

Case studies of children with cochlear implant rehabilitation therapy, in Belgium



Title of the case study: Koen, age 30 months (2.5 y)

General data on the case:

- Biographical and case identification data – personal data, address, important events in the biography of subject, significant data on the composition of the family, hearing status parents, etc

Koen is the oldest son of a hearing family. Both parents and his younger brother are hearing.

- Case history (Anamnesis):

- **Significant medical data** – By the universal neonatal hearing screening, a bilateral hearing loss was detected at birth. Further objective measurements (BERA) showed a bilateral hearing loss > 90 dB on both sides. Further genetic counselling could not find any cause of the deafness. There was a hearing aid trial between 4 months and 9 months. At the age of 9 months he received his first cochlear implant at his right ear and 3 months later, at the age of 12 months, he received his second implant on his left side.
- **Significant psychological data** – After implantation Koen started immediately reacting to speech sound and started also babbling with more variation. Already at the age of 18 months he started to speak. His speech and language did develop very naturally. Signs were not used, although the parents followed a short course in sign language (in case they needed it). On the Bayley Developmental scale revised, Koen scored at age 30 months a cognitive development index of 125, which means he has very good non-verbal skills. On the Bayley Scale he also scored an expressive and receptive language index of 110. At the age of 30 months, he had a spoken language corresponding to an age of 37 months. He is a quiet young boy, with good social skills and very good attention span and auditory memory skills.
- **Educational setting:** Already at the age of 6 months he started in a multidisciplinary day care centre for babies and toddlers with a hearing loss, where he received daily speech and language therapy. At age 2.5 he started in a regular preschool. The SLP suggested no more therapy, because the speech and spoken language is even ahead in comparing to typical hearing children.

Significant social data : Both parents have a university degree: mother is a surgeon (gastroenterologist) and father is lecturer (in ICT) at a University College.



- **Age of fitting the first hearing aids and cochlear implants:** At age 9 months Koen received his first CI which was fitted at age 10 months and he already received his second implant 3 months later. During the fitting of his second device he didn't want to wear his second device. It was clear that he had to adapt to all sound input. It was too loud for him and too much input. So we had to start again wearing the second device step by step (taking care of the loudness). Further on both fittings went smoothly without any big problems.
- **How often and what kind of support/rehabilitation does the child/family receive?**
After the referral at the Neonatal Hearing Screening, the parents received support from an early intervention team, who visited the family every 2 weeks at home.
Already at the age of 6 months and before the first implantation Koen started in a multidisciplinary day-care centre for babies and toddlers with a hearing loss, where he received 3x/week speech and language therapy.
The parents received (in a group of parents) more information on how to nurture and educate deaf children and on how to communicate and to stimulate spoken language.

The implantation

- **age of undergoing first cochlear implantation (left or right side):** 9 months right side
- **type of implant:** Cochlear Nucleus 7 device
- **number of implants (CI and hearing aids):** CI1 at 9 months; CI2 at 12 months
- **current average duration of the CI use** (information from the audiologists): 10 hours/day
- **other relevant information: difficult periods during early stage development. If yes, why?**
During fitting of second device, Koen was not willing to wear the device anymore. He could not manage all sound input. It was also too loud for him. Because he refused to wear his second device, we have to start again wearing his device and increasing the loudness step by step. Further on there were no real difficult periods in using devices.

What is the procedure to start the speech therapy after CI? (actors involved, what is needed)

Already before cochlear implantation, the CI-team discussed with the parents the rehabilitation after implantation. They suggested a multidisciplinary day-care centre at 20 km distance from the family, which they also decided to do.

Children can only go to this kind of day-care centre after receiving a certification from the government of health care, based on the audiogram and a short report signed by an ENT-doctor.

The Speech Therapy used in the rehabilitation

- The speech therapy was integrated in the work of the multidisciplinary day care centre. Children can receive daily therapy : speech therapy + also physical therapy if needed + audiological support



- **Koen came 3 days/week to this multidisciplinary day-care centre** and every day he received individual speech and language therapy. Also an audiologist is working in the day-care centre and works close together with the audiologist of the fitting team.
- **listening development** : already a few weeks after his first fitting, it was clear that Koen started reacting to speech sounds (Ling sounds)
- **speech production development**: Koen was a quick starter. Speech and spoken language developed very quick and very naturally. He is able to pick up information from the environment, even from distance and in difficult listening situation. He really comes to binaural hearing. Also his voice sounds very natural.
- **spoken language development**: although the parents followed a course on ‘how to sign with your baby’, they never used signs, because the spoken language developed very quickly. Also the parents were coached on how to support the child’s spoken language development at home.
- **monitoring of the progress in auditory, speech and spoken language development. How?** In the day-care centre audition, speech, spoken language development, cognitive development and social emotional development is monitored very well. Every 6 months there is a multidisciplinary meeting with the parents on the development of their child.

Audition is monitored by: tonal audiogram, Auditory Speech Sound Evaluation (ASSE)-test, Littleears parent questionnaire. Also the NAMES (Nottingham, Auditory Milestones) is used to monitor the early auditory development.

Speech is monitored by a Dutch Speech test

Spoken language (expressive and receptive) is monitored by the Bayley Scale and later by the CELF-test.

The NEAP (Nottingham Early Assessment Package) is also a very interesting monitor to be used the first 3 years after implantation. This assessment package is also available in the Dutch language.

6. Results



SWOT analysis by Koen’s parents

Strengths: Although the detection of the bilateral deafness by the universal hearing screening was a **big check for the parents**, they decided to accept it and to come to action as soon as possible. They are very satisfied about **the ENT-doctor who took time to answer all their questions**. Also the interventionist did give them some relevant and important information.

Already at the age of 6 months, 3 months before his first CI, Koen started in a **multidisciplinary day care centre for children with a hearing loss, called ‘KIDSJE’**. The multidisciplinary team of the day care consists of: a speech and language therapist, teacher of the deaf, audiologist, physiotherapist, psychologist and social worker and they work in close cooperation with the CI-team. In group as well as individually the children receive intensive stimulation of their listening and spoken language.



The parents were very satisfied about the multidisciplinary support they received there. They also liked the **information session** they followed (in group with other parents) on how to nurture a child with a hearing loss and on how to communicate with your child who has a hearing loss.

Weaknesses: The parents confirm they received excellent support **with little or no weaknesses**. A difficult moment, was the time they had to inform their family (parents, brothers, sisters) about the deafness of their child. Their advice (are you really sure he is deaf, go for a second opinion,...) was not a good signal in moving forward. Some support during this period was welcome.

Opportunities: The support the parents and child received from **the multidisciplinary team in KIDSJE was excellent** and it is hard to improve. Although there were multidisciplinary meetings (every 6 months) on the development of Koen, they also received a lot of information **through his diary**, in which they could follow Koen's activities and exercises in the day care centre and in therapy. When possible for them, they could also attend the therapy sessions, which was also very useful.

Threats: the parents **had little or no negative experiences** on the support they and their child received. "We were supported by excellent professionals with a lot of experience and knowledge in educating deaf children and in stimulating listening and spoken language in children with a hearing loss. Now he is going to start in a regular preschool, we are just a little bit afraid how this will go, without the close support from a multidisciplinary team. An SLP from the mainstreamed support service will visit his school ones every 2 weeks".



SWOT analysis by Marlies, Koen's therapist

Strengths: Supporting young deaf children with cochlear implants requires a multidisciplinary team. Also parents are part of the team and we have to coach the parents on how they can stimulate the audition and the spoken language development of their child. These very young children, only develop their skills when they feel relaxed and comfortable. So this is the first topic to focus on.

During this very young age, when the brain is plastic, we have to stimulate the child individually. In the day care centre (called KIDSJE) I take the children individually 3 times/week for 30 minutes in therapy. When possible, parents are allowed to join the session. Otherwise I make video recordings and send them to the parents. The Ling sounds are one of the first things we introduce in therapy.

For me, it is important to focus on eye contact, auditory development, speech and spoken language. Auditory stimulation is based on the Listening Cube program.

I also monitor the children regularly by measuring their speech perception, speech production, language comprehension and cognition every 6 months and by discussing the outcomes with the parents.



Weaknesses: In case the early intervention team is visiting the families, it is important to work close together with this team. Because of changes in staff members in the early intervention team, this is not the case today. So I miss a little bit (which I had in the past), that we all work close together on the same goal. Because a lot of CI-children go to a regular school when they leave the day care centre, some parents (of children who don't progress so well) also want to decide to the regular school, although the child still has weak speech perception and big language retardation. It is difficult and hard to explain to these parents that their child is more at risk and needs a more intensive guidance.

Opportunities: Let's stimulate listening and spoken language development intensive when the children are young (< age 4) and the brain is plastic. The Listening Cube is an excellent auditory training program, which helps professionals to stimulate the auditory development of the CI-child at the correct level.

Threats: Professionals supporting these young children with cochlear implants need up-to-date knowledge on how to support young children with cochlear implants, which is not always the case.

