

Surgical device invented in Halifax transplants stem cells

John Gillis Health Reporter

A surgical tool designed and built in **Halifax** is already being used to help Nova Scotians with neurological disorders and could become the gold standard around the world, says the head of the Brain Repair Centre.

Dr. Ivar Mendez showed off the instrument, called the **Halifax Injector**, at the Queen Elizabeth II Health Sciences Centre last week.

The device can be programmed by a touch screen to deliver precise quantities of stem cells to very specific areas deep inside the brain.

"This is the instrument that's going to allow all the neurosurgeons in the future to repair the brain using cellular restoration," Dr. Mendez said. "When the time of stem cells comes and they're ready for broader applications, the idea is that every operating room in the world will have the **Halifax Injector**."

The Brain Repair Centre has already pioneered a technique for transplanting stem cells into the brain to treat Parkinson's disease. Video of a patient before and five years after a transplant shows a dramatic transformation: The man regained control of his hands and was able to walk normally.

Examinations of brain tissue in patients who have had the treatment also show the stem cells caused brain cells to resume producing dopamine and restore connections that were lost as a result of Parkinson's, said Dr. Mendez.

But without an automated device like the **injector** it was difficult to precisely deliver the cells to the areas they needed to reach. A surgeon had to manually adjust the mechanisms that drove the needle into the brain, he said.

"We had to build an instrument that will allow us to do this, because there is nothing available," Dr. Mendez said. "To be able to put the right amount of cells in the right area without damaging the brain, and being safe, we created the **Halifax Injector**."

The device includes a frame that is fitted to the patient's head and precisely holds the injection system and the micro-motors that drive it. The mechanism is connected to a computer with which a surgeon can program exactly how deeply the needle should enter the brain, how many deposits of stem cells to make, and where, and the volume of the deposits in micro-litres. Each procedure is practised and mapped out beforehand in virtual reality.

Once the patient is prepared for surgery, the injection can proceed with one touch of a screen.

Dr. Mendez said accurate placement of the stem cells is of paramount importance, and giving surgeons this level of control is a major achievement.

The **injector** has been in development for at least three years with all of the work, including the

machining of the components, done in **Halifax**.

There are plans to test the instrument at five different universities in the United Kingdom, Sweden, Germany and the United States.

Dr. Mendez said medical technology companies are interested in acquiring the rights to the patented device, and he's already heard from surgeons wondering about its use in other areas of the body.

Dr. Murray Hong, part of the design team along with Ron Hill, Luis Bustamente and others, said the **injector** also has the potential to deliver drugs, genes or other compounds that need to be precisely targeted for treatment.

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Figure:

Dr. Ivar Mendez operates with an instrument called the **Halifax Injector**.

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