

DEPARTMENT OF EAR, NOSE AND THROAT, HEAD AND NECK SURGERY, INSELSPIITAL, UNIVERSITY OF BERN, SWITZERLAND



## BILATERAL COCHLEAR IMPLANTATION IN CHILDREN AND ADULTS

### BENEFIT OF THE SECOND CI

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**ALEXORL 2010**



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## HATEPSE: QUEEN OF DECISIONS

### AlexORL 2008


<b>H</b>	<b>Hearing loss</b>
<b>A</b>	<b>Age at implantation</b>
<b>T</b>	<b>Type of implant</b>
<b>E</b>	<b>Ear to be implanted</b>
<b>P</b>	<b>Parents motivation</b>
<b>S</b>	<b>Support &amp; maintenance</b>
<b>E</b>	<b>Education, rehabilitation</b>



... of course you recognize famous HATCHEPSUT

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## HATEPSE: QUEEN OF DECISIONS

AlexORL 2010

**H**

**A**

**T**

**E**

**P**

**S**

**E**

**H** Hearing loss of 2nd ear

**A** Age at 2nd implantation


**T** Time intervall to 2nd CI

**E** Evenly programmed

**P** Parents motivation

**S** Speech processor


**E** Education, rehabilitation



...Hatschepsut again – she should keep you focused

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## THE CI PROGRAM IN BERN

463 cochlear implants


86 Nucleus CI

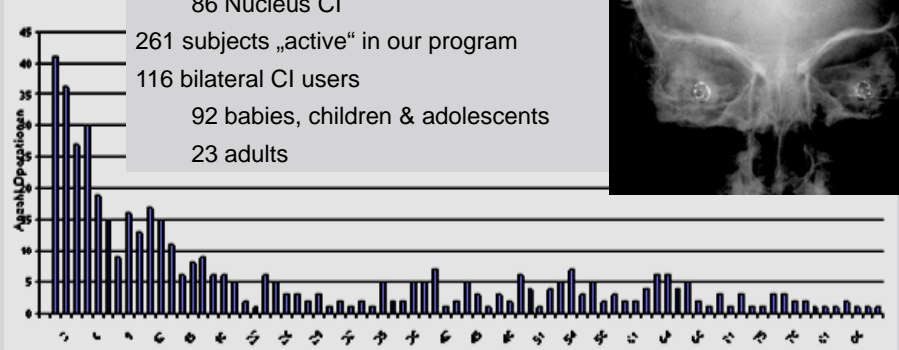
261 subjects „active“ in our program

116 bilateral CI users

92 babies, children & adolescents

23 adults

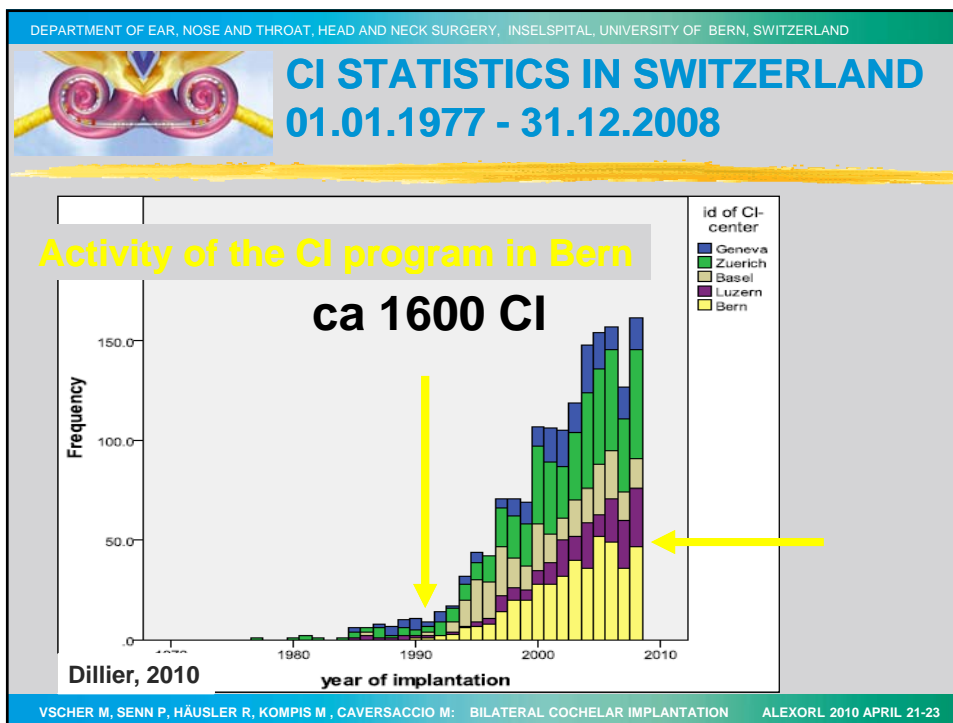
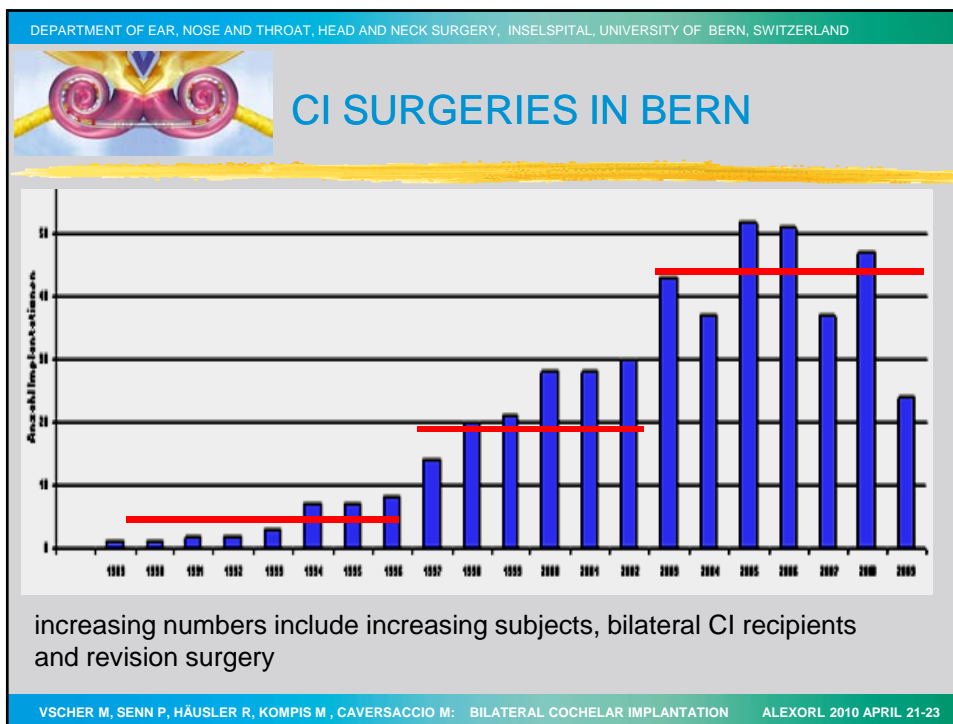





AGE @ COCHLEAR IMPLANTATION

increasing numbers in babies & young children, as well as in adult elderly

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## APPROVED INDICATIONS 1

The board of Audiology and Experts for hearing aids → Swiss Federal Office of Social security, **Nov 2003**

- bilateral profound congenital deafness
- prelingually acquired deafness
- no adequate reaction on auditory stimulation in best aided condition
- suitable anatomical and surgical conditions in both ears
- physical & psychological condition to benefit from two CI
- Likelihood to develop open speech perception

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## APPROVED INDICATIONS 2

Comment

- Surgery is suitable as a one stage procedure, especially in meningitic deafness
- second implantation should be within one year, no later than 10 years after 1<sup>st</sup> CI
- Bilateral CI in **postlingually** deafened children and adults may be indicated, if subjects with only one CI cannot make use of spoken language **sufficiently** and therefore integration in their professional life is jeopardized.


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## OUTCOME OF THE 2nd CI IN BILATERAL CI LISTENERS


- Retrospective study on charts of bilateral CI users implanted sequentially with a 2nd CI between 2000 and 2009
- Included are children and adolescent with data on speech audiometry
- Scores of their speech perception abilities were measured with Freiburg multisyllabic numbers and Freiburg monosyllabic words.



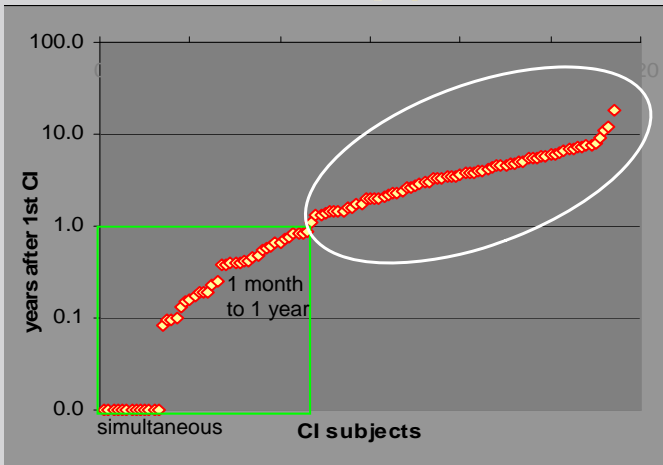
- This study is focused on speech perception scores obtained with the 2nd CI alone

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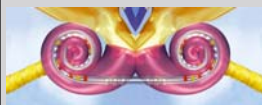


## $\Delta$ (years) @ 2nd CI



- Large sample of late implantees with 2<sup>nd</sup> CI
- Many subjects received their 2<sup>nd</sup> CI simultaneously or in between 12 months

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## SEQUENTIAL BILATERAL CI 1

### **SHORT TIME INTERVALL between 1<sup>st</sup> and 2<sup>nd</sup> CI**

- Congenital profound deafness, *LIMITED* benefit of amplification where the hearing aid will be continuously used at first
  - 2<sup>nd</sup> CI as soon as fitting is accomplished and „hearing“ with the 1<sup>st</sup> CI exceeds amplified hearing with hearing aid
- Congenital profound deafness in patients where simultaneous bilateral surgery was not suitable for these reasons: time limit in infants, OMC, ossified basal turn

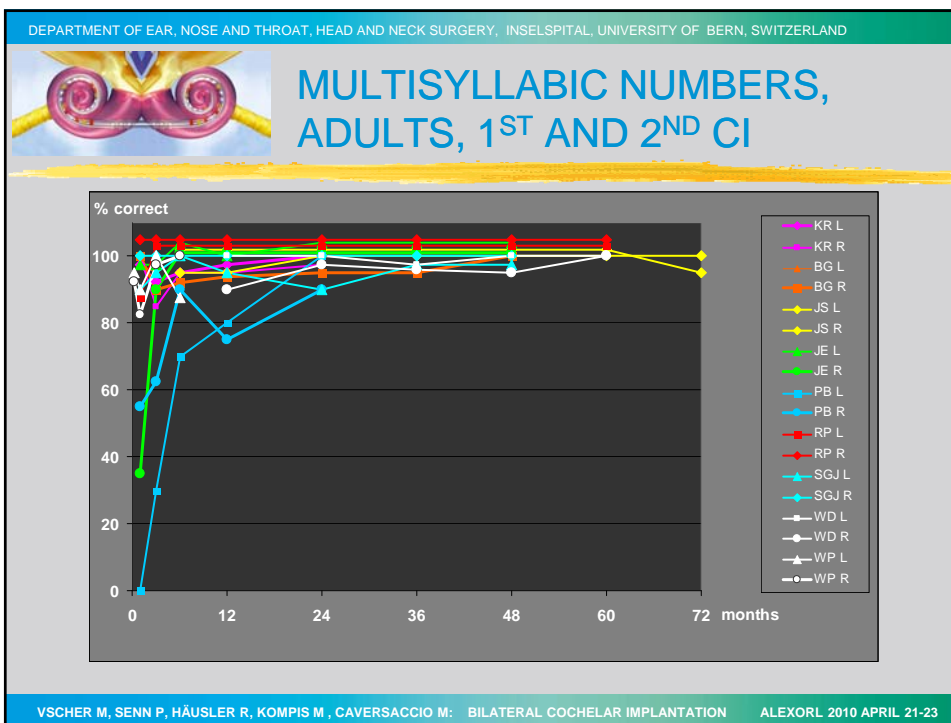
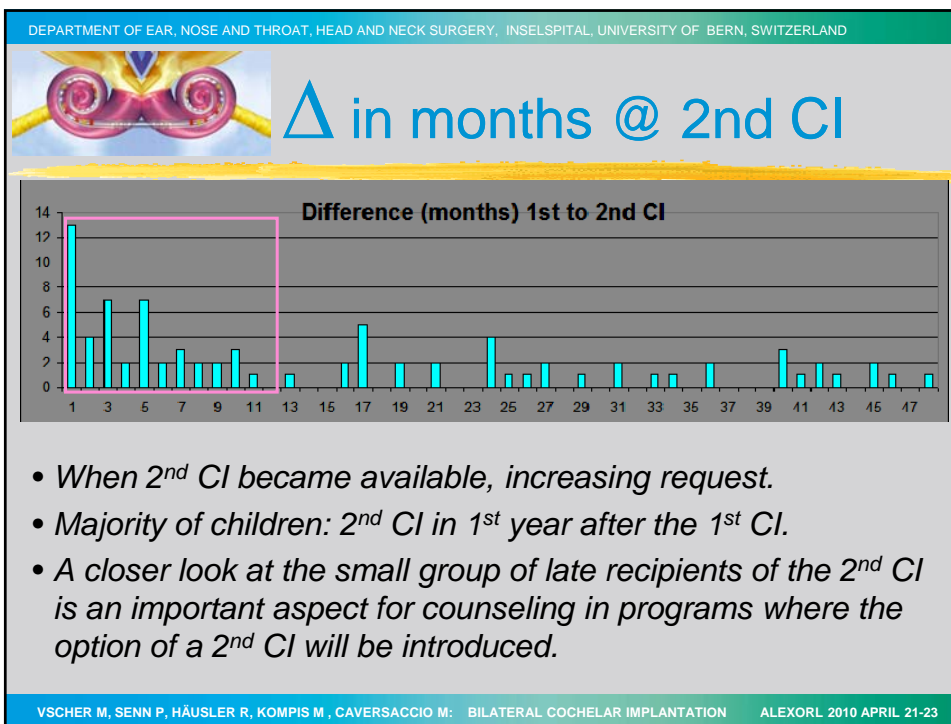


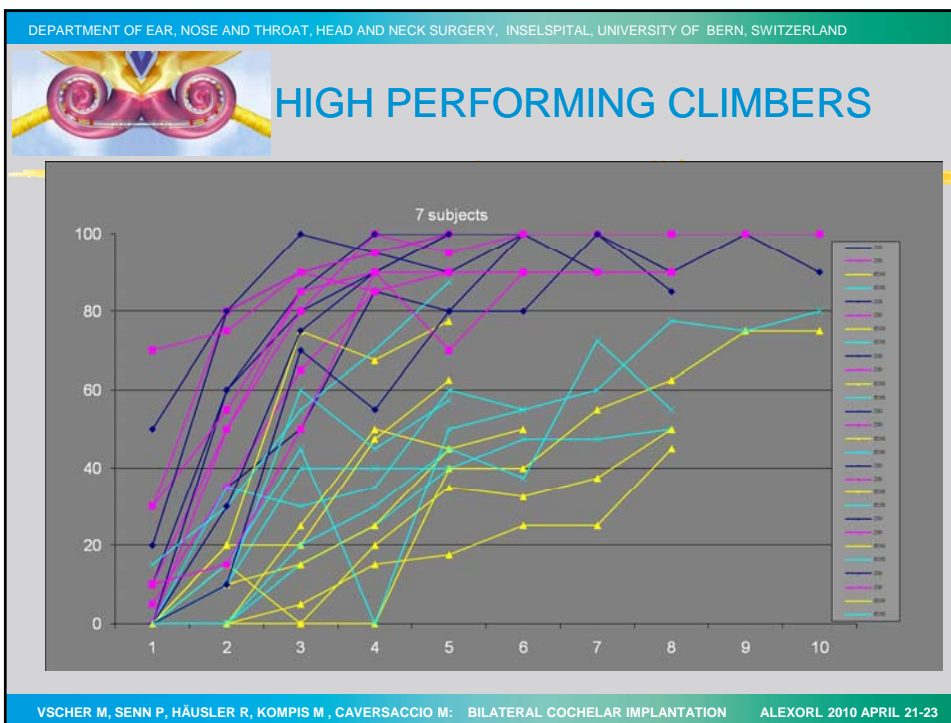
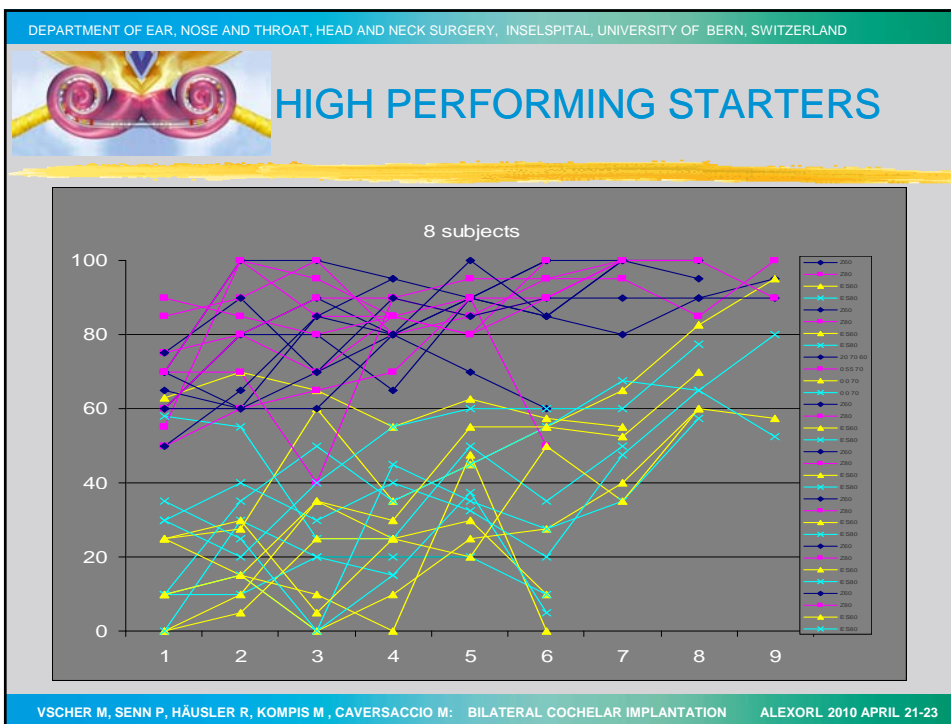
## SEQUENTIAL BILATERAL CI 2

### **LONG TIME INTERVALL between 1<sup>st</sup> and 2<sup>nd</sup> CI**

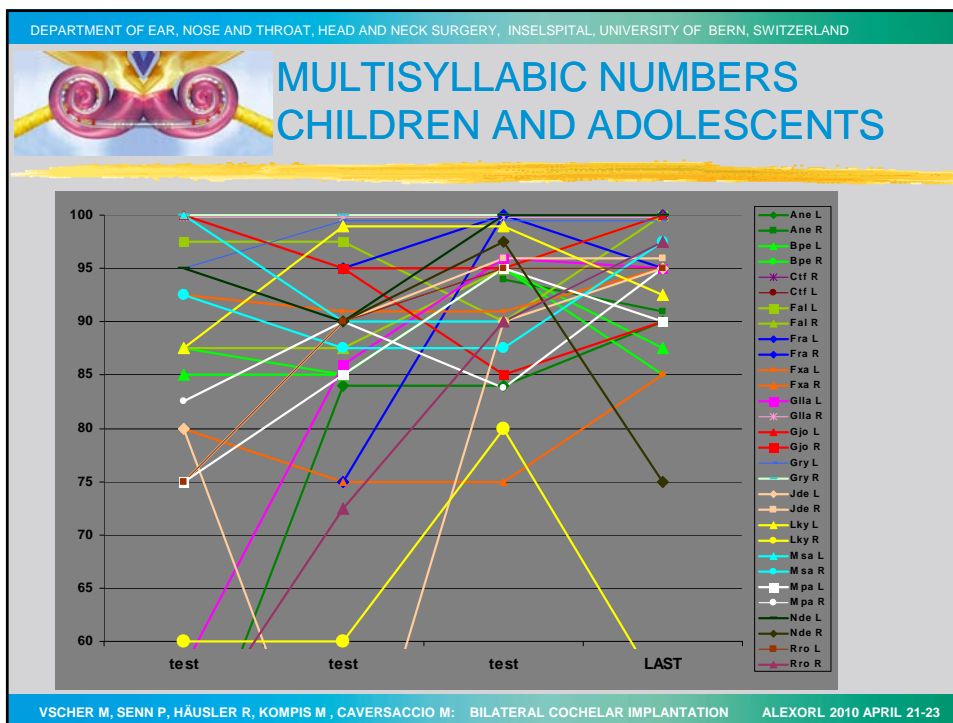
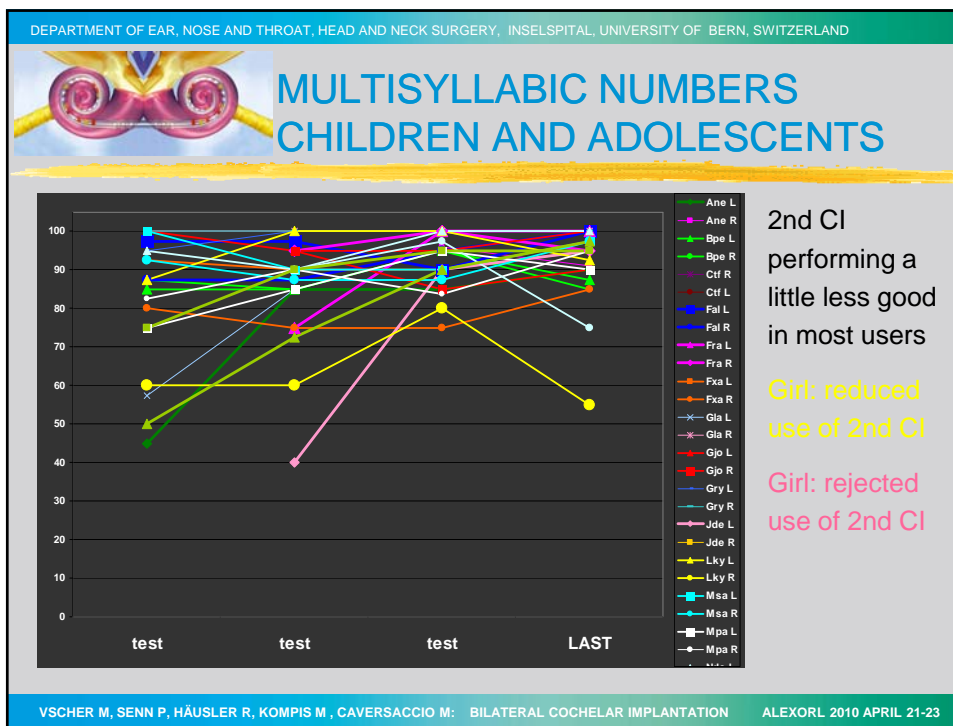
- Children, adolescents: cases, where 2<sup>nd</sup> CI was not available, high motivation to follow rigorous rehabilitation
- Congenital profound deafness, *USEFULL LIMITED BENEFIT* of amplification where hearing aid was continuously used
  - 2<sup>nd</sup> CI when hearing aid ear drops to no more useful hearing ... individual decision in every case

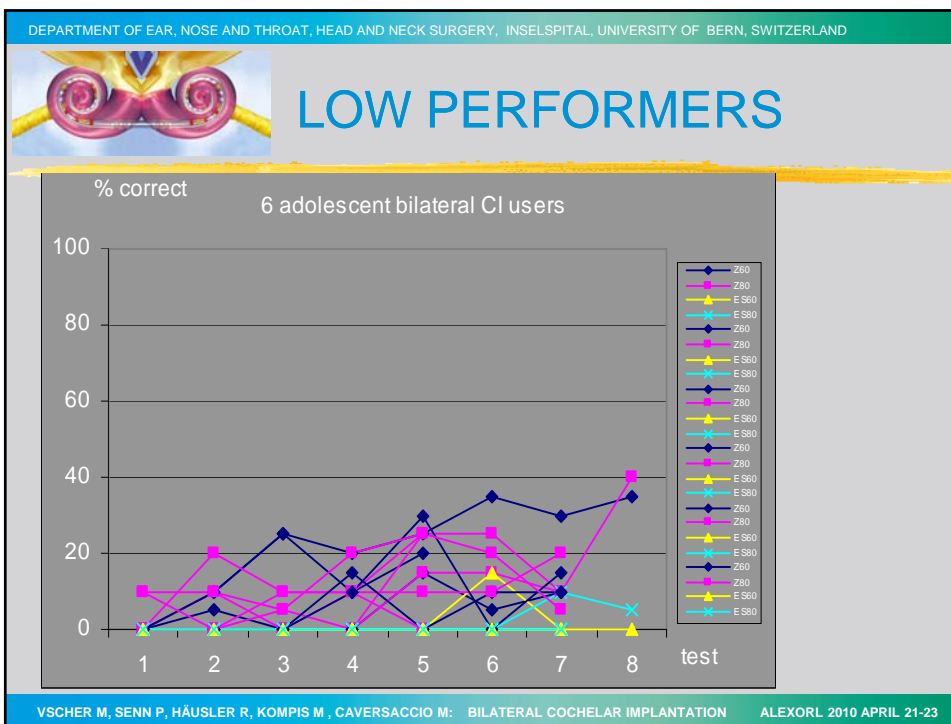













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## QUESTIONNAIRE: PARENTS

*E. KHAN HALLER, M.VISCHER 2004*

SITUATION	YES	? yes	?? no	NO
Responds to name without visual contact	14	3	1	0
Looks in the right direction when called	4	12	1	1
Looks at sound source quicker	8	8	2	0
Realizes sound source earlier	7	9	2	0
Participates in conversation, asks questions	8	6	4	0
Social contacts to other subjects	8	4	5	1
Participates in conversation in the car while driving	9	6	2	1
understands language in the dark	8	7	2	1
Better orientation in space	6	6	3	3
less exhausted after school	3	3	3	9
More interested in stories and songs	10	2	1	5

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## QUESTIONNAIRE: COMMUNICATION

E. KHAN HALLER, M. VISCHER 2004

COMMUNICATION	YES	?? yes	?? no	NO
More spoken language	9	5	1	3
Spoken language better understood	8	5	2	3
Makes longer sentences	8	5	2	3
Speaks softer	6	3	3	6
Speaks faster / more fluent	6	5	3	4
Reports more often spontaneously on events	12	3	1	2
Understands messages better	8	7	2	1
Understands without lip reading	9	7	1	1
Spoken language is the prime mode of communication	13	3	1	1
able to use telephone without help	7	5	3	2

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## CONCLUSIONS

- *Very convincing benefit in speech perception from 2<sup>nd</sup> CI in sequentially implanted children and adolescent cochlear implant users even after > 10 years.*
- *Postlingual hearing loss - either progressive or acute - is a very favorable condition for 2<sup>nd</sup> cochlear implantation no matter how long after the 1<sup>st</sup> CI.*
- *Benefit in speech perception from the 2<sup>nd</sup> cochlear implant will in general not exceed benefit from the 1<sup>st</sup> CI.*

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## PREDICTIVE FACTORS

*For the benefit of the sequentially implanted children & adolescent:*

- *expect good to very good benefit from 2<sup>nd</sup> CI in subject with high performance in the 1<sup>st</sup> CI, high motivation to train the 2<sup>nd</sup> ear, no concomitant disease*
- *expect good to very good benefit from 2<sup>nd</sup> CI in subject who used hearing aid – no matter how low their discrimination was*
- *Expect low or very moderate benefit in CI users with low performance with the 1<sup>st</sup> CI.*
- *... and there are exceptions*

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**thank you for listening**



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