

ULOGA LOGOPEDA U TRETMANU SA DECOM OŠTEĆENOG SLUHA – ZNAČAJ RANE INTERVENCIJE

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SAŽETAK

Cilj ovog preglednog rada je da predstavi vezu između rane intervencije u rehabilitaciji govora i uspeha logopeda u habilitaciji govora kod dece oštećenog sluha. Uredan sluh je jedan od najvažnijih preduslova za pravilan razvoj govora, jer se govor uči slušajući. Neophodno je da se roditelji obrate logopedu za pomoć, ako detetova vokalizacija izostaje ili naglo prestane, ako ne reaguje na zvukove iz okoline, ako se ne okreće pozivu sagovornika koji nije u vidnom polju, ako ne reaguje na jednostavne verbalne komande, ako se tokom razgovora izrazito fokusira na lice druge osobe, ako se približava izvoru zvuka ili pokušava da pojača zvuk, kao i ako postoji nedostatak socijalizacije sa članovima porodice. Rani tretman dece sa oštećenjem sluha podrazumeva niz stimulativnih aktivnosti koje imaju za cilj unapređenje razvoja deteta, posebno razvoja govora i slušne pažnje. Savremeni pristup u habilitaciji govora i jezika stavlja veliki naglasak na razvoj verbalne komunikacije, što je ključno za zajednički život dece sa slušnim oštećenjima i dece koja čuju, naročito u periodu kada deca žele da se druže sa vršnjacima. Rana intervencija je od ključne važnosti jer se mozak deteta u periodu od začeca do treće godine života razvija brže nego ikada kasnije u životu. Deca koja su uključena u proces ugradnje kohlearnog implanta pre prve godine imaju veće šanse da ostvare svoj puni potencijal u odnosu na decu kojoj je implantat ugrađen oko treće godine.

Ključne reči: rana intervencija, habilitacija govora, deca oštećenog sluha

Uvod

Sluh je čulo koje nam omogućava da percipiramo zvukove iz našeg okruženja. Omogućava nam da analiziramo našu okolinu, da komuniciramo, izražavamo svoje misli i stičemo znanje. Ako se gubitak sluha ne otkrije rano u životu, može imati značajne posledice i za tu osobu i za porodicu. Ove posledice uključuju negativne uticaje na razvoj govora i jezika, psihosocijalno blagostanje, kvalitet života, obrazovna postignuća i ekonomsku nezavisnost u različitim fazama života (1).

Zvuci koje čujemo se prenose kroz uho preko nervnih vlakana do cerebralnog korteksa u roku od milisekunde. Bilo kakav poremećaj na tom putu dovodi do poteškoća sa obradom zvuka. Sluh je neophodan za komunikaciju jer igra ključnu ulogu u usvajanju govora i samokontroli artikulacije. Čak i manji poremećaji u obradi zvuka mogu da

ometaju interpersonalnu komunikaciju, s obzirom da značenje rečenice takođe zavisi od intonacije. Govor se obično percipira u opsegu od 30 do 60 decibela, a oštećenje sluha u ovom opsegu može da učini i sam govor i razumevanje govora izazovnim. Kada dođe do devijacija u ovom procesu, rehabilitacija sluha i govora postaje neophodna (2).

Govorne i jezičke sposobnosti spadaju u naj-složenije funkcije ljudskog tela, koje služe ne samo kao sredstvo komunikacije već i kao sredstvo za upoznavanje sveta. S obzirom da su govor, jezik i sluh međusobno zavisni, gubitak sluha može dovesti do oštećenja ili čak odsustva verbalne komunikacije. Ovo može dovesti do socijalne izolacije i povlačenja, posebno kod dece koja izgube sluh u prelingvalnom periodu tj. kod one koja izgube sluh pre nego što počnu da govore (3).

THE ROLE OF THE SPEECH THERAPIST IN THE TREATMENT OF HEARING IMPAIRED CHILDREN - THE IMPORTANCE OF EARLY INTERVENTION

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SUMMARY

The aim of this review is to present the relationship between early intervention in speech rehabilitation and the success of speech therapists in speech habilitation in hearing impaired children. Proper hearing is one of the most important prerequisites for the proper development of speech, because speech is learned by listening. It is necessary for parents to turn to a speech therapist for help if the child's vocalization is absent or stops suddenly, if he does not respond to sounds from the environment, if he does not turn to the call of the interlocutor who is not in his field of vision, if he does not respond to simple verbal commands, if during the conversation he focuses strongly on the face of another person, if he approaches the sound source or tries to amplify the sound, as well as if there is a lack of socialization with family members. Early treatment of children with hearing impairment involves a series of stimulating activities aimed at improving the child's development, especially the development of speech and auditory attention. The modern approach to speech and language habilitation places great emphasis on the development of verbal communication, which is crucial for the common life of children with hearing impairments and hearing children, especially in the period when children want to socialize with their peers. Early intervention is critical because a child's brain develops faster from conception to age three than at any time later in life. Children who are involved in the process of installing a cochlear implant before the age of one have a greater chance of achieving their full potential compared to children who are implanted around the age of three.

Key words: early intervention, speech habilitation, hearing impaired children

Introduction

Hearing is the sense that allows us to perceive sounds from our environment. It allows us to analyze our surroundings, communicate, express our thoughts, and acquire knowledge. If hearing loss is not detected early in life, it can have significant consequences for both the individual and their family. These consequences include negative impacts on speech and language development, psychosocial well-being, quality of life, educational attainment, and economic independence at various stages of life (1).

The sounds we hear are transmitted through the ear via nerve fibers to the cerebral cortex within milliseconds. Any disruption along this pathway results in difficulties with sound pro-

cessing. Hearing is essential for communication, as it plays a crucial role in speech acquisition and self-monitoring of articulation. Even minor disturbances in sound processing can hinder interpersonal communication, as sentence meaning also relies on intonation. Speech is typically perceived within 30-60 decibel range, and hearing impairments in this range can make both speech comprehension and production challenging. When deviations occur in this process, hearing and speech rehabilitation becomes necessary (2).

Speech and language abilities are among the most complex functions of the human body, serving not only a means of communication but also as a tool for learning about the world. Because

Od rođenja, bebe prolaze kroz pripremne faze za usvajanje zvukova i reči, što je proces koji počinje spontano u prvom mesecu života. Zvuk ljudskog glasa podstiče decu koja čuju da gledaju u usta sagovornika i da pokušaju da imitiraju pokrete usana. Ovo je prvi pokazatelj da dete sluša i pokušava da proizvede zvukove. Međutim, kod dece oštećenog sluha, ova spontana glasovna imitacija izostaje (4).

Otrprilike u trećem mesecu života, bebe počinju da proizvode svoje prve nefiziološke zvukove, što podstiče vokalnu igru. Ako dete ne može da čuje, ono postepeno prestaje da proizvodi glasove. Ovo se dešava zato što je dete koje čuje motivisano sopstvenim glasovnim povratnim informacijama, dok detetu sa oštećenjem sluha nedostaje ovaj podsticaj. Odsustvo brbljanja i ponavljanja slogova može biti prvi znak upozorenja za roditelje da postoji problem sa sluhom. Ako dete ne proizvodi zvukove kao njegovi vršnjaci, njegov govorni razvoj odstupa od tipičnog (5). Cilj ove studije je da predstavi vezu između rane intervencije u rehabilitaciji govora i uspeha logopeda u habilitaciji govora kod dece oštećenog sluha.

Metode

U ovom preglednom radu koristili smo Pub Med bazu podataka. Pretraživanje smo sprovedli za poslednjih dvadesetpet godina korišćenjem sledećih ključnih reči: rana intervencija, habilitacija govora i deca oštećenog sluha. Uključeni su rezultati samo onih studija koje su bile na engleskom jeziku.

Razvojne faze govora

Dete koje čuje spontano razvija govor i jezik uz kognitivne sposobnosti u sredini u kojoj odrasta. S druge strane, dete sa oštećenim sluhom nema zvučnu stimulaciju iz okoline i ne može spontano da razvija govor bez stručne podrške. Da bi komuniciralo, takvo dete se često oslanja na gestikulaciju i izraze lica. Ako okolina prihvati ovaj neverbalni oblik komunikacije, dete može da izgubi interesovanje za verbalnu komunikaciju (7).

Razumevanje faza razvoja govora je od ključne važnosti za podržavanje usvajanja jezika i govora kod dece oštećenog sluha. Govor i jezik se razvijaju progresivno, a svako dete se rađa sa sposobnošću da usvoji jezik svog okruženja (8).

Prva razvojna faza govora je plač. Prva vokalizacija novorođenčeta je plač, koji služi kao refleksivni odgovor na prilagođavanje novom okruženju.

Ova početna fonacija predstavlja najraniju manifestaciju govora.

Druga faza je gukanje. Otrprilike u drugoj polovini prvog meseca, počinje faza gukanja, u kojoj dete proizvodi zvukove različitih tonova i nijansi. Ova vokalizacija napreduje paralelno sa razvojem sluha i drugih čula. U početku se pojavljuju samoglasnici (a, e, u), a zatim nazalni suglasnici (m, n) i plozivi (g, b, d). Na ove prve vokalizacije utiče muskulatura usana, koja se jača sisanjem. Deca sa oštećenim sluhom takođe ulaze u fazu gukanja, ali na kraju prestaju da vokalizuju zbog odsustva slušne povratne informacije – ne čuju majčin glas kao odgovor na svoje zvukove.

Treća faza je brbljanje. Brbljanje se javlja između četvrtog i devetog meseca ili dok se ne pojavi prva reč koja ima značenje. Tokom ove faze, dete stiče kontrolu nad svojim glasom, modulira zvuk i koristi brbljanje za društveni kontakt. Pošto je ova faza ključna za razvoj govora i jezika, rana dijagnoza oštećenja sluha je od suštinskog značaja za obezbeđivanje pravovremene intervencije i za kontinuirano izlaganje zvuku.

Četvrta faza je govor. Između devetog meseca i druge godine života, dete počinje da proizvodi prve smislene reči i kratke govorne jedinice koje liče na rečenice. Ovaj period je posebno značajan za formiranje govora i jezika.

Peta faza je ekspanzija jezika. Od druge do četvrte godine, jezik se brzo razvija u svim oblastima. Ako dete izgubi pristup zvuku tokom ove faze, njegovo vraćanje je ključno da bi se obezbedio kontinuirani razvoj govora - jezika.

Šesta faza je razvoj gramatike i vokabulara. Između četvrte i sedme godine, dete usavršava gramatičke strukture i značajno proširuje rečnik. Dok deca sa normalnim sluhom i kognitivnim sposobnostima savladavaju govor do pete godine, puni jezički razvoj se obično postiže do sedme godine života.

Važnost rane intervencije

Cilj rane intervencije i otkrivanja oštećenja sluha ja da se obezbedi pravovremena podrška detetu i roditeljima, obezbeđujući uspešnu integraciju u zajednicu. Dok se deca sa oštećenim sluhom ne razlikuju suštinski od njihovih vršnjaka koji čuju, nedijagnostifikovan ili nelečen gubitak sluha može dovesti do izraženih razvojnih izazova tokom vremena (9).

speech, language, and hearing are interdependent, hearing loss can lead to impaired or even absent verbal communication. This can result in social isolation and withdrawal, particularly in children with prelingual hearing loss - those who lose their hearing before acquiring speech (3).

From birth, babies go through preparatory stages for acquiring sounds and words, a process that begins spontaneously within the first month of life. The sound of a human voice encourages hearing infants to look at the speaker's mouth and attempt to imitate the lip movements. This is the first indication that the child is listening and trying to produce sounds. However, in hearing-impaired children, this spontaneous vocal imitation is absent (4).

Around the third month of life, babies begin producing their first non-physiological sounds, which encourage vocal play. If the child cannot hear, they gradually stop vocalizing. This happens because a hearing child is motivated by their own vocal feedback, whereas a child with hearing loss lacks this reinforcement. The absence of babbling and syllable repetition may be the early warning sign for parents that there is a hearing problem. If a child does not produce sounds like their peers, their speech development deviates from the typical trajectory (5). This study aims to present the relationship between early intervention in speech rehabilitation and the success of speech therapists in speech habilitation in hearing-impaired children.

Methods

In this review paper, we used the Pub Med database. We conducted a search for the last twenty-five years using the following key words: early intervention, speech habilitation and hearing-impaired children. The results of only those studies that were in English were included.

Stages in Speech Development

A hearing child spontaneously develops speech and language alongside cognitive abilities in the environment where they grow up. On the other hand, a hearing-impaired child lacks sound stimulation from their surroundings and cannot develop speech spontaneously without professional support. To communicate, such a child often relies on gestures and facial expressions. If the environment accepts this non-verbal form of com-

munication, the child may lose interest in verbal communication (7).

Understanding the stages of speech development is crucial for supporting language and speech acquisition in hearing-impaired children. Speech and language develop progressively, and every child is born with the ability to adopt the language of their environment (8).

The first stage is crying. The newborn's first vocalization is crying, which serves as a reflexive response to adapting to a new environment. This initial phonation represents the earliest manifestation of speech.

The second phase is cooing. Around the second half of the first month, the cooing phase begins, where the child makes sounds with varied tones and shades. This vocalization progresses in parallel with the development of hearing and other senses. Initially, vowels (a, e, u) emerge, followed by nasal sounds (m, n) and plosive sounds (g, b, d). These early vocalizations are influenced by the musculature of the lips, which is strengthened through sucking. Hearing-impaired children also enter the cooing phase, but eventually stop vocalizing due to absence of auditory feedback – they do not hear their mother's voice in response to their sounds.

The third stage is babbling. Babbling occurs between the fourth and the ninth months or until the first meaningful word appears. During this stage, the child gains control over their voice, modulates volume and uses babbling for social contact. Since this stage is crucial for speech-language development, early diagnosis of hearing impairment is essential to ensure timely intervention and continued exposure to sound.

The fourth stage is speaking. Between the ninth month and the second year of life, the child begins producing their first meaningful words and short speech units resembling sentences. This period is particularly significant for speech and language formation.

The fifth stage is language expansion. From ages two to four, language develops rapidly in all areas. If a child loses access to sound during this stage, restoring it is critical to ensure uninterrupted speech-language development.

Sixth stage is grammar and vocabulary growth. Between ages four to seven, the child refines grammatical structures and significantly expands their vocabulary. While children with normal hear-

Deca koja čuju se prirodno igraju zvucima od ranog uzrasta i uživaju da ih proizvode. Nasuprot tome, deca sa oštećenjem sluha zahtevaju dodatnu podršku kada pokušavaju da se uključe u glasovnu igru i imitaciju zvukova. Ovakva podrška pomaže razvijanju pokreta govornih organa, što je važno za kasniji rad sa roditeljima i terapeutima (2).

Rano prepoznavanje ili sumnja roditelja da dete ima problem sa sluhom je od ključne važnosti za ranu intervenciju. Što pre počne stručni tretman, veće su šanse za uspešnu terapiju i integraciju deteta u zajednicu koja čuje. Vreme intervencije zavisi od toga kada roditelji primete da razvoj govora njihovog deteta ne napreduje istom brzinom kao kod vršnjaka, kao i od različitih porodičnih, društvenih i ekonomskih faktora (6).

Rehabilitacija govora kod dece sa oštećenjem sluha

Primarni cilj logopedске terapije za decu oštećenog sluha je da podrži normalan razvoj govora i jezika, bez obzira na uzrok, vrstu ili težinu oštećenja (10). Da bi to postigli, logopedi koriste specijalizovane vežbe koje podstiču verbalnu komunikaciju integracijom govora i jezika. Ovaj pristup se ne fokusira samo na fizičku proizvodnju glasova, već i podstiče kognitivnu organizaciju kroz unutrašnji govor, što je od ključne važnosti za razvoj jezika. Logoped ima zadatak da olakša razvoj govora kao sredstva emocionalnog i afektivnog izražavanja, čime se podstiče spontanost izražavanja i razumevanje dubljih lingvističkih značenja. Da bi to postigao, logoped prilagođava svaku vežbu jedinstvenim karakteristikama deteta, uzimajući u obzir njegova interesovanja, uzrast i trenutni nivo razvoja govora i jezika (11). Uspešna terapija se oslanja na jaku emotivnu vezu između deteta i logopeda. Na kraju, cilj je da deca mogu da komuniciraju i da se integrišu u okruženje, u vrtićima i redovnim školama, kako bi mogli da učestvuju jednako u društvenoj i obrazovnoj sredini (12).

Ključni principi u rehabilitaciji govora dece oštećenog sluha su:

1. Individualni pristup – prilagođavanje sadržaja, metoda i sredstava da bi se zadovoljile specifične potrebe svakog deteta, uz poštovanje njegove ličnosti.

2. Prvo poznate reči – korišćenje rečnika koji se odnosi na neposredno okruženje deteta pre nego što se proširi na šire koncepte.

3. Konkretno učenje – istovremeno imenovanje i pokazivanje stvari, igračaka i predmeta iz stvarnog života da bi se podstakao razvoj govora.

4. Multisenzorno angažovanje – stimulisanje svih čula kroz interaktivne metode učenja.

5. Kontekst iz stvarnog života i vizuelni kontekst – predstavljanje govornih aktivnosti na realističan i vizuelno zanimljiv način.

6. Postepeno uvođenje zvukova – davanje prioriteta zvukovima koji zahtevaju minimalan napor, prateći prirodni razvoj artikulacije.

7. Igra koja se zasniva na govoru – uključivanje strukturiranih govornih igara za podsticanje verbalnog izražavanja od prve sesije pa nadalje.

Ovi principi su optimalni za razvoj govora i jezika, i time olakšavaju deci sa oštećenim sluhom komunikaciju i integraciju u zajednice koje čuju (13).

Logopedске tehnike i rane vežbe

Tokom prvih časova terapije, od ključne važnosti je pažljivo posmatranje interakcije deteta sa terapeutom i vršnjacima. Vežbe se izvode kroz igru, a primarni fokus je na razvijanju govora. Sve terapijske aktivnosti moraju biti individualno prilagođene, uzimajući u obzir slušnu, govornu, hronološku i psihološku zrelost deteta. Cilj je da se stvori okruženje koje motiviše dete da se verbalno izražava. Ovo se postiže uz pomoć igara koje su napravljene tako da izazovu emocionalnu reakciju i da podstaknu dete da imitira terapeuta (14).

Jedna od prvih govornih vežbi uključuje onomatopeju, gde deca imitiraju prirodne zvukove (npr. zvukove životinja) ili zvukove igračaka koje variraju po intenzitetu i frekvenciji. Ove aktivnosti podstiču vokalizaciju i imitaciju zvuka, što je od ključne važnosti za razvoj govora. Osim govora, terapija takođe podržava sveukupni razvoj ličnosti deteta (15).

Savremena govorno-jezička habilitacija daje prednost verbalnoj komunikaciji, koja je od ključne važnosti za decu oštećenog sluha, dok komuniciraju sa svojim vršnjacima (16). Ovaj pristup je koristan ne samo za decu koja imaju problem sa razvojem govora, već i za širu društvenu zajednicu. Pažljivo planirana i razvojno adekvatna logopedska terapija značajno poboljšava ishode. Preduslovi za uspešnu govorno-jezičku terapiju su postupnost, metod i strpljenje terapeuta (13).

Vežbe ranog govora obuhvataju nekoliko ključnih aktivnosti koje pomažu razvoju govora i jezika dece (17):

ing and cognitive abilities master speech by the age of five, full language development is typically achieved by the age of seven.

The Importance of Early Intervention

The goal of early intervention and hearing impairment detection is to provide timely support for both the child and parents, ensuring successful integration into the community. While hearing-impaired children are not inherently different from their hearing peers, undiagnosed or untreated hearing loss can lead to pronounced developmental challenges over time (9).

Hearing children naturally play with sounds from an early age and enjoy producing them. In contrast, children with hearing loss require additional support when attempting to engage in vocal play with and sound imitation. Such support helps develop the movement of speech organs, which is important for the later work with parents and therapists (2).

Early recognition or parents' suspicion that the child has hearing problems is crucial for effective intervention. The sooner professional treatment begins, the greater the chances of successful therapy and integration of the child into the hearing community. The timing of intervention depends on when the parents notice that their child's speech development is not progressing at the same rate as their peers, as well as various family, social, and economic factors (6).

Speech Rehabilitation for Children with Hearing Impairment

The primary goal of speech therapy for hearing-impaired children is to support normal speech and language development, regardless of the cause, type, or severity of impairment (10). To achieve this, speech therapists use specialized exercises that encourage verbal communication by integrating speech and language. This approach not only focuses on the physical production of speech sounds but also fosters cognitive organization through inner speech, which is crucial for language development. Speech therapist has the task of facilitating the development of speech as a means of emotional and affective expression, which encourages spontaneity of expression and understanding of deeper linguistic meanings. To achieve this, the speech therapist tailors each exercise to the child's unique characteristics, con-

sidering their interests, age, and current level of speech and language development (11). Successful therapy relies on strong emotional bond between child and therapist. Ultimately, the goal is to enable children to communicate effectively and integrate into hearing environments, such as kindergartens and mainstream schools, to enable them to participate equally in the social and educational environment (12).

Key Principles in Speech Rehabilitation for Hearing-impaired Children are:

1. Individualized Approach - Adapting content, methods, and tools to meet the specific needs of each child, while respecting his personality.
2. Familiar Words First - Using vocabulary related to the child's immediate environment before expanding to broader concepts
3. Concrete Learning - Simultaneously naming and showing objects, toys, and real-life items to reinforce speech development.
4. Multisensory Engagement - Stimulating all senses through interactive learning methods.
5. Real-Life and Visual Contexts – Presenting speech activities in realistic and visually engaging ways.
6. Gradual Introduction of Sounds - Prioritizing sounds that require minimal effort while following natural articulation development.
7. Speech-Based Play - Incorporating structured speech games to encourage verbal expression from the first session onward.

These principles optimize speech and language development, making it easier for hearing-impaired children to communicate and integrate into hearing communities (13).

Speech Therapy Techniques and Early Exercises

During the initial therapy sessions, careful observation of the child's interaction with the therapist and peers is crucial. Exercises are conducted through play, with a primary focus on speech sound development. All therapeutic activities must be individually tailored, considering child's auditory, speech, chronological, and psychological maturity. The goal is to create an environment that motivates the child to express themselves verbally. This is achieved through engaging games designed to elicit emotional reactions and encourage imitation of the therapist (14).

- Imitacije – služe kao podsticaj za vokalizaciju, naročito u procesu dupliranja slogova.
- Praćenje osnovnih verbalnih naredbi – pomaže deci da razviju razumevanje izgovorenih uputstava i reakciju na njih.
- Rano imenovanje – uključuje uvođenje imenica, glagola i prideva kako bi se omogućilo deci da povežu reči sa predmetima i radnjama.
- Svest o šemi tela – podstiče razumevanje sopstvenog tela i njegove funkcije u prostoru.
- Vežbe vizuelne percepcije – pomažu u prepoznavanju i tumačenju slika, predmeta i njihovih karakteristika.
- Vežbe slušne percepcije – fokusiraju se na razvijanje sposobnosti prepoznavanja zvukova i obrade slušnih informacija.

Zašto je važna rana intervencija?

Rana intervencija je suštinski važna zato što se dečiji mozak razvija mnogo brže od začeca do treće godine nego u bilo kom periodu života. Do treće godine, razvije se oko 90% moždane mase. Tokom ovog perioda, neuroni stvaraju veze neverovatnom brzinom – 700 do 1000 veza u sekundi – što daleko prevazilazi kasnije razvojne faze. Mozak trogodišnjeg deteta je dvostruko aktivniji od odraslog čoveka. Svako čulno iskustvo u ranom životu doprinosi oblikovanju sposobnosti mozga da misli, oseća i uči (18).

Rehabilitacija govora i sluha je složen proces na koji utiču različiti faktori. Najvažniji faktor je rano otkrivanje i strukturalna stručna intervencija kako u specijalizovanim ustanovama, tako i u kućnom okruženju. Istraživanja pokazuju da intenzivna logopedska terapija između druge i četvrte godine ima dugoročne pozitivne efekte na ukupan razvoj deteta. Rana intervencija pomaže da se ublaži kašnjenje u razvoju i uticaj tog kašnjenja na dete i njegovu porodicu (19).

Istraživanja takođe potvrđuju da odložena ugradnja kohlearnog implanta ometa razvoj slušnih, kognitivnih i jezičkih veština, što može značajno uticati na napredak u ovim oblastima (20,21,22).

Rani znaci da detetu treba logopedska terapija

Roditelji treba da potraže stručnu pomoć ako primećuju odsustvo ili naglo smanjenje vokalizacije; izostanak reakcije na zvukove iz okoline; izostanak

reakcije na govorne pozive osim ako je sagovornik u vidnom polju; poteškoće u praćenju jednostavnih verbalnih instrukcija; preterano fokusiranje na lice sagovornika, što ukazuje na moguće oslanjanje na čitanje sa usana; pokušaji da se približe izvoru zvuka ili da ga pojačaju; i smanjena društvena interakcija sa članovima porodice. Rano prepoznavanje ovih znakova omogućava pravovremenu intervenciju, što maksimalno povećava sposobnost deteta da razvije govor i da se integriše u svet koji čuje.

Zaključak

Rana stimulacija slušnih puteva igra ključnu ulogu u razvoju slušnih, govornih i jezičkih sposobnosti. Pravovremeno otkrivanje gubitka sluha i rana intervencija su od suštinskog značaja za uspešnu slušnu rehabilitaciju i habilitaciju govora. Deca koja dobiju kohlearne implante pre svog prvog rođendana imaju znatno veće šanse da dostignu svoj puni potencijal u poređenju sa onima kojima je implant ugrađen sa tri godine. Rana logopedska terapija dalje podstiče razvoj verbalne komunikacije.

Konflikt interesa

Autori su izjavili da nema konflikta interesa.

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One of the first speech exercises involves onomatopoeia, where children imitate natural sounds (e.g. animal noises) or sounds from toys that vary in intensity and frequency. These activities encourage vocalization and sound imitation, essential for speech development. Beyond speech, therapy also supports the overall development of the child's personality (15).

Modern speech and language habilitation prioritizes verbal communication, which is critical for hearing-impaired children, as they interact with their peers (16). This approach benefits not only children with speech development problems, but also the broader social community. Carefully planned and developmentally appropriate speech therapy significantly improves outcomes. The prerequisites for successful speech and language therapy include the gradualness, method, and patience of the therapist (13).

Early speech exercises include several key activities that help children's speech and language development (17):

- Imitations - serve as stimulus for vocalization, especially in the process of doubling syllables.
- Following basic verbal commands - helps children develop comprehension and responsiveness to spoken instructions.
- Early naming – involves introducing nouns, verbs and adjectives to enable the child to associate words with objects and actions.
- Body schema awareness – encourages an understanding of one's own body and its function in space.
- Visual perception exercises – aid in recognizing and interpreting the images, objects and their characteristics.
- Auditory perception exercises – focus on developing of the ability to recognize sounds and process auditory information.

Why is early intervention important?

Early intervention is crucial because a child's brain develops more rapidly from conception to age three than at any other time in life. By the age of three, approximately 90% of brain mass is developed. During this period, neurons form connections at an extraordinary rate - 700-1000 connections per second – far exceeding later developmental stages. The brain of a three-year-old is twice as active as an adult. Every sensory experi-

ence in early life contributes to shaping the brain's capability for thinking, feeling, and learning (18).

Speech and hearing rehabilitation is a complex process influenced by various factors. The most important factor is early detection and structural professional intervention in both specialized institutions and home environments. Studies indicate that intensive speech therapy between the ages of two and four has long-term positive effects on the overall child development. Early intervention helps mitigate developmental delays and their impact on both the child and their family (19).

Research also confirms that delayed cochlear implantation hinders the development of auditory, cognitive, and language skills, which can significantly impact progress in these areas (20, 21, 22).

Early Signs That a Child May Need Speech Therapy

Parents should seek professional help if they notice: absence or sudden reduction in vocalization; lack of response to environmental sounds; no reaction to spoken calls unless the speaker is in direct view; difficulty following simple verbal instructions; excessive focus on the speaker's face, indicating possible reliance on lip-reading; attempts to move closer to sound sources or amplify them; and reduced social interaction with family members. Recognizing these signs early allows for timely intervention, maximizing a child's ability to develop speech and integrate into the hearing world.

Conclusion

Early stimulation of auditory pathways plays a crucial role in the development of auditory, speech and language abilities. Timely hearing loss detection and early intervention are essential for successful auditory rehabilitation and speech habilitation. Children who receive cochlear implants before their first birthday have a significantly higher chance of reaching their full potential compared to those implanted at age three. Early speech therapy further supports verbal communication development.

Competing interests

The authors declared no competing interests.

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