

# EFFECT OF C LEVEL ON ECAP AMPLITUDE

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# QUESTIONS OF THE STUDY

- How does stimulus level effect ECAP amplitude?
- Can we find an objective safety limit for C level?

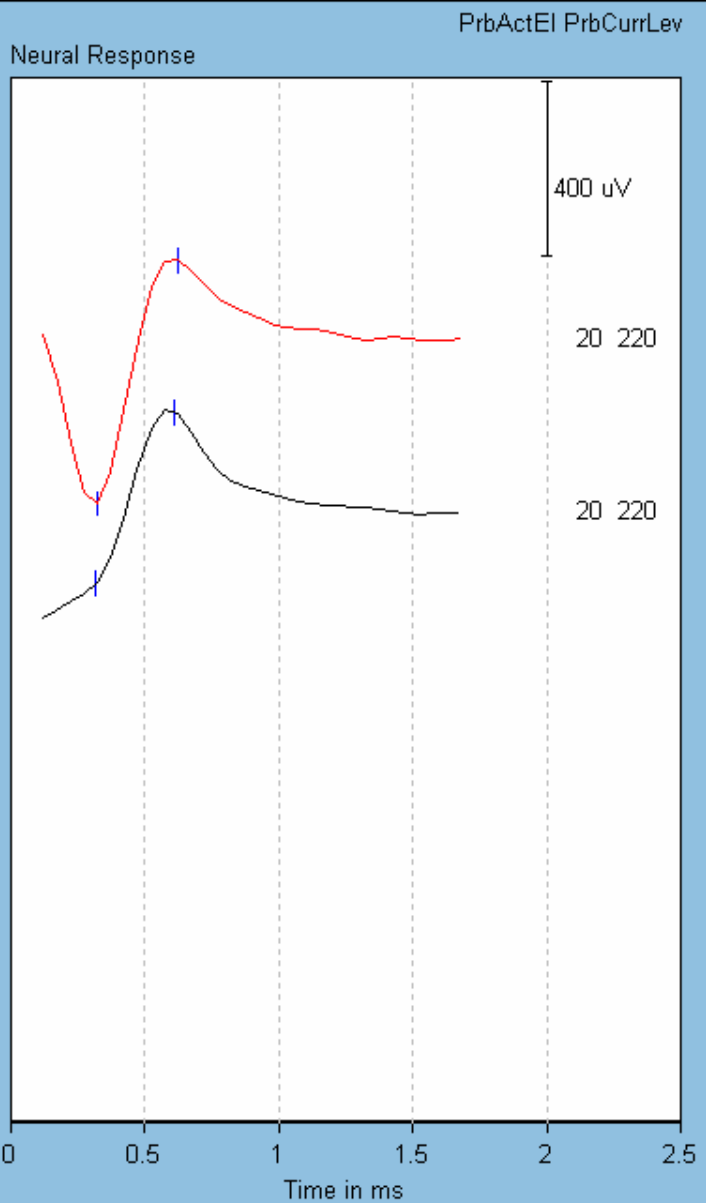
# PATIENTS

- 23 CI24 M users / Full insertion
- Age range: 4 – 68 years
- 13 post / 10 prelingual
- Test electrode: 15 or 20

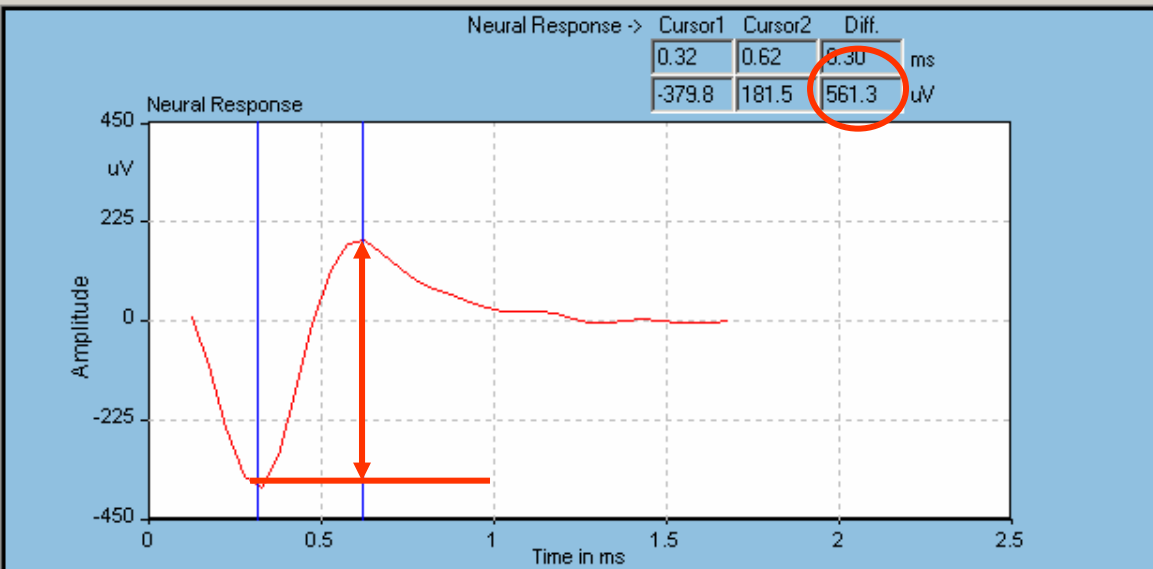
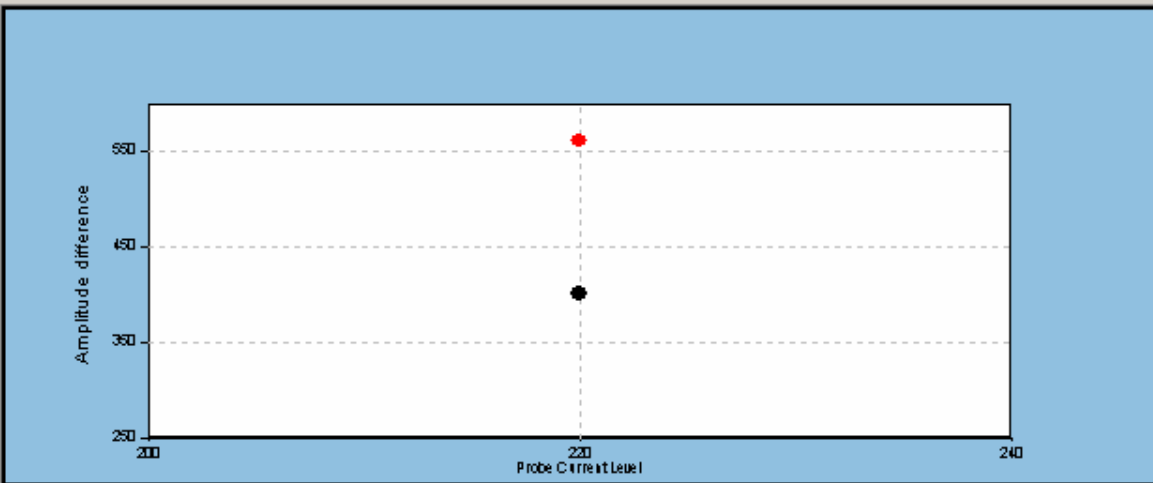
# METHOD

- Patients were followed up for one year using the NRT test.
- First test done after maximum 3 months of initial programming.
- Test and record parameters were kept constant for each patient.
- ECAP amplitude difference between first and last record were plotted according to C Level / t-NRT difference.

# METHOD

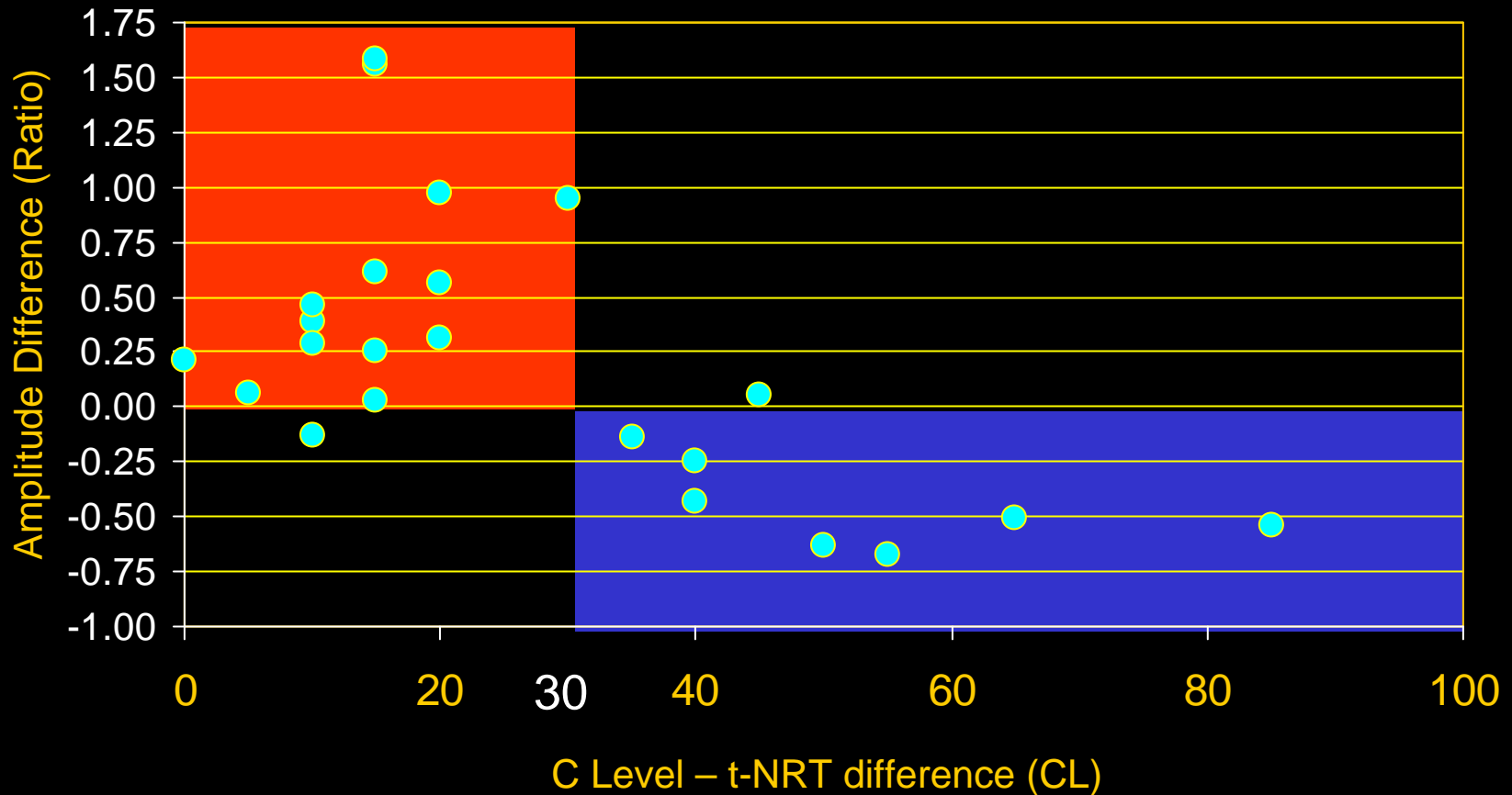


Probe: 20/MP1 CL: 220 PW: 25  $\mu$ s Rate: 80 Hz  
Masking: 20/MP1 CL: 230 PW: 25  $\mu$ s MPI: 500  $\mu$ s NumMsk: 1  
Recording: 22/MP2 Gain: 60 dB Delay: 50  $\mu$ s SampRate: 9965 Hz  
Averaging: 100 Sweep(s) 0 Artefact(s) Subtraction HiRes: On



# RESULTS

## ECAP amplitude difference in a year



# RESULTS

- Most of the patients' ECAP amplitudes increased at the end of one year if C levels 0 to 30 CL higher than t-NRT.
- ECAP amplitudes reduced if C level / t-NRT difference was higher than 30 CL.

# COMPARING ESRT, t-NRT, T & C LEVEL

10 Patients:

6 patients with low C level / t-NRT difference (red group)

4 patients with high C level / t-NRT difference (blue group)

ESR Threshold (post-op), t-NRT, T & C Levels were compared

# COMPARING ESRT, t-NRT, T & C LEVEL

	Patients	ESRT	t-NRT	T Level	C Level
Low C / t-NRT (deeper Amp)	HY	185	185	155	200
	RC	200	180	160	190
	DB	210	190	170	220
	HKL	205	175	150	185
	EK	180	160	140	170
	OY	190	175	160	190
	<b>MEAN</b>	<b>195</b>	<b>177,5</b>	<b>155,8</b>	<b>192,5</b>
High C / t-NRT (reduced Amp)	MK	200	195	170	230
	BP	185	165	155	250
	RB	200	180	160	220
	HK	205	200	165	255
	<b>MEAN</b>	<b>197,5</b>	<b>185</b>	<b>162,5</b>	<b>238,8</b>

# COMMON FEATURES OF OVER STIMULATED PATIENTS

- Lack of pain sensation
- Side effects: Eye blinking, speech difficulty, etc.
- Re-sensation of pain after some period of decreasing C Levels
- Loud speaking.
- Progress of hearing & speech.

# CONCLUSION

- ECAP amplitude growth function is related with activated number of spiral ganglion cells.
- Electrical over stimulation may degenerate SGC like acoustic trauma.

# CONCLUSION

- High C level may reduce ECAP amplitude in the long run.
- Subjectively decided C Level carries risk of over stimulation.
- If there is no pain or any side effect, upper limits of C level should be:
  - t-NRT + 20 CL
  - ESRT + 10 CL
  - T Level + 40 CL for CI 24M implants.