An automated surgical robot for tissue resection

BRAIN TOOL LABORATORY
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Unmet Need

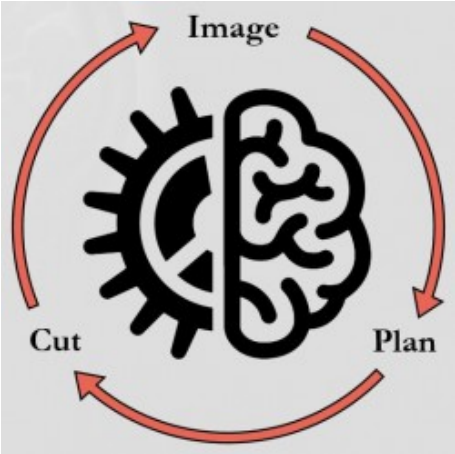
Laser surgery has become a critical procedure in the treatment of many conditions, such as brain cancer, skin cancer, and urinary-tract conditions, among others. In addition, laser surgery has been directed to the treatment of many non-life-threatening ailments, such as tattoo removal and the like. Unfortunately, in many instances, a life-threatening condition is deemed inoperable because its surgical treatment is beyond the ability of even state-of-the-art laser treatments. Furthermore, some procedures require a greater accuracy or precision than is possible within the limitations of the human hand and physiologic tremor. There is a need for a laser-surgery approach that reduces the rate of complication, increases the percentage of conditions deemed operable, increases accuracy and precision of intervention, and/or reduces operating-room time and cost.

Technology

Duke inventors have developed **an automated system for improving laser-based surgical procedures**. This technology is intended to be utilized by surgeons during laser-based tissue resections, such as brain tumor removal. The system and method combine preoperative planning, intraoperative imaging, and surgical tool path planning with robotic control of a laser scalpel for tissue removal. Through these steps, this invention provides closed-loop soft tissue resection at a significantly higher level of automation than offered by any existing robot-assisted surgical device. The inventors have developed a prototype of this technology.

Advantages

- Automating soft tissue resection may reduce operation time for both the patient and surgeon resulting in lower



surgeon fatigue and cost savings to the hospital
- Can improve surgical accuracy and standardize difficult operations for less experienced surgeons or for teleoperation
- Allows surgeons to focus on more complex portions of surgery

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Patent Information

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Country United States of AmericaPatent #: 11,911,099
Patent Title: SYSTEM FOR PERFORMING LASER THERAPY AND METHOD THEREFOR
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Department

Neurosurgery (Dept. & CRU)

Publication(s)

External Link(s)

• Developed by the team at the Brain Tool Laboratory
• Automated Tumor Resection Project Description
• Laser and Imaging in Dermatology Surgery Project Description