Stereoscopic 3D Endoscopic Images of Middle Ear Anatomy

João Flávio Nogueira, MD; Daniel Nogueira Cruz, MD; Daniele Marchioni, MD; Livio Presutti, MD; Dave Pothier, MD; Muaaz Tarabichi, MD

1Sinus & Oto Centro - Hospital Geral de Fortaleza, Brazil; University Hospital of Modena, Italy; University of Toronto, Canada; American Hospital, Dubai, UAE

ABSTRACT

Endoscopic middle ear surgery is a current "hot topic" in our specialty. The use of endoscopes in middle ear surgery has shown new anatomical landmarks and novel surgical techniques that may help understand the pathology of inflammatory middle ear diseases and also develop new surgical techniques for the future of ear surgery. We live in a physically stereotradimensional 3D world, but our teaching and dissection techniques are essentially based on the use of 2D images. This has caused academic and technical difficulties. The complexity and richness of 3D details of the surgical anatomy of the middle ear and mastoid makes endoscopic need to know it deeply before starting surgical practice.14. Nervous, vascular and other structures are closer-related, sometimes separated just by few millimeters. The inter-related structures, the several planes and deepness make the anatomic teaching difficult to understand, mainly when classically demonstrated in anatomy books or 2D stereotradimensional. The idea of this project is to show stereoscopic 3D images of the human temporal bone (middle ear and mastoid). Some equipment was acquired, but this is expensive and, also, the obtaining stereoscopic images process is very technical and complicated. We obtained high-quality 2D digital images containing 0-megapixel resolution. After editing and using proper computer program, we created 3D stereoscopic images (Figures 1,2,3,4,5).5 To demonstrate stereoscopic 3D endoscopic images of the middle ear and mastoid.

INTRODUCTION

Free human heads were dissected using traditional instruments and a traditional protocol of endoscopic middle ear dissection. We used a digital camera (DOMY Cyber-Shot Digital Camera with 3.2-megapixel resolution). The anatomic landmarks were chosen based on 1) functional and anatomical importance. 2) Sequence usually found in endoscopic middle ear surgeries. Two different pictures of the same specimens were captured using stereoscopic technique for obtaining the stereoscopic endoscopic image, and also digital images with simple equipment, without special support. A distance varying from 2 to 5 mm. The camera was directly connected to the endoscope with a special cable or adapter. We obtained high-quality 2D digital images (anatomic) in proper computer program (Calligamy 3D 2.2 system), which may be found free of charge or Internet at the following electronic address: http://www.calligamy.com/3d.

RESULTS

We obtained high-quality 2D digital images containing 0-megapixel resolution. After editing and using proper computer program, we created excellent 3D stereoscopic images (Figures 1,2,3,4,5).5

DISCUSSION

The stereoscopic reproduction of the anatomy in the middle ear and mastoid with the endoscope was directly connected to the endoscope with a special cable or adapter. We obtained 3D images (anatomic) in proper computer program (Calligamy 3D 2.2 system), which may be found free of charge or Internet at the following electronic address: http://www.calligamy.com/3d.

CONCLUSIONS

Such images were obtained with low cost and low technical difficulties; they may help us to understand the anatomy of the middle ear and mastoid.

METHODS AND MATERIALS

The stereoscopic reproduction of the anatomy in the middle ear and mastoid was directly connected to the endoscope with a special cable or adapter. We obtained 3D images (anatomic) in proper computer program (Calligamy 3D 2.2 system), which may be found free of charge or Internet at the following electronic address: http://www.calligamy.com/3d.

REFERENCES