

Comparing three broad-band Stimuli

Click

CE-Chirp

LS-Chirp

(Level Specific)

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Purpose of the study

- To compare three broad-band stimuli using Auditory Brainstem Response
 - Especially CE-Chirp vs. LS-Chirp at higher levels
- Evaluated on their ability to generate response amplitude and give resolution of the peaks
- Hypothesis: The LS-Chirp will produce larger ABR-amplitudes and better resolution

Test protocol

Test subjects:

- 9 females 1 male. Thresholds above 10dB HL for all frequencies 125Hz-8kHz. N=20 ears.

Equipment:

- Interacoustics Eclipse, ER-3A insert earphones.

Stimuli:

- A standard 100 μ s Click (350-10,000Hz)
- CE-Chirp (350-11,300Hz)
- LS-Chirp (350-11,300Hz)

Intensity:

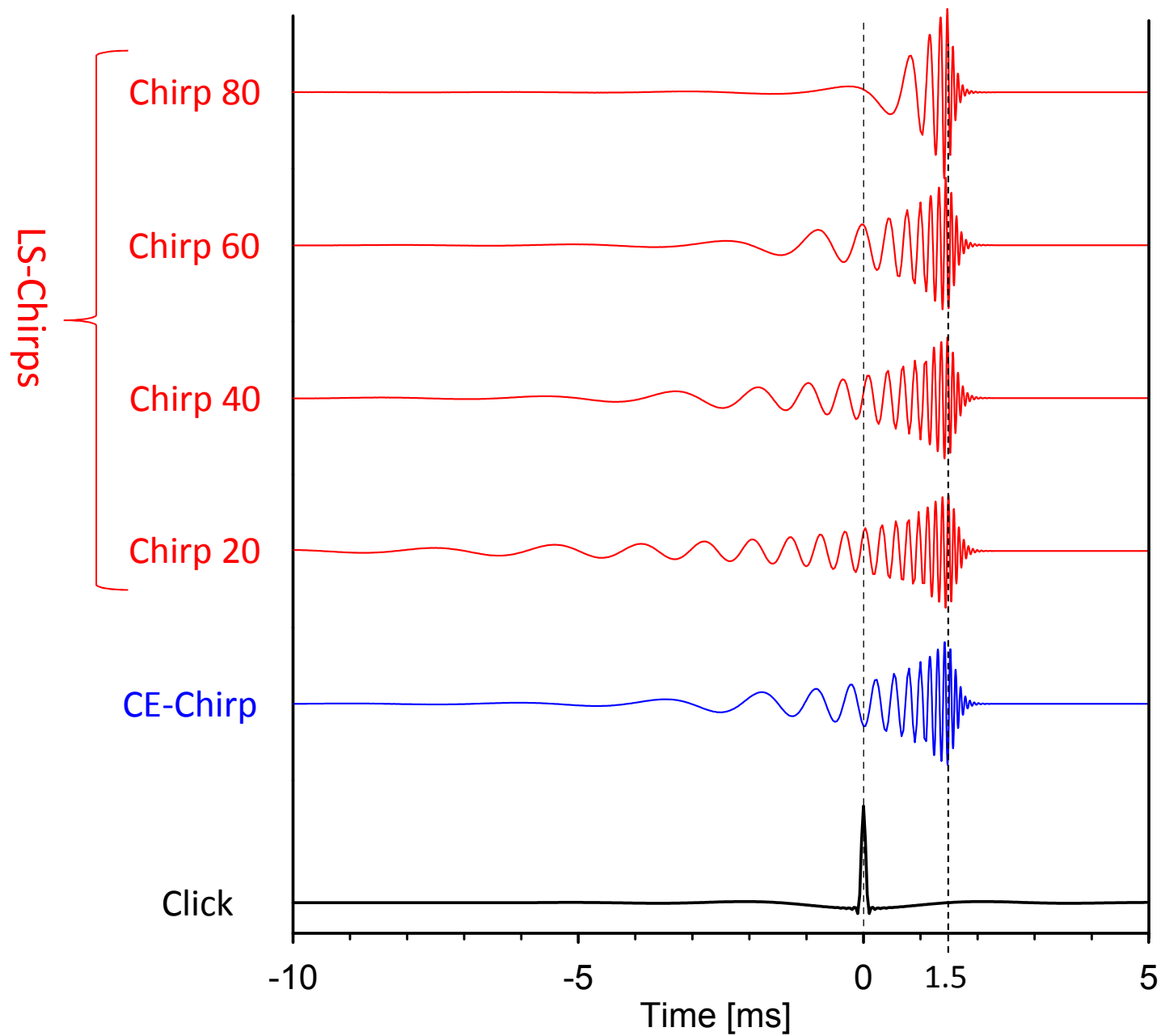
- 20, 40, 60 and 80 dB nHL

Setup:

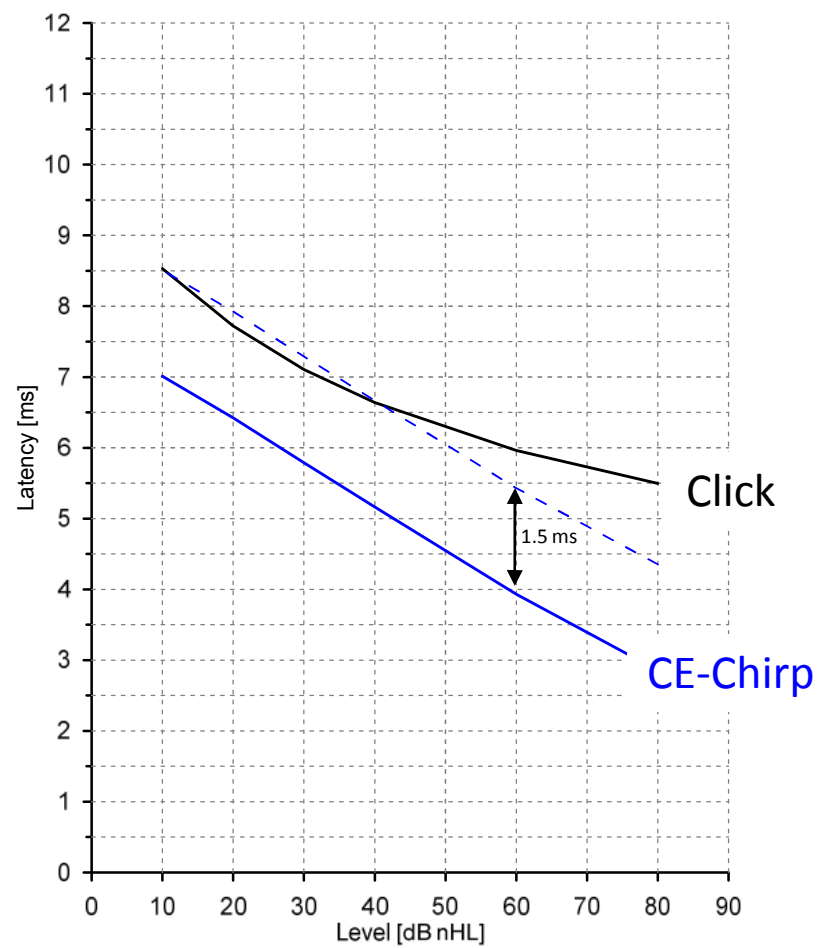
- 27.1 stimuli/second
- Alternating polarity
- Weighted averaging
- Stop criteria = 40 nV

Chirp Stimuli

Stimulus timing

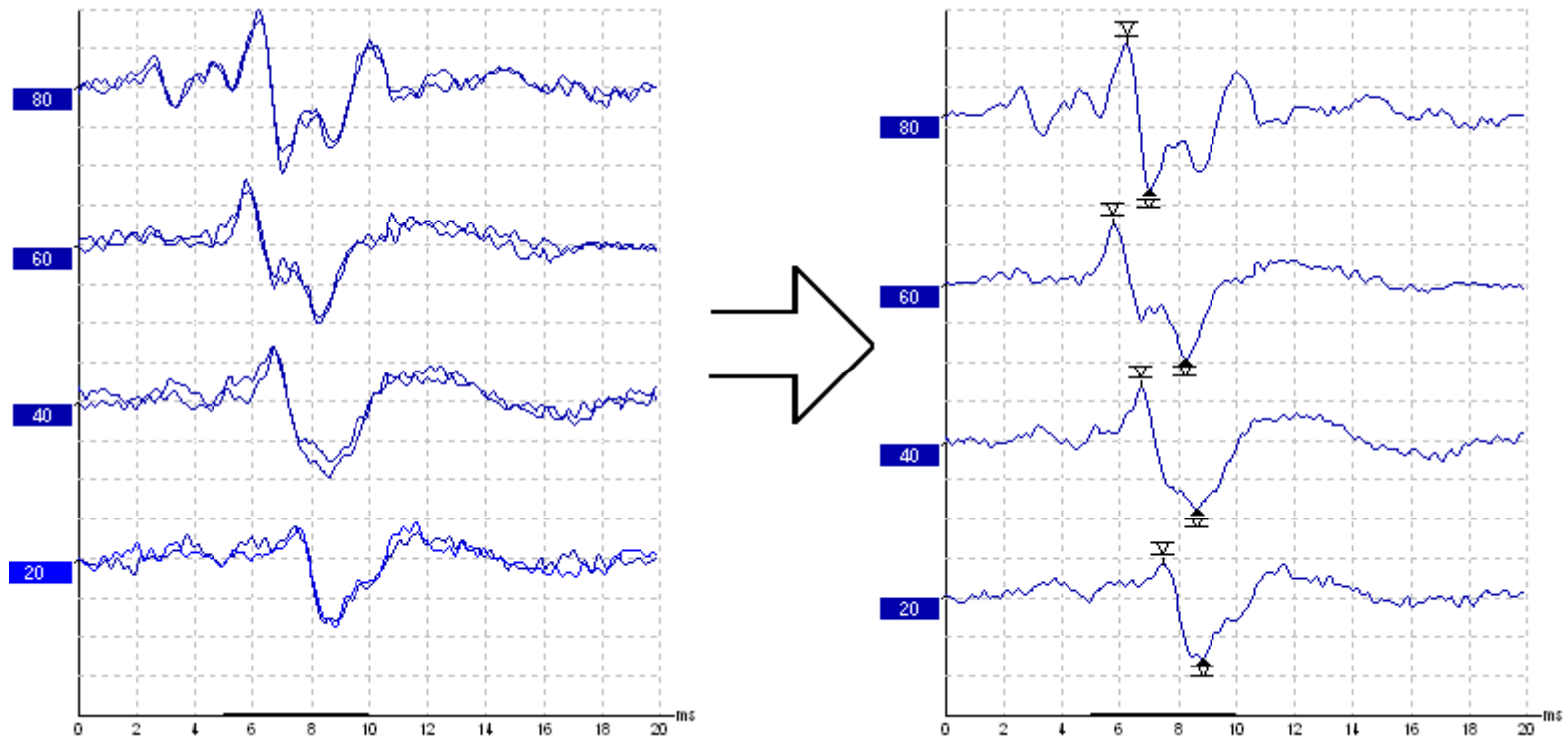


Click-ABR and Chirp-ABR latencies alignment

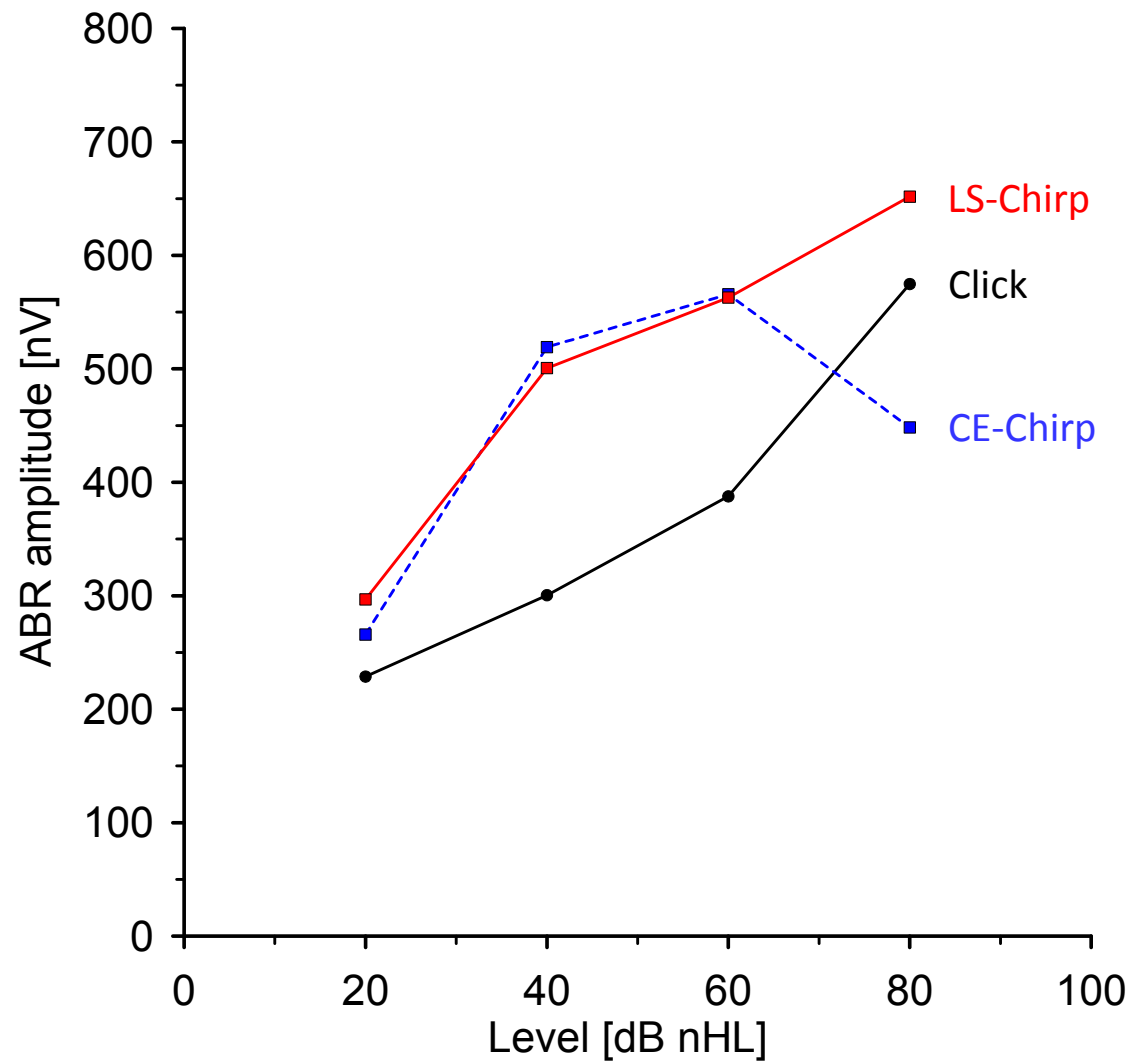


Data and Results

ABR Data Analysis (LS-Chirp)

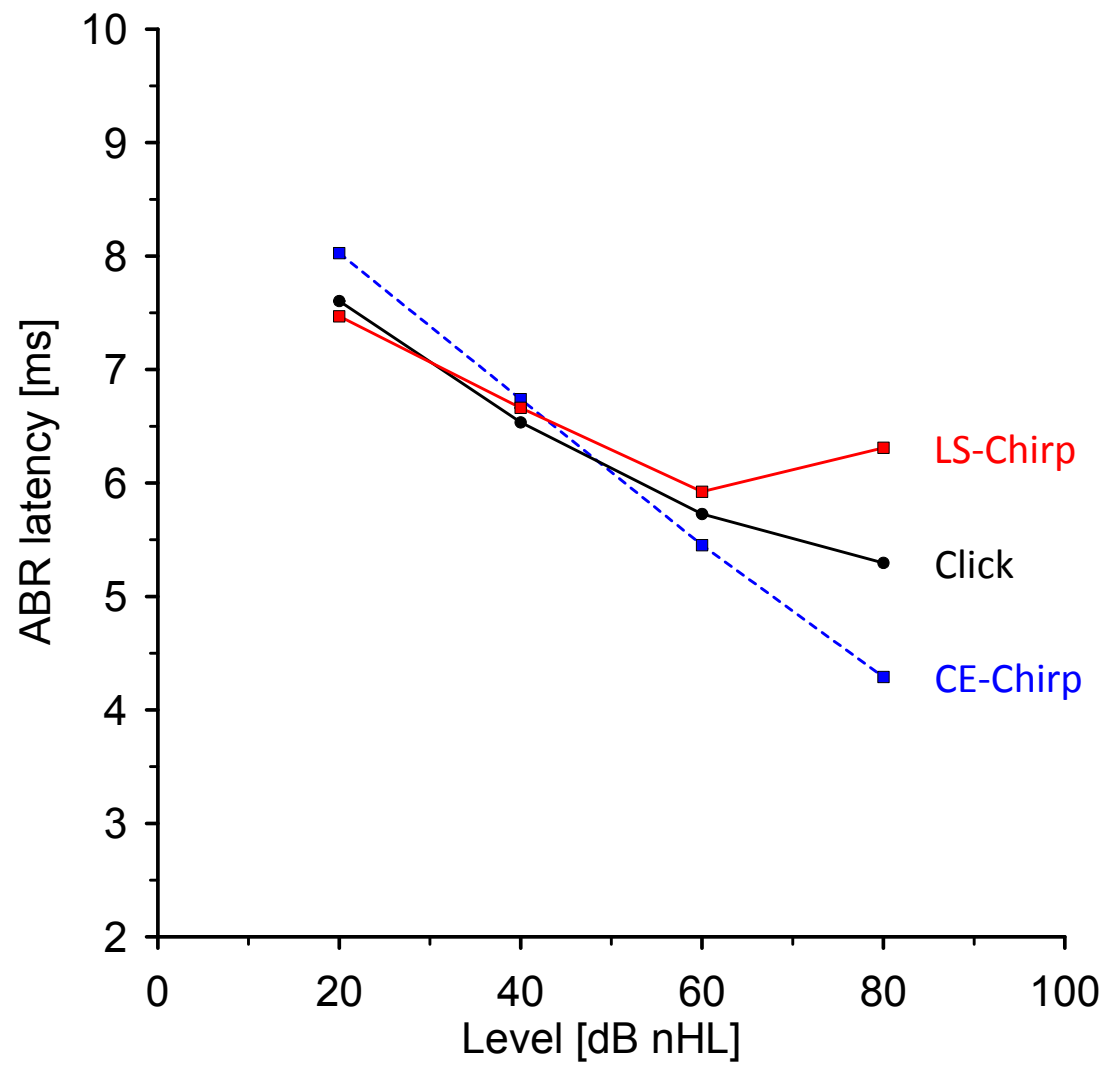


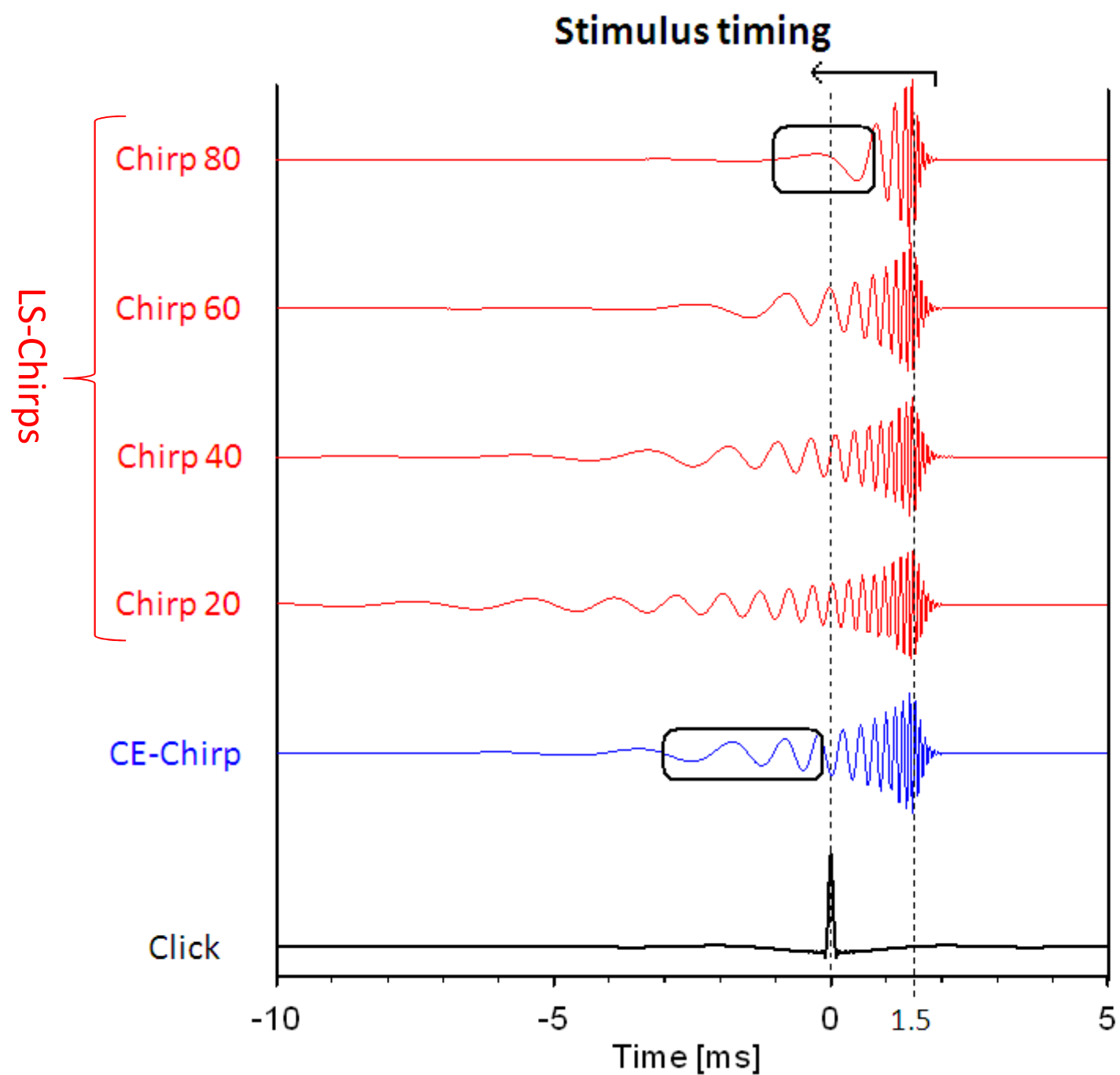
Amplitude Results Normal-hearing (N=20 ears)



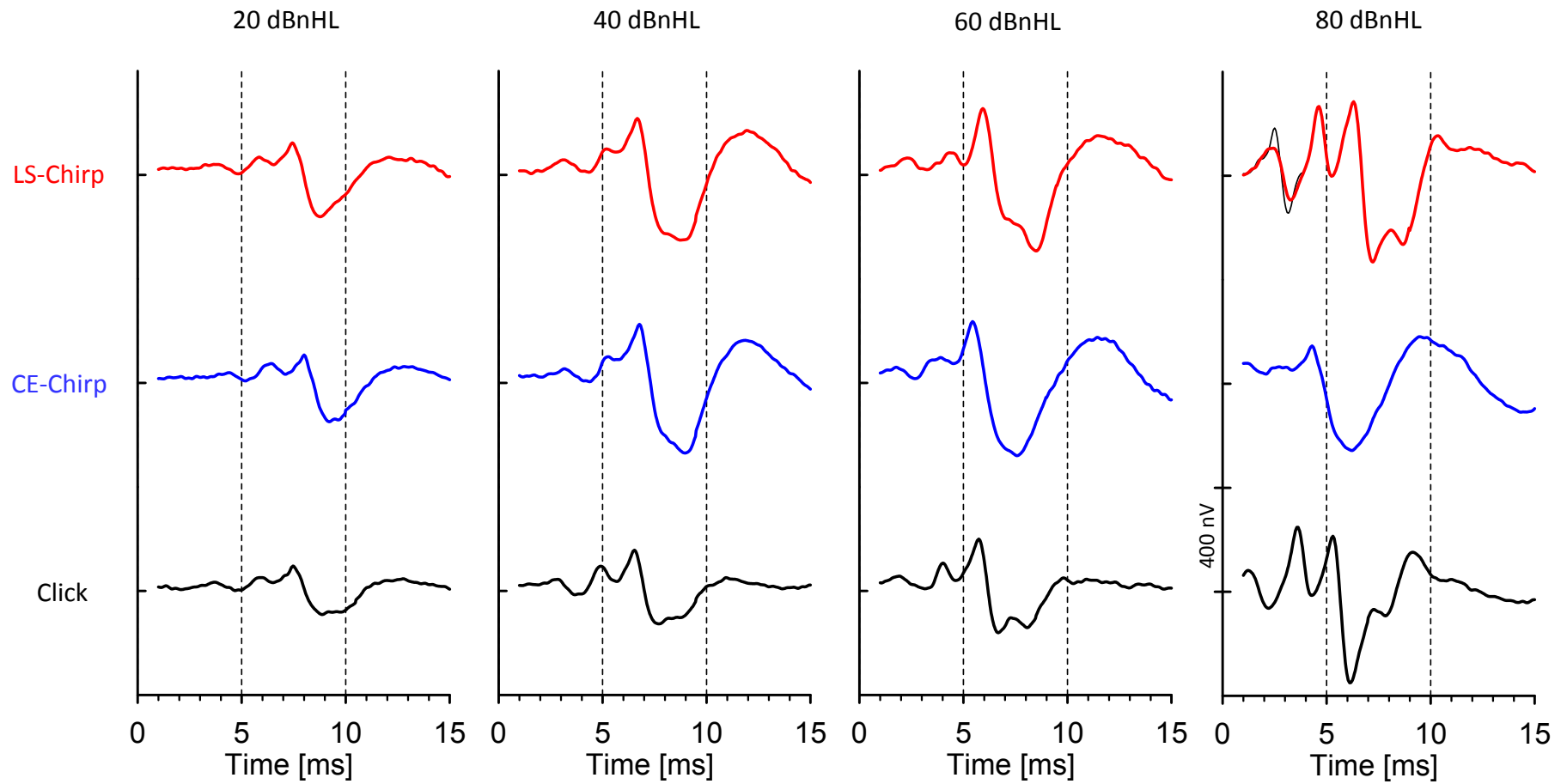
Latency Results

Normal-hearing (N=20 ears)

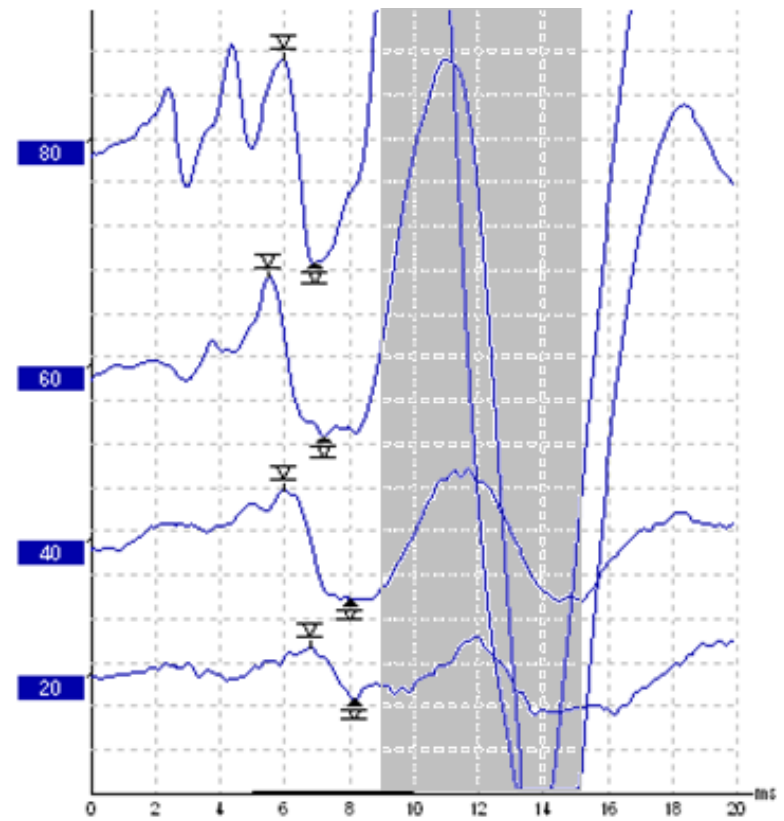
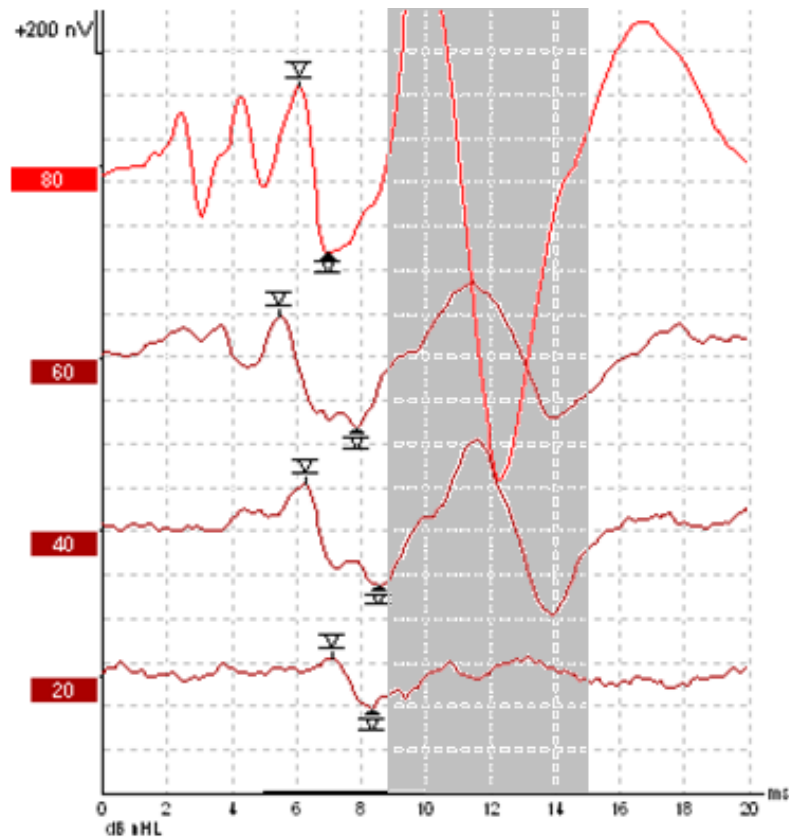




Grand Averages



ABRs showing PAM response (LS-Chirp)

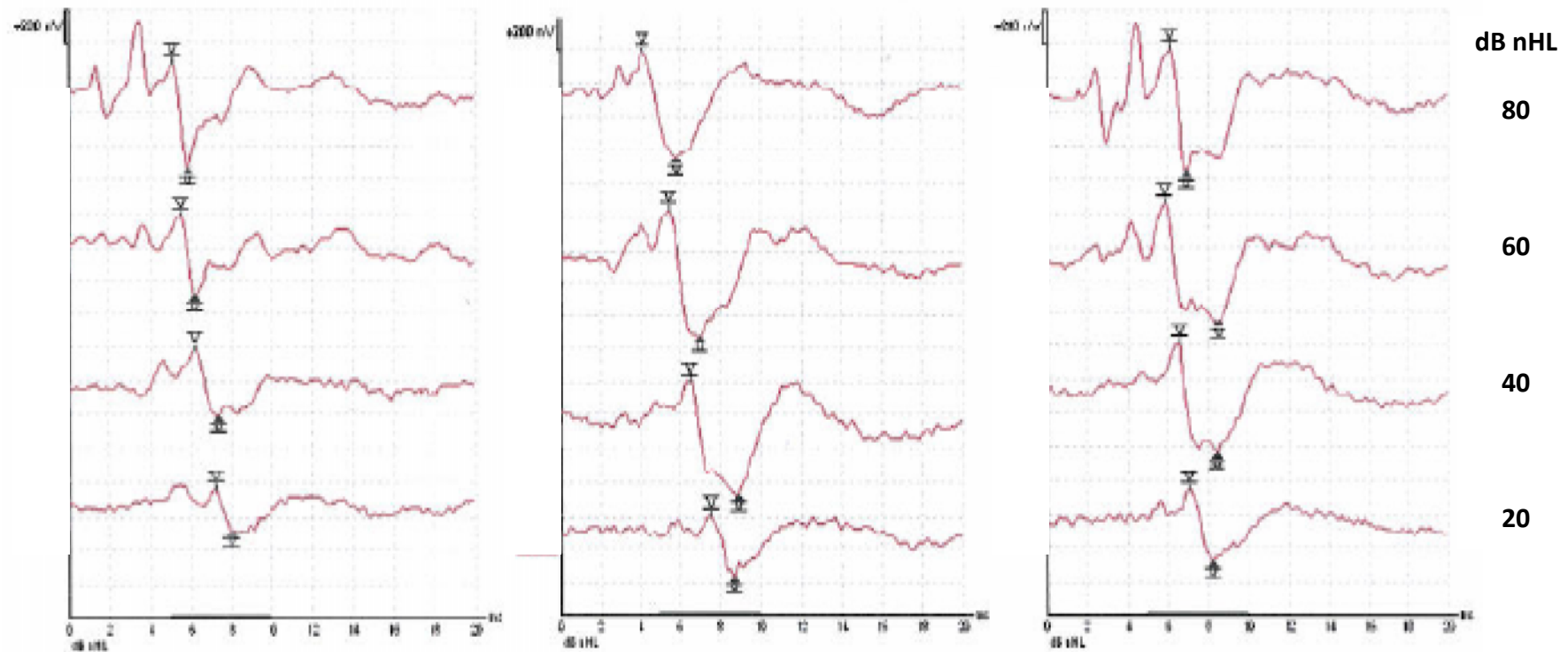


ABRs from one normal-hearing subject

Click

CE-Chirp

LS-Chirp



Wave resolution of peak I, III and V

Level	Stimulus	WAVE					
dB nHL	type	I		III		V	
80	LS-Chirp	20/20	(100%)	20/20	(100%)	20/20	(100%)
	CE-Chirp	0/20	(0%)	7/20	(35%)	18/20	(90%)
	Click	20/20	(100%)	20/20	(100%)	20/20	(100%)
60	LS-Chirp	7/20	(35%)	16/20	(80%)	20/20	(100%)
	CE-Chirp	0/20	(0%)	9/20	(45%)	20/20	(100%)
	Click	7/20	(35%)	16/20	(80%)	20/20	(100%)

Conclusion

Comparing three broad-band stimuli – summing up

- ABRs to the Click, **CE-Chirp** and **LS-Chirp** are compared in normal-hearing subjects
- At the lower levels (≤ 60 dB nHL) both Chirps give larger ABRs than the Click
- At higher levels (> 60 dB nHL) the ABR to the Click becomes larger than to the **CE-Chirp** but smaller than the ABR to the **LS-Chirp**

Conclusion

(for normal hearing subjects):

- The CE-Chirp is adequate at lower levels of stimulation
- The LS-Chirp should be applied at higher levels (> 60 dB nHL)

END

Thank you for your attention 😊