Choosing Equipment for Examining Ears and Testing Hearing

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Adapted for the Ear*InfoNet* (www.earinfonet.org.au) from a presentation given at the Hear Speak Live Conference, Gold Coast, September 2007, addressing ear health and hearing in Aboriginal and Torres Strait Islanders.

This paper will help you to decide:

- what you need the equipment for
- what instruments you need
- what features you want
- what related services you need

IT DOES NOT TELL YOU WHICH MODEL TO BUY

EQUIPMENT

For examining and cleaning ears: otoscope, pneumatic otoscope, video-otoscope, LumiView (headlight) ear canal tools, tymp-anometer

For assessing hearing: audiometer

Things to Consider

1. Determine what are the most common ear conditions in your population.

a. If there are lots of people with eardrum perforations, it's useful to have instruments which make it easier to clean the canal, e.g. LumiView headlight, suction, operating micro-scope, ear canal instruments.

b. If there are lots of people with ear disease behind an intact eardrum, pneumatic otoscopy or tympanometry is useful for diagnosing middle ear conditions.

2. Determine the uses of the equipment, i.e. whether it will be used for screening or for di-agnosis

3. Determine your target age groups.

   a. With a standard audiometer you can test the hearing of children from about 4 years of age. There are special equipment needs for diagnosing hearing loss in infants and very young children.

   b. It's useful to have some blocks and a small bucket, or pegs and pegboard, if you are testing preschool and school aged children.

   c. If you expect to be testing adults, a response button is useful.

1. Decide who will use the equipment and who will be responsible for its storage, care, maintenance and for arranging calibration.

5. Decide where it will be used, e.g. clinic, school, Day Care Centre.

   a. Decide if it is to be accessible all the time or only available for special projects, e.g. screening. This will affect where it is stored.

6. If it is only to be used for annual screenings, a simple instrument is recommended so that staff can remember how to use it without having to be retrained each time.

7. Other people's experiences: find out what instruments are in use in other clinics. Ask how robust, reliable, easy to use etc.

8. Budget. Identify sources of funds for equipment. You will need to justify the purchase by describing what savings you can make (e.g. time, repeated examinations, evacuation) and how it will improve care for patients

9. Record-keeping.

a. Computer-based record system: this can be very useful for generating review lists and follow-ups and tracking referrals. It must integrate with other record systems to be most useful and everyone using the instrument must understand the system. It's easier to use a computer-based system if you are just starting a project.

b. Paper record system: if this is already be in place you might have to continue this way, or determine the value of changing.

EQUIPMENT cont.

ESSENTIAL EQUIPMENT FOR EXAMINING EARS – OTOSCOPE

- → Should be as strong a light as possible, i.e. at least 3.5v
- → Hand-held otoscope is portable but batteries may be flat
- → Wall-mounted otoscope is always charged and everyone knows where it is, but it isn't portable
- → A pneumatic bulb attached to the otoscope is useful for describing eardrum movement
- → A video otoscope is very useful for health promotion and training. If the clinic doesn't have one, it could arrange to borrow one for training days, special events, screening etc

Things to Consider

- → Does the otoscope have disposable or reusable tips?
- → Is there a choice of sizes of tips?
- → What are other clinics using (for consistency)?
- → Can a pneumatic bulb be added (order with the otoscope)?
- → Video-otoscope – can it work without a computer? There is potential for tele-otology with the better quality instruments which can download images to a computer and transmit via the WWW

EXAMINING EARDRUM MOVEMENT

You cannot tell how well the eardrum and middle ear are working from their look, alone; you need to assess mobility using pneumatic otoscopy or tympanometry.

1. Pneumatic otoscopy is an inexpensive addition to the otoscope, the user needs training but it's quick to learn if the person already has otoscopy skills

Tympanometry is expensive, needs a power source, the user needs training, it's harder to interpret and easier to make mistakes

Use to describe the movement of intact eardrums (ones without holes)

Helpful in distinguishing between an air-filled middle ear (healthy) and fluid-filled middle ear (unhealthy)

May help distinguish a small, dry perforation from a healed perforation

(Do not perform tympanometry on ears with obvious pus or hole in drum)

EQUIPMENT cont.

CLEANING THE CANAL

For cleaning the canal (removing wax, pus, foreign bodies) so you can see the eardrum clearly.

- → Lumi-view or head-light (portable)
- → Alligator forceps, wax hooks and rings
- → Suction (for the clinic)
- → Operating microscope (for the clinic)

TESTING HEARING

A pure-tone audiometer is suitable for testing hearing in adults and in children from three years of age.

1. Screening: air conduction only

Diagnosis: air and bone conduction, speech tests optional

You also need a simple response task for children, e.g. peg-board or blocks

Things to Consider About the Instrument Model (Audiometer or Tympanometer)

- → Does it run on AC or DC power?
- → Does it have a carry case? Noise- excluding headset? Printer? Response button?
- → Portability - consider size and weight
- → Data storage and download?
- → Calibration support?

OTHER CONSIDERATIONS

1. Knowledge and skills. Staff will need:

a. Training to perform new techniques and interpret the results
b. Supervision during early use
c. Back-up from an experienced person for interpretation of results
d. 'Refresher' training if they only use the equipment for annual screening

2. Availability of maintenance and support

a. Power supply
b. Replacements parts.
c. Repairs
d. Calibration

EQUIPMENT cont.

Suppliers Contact Details

Biotronic Pty Ltd — Oscilla
3/51 Church St
Randwick NSW 2031
Ph; 02 9398 8132 Fax 02 9399 7884
www.biotronic.com.au

Economedical — Oscilla
Ph; 02 4325 5505
www.economedical.com.au

Paxton Barrand — Microaudiometrics (Earscan')
Level 5
283 George Street
Sydney NSW 2000
Ph 02 9299 4855
www.paxtonbarrand.com.au

Phoenix Hearing Instruments — Maico
Unit 6 49 Butterfield Street
Herston QLD 4006
Ph 07 3852 4633 Fax 073852 4633
www.phoenixhearing.com.au

Quadrant Industrial Acoustics
PO Box 212
Woori Yallock VIC 3139
Ph 03 5967 4442 Fax 03 5967 4467

Sonic Innovations — GSI, Amplaid, Amplivox, GSI, Maico
1/10 Dorsey St
Milton QLD 4064
Ph 03 9013 0987 Fax 03 9763 2195
www.sonici.com.au

Welch Allyn — Welch Allyn otoscopes, Lumi-view
Unit 5 Metro Centre
38-46 South Road
Rydalmere NSW 2116
Ph 02 9638 3000

Surgical Appliance sales http://www.hotfrog.com.au/products/surgical-appliances/SA
(search by State)
Wax loops, wax curettes, wax hooks, alligator forceps

When babies are born in the dry season this is also the time of the birth of the dragonfly, which hums and buzzes around the air excited about the birth of the new season.

The grandmothers catch the dragonflies to test babies' hearing, making them buzz near the babies' ears. When a baby responds we know that they have good hearing. If not, the old ladies bring the dragonfly closer so the baby can feel the vibration and the sound of its wings, then she sings to the spirits and the dragonfly, "we all must look after this child together to help him to grow and be able to communicate".

So, if you see a dragonfly buzzing around a baby, it is just looking and checking the baby's response because that's what they do. In the past, everyone worked together - dragonflies, grandmothers and the spirits.

Artist: Norma Benger Chidanpee