An ear microsurgery trainer for low-resource settings

Presenting Author: Matthew Clark

Matthew Clark1, James Mitchell2, James Morris3, Brian Westerberg4
1Gloucestershire Royal Hospitals NHS Trust, 2ENT Dept, Frimley Park Hospital, 3ENT Dept, Gloucestershire Royal Hospitals NHS Trust, 4Clinical Professor, Department of Surgery, University of British Columbia

Learning Objectives

Introduction: The World Health organisation has identified chronic suppurative otitis media as a neglected condition affecting up to 330 million people worldwide, the burden of the disease located in impoverished countries. There are huge socioeconomic implications that support any progress towards the correct management of otitis media. The recent Lancet Commission on Global Surgery highlighted the need for NGOs to improve training for programmes and that low cost simulation would be one avenue by which this might be achieved. With this in mind, we aimed to develop an ear surgery simulator appropriate for training in resource poor settings and to demonstrate its effectiveness in facilitating acquisition of headlight and microsurgical skills necessary to perform procedures via the ear canal, safely.

Methods: A low-fidelity ear trainer was designed to emulate the ear canal and middle ear space. Face validity was assessed via questionnaires. Six tasks were developed, from headlight foreign body removal through to microscope-orientated tasks of foreign body removal, ventilation tube insertion, tympanomeatal flap raising, myringoplasty, and middle ear manipulation skills.

Novices (medical students), those with limited otology experience (junior ENT doctors) and experts (consultant otologists) were video-recorded performing each task. Videos were scored by a blinded observer, using a validated measurement tool and specially adapted task-specific checklist, in order to assess construct validity.

Results: Face validity results confirmed that ET was a realistic representation of the ear. Construct validity results showed a statistically significant trend with experts performing better than those with limited experience performing better than novices.

Conclusion: This study validates ET as a useful training tool to assess headlight and microsurgical skills required to perform otologic procedures. Further testing is now planned in the developing world setting.