Novel Use of Visual Biofeedback for Binocular Microscopy in the Otolaryngology Clinic

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Introduction

Studies have described the use of biofeedback in multiple specialties to improve patient outcomes. Within otolaryngology, biofeedback techniques are used in the treatment of synkinesis after facial nerve palsy,[1-2] nasal muscle training to relieve obstructed nasal breathing secondary to nasal valve stenosis or collapse,[3] and to improve velopharyngeal sphincter function during speech therapy.[4-5]

Video glasses are a commercially available display option designed for home video use. There is anecdotal evidence supporting the use of video glasses as a display option for patients in the office setting during a range of different diagnostic and therapeutic interventions, however there are no published studies detailing such use. While several studies from the interventional radiology and anesthesia literature have demonstrated that video glasses may be used as an effective distraction technique,[6-7] no studies have focused on the use of video glasses as a biofeedback tool.

Binocular microscopy is a vital tool for the otolaryngologist in the diagnosis and treatment of otologic conditions. An important potential drawback of binocular microscopy in most otolaryngology clinics is the inability of patients to visualize their exam in real time. This may be due to ergonomics of the exam room, position of the microscope, or lack of a second display monitor.

The objective of this pilot study is to trial the use of video glasses for patients undergoing binocular microscopy. We hypothesize that, by allowing for direct patient visualization of their exam in real time, visual biofeedback may enhance patient comfort, satisfaction, and reduce anxiety. We also hypothesize that visual biofeedback may contribute to improved patient understanding of anatomy and disease.

Figure 1. Video glasses used in the otolaryngology clinic

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/otoscopy for diagnosis and treatment of otologic conditions were recruited for the study. There was no specific exclusion criteria based on the presence or absence of otologic pathology. Video glasses (Sony Glasstron or Accupix Mybud) were given to the patient to wear during the entirety of the otoscopic examination **(Figure 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, satisfaction, and anxiety during the examination. Patients were asked if they would prefer to use the glasses again during a future visit and if they felt as though the 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.

Results

A total of 29 patients were recruited for the study. Of these, 8 patients had normal otologic exams, 9 were found to have cerumen impaction, and 12 had some form of chronic ear disease. On a 10-point scale, patients found that the video glasses were very comfortable (mean 9.875, SD 0.35). Patients were very satisfied with their clinical examination (mean 10, SD 0). Additionally, they reported very slight anxiety with the glasses (mean 2.375, SD 3.11). Patients all agreed that they would use the video glasses again, and that compared to their last visit, the video glasses enhanced their overall experience.
These results were not found to significantly differ among the three patient groups (**Figure 2**). Furthermore, with the video glasses, patients felt they had a better understanding of their ear-related issues.

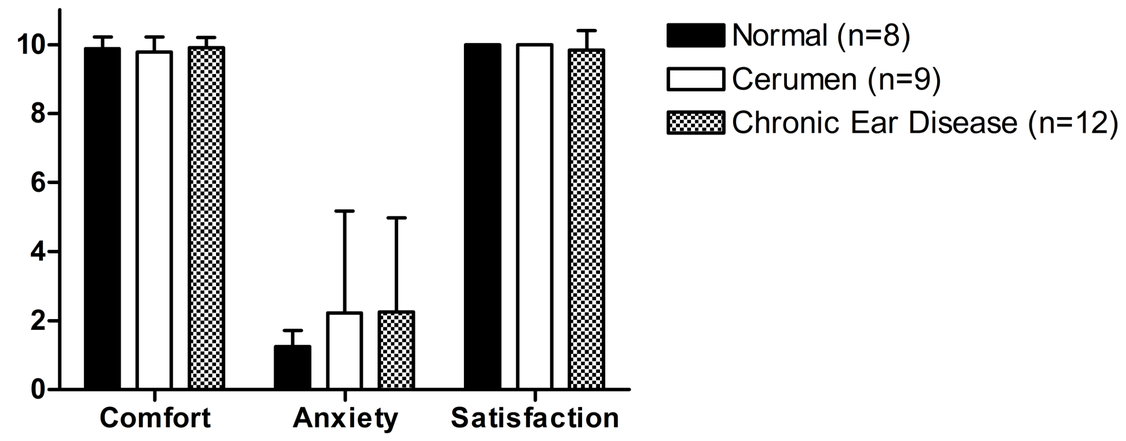

Figure 2. Measured outcome among different otologic pathologies

Discussion

This pilot study consisting of a single treatment group suggests that video glasses may be a viable alternative display option in the otolaryngology office setting. Video glasses may represent a more cost-effective and ergonomic display option as compared to the dual monitor set up used in some clinics. Furthermore, video glasses may represent an improvement from other display options in that it allows patients to visualize their exam in real time. Although binocular microscopy was the specific focus of this study, video glasses may have applications in other clinic settings and may function as an alternative display for other diagnostic and therapeutic interventions including flexible laryngoscopy, stroboscopy, and rigid nasal endoscopy, among others.

The results, although preliminary and obtained from a single patient group without control subjects, suggest that video glasses may contribute to improved patient satisfaction and comfort and reduced anxiety during binocular microscopic exam. This may be due, in part, to video glasses functioning as a distraction technique. However, unlike the aforementioned articles from the interventional radiology and anesthesia literature, in this study patients visualized their exam and not alternative media. Importantly, video glasses may contribute to improved patient understanding of disease and anatomy, the significance of which is not clear at this time. A prospective study with control subjects is currently underway to further investigate the use of this tool and its potential role in both the otology and rhinology clinics.

Conclusions

This pilot study demonstrates that video glasses may represent a viable alternative display option in the otolaryngology clinic. The results suggest that video glasses may increase patient comfort and satisfaction and decrease anxiety during binocular microscopy. Further study, including control subjects, is warranted and is currently underway.

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