Todd Kuiken, a doctor from the Rehabilitation Institute of Chicago, brought the future to Kildonan on Monday afternoon with a presentation on the "bionic arm," a prosthesis he developed that reads a patient's own nervous-system signals and uses them to move a motorized arm.

The procedure, which was first performed in January 2002 on a double amputee in Ghana, has now been performed 20 times. But that's about to change, as Kuiken said, only come for the lecture. The visit also included consultation here with local doctors in order to bring the bionic arm to its two Kildonan patients.

The procedure is revolutionary, Kuiken said, because it allows for intuitive control of a prosthesis. That is, the patient only has to think what action they want to perform—for example, "close hand"—and their prosthetic hand will close.

This is possible, Kuiken explained, because the nerves that usually run to the arm are attached to the patient's muscular or brain, depending on whether the amputation was above or below the elbow. This means that the brain can send signals to the nerves it normally would to move your arm.

These electrical signals are then picked up by electrodes on the patient's skin and fed into the prosthesis. This system is such an improvement on old prostheses, Kuiken said, that in most cases, patients were up to six times faster with their "bionic arm" than their old prostheses.

Kuiken said he has also observed some amazing side effects after attaching nerves to the patient's prosthesis. Many of the patients feel sensation in their missing limb when pressure is put onto their prosthetic muscles and the surgically attached nerves.

Kuiken has exploited this by attaching a device called a "tactor" to the patient's class, which applies pressure proportional to the pressure applied when they close their prosthesis hand, giving them sensation in their missing limb.

"We've got on the patients' class so he can feel how hard he's squeezing when he closes his hand," Kuiken explained. This can result in surprising sensitivity, he said. For instance, one patient could distinguish between different grades of wallpaper when she fed them with her prosthesis.

But despite the success, Kuiken has also encountered problems. The number one complaint of patients is how long it takes to put on the arm. "It can take up to five minutes to put on your arm," Kuiken explained. "That's just not acceptable."

He has also experienced problems with the durability of the arm. One patient, for instance, broke off the stainless steel bolts while attempting to pull-start his lawn mower.

Still, Kuiken has only one fitted procedure out of 20 operations—and even that one wasn't his fault, he said. When the surgeon opened up the patient, he noticed that their medial nerve, one of those used to send signals to the prosthesis arm, was pulled out, an unfortunate result of the patient's amputation. However, Kuiken accepts that this will happen from time to time.

"Most people don't lose their limb gently," he explained.

Since developing the arm, Kuiken has continued to improve it, and enormous strides are continuing to be made. However, the importance of the work already done can be seen in patient's grateful reactions.

"My first arm just wasn't worth wearing," said Claudie Mitchell, a patient who has received the bionic arm. "This one is."