

## A low-cost, endoscopic, digital, still and video photography system for ENT clinics

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### Abstract

Image capture systems that display and record endoscopic images are important for documentation and teaching. We have modified a universal serial bus microscope to couple with most clinical endoscopes used in our practice. This very economical device produces images suitable for teaching, and potentially for clinical use. The implications of this could be significant for teaching, patient education, documentation and the developing world.

**Key words:** Camera; Imaging; Endoscope; Teaching

### Introduction

Image capture systems that display and record endoscopic images are important for documentation and teaching.<sup>1</sup> Many ENT clinics have only one purpose-built system, and the majority of clinic rooms have no image recording facilities.

Home-made methods for attaching consumer digital still cameras to endoscopes have been described.<sup>2–5</sup> Most record only still images, do not provide a 'live' image preview and are expensive, and some are large.

We have modified a cheap consumer electronic microscope to couple with endoscopes that have a standard eyepiece. Video and still images can be displayed and recorded on any universal serial bus (USB) equipped computer (Figure 1) and (Figure 2).

### Method

Webcams are cheap, miniature, digital video cameras connected to a computer, which capture images of the user. The Veho™ VMS-001USB microscope (Veho HQ, Hampshire, UK; www.veho-uk.com) has a similar function to a webcam, but is designed for high magnification.

We used part of a disposable camera-head drape (Fairmont Medical© DCC 8007 disposable camera drape (Bayswater, Victoria, Australia)) as a cheap method of attaching the USB microscope to an endoscope. The fitting is suitable for clinical endoscopes equipped with the common standard 32 mm eyepiece.

The USB microscope and endoscope adapter required modification. More details are available online at <http://www.usbendoscopy.co.uk>.

The camera software runs on most operating systems, including the latest 'netbook' low cost compact laptop computers. When combined with a battery-powered endoscopy light source, the system is exceptionally portable.

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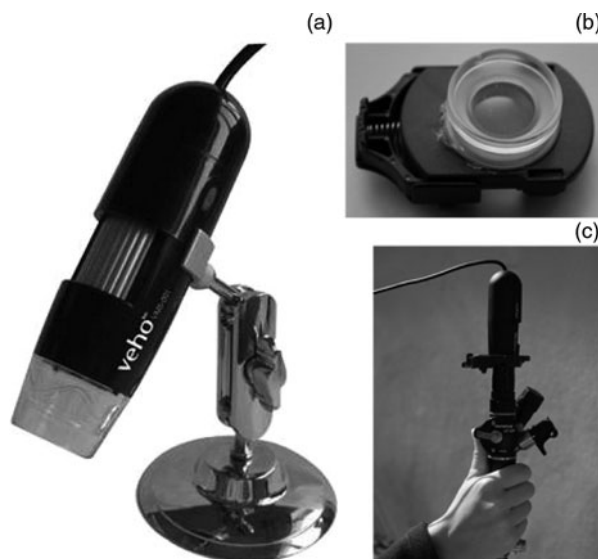


FIG. 1

(a) Veho™ VMS 001 USB Microscope. (b) Fairmont Medical 8007 disposable camera drape (polythene removed). (c) Universal serial bus camera head.

We asked 30 colleagues to compare video images (of nasendoscopy performed on one of the authors) recorded on the USB microscope with images from a professional image capture system. They reported that the USB system produced images suitable for teaching and clinical work. We do not advise its use as a diagnostic imaging tool, as we are awaiting clearance for clinical purposes from the Medicines and Healthcare Products Regulatory Agency; however, the device has been cleared as safe by

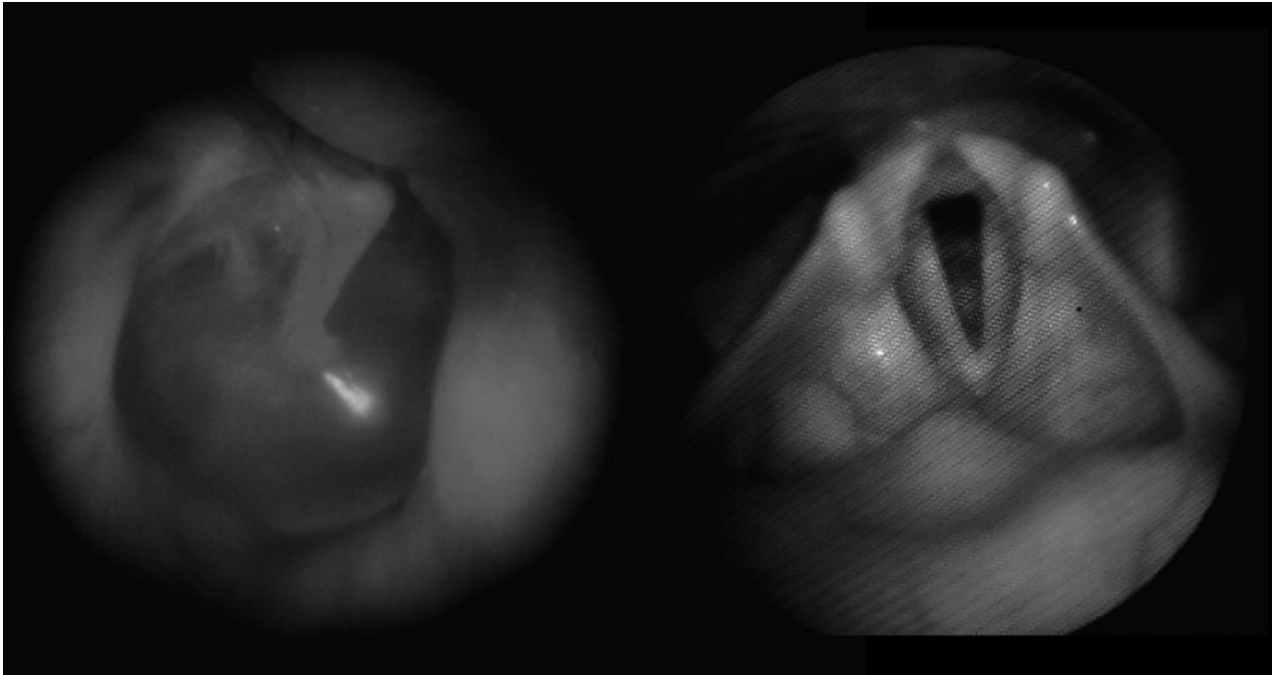


FIG. 2

Example of still images obtained via universal serial bus microscope.

our hospital's medical equipment department. A video is available online at <http://www.vimeo.com/6006462>.

### Conclusions

The low cost USB endoscopy camera described has excellent potential for teaching, patient education, documentation and use in the developing world. The image obtained may be useful for demonstrating pathology in the out-patient clinic and in-patient ENT consultation, and for aiding fibre-optic intubation during anaesthesia.

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