

Orthopedic surgeons have another tool for knee replacement: Augmented reality

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For people with severe arthritis pain in the knee joints, knee replacement is a viable option to improve their quality of life. Orthopedic surgeons now have a new tool for knee replacement: augmented reality.

With augmented [reality](#) technology, a surgeon views data with special smart glasses or a helmet-based visor while maintaining the view of the surgical site. Virtual reality headsets block out users' vision and give them the sense that they are elsewhere. In that way, augmented reality differs from virtual reality.

"Think of a fighter pilot in a jet who has a visor over their eyes that displays electronic data laid over what they're seeing in the [real world](#)," says Michael Taunton, M.D., a Mayo Clinic [orthopedic surgeon](#) specializing in hip and knee replacement. "This is not the [virtual reality](#) your kids use when playing video games with their eyes covered."

Augmented reality technology superimposes digital content, such as data and 3D images, onto the user's view. Surgeons use this information to be precise and receive real-time feedback when

removing bone and cartilage, and placing a knee implant. As the surgeon's head moves, the system moves the information in the surgeon's visual field.

Dr. Taunton says augmented reality represents an advancement beyond computer-assisted approaches. Surgeons collect data from the patient's leg, enter it into a computer, and use that information to help determine how best to remove the right amount of bone, in the right angle, for the best fit and alignment. Surgeons take their eyes off the patient during surgery to view the computer or cameras.

"With augmented reality, I use the navigation and stay focused on the patient," Dr. Taunton says. "I don't have to look away. Ultimately, we want to reduce the outliers so we can more efficiently and precisely do their knee replacement."

Dr. Taunton performed the first augmented reality knee replacement at Mayo Clinic in fall 2021. The technology is not yet widely available, but research continues into whether augmented reality can reduce the length of surgery and hospital stay, and improve patient outcomes.

The augmented reality approach would be appropriate for most patients undergoing their first knee replacements, Dr. Taunton says. But it may not be right for patients with more complex situations or those who need revision surgery.

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