GoPro HERO 4 Black Recording of Scleral Buckle Placement during Retinal Detachment Repair
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Introduction:

This Case of the Month features a new surgical recording technique that improves resident/fellow education. GoPro and Google Glass technology has previously been used to record procedures in medical fields. In ophthalmology, orbital and extraocular procedures are difficult to record on traditional ophthalmic surgical microscopes with mounted recording systems. For this surgery, the fellow wore GoPro’s latest HERO 4 Black edition camera (released September 2014) mounted on a Head Strap + QuickClip mount to record the placement of a scleral buckle (41 band, 72 sleeve, 5-0 nylon sutures) during a retinal detachment repair, Figure 1.

Technique:

At the start of the case, the camera and mount was adjusted by the surgeon wearing a sterile plastic bag or by a nonsterile operating room member to ensure the field of view was centered on the live feed on the iPad. The camera was set to record using the 4K SuperView setting with default ProTune settings (recording speed, white balance, color, ISO limit, Sharpness, Exposure Value Compensation) and an Apple iPad was connected via Bluetooth to the GoPro App to remotely start or stop the recording. An internal microphone captured high-fidelity sound, but the audio was not included in this video to protect patient privacy. Although 12MP photographs can be captured, only video input with the 4K SuperView setting was utilized to document this case. After recording, we imported the entire surgery into the GoPro Studio software platform. First, we spliced the film to eliminate the uneventful frames. Then, the remaining sections were optimized by increasing the zoom and adjusting the horizontal and vertical positioning to center the frames. The overhead

Figure 1: HERO 4 Black edition camera and Head Strap + QuickClip mount by GoPro.

Figure 2: Placement of 41 band under inferior rectus muscle.
lighting in the operating room remained relatively consistent throughout the surgery and the camera’s ProTune automatic white balance setting was utilized so the video required minimal exposure and contrast tunings. Video 1 [https://youtu.be/7QxZsHQDz9I](https://youtu.be/7QxZsHQDz9I) and Figures 2-5.

**Discussion:**

This was a proof of concept study of utilizing the GoPro HERO 4 Black camera to record extraocular surgery (scleral buckle placement) from a surgeon’s prospective during a retinal detachment repair. This camera/mount was easy to use because it is portable, works with loupes, and can be controlled remotely outside the surgical field. Furthermore, prior GoPro HERO models required manual screen resolution and field of view adjustments on the camera to optimize the image quality. This step is no longer needed because all recordings can be done with the 4K SuperView setting with automatic white balance and post production editing produces high quality videos and video stills.

Disadvantages of this technique include the need for minor intraoperative adjustments to the camera to center the video, battery life limitations, need for nonsterile assistant to control the recording on a phone/tablet, background noise during narration, and need for possible password/encryption protection of patient sensitive videos on Bluetooth or Wi-Fi networks.

Future ideas for this new concept include using sterile wraps for a GoPro Smart Remote or phone/tablet to increase surgeon independence, investigating intraoperative photograph
capture, utilizing ceiling/wall mounts or sterilized plastic cases/mounts to provide different views of the procedure, creating stereoscopic videos with dual camera mounts\textsuperscript{3,4} or attaching magnification lenses or polarizing filters to the camera to improve video capture\textsuperscript{1,3,5}.

References:


The Retina Institute in conjunction with the Retina Research & Development Foundation proudly present The Spring Retina Update - Saturday, May 14, 2016. This course was designed for eye care professionals to learn about recent clinical advances in the diagnosis and management of eye diseases as well as advances in ophthalmic research.

This seminar will be held at the Drury Inn, 8700 Eager Road, St. Louis, Missouri 63144.

Early registration is encouraged. There is no cost for the meeting and CE credits will be available. For more information about the course, contact Kelly: kelly.mckittrick@rc-stl.com or call 314-367-1181 x-2157.