

# Cued Speech

## Late cochlear implantation - what can we expect?



This summary was prepared by the Cued Speech Association UK (CSAUK), a charity run by users of Cued Speech, based on research by:

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The authors of the research studied thirteen pre-lingual profoundly deaf patients who were implanted in Geneva between the ages of 8 and 22 years.

All had similar hearing thresholds before and after cochlear implantation. They were implanted by the same surgeon using the same surgical technique, with fully implanted arrays. Surgery was uneventful in all cases. Before cochlear implantation, none of the individuals used oral language. It was reported that none 'suffered from any handicaps besides deafness'. Prior to implantation all received speech therapy and all had worn hearing aids.

Six of the children and young people used Cued Speech and had followed education in normal schools with the

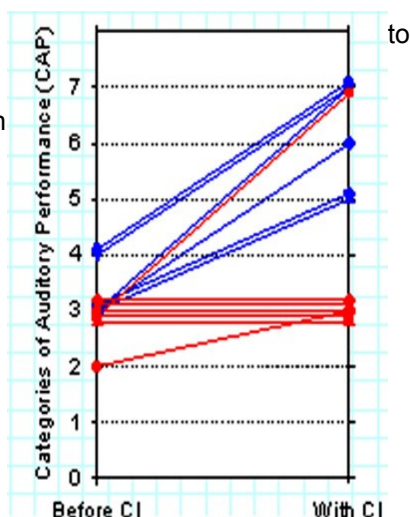
support of Cued Speech. Seven used sign language and had followed education in sign language with incidental oral support and, in two cases, with some Cued Speech.

Evaluations were made an average of 4.5 years after implantation by measuring, before and after implantation:

- categories of auditory performance
- speech intelligibility rating
- phoneme identification
- changes to the principal mode of communication (i.e. oral, Cued Speech or sign language).

## Results

**Categories of auditory performance (CAP)** were used to classify individuals in seven groups ranging from the lowest (not being aware of environmental sounds) to the highest (being able use the telephone with a familiar talker and to understand an unannounced subject without lip-reading). The graph here shows individual scores before and after implantation.

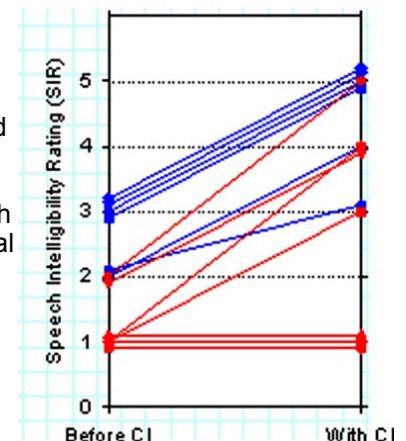


For both graphs:

**Blue lines:** users of Cued Speech

**Red lines:** users of sign language

**Speech intelligibility rating (SIR)** was used to classify individuals in five levels ranging from the lowest (uttering only pre-recognisable words in spoken language) to the highest (having connected speech that is intelligible to all listeners, the child being understood easily in everyday contexts). The graph here shows individual scores before and after implantation.



The results for **phoneme identification** showed a similar pattern, with Cued Speech users reaching 'statistically better phoneme identification than their sign language pairs after implantation'.

In a summary of the results the authors wrote:

**'The former users of Cued Speech benefited significantly more from cochlear implantation than the sign language users** for phoneme identification and categories of auditory performance, although all had similar hearing thresholds before and after cochlear

implantation.'

'After a mean implant use of 4.5 years, four out of six Cued Speech users converted to exclusive use of the oral language, while only one out of seven former users of the sign language converted to the use of the oral language.'

## In the discussion at the end of the research paper the researchers say:

'The benefit of cochlear implantation in pre-lingually deaf children implanted early in life, preferably before the age of 3 years, is now well established as it is in post-lingually deaf patients. The question of how useful is cochlear implantation after the age of 8 years in pre-lingually deaf patients is still debated. In our series, the hearing thresholds after cochlear implantation improved to reach similar levels in all patients, suggesting that the cochlear implant brought a roughly similar perception of sounds to all of them. Improvements in phoneme identification, auditory performance and speech intelligibility were also observed in most patients, but former Cued Speech users benefited more than former sign language users.

'The explanation most commonly accepted for this observation is that sign language users having had no sound stimulation during the critical period of auditory plasticity develop visual instead of oral communication skills, leading to an irreversible visual colonisation of the auditory cortex.'

'Based on the present results, we argue that the reason for the bad results of late implantation in sign language users is not the lack of auditory stimulation but the ignorance of the acoustic (and temporal) structure of the oral language. If not, why would Cued Speech users obtain better benefits from cochlear implants than sign language users? Strategies involving learning the oral language with the help of Cued Speech or lip-reading can help to neutralize the consequences of the lack of auditory stimulation during the critical period of language acquisition.

'Oral language is a sound code in which each phoneme follows the other to form words, which are in turn arranged in a grammatical order to form sentences. Even without hearing, the patients who learnt to communicate using the Cued Speech code are acquainted with this structure. They also develop a "listening attitude" with the help of the hearing aid to detect any useful speech information from incoming sound. Later, if they receive a cochlear implant they can coherently integrate the sounds they perceive.

'The sign language users, who function in a visual (and spatial) communication mode, receive information via the overall sequence of "pictures" created by the interlocutor. They do not learn to integrate the chain of sounds of speech..... It is difficult to convert from a visual (and

spatial) to an auditory (and temporal) communication system. However, this is not impossible, as we report here one such exceptional case.....'

## The authors summarise:

'This small group confirms that a prelingual or congenital deaf [child or young person] can convert from a visual to an oral mode of communication after a delayed implantation. The previous knowledge of the structure of the oral language as promoted by the use of the Cued Speech code influences very positively the outcome in late implanted subjects.'

**'Previous awareness of the structure of the oral language, even without hearing (e.g. via Cued Speech), influences positively the outcome of delayed implantations.** We recommend the adoption of oral communication with the Cued Speech code in cases where a late cochlear implantation is envisioned.'

## Anne Worsfold of CSAUK, writes:

It's important to note that, in order to make comparisons, the study had to look at children and young people who used **either** Cued Speech **or** sign language. In reality many children and young people use both and there is no reason to choose between the two either before or after an implant. So, the 'take home message' should be, not that a deaf signer would leaving signing behind and exclusively enter the 'oral' world, rather that, should a deaf child or young person wish to improve their access to a spoken language by having a cochlear implant, then the use of Cued Speech beforehand, and in their early years, will greatly increase their chances of success.

In my opinion this study, though small, is very important: it demonstrates that late implants are more likely to be successful following early access to Cued Speech. The conclusion to be drawn from this is that being able to **hear** spoken language in the early years is not the only thing which primes the deaf baby or child's brain for spoken language. The use of Cued Speech gives deaf children knowledge of 'sound-based' language - even when they don't have enough hearing to access it - and a way to interact with the world before an implant.

As Professor Jacqueline Leybert and Professor Carol LaSasso wrote\*: 'Experiencing a cued language early in a child's development will have long-lasting effects on the child's ability to learn that language auditorily later, when they receive the cochlear implant.'

\*In 'Cued Speech for Enhancing Speech Perception and First Language Development of Children With Cochlear Implants'. First printed in: Trends in Amplification 14(2) 96-112 © 2010

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