

myaudiometer.

FRESH noise™

The MADSEN Astera is the first commercially available audiometer to present a narrow band noise stimulus signal designed for the purpose of measuring hearing thresholds. Unlike the common narrow band masking noise, which when used for stimulus only gives a loose estimate of the child's hearing capabilities (and only with flat losses), the FRESH noise allows for measuring with increased frequency specific precision also in children with sloping audiogram configurations. This new FRESH (FREquency Specific Hearing assessment) noise is a narrow band noise signal that has been designed with extremely steep filter slopes. That way the skirt of the FRESH noise stimulus signal does not spread beyond the desired frequency region. It is focused on the critical frequency band of the hearing that is targeted with each audiometer frequency setting. In the FRESH noise, the Pure-tone and the Warble tone stimuli now have a worthy companion on your pediatric measuring palette.

Where does FRESH noise fit in clinically?

The use of alternative stimuli such as narrow band noise and warble tones for behavioural threshold testing in young children is a concept that has been widely accepted and used since the 1950's. It is all about the great idea to administer a diverse battery of test signals in order to keep the child's interest in the presented sounds. For that purpose the combination of pure tones, warble tones and narrow band noise signals has proven to be a quite interesting cocktail of sound sensations for the otherwise difficult-to-impress toddler.

Narrow band noise is also traditionally used as an alternative to the warble tone stimulus in order to avoid standing waves when performing sound field testing (as e.g. in Visually Reinforced Audiometry (VRA) testing with speakers). The reason the warble tone should be complemented with an alternative is again simply for variation to maintain the child's interest in the test signal.

The FRESH noise replaces the use of the narrow band masking noise as a stimulus for threshold assessment.

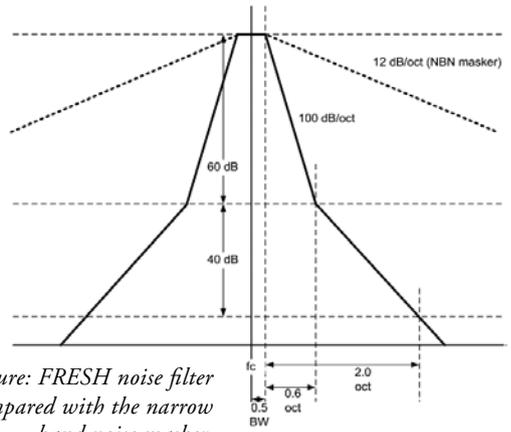


Figure: FRESH noise filter as compared with the narrow band noise masker.

...and what was wrong with using the masking noise as stimulus, really?

- 1) Narrow band masking noise is calibrated in Effective Masking Level (EML), not in Hearing Level (HL). EML is the level of a stimulus that is just barely masked by the concurrent masking noise presented at the specific level. Hence the reported masking level and the stimulus level of the audiometer are not comparable in terms of hearing level. The EML correction is in the ANSI standard and is applied when calibrating most audiometers.

In order for the FRESH noise to be suited for- or compared with other hearing level measurements it is calibrated in dB HL not in EML like the masking noise.

- 2) Narrow band masking noise is too widely spread in frequency to pinpoint only the frequency range that you wish to assess with each frequency setting in tone audiometry. The top plateau of the masking noise is reasonable, but the masking filter slopes are only falling off by 12 dB/octave, so much of this noise is likely to be heard by adjacent frequency bands. If there is a sloping loss, the noise skirts are heard through "off-frequency listening" although the intended test frequency is not heard at all. That will underestimate the hearing loss to a degree that depends on the slope of the loss. This is not a problem with normal or flat audiogram configurations because in those cases there are no frequencies adjacent to the test frequency where the sensitivity is so much better that the noise slopes are detected although the test frequency is not.

In order to minimize errors associated with the bandwidth of the stimulus, the out-of-band energy of the FRESH noise stimulus falls off with a steeper slope than that of any typical threshold curve.

Johannes Lantz
Audiologist
GN Otometrics
johlan@gnotometrics.dk

MADSEN Astera

www.myaudiometer.com



otometrics

MADSEN · AURICAL · ICS

myaudiometer.

The Masking Assistant™

Benefits

The Masking Assistant is designed to make your tone audiometry procedure more efficient, decrease the risk for masking errors, and limit the time you and your patient spend on very time consuming tasks that may be both tiresome and stressful.

Now you don't have to use the (inefficient) 40 dB difference criterion to judge whether an air conduction threshold needs masking or not. The Masking Assistant will instead tell you when to mask. The Masking Assistant suggests when to mask based on proven transducer- and frequency specific masking criteria, leading to avoidance of unnecessary masking. Just wait for the prompt. A threshold that requires masking will start blinking in the audiogram graph when necessary. In order to determine this masking need, the Masking Assistant automatically does all the cross-checking of the different thresholds and curves in order to determine whether the need for masking occurs thus relieving you from that task.

For the first time, the Masking Assistant, makes it practically feasible to use transducer and frequency specific criteria for deciding whether clinical masking is needed for air conduction threshold testing. This is reportedly more efficient and safer than using a traditional "one-number-fits-all" dB criterion which is otherwise used. In the highly esteemed Katz' "Handbook of Clinical Audiology" (2002), Katz & Lezynski conclude that using the traditional 40 decibels Minimum Interaural Attenuation (Min IA) criterion for all frequencies is "...inefficient, may have caused some errors, and increased the wear and tear on our patients because at 2000 Hz and above, Min IA is 45 or 50 dB (and at 125 Hz, 35 dB is Min IA). By using more accurate frequency-dependent Min IA criteria rather than "one-number-fits-all" frequencies, unnecessary masking may be avoided." If you use insert phones together with the Masking Assistant, you have the unsurpassed combination for reducing your masking efforts to an absolute minimum.

Masking Is Not Free

- unnecessary masking should be avoided

Masking is time consuming and can be tiresome for both you and your patient. Masking can also introduce variability to your threshold measures. The Masking Assistant helps you reduce the instances of masking by simply applying the (too-hard-to-remember) frequency specific interaural attenuation criteria that are recommended in such contemporary audiological literature as "Audiologists' Desk Reference Vol. I", by James W. Hall and H. Gustav Mueller and "Handbook of Clinical Audiology" by Jack Katz (Ed.). This assistance is invaluable because masking is not free.

- Unnecessary masking requires re-instructing the patient
- Unnecessary masking for bone conduction requires entering the test chamber
- Unnecessary masking requires rechecking thresholds
- Unnecessary masking is uncomfortable or unsettling to some patients
- Unnecessary masking contributes to patient fatigue
- Unnecessary masking can cause temporary threshold shift after a period of masking
- Unnecessary masking sometimes confuses children and the elderly
- Unnecessary masking heightens the central masking effect in some patients

Because of the considerable cost of clinical time, the potential effects on patients, and the possible contamination of the threshold measure itself, there is sufficient reason not to use masking *when there is no actual need*. The Masking Assistant helps you avoid the unnecessary masking.

Johannes Lantz
Audiologist
GN Otometrics
johlan@gnotometrics.dk

MADSEN Astera

www.myaudiometer.com



otometrics

MADSEN · AURICAL · ICS