

Auditory Outcomes following delayed re-implantation and implantation in a patient's long term deaf ear

Introduction

This is the case history of a 38 year old woman who is deaf from birth with a profound hearing loss in the right ear and a progressive loss in the left ear. The patient developed good speech and was able to use the telephone with the left hearing aid until September 2004 when she had a sudden further drop in her hearing and no longer benefited from the left hearing aid. The left ear was chosen for the first implant in August 2005 because there was the least auditory deprivation in this ear. This implant failed in June 2006 and re-implantation was delayed for medical reasons. Simultaneous bilateral re-implantation took place in September 2007.

Why bilateral implantation?
What would the outcome be:

- after a delay with no hearing?
- with a different speech processing strategy?
- from the long-term deaf ear?

Why bilateral implantation?

- Patient did not want to be without sound if the left device failed again
- Patient often in difficult listening situations (noisy situations with several speakers)
- Patient counselled to expect a poorer outcome from the right ear
- Bilateral surgery done simultaneously

Cochlear Implants

- Implants - Advanced Bionics HiRes 90K
- L processor 2005 - Auria HiRes P strategy (all electrodes active)
- L and R processors 2007 - Harmony with HiRes S with Fidelity strategy. All electrodes active L ear, 15 electrodes active R ear

Speech discrimination tests

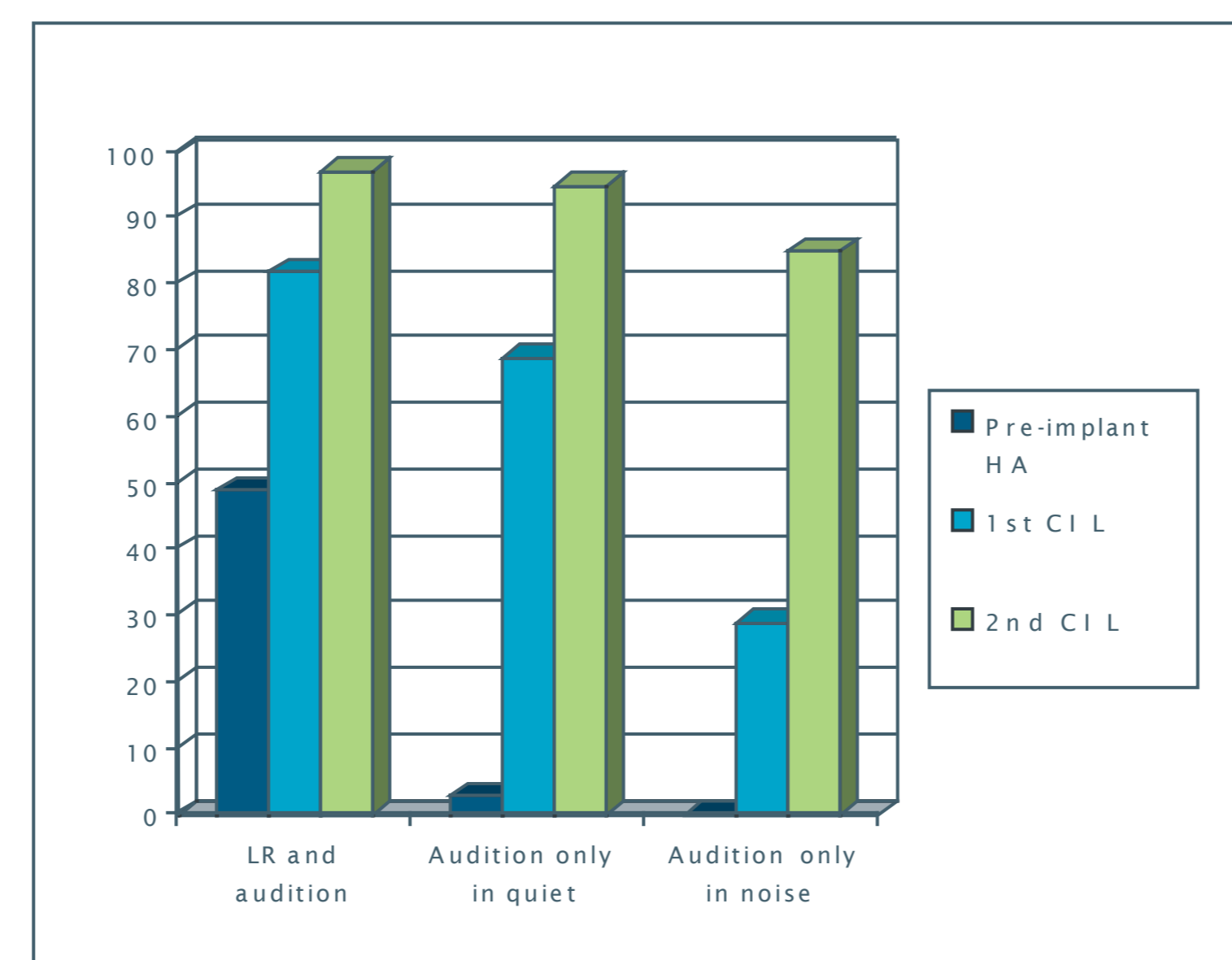
- CUNY sentences with lip-reading (70dBA)
- BKB sentences in quiet 70dBA and fixed noise S:N 10dB (audition alone)
- AB words in quiet (audition alone 65dBA)
- Adaptive BKB sentences in variable noise levels (audition alone)
- Graphs show % key words/phonemes correct, pre-CI, at 1 week post-CI with lip-reading and at 3 months post-CI with audition only unless stated otherwise

Results

Aided responses – Warble tones dB(HL)

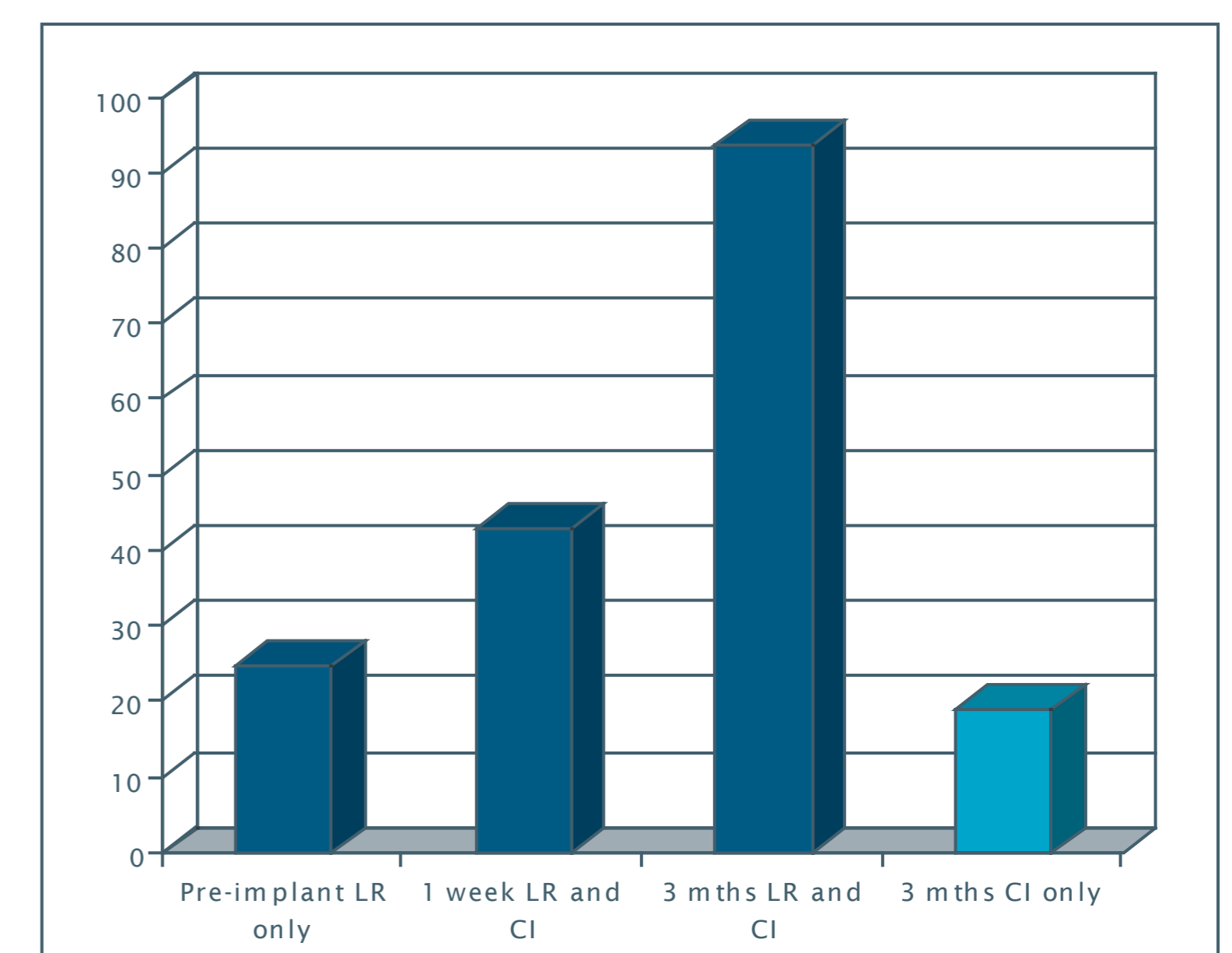
Freq Hz	250	500	1000	2000	4000
Left 1 st CI	35	25	25	25	20
Left 2 nd CI	25	25	25	20	20
Right CI	35	25	40	25	25

Sentence discrimination pre-implantation and post-implantation with HiRes P and HiRes S with Fidelity in the left ear.

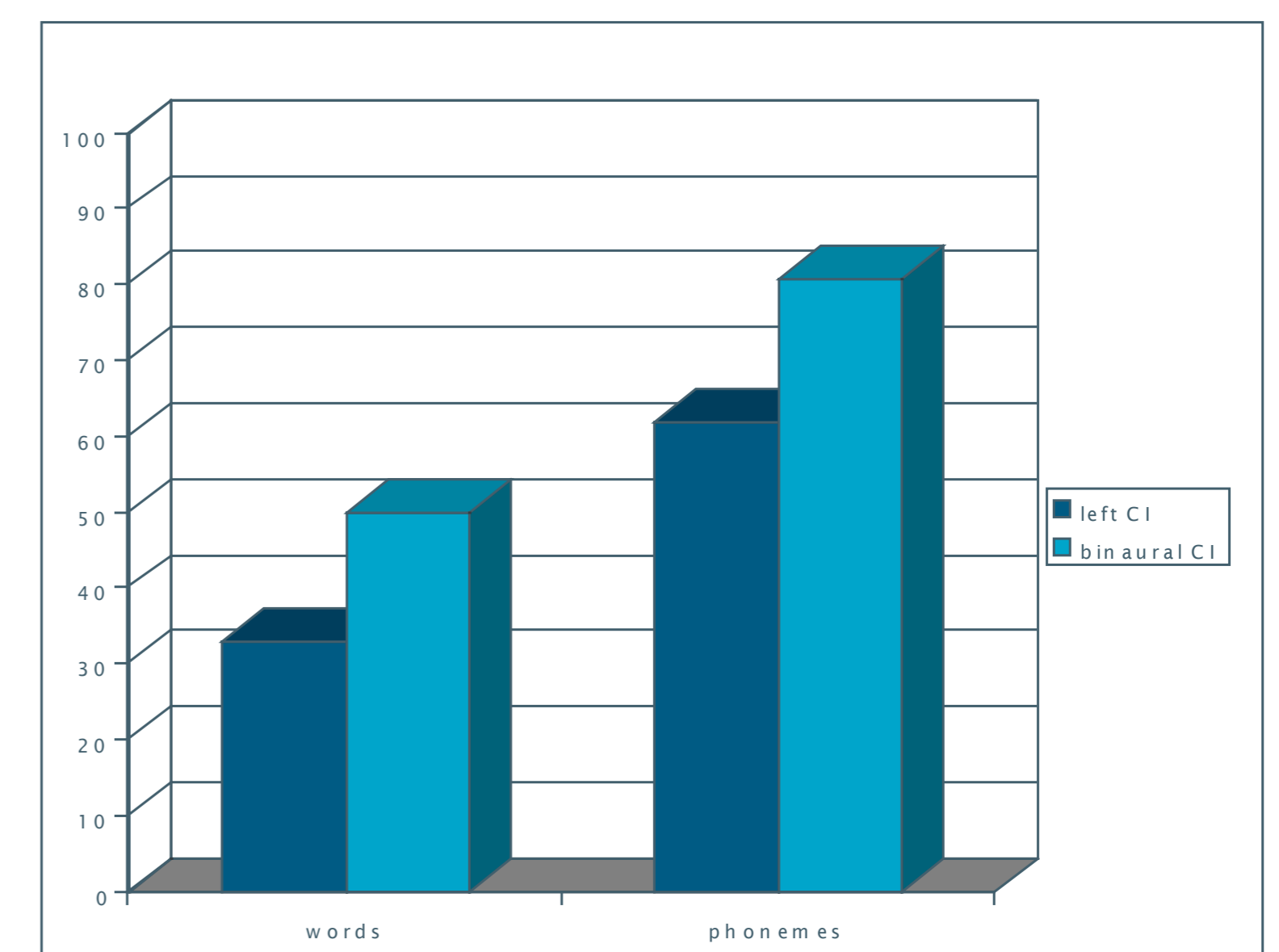


Thank you to this highly motivated lady for participating in all the tests with enthusiasm. Also, thank you to SOECIC staff who took part in surgery, tuning and rehabilitation with the patient.

Sentence discrimination in the right, long-term deaf ear before and after implantation



Word and phoneme discrimination - left implant only and binaural implants



Sentence discrimination in noise with the left implant only and binaural implants

With the left implant only the patient scored 50% key words correct at a S:N ratio of 12.5dB with binaural implants the S:N ratio was 9.5dB

Conclusions

- Good speech discrimination developed quickly despite delayed re-implantation
- Better speech discrimination with HiRes S with Fidelity strategy, especially in noise
- Excellent speech discrimination with lip-reading and speech discrimination beginning with audition alone in long-term deaf ear
- Early results show a binaural advantage in word/phoneme discrimination and in noise
- If one processor breaks the patient still has access to sound