament.
- The patients performed the activity without any discomfort and the femorotibial AP articulation remained within the confines of the design geometry.

Medial-pivot kinematics

Miyazaki, 2011

Analysis of the kinematics of total knee prostheses with a medial pivot design.

Miyazaki Y et al.

JOA. 26(7): 1038-1044.

- Using fluoroscopy and 2D-3D image registration, this study analyzed knee kinematics in patients implanted with various medial pivot implants for a knee bend activity.
- Analysis of the kinematics of the Advance® knee revealed that the amount of movement in the medial condyle was almost fixed while the lateral condyle exhibited negligible movement at early flexion after which is moved posterior at an approximately fixed rate.

Freeman/Pinskerova, 2005

The movement of the normal tibio-femoral joint.

Freeman MR and Pinskerova V.

Journal of Biomechanics. 2005; 38(2): 197-208.

- Using fluoroscopy, MRI, CT, or RSA, this review found that medially the condyle hardly moves antero-posteriorly from 0° to 120°, but the contact area moves backward in flexion, not the condyle.
- Laterally the femoral condyle and the contact area move posteriorly, but to a variable extent in the mid-range causing tibial internal rotation to occur with flexion around a medial axis.

Komistek, 2003

In vivo fluoroscopic analysis of the normal human knee.

Komistek RD, Dennis DA, Mahfouz M.

Clin Orthop Relat Res. 2003; 410:69-81.

- The objective of study was to use fluoroscopy and CT to accurately determine the three-dimensional, in vivo, weight-bearing kinematics of five normal knees in five activities.
- During all five activities, the lateral condyle experienced significantly more anteroposterior translation, leading to axial rotation of the tibia relative to the femur.

Schmidt, 2003

Fluoroscopic analyses of cruciate-retaining and medial pivot knee implants.

Schmidt R, et al.

Clinical Orthopaedics and related research.

2003; 410:139-47.

- Study compared the gait kinematics of the Sigma CR, the Advance® CR, and the Advance® CS using fluoroscopic analysis.
- **Data suggested that the Advance® medial-pivot TKA shows a MP motion during the stance phase of gait with a lower frequency of condylar lift-off than conventional CR designs.**

Medial-pivot kinematics

Blaha, 2003

Kinematics of the human knee using an open chain cadaver model.

Blaha JD et al.

Clin Orthop Relat Res. 2003 May;(410):25-34.

- This study used seven knees from cadavers moved by pulling on the quadriceps tendon in an open chain fashion using video motion analysis to determine the instantaneous helical axis of movement.
- The results of this study show that the medial side of the knee stays stable in spinning kinematics whereas the lateral side has a rolling motion in full flexion progressing to a spinning motion in midflexion and counter-translation near full extension.

Freeman/Pinskerova, 2000

Tibiofemoral movement 1: the shapes and relative movements of the femur and tibia in the unloaded cadaver knee.

H Iwaki, V Pinskerova, MAR Freeman.

JBJS Br, 82-B:8 (2000): 1189-1195.

- The purpose of this study was to determine the shapes and movements of the articular surfaces in six unloaded cadaveric knees.
- **The medial femoral condyle does not move in the AP direction until flexion of 110° is obtained.**
- **Both medial and lateral femoral condyles were found to be circular.**

Hill, 2000

Tibiofemoral movement 2: the loaded and unloaded living knee studied by MRI.

P Hill,H Iwaki, V Pinskerova, MAR Freeman.

JBJS Br, 82-B:8 (2000): 1196-1198.

- This study sought to determine if living knees behaved similarly in terms of motion to the above mentioned findings from cadaver knees.
- Images taken of 13 normal knees in all phases of flexion.
- **Medial AP position did not change from -5° to 110°.**
- **Lateral side rolled forward from flexion to extension.**

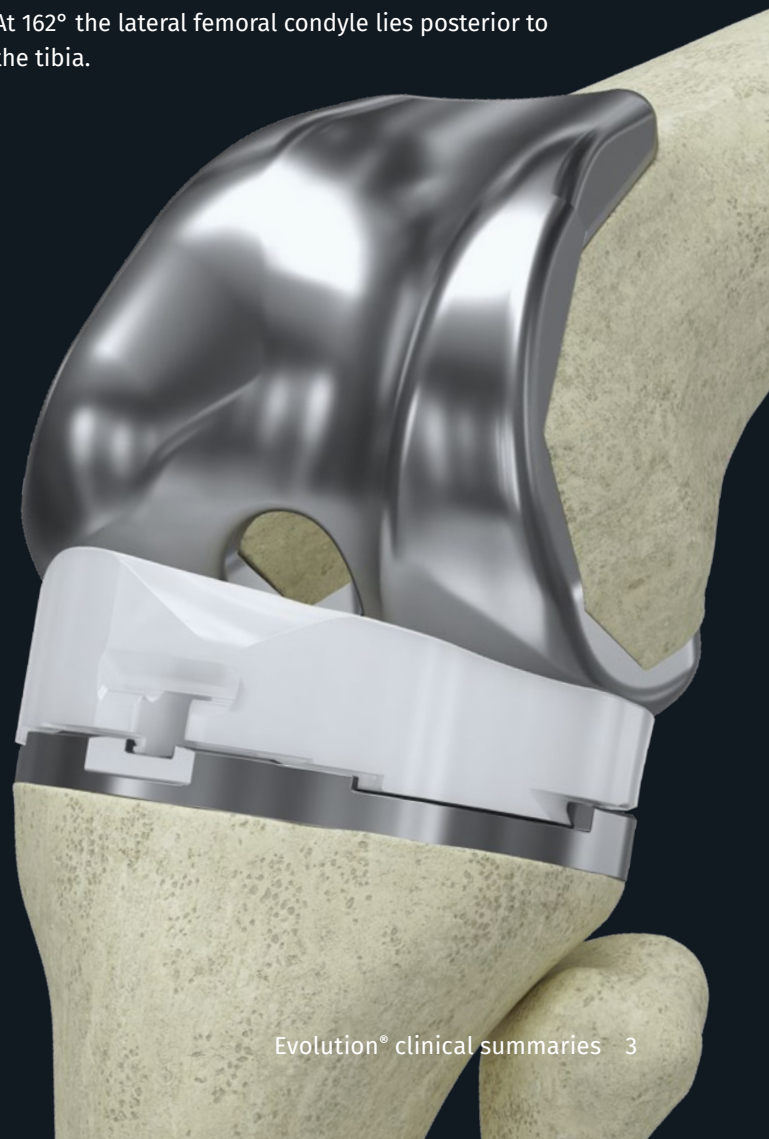
Nakagawa, 2000

Tibiofemoral movement 3: full flexion in the living knee studied by MRI.

S Nakagawa, MAR Freeman et al.

JBJS Br, 82-B:8 (2000): 1199-1200.

- This study examined the active flexion from 90° to 133° and passive flexion to 162° using MRI in 20 unloaded knees.
- 20 adult male volunteers with no knee symptoms and with normal MR images. Mean age was 29.7 years (range of 26-40 years).
- Flexion past that arc was accompanied by backward movement of the medial femoral condyle 4.0 mm and by backward movement laterally of 15 mm, i.e., by internal rotation of the tibia.
- At 162° the lateral femoral condyle lies posterior to the tibia.



Enhanced quadriceps efficiency

Beach, 2019

The effect of knee prosthesis design on tibiofemoral biomechanics during extension tasks following total knee arthroplasty.

Beach A, et al.

Knee. 2019 Oct;26(5):1010-1019.

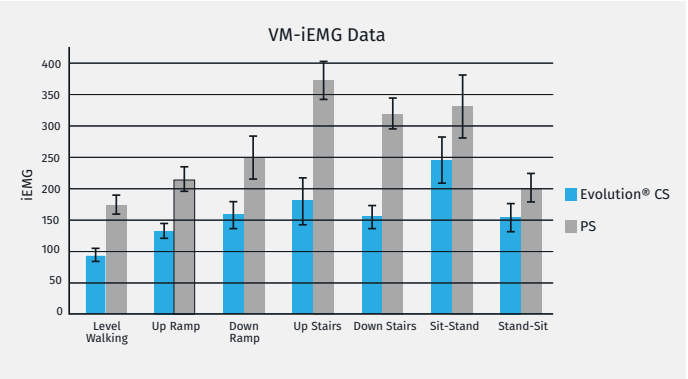
- In this study, the medial-pivot (MP) knee exhibited a greater range of absolute tibial motion compared with the CR knee during the step-ascent task. **Vastus Lateralis muscle during the step-ascent task was significantly lower in activity in the MP group.**

LaMontagne, 2014

Quadriceps and hamstring muscle activation and function following medial pivot and posterior stabilized TKA: Pilot study.

LaMontagne M, et al. 2014. Data on File.

- This study used electromyography (EMG) analysis to examine knee biomechanical function of total knee patients with a Medial Pivot knee during various slopes and surfaces and sit-to stand tasks.
- Specifically, the aim was to investigate the muscle function of the quadriceps and hamstring muscles during certain movements and tasks.
- PS knee patients were used to compare against the Medial Pivot patients.
- **One of the more important findings was that the Medial Pivot patients showed less quad activation in various movements, indicating more efficiency.**



Blaha, 2012

Assessment of a medial pivot total knee arthroplasty design in a cadaveric knee extension test model.

Blaha JD et al.

JOA. 2012; 27(8): 1460-1468.

- This study compared in vivo testing with open-kinematic chain behaviors in cadaver knees implanted with a medial-pivot prosthesis.
- Specimen's limbs were computed tomography scanned, and infrared arrays on tibia and femur were registered to bone markers. Motion of the joint and quadriceps force were reported from 90° flexion to full extension.
- **The prosthesis tested exhibits kinematic behavior similar to that in their normal state, with no difference in quadriceps force required for extension.**

Mahoney, 2002

The effect of total knee arthroplasty design on extensor mechanism function.

Mahoney OM et al.

J Arthroplasty. 2002;17:416.

- This study compared single- and multi- radius knees and the effect they have the extensor mechanism.
- 83 knees had a multi-radius knee and 101 had a single-radius Advance® knee.
- **They found that the patients with a single-radius implant gained flexion more rapidly, were able to rise from a seated position quicker without using their arms, and had significantly less anterior knee pain.**

Patient satisfaction

Gill, 2019

Comparison of functional outcome of medial pivot total knee arthroplasty with posterior stabilizing (PS) total knee arthroplasty - a randomized trial

Gill U.N., et al.

Pakistan Journal of Medical and Health Sciences

- This study examined 35 patients with medial-pivot (MicroPort Orthopedics) against 35 with PS (Zimmer or J&J) had similar knee society scores. **Patients in the medial-pivot group had group significantly better flexion (119.4° vs 113.4°) and better FJS (60.08 vs 47.6) than the PS group at 2 year follow-up.**

Nizam, 2019

Early resumption of driving within 3 weeks following patient-specific instrumented total knee arthroplasty: an evaluation of 160 cases

Nizam I, et al.

J. of ISAKOS: Joint Disorders & Ortho. Sports Med. 2019;4:88-92

- **In total, 108 (72%) patients returned to driving within the first 3 weeks after surgery, of which 15 (10%) patients resumed driving within the first postoperative week, 52 (35%) patients drove in the second week and 41 (28%) returned to driving in the third week.**
- The remaining 41 patients reported that they could have driven earlier but chose not to as they had pre arranged alternatives.
- **Many studies in the literature suggest that time to resuming driving varies from 4 to 8 weeks following TKA.**

95% Patient satisfaction

Samy, 2017

A retrospective comparison of a medial pivot and posterior-stabilized total knee arthroplasty with respect to patient-reported and radiographic outcomes

Samy DA, Wolfstadt JI, Vaidee I, Backstein DJ.

Journal of Arthroplasty. 2018 May;33(5):1379-1383.

- This retrospective study compared outcomes in 76 patients implanted with the Evolution Medial Pivot TKA with 88 patients implanted with a competitive PS TKA at pre-operative, 6 weeks, 6 months and 1 year follow up.
- At 1 year follow-up the range of motion was 121.7 degrees for the MP group and 115.9 for the PS group.
- At 1 year follow-up the Forgotten Joint score was significantly higher in the MP group (MP: 60.5 Vs PS: 48.4) compared to the PS group.
- The study concludes that Evolution MP TKA may offer improved patient outcomes because of it highly congruent medial tibio-femoral articulation.

Macheras, 2017

A long term clinical outcome of the Medial Pivot Knee Arthroplasty System.

Macheras G.A, et al.

Knee. 2017 Mar;24(2):447-453

- 93% of patients experienced very good to excellent pain relief.
- 94% of patients able to perform regular activities and 78% of them reported ability to perform age-appropriate heavy manual work or to take part in sports activities at a mean post-op period of 6 months.
- **For 95%, surgery fulfilled patients expectations at an excellent or a very good level.**
- ROM was improved from 85 to 120 deg on average.
- **Survivorship analysis showed cumulative success rate of 98.8% at 5 and 17 years.**

Patient satisfaction

Van Overschelde, 2016

Patient satisfaction at 2 months following total knee replacement using a second generation medial-pivot system; follow-up of 250 consecutive cases

Van Overschelde PP, et al.

Ann Transl Med. 2016 Sep;4(18):339.

- **The overall very satisfied/satisfied rate was 94.6% at 2 months follow-up for patients implanted with the medial-pivot knee system. After 50 TKRs, satisfaction rate improved to 99.4%.**

Yuom, 2014

Total knee arthroplasty using a posterior cruciate ligament sacrificing medial pivot knee: Minimum 5-year follow-up results.

Yuom Y-S, et al.

Knee Surg Relat Res. 2014. 26(3):135-140.

- The purpose of this study was to evaluate minimum 5-year follow-up clinical and radiological results of TKA using a posterior cruciate ligament sacrificing (PS), non-substituting Advance® Medial Pivot Knee.
- 120 knees were examined in the study.
- KS knee and function scores, as well as WOMAC scores were significantly improved after surgery.
- The seven-year survival rate was 98.1% in the Kaplan-Meier survival analysis.

Schmidt, 2014

Midterm clinical and radiographic results of the medial-pivot total knee system.

Schmidt R, Ogden S, Blaha JD, Alexander A, Fitch DA, Barnes CL. International Orthopaedics. 2014.

- Study found component survivorship (Advance® medial-pivot), excluding revisions for infection or trauma, was 96.6% at five years in 365 TKA's.
- The average Knee Society score was 95.5 at final follow-up, with 358 (98%) having excellent or good results.

Pritchett, 2011

Patients prefer a bicruciate-retaining or medial-pivot total knee prosthesis.

Pritchett J.

JOA. 2011; 26 (2): 224-8.

- Total of 440 patients underwent bilateral TKR using a different prosthesis on each side.
- 5 knee prostheses were used: ACL-PCL retaining, CR, medial or lateral pivot, mobile-bearing, and PS. Patients preferred retention of both their cruciate ligaments or substitution with a medial or lateral pivot prosthesis over all others.
- Author concluded the reasons may have been from increased stability, proprioception and quadriceps efficiency.

Pritchett, 2013

A comparison of the noise generated from different types of knee prostheses

Pritchett, James W.

Journal of Knee Surgery 26.02 (2013): 101-104.

- This prospective study was conducted with 465 (930 knees) patients to evaluate noise after bilateral TKA. A different randomly selected prosthesis was used on each side.
- The prostheses used were medial pivot (MP), anterior and posterior cruciate ligament retaining (ACL-PCL), posterior cruciate ligament retaining (PCL), posterior cruciate-substituting (PS), or mobile bearing (MB).
- Noise-related symptoms were reported by 12% of the patients with MP prostheses, 4% of patients with ACL-PCL, 31% of patients with PCL, 33% of patients with PS, and 42% of patients with MB.
- Occasionally, patients were concerned or dissatisfied with this phenomenon. **Noise was less common with TKAs that used MP and ACL-PCL knee prostheses than with TKAs that used other prostheses.**

Wear-limiting design

Clem, 2013

Long-term wear analysis of retrieved medially-pivoting TKA patients.

Clem WC, Nambu SN, Bible S, Spurgeon GW, Moseley JP.

Data on file with MicroPort Orthopedics.

- The study measured the in-vivo linear wear rate of medial-pivoting tibial inserts using a novel laser scanning technique.
- The average wear rates of the retrieved medial-pivot inserts were **0.052 & 0.030 mm/year** on the medial & lateral compartments respectively.
- The in-vivo wear rates as reported by different manufacturers in the literature **ranged from 0.02-0.67 mm/year. The medial-pivot inserts exhibited lower wear than the reported values.**

Schmidt, 2011

In vitro assessment of a cruciate retaining and cruciate sacrificing medially pivoting knee replacement.

Schmidt R, et al.

Poster No. 1150 ; ORS 2011 Annual Meeting.

- The objective of this study was to determine the wear rates of the Evolution® Total Knee Replacement (TKR) System with conventional polyethylene using an in-vitro wear simulator and compare these results with other knee systems.
- See **chart on right** for the wear rates of the different systems.
- The results for the Evolution® CS illustrate how modern designs with advanced manufacturing techniques can successfully reduce the wear rate of knee replacements without sacrificing fatigue strength in exchange for low wear.

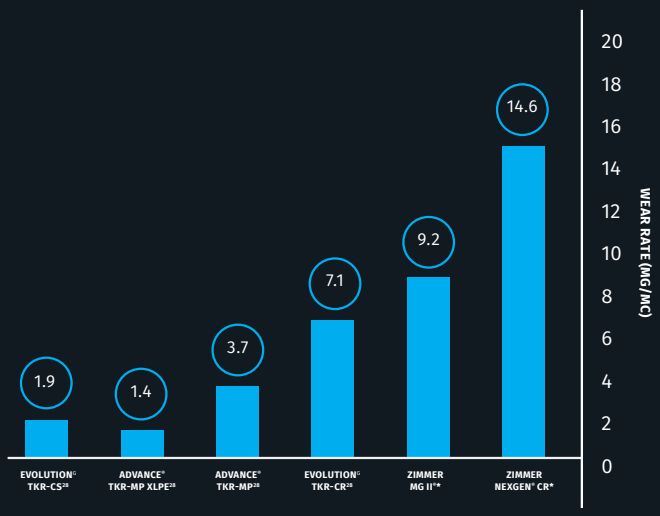
Minoda, 2003

Polyethylene wear particles in synovial fluid after TKA.

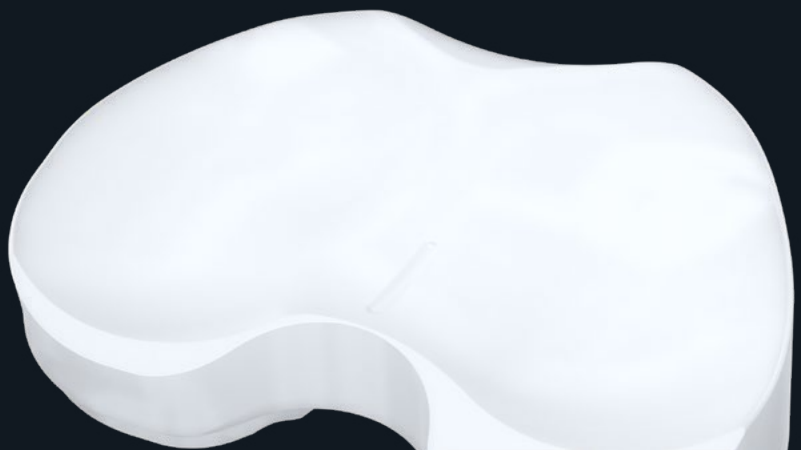
Minoda Y, et al.

Clin Orthop Relat Res. 2003. 410:165-172.

- The aim of this current study was to examine polyethylene particles in synovial fluid at an early stage, and to compare the Advance® Knee System with established PS knees.
- Synovial fluid was obtained 1 year after knee arthroplasty from 17 patients with well-functioning prostheses (22 knees, 11 posterior-stabilized prostheses and 11 medial pivot prostheses).
- There was a statistically significant number of fewer particles found in the medial-pivot knees compared with the PS knees.



**Wear data retrieved from literature sources.*
Wear testing was not performed by MicroPort Orthopedics.
Figure 2 | Wear rates for Evolution®, Advance® and two Zimmer systems



Survivorship

Yuan, 2019

Total Knee Arthroplasty Using a Medial Pivot or Posterior Cruciate-Stabilizing Prosthesis in Chinese Patients.

Yuan D et al.

Journal of Knee Surg. 2019 May 7

- Both the medial-pivot and PS design are safe and reliable, providing satisfactory midterm TKA outcomes in all categories of the HSS knee score and WOMAC score.

Karachalios, 2018

A 9-year outcome study comparing cancellous titanium-coated cementless to cemented tibial components of a single knee design.

Karachalios T, et al.

Journal of Arthroplasty. 2018 Dec;33(12):3672-3677

- 54 patients in each group with **no failures reported for any reason at 9 years (100% survivorship)**.
- **Both groups showed improved objective knee score, objective function score, objective total score, and subjective SF-12, subjective WOMAC, and subjective Oxford knee score.**
- **No implant change in alignment and migration was recorded in either group.** No other adverse radiological signs were observed.

Dehl, 2017

Total knee arthroplasty with the medial-pivot knee system: clinical and radiological outcomes at 9.5 years' mean follow-up.

Dehl M, et al.

Orthop Traumatol Surg Res. 2018 Apr;104(2):185-191

- Mean knee flexion was 110 deg, and average increase of 11.3 degrees.
- The 10 year survival rate was 93% with all revision causes included and **95.9% when revisions due to trauma or infection were excluded.**
- The global KSS was 195 with an average improvement of 85.
- There was no significant difference between knees that underwent patellar resurfacing and those that did not.

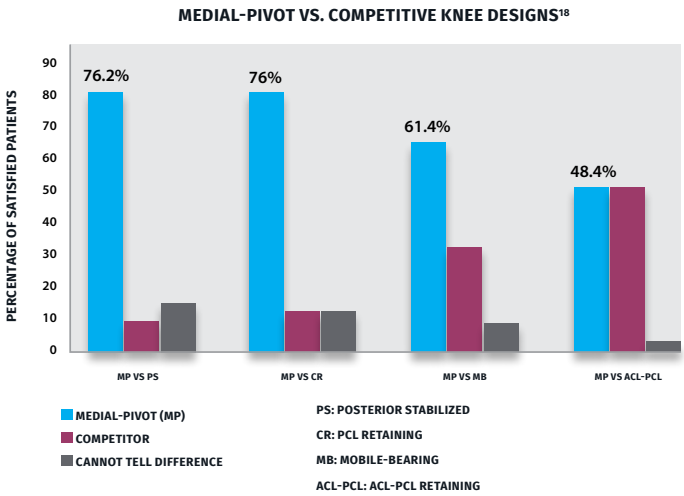
Macheras, 2017

A long term clinical outcome of the medial-pivot Knee Arthroplasty System.

Macheras G.A, et al.

Knee. 2017 Mar;24(2):447-453

- 93% of patients experienced very good to excellent pain relief.
- 94% of patients able to perform regular activities and 78% of them reported ability to perform age-appropriate heavy manual work or to take part in sports activitiesat a mean post-op period of 6 months.
- **For 95% of patients, surgery fulfilled expectations at an excellent or very good level.**
- ROM was improved from 85 to 120 deg on average.
- **Survivorship analysis showed cumulative success rate of 98.8% at 5 and 17 years.**



98.8%
Survivorship at 17 years.[1]

Survivorship

Bae, 2016

Comparison of midterm clinical and radiographic results between total knee arthroplasties using medial pivot and posterior-stabilized prosthesis - a matched pair analysis.

Bae D.K, et al.

Journal of Arthroplasty. 2016 Feb;31(2):419-24

- The most important finding of the present study was that the improvement of the clinical scores and radiographic results including patellofemoral joint symptoms and survival rates were similar between the medial-pivot and posterior-stabilized groups, with a low incidence of patellofemoral complications.

Bordini, 2016

Long-term survivorship of a medial-pivot total knee system compared with other cemented designs in an arthroplasty registry

Bordini B, et al.

Journal of Orthop Surg Res. 2016; 11: 44

- There were 506 TKAs performed with the subject system by 30 orthopedic surgeons at more than ten hospitals. The mean follow-up was 6.6 years and there were no intraoperative complications reported. **The Kaplan-Meier survivorship estimate at 10 years was 96.3 % (95 % CI, 94.5–98.1)**

Karachalios, 2016

An 11- to 15-year clinical outcome study of the Advance® medial-pivot total knee arthroplasty

Karachalios T, et al.

Bone Joint J. 2016 Aug;98-B(8):1050-5

- Mean follow-up was 13.4 years (11 to 15). 195 patients with 251 TKAs were available with 179 having complete recordings from all time intervals. (Same cohort of patients evaluated in 2008.)
- Mean ROM showed statistically significant improvement from 101 to 117 deg.
- **There was a statistically significant improvement in all objective and subjective outcome scores and the cumulative success rate was high, at 97.3%at 15 years with revision for all causes as the end point.**

Chinzei, 2014

Satisfactory results at 8 years mean follow-up after Advance® medial-pivot TKA.

Chinzei N, et al.

Knee .2014; 21(2):387-390.

- This study aimed to investigate the clinical and radiological results and complications of 76 TKA's using the Advance® medial-pivot, at mid-term follow-up.
- **Survivorship analysis indicated a success rate of 98.3%.**
- Patients achieved excellent clinical and radiographic results without any implant-related failures at mid-term follow-up.

Fitch/Sedacki, 2014

Mid- to long-term outcomes of a medial-pivot system for primary total knee replacement – A systematic review and meta-analysis.

DA Fitch, PhD, K Sedacki, MS, Y Yang, MA, MS, Biostatistician

Bone Joint Res. 2014 Oct; 3(10): 297-304.

- Included 8 studies with a total of 1146 TKR's performed in 6 countries.
- **The pooled component survivorship estimates were 99.2% and 97.6% at 5 and 8 years, respectively.**
- Additionally, the weighted mean post-operative KSS was 87.9, in the excellent range.

Survivorship

Schmidt, 2014

Midterm clinical and radiographic results of the medial pivot total knee system.

Schmidt R, Ogden S, Blaha JD, Alexander A, Fitch DA, Barnes CL.

International Orthopaedics. 2014.

- Study found component survivorship (Advance® medial-pivot), excluding revisions for infection or trauma, was 96.6% at five years in 365 TKA's.
- **The average Knee Society score was 95.5 at final follow-up, with 358 (98%) having excellent or good results.**

Yuom, 2014

Total knee arthroplasty using a posterior cruciate ligament sacrificing medial pivot knee: Minimum 5-year follow-up results.

Yuom Y-S, et al.

Knee Surg Relat Res. 2014. 26(3):135-140.

- The purpose of this study was to evaluate minimum 5-year follow-up clinical and radiological results of TKA using a posterior cruciate ligament sacrificing (PS), non-substituting Advance Medial Pivot Knee.
- 120 knees were examined in the study.
- KS knee and function scores, as well as WOMAC scores were significantly improved after surgery.
- **The seven-year survival rate was 98.1% in the Kaplan-Meier survival analysis.**

Brinkman, 2014

Midterm results using a medial pivot total knee replacement compared with the Australian National Joint Replacement Registry data.

Brinkman, Justus-Martijn, et al.

ANZ journal of surgery 84.3 (2014): 172-176.

- 50 consecutive knee replacements using a medial pivot-type knee replacement were compared with the results in the Australian Orthopaedic Association National Joint Replacement Registry.
- There was no statistically significant difference in revision rate compared with the registry results.
- The medial pivot knee-type implant in this series provided pain relief, functional improvement and a revision rate, similar to what is reported in the literature.

Vecchini, 2012

Clinical and radiologic outcomes of total knee arthroplasty using the Advance® Medial Pivot prosthesis. A mean 7-years follow-up.

Vecchini E, et al.

The Knee. 2012; 19: 851-855.

- The purpose of this study was to evaluate clinical and radiologic results of the 172 Advance® Medial Pivot Total Knee Arthroplasties, at a mean follow-up of 7 years.
- **The Kaplan–Meier survivorship analysis showed a cumulative success rate of 98.6%.**

Survivorship

Bae, 2012

Clinical outcome of total knee arthroplasty with medial-pivot prosthesis: A comparative study between the cruciate retaining and sacrificing.

Bae DK et al.

JOA. 26(5): 693-698.

- The purpose of this study is to evaluate results after total knee arthroplasty using a medial pivot prosthesis with the posterior cruciate ligament (PCL)-retaining and PCL-sacrificing techniques.
- 67 CR knees and 70 CS knees were included in the study.
- The clinical results of total knee arthroplasty with a medial-pivot prosthesis were satisfactory, whether the PCL was retained or sacrificed.

Fan, 2010

Primitive results after medial-pivot knee arthroplasties: A minimum 5-year follow-up study.

Fan, Cheng-Yu, et al.

JOA.25.3 (2010): 492-496.

- 58 medial-pivot TKA were enrolled with a minimum 5-year follow-up.
- The Knee Society score improved from 30.5 to 91.1 in objective and from 36.7 to 82.3 in functional scale.
- **The medial-pivot TKA provided significant improvement in the postoperative range of motion, objective Knee Society score, pain scale, and functional score (P < .05) statistically.**

Anderson, 2010

Medium-term results of total knee arthroplasty using a medially pivoting implant: A multicenter study.

MJ Anderson, et al.

J of Surg Orthop Adv, 19:4 (2010) p. 191-195.

- This study evaluated the performance of the Advance® medial-pivot (MP) TKA after a mean follow-up of 5.4 years.
- Multicenter, prospective clinical study of 276 patients who underwent primary TKA with Advance® medial-pivot TKAs.
- Survivorship was 97.4% with revision or loosening as the endpoint.

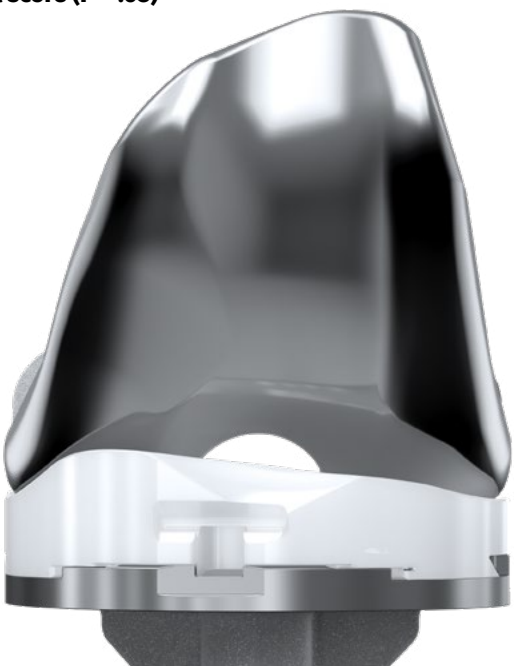
Karachalios, 2009

A mid-term clinical outcome study of the Advance® medial-pivot knee arthroplasty.

Karachalios T, et al.

The Knee. 2009. 16(6):484-8.

- Prospective clinical outcome study of 284 arthroplasties in 225 consecutive patients with a mean follow-up of 6.7 years (range 4 to 9 years).
- **Survival analysis showed a cumulative success rate of 99.1% at 5 years.**
- This study demonstrates satisfactory mid-term clinical results for this knee design.



Additional studies

Yamamura, 2019

Design improvement in patient-specific instrumentation for total knee arthroplasty improved the accuracy of the tibial prosthetic alignment in the coronal and axial planes

Yamamura K, et al.

Knee Surg Sports Traumatol Arthrosc. 2019 Jun 2

- The most important finding of this study was that the improvement of the PSI, including MicroPort Prophecy® design enhanced its accuracy. Larger contact area, rotational marker on PSI, connection to the extramedullary guide, and AP marker pin proved significantly effective for the improvement of coronal and axial alignments of the tibial component.

Nizam, 2018

Accuracy of bone resection in total knee arthroplasty using CT assisted-3D printed patient specific cutting guides

Nizam I, et al.

SICOT J. 2018;4:29

- Caliper readings post resection on comparison with the proposed resections, revealed that 90% of the overall readings showed resection error ≤ 1mm (P<0.0001).

Minoda, 2017

Asymmetric tibial component improved the coverage and rotation of the tibial component in a medial pivot total knee prosthesis.

Minoda, Y et al.

Journal of Knee Surgery 2018; 31(05): 416-421

- This study presented evidence that the tibial rotation parallel to the AP axis and maximizing coverage of the tibial surface conflict in the conventional symmetric tibial component, but are compatible in the newly introduced asymmetric tibial component.

Notes

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MicroPort Orthopedics

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