

## Station 1: Ear canal screen / Otoscopy

### Procedure:

- ✓ Wear gloves
- ✓ Perform otoscopy in each ear
- ✓ Use same speculum for both ears, unless visible infection or blood in first ear
- ✓ Plastic ear specula = garbage bag; Metal ear specula = box to clean and disinfect/sterilize

### Note of results:

Clear = ear drum > 50% visible (= PASS)  
Partially Blocked = ear drum < 50% visible (= REFER)  
Blocked = ear drum not visible at all (= REFER)

- ✓ Take note on any abnormality of the pinna, en the ear canal or at the ear drum. Let the decision on the necessity of referral for these abnormalities be made by the Medical Doctor.

### Remarks:

- ✓ "Follow-up needed:" check only if Medical Doctor decides it's necessary. Do not check this box for referral of excessive ear wax.
- ✓ Contra-indications for further screening: make a clear note on the screening form.  
Excessive ear wax ≠ contra-indication

### Next step:

- ✓ After otoscopy, all athletes continue to station 2 (OAE), regardless off results, unless contra-indication.

## Extra: Removal of Ear Wax

### Note of results:

Yes = complete removal of ear wax  
Yes, partially = partially removal of ear wax  
No = no removal of ear wax, because no Medical Doctor present  
Not possible = geprobeerd om te verwijderen maar niet mogelijk binnen deze setting  
Athlete refused = refusal of ear wax removal by athlete

- ✓ Always fill in 1 of the options above (= second line at station 1) when the ear canal is "partially blocked" or "blocked", never when the ear canal is "clear".
- ✓ Always check what the situation is after (partially) removal of ear wax (or not) by filling in the third line at station 1. Never fill in this third line when the first situation was already 'clear'.

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## **Station 2: Screening with Otoacoustic Emissions**

### **Procedure:**

- ✓ Wear gloves
- ✓ Perform OAE screening in each ear
- ✓ Use the same foam ear tip for both ears, unless visible infection or blood in first ear
- ✓ Foam ear tip = garbage bag

### **Note of results:**

PASS = PASS on screening unit

NO PASS = REFER on screening unit

CAN'T TEST = if OAE screening not possible + check one of the reasons in last column  
= NO REFERRAL

### **Next step:**

- ✓ If bilateral "pass" → check-out
- ✓ If unilateral or bilateral "refer" / "no pass" → station 3 (tympanometry) and 4 (pure tone audiometry), unless contra-indication

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## Station 3: Screening with Tympanometry

### Procedure:

- ✓ Wear gloves
- ✓ Perform tympanometry in each ear
- ✓ Use the same ear tip for both ears, unless visible infection or blood in first ear
- ✓ Used ear tips → box to clean and disinfect

### Note of results:

PASS = all values within the values of the normative data

NO PASS = type B-tympanogram or at least one of the numeric results outside of the normative data

CAN'T TEST = If tympanometry not possible + check one of the reasons at last column  
= NO REFERRAL

### Normative data for tympanometry: ("rule of 2")

**PASS** = admittance between 0.20 and 2 mmho

middle ear pressure between +20 and -200daPa

ear canal volume between 0.60 and 2 ml

**NO PASS** = type B (flat)

type C (under pressure) with pressure more positive than +20 daPa or more negative than -200 daPa

type As with value for admittance < 0.20 mmho

type Ad with value for admittance > 2 mmho

ear canal volume < 0.60 ml or > 2 ml

### Comments:

- ✓ Note type of tympanogram when "no pass", this way Clinical Director or Lead Audiologist can decide on follow-up recommendations.
- ✓ Type D-tympanogram, without any further abnormalities on otoscopy = "pass"
- ✓ When unilateral or bilateral "no pass" on tympanometry, but all other screening results are normal, then the athlete will not be referred for follow-up, unless the Medical Doctor or the Clinical Director at the event decides otherwise.

### Next step:

- ✓ After tympanometry, all athletes continue to station 4 (Pure Tone Audiometry), regardless of results.

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## Station 4: Screening with Pure Tone Audiometry

### Procedure:

- ✓ Test frequencies: 2000 and 4000Hz (ear by ear)
- ✓ Intensity level: 25dBHL = "pass"
- ✓ Interrupted (pulsed) tones
- ✓ Screening procedure: starting level = 50dBHL → 35dBHL (if response at 50dBHL) → 25dBHL.
- ✓ Requested response = raise hand; play audiometry if needed
- ✓ Short training and/or conditioning if needed
- ✓ Disinfect headphones before usage with new athlete

### Note of results:

**PASS** = reliable response at 25dBHL  
→ check-out if 4x "pass" (both frequencies in both ears)  
**NO PASS** = no (reliable) response at 25dBHL, or athlete refused testing  
→ station 5

### Next step:

- ✓ If 4 times PASS → check-out
- ✓ If NO PASS for at least 1 of the 4 frequencies → station 5 (threshold testing with pure tone audiometry)

## Station 5: Threshold Testing with Pure Tone Audiometry

### Procedure:

- ✓ Test frequencies air conduction: 1000, 2000, 3000, 4000 and 6000Hz  
Test frequencies bone conduction: 1000, 2000 and 4000Hz
- ✓ Mask if necessary and possible
- ✓ Determine hearing threshold, ear by ear, also for ear with "pass" at pure tone screening

### Note of results:

**NR** = No Response: if no response for certain frequency at maximum intensity level.  
Note if masking technique is used.  
Note if test results are reliable or not.

### Comments:

- ✓ Test as many thresholds for air and bone conduction as possible. If attention or reliability decreases, try to test at least 1 threshold for bone conduction (1000Hz).
- ✓ Ask assistance if needed.

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