

Could Head-mounted Cameras Be to Plastic Surgeons What a Laparoscope Is to Abdominal Surgeons?

Takashi Nuri, MD, PhD; Yuki Otsuki, MD, PhD; Gouki Ohashi, MD; Chizuru Umeda, MD; Kie Okamoto, MD; Koichi Ueda, MD, PhD

As surgery becomes more minimally invasive, there are more opportunities to perform surgery through small skin incisions. However, only the surgeon can see the surgical field directly and sometimes the assistant needs to provide blind assistance. The main surgeon is required to adjust the position of the hooks that the assistant pulls as the surgery proceeds. The accumulation of these tasks prolongs the operation time and improper assistance can make the surgeon miss bleeding spots and cause postoperative hematoma. In this report, we present our experience sharing the surgical field with assistants and nurses using a head-mounted camera.

A head-mounted wireless camera FM-105 (Faspro Systems Co., Ltd., Taipei, Taiwan) was used in the surgery. Use of a camera-specific application allows the observers to monitor a live view of the video and recording. The video taken by the head-mounted camera was transferred to a laptop computer via Bluetooth, and the computer screen was projected to an external monitor in the operating room via an HDMI port. The assistant supported the surgeon while referring to the surgeon's field of view on the screen (Fig. 1).

The video taken by the camera was projected on the screen in real time, allowing the assistant to provide precise and timely support. Because the head-mounted camera was equipped with lighting, the surgical field was brightly illuminated, making ceiling-mounted lighting unnecessary. (See Video [online], which displays a scene of reanimation surgery for left facial palsy using a latissimus dorsi muscle flap. The surgeon is creating a narrow tunnel under the skin of the cheek. The video taken by the camera was projected on the screen in real time, allowing the assistant to provide precise support.)

The use of high-definition video in surgical education is becoming popular.¹⁻³ In recent years, operating rooms have been equipped with external cameras installed on the ceiling to capture videos of surgeries, providing a bird's eye

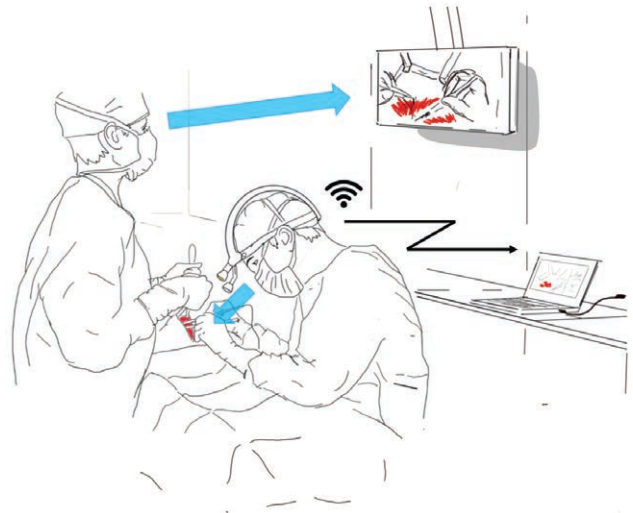


Fig. 1. Photograph of the head mounted camera used in this study. The camera and LED light are mounted in the middle. The captured images can be sent to a computer, tablet, or other devices via Bluetooth.

view. However, some procedures have very narrow surgical fields, such as cleft lip surgery, hand surgery, and muscle flap elevation performed through a small skin incision; the surgeon's head often blocks the camera, and he is the only one who can directly see the surgical field.

Recently, laparoscopy has become popular in abdominal surgery.⁴ The advantage of endoscopic surgery is that the surgeon and his assistants can see the same image of the surgical field through the camera. On the other hand, endoscopes are not commonly used in plastic surgery, where the body surface is often the site of surgery. Head-mounted cameras have been used to store surgical images for educational and academic presentations. In recent years, with the development of Bluetooth and other communication technologies, cameras are no longer limited to recording images; rather, they can also transmit images and videos to a computer or tablet in real time. There are several reports on the recording of surgical images using commercially available body cameras.^{2,3} However, when used in surgery, the surgeon may become fatigued due to the camera's weight, and the quality of the video may deteriorate. A camera designed for surgery can accurately capture surgical images from the surgeon's point of view, since the camera is placed between his eyes. By using Bluetooth

From the Department of Plastic and Reconstructive Surgery, Osaka Medical and Pharmaceutical University, Osaka, Japan.

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to share videos and images, the head-mounted camera can be used like a laparoscope for abdominal surgeons.

Takashi Nuri, MD

Department of Plastic and Reconstructive Surgery
Osaka Medical and Pharmaceutical University
569-8686, 2-7, Daigaku-Machi
Takatsuki, Osaka
Japan
E-mail: takashi.nuri@ompu.ac.jp

DISCLOSURE

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