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## **Letter to the Editor**

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## Neurorobotics and how it can make advanced surgeries easier

Sir.

Neurorobotics is a combination of neurosciences and robotics that leads to build artificial intelligence and cognitive system. Neurorobotics is a recent innovation in the field of medicine particularly for surgeries which require minimally invasive procedures. It is a technology that has control system based on both the autonomous and central nervous system. Neurorobotics has done considerable advancement in surgeries, through its commendable properties such as refined precision, stability and dexterity. 1 It can perform simple tasks such as grasping and fenestrating. This device is capable of performing finely controlled motions which the human hands cannot and therefore perform more delicate procedures like for lesions present in brain parenchyma. This device has one rigid endoscope and three robot arms that have employed to perform procedures in many cases. The procedures are usually performed through a small burr hole. The basic skills of robots are to detect and identify objects as well as processing language.

The main purpose behind this idea was to make these surgeries easier and more accurate. There are many pros and cons of neurorobotics. First they are more capable in exploring hostile spaces and working in them with decreased risk of error. Secondly, they can be programmed for several hours without getting tired or needing any breaks or shifts. They can work for repetitive task with decreased risk. Even the people controlling them can access these devices online. The speed of these robots reduces cycle time of these operation and increases output. Some people in US argue that these robots are taking jobs away from workers.

These robots although reduces labor cost but their maintenance and programming is very costly. They require huge amount of expense in hardware and software investments. The people controlling these machines require special kind of expertise which is very limited. Despite these disadvantages, robots have their own significance in the manufacturing innovation.

In a study, it was reported that due to advances in technology, nowadays minimally invasive procedures are performed successfully through robotic systems. These

robotic systems have an advantage of being less invasive therefore safe, provide lesser injury and faster healing in comparison to open surgeries. There are several types of robotic systems that have been successfully used in neurosurgery. Neuromate was the first robotic system to be approved by FDA and commercially used. It is usually used in different procedures such as biopsy and deep neuroendoscopy brain stimulation. and electroencephalography. ROSA robotic system was introduced by a French company; it has an advantage of providing navigation of instruments in surgeries, making an increased access to surgical areas. It is used in procedures such as epilepsy surgery, biopsy, tumor resection, endoscopic procedures and deep brain stimulation. Mazor Robotics was the first to introduce Renaissance system which is used for spine surgeries previously called Spine Assist. It provides 3D view and assist surgeon in tool guidance.

So, to conclude that with the progress in technology and science, robotics has made easier for surgeons to perform procedures where open access is not possible through providing 3D and 4D images for more accurate localization of targets and providing tool guidance. The benefits of robotics are more therefore; in future increasing use of it might be seen.

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