Teaching Surgical Procedures with Movies: Tips for High-quality Video Clips

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Summary: Video must now be considered as a precious tool for learning surgery. However, the medium does present production challenges, and currently, quality movies are not always accessible. We developed a series of 7 surgical videos and made them available on a publicly accessible internet website. Our videos have been viewed by thousands of people worldwide. High-quality educational movies must respect strategic and technical points to be reliable. (Plast Reconstr Surg Glob Open 2016;4:e1025; doi: 10.1097/GOX.0000000000001025; Published online 21 September 2016.)

Learning surgery is a long endeavor involving years of training before junior surgeons are allowed to practice on real patients.

The “see one, do one, teach one” concept was developed by William Stewart Halsted in 1890.1–3 It was based on the principle that trainee surgeons had to observe senior surgeons for years before practicing on their own and ultimately becoming teachers themselves. Considering the evolution of society, this concept now seems outdated. Patient concerns, the array of surgical techniques, competitiveness issues, and economic constraints leave increasingly little time for residents to learn under real-life conditions. New technologies are now widely used for learning. This includes videos, which are now easy to capture and distribute worldwide. In the present work, we share our experience in and provide step-by-step tips for the production of high-quality surgical videos.

METHODS

We filmed advanced surgeons performing common procedures in plastic, reconstructive, and maxillofacial surgeries to build an open-access video library. The purpose was strictly educational, with no commercial benefit. After several tests, a hand-held video camera was chosen (mini digital camera HDHDR-CX740, Sony Corporation; Tokyo, Japan) and used for each procedure by the same observer. Editing was done with iMovie 11 (Apple Inc; Cupertino, Calif.).

RESULTS

Seven surgical procedures were filmed in 2013 and 2014. The topics chosen were latissimus dorsi flap harvest, radial forearm flap harvest, fibula flap harvest, anterolateral thigh flap harvest, selective neck dissection, LeFort I osteotomy, and bilateral sagittal split osteotomy. (See video, Supplemental Digital Content 1, which displays a compilation of videos describing various types of flap procedures including selective neck dissection. This video is available in the “Related Videos section of the Full-Text article on PRSGlobalOpen.com or available at http://links.lww.com/PRSGO/A253.) The mean length of the final video clips after editing was close to 15 minutes. Starting in April 2014, all of the video clips were made available via a YouTube channel entitled “HD Plastic and Maxillofacial Surgery” (https://www.youtube.com/channel/UC5J_3Vzdt9XaM4bGpGji222g). Collectively, and at the time of this writing, the videos have been viewed more than 200,000 times worldwide.

DISCUSSION

Producing a high-quality surgical video presents numerous challenges and has specific requirements at each
Choice of Surgical Procedures

We note that video is not always the most appropriate medium for learning. For example, superficial skin surgery can usually be presented very well with a series of pictures, often more meaningful than a video.

Other procedures such as microinvasive surgery may also be poor candidates for video.

Operator Cooperation

The surgeon and assistants play an important role in the quality of the video. For example, they must pay close attention to keeping the surgical site as free of blood as possible, because the presence of blood greatly impedes the identification of anatomical structures. Also, white swabs and compresses should not be left in the field of view, as they can jeopardize light exposure.

Video Capture

We found that fixed cameras (integrated in the surgical lamp or on a specific stand) lacked adaptability to the surgeon’s movements, which frequently masked the surgical site. Head-mounted cameras such as GoPro (GoPro, Inc., San Mateo, Calif.) have been used for filming surgical procedures but their very wide field of view made the surgical field hard to see, and head movements often spoiled contrast.

Thus, after several attempts with these other devices, we determined that hand-held cameras seem to be the best option for surgical filming. Camera operators must be familiar with operation room rules and dressed in a sterile surgical outfit so that they can stand close to the surgical field. They must furthermore do so without disturbing the surgical team. The full surgical procedure must be filmed.

Editing

The video clip must focus on key steps of the procedure.

Comments are necessary and must be in English, as it is the de facto international language, especially in the sciences. We advise written rather than vocal comments as they have the advantage of being silent (for viewing in libraries, public transportation, etc).

Pauses are useful to highlight difficult surgical steps or to point out anatomical elements with arrows and/or legends (Fig. 1).

For bone surgery, we found it interesting to include short simulation sequences on artificial models, making the osteotomy lines easier to integrate (Fig. 2).

Currently, videos of surgical procedures are an essential learning method for junior surgeons. The advancing field of 3-dimensional video capture will probably be the future of medical pedagogical tools.

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Video Graphic 1. See video, Supplemental Digital Content 1, which displays a compilation of videos describing various types of flaps procedures including selective neck dissection. This video is available in the related videos section of the full-text article on PRSGlobalO.com or available at [http://links.lww.com/PRS-GO/A253](http://links.lww.com/PRS-GO/A253).

Fig. 1. Anatomical description of selective neck dissection landmarks with legend.

Fig. 2. Anatomical focus on osteotomy line and security of inferior alveolar nerve with artificial model.
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