

Development of a New Endoscopic Surgical Robot System with Haptic Sensations and Navigational Function

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【 Outline of survey 】

The aim of this project is to develop a new endoscopic surgical robotic system that enables surgeons to perform surgical procedures like open surgery inside the gastric tube without penetrating the body surface. We are planning to design a new master-slave robotic system utilizing two forceps type manipulators as slave devices, which are attached to both sides of an ordinary upper gastrointestinal scope. The surgeon is able to grasp and lift soft tissue by operating the manipulators, and dissect it with the needle knife. Furthermore, we are planning to develop an image-guided function for this robot system. The function enables precise and safe surgery and shortens the surgery time. After we perform safety evaluations through animal experiments, we will apply the system to clinical cases and examine its efficiency.

【 Expected results 】

Current robot surgery systems (ex. da Vinci, Zeus: Intuitive Surgical Inc.) are rigid scope base systems. There are no systems that enable two-handed operations in the gastric tube without any incision on the body surface. The new endoscopic surgical robot system will create a new paradigm in surgery of the next generation.

【 References by the principal researcher 】

Suzuki N, Sumiyama K, Hattori A, et al. Development of an endoscopic robotic system with two hands for various gastric tube surgeries. *Medicine Meets Virtual Reality 11* 2003: 349-53.

Hattori A, Suzuki N, Hashizume M, et al. Development of data fusion system for robotics surgery (da Vinci). *J JSCAS* 2000; 2: 253-60.

【 Term of project 】 FY 2004 - 2008

【 Budget allocation 】 75,700,000 yen

【 Homepage address 】

<http://www.jikei.ac.jp/ihdmi/>