



ESSENTIAL SURGICAL TECHNIQUES

How to produce a *JBJS EST* video article

Edward Y. Cheng and Stephen R. Thompson

1. Planning and practice runs with trial surgeries are the key.
2. Select the procedure and an appropriate patient.
3. Ensure all hospital regulations regarding video production are met well in advance.
 - a. Some hospitals include photography permission in the standard surgical consent form; others require the patient to sign a specific written form granting permission for release of information.
 - b. JBJS requires that patient permission be granted, but the signed release forms should not be submitted to JBJS to protect patient confidentiality.
4. Before you do any filming, write a storyboard outline using the [template](#) already prepared by *EST*. This storyboard becomes the outline and plan for your video. It saves time, avoids errors, and simplifies the addition of narration later. It is highly advisable to submit the storyboard to *EST*, prior to video production, for review and provisional acceptance. The usage of a storyboard reduces your work burden by minimizing editing after video production.
 - a. Think like a director. Plan. Do not “wing it”.
 - b. Understand what the audience wants to see.
 - c. List the steps of the procedure.
 - d. Consider making a video of the patient’s function or joint range of motion before surgery in order to compare the preoperative function with a corresponding video of the postoperative function.
 - e. Determine which steps require a video scene and which can be taught with either text slides or still images (photos or line diagrams):
 - i. What is the message of each scene?
 - ii. How will you demonstrate the procedure step in the scene? Would two views displayed simultaneously, either side by side or as a picture in a picture (e.g., a shoulder arthroscopic camera video view with a simultaneous view of portals and instruments being manipulated outside the joint), be useful to the viewer?

Technical hint: When two views are used (e.g., 2 different camera angles of the same scene), it will be necessary to sync the display of 2 recorded videos. If both recordings also include an audio track, video editing software can be used to synchronize the 2 videos. If one of the cameras does not record an audio track (e.g., an arthroscopy camera), then it is best to start recording the view outside the joint with the second camera and recite a verbal countdown to a loud clap (starting the arthroscopic camera recording on the clap) in order to create an audio time-point mark to facilitate synchronization during editing afterward.
 - iii. How will you film the scene?

- iv. Is a surgical demonstration best, or would a Sawbones or other demonstration be better?
 - v. How will the camera be positioned or held? In most cases, being as close to the surgeon's line of sight is optimal. For surgery in a deep body cavity, consider using a specialized headlight with the camera built in or position an external camera directly beside the surgeon's eye. Head-mounted cameras can be helpful, but the camera must have a very narrow angle of view, which makes targeting the camera very difficult (e.g., $<45^\circ$ is rarely found on GoPro-type cameras); the surgeon's head motion must be minimized; and someone has to be able to control camera functions (e.g., on/off, focus, and zooming). Make sure that equipment and/or the surgical team does not obstruct the camera's view. Also, make sure that the camera operator knows how to confirm that video is actively being captured and that the camera has extra digital media and battery capacity.
 - vi. What will be the field of view to be seen? How will the body part be positioned, and what retractors will be used to expose the surgical field while allowing the camera to see the region of interest? Be sure that it is possible to perform the surgical step being demonstrated without obstructing the camera's view. Be mindful of who and what is in the background. Try to minimize the background in the video to avoid including other staff, health information considered private by HIPAA, or other undesirable content in the filming.
 - vii. Will lighting be sufficient? Surgical overhead lights provide uniform lighting over a very limited area, and the camera's field of view should be narrower than the diameter of the illuminated field. Consider whether to use the daylight or tungsten light source setting. If using an arthroscopic camera, be sure to adjust the white balance initially.
 - viii. How will you orient the viewer to the anatomical position of the body part? This can be done with an initial wider field-of-view shot and then zooming into the smaller target surgical field or, alternatively, by adding text annotation or narration during editing.
 - ix. Will capturing ambient audio during the scene shot enhance the viewer's experience? If so, you need to warn the surgical team to be quiet and limit any extraneous noise.
 - f. Plan for errors and poor visualization. What steps will be taken to ensure visualization? Will any modifications to the usual technique be employed, such as use of a tourniquet?
 - g. Keep each scene duration as short as possible.
 - h. Add a written abstract (600-word limit).
 - i. Add a video scene of the author, speaking on camera, introducing the procedure to the viewer. Write a script or jot down a few points for the author to convey to the viewer. Determine the scene location. A limited view of the head and chest is usually optimal.
 - j. Write the narrative script for each scene, regardless of whether it is composed of video or text slides. Most importantly, this will ensure that you capture the essential content that you wish to communicate to the viewer. Furthermore, it will limit vocalized pauses, minimize verbal gaffes, and facilitate your recording of the narration afterward.
5. Know your technical limitations and requirements. Consumer-grade cameras can capture excellent video when used appropriately. A minimum resolution of 1080p (full HD, i.e., 1920×1080) is recommended. An aspect ratio of 16:9 (i.e., "wide screen") is optimal. The

suggested frame rate is 30 frames/second. Autofocus is acceptable in most situations; however, be sure to focus on the correct target. It is best to capture video in MP4 format, which is most universal. If you must capture video in QuickTime (.mov) or other formats (e.g., .wmv or .avi), the video can be readily converted later.

6. Have an extra person present during surgery to help with setup and filming. Although a professional videographer is helpful, it is not a necessity as the most important person is the surgeon-director, who best understands the appropriate views, level of detail, and content for each scene required to “tell the story.” Allow for the extra time needed in the OR. Ask the OR staff for a scrub team and circulating nurse familiar with both the procedure and your preferences so that you will not have to devote much attention to helping them. Have a few pairs of extra, oversized sterile surgical gloves available to put on over your existing gloves in case you need to briefly touch something without breaking sterility.
7. Review the storyboard with your coauthors.
8. Submit the storyboard and Title and Abstract form to *JBJS EST* for provisional peer review.
9. Make any necessary edits upon receipt of the *JBJS EST* editorial comments.
10. Review the storyboard preoperatively with your surgical team.
11. Film the scenes according to the storyboard plan. It is not advisable to narrate, direct, film, and perform surgery simultaneously. At a minimum, however, you will need to both direct the filming and perform the surgery simultaneously.
12. Edit scenes to the minimum duration necessary to communicate the point to the viewer. Consider the use of display techniques such as side-by-side or picture-in-picture when appropriate (see 4.e.ii, above). Software such as iMovie and Final Cut Pro is frequently used on the Mac platform, and Adobe Premiere and Sony Vegas are used on the PC.
13. Record the audio narration, already written in the storyboard, being mindful of the duration of the scene.
14. Add the audio to the video scene.
15. Repeat the necessary steps for each scene; then add or stitch the scenes together using video editing software.
16. Add title slides.
17. Submit the video article as a revised manuscript to *JBJS EST* for peer review.