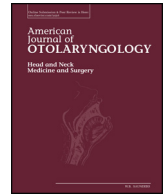




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Novel use of video glasses during binocular microscopy in the otolaryngology clinic

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ABSTRACT

Introduction: The development of portable, high resolution video displays such as video glasses allows clinicians the opportunity to offer patients an increased ability to visualize aspects of their physical examination in an ergonomic and cost-effective manner. The objective of this pilot study is to trial the use of video glasses for patients undergoing binocular microscopy as well as to better understand some of the potential benefits of the enhanced display option.

Methods: This study was comprised of a single treatment group. Patients seen in the otolaryngology clinic who required binocular microscopy for diagnosis and treatment were recruited. All patients wore video glasses during their otoscopic examination. An additional cohort of patients who required binocular microscopy were also recruited, but did not use the video glasses during their examination. Patients subsequently completed a 10-point Likert scale survey that assessed their comfort, anxiety, and satisfaction with the examination as well as their general understanding of their otologic condition.

Results: A total of 29 patients who used the video glasses were recruited, including those with normal examinations, cerumen impaction, or chronic ear disease. Based on the survey results, patients reported a high level of satisfaction and comfort during their exam with video glasses. Patients who used the video glasses did not exhibit any increased anxiety with their examination. Patients reported that video glasses improved their understanding and they expressed a desire to wear the glasses again during repeat exams.

Conclusion: This pilot study demonstrates that video glasses may represent a viable alternative display option in the otolaryngology clinic. The results show that the use of video glasses is associated with high patient comfort and satisfaction during binocular microscopy. Further investigation is warranted to determine the potential for this display option in other facets of patient care as well as in expanding patient understanding of disease and anatomy.

1. Introduction

The use of visual biofeedback has been demonstrated to improve patient outcomes in multiple medical specialties. Within otolaryngology, clinicians have utilized biofeedback techniques to improve post-operative swallowing outcomes in head and neck cancer patients, for postural rehabilitation after vestibular schwannoma surgery, and to treat synkinesis following facial nerve palsy.

The development of portable, high resolution video displays offers clinicians an increased opportunity to integrate visual biofeedback into their practices. Video glasses are head-mounted binocular displays designed as personal media viewers that usually take the form of relatively lightweight glasses. Several authors have suggested potential

roles for video glasses within medicine [1]. Two recent studies demonstrated that video glasses may be used as an effective distraction technique for patients undergoing outpatient interventional radiology procedures, and effectively facilitated distraction in pediatric patients during anesthesia induction [2, 3]. There are no studies that have focused specifically on the potential role of video glasses during routine clinical examinations.

There is anecdotal evidence supporting the use of video glasses as a display option for patients in the otolaryngology office setting during a wide variety of diagnostic and therapeutic interventions. For example, video glasses can be used during sinonasal procedures, during which patients can visualize their nasal endoscopy and/or post-operative debridement. While the impetus for use of the technology may stem

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from efforts to improve patient satisfaction or ergonomic concerns, a patient's ability to watch his or her exam in real time may have other important effects. Given that there are no published studies detailing the aforementioned use of video glasses, this study is the first of its kind and proposes a role for this technology in the otolaryngology office setting.

The objective of this pilot study is to trial the use of video glasses for patients undergoing binocular microscopy, which is a vital tool for the otolaryngologist in the diagnosis and treatment of otologic conditions. Binocular microscopy is particularly suitable for use of video glasses because an important potential drawback of the procedure in many otolaryngology clinics is the inability of patients to visualize their exam in real time. We hypothesize that use of video glasses can be seamlessly integrated into otology clinic use. Furthermore, by allowing direct patient visualization of his or her exam, the patient may exhibit improved comfort and satisfaction. We also hypothesize that usage of the glasses may contribute to improved patient understanding of anatomy and disease.

2. Methods and materials

This study was conducted as a pilot study with a single treatment group. Patients seen in our otolaryngology clinic who required binocular microscopy for diagnosis and treatment of otologic conditions were recruited for the study. Additional patients were recruited as a control group and were not given access to the video glasses, but were provided with static images of their clinical examination after the binocular microscopy was completed. There were no specific exclusion criteria based on the presence or absence of otologic pathology. There was a single attending otolaryngologist who performed all of the otoscopic examinations. Video glasses (Sony Glasstron® or Accupix Mybud®) were given to the patient to wear during the entirety of the otoscopic examination (Fig. 1). Following the examination, a survey was administered to the patient. Outcomes were measured using a 10-point Likert scale survey that assessed patient comfort, anxiety and satisfaction. All data are reported as sample mean \pm standard deviation. Pairwise comparisons between means of different groups were performed using a Student's *t*-test. Patients were asked if they would prefer to use the glasses again during a future visit and if they felt the



Fig. 1. Subject undergoing binocular microscopy while wearing video glasses.

Table 1

Results of survey questionnaires. All data are reported as sample mean \pm standard deviation. All pairwise comparisons yielded a non-significant *p* value of greater than 0.05.

	Comfort of video glasses	Anxiety during examination	Satisfaction with examination
Control (n = 10)	N/A	1.20 \pm 0.42	9.90 \pm 0.32
Normal exam (n = 8)	9.88 \pm 0.35	1.25 \pm 0.46	10.00 \pm 0.00
Cerumen impaction (n = 9)	9.78 \pm 0.44	2.22 \pm 2.95	10.00 \pm 0.00
Chronic ear disease (n = 12)	9.92 \pm 0.29	2.25 \pm 2.73	9.83 \pm 0.58

glasses enhanced their understanding of their ear-related issues. This study was approved by the Institution Review Board of the Albert Einstein College of Medicine and Montefiore Medical Center.

3. Results

A total of 29 patients were recruited for the pilot study. Of these, 8 patients had normal otologic examinations, 9 were found to have cerumen impaction, and 12 had some form of chronic ear disease. An additional 10 patients were recruited as a control population. On a 10-point scale, patients across all groups found that the video glasses were very comfortable (Table 1, Fig. 2). There was no increased anxiety for patients who used the video glasses as compared to the control population (Table 1, Fig. 3). Patients in each group were very satisfied with their examinations (Table 1, Fig. 4). All of the patients who used the video glasses felt that visualization of their examination enhanced their understanding of their ear and ear issues and enhanced their overall clinical experience.

4. Discussion

This pilot study suggests that video glasses may be a viable alternative display option in the otolaryngology office setting. The patients found the video glasses to be comfortable and were highly satisfied with their examinations. All of the patients who used the video glasses in this

Comfort of Video Glasses

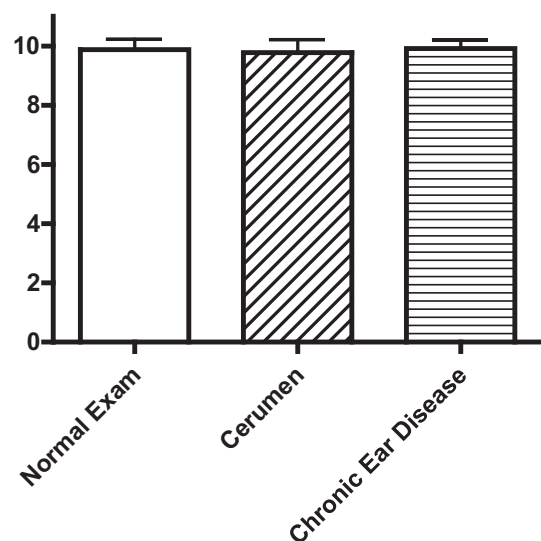


Fig. 2. Patient reported comfort wearing video glasses during binocular microscopy.

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