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CORRESPONDENCE

Use of a point-of-view camera and an Apple® iPad to teach direct laryngoscopy to trainees

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To the Editor,

The ability to teach direct laryngoscopy effectively poses a challenge to medical educators.[1] A key difficulty is the inability of the instructor and trainee to visualize the laryngoscopy field of view simultaneously. The ability of the instructor to see what the trainee is seeing would allow for real-time feedback without interference with the laryngoscopy. This concept was previously described by Levitan who invented a head-mounted video system connected to a monitor for real-time display.[2] Nevertheless, the costs and technical setup associated with Levitan's "Airway Cam™" likely limited its widespread use as a teaching tool. To address these limitations, we have created an alternative solution that is simple, portable, cost effective, and as unobtrusive to the trainee as possible.

A JVC ADIXXION GC-XA2 camera (JVC Canada) was used to stream a high resolution video to a fourth generation iPad (Apple® Canada) using Wi-Fi connectivity. The camera was mounted on a goggle strap with the field of view calibrated with the learner's line of sight (Figure A). Real-time imaging was possible using the ADIXXION Sync application (Apple iTunes App Store) (Figure B). We tested this system in a simulation laboratory on a Laerdal® Airway Trainer (Laerdal Medical Canada).

After two to three minutes of setup, a high-quality image was attained with the Sync application set to maximum zoom on the iPad (Video). The streamed images were of sufficient quality to allow an instructor to provide real-time feedback and guidance with regard to laryngoscope insertion, positioning, and endotracheal intubation. Specifically, there was adequate visualization (without glare) of all relevant airway structures on the iPad screen. The light provided by the laryngoscope alone was sufficient to provide adequate image brightness, and the latency between the laryngoscopic view and the display of streamed video images was less than one second.

Using our proposed teaching solution, both a trainee and an instructor's shared laryngoscopic view would allow for real-time feedback to guide laryngoscopy and intubation. This is an accessible tool, since it is portable and the required equipment is readily available, with the most expensive component being an iPad. Since iPad use amongst physicians and students in academic centres is already high,[3] the camera would likely be the only required purchase (approximately $300).

The major disadvantage of our solution is that the operator's line of sight must be kept constant relative to their head position (and therefore the camera position) in order to ensure that the camera displays what the operator sees. Nevertheless, in our view, this approach is still likely to enhance teaching of direct laryngoscopy and endotracheal intubation, since this process tends to be a slow and deliberate procedure. As with any new teaching tool, the instructor may have initial difficulty explaining to the learner how s/he needs to alter the laryngoscopy technique based on the streamed image. We consider this challenge to be similar to that occurring in traditional laryngoscopy instruction and one that would be quickly overcome.

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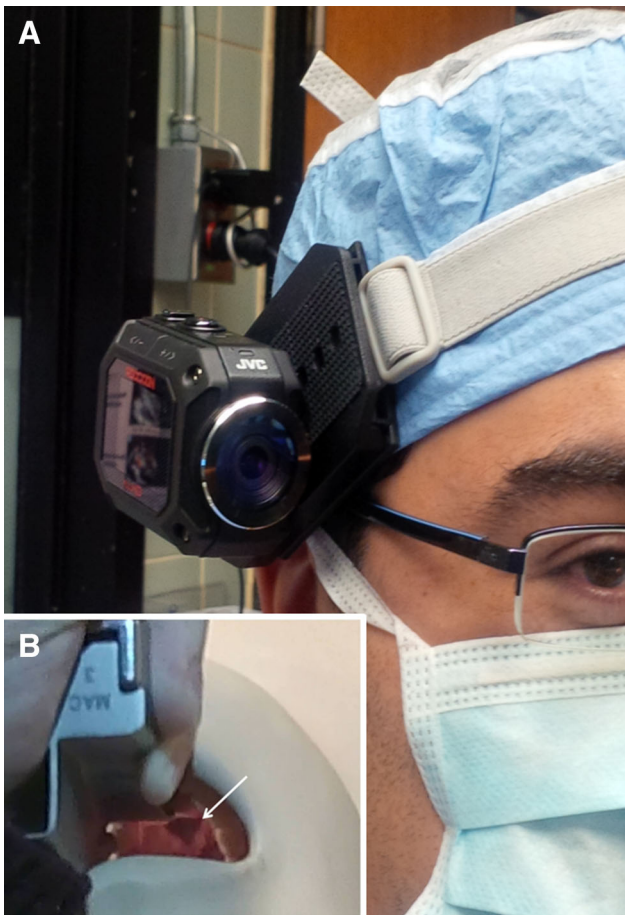

Figure A) Demonstration of a JVC ADIXXION GC-XA2 camera mounted to a goggle strap and adjusted to the wearer's line of sight. B) Learner's view via streaming video from the camera. The glottis of the mannequin is easily identified (arrow)

Mobile technology is widely used to achieve clinical and educational outcomes. The use of smartphones and tablets has significantly impacted the practice of medicine by enhancing medical education, patient care, and communication.[4] Wearable technology, such as "Google Glass", is being touted in the lay press as an important education and clinical tool that will become commonplace across the medical establishment.[5] With the ability to stream video directly, use of mobile technology as an integral component of clinical medical education will become more prominent. Innovative teaching strategies must be further explored and may represent the beginning of a shift away from traditional teaching paradigms.

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Conflicts of interest None declared.

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