Minimum pass criteria for behavioural paediatric hearing tests - Summary Clinical Guideline - Joint Derby and Burton

Reference No:CH CLIN AUDIOLOGY/4049/001

Audiologists should seek to collect the maximum amount of audiological information possible for each child. Testing should be prioritised in a way that meets the clinical need of each case.

Test and ear specificity	Recommended minimum discharge criteria	Limitations of using test in isolation
Distraction (BSA, 2018) (developmental age from 6 months+) Sound Field only	All test signals must be measured using appropriately calibrated SLM: Satisfactory hearing levels are accepted as responses at 30 - 35dB (A). At a minimum, distraction test should cover responses to a low, mid and high frequency stimulus. Localisation of sounds should be assessed. A range of stimuli can be used including filtered theme tunes, reality sounds, warble and narrow band noise. Other stimuli that can be employed include: • High frequency rattle 6 - 8 kHz • Repeated unforced production of unvoiced phoneme ‘s’ ~4 kHz • Minimal voice (i.e., voicing with intonation and rhythm but no articulation, humming ~500 Hz	• Test of hearing sensitivity rather than absolute thresholds • Should not be used solely to discharge paediatric patients • Visual status should be assessed, and test modified • Inadvertent visual, tactile, auditory and olfactory cues • Cues from parents or tester 2 (e.g., parents moving when sound is presented or tester 2 phasing out play) • Frequency specificity and interpretation of responses

VRA (BSA, 2014) (developmental age 6 months+) Sound Field Ear Specific Bone Conduction	Sound field ≤25 dB HL at 0.5, 1 or 2kHz & 4 kHz MRL*. If ear specific required: 1 & 4 kHz ≤20 dB HL	• Attempting conditioning to sub-threshold stimuli e.g., starting at 70 dB when thresholds are around 90 dB • Cues from parents or tester 2 (e.g., parents moving when sound is presented or tester 2 phasing out play) • Varying level of engagement by parent/tester 2 inhibiting reliable responses • Overemphasis on quantity of results and not using time efficiently • Obtaining MRLs* with speakers on right and left and interpreting these as providing ear-specific information • Tester response bias (e.g., tester expecting that child's hearing is normal) • Visual status of child
Performance (from developmental aged 2+ years) Sound Field Bone Conduction	Hand held warbler: ≤20 dB HL at 0.5, 1 or 2kHz & 4 kHz. VRA speakers: ≤25 dB HL at 0.5, 1 or 2kHz & 4 kHz.	• Lack of ear specific information • Cues from parents/tester • Standardised distances and positions needed • Stimulus level will always be more accurate when presented through VRA speakers if the child is seated in the calibrated spot. This method should be employed whenever practically possible

		• All test signals need to be measured using calibrated sound level meter
Play Audiometry (from developmental age 2+ years) (BSA, 2018) Ear Specific Bone Conduction	Headphones (incl. inserts): ≤30 dB HL at 0.5kHz and ≤20 dB HL at 1 or 2kHz & 4 kHz Bone conduction: ≤15 dB HL at 0.5, 1 or 2kHz & 4 kHz	• Timing of test stimuli • Room set up • BC problematic above 2KHz • Vibrotactile transducers • Inadvertent tester cues • Collapsed canals (inserts preferred)
PTA (from developmental age 5+ years) (BSA, 2018) Ear Specific Bone Conduction	Headphones (incl. inserts): ≤30 dB HL at 0.5kHz and ≤20 dB HL at 1 or 2kHz & 4 kHz Bone conduction: ≤15 dB HL at 0.5, 1 or 2kHz & 4 kHz	• Refer to Play limitations
Tympanometry (BSA, 2013) Ear Specific Birth-adults	Pressure Children +50 /-200 Adults +50/-50 Compliance Children 0.2cm3/1.6 cm3 Adults 0.3 cm3 /1.6 cm3 ECV Children 0.4 cm3 -1.0 cm3 Adults 0.6 cm3 -2.5 cm3	• Artefacts • Contraindications including surgery within the last two months, foreign bodies, wax, otalgia, otorrhoea, excessive wax • Incorrect probe tip selection
TOAE (BSA, 2022) Ear Specific	Response Present = Amplitude between -10 dB SPL to +30 dB SPL and A SNR of ≥ 6 dB SPL at	• TEOAEs will not be detected for patients with a cochlear hearing loss involving outer hair cell dysfunction > 35 dB HL • Tests outer hair cell function - cannot rule out inner hair cell dysfunction, neural auditory dysfunction

	2 or more bands.	• Not frequency specific • Rarely TEOAEs may be absent for persons with subtle cochlear dysfunction who have hearing thresholds within normal limits

Table 1: Development stage behavioural tests of hearing and minimum pass criteria.

**Minimum Response Level (MRL) - Information available on the relationship between adult thresholds and MRLs for sound-field VRA indicates that normally hearing infants (ages 7–12 months) present mean thresholds at approximately +10 dB relative to adult thresholds (from 0.5–4 kHz). For example, an infant with an MRL at 45 dB HL could be considered to have an equivalent hearing to an adult responding at 35 dB HL. Therefore, it is suggested that when testing infants by VRA in the sound field, the hearing should be tested down to at least 25 dB HL (equivalent to adult 15 dB HL) and that responses at this level are accepted as indicative of hearing within normal limits* (see BSA, 2014).

References

See Routine Hearing Assessment of Children Referred to Paediatric Audiology – Full Clinical Guideline for all references.