

# Aktualne aspekty procesu diagnostycznego i terapeutycznego u dzieci z wadą słuchu

## Present-day aspects of diagnostic and therapeutic process in children with hearing loss

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W pracy przedstawiono złożoną problematykę interdyscyplinarnego postępowania diagnostyczno-rehabilitacyjnego oraz aspekt etyczny i prawny ze szczególnym uwzględnieniem aktualnie obowiązujących standardów postępowania z dzieckiem niesłyszącym. Autorzy przedstawili nowatorskie kierunki pracy terapeutycznej związane z nową generacją aparatów słuchowych, systemów wzmocnień oraz implantów ślimakowych.

**Słowa kluczowe:** uszkodzenie słuchu, rehabilitacja, dzieci

The paper presents complex issues of interdisciplinary diagnostic and rehabilitation approach as well as ethical and legal questions with particular regard to current practices used in the treatment of children with hearing loss. The authors present novel therapeutic strategies associated with the introduction of a new generation of hearing aids, amplification systems and cochlear implants.

**Key words:** hearing loss, rehabilitation, children

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### Introduction

Pediatric impairments and dysfunctions have been attributed to harmful environmental effects, pathological pregnancy and abnormal delivery as well as adverse effects of perinatal pharmacotherapy. Surprisingly enough, developmental deficits can result from progress in medicine including neonatal resuscitation and life support in children with extremely low birth weight. Also, from assisted reproduction and treatment of women who otherwise could not conceive or carry pregnancy to term. Not infrequently assisted reproductive technologies result in malformations and deficits [1].

Such deficits are not always timely diagnosed; appropriate aid for children and family support are not necessarily organized – with the exception of children with hearing deficits.

We live in a time when advances in medicine and medical technology as well as social engagement can

provide hearing and vision impaired children with a new quality of life. The Polish Great Orchestra of Christmas Charity (Wielka Orkiestra Świątecznej Pomocy) initiated and implemented the Program of Universal Neonatal Hearing in all Polish hospitals. Thanks to suitable equipment, all babies are screened for hearing impairments during the first 24 hours of life. This creates an unprecedented chance for diagnostic, surgical, prosthetic and rehabilitating interventions.

### History

The history presents the contemporary researchers with a continuous process of two mainstreams that interweave in the care of patients with hearing defects, ie., verbal and sign language communications. In the XVIIIth century a French school preferred sign language messages whereas Germans recognized verbal transmission as the only effective form of communication.

Until the 1980s Polish speech therapy was based on verbal methods. Synthetic methods were employed starting with single sounds whereas global strategies introduced phrases. The Acupedic (Auditory-Verbal) approach was based on auditory stimulation and accessing fundamental properties of a spoken language through the use of vision including 'cued speech', ie., phonogestures [2]. Sign language was perceived as a set of primitive image-like signs (gestures) with grammars different from those of spoken languages. As the effects of the above methods were hardly measurable, a new approach was developed at the turn of the 1980s and 1990s referred to as 'total communication'. Total communication is an approach to deaf education using sign language, voice, fingerspelling, lipreading, amplification, writing, gesture, visual imagery (pictures) to facilitate transmission of information [3]. In recent years a lot of attention has been paid to bilingual education of deaf children. Long-term studies of Klima and Bellugi demonstrated that a visual/gestural language had, similarly to spoken languages, a linguistic structure of its own [4]. Research into education of deaf children stimulated in first language showed considerable progress in their second language taught based on visual/gestural strategies. However, most of deaf children using sign language are not able to fully master the spoken language. This limits exchange of information and ideas between normal-hearing and deaf interlocutors. Some of the latter, although bilingual and capable of speaking, have problems with comprehending utterances of normal-hearing people. As a result, the deaf represent a consistent but separate population [5]. The fact discloses the shortcomings and failure of commonly used rehabilitation methods.

#### **Present aspects of diagnostic and therapy in children with hearing loss**

For years the situation was maintained by civilizational, scientific and technical status quo. Inavailability of acoustic signals was causing communication problems thereby decreasing life quality and chances, frequently despite a considerable intellectual potential. The World Health Organization identifies a following sequence of events:

- a disease or impairment causes a defect,
- a defect results in disability,
- disability entails handicap or a defect becomes a direct cause of handicap, where:
  - defect refers to the loss of or abnormal body structure or function;
  - disability means a limitation or lack of capability to perform tasks considered typical for a given individual; disability results from a defect;

– handicap describes how a defect or disability compromises life chances of an individual or society or/and causes problems regarding meaningful interpersonal relationships.

Hearing loss involves all elements of the above sequence including hearing defects or impairments, developmental problems and hampered communication. The effects in the life of hearing impaired people, ie., partial perception of reality, less differentiated and inflexible personality, impoverished emotions, weak empathy, problems with adhering to social norms and rules, and self-esteem disturbances used to be severe and irreversible [6].

Under natural circumstances most children develop speaking skills with no considerable difficulty. The ability to use the language as a communication tool not only affects task performance in different social contexts, but is of considerable importance for mental function of an individual [7].

Effective development of communicative function can be disturbed by incomplete auditory perception. This results in limitation in cognitive function and developmental problems; thus, social and emotional interactions are difficult from the very beginning. However, despite frustration and the sense of threat, the interest in the surrounding world and the will to get to know new objects and situations is not weaker than in normal-hearing peers [8]. The child should have optimal conditions of conscious development, acquiring new skills and experience, and communicative functioning [9]. It is particularly important in children with new generation hearing aids and cochlear implants.

The use of prostheses is beyond doubt. In early childhood, the central nervous system enables the child to perceive or process incoming acoustic signals using a hearing aid or through a cochlear implant.

A wide range of appliances for audio enhancement or acoustic signal generation open up a new era in therapies for the deaf and hypoacusics. Today the question is not how to substitute for, but rather how to improve the impaired function. Providing a child with a suitable hearing aid, enhancement system or cochlear implant is just the beginning of a long process aimed at function improvement. The subsequent phase is not a dilemma of appropriate technique selection, but auditory-verbal rehabilitation which will ensure comfort of life and normal development among normal-hearing contemporaries [10].

Choice of therapy depends on several factors. Not all hearing impaired children are candidates for auditory-verbal rehabilitation. The defect can

be diagnosed too late, i.e., after the critical period of language acquisition or parents' awareness may be insufficient to try for therapy. Rehabilitation effects also depend on age, duration of hearing defect, the level of speaking skills developed before hearing loss, the intelligence of the child and people in his/her surroundings, writing and speaking skills and beneficial impact of prosthesis. However, considering the results of the program of universal early hearing screening, the criteria are no longer significant.

It may seem that a child who receives a sound-generating device should immediately become a grateful and responsive object of rehabilitation sessions. However this is a very misleading concept. A child, and especially a small child, is frightened and cannot understand things happening around and inside. Living beyond the curtain of silence, they are unaware of auditory stimuli and develop own adaptation and adjustment strategies. Exposure to auditory stimuli causes a rapid change in everyday function. Each child reacts in a specific way. Some would reject all attempts of interaction by a therapist, some other listen to sounds discovering an unknown world, still other start crying in response to more aggressive auditory stimuli. Some children cannot perceive sounds as information carriers.

Thus, it is important to define significant trends, tendencies and changes to be postulated and implemented into rehabilitation of the deaf.

First of all, it seems that emphasis should be shifted from work on the replacement of one modality with the other, i.e., lipreading with speech decoding through hearing, to work aimed at improvement of impaired function, e.g., production of intelligible speech sounds.

Efforts should also be directed towards elimination of hearing defect being perceived as an overpowering problem. It becomes more important to optimize development towards improvement of life quality and to make up for developmental deficits compared to normal peers.

Another issue to be considered is associated with the child's surroundings. Artificial and non-contextual speech training has no more „raison d'être". Instead, therapeutic tasks should be based on everyday situations. Much more than in the past, rehabilitation programs emphasize the child's motivation and preferences. Specialist teams working with children try to determine what should be done, in what way, why and by whom. Thereby targeted activities can be more precisely planned including diagnostic tests, appropriate treatment or the use of prostheses, and specialist rehabilitation aimed to make up for hearing deficits [11].

Prognosis and changes to be obtained in the function of a hearing and vision impaired child must be based on the fact that a change in any part of the system will affect all others. This involves the principles of equipotentiality and equifinality which assume that causes of the same origin may result in different end states, but also that different causes may result in the same end state. Despite similar external circumstances, diagnostic and therapeutic activities in a hearing and vision impaired child may have different results. Similarly, different circumstances may cause a similar end result. All this requires ultimate attention of a specialist and entails moral responsibility for correct test results and the effect of rehabilitation strategies.

Prognosing the child's future requires that a specialist should use their experience, knowledge and, last but not least, intuition. Intuition comes from experience and facilitates accurate symptom matching to impairment type. However, it is essential that intuition-based diagnosis should be confirmed by tests and careful, methodical reasoning in both heuristic and verifying approach. All prognoses concerning human beings are hypothetical by nature which should make us respect the dictum *primum non nocere* [12].

According to the most recent regulations of education law, assistance for early childhood development can be organized for all children requiring help and specialist support (Regulation of MENiS of 4th April 2005, Official Journal No 68 item 587). The services are provided at home or institution the child attends, from the moment of diagnosis until starting primary school. Assistance is available on condition that a psychological – pedagogical clinic issues a specialist opinion. Depending on the situation and needs of the child, four to eight hours of therapeutic activities are held monthly.

The regulation concerning assistance for early childhood development helps organize regular therapeutic work with children diagnosed with hearing deficits; parental participation yields additional advantages.

As far as possible, the child should be actively engaged in the diagnostic process. However, it should be remembered that parents or guardians are also rightful participants thereof. The more they know about the child, the greater is the chance of them selecting suitable projection activities. They can regularly control the therapy course, evaluate own work, revise therapy cycles, and possibly also participate in designing subsequent stages of therapeutic actions. Therefore, co-operation with the child's family ensures better rehabilitation results. The therapist outlines direction and methods, but

the major workload of therapy rests in a large part on the patient and family influences and support.

One of the resolutions of the 33 BIAP Convention of 1998 regards co-operation with the parents of deaf children. It emphasizes the importance of information obtained from a reliable source, i.e., specialist clinics. Treatment, prostheses or cochlear implantation must follow some work with parents by a psychologist, speech therapist and medical staff. Parents should be provided with honest information on the treatment and rehabilitation; they should also be aware of the fact that the success of the whole process largely depends on their work with the child. Giving advice, and coordination of the activities of children and their parents is one of the top priorities of a therapist [13].

Due to current education system reforms, 'integration class should enable disabled pupils and students to gain knowledge in mainstream education (kindergartens and schools)'. (Regulation No 29 of the Minister of National Education of 4th October 1993). The concept of integration of disabled pupils into mainstream schools is aimed to fill the gap between education of children with special needs and mass education.

Kindergartens and schools with integration classes should employ teachers with special pedagogical background to help organize integration schemes and assist other teachers in selecting teaching materials and methods. Also, to help arrange different forms of psychological and pedagogical aid as well as individual revalidation activities, in which a pedagogical consultant can support and continue the work of speech therapists.

When a child with a hearing defect enters mainstream education, then, on the basis of the opinion of a psychological-pedagogical clinic, some special, corrective-compensatory, speech therapy and socio-therapy classes can be organized for children and young people whose developmental abnormalities or behaviour disturbances impede knowledge acquisition and social adaptation' (Regulation No 15 of the Minister of National Education of 25th May 1993). Individual-oriented activities seem to support speech improvement programs.

Rehabilitation is a complex and multifacet issue. A team of a pediatrician, audiologist, pedagogical consultant, and speech therapist should be prepared to co-operate, exchange experience, and design further, possibly most effective, action [14]. The success of such team results from collectively developed philosophy, methodology, and strategies aimed at improvement of impaired function. It is a challenging task regarding different education and experience of team members and different ways of establishing a diagnosis, prognosis and recommendations. The diversity can be of value on condition that the specialists are able to respect their professional identity and competence [15].

### Conclusions

The above analysis of the present-day situation of a hearing impaired child demonstrates well-designed system solutions which provide the child with a chance to make up for developmental deficits and integrate with normal hearing peers.

We do realize the importance of systematic therapeutic work with the child; specialist interventions can help the child achieve harmonious development and the best adaptation strategies as well as assist in hearing loss compensation. An analysis of the role of interdisciplinary approach also reveals consequences of communication problems between specialists and organizations working with hearing impaired people, the most serious being a delay in therapy. Unawareness of the medical profession of the necessity of co-operation with support institutions, and, similarly, unawareness of teachers and officials responsible for education of the needs of hearing impaired individuals slows down the rehabilitation process or even causes its regression.

Genuine engagement of diagnostic and therapeutic staff may render the work with a hearing impaired child challenging, interesting and successful. Timely diagnosis, prosthetic intervention, cochlear implant give satisfaction. However, the ultimate success can be spoken of when rehabilitation leads to full integration of a hearing impaired child into the community of normal hearing peers.

**Piśmiennictwo**

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