

Application Of Medical Engineering In The Field Of Neurosurgery

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Purpose:

To improve surgical skill in deep surgical field, we require objective methods to evaluate skills and skill-enhancing robotics. Here, we describe our work to develop microsurgical simulation models to evaluate surgical skills and robotic system.

Materials And Methods:

With the collaboration of neurosurgeons and an engineering team, we have developed skill-evaluating microsurgical simulation models and, at the same time, robotic system to enhance complicated surgical skills in the deep surgical field, such as endo-nasal dural closure.

Results:

By virtual and real endo-nasal surgical simulation model, we can practice opening endo-nasal route, opening dura, removing tumors and suturing dura. This system allows digital analysis of surgical skills in the aspect of range, length, speed and other motion factors. Then, the deep surgical robotic system with two 3.5mm shaft multi-degree of freedom manipulator are being constructed. This system can be applied through very small hole and can have good range of motion at the depth. Suturing trial was successful.

Conclusion:

Our virtual and real simulation model for endo-nasal procedures should enhance surgical skill training in scientific fashion. And the deep-microsurgical robotic system will be evaluated with this simulation model for its safety and maneuverability and will expand the possibility of our abilities of endo-nasal surgery.