

How the ATTUNE® Knee System Supports Many Patient Profiles – From Active to Aging

More than 600,000 total knee replacements (TKRs) are performed each year in the United States,¹ with projected growth by 85%, to 1.26 million procedures, by 2030.² As the number of individuals undergoing TKR increases, it is important for the implant to be able to support a more diverse patient profile. Additionally, the healthcare landscape is evolving to focus more on meeting clinical needs and providing value. With these growing trends, there is an urgency to generate not only positive clinical outcomes, but to improve patient satisfaction and decrease healthcare cost.

DePuy Synthes recognized this trend and spent more than six years - the company's largest ever research and development program - to develop the ATTUNE® Knee System, which is designed to work in harmony with the patient's native knee muscles and ligaments to increase stability and reduce pain.

Now, more than five years since its introduction, the ATTUNE Knee has distinguished itself in many ways due in part to the design of the implants, the INTUITION™ Instrumentation, the adjustable sizing and the flexibility and precision it gives surgeons in tailoring their approach for patients.

Dr. Anna Kulidjian*, La Jolla, CA, believes that the ATTUNE Knee introduced changes into the paradigm of total knee replacement that allows a surgeon to be more precise in achieving the goals they've set out for themselves and their patient. *"I believe the ATTUNE Knee makes it easier for the surgeon to correct the arthritic deformity of a patients' knee by being more congruent and stable, helping achieve alignment for a particular patient. It simplifies soft tissue balancing and I see patients recover faster."*

Surgeon experience is backed by clinical evidence

As of August 2018, more than 675,000 ATTUNE Knee implants have been provided for patients around the world and the broad clinical evidence from registry data and clinical studies supports the performance of this implant.

Results to date show implant survivorship rates are in line with the comparator as indicated in four separate registries:

- The National Joint Registries for England, Wales, Northern Ireland and the Isle of Man (NJR)³,
- The Australian Orthopaedic Association National Joint Registry (AOANJRR)⁴,
- The Michigan Arthroplasty Registry⁵,
- The Kaiser Total Joint Registry.⁶

Furthermore, one-year results from two worldwide studies showed improved patient reported outcomes with the ATTUNE Knee compared to other leading knee systems.⁷ In a database analysis, patients who received TKR with the ATTUNE Knee had a slightly shorter Length of Stay (LOS) and were

less likely to be discharged to a skilled nursing facility (SNF) and more likely to be discharged home versus patients in the study who received a Triathlon™ Knee.⁸

Additionally, in one clinical study, physical therapists noted that patients who received the ATTUNE Knee System did the following compared to other knee replacement patients:

- Had significantly greater range of motion when evaluated at two and six weeks after surgery,
- Required less time to meet the necessary criteria to leave the hospital.⁹

Surgeons are seeking more precision with multiple instrumentation options

The ideal system for TKR provides instrumentation options that allow surgeons to perform TKR with their preferred method, and the ATTUNE Knee was designed to allow for such flexibility.

Surgeons seeking more precision are able to take advantage of DePuy Synthes' award-winning INTUITION Instruments designed to combine the surgical process with intuitive and efficient instruments to allow the surgeon to balance the soft tissue and precisely control the implant position and fit for each patient.

Dr. Jeffrey Jaglowski*, Houston, TX, says that *“my experience with ATTUNE compared to competitive knee systems has been that the overall system and the intraoperative instruments are very user friendly. The INTUITION instruments are very easy to construct for our scrub techs. They are very easy to handle. They are very clear in what you are trying to achieve, and they are very modular.”*

The ability to upsize or downsize implants allows surgeons to better match individual components (e.g., the tibial bearing component and the femur) thereby reducing the kinematic and stability issues patients experience with other devices.¹⁰

Dr. Andrew Spitzer*, Los Angeles, CA, says that DePuy Synthes has developed a design for responding to *“many of the challenging issues that we faced in knee replacements, such as instability, patellofemoral problems, anterior knee pain, and versatility in terms of sizing as well. At the time of surgery, the design really helps us tailor the prosthesis to the individual anatomy and the individual needs. In addition, my experience has been that all of those design kinematic features really alter, improve and accelerate what happens with the patient after surgery.”*

As demonstrated in the comprehensive evidence from national joint registries, local/state registries, DePuy Synthes sponsored studies (company initiated, and investigator initiated), and independent studies, the ATTUNE Knee helps surgeons provide treatment options that may improve outcomes for their patients compared to other knee brands, with instruments and implants that support the changing needs of different patient populations.

¹The American Academy of Orthopaedic Surgeons. Beyond Surgery Day: The Full Impact of Knee Replacements. 2018. <https://www.anationinmotion.org/value/knee/>

²Sloan M, Premkumar A, Sheth N. "Projected Volume of Primary Total Joint Arthroplasty in the U.S., 2014 to 2030. The Journal of Bone and Joint Surgery, 2018.

https://journals.lww.com/jbjsjournal/Abstract/2018/09050/Projected_Volume_of_Primary_Total_Joint.3.aspx

³National Joint Registry for England, Wales, Northern Ireland and the Isle of Man 15th Annual Report 2018. Table 3.25, 3.27 and 3.29. [Accessed 3 October 2018 from

<http://www.njrreports.org.uk/Portals/0/PDFdownloads/NJR%2015th%20Annual%20Report%202018.pdf>

⁴Australian Orthopaedic Association National Joint Replacement Registry (AOANJRR). Hip, Knee & Shoulder Arthroplasty, AOA, Adelaide; 2018:1-442. Tables KT7, KT31 and KT32. [Accessed 1 October 2018 from

<https://aoanjrr.sahmri.com/documents/10180/576950/Hip%2C%20Knee%20%26%20Shoulder%20Arthroplasty>

Table KT7 Cumulative Percent Revision of Cemented Primary Total Knee Replacement by Prosthesis Combination

Femoral Component	Tibial Component	N Revised	N Total	1 Yr	3 Yrs	5 Yrs	10 Yrs	15 Yrs	17 Yrs
Attune CR	Attune	109	8849	0.7 (0.6, 1.0)	2.3 (1.9, 2.9)				
Attune PS	Attune	37	4034	0.6 (0.4, 1.0)	1.3 (0.9, 1.8)				

Table KT31 Cumulative Percent Revision of Minimally Stabilised Primary Total Knee Replacement by Fixation (Primary Diagnosis OA)

Fixation	N Revised	N Total	1 Yr	3 Yrs	5 Yrs	10 Yrs	15 Yrs	17 Yrs
Cemented	5407	178279	0.8 (0.8, 0.9)	2.2 (2.1, 2.3)	2.9 (2.9, 3.0)	4.5 (4.4, 4.6)	6.6 (6.3, 6.9)	7.6 (7.0, 8.2)
Cementless	5230	107505	1.2 (1.1, 1.2)	3.2 (3.0, 3.3)	4.2 (4.1, 4.3)	6.0 (5.9, 6.2)	8.4 (8.1, 8.7)	9.4 (8.8, 10.0)
Hybrid	4284	129334	0.8 (0.8, 0.9)	2.3 (2.2, 2.4)	3.1 (2.9, 3.2)	4.5 (4.4, 4.7)	6.6 (6.3, 6.9)	7.4 (6.9, 7.9)
TOTAL	14921	415118						

Table KT32 Cumulative Percent Revision of Posterior Stabilised Primary Total Knee Replacement by Fixation (Primary Diagnosis OA)

Fixation	N Revised	N Total	1 Yr	3 Yrs	5 Yrs	10 Yrs	15 Yrs	17 Yrs
Cemented	5472	135641	1.1 (1.1, 1.2)	2.9 (2.8, 3.0)	3.9 (3.8, 4.0)	6.0 (5.8, 6.2)	8.1 (7.7, 8.5)	8.7 (8.0, 9.4)
Cementless	369	7433	1.9 (1.6, 2.3)	4.0 (3.5, 4.4)	5.0 (4.5, 5.5)	6.4 (5.7, 7.1)	7.1 (6.2, 8.1)	
Hybrid	744	12124	1.7 (1.5, 1.9)	4.2 (3.9, 4.6)	5.6 (5.1, 6.0)	7.3 (6.8, 7.9)	10.0 (9.0, 11.2)	11.5 (9.5, 13.9)
TOTAL	6585	155198						

⁵Hughes RE, Hallstrom BR, Zheng H, Kabara J, Cowen M, Igrisan R, Richmond A. (2017) Michigan Arthroplasty Registry Collaborative Quality Initiative (MARQUI) Report: 2012-2016. University of Michigan, Ann Arbor.

⁶Kelly M, Cafri G, Kurtz S, Paxton E, Hinman A, Antioxidant highly crosslinked polyethylene in total knee arthroplasty: Risks and reason for short term revisions in a US Registry. Paper # 158 at the 7th ISAR Congress, Reykjavik, Iceland, 9-11 June 2018.

⁷Hamilton W.G., Brenkel, I., Clatworthy, M., Dwyer, K., Himden, S., Lesko, J., Kantor, S.: Early Outcomes with a New Primary TKA System vs. Contemporary TKA: Interim Results of Two Worldwide, Multi-Center Prospective Studies. AAOS, San Diego, California, March 14-18, 2017 Poster #106. Other implants tested: SIGMA Knee (DePuy), NexGen® (Zimmer), Triathlon® (Stryker).

⁸Etter K, Lerner J, Moor C, Yoo, A, Kalsekar, I. (2016). PMD10-Comparative Effectiveness of ATTUNE® Versus Triathlon™ Total Knee Systems: Real-World Length of Stay and Discharge Status." Value in Health 19(3): A298. Premier Perspective™ Database analysis including 38 hospitals, representing 1,178 primary, unilateral TKAs with the ATTUNE Knee and 5,707 primary, unilateral TKAs with Triathlon™. The analysis found that the patients

implanted with the ATTUNE Knee had statistically shorter length of stay and were more frequently discharged home vs. a skilled nursing facility compared to the TKAs with Triathlon™.

⁹ Clatworthy, M. (2015). An Early Outcome Study of the ATTUNE® Knee System vs. the SIGMA® CR150 Knee System. DePuy Synthes Companies White Paper. DSUS/JRC/0814/0418 (1). In an IRB approved early outcomes study, physiotherapists collected data on 40 patients implanted with ATTUNE® Knees and 40 patients with SIGMA® CR150 knees. The results demonstrated that patients implanted with the ATTUNE Knee had statistically significant improvements in some early outcomes, other outcomes demonstrated a trend favoring the ATTUNE Knee, and some outcomes were equivalent.

¹⁰ List R, Schütz P, Angst M, Ellenberger L, Cerletti C, von Eisenhart-Rothe R, Gruenig R, Perka C., Schwaller C, Ferguson, S. Influence of gradually reducing femoral radii in total knee arthroplasty on in vivo tibiofemoral kinematics during daily activities: A videofluoroscopy study (Abstract to be presented at International Society for Technology in Arthroplasty, 2018).

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