

Customer Perspective

Leksell® Vantage™ Stereotactic System Enhances Deep Brain Stimulation (DBS) Workflow

Contributor

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About

St. Olav's Hospital, Trondheim University Hospital, Norway

Serving a population of 725,600 with 983 beds, St. Olav's University Hospital is the main teaching hospital for central Norway and the local hospital for southern Trøndelag. It is integrated with the Norwegian University of Science and Technology's (NTNU) Faculty of Medicine and Health Sciences, and is one of two centers in Norway to provide deep brain stimulation (DBS).





Figure 1. The Leksell Vantage Stereotactic System is based on the proven Leksell® coordinate system and center-of-arc principle

Background

DBS has been available at St. Olav's University Hospital since 2001 for the treatment of movement disorders including essential tremor, dystonia and symptoms of Parkinson's Disease. This method requires absolute precision in planning the trajectory and final position of the electrodes in the brain.

Since the start, the team at St Olav's University Hospital has been using the Leksell Stereotactic System® for stereotactic neurosurgery. This minimally invasive method for localizing and treating targets in the brain is the gold standard for clinical accuracy in stereotactic neurosurgery. In 2018, when the

team was looking to replace their existing Leksell Stereotactic System, they were intrigued by some of the innovative features of the new Leksell® Vantage™ Stereotactic System (Figure 1).

“We were very comfortable with the Leksell Stereotactic System but needed to replace it due to wear and tear,” says Prof. Sasha Gulati, Consultant Neurosurgeon.

“We had seen models of the new Leksell Vantage Stereotactic System and particularly liked the way that it is fixated to the skull and movement of the arc during surgery. It seemed much easier, and we could see it would be more comfortable for patients, which is a major advantage for us.”



A smoother clinical workflow

For DBS patients at St Olav's Hospital, a contrast-enhanced MRI scan is performed without the head frame at least one day, but sometimes up to a few weeks, before surgery. This is used to plan the procedure using the StealthStation surgical navigation system. Depending on the circumstances, a CT scan may also be acquired for planning purposes.

On the day of surgery, the Leksell Vantage Stereotactic System head frame is mounted quickly and easily on the patient's head using the presterilized, disposable FirmFix™ pins. These come in different lengths to accommodate varying head shapes and sizes (Figure 2). Another MRI scan is then performed (T1 without contrast) with the head frame in place.

"MRI scanning with the frame mounted is much easier using the new Leksell Vantage Stereotactic System head frame," says Prof. Gulati. "The process of mounting the frame is much smoother and causes much less discomfort for the patient. Once mounted, the patient fits easily into the MRI scanner. The localizer attaches smoothly and neatly to the frame. It's a very good piece of engineering. At the moment, we don't perform a CT scan on the day of

surgery, but this will also be an option when we have the CT localizer for the Leksell Vantage System."

The new MRI images are merged and registered with the planning images using the StealthStation, which only takes 5-10 minutes, and the plan is double checked.

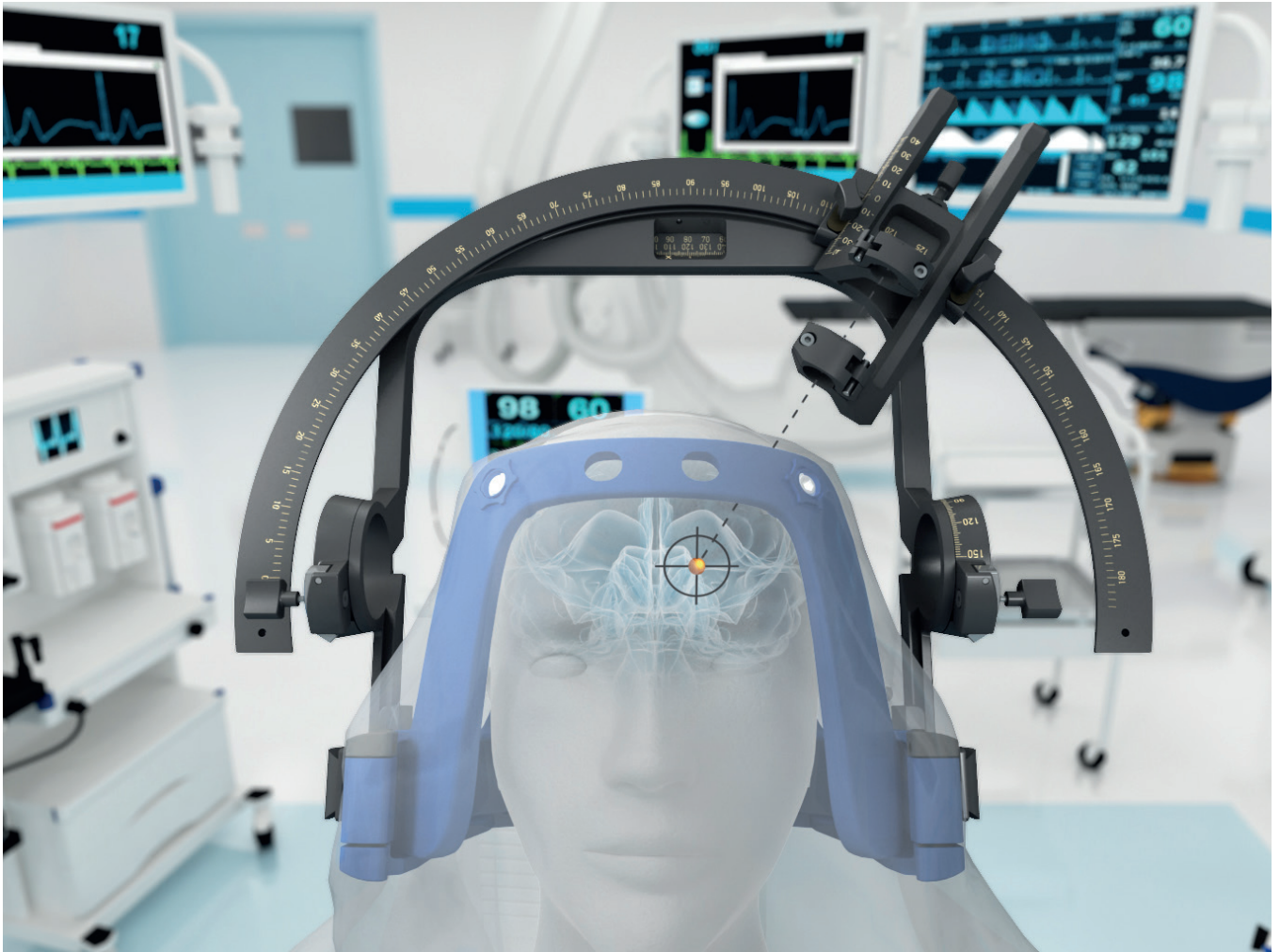
With fewer pieces to assemble and a rapid, click-on docking mechanism, patient setup is much simpler and faster with the Leksell Vantage System. The new design places the X-, Y- and Z-scales outside of the draping, which enables smooth and easy coordinate setting during surgical procedures.

"Using the Leksell Vantage system makes the workflow smoother and faster," confirms Professor Gulati. "It is important to keep the length of the procedure as short as possible because we know that, in general, the longer the surgery, the higher the risk for infection. It's also easier for the operating nurses to have a sterile field with the surgical drapes.

"The open-face design ensures easy access to the airways for the anaesthetist if the procedure is performed under general anaesthesia," he continues. "At the same time, it is more comfortable for the patient and allows access to their face and eyes if they are awake during surgery."



Figure 2.
The Leksell Vantage Stereotactic System head frame with FirmFix lengths and ruler



Adopting the Leksell Vantage Stereotactic System

The Leksell Vantage Stereotactic System builds on the strong principles and foundations of the Leksell Stereotactic System to provide neurosurgeons with a high level of user confidence in an intuitive and user-friendly workflow. At the same time, the frame's open-face design ensures a greatly improved patient experience.

"I think it's very important when you're using a new system to have good support," comments Professor Gulati. "We had on-site support from

Elekta on the first occasion that we used the Leksell Vantage Stereotactic System and, because it was a few months later, on the second occasion as well. This was reassuring for us the first time we were importing data and registering the frame using the Medtronic StealthStation™ surgical navigation system. Everything went well and it was a very good experience for us.

"I expect the outcomes to be as good as we achieved with our previous system," he continues, "and straight away we could see the improvements in the workflow, which is better for everyone involved – patients, theatre nurses and surgeons."





Case Example

The first patient to be treated using the Leksell Vantage Stereotactic System at St Olav's University Hospital was a female in her 50s with Parkinson's Disease-related dyskinesia and disease fluctuations. This patient was a good candidate for DBS as she had no dementia and had a previously good response to medication, which had declined due to the progression of the disease. But, intracerebral calcifications were present due to a rare genetic mutation, which brought challenges to planning a safe trajectory to the target areas.

In this particular case, since there were so many calcifications, planning was performed using both MRI and CT scans without the head frame.

"With the help of the Leksell Vantage Stereotactic System, used in conjunction with the StealthStation System, we managed to plan a trajectory through the calcifications, and two DBS leads were successfully positioned in the target areas," explains Prof. Gulati "Since the calcifications were very close to the trajectory and there wasn't much room, we opted to just insert the electrodes without microelectrode recordings, in this instance.

"Everything went smoothly, and the trajectory was perfect," he adds. "The patient had a very good clinical response—with rapid resolution of dyskinesia and disease fluctuations—and she was very happy with the result."



Conclusions

“We have now performed several DBS procedures using the Leksell Vantage Stereotactic System, and we are very comfortable with it,” Prof. Gulati concludes. “As with the previous Leksell system, we have confidence in the accuracy and precision of the device, and we are not looking back. The workflow improvements ensure that it is a better day in the OR for everyone involved.”

Disclaimer

This customer perspective is based on the experience and application of medical experts, and is intended as an illustration of an innovative use of Elekta solutions. It is not intended to promote or exclude any particular treatment approach to the management of a condition. Any such approach should be determined by a qualified medical practitioner.



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