



BE YOUR OWN  
**HERO**

Your Knees can now  
HEAL FASTER, FEEL BETTER & LAST LONGER!!

**ROBOTIC KNEE REPLACEMENT**

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“I feel like I can enjoy my life again.  
I just wish I hadn't waited so long.”





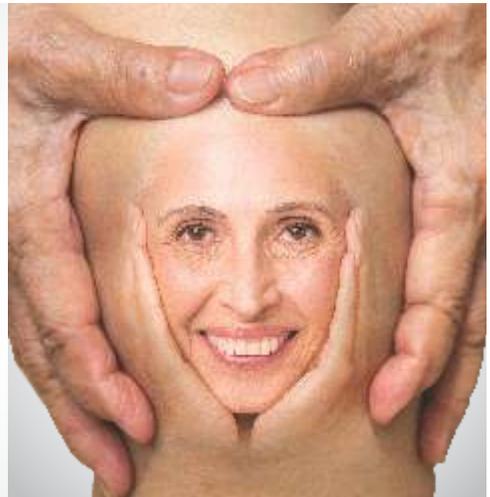
“Knee pain due to Osteoarthritis can be discouraging and depressing. Fortunately, there are many treatment options to address this pain. If surgery happens to be the best recourse, you should be happy to know that we always use the latest technology for our patients. At The Knee Clinic we are committed to delivering the finest care possible backed by experience and evidence. All of this, just for our patients to Walk. Run. Live. After reading this booklet, I hope you have a better understanding of a Robotic Knee Replacement procedure”

*M. Sheth*

**Dr. Miten Sheth**



Osteoarthritis occurs when there is a breakdown of the cushioning cartilage in the knee. Bones begin to rub against each other causing pain, swelling and stiffness affecting routine daily activities. While there is no cure for osteoarthritis, there are multiple treatment options to manage pain and potentially delay disease progression. These include exercises, weight loss, braces and/or medication. If osteoarthritis progresses to an advanced stage and is causing severe pain, surgery including partial or total knee replacement may be the best option.



If surgery happens to be the best recourse, you should be happy to know that we always use the latest technology for our patients. The NAVIO-CORI Robotic Surgery platform (Smith & Nephew, UK) is one of the foremost healthcare innovations of this century and we strongly believe that THIS IS THE FUTURE of Knee Surgery. Robotic Knee Replacements have the potential to RECOVER FASTER, FEEL BETTER and LAST LONGER.

“Incredible things can be done  
if we are committed to make them happen”



# What is done during a Knee Replacement?

**Partial Knee Replacement**, where only the diseased part of the knee is resurfaced (replaced), can benefit patients with early to mid-stage osteoarthritis.

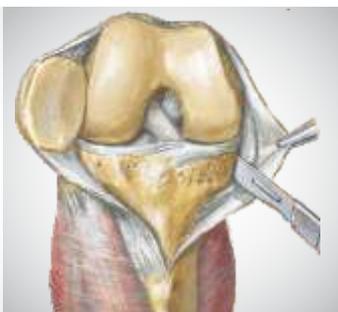
**Total Knee Replacement**, where the entire knee joint is resurfaced, is generally reserved for advanced osteoarthritis affecting multiple compartments of the knee.

## A knee replacement consists of 3 basic steps:

**1** Skin and soft tissue over the affected knee is incised. Muscles are retracted to gain access to underlying bone surfaces.

**2** Damaged cartilage coating at the end of femur (thigh bone) and tibia (shin bone) is removed manually or with robotic assistance.

**3** Removed cartilage and bone is replaced with metallic components - to recreate femoral and tibial surfaces. Metallic parts are cemented in place.



\*Step 2 is the key.

It may be executed with conventional instruments by surgeon judgement

**= Surgeon Judgement**

OR

It may be planned on the computer & executed with conventional instruments

**= Computer Assisted Surgery (CAS)**

OR

It may be planned and executed by the NAVIO-CORI robotics platform

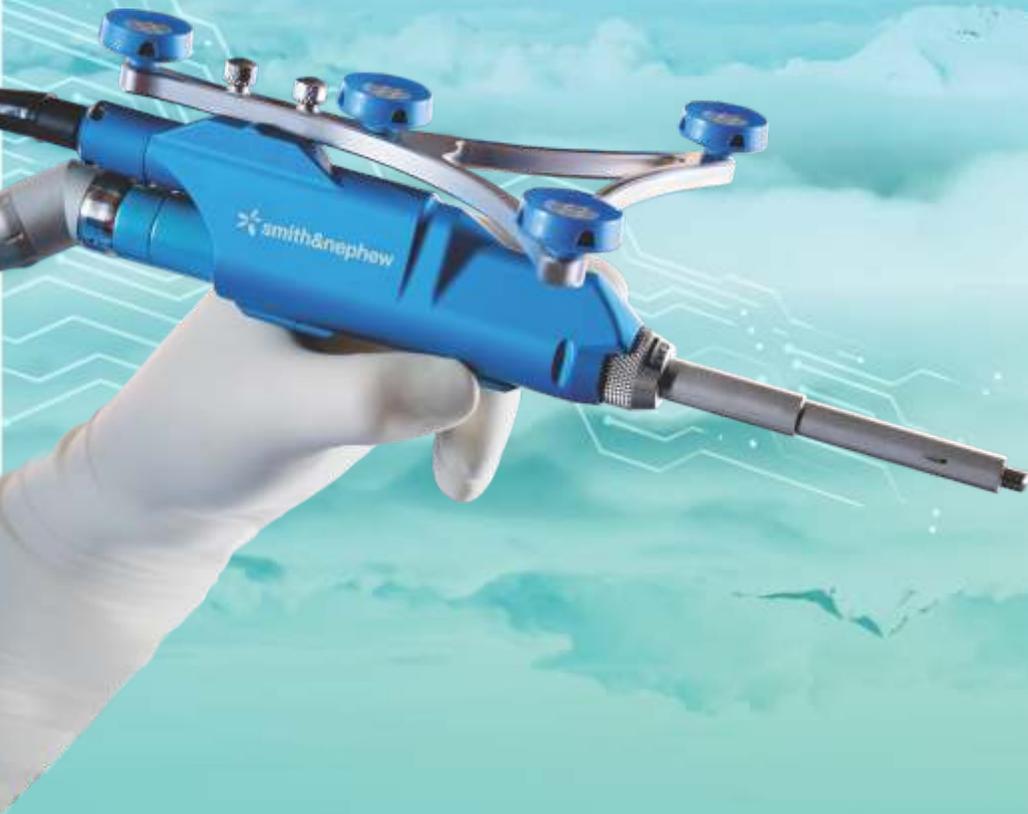
**= Robotics Assisted Surgery**

\*\* The under surface of the patella (kneecap) may be optionally cut and resurfaced with a plastic button.

# Why Robotics?

Think of a pilot negotiating a plane through a thunderstorm. A few decades ago, gut instincts would matter most. Today, the pilot has high quality satellite navigation (GPS) to rely on, think 'autopilot'. No sudden drops, no emergency landings, in fact even turbulence is managed well!

On similar lines, an orthopaedic surgeon doing conventional knee replacements eyeballs most parts of the surgery. The same surgeon, with robotics assistance, can get a great three dimensional view of the knee and can plan near perfect sizing and placement of replacement components. Each time. Every time.





Robotics-assisted Replacement surgery is an advancement in the way orthopaedic surgeons perform Knee Replacements. Robotic assistance is provided by NAVIO-CORI (Smith+Nephew, UK), an advanced computer program (on a console) that relays precise, real-time information to a surgeon-held device. Every procedure has an individualized plan based on each patient's unique anatomy.

In simple words, Dr. Sheth first maps the unique shape of your arthritic knee with a special pencil tool. A 3D mock-up of the native knee is then generated, on which the computer tries to custom fit and size implants (replacement components). Once this plan is approved by Dr. Sheth, the resurfacing is executed with a special robotics-assisted handpiece that works within pre-defined boundaries, minimizing tissue damage and eliminating human errors.

### **Image-free Registration**

In real time, we characterize the patient's bone and cartilage through point mapping.



### **Patient-specific Planning**

We customize a plan to position components, based on each knee's native kinematic motion.



### **Robotics-assisted Preparation**

The plan including bone resurfacing can be executed to perfection using a hand held device (small cutting tool).



### **Post-surgery Confirmation**

At the end of surgery, we can assess the final knee stability, motion and long leg alignment.



# Why Robotic Knee Replacement?



**Greater Accuracy & Precision**  
leads to less tissue damage



**Consistent & Repeatable Technique**  
leads to less errors



**Individualised Surgical Plans**  
ensure natural feeling knees



**Real-time Robotics-Assistance**  
ensures efficiency and time-saving

Your Knees can now  
**HEAL FASTER, FEEL BETTER & LAST LONGER!!**



# Things you should know

## 1 Who is a candidate for Robotic Knee Replacement?

If you are a good candidate for traditional knee replacement surgery, you are a good candidate for Robotic Knee Replacement. As most knee replacements last between 15 and 20 years, treating patients under the age of 60 has always been a challenge. Also, it has been difficult to achieve patient satisfaction consistently after each and every surgery. Robotic Knee Replacements are slated to change this paradigm. Accurate and precise implant positioning, individualised to every knee augers well for patients - better functional outcomes, shorter recovery times and hopefully longer lasting results.

## 2 The surgery is not performed by a robot!

One of the common misconceptions about Robotic Knee Replacements is that the surgery is done 100% robotically. That is simply not the case. While the procedure is assisted by a robotic arm or device, your orthopaedic surgeon is still in control. The robot's only job is to help the surgeon perform with greater precision. Real-time, intra-surgery mapping helps create a 3D model of the patient's knee. The robotic software then allows surgeons to plan – how to custom fit and size implants (artificial knee components) on a case-to-case basis. Finally, execution of the plan with the robotic arm/device is close to flawless, minimizing tissue damage in the knee.

## 3 Robot-assisted techniques can reduce recovery times and may result in a more natural feeling knee after surgery.

As robotics-assisted techniques are relatively new, many of the long-term benefits have not been published yet. But short-term benefits, like the potential for reduced recovery time, are quickly becoming apparent. Smaller incisions combined with greater surgical precision means that less bone and tissue is disturbed, speeding up the body's natural healing process.

Ideally, you should be able to completely forget about your joint replacement as you go about your day to day life. But for many patients, simple tasks like walking down stairs or kneeling can trigger stiffness, numbness, or even pain. The NAVIO-CORI Robotics platform allows surgeons to customize knee replacements to each patient's anatomy, which may lead to a more natural feeling knee in the long run.

## 4 Potential risks are reduced.

Robotic Knee Replacement surgery comes with the same risks and complications as traditional knee surgery. As robot-assisted procedures reduce outliers (errors), some of the complications like risk of poorly fitting or unstable components can be significantly reduced.

# Partial vs Total Knee Replacements

The knee is composed of 3 compartments: inside (medial), outside (lateral) and underneath the knee cap (patellofemoral). Each of these compartments can be replaced individually in partial knee replacement surgery, or all three can be replaced in total knee replacement surgery. A partial knee replacement is technically one-third of the surgery of a total knee replacement.

## Total Knee Replacement

This procedure has been revolutionary to orthopaedics giving many patients the ability to return to function, with implants lasting about 20-25 years. Physical therapy is tougher early on, and the knee sometimes doesn't quite feel the same as your own knee. Despite these potential limitations, patients have great patient satisfaction, high functional scores and longer-lasting replacements.



## Partial Knee Replacement

This is offered to patients who have pain on one side of the knee; ligaments are in good shape, have little deformity and can move their knee pretty well. It has been reported to have an easier, quicker, more complete recovery and greater satisfaction than a total knee replacement. Complications like blood loss and blood clots tend to be less; however, long-term studies show the lifespan of partial knee components is not as long as the lifespan of total knee components. Even after surgery, you are still susceptible to progression of arthritis in the rest of the knee. When a partial knee replacement fails, it can be converted to a full knee replacement with excellent success.



## Overall Outcomes

Both partial and total knee replacements can be highly successful for patients who are good candidates. If you take good care of your replaced knee, it will provide you with the greatest longevity possible.





# Testimonials

## I Went Skydiving After Robotic Knee Replacement Surgery

"As a young man, I remember having dreams of parachuting out of an airplane. As time went by, I thought less about skydiving, especially with a bad knee. Eventually, I had knee replacement surgery and I didn't think it was even possible. What a surprise when for my 60<sup>th</sup> birthday, my son took me skydiving. This was 9 months after my knee replacement, so I had enough time to recover from the surgery. My biggest concern was the landing and what it might do to my knee replacement. We went to see our doc and take his permission. I distinctly remember Dr. Miten's reaction. He wanted to join us too!

When we arrived, the receptionist greeted us with a few forms to complete while we watched a 20-minute safety and instructional video. I had to inform them of my knee replacement on the form. They never acted concerned or asked any questions. At 60, I was by far the oldest person.

Once we were in the air and nearing our altitude (13,000 feet) the instructor buckled me to his harness. I watched my son and another skydiver jump first, then my instructor pushed us out. The free fall was amazing. It was a beautiful day and you could see farmland, mountains on one side, and the ocean on the other side.

The landing came up very quick. I was instructed earlier to keep my feet up at a 90-degree angle and let the instructor's feet hit the ground. I took no impact, landed gently on my bottom and was up in an instant. The entire experience lasted about 10 minutes from plane to ground. I was very concerned about the landing but it was as smooth as ice. I felt great afterward and had no soreness or pain the next day. It was a great surprise and a wonderful birthday present. If you have had a robotic knee replacement and are in good health, and not overweight, you can skydive too!!

-Ashok Shah





## Climb Kilimanjaro after Robotic Knee Replacement

She has climbed Kalsubai, Harishchandragad, Bhimashankar (mountains in the Western Ghats, Maharashtra, India) on painful knees umpteen times. Now that she has two good new knees, Mona Singh is able to climb almost as well as she did 23 years ago on her first trek. Robotic partial knee replacements have given her a new lease on trekking life and she encourages those contemplating either a partial or total knee replacement to go for it. A successful surgery can give you a chance to continue your active lifestyle and your pursuit of higher peaks.

“At 58, I couldn’t use my knees. The cartilage was totally gone and they were bone on bone. Four months after my second knee replacement I was trekking 10 km a day without pain. The secret to maintaining your active life is to do your rehab religiously after surgery and keep moving” she says. “I have recently conquered Kilimanjaro (African continent’s highest peak) and plan to run many more expeditions.

“Exploring the natural world is a big part of who we are, and to stay in the life fulfilling game, many don’t consider a knee replacement. There are many reasons - fear of medical procedures is a major factor. A knee replacement makes many think they have become ‘old’ and feel ashamed about joining a hiking group with trekkers in better condition.

“I’ve seen people climb Kilimanjaro with us who have had total knee replacements, and you never would have known!”

Mona did her homework before choosing Robotic knee surgery. She had spent many years and much money on one knee surgery, one stem-cell injection and valiantly limped for decades until Dr. Sheth performed partial knee replacements at The Knee Clinic in Mumbai.



# Surgical Outcomes



**Partial Knee Replacement**

**Total Knee Replacement**

**Revision Knee Replacement**



**Your Knees can now  
HEAL FASTER, FEEL BETTER & LAST LONGER**



# DR. MITEN SHETH

## **Master of Surgery, Orthopaedics**

Maharashtra University of Health Sciences, Nashik, India.

## **Diplomat of National Board, Orthopaedics**

National Board of Examination, New Delhi, India.

## **IOC Diploma in Sports Medicine**

The International Olympic Committee, Lausanne, Switzerland.

## **MS Orthopaedics**

- Seth G.S. Medical College & K.E.M. Hospital, Mumbai.

## **Knee arthroscopy and sports medicine**

with Prof. Jae Hwa Kim at CHA Bundang Medical Centre, Seoul, South Korea. 2014

## **Navigated knee arthroplasty and osseointegration**

with Dr. Munjed Al Muderis at Sydney, Australia. 2014

## **Paediatric and adult reconstruction & sports medicine surgery**

with Dr. Sachin Tapasvi at Pune, India. 2015

## **Awarded the 2014 'SICOT meets SICOT' Fellowship in minimally invasive joint surgery**

at Brüder Krankenhaus St. Josef Paderborn Center, Germany. 2016

## AFFILIATIONS:

**International Society of Arthroscopy, Knee Surgery & Orthopedic Sports Medicine (ISAKOS)**

**La Société Internationale de Chirurgie Orthopédique et de Traumatologie (SICOT)**

**Indian Society of Hip and Knee Surgeons (ISHKS)**

**Indian Orthopaedic Association (IOA)**

**Indian Arthroscopy Society (IAS)**

**Bombay Orthopaedic Society (BOS)**

Dr. Sheth has special expertise in treating arthritis of the knee, ligament injuries in young athletes, and acute or degenerative meniscus-cartilage damage. He is adept at knee arthroscopy, ligament repair and reconstruction, cartilage restoration, osteotomies and arthroplasty (replacement surgery). This makes him one of Mumbai's few true Knee Surgeons. He has published more than 10 peer-reviewed scientific manuscripts, 5 book chapters, and has given over 50 professional presentations, symposia, and lectures. He has received many awards for his work, including the S.P. Mandal Award at the Indian Orthopaedic Conference (IOACON) in 2014. He is an ardent follower of evidence-based medicine, with many referrals from physicians due to successful patient outcomes.

**The Knee Clinic @ ACI-Cumballa Hill Hospital is Mumbai district's first and foremost centre for Robotic Knee Replacements.**





## DR. MITEN SHETH

**MBBS, MS, DNB (ORTH.)**

Fellowship in Minimally Invasive Knee Arthroplasty (Germany)  
Fellowship in Arthroscopy and Sports Medicine (South Korea)  
Fellowship in Adult Reconstructive Knee Surgery (Pune, India)  
Diploma in Sports Medicine (International Olympic Committee)

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