

The Many Uses Of An Otoscope: Much More Than Just Looking Into Ears

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Abstract

An otoscope is basically a magnifying glass with a source of light and a speculum that serves as a guide. The otoscope is a valuable tool beyond its primary role as an examination tool for detecting ear problems. It can also be used for transillumination, dermatologic observation, examination of the eye and body orifices other than the ear, as a pump, as a light source, in veterinary medicine, and in non-medical tasks. Use your imagination and discover that the eardrum is not the only objective of otoscope.

INTRODUCTION

The otoscope is one of the medical instruments most frequently used by primary care physicians.¹ Although the aural and nasal speculum were described by Guy de Montpelier in France in 1363, the prototypes of the modern otoscope were only developed in France and Germany about 500 years later.^{2,3} The otoscope has not really changed since its development in the 19th century. The modern otoscope consists of a magnifying glass on the eyepiece, a cone shaped speculum at the end of a tube and a light source that does not obliterate vision. Since my graduation from medical school, almost two decades ago, I have found that the otoscope is a valuable tool beyond its primary role as an examination tool for detecting ear problems. The following list of additional uses of the otoscope is based on my experience and review of the literature. The list of uses and their respective references are presented in Table 1.

Figure 1

Table 1: Various uses of the otoscope as reflected in the literature

Use	Reference number
<u>Transillumination</u>	
Finding a vein for venipuncture	4
Examination of the content of the scrotal sac	5
Diagnosis of intracranial fluids	6
Diagnosis of sinusitis	7
<u>Dermatology</u>	
Examination of surface lesions	8
Controlling the spray while performing cryotherapy	9,10
Removal of small mites	
<u>Body orifices</u>	
Examination of ears	5
Examination of intranasal deformities/lesions	5,11-13
Detection of intraurethral warts	8,15,16
Detection of foreign bodies	17
Removal of splinter in umbilicus	18
Paediatric genital examination	19,20
Suction of cerumen	
<u>Eyes</u>	
Detection of strabismus, red reflex, cataract, hyphema, foreign body.	
Checking eye movement and pupil's reflex	
<u>Other uses of the light and the pump</u>	
Reduction of anxiety	
Encouraging forced expiration	
Checking fine motor coordination	
<u>Laboratory and veterinary medicine</u>	
Intubation of small mammals	21,22
Liver biopsy	23
Detection of avian gender	24
Detection of cataract in fish	25
Checking animal body orifices	26
<u>Non-Medical use</u>	
Looking into small dark places	

USE OF OTOSCOPE FOR TRANSILLUMINATION

Venipuncture in infants: sometimes very difficult to perform

because of the small size of the veins and their deep position in the skin. The beam of otoscope light is able to illuminate the tissues of the arms of young infants and facilitate the location of veins which appear as dark lines now easily accessible for venipuncture.⁴

Demonstration of hydrocele: easily done by the otoscope light. The testicles in pre-adolescents are visualized as small pea-size shadows where the surrounding is well transilluminated as fluid. In case of an intestinal loop within the testicular sac, the illumination is demonstrated by irregular shadows.⁵

Cranial transillumination: described as an easy and helpful method that aids in the diagnosis of hydrocephalus and various cerebral cysts in infants.⁶

Maxillary sinus transillumination: a common otoscope is suggested to replace an optical system endoscopy.⁷ A trocar, especially designed to fit into the lumen of the otoscope, helps in introducing the tip of the otoscope into the maxillary sinus through the canine fossa. After the removal of the trocar, endoscopy of the maxillary sinus is easy and quick.

USE OF OTOSCOPE IN DERMATOLOGY

Borders and surface of lesions: close observation is often critical in making the right diagnosis. Using the otoscope as a magnifying glass with a source of light is ideal for this purpose.⁸

Microvascular telangiectasia in nail beds: sometime difficult to observe. The otoscope provides the ideal light source and magnification.

Cryotherapy: control of the spray of liquid nitrogen over skin lesions. Various sizes of otoscope speculum have been used successfully to confine the spread of the liquid to the affected area.^{9,10}

Penile skin edema: observation of small mites (1-2 mm.) causing edema and swelling of skin at the base of the glans penis. The otoscope aided the author in observation and removal of the mites.

USE OF OTOSCOPE FOR EXAMINING BODY ORIFICES OTHER THAN THE EAR

Nasal: Detection of septum deviation in newborns and other nasal pathology: septum deviation and pyramid deformation are more frequent following vaginal versus Caesarean delivery.^{11,12} However, in a study from Malaysia, septal

deformity was found in 21.8 percent of 674 newborns with no significant relationship to the mode of delivery. The high prevalence of this pathology suggested routine screening, as early detection decreases future morbidity.¹³ A modified otoscope with comparable results to fibro-optic sinoscis is suggested as a cheap alternative for the developing world.¹⁴ The otoscope is also used to detect bleeding, polyps, mucosal colour and foreign bodies in the nose.⁵

Urethra: Detection and follow-up on treatment of urethral lesions (intrameatal warts-95 percent are distal to the fossa navicularis and condylomata): The speculum of the otoscope can be inserted as deep as two centimeters. This method is less expensive and more comfortable than the use of flexible urethroscopy.^{8,15,16}

Detection and extraction of foreign bodies in body orifices: a common problem in emergency paediatrics. The procedure of extracting a foreign body is preferably done by an otoscope with a surgical head. This provides greater flexibility in using instruments and better vision.¹⁷ An otoscope was used to detect and extract a tiny splint deep in the umbilicus of a young woman who complained of intense pain in her umbilicus.¹⁸ It is suggested that a similar method could be used to inspect sinuses and fistulae.

Investigation of sexual abuse and genital complaints in young females: evaluation is aided with the use of paediatric otoscope.^{19,20}

USE OF OTOSCOPE FOR EXAMINATION OF THE EYE

Detection of strabismus: the “cover/uncover test” can be easily performed by using an otoscope as the source of light.

Checking for red reflex: is conventionally done by checking the eyes through an ophthalmoscope with a zero number lens.⁵ Looking through an otoscope after removing its magnifying glass is virtually the same. Darkening the room by turning off the light is enough to produce adequate pupil dilatation. I invite parents to observe the red reflex with the use of the otoscope and find this useful in explaining the situation.

Detection of cataract, hyphema, foreign body: these can be detected by using the otoscope light directly or from the side as with a slit lamp.

Examination of pupil reflex and eye movements: the otoscope can be used in the neurological examination.

USE OF THE OTOSCOPE PUMP

Mini-suction: especially to suction small particles of cerumen at the tip of the speculum.

Reduce anxiety: ease child's fears by allowing child to play with the otoscope. Blowing air on the child's cheek before performing pneumatic otoscopy can demonstrate that the procedure is painless and fun.

USE OF THE OTOSCOPE AS A LIGHT SOURCE

Checking the throat: obvious enough.

Magic: I ask children to blow on the light of the otoscope and when they do so, I shut off the light. Children up to five years old just love this. By the age of five most children know that it is not a candle light and that actually I am the one who turns off the light. I use this activity also to assess the child's understanding of the situation.

Encourage forced expiration to detect wheezing: asking small children to expire air forcefully is often not understood. Blowing out the light as described above is a challenge that most children accept. Listening to their lungs at the same time is a good opportunity to detect suspected wheezing.

Checking technical coordination and understanding: Following the previously described magic treat, some children want to master the turning on and off of the otoscope light. This is a challenge because in order to turn on the battery otoscope there is a need to simultaneously push a button and turn a ring.

USE OF THE OTOSCOPE IN LABORATORY AND VETERINARY MEDICINE

Intubation of small mammals: aided by otoscope in lab research involving rodents.^{21,22}

Liver biopsy in dog: the otoscope can be used as an alternative to a laparoscope in guiding the biopsy needle.²³

Determination of avian gender: possible in monomorphic birds using an otoscope as an alternative to a laparoscope.²⁴

Detection of cataracts in salmon fish: detected in 83 percent of a sample of 777 fish in a study on farm Atlantic Salmon in Norway with the aid of an otoscope.²⁵

Checking ears and other small body orifices: as for humans.²⁶

NON-MEDICAL USE

Light in a dark hall: as a young doctor I often did home

visits at night. My otoscope helped me to find the right door in dark hallways.

Looking into narrow dark spaces: using the otoscope to find a screw inside a computer or under a low cupboard are but examples.

Checking the content of a sunbird nest: on my porch.

Dislodging a stuck drawer: I drilled two holes in the bottom of the drawer. Through one hole I pushed a hook while looking in the second hole with my otoscope. I succeeded in moving the obstacle and opening the drawer.

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