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Israeli and foreign researchers present developing technologies for the ill and disabled at the Presidential Conference.

The Jerusalem Post, By JUDY SIEGEL-ITZKOVICH

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Dr. Amir Amedi. Photo: judy siegel-itzkovich

Israeli and foreign researchers presented these developing technologies at the Presidential Conference in Jerusalem's International Convention Center Wednesday.

Prof. Hagai Bergman of the Hebrew University's neurobiology department described growing progress in Israel and the world in treating severe cases of Parkinson's disease patients' palsy by surgically implanting a battery-operated neurostimulator similar to a heart pacemaker to deliver electrical stimulation to specific parts of the brain that control movement.

This tiny device, available to suitable patients in the basket of health services, blocks the abnormal nerve signals that cause the severe shaking and other symptoms.

He noted that some 400 Israelis with debilitating Parkinson's out of some 100,000 people worldwide had already undergone the surgery. But adjusting the system optimally was still not easy, Bergman said, and therefore the next step would be "closed-loop" deep brain stimulation (DBS) that would work automatically in reaction to brain function.

While Parkinson's usually affects older people, schizophrenia the most severe psychiatric disease can affect young people as well.

The same DBS is expected to help victims of schizophrenia once studies on monkeys show the treatment is feasible and it progresses to clinical trials, Bergman said.
He noted that researchers must be very careful, as frontal lobotomies—a practice going back to the 19th century, in which people with psychiatric and developmental diseases would have parts of their brains removed surgically—had proved to be disastrous.

"Frontal lobotomies were a mistake and should not be tried again, but if a loved one had a severe mental disorder, I would think about closed-loop DBS, which would be reversible and adjustable, with minimal side effects. The technique is based on good animal research."

Swiss cognitive neuroscientist Prof. Olaf Blanke, who has pioneered the neuroscientific study of human self-consciousness and subjectivity, discussed how illusions could be induced in the brain to give a person whose arm was amputated the feeling that it was still there and able to function.

Blanke showed how a person wearing computer-activated goggles could be given missing senses through illusion.

Techniques that surgeons use to perform operations by robot—i.e., moving robotic controls without the surgeon's hands ever entering the patient's body—can be adapted to have the patient operate artificial hands.

"It is so intuitive that the prosthesis of a missing upper arm becomes like part of the body," said Blanke, adding that similar techniques enabled computer gamers to use avatars and feel they were actually moving through artificial scenery.

Moderator Prof. Idan Segev of the HU neurobiology department and Interdisciplinary Center for Neural Computation hypothesized that at some future Presidential Conference, lecturers could remain abroad and yet physically appear to be in Jerusalem, speaking and answering questions through highly sophisticated videoconferencing.

Dr. Amir Amedi of HU's Safra Brain Research Center showed how blind-from-birth people could be taught to interpret sound signals even as facial expressions that they could never see.

"We were always told the brain is a sensory-specific machine with a visual or auditory cortex, thus implying that specific senses cannot be restored" even if the physical problem were repaired. But now, brain scientists believe there is a different organization of the brain, which is flexible and could adapt. The brain, he explained, can see things that aren't there.

"Maybe we can help blind people who would hear sounds or be touched, causing the brain to create images as if they were seen. Already, training the blind for 40 to 70 hours can make it possible for them to 'feel' facial expressions from sounds and 'rewire' the brain," Amedi said.

Nonetheless, Weizmann Institute of Science robotics expert Prof. Shimon Ullman, who discussed artificial intelligence, cautioned that there were dangers to the "superpowers" that could result from brain research.

"One day, we could 'look into' brains and know what people are thinking," he said. "This could lead to the invasion of privacy. These ethical issues must be discussed and be brought out into the open."

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