



TALK TO YOUR SURGEON ABOUT  
**VERASENSE SENSOR-ASSISTED TKR**

BECAUSE EVERY MOVE MATTERS



BECAUSE EVERY MOVE MATTERS

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**SENSOR-ASSISTED  
TOTAL KNEE REPLACEMENT**



## ARTHRITIS SHOULDN'T KEEP YOU FROM DOING WHAT YOU LOVE

Do you suffer from chronic knee pain (as a result of arthritis or injury) that limits your normal activities, and nonsurgical treatments are no longer helpful? If so, you may benefit from knee replacement surgery. Whether you have just begun exploring treatment options or have already decided with your orthopedic surgeon to have total knee replacement (TKR) surgery, this educational resource can help you understand more about your surgery.

**THE CAUSE** The most common cause of chronic knee pain and disability is arthritis, a degenerative joint disease characterized by the loss of joint cartilage. Cartilage is a protein substance that serves as a cushion between the bones of a joint. When knee cartilage becomes damaged, many people experience the following symptoms and limitations:

- Severe knee pain or stiffness that limits everyday activities (including walking, climbing stairs, and getting in and out of chairs and vehicles)
- Moderate or severe knee pain while resting, either day or night
- Chronic knee inflammation and swelling that does not improve with rest, medications or physical therapy
- Knee deformity – a bowing in or out of your knee<sup>1</sup>

# TOTAL KNEE REPLACEMENT SURGERY

**ABOUT** Total knee replacement surgery has evolved significantly since first performed in 1968. Improvements in materials, techniques, and instrumentation have greatly increased its effectiveness. The National Institutes of Health states that knee replacement surgery has shown to be a safe and cost-effective treatment for alleviating pain and restoring function for patients who have not responded to non-surgical therapies.<sup>2</sup> It is also one of the most common elective procedures in the U.S.

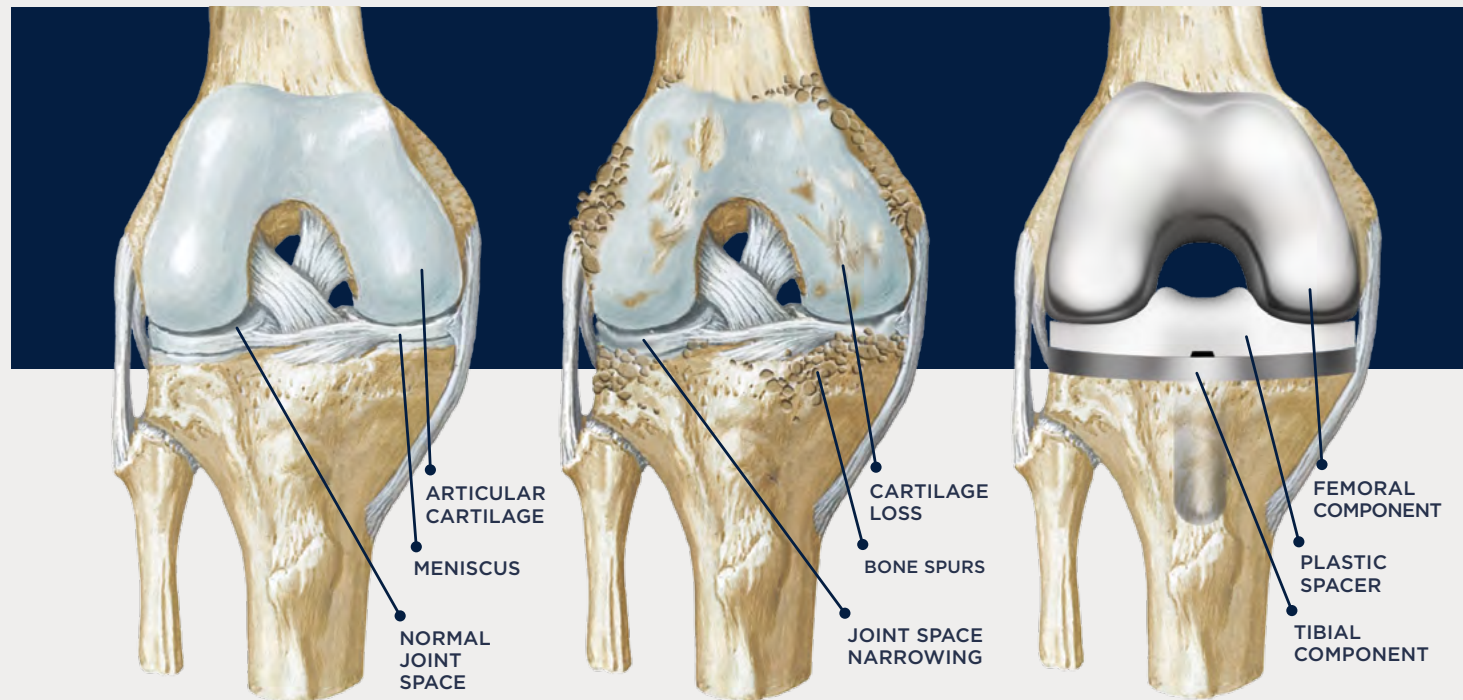
## CHALLENGES WITH TOTAL KNEE REPLACEMENT

While total knee replacement complication rate is low, knee instability remains the most common cause for patient dissatisfaction. When this occurs, your surgeon may suggest a revision. Approximately 12-13% of total knee replacement require revisions.<sup>4-6,8</sup>

In fact, 40% of premature revision procedures can be due to incorrect implant positioning and/or soft tissue imbalance.<sup>5-9</sup>

**TOTAL KNEE REPLACEMENT STEPS** A knee replacement might be more accurately termed a knee “resurfacing” because only the surfaces of the bones are actually replaced. There are four basic steps to a knee replacement procedure.<sup>11</sup>

- 1 BONE PREPARATION:** Damaged cartilage surfaces and a small amount of underlying bone are removed at the ends of the femur and tibia.
- 2 POSITION THE METAL IMPLANTS:** The removed cartilage and bone is replaced with metal implants that recreate the surface of the joint. These may be cemented or “press-fit” onto the bone.
- 3 RESURFACE THE PATELLA:** The under-surface of the patella (kneecap) is cut and resurfaced with a plastic button. Some surgeons choose not to resurface the patella.
- 4 INSERT A SPACER:** A medical-grade plastic spacer is inserted between the metal components to create a smooth gliding surface.



HEALTHY KNEE

SEVERE OSTEOARTHRITIS

TOTAL KNEE REPLACEMENT



STUDIES SHOW  
1 IN 5 PATIENTS  
IS DISSATISFIED  
AFTER A TKR<sup>3,10</sup>



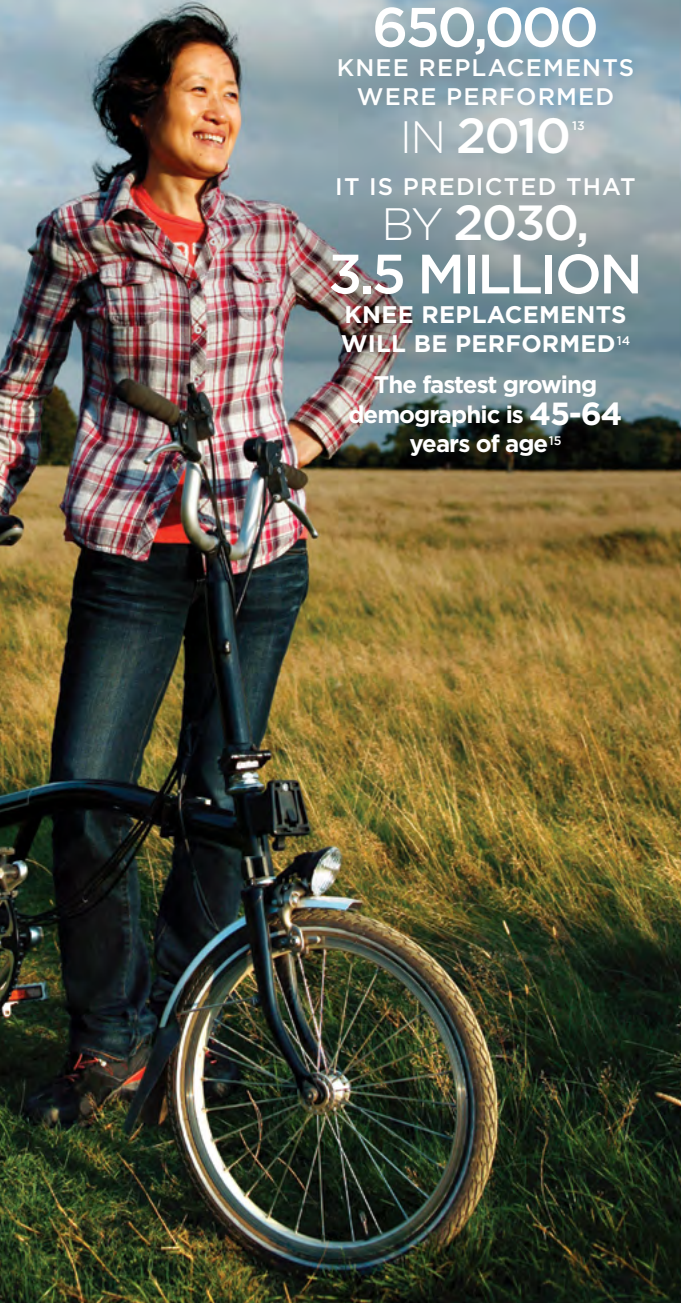


OVER **50** MILLION  
AMERICANS  
SUFFER FROM  
**ARTHRITIS**<sup>12</sup>

**650,000**  
KNEE REPLACEMENTS  
WERE PERFORMED  
IN **2010**<sup>13</sup>

IT IS PREDICTED THAT  
BY **2030**,  
**3.5 MILLION**  
KNEE REPLACEMENTS  
WILL BE PERFORMED<sup>14</sup>

The fastest growing  
demographic is **45-64**  
years of age<sup>15</sup>



BECAUSE EVERY MOVE MATTERS



### VERASENSE DISPOSABLE SENSOR-ASSISTED TECHNOLOGY

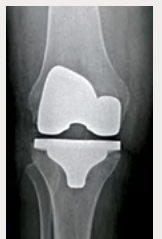
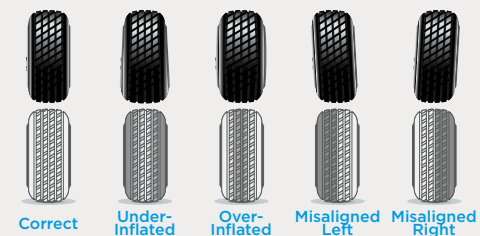
**WHAT IS VERASENSE?** VERASENSE is a wireless sensor-assisted technology used in total knee replacements. The disposable sensor transmits data about your knee during surgery, which enables your surgeon to customize implant positioning and improve soft tissue balance.<sup>16-17</sup>

With VERASENSE, your surgeon can now make data-driven decisions, enhancing your recovery and overall satisfaction.<sup>10, 16-18</sup>

### HOW DOES VERASENSE HELP ADDRESS TODAY'S TOTAL KNEE REPLACEMENT CHALLENGES?

VERASENSE elevates knee replacement surgery to a new level of precision. The sensor is used to assist your surgeon in improving soft tissue balance and implant positioning during your total knee replacement. Soft tissue balance is critical to avoiding pain, instability and stiffness post-operatively that can lead to premature implant failures and revision surgery.<sup>16-17</sup>

**HOW DOES VERASENSE WORK?** Think about when you take your car in for new tires. The mechanic will use computers to ensure your tires are properly balanced for improved long-term performance. Similarly, surgeons use VERASENSE during your knee surgery to help them better balance your knee with the goal of achieving both long-term stability and improved range of motion.



### AM I A CANDIDATE FOR A VERASENSE TKR?

VERASENSE can be used in primary and revision TKR procedures. Speak with your surgeon to discuss whether or not VERASENSE is right for you.

### WHAT IS THE LIFESPAN OF A TOTAL KNEE REPLACEMENT USING VERASENSE?

VERASENSE is not an implant. It is a disposable sensor that is used one time during a total knee replacement procedure. Total knee replacements have a life expectancy that depends on several factors including, but not limited to: a patient's weight, activity level, quality of bone and compliance with physician's orders.<sup>20-21</sup>

Proper implant position and balance of the soft tissues during surgery are very important factors that can affect the life expectancy of a total knee replacement.<sup>6-8</sup> VERASENSE data, transmitted wirelessly by the sensor, gives surgeons the information on your soft tissue and best implant position – two key factors for a successful knee replacement.<sup>6-8, 16</sup> This allows for better patient outcomes and the potential for a longer lifespan of your knee implant.<sup>10, 16-18</sup>

**HOW CAN VERASENSE BENEFIT ME?** When your surgeon uses VERASENSE during your total knee replacement procedure you may experience:

Less pain

Quicker return to normal activities

Improved function of your knee

Improved satisfaction<sup>10, 16-18</sup>

### IS VERASENSE USEFUL FOR REVISION TKR

**PROCEDURES?** Revision knee replacement can be necessary for various reasons. Sometimes, improper soft tissue balance of a patient's original TKR procedure – resulting in persistent pain, instability and stiffness – may be the cause.<sup>5-9</sup> In these cases, where the TKR “looks good, but feels bad,” your surgeon may be able to use VERASENSE to correct this imbalance and potentially replace fewer metal components than planned.<sup>19</sup>

MULTI-CENTER  
STUDY RESULTS



**98%**  
**BALANCED**  
**PATIENTS**  
REPORT BEING



**SATISFIED**  
**TO VERY**  
**SATISFIED**



**3** **YEARS**  
**POST-OP**<sup>18</sup>

# QUESTIONS TO ASK YOUR SURGEON



- Why is total knee replacement (TKR) being recommended?

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- What are the benefits of TKR?

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- Typically, how long will a TKR last?

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- What are the risks involved?

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- What is the success rate for a TKR?

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- Will TKR solve my symptoms?

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- What percentage of patients improve following a TKR?

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- What are the benefits in using VERASENSE?

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- Will I have pain following a TKR?

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- Will I need physical therapy?

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- How can the use of VERASENSE improve my recovery?

# REFERENCES

- 1 AAOS website, <http://orthoinfo.aaos.org/topic.cfm?topic=A00212>, accessed February 2017.
- 2 National Institutes of Health Consensus Development Conference Statement: Total Knee Replacement 12/10/03.
- 3 Bourne RB, Chesworth B, Davis A, Mahomed N, Charron K. Comparing Patient Outcomes After THA and TKA: Is There a Difference? *Clinical Orthopaedics and Related Research*. 2010;468(2):542-546.
- 4 Thiele K, Perka C, Matziolis G, Mayr HO, Sostheim M, Hube R. Current failure mechanisms after knee arthroplasty have changed: polyethylene wear is less common in revision surgery. *J Bone Joint Surg*. 2015; 97(9): 715-720.
- 5 Rodriguez-Merchan, EC. Instability Following Total Knee Arthroplasty. *HSS J*. Oct 2011; 7(3): 273-278.
- 6 Schroer WC, Berend KR, Lombardi AV, et al. Why are total knees failing today? Etiology of total knee revision in 2010 and 2011. *J Arthroplasty* 2013;28(8 Suppl):116-119.
- 7 Lombardi AV Jr1, Berend KR1, Adams JB1. Why knee replacements fail in 2013: patient, surgeon, or implant? *Bone Joint J*. 2014 Nov;96-B(11 Supple A):101-4.
- 8 Parratte S, Pagnano MW. Instability after total knee arthroplasty. *J Bone Joint Surg Am* 2008; 90: 184-94.
- 9 Bozic KJ, Kurtz SM, Lau E, Ong K, Chiu V, Vail TP, Rubash HE, Berry DJ. The epidemiology of revision total knee arthroplasty in the United States. *Clin Orthop Relat Res*.2010; 468(1):45-51.
- 10 Gustke KA, Golladay GJ, Roche MW, Jerry GJ, Elson LC, Anderson CR. Increased satisfaction after total knee replacement using sensor-guided technology. *Bone Joint J* 2014;96-B:1333-8.
- 11 AAOS Website, <http://www.orthoinfo.org/topic.cfm?topic=A00389>, accessed February 2017.
- 12 Centers for Disease Control and Prevention Website, [https://www.cdc.gov/arthritis/data\\_statistics/arthritis-related-stats.htm](https://www.cdc.gov/arthritis/data_statistics/arthritis-related-stats.htm), accessed February 2017.
- 13 Kurtz SM, Ong KL, Lau E, Bozic KJ. Impact of the economic downturn on total joint replacement demand in the United States. *J Bone Joint Surg Am*. 2014 Apr 16;96(8):624-30.
- 14 Kurtz S, Ong K, Lau E, et al. Projections of primary and revision hip and knee arthroplasty in the united states from 2005 and 2030. *J Bone Joint Surg Am*. 2007. 89 (4); 780-785.
- 15 Losina E, Thornhill T, Rome B, Wright J, Katz J. The dramatic increase in total knee replacement utilization rates in the united states cannot be fully explained by growth in population size and the obesity epidemic. *J Bone Joint Surg Am*. 2012; 94(3): 201-207.
- 16 Gustke KA, Golladay GJ, Roche MW, Elson LC, Anderson CR. A new method for defining balance: promising short-term clinical outcomes of sensor-guided TKA. *J Arthroplasty* 2014;29:955-960.
- 17 Gustke KA, Golladay GJ, Roche MW, Elson LC, Anderson CR. Primary TKA Patients with Quantifiably Balanced Soft-Tissue Achieve Significant Clinical Gains Sooner than Unbalanced Patients. *Advances in Orthopaedics*, vol. 2014, Article ID 628695, 6 pages, 2014.
- 18 3-year Multicenter Study, Data on file at OrthoSensor, Inc.
- 19 Leone W, et al. Using Sensors to Evaluate Revision TKA: Treating the "Looks Good; Feels Bad" Knee. *EC Orthopaedics* 3.5 (2016): 381-385.
- 20 Rand JA, Trousdale RT, Ilstrup DM, Harmsen WS. Factors affecting the durability of primary total knee prostheses. *J Bone Joint Surg Am*. 2003; 85-A(2): 259-265.
- 21 Wagner ER, Kamath AF, Fruth K, Harmsen WS, Berry DJ. Effect of body mass index on reoperation and complications after total knee arthroplasty. *J Bone Joint Surg Am*. 2016; 98(24): 2052-2060.