KNEE SURGERY · PATIENT GUIDE

CORI vs Mako: How Robotic Knee Replacement Systems Compare

Two leading robotic platforms, one honest comparison, from Dr. Vishnu Baburaj at Aster MIMS Kannur.

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Key Takeaways

- CORI (Smith and Nephew) is a handheld, image-free system: no pre-operative CT scan and no extra planning radiation.
- Mako (Stryker) is a robotic arm that is CT-based: it builds its plan from a CT scan taken before surgery.
- Both aim at the same goal: precise, patient-specific implant placement, and both improve alignment accuracy over conventional tools.
- There is no robust evidence that one robotic system beats another on how your knee actually feels.

> - Dr. Vishnu Baburaj uses CORI at Aster MIMS Kannur because an image-free workflow suits most patients.

When patients in my clinic ask about robotic knee replacement, the conversation often turns into a brand contest. "Is the Mako better than the CORI?" "Which robot should I choose?" It is a fair question, and the honest answer surprises people: the two systems are built differently, but neither has been shown to give you a better knee than the other.

I am Dr. Vishnu Baburaj, consultant orthopaedic surgeon at Aster MIMS Hospital, Kannur (MS Orthopaedics, PGIMER Chandigarh; MRCS, UK). I use the Smith and Nephew CORI system here in North Kerala. In this article I want to compare CORI and Mako fairly, explain the genuine design differences, and be clear about what the evidence does and does not say. If you want the bigger picture on robotics first, my guide to robotic knee replacement in Kannur is a good starting point.

The two systems, in one sentence each

CORI, made by Smith and Nephew, is a **handheld, image-free** robotics-assisted system. It does not need a pre-operative CT scan or MRI. During surgery the surgeon maps the patient's own bone landmarks with a handheld probe, the software builds a 3D model of the knee and checks the gaps through the full range of motion, and the surgeon then removes bone and positions the implant under the system's guidance using a surgeon-controlled handpiece.

Mako, made by Stryker, is a **robotic-arm** system that is **CT-based**. It uses a CT scan taken before surgery to build a 3D model and a surgical plan. During the operation a semi-active robotic arm provides haptic, or tactile, boundaries so that the cutting burr stays within the planned area.

Both are trying to solve the same problem: getting the implant into exactly the right position for your individual knee, more consistently than freehand instruments allow.

> CORI
>
> Smith and Nephew

- **Imaging:** Image-free. Knee mapped live in theatre, no CT or MRI.
- **Form factor:** Handheld, surgeon-controlled handpiece.
- **Radiation:** No extra planning radiation.
- **Surgeon controls:** The handpiece directly, with software guidance and boundaries.

> Mako
>
> Stryker

- **Imaging:** CT-based. Plan built from a pre-operative CT scan.

- **Form factor:** Semi-active robotic arm.
- **Radiation:** One pre-operative CT scan for planning.
- **Surgeon controls:** The arm guides the cut within haptic limits the surgeon stays inside.

The real trade-off: imageless versus CT-based

Most of the practical difference between these two systems comes down to one decision the engineers made: whether to plan from a scan taken beforehand, or to map the knee during the operation itself. Each approach has honest pros and cons.

> Image-free (CORI)
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> Mapped during surgery
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> - No pre-operative CT scan to schedule.
> - No extra radiation for planning.
> - One less appointment before surgery.
> - The 3D model is built live in theatre rather than reviewed in advance.

> CT-based (Mako)
>
> Planned before surgery
>
> - A detailed plan is prepared and reviewed ahead of the operation.
> - The CT model can be studied calmly, off the clock of theatre time.
> - Requires a separate CT scan, which is one more visit.
> - The CT adds a small radiation exposure for planning.

Neither column is "right." A surgeon who values a fully rehearsed pre-operative plan may prefer the CT-based approach. A surgeon and patient who value a simpler pathway, with no scan to arrange and no planning radiation, may prefer image-free. The destination, a precisely placed implant, is the same.

What the evidence actually shows

Here is the part I am most careful about. Across the published trials, robotic-assisted knee replacement reliably improves the **accuracy and consistency of implant alignment** compared with conventional, freehand instruments. There are fewer alignment outliers, meaning fewer knees that end up further from the target than intended.

One systematic review and meta-analysis of randomised trials found robotic surgery roughly halved the risk of mechanical-alignment outliers compared with conventional technique, while showing little to no difference in patient-reported function scores. Other reviews report the same pattern: better alignment restoration, similar pain, function, satisfaction, complication and revision rates in the short to medium term, and a modestly longer operating time. Some studies also report lower blood loss with robotics.

What the trials agree on

Robotic-assisted versus conventional knee replacement

Fewer outliers

Robotic surgery produces significantly fewer alignment outliers and less deviation from the target.

Proven edge: precision
Similar function

Short to medium term pain, function and satisfaction scores are broadly similar to conventional surgery.

Not yet a feel difference
Same safety

Complication and revision rates are comparable between robotic and conventional technique.

Reassuring
A bit longer

Robotic operations tend to take somewhat longer; some studies also report lower blood loss.

An honest trade-off

Crucially, almost all of this evidence compares robotic against conventional surgery. **There is no robust head-to-head evidence that CORI produces better outcomes than Mako, or the reverse.** When you read a neutral comparative assessment of the current robotic systems, the systems differ in imaging and workflow, not in any proven patient-outcome ranking.

> The honest part
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> The proven benefit of robotics is precision and consistency, not a guaranteed better-feeling knee. Long-term benefit and cost-effectiveness are still being studied. Anyone promising you that one specific robot brand will make your knee feel better than another is going beyond what the evidence supports.

So how should you actually choose?

If the systems are comparable on outcomes, the sensible question is not "which robot," but "which surgeon and which plan for my knee." The implant system, the surgeon's experience with their platform, the hospital's setup, and your own anatomy matter more than the brand on the console.

> The system matters less than the surgeon. A robot improves precision, but it is the surgeon's planning, judgement, and experience that turn that precision into a knee that serves you well.

In my practice at Aster MIMS Kannur I use CORI. I chose an image-free workflow because for most of my patients it is simply a cleaner pathway: there is no separate CT scan to arrange, no additional radiation for the planning step, and nothing extra to schedule before the day of surgery. I map the knee live in theatre and assess the gaps through the full range of motion, and I remain in control of the handpiece throughout. That said, I would not tell a patient that CORI is "better" than Mako. A skilled surgeon using Mako can deliver an excellent result. The technology is a tool, and the right tool in experienced hands is what matters.

If you are weighing up robotic surgery, you can read more about how the procedure works on my robotic knee replacement page, or compare it directly with manual technique in my robotic knee replacement guide. When you are ready to talk through your own knee, you can book a consultation at the clinic.

A note for patients in North Kerala

Robotic-assisted knee replacement is available right here in Kannur. Patients from across the Malabar region, including Thalassery, Payyannur, Taliparamba, Mattannur, and Iritty, no longer need to travel to Kochi or Bangalore to access this technology. What you should look for is not a particular brand of robot, but a surgeon who will plan your surgery carefully, explain the trade-offs honestly, and stand behind your result.

The evidence behind this article

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6. Onggo JR, et al. Robotic-assisted total knee arthroplasty is comparable to conventional total knee arthroplasty: a meta-analysis. *Archives of Orthopaedic and Trauma Surgery*, 2020. Fewer

outliers, lower blood loss, longer operative time; other outcomes similar. doi.org/10.1007/s00402-020-03512-5 (via PubMed)

Findings sourced via PubMed; device descriptions from the manufacturers' patient pages. General patient education, not individual medical advice.

> **Dr. Vishnu's Perspective**
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> Patients often ask me which robot is best, expecting a league table. The honest answer is that the evidence does not support crowning one system over another for how your knee feels afterwards. I use CORI at Aster MIMS Kannur because an image-free workflow suits most of my patients well: no extra scan, no extra radiation, and the same goal of getting the implant in exactly the right place. The tool matters far less than the hands and judgement behind it.

Frequently Asked Questions

Is the CORI system available in Kerala or near Kannur?

Yes. Dr. Vishnu Baburaj uses the Smith and Nephew CORI robotics-assisted system at Aster MIMS Hospital, Kannur. Patients from across North Kerala and the Malabar region, including Thalassery, Payyannur, Taliparamba, Mattannur, and Iritty, can have robotic-assisted knee replacement here without travelling to Kochi or Bangalore.

What is the main difference between CORI and Mako?

The biggest difference is imaging and form. CORI (Smith and Nephew) is a handheld, image-free system that maps your knee during surgery, so it needs no pre-operative CT scan. Mako (Stryker) is a robotic arm that is CT-based, so it builds its plan from a CT scan taken before surgery and uses haptic boundaries during the operation. Both aim at precise, patient-specific implant placement.

Does CORI need a CT scan before surgery like Mako does?

No. CORI is image-free. During the operation the surgeon maps your own bone landmarks with a handheld probe, and the software builds a 3D model of your knee then and there. Mako, by contrast, requires a pre-operative CT scan to build its plan. With CORI there is no extra scan to schedule and no additional CT radiation for the planning step.

Is CORI or Mako better for patient outcomes?

There is no robust evidence that one robotic system produces better patient outcomes than another. No reliable head-to-head studies show a winner. Both systems improve the accuracy and consistency of implant alignment compared with conventional instruments. The choice usually reflects the implant system and what the hospital and surgeon use, not a proven outcome advantage.

Does the robot do the surgery on its own?

No. With both CORI and Mako the surgeon makes every decision and performs the operation. CORI is a surgeon-controlled handpiece; Mako is a robotic arm with haptic limits that keep the cutting tool within the planned area. The technology guides accuracy, but the surgeon is in charge throughout.

Why does Dr. Vishnu use an image-free system at Aster MIMS Kannur?

An image-free system like CORI means no pre-operative CT scan to arrange, no extra radiation for planning, and nothing additional to schedule before surgery. The knee is mapped live in theatre and gaps are assessed through the full range of motion. For many patients this is a simpler pathway that reaches the same goal of precise, patient-specific implant placement.

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This article is for educational purposes and does not replace a medical consultation. For personalised advice, book an appointment at Aster MIMS Kannur.