So many people are getting knee replacements, it seems like a routine procedure any more. But there's really nothing routine about getting the implant lined up with the mechanical axis of the bones and joint. And without an accurate placement of the implant, the joint replacement may not last as long as it should.

Surgeons are always looking for ways to improve their technique. Efforts are being made to improve implant alignment with knee replacement. One of the newest ways to improve total knee replacement surgery is with computer-assisted navigation.

Computer-assisted navigation uses an infrared tracker to help find the center of rotation for the femoral head. The infrared light helps the surgeon make bone cuts at exactly the right angle and thickness for the selected implant. X-rays taken after the procedure are done to verify the accuracy of implant placement.

Even though alignment is crucial to the survival of the prosthesis, there are other factors that affect how long a knee implant will last. Some are patient-related (e.g., age, activity level, bone density, body mass index or BMI). Some are surgeon-dependent (e.g., operative technique such as balancing the pull of opposing soft tissues during the procedure).

But matching the normal anatomic joint axes (where the bones and joint surfaces line up horizontally and vertically) is probably the one the surgeon has the most control over. Studies show that any deviation from the norm more than three degrees throws the joint off enough that uneven wear and force-to-load ratios increase. The result of these changes is loosening of the knee prostheses (implant).

This study is another one to confirm those findings but in a slightly different way. The authors performed total knee replacements on 32 adult patients who were having both knees replaced at the same time. Everyone received the same type of prosthesis and the same one in both knees.

In order to compare conventional surgery with computer-assisted-navigation, the surgeons performed the standard surgical procedure on one knee. The second knee was replaced using computer navigation.

Results showed a clear difference between the two methods with far superior results when using the computer-assisted navigation technique. In fact, when the surgeon used the computer program to help line the knee and implant up perfectly, there were no problems with axes angles (compared with a rate of 28 per cent in the conventional group who had more than a three-degree deviation from the norm). Only when a surgeon performed the procedure using the standard surgical techniques (without computer assistance) were there problems noted.

This information is helpful because there has been some ongoing debate about how well the computer-navigational systems work. Hospital administrators have asked if they are worth the cost and the extra operative time it takes to use it.

Patients have wondered if they aren’t putting themselves at increased risk for complications. But surgeons have persisted in trying to perfect this technique because the computer makes more accurate bone cuts and positions the implant more precisely. And the results of this study confirm that although the
computer-assisted procedure took 30 minutes longer, there was no increase in complications reported.

The next step is to follow both groups and track their long-term results. Patients will be followed in order to measure mid-to-long-term survival rates of the implants. The authors also suggest conducting the same study with different types of implants and compare the results. But for now we can say the computer-navigated technique provides a more accurate alignment for total knee replacements without increased problems or complications.