



Hearing Impaired Children and ASD: The Importance of Early Identification and Intervention and its Role in Further Development of Life

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Abstract: *Dealing with hard of hearing or deaf children plus ASD diagnosis has had limited data available in the literature. This article is a brief of overview of about the heterogeneity of hearing-impaired children's group, the differential diagnostic aspects and difficulties in the professional field and summarizes of our team work. One of the key aspects of the article is the parents' view, the parents' informing. We introduce some single-case studies which demonstrate the Hungarian practice.*

Keywords: heterogeneity of hearing-impaired children, differential diagnostic aspects, dual diagnosis, team work, informing parents, individual pathways

Nowadays it is a rarely explored area. 30-40 per cent of hearing-impaired children have multiple disabilities. Within this, the rate of hearing-impaired autistic children is high, which is 4-7% (Gallaudet Research Institute, 2003; Schum, 2004; Marschark & Spencer, 2009; Hitoglou et al., 2010; Robertson, 2013).

The importance of early identification and intervention considering the brain plasticity and sensitive periods in this area is significant for the development of their life path (Mood & Shield, 2014). However, this shows a significant late in practice. The average age of the ASD diagnosis in hearing impaired children is between 50 and 66 months old (Vernon & Rhodes, 2009; Kancherla et al., 2013; Meinzen et al., 2014). How can this late diagnosis and recognition be explained? Firstly, the diagnosis of ASD

in hearing impaired children is not so easy from the point of view of differential diagnoses. Delay in speaking and language development, difficulties in social and communication skills, inflexibility and delay in role play can be explained by both hearing loss and ASD. Secondly, parents may also have difficulties accepting double diagnoses. Thirdly, there are few professionals who can have practice in both fields. Moreover, the adaptation of the diagnostic tools like ADI -R or ADOS used in autism to the hearing impaired has not been achieved and is still taking place today (Meinzen et al., 2014). Last, but not least, the needs of hearing-impaired children and families are very different. Personal programming, individual decision making for the appropriate therapy, family-centred interventions, team work and the coordination of the different therapies and professionals are important according to both the experience of literature and ours (Marschark & Spencer, 2009).

We present opportunities for intervention and rehabilitation sparking some good practice including the difficulties which possibly occur like overcrowding, lack of institutional system, lack of professionals, parental insecurity and incompetence.

Because of the high rate of children who do not speak or who have intellectual disabilities both in case of children with hearing loss and children with ASD, we would like to present a pilot study in this area. The study, as a part of a larger research, has a result that communication tools of both groups include varied behaviour like vocalization, gestures, eye contact and alternative communication, hearing impaired children used almost sign language, while children with ASD used only visual communication (Varga-Bóti, 2015). As a result of international studies, it seems encouraging to use visual communication forms for children with ASD, hearing impaired and deaf and blind children (Roche et al., 2014; Luckner et al., 2016).

The heterogeneity of hearing-impaired children

The population of deaf and hard-of-hearing children comprises a heterogeneous group. While the number of hearing-impaired students in mainstream schools shows an increasing tendency, at the same time the deaf and hard of hearing children in special educations indicate more complex needs (Gallaudet Research Institute, 2003; Csányi et al., 2007; Marschark & Spencer, 2009). These needs and other disabilities are not caused by hearing loss because multiple disabilities can be found with mild to profound hearing loss. 30-40% of hearing-impaired children have multiple disabilities where the demands are characterized by a high degree of heterogeneity. Nowadays it is a rarely explored area and we do not have accurate data (difficulties in administration, scoring). Within this proportion the rate of hearing-impaired autistic children is high, which is 4-7%, approximately 10% of children who are hearing impaired have learning disabilities or intellectual disabilities, 6-7% of the hearing-impaired children have hyperactivity and attention disorder. Similarly, the specific language disorder (SLI) rate in the population is 6-8% and about 1.6-2.8% of children who are deaf or hard of hearing have co-occurring visual problems (Gallaudet Research Institute, 2003; Schum, 2004;

Marschark & Spencer, 2009; Hitoglou et al., 2010; Robertson, 2013; Mood & Schield, 2014).

In fact, needs may be combined, for instance, a hearing-impaired, autistic children may have learning difficulties or intellectual disabilities at the same time (Cupples et al., 2016).

The ethology of the multiple disabilities contains varied factors like cytomegalovirus (CMV) or rubella infections, birth trauma, drug side effect or postnatal injuries (Gallaudet Research Institute, 2003; Schum, 2004; Marschark & Spencer, 2009; Hitoglou et al., 2010; Robertson, 2013).

Differential diagnostic difficulties and aspects

Hearing impaired and autism spectrum disorders (ASD) are still "rarely" diagnosed and little explored field. The co-occurrence hearing impairment and ASD shows a high rate and significant delay in the co-morbid diagnosis (Vernon & Rhodes, 2009; Kancherla et al., 2013; Meinzen et al., 2014). It is also supported by our experience case studies. 50-66-month hearing impaired children are diagnosed with an ASD on average (varied between 33-106 months), however the emphasis on the importance of early identifications and interventions in these children is relevant because of sensitive periods and the optimal developmental way (Mood & Shield, 2014).

The difficulties in diagnosis is consist that delay in speech and language development, difficulties in social and communication skills or poor and not creative playing and lack of role play and repetitive interests and inflexibility personality are both found in hearing people as well as individuals with ASD. There is a lot of overlapping symptoms in ASD and hearing loss. In both populations the individual differences are shows a great variety (Meinzen et al., 2014; Mood & Shield, 2014). Children who received cochlear implants (CI) they are likely to recognize ASD earlier because of follow-up and monitoring (Meinzen et al., 2014).

In the background of the difficulties that there are only a few professionals who can have practice in both fields. Moreover, the adaptation of the diagnostic tools like ADI -R or ADOS used in autism to the hearing impaired has not been achieved and is still taking place today (Meinzen et al., 2014).

In fact, this research is also being carried out, however these are still in the experimental phase. Particular autism-specific approach developed to deaf children was presented by researchers in Autism Europe 2016 conference. This diagnostic procedure is called DIADS (Diagnostic Instruments for Autism in Deaf Children's Study). The result of ADOS-2D and ADI-RD were demonstrated using 45 family studies. New guidelines were introduced for autism examination procedures due to linguistic and theoretic differences affecting deaf people, which are both practical changes in examination and in terminology. Sign language is the means of communication and one of the two participants involved in the trial is a deaf person, using a sign language, and the other one can hear and speak. The main participant is always the one who can communicate with the child in the appropriate communication way. According to the results of the experimental phase, the method makes it possible to differentiate

between autistic children and deaf children without autism. The early signs of ASD in hearing impaired children:

- unusual first words
- lags in spontaneous language use
- atypical speech and language development (speech comprehension lower than hearing and language level, limited gesture use, different pronunciation)
- difficulties in common attitudes
- delay in symbolic and role playing
- unusual play with tools
- unusual monitoring
- lack of eye contact, qualitatively different
- lack of social smiling in the early years
- underdeveloped sign language
- sensory search
- inflexibility in changes in routines.

Help to recognize early diagnosis of autism in hearing impaired children:

- ✓ regression in skills (communication)
- ✓ reduced vocalization
- ✓ fewer roles in the observed interactions
- ✓ more frequent echolalia
- ✓ more frequent repetitions of words, sticking to one topic or particular expressions
- ✓ individual developmental profile.

The role of team work in our institute

In the case of hearing loss and autism, team work is a major part of the child's care and development. In this, an expert specialised in hearing impairment and autism spectrum disorder (ASD), provides the particular pedagogical development of both fields, giving opportunities for family consultations as well. A psychologist can play a role in choosing an expert, as well as helping the child, parents, teachers, and sometimes psychiatrists.

The audiologist has an important role in the diagnosis of hearing loss, in determining the extent of hearing loss, in the selection of hearing aids and in their optimal functioning and use. In the case of associated autism, problems of attention and social interaction can seriously affect the evaluation of the child's reactions to auditory stimuli, such as determining the existence or severity of hearing loss and adjusting the auditory device.

The school doctor may assist other health problems, illnesses. The parents of children and teenagers applying to our institution, are recommended to visit and get impressions of the institution for the first time. This encounter, as well as the need and the need for encounters and occasions of acquaintance, are appropriate for the institution's specialist to get to know the child, their individual needs, and to gain experience whether the child is likely to be integrated into an existing group and institutional structure or not. Furthermore, it is an advantage the parents

and families because they can also obtain information about the institution and its therapies, plus they can decide whether their children would have a good place or not. These encounters and times of acquaintance are especially important when the parents or the specialist who used to deal with the child have a suspect that the child has an ASD as well. Most of the time, as described in the literature, the associated disabilities are diagnosed later, so it may only take place after choosing the institution and the child is accepted, or years later. If a hearing-impaired child with an institution is suspected of autism by a teacher or a psychologist, it is preferable thing if autism specialist is applied in the institution. In this case, by observing or examining the child, they can confirm the suspicion or discard it, and if necessary, assist in further steps.

Communication, parents informing

If the suspicion of autism is involved in a hearing-impaired child, the suspicion must be communicated to the parents. Since gaining the cooperation of the parents is of great importance to identify the problem and for the optimum development of the child. However, informing the parents is always preceded by a team discussion.

In the discussion we consider when suspicion shared with the parent, who tells it the parent, and where to direct them. Parents may be in a current life situation when we do not find informed them it beneficial (e.g. waiting for a child or experiencing a more serious crisis) or we feel that our suspicions are not established. The suspicions might be communicated by the teacher, the autism specialist, or the psychologist. The choice is based on who parents trust the best. If possible, consultation with a specialist in autism is available in order to talk to an expert who is familiar with the problem.

After informing the parents they are also provided information about the diagnostic clinic and foundations, where the child will receive appropriate therapy and the parents also can get support. It is important to emphasize during the consultation that we have only indicated our suspicions about ASD. Whether the child has such a problem with hearing loss can only be diagnosed with autism specific examinations for example ADOS and ADI-R because the results may not verify the suspicions.

Diagnostical problems - Is diagnosis needed?

Unfortunately, there are few institutions in Hungary that supplying diagnostics of ASD, and there are few experts who are well-known in this field, both for diagnosis and appropriate therapies. The institutions are overwhelmed, and the examinations take place after long waiting time, particularly if the child is hearing impaired. There are few experts skilled at characteristics of hearing loss, who would really be proficient in differential diagnosis.

Prior to initiating the diagnostic process, a specialist will always consider whether a diagnosis is necessary or not. When the parents are

reported, they decide, regarding the view point of their' child later life. The benefits of diagnosis include:

- ✓ giving the parents the feeling that they are not "bad" parent, because their child is different,
- ✓ starting an appropriate therapy,
- ✓ more favourable institutional care,
- ✓ finding a community of comrades where they can get right information and emotional support.

The disadvantages of diagnosis, similar to when other disability is identified, involve: trauma for the parents, a negative life event affecting their child and themselves life for a long time and stigmatization (Pálhegyi, 1984; Kálmán & Köncezi, 2002; Radványi, 2013).

Furthermore, the diagnosis does not necessarily involve starting of the child therapy suggested by us. As there are few experts in autism in Hungary, post-diagnosis therapy and development are uncertain. Parents can stay with their problems on owns and their child's development and future seem to be hopeless. There is also a serious problem that there is no institution specifically for hearing impaired autistic children in Hungary. Based on all these factors taking the child's and parents' personal situation into consideration, the decision is riches whether or not, initiate a test on autism to determine or exclude the suspicion. What can parents go through:

- Anxiety from diagnosis: whether it will be beneficial for their child or not.
- Even another trauma, hearing impairment is too recent.
- "Not only" is there hearing loss, but also this. What will they have to? (Negative expectations about the future).
- Their child is not like ordinary hearing-impaired children. They do not belong to them either.
- There is no appropriate institution in Hungary yet, and even professionals not competent.
- Competence shortage, uncertainty in parenting: What should be done with a hearing-impaired autistic child? How to educate?
- After previous problems and difficulties, the parents can enjoy relative relief after finding the right care and support (Pálhegyi, 1984; Kálmán & Köncezi, 2002; Luterman, 2004; Radványi, 2013).

Difficulties of special teachers:

- ❖ causing sadness in parents, taking their anger, enduring their resistance, waiting for the stage of constructive acceptance until the time when they are actively involved in the therapy,
- ❖ what to tell about the child's behavioural problems to the parents, keeping in mind both parents should see their child's real condition and psychic burdens,
- ❖ if the teacher is not qualified in both fields, they experience uncertainly in their professional role and competence,
- ❖ the development and therapy of two fields involved more work, greater burdens (Luterman, 1987; Békési, 2008; Borbély, 2012).

How to improve? Opportunities, individual pathways, solutions

Children with multiple disabilities are different in many aspects, for example the type of impairment and severity and degree of developmental delays and their family backgrounds.

About 25-30% of severe hearing-impaired children need alternative help instead of oral communication (Várszegi, 2012). Approximately 25% of children is the proportion of non-speakers, some communication and speech need to be replaced.

The AVT (auditory verbal therapy) has been used in special schools of deaf and hard of hearing children since 1979-1980. Therapies try to encourage every child to speak. However, other disorders and disabilities associated are with hearing loss (such as hyperactivity, dysphasia, autism, behaviour, and attention disorder) which require differentiation, finding new ways, and methodological re-planning. In spite of the use of differentiated tasks the lessons, it is difficult to make conversations and the most critical points are reading lessons and reading comprehension. Many times, motivation, teaching of loud speech and writing communication are also difficult. Frontal lessons are not effective enough to develop children with multiple disabilities, as there is no recipe and unified methodology, personal planning and using individual plans are needed because of the variety of individual's needs (Várszegi, 2012).

Different methods have emerged in the development of hearing impaired and dysphasic children such as the Affolter method¹ in several decades of experience and good practice. Affolter method is effective for deaf children with ASD as well (Heldstab, 2012; Várszegi, 2012).

Dealing with hard of hearing or deaf children plus ASD diagnosis has had limited data available in literature, most information come from single-case studies.

Individualized treatment is included in the literature, using ABA therapy and behavioural interventions, varied social and communication skill development methods, or even PECS can be effective, but there are a lot of questions about the appropriate therapy (Vernon & Rhodes, 2009; Meinzen et al., 2014). *Sign language in ASD:*

- there have been controversial results on the difficulties of imitation in motor way (Shield & Meier, 2014) but they can master it according to several case study (for review: Ganz, 2014)
- management, attention, face-processing, common attention: hearing impairment and ASD challenge learning signal meaning (Bloom, 2002)
- in impairment to theory of mind (ToM) in both populations: Does sign language using support social cognition and language skills? 71 using sign language ASD children (N = 71) did not acquire signs as a

¹ The essence of Affolter method is that children solve problems during problem solving situations in everyday activities. The therapist provides the child with information on a specific method of guidance. The interactions created during the session lead to communication, mutual exchange of experiences and thoughts. In addition to tactile perception, drawing and describing experiences and processes are important in the therapeutic process. The processes are generated by their own experiences and they are related to verbality, visuality (drawing and writing) (Heldstab, 2012).

- language, they could not use potential benefits, which signs could offer; it was a challenge as to use signs in social context.
- Quill draws attention to the fact that sign language is an evanescent system, requiring constant attention to changing social interactions, quick processing of symbols, featuring memory, and the development of motor skills in sign design. It is also difficult that the number of partners who are familiar with the language are limited, so they are not able to use this type of communication in general (Quill, 2009). These factors considerations needed in the choice of communication ways.
 - When autism and hearing impaired co-occur, more dominant symptoms in education are autism, as they effect it the understanding of objects, people and events (Peeters, 2007).

Tactile symbols in hearing impaired children?

There are similarities of therapies of hearing-impaired children and children with ASD, these are: schooling, education in small groups, emphasized communication development, behavioural therapy, visuality instead of /besides verblability, preparation for future events (agenda, timetable, calendar), social competence development.

Some advice and good practise in development expressive communication in CCN² children: with individualized goals, to replace speech and insufficient communication, embedded in a variety of techniques, visual strategies and tactile symbols. It is encouraging that a pictorial / physical communication signs for visual hearing and deaf-blind children are used (Roche et al., 2014; Luckner et al., 2016).

Hungarian pilot study

(Varga-Bóti's research was motivated by her own work experience. She works as a special teacher in the school of multiple disabled children. In her research, which is part of a larger research, the aim was to present the communication development of hearing impaired and autistic students in order to develop them even more effectively (Varga-Bóti, 2015). In her research compared the communication characteristics of 5 hearing impaired and 5 autistic students. She matched pairs based on children age, IQ, and time spent at school based on pairs. Video was recorded about the children's interaction while eating, learning and during leisure situations, which were coded and analysed using the M-COSMIC method. The research is not representative due to the small number of elements, but it is not possible to draw general conclusions from the data but represent important observations.

In terms of results, hearing impaired children in the sample interacted considerably more times with children with autism. There was a difference between the two groups that multiple hearing-impaired students had several interactions apart from own their teachers, possibly with other

² CCN = complex communication needs

adults or peers, such as children with autism. The differences were also clear well in communication roles. The hearing impaired questioned and initiated, while children with autism were more likely to be responsive. However, behaviour without communication value of hearing-impaired student were recognise. Vocalization, alternative and augmentative communication (AAC) and eye contact appeared between the communication tools of both groups. In the case of hearing-impaired students, AAC was almost only sign language, in one case the use of the gesture language, while children with autism only had the ability of alternative communication.

The results are consistent with the literature. They call attention to the importance of individualized communication development. The Hungarian literature and the special pedagogical tradition emphasize the possibility of sign language for hearing impaired students in case of inappropriate speech development. This was also confirmed by the experience of pilot research. However, it is also a proven fact that the use of sign language may not be the best solution for students with multiple hearing impairments, so it is important to have a wider understanding and use of alternative and augmentative forms of communication and methods in specialized hearing impaired in situations, with more flexible adaptation of methods and team-work of professionals.

Based on our own practical experience, it can be claimed that some movement is perceived in the direction of the opportunity of using alternative communication, depending on the teacher. In the institutions, the communication strategies applied are even less suited to customized choices taking the needs of the child into account, instead the applications of traditions, customary methods and curricula are in practice.

Case study: Julie

There has been suspicion of Julie's hearing loss since her birth as she was born infected by CMV virus. Hearing loss was diagnosed when she was 6 months old with objective examination (BERA). She was provided with hearing aids when she was 7 months old. Since speech development had not started, at the age of 2 she was operated with a right CI. Then, due to significant linguistic backwardness, she was given the left CI at the age of 3. Subsequently, based on audiological tests, she responded to speech sounds at 30 dB.

However, her speech development did not start yet. Her abilities were scattered. Her behaviour was weird (e.g. inappropriate approach to foreign adults - smelling, watching their navel), and changes were difficult for her to tolerate.

Her parents and the special teacher dealing with her came up with the suspicion of autism spectrum disorder, which was confirmed by the autistic specific examinations (ADOS, ADI-R). Julie was diagnosed with ASD at age 4.5. Autism specific therapy was proposed in addition to special education.

She was allowed to attend an integrated nursery school until she was 5 years old, where an excellent nurse dialled with her. She learned the subject agenda and then the mini subject and the visual agenda. She had

separate work tasks in boxed organization. She learnt how to use a choice table at leisure activities and a flow chart for dressing and bathroom use. There was collaboration and teamwork involving her parents.

She started the special kindergarten at the age of 6. There she was wearing CI, but if the others were loud, which disturbed her, she took them off. The small group has special educators and assistants dealing with the children. Her progress was satisfactory. Therapeutic Methods:

- visual help - agenda, diary, calendar, conciliation and transfer cards, use of work schedule in occupations, use of flow charts (e.g. in self-service situations, activities during classes)
- PECS (Picture Exchange Communication System)
- Affolter therapy, guiding method
- in interactions, beanbags indicate the role change, "Wait" card indicates waiting
- motivation and reinforcement of audio outputs, articulation exercises in structured positioning by helping and modelling (e.g. blaring exercises, sounding in "mirrored" and imitation games of sound lines mentioned by Julie)
- differentiation of environmental sounds
- practising with gesture or visual aids to understand instructions
- consistent education in consultation with her parents, unified expectations, team work
- continuous control and refinement of CI adjustment
- prevention of behaviour problem, predicted changes or program failure, diversion,
- providing a relaxed corner for rest; teaching alternative ways of draining anger
- TSMT therapy (planned sensomotor training)
- motivation, role models, positive reinforcement, reward.

At the age of 6, a mild degree of intellectual disability was also established. She had distracted attention, and she was insufficiently cooperative in situations. Compared to her age, her analogical thinking, visual memory performance, combination skill and intelligence age were 4.1 years, however she drew it deftly. She expressed her experiences, feelings, tension in drawing.

She began her studies in a special school, where the main profile was autism specific care. It was a continuation of the started therapies (autism-specific development, autism-specific pathopedagogic development by visual reinforcement and structure, visual card changeover apart from the motivation of speech).

Rapid change of activities, impulsiveness, severe mood swings, continuous auto-aggressive symptoms and sleep disturbances required the need for a new examination. At age 6, she was diagnosed with hyperactivity. 'Risperdal' was prescribed for the symptoms. Additionally, the hearing aid was continually refined.

Now Julie is fine. She is in the 2nd grade, and she likes to go to school. Her social skills have developed, especially in her family relationships. She can express her love towards her parents and her sister more and more often (e.g. embracing, sending a kiss). Developing listening and differentiating skills, speech comprehension is still targeted - encouraging

conscious audio outputs in action and everyday situations. As Julie is susceptible to writing or copying or drawing letters, the preparation of reading and writing has been started using the agenda cards. Julie skilfully matches the printed and written agenda cards, and she can copy the words understanding their meanings. Her individual progress is based on her individual development plan.

Case study: David

He is a prematurely born, hard of hearing boy. He has an ear canal atresia, therefore, he has been wearing a hearing aid since he was 3 years old. He went to a special kindergarten, a speech therapy group, and started his elementary studies in speech therapy class. During class 3, due to behavioural problems, a change of institution took place into a primary school provided for hearing impaired children. At that time, he had regular psychiatric care. His diagnosis includes “Different childhood emotional disturbances”, “Mixed specific developmental dysfunction”, “Disturbance of activity and attention”.

In the special school of non-hearing children, teachers also experienced serious problems in the field of attention and behaviour. During the lessons, his attention was difficult to keep, he often fell into his inner world, so he sucked his finger. In the case of negative experiences, aggressive behaviour appeared, sometimes directed towards others, sometimes towards himself. In the case of indistinct bursts, he threw his hearing aid or glasses away, took off his clothes, even stripping himself naked and suffocated himself.

Due to behavioural problems, he was cared by the psychologist of the institution from the beginning. Autism analysis starts at the initiative of a psychologist, apart from the bizarre elements of behaviour, social relationships and flexible behaviour, the suspicions are the following

- ❖ After several encounters with the psychologist, his emotions and gestures are not visible to the acquaintances either the signs of joy or rejection.
- ❖ There are difficulties in empathy: he puts infant dolls into the washing machine to wash; he did not understand that we do not eat human flesh because it is not delicious, but because it would be a bad feeling.
- ❖ The level of his playing and drawings do not correspond to his age, containing some bizarre elements.
- ❖ Emotional development is significantly below the level of age, intelligence, general awareness, and state of speech. Neither his normal intellect, nor his knowledge, nor his speech level, which is close to hearers', explain this handicap.

The psychologist indicates the suspicion to his psychiatrist. At the end of class 5, after autism specific examination, at the age of 13, he receives a diagnosis of childhood autism. The new diagnosis is well received by his mother, though, his dad did not agree questioning its existence. Since class 6, he has received an autism specific therapy at his school once a week. Therapeutic Methods:

- picture and visual aids support, using video modelling and mobil applications (calendar, social stories read in Mobil phone)
- behavioural intervention strategies
- Cat-Kit (Cognitive Affective Training program by Attwood)
- Ö.T.V.E.N. program (PHSE – Personal, Health, Social and Citizenship Education by Speirs)
- making conversations and social stories and comic strip conversations with thinking and speech bubbles
- consistent education in consultation with his mother, unified expectations, team work

The upper classes were characterized with increased sexual interest. Due to outbursts, he was temporarily medicated. His mood waned, often depressive, in which the negative self-image, social problems were emphasized. In class 7 suicide intent appeared. The provision of support and the assistance of parents and teachers until the end of primary school were ongoing through autism-specific therapy, psychology and psychiatric care, and teamwork of specialists.

He completed his primary school education, and he attends secondary school education in a grammar school provided for handicapped and autistic young people.

Case study: Mark

Mark's parents started to worry about different development of motor skills and speech. Although the suspicion of hearing loss had already occurred, but since at the age of 2, audiological examinations did not confirm it, therefore the parents were relieved. However, due to recurrent upper respiratory infections, he was continuously monitored by a specialist.

Finally, at age 4.5, mild to moderate hearing loss was diagnosed on both ears, and proper hearing aids were provided. Due to the two-sided, sensory-neural hearing loss, he became a child with special educational needs who was proposed to attend mainstream education. He started to study in a kindergarten where he was given speech development.

He was an inquisitive little boy who developed a lot as a result of the therapies. He differentiatesling sounds, noises, speech sounds, words and sentences nicely. He also liked such tasks, games and vocabulary, thus his vocabulary constantly expanded. Cooperation with parents was like in a partnership. However, socializing, social communication and social relationships were difficult for Mark. It was hard for him to make friends, or to keep them, as he was timid. His speech was correct in relation to situations, but he only understood deeper contexts and non-literal meanings with help. He had to learn to understand stories, others' feelings and nonverbal communication, gestures and to share experiences.

His intellect is above the average, but his ability profile is scattered. The suspicion of autism evolved, first and foremost, in his therapist and in his mother, mainly because of the adversity of Mark's behaviour, the adversity and the difficulties in forming relationships with peers. Lastly, autism diagnosis was claimed while attending nursery school.

His parents did not get the diagnosis unexpectedly. They got answers to the slightest problems they experienced every day, but they did not want to tell the ASD diagnosis in the child's institution. Since Mark's symptoms were not significant, the experts also agreed about it, as in a group situation, the social-communication difficulties or any inflexibility experienced fit into the image of a hearing-impaired child, and due to the choice of the forthcoming school, they did not want to reveal it. Appropriate therapies were received without ASD diagnosis and his parents did their best, but because of his co-morbid disability, Mark would probably fail getting into a good school, despite his over-average intellect. In the development of social-communication skills, the following methods have been given priority

- Creating a peer support group
- using social stories, speech and thinking bubbles
- modelling, roleplaying
- anticipating events and preparation for change using visual aids
- -CAT-kit (cognitive-affective training program by Attwood)
- his mother's attending a group for parents

Mark has been going to a mainstream school. He is an excellent student, who has successfully integrated into the class with help, and continues the ongoing social communication skill therapies.

Case study: Thomas

Thomas is a moving, inquisitive boy. His development took place well in the early childhood. From the age of 3 months he vocalized and then glittered. However, his speech did not expand afterwards. At the age of 2, he was diagnosed with hearing loss. Thomas had severe hearing loss on speech frequencies (110 dB loss between 500-4000 HZ). First, they tried to correct his hearing loss with hearing aid, but it was not accepted by him, then he had a bilateral CI operation. With it and a special therapy, speech-sounds were provided, so hearing threshold became 30 dB.

However, his sound out puts did not expand due to traditional speech therapies, his attention was verbally difficult to control, and he did not care his name either. He could be involved in activities that he was interested in, in car games, but not in other adult-initiated activities.

After the early intervention, he went to the kindergarten of hard of hearing children. As no speech was triggered with CI-corrected hearing and intense speech therapy, autism was suspected due to attention problems, narrow-mindedness and ineffective behaviour.

This suspicion was proven in a complex paediatric, psychiatric examination. Parents in a situation where they could not completely process and accept Thomas's hearing loss tried to ignore the diagnosis of autism. Even though they realised that when they used a visual agenda at home or they help Thomas's communication with images, there were also fewer behavioural problems at home.

The situation was made worse by the fact that parents had got divorced, so Thomas witted his home every 2nd week between his parents' homes. It was difficult for parents to take Thomas to school day by day, which was

situated far from their homes and they trusted that if he were close to typical peers, his communication would begin, his behaviour and his activities would approach to his age. Therefore, they asked for a commission of experts and started looking for an integrated nursery school for him.

They were able to find a private kindergarten with a smaller number of group (20 children/ group), where Thomas got specialized therapies by peripatetical teachers.

Thomas has now been attending the integrated nursery school for 2 years. He got autism specific and speech therapy for 4 hours a week, as well as a remedial assistant, and an ABA therapist has been in the group with him since summer.

Thomas joined the kindergarten group at the end of the 1st year. He was able to play besides his friends in their free time, but he was not involved in group activities, though, he solved the tasks individually with the assistant. In his speech, vocalization grew, he used gestures to tell his wishes.

The continued presence of the ABA therapist helped his speech development. He started to say some words (e.g. give it to me, come here), which was still far below his age. All in all, there is a delay in all areas of Thomas's age. His parents tend to settle for him due to his childish appearance. He is still difficult to engage in motivational tasks. Although he may stay in kindergarten for 1 more year, it is doubtful where he will be able to start school. Whether his parents will be able to accept special education or will be looking for an alternative solution (e.g. starting a small, private school with individual help) is still a question.

Summary

The aim of the present study is to give a review of the available literature on multiple disabled hearing-impaired children particularly with dual diagnosis of hearing impairment and autism, as well as trying to present our practice with good strategies and methods applied besides the difficulties in the diagnostical and educational pathways are detailed, and case studies demonstrate the variety of children's lifeways.

The hard of hearing or deaf autistic children are a small minority of children who are hearing impaired. There is lot of is said about effective therapies developing them.

It is essential to establish of well-developed diagnostic procedures that revel their capabilities in order to plan an appropriate individual therapeutic program for multiple disabled deaf or hard of hearing children.

Therefore, the optimal development path assumes the earliest diagnosis, differentiations, the cooperation of professionals with each other and with the family, multidisciplinary team work, appropriate institution and individual planning. The focus is in "Person-centred" programming rather than "Category-centred" programming (Marschark & Spencer, 2009).

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