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MUSIC THERAPY METHODS FOR APHASIA

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SUMMARY. Aims: The aim of the study is to give an overview of the known and less-known methods of music therapy for aphasia and to introduce the reader to our own developed therapeutic method based on folk singing, which is not yet internationally known but is already used in Hungary. **Method**: Articles from the Hungarian and international literature were studied for the research. We used the PubMed database, supplemented by a traditional library search. **Results**: We found 8 different aphasia therapy methods based on musical elements, targeting aphasic individuals with relatively good auditory speech understanding and impaired language expression skills. Each method was described as effective in improving some areas of impaired language and speech abilities. Our own therapeutic method has been found to be effective in improving word comprehension. **Conclusions**: The effectiveness of the methods described is known from measurements on relatively small groups of participants, and further research is needed.

Keywords: Aphasia, Stroke, Music Therapy, Speech Disorders

Introduction

The aim of this paper is to describe the methods of music-based sessions with people with aphasia, a specific area of clinical practice in music therapy. The topic is timely because in Hungary, music therapy, including

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neurological music therapy, and the profession of music therapist have not yet achieved the recognition that the literature suggests they deserve[4], but music therapy is an excellent tool for the therapist to create a safe relationship with people who feel increasingly lost[5].

Definition and aetiology of aphasia

Aphasia can be defined as an acquired language disorder in which the language-dominant hemisphere or subcortical structures are damaged. This results in a complex of symptoms that affect the language levels to different degrees, both expressive and receptive. This affects both the patient's ability to express language and to process information. This symptomatology is often accompanied by some degree of impairment in various modalities such as reading, writing and arithmetic[6]. As regards the aetiology of aphasia, it can be said that stroke plays a primary role in its development. In terms of cerebral vascular catastrophe, there are approximately 40,000 new cases in Hungary every year[7]. Of these, at least 40-50 thousand will need speech and language rehabilitation services[8] Hungary's population is 9.6M, according to the KSH data for 2023[9].

Methods

For this research, we searched for articles detailing the everyday use of music therapy techniques in neurological practice, defining the methods, describing the mechanism and clinical protocol of the therapy, and identifying the target group to be included in the therapy and the characteristics of the subjects' aphasic symptoms. The PubMed database contains 86 hits for the

[4] Juhos-Kiss, Eszter, et al. "Zeneterapeuták Intézményi Jelenléte a Magyarországi Aphasiaterápiában *(The Institutional Presence of Music Therapists in Aphasia Therapy in Hungary)*." In *Orvosi Hetilap*, vol. 164, no. 19, May 2023, pp. 747–752.

[5] Văduva, Lois, and Catherine Warner. "Don't Let Me Go'. A Case Study on Music Therapy in Early-Stage Dementia." In *Studia Universitatis Babeş-Bolyai Musica*, vol. 66, no. 2, Dec. 2021, pp. 29–38.

[6] Mészáros, Éva. Mondatfeldolgozás Magyar Agrammatikus Afáziásoknál *(Sentence Processing in Hungarian Agrammatical Aphasics*) ELTE, 2007, http://doktori.btk.elte.hu/lingv/meszaroseva/diss_nem.pdf. (accessed on 01. 08. 2024.)

[7] Szőcs, Ildikó, et al. "A Stroke-Ellátás Hazai Eredményei a Nemzetközi Adatok Tükrében *(Domestic Stroke Care Outcomes in the Light of International Data)*" In *Orvosi Hetilap*, vol. 157, no. 41, 2016, pp. 1635–41.

[8] Szapáry, László. *Stroke Napja 2019 (Stroke Day 2019).* 2019, https://www.doki.net/tarsasag/stroke/info.aspx?sp=57&web_id= . (accessed on 01. 08. 2024.)

[9] KSH. *Magyarország Népessége 2023-ban (Population of Hungary in 2023).* 2023, https://www.ksh.hu/stadat_files/nep/hu/nep0001.html. (accessed on 01. 08. 2024.)

subject “music therapy in aphasia” from studies published between 1973 and 2022. We considered those publications in which all the criteria listed appeared together. We excluded articles in which the keyword “aphasia” was entered in the search box, but music therapy in aphasia was used for other neurological diseases (e.g. Parkinson’s disease, dementia, etc.). Our study focuses on music therapy for acquired language disorder, so we also filtered out papers on primary progressive aphasia. This was supplemented by a traditional library study, resulting in 14 scientific publications relevant to our research.

Results

In the following chapter, we present the eight different music-based aphasia therapy methods that we have identified from the literature during our research and supplement them with a description of our own therapeutic methods. The methods have in common that the target group of the therapy includes aphasiacs with impaired verbal expression skills and relatively good auditory speech understanding[10]. This group of aphasia is characterised by frequent word search and a much slower speech rate than normal speech[11].

Music therapy methods in aphasia therapy
Folk song-based language therapy

In the late 1950s, the therapeutic idea was born, based on the speech-stimulating effect of the musical elements of folk songs. The method uses Hungarian folk songs and children’s songs as a therapeutic tool. Songs containing simple words commonly found in everyday life, sung with precise pronunciation, were recorded and played back to the patients. An important consideration in the selection of the songs was that certain words should appear in different songs, but also in different contexts. The songs were first presented with the rhythm and tempo of a normal performance, and then pauses were inserted before and after the target words to emphasise them. The vocabulary to be emphasised was gradually expanded. The phonetic material was accompanied by schematically illustrated pictures in a visual format. In the first step, the entire text was synthetically presented,

[10] Juhos-Kiss, Eszter and Pusztafalvi, Henriette. “Zeneterápiás Eszközök Alkalmazása Az Afáziaterápiában Hazai És Nemzetközi Kitekintéssel – Szakirodalmi Áttekintés *(The Use of Music Therapy Tools in Aphasia Therapy with a Domestic and International Perspective - Systematic Review.)*” In *Rehabilitáció: A Magyar Rehabilitációs Társaság Folyóirata*, vol. 33, no. 1, 2023, pp. 3–10.

[11] Ferré, Gaëlle. *Gesture,* „Prosody and Verbal Content in Non-Fluent Aphasic Speech”. In *Multimodal Communication* no. 1, 2021, pp. 73–91.

with capitalised captions. Then, elements indicating the target words were highlighted from the background. Finally, both the visual and audio presentation was again synthesised. The therapy was thus based on a complex application of synthesis-analysis-resynthesis and acoustic and visual stimuli. Of the 25 individuals with aphasia of varying types and severity who received therapy, 17 showed such improvement that they were able to formulate their thoughts in coherent sentences at the end of the intervention. Measurable improvement in aphasia symptoms was also documented in the remaining patients[12].

Melodic Intonation Therapy

In Melodic Intonation Therapy (MIT)[13] [14] [15] words or short phrases are sung in a range of 3-4 tones, with the aim of gradually bringing the melody and prosody of the sung text closer to the intonation of live speech. The musical pattern of melodic intonation is similar to that of recitative in classical opera. The programme is divided into four different levels of difficulty. To progress to a more difficult level, the patient must have an acceptable performance at that level. Level I has no linguistic component, only musical elements. This stage ensures the subject's adaptation to the procedure. In Stage II, the therapist sings melody patterns, repeats them with the addition of target words, and then asks the patient to sing in unison while gradually receding into the background. Finally, the patient is asked to repeat the previously intoned words in response to a question. At further levels, the therapist gradually seeks to delay repetition, to force the patient to respond intoned, and finally to detach the words from the melody. Three studies examined a total of 31 participants who received melodic intonation therapy because none of them had previously shown any improvement in verbal expression despite 2-6 months of other language therapy. However, two weeks after the start of the MIT, there was a measurable improvement in verbal production[16].

[12] Varga, Miklós, and György Geréb. "Az Aphasia Új Módszerű Kezelése *(A New Way to Treat Aphasia)*." In *Pszichológiai Tanulmányok*, 1958, pp. 289–302.

[13] Albert, Martin L., et al. "Melodic Intonation Therapy for Aphasia." In *Archives of Neurology*, vol. 29, no. 2, Aug. 1973, pp. 130–31.

[14] Thaut, Michael H, et al. *"Melodic Intonation Therapy."* Handbook of Neurologic Music Therapy, edited by Michael H; Thaut and Volker Hoemberg, vol. 6, no. 1, Oxford University Press, 2014, pp. 140–145.

[15] Norton, Andrea, et al. "Melodic Intonation Therapy." In *The Neurosciences and Music*, vol. 6, 2009, pp. 431–436.

[16] Sparks, Robert W., and Audrey L. Holland. "Method: Melodic Intonation Therapy for Aphasia." In *Journal of Speech and Hearing Disorders*, vol. 41, no. 3, Aug. 1976, pp. 287–97.

Musical speech stimulation

The Musical Speech Stimulation (MUSTIM) technique is targeted at people with nonfluent aphasia whose verbal expression retains automatisms - number sequences, days of the week, melodies and lyrics of previously learned, familiar songs, etc. The exploitation of this intact capacity is the basis of a multi-level therapy, the aim of which is to gradually lead the patient from automatisms to the initiation of spontaneous speech. At the first level, lines from familiar songs are sung with the therapist omitting the last word of the phrase and the patient having to fill in the missing word. At the second level, common phrases are intoned frequently, also expecting the patient to complete the missing phrases. The prosody and intonation of the improvised melody are adapted to the intonation characteristics of the target sentence. At the third level, the client is encouraged to complete sentences with a variety of completions. Finally, these sentences must also be produced by the patient in response to the therapist's questions[17].

Therapeutic singing

Therapeutic Singing (TS) is widely used for a wide range of conditions. It can be used as an individual or group session, but it is best used as a complement to other therapies rather than on its own. It is often interpreted as simply singing together. However, the intervention goes beyond the uplifting aesthetic experience of singing together. Its success depends to a large extent on the choice of song, so much depends on the therapist. It is not enough to have patients sing randomly selected songs. The songs chosen by the therapist must serve the therapeutic goal. As rhythm is the driving force for facilitating speech motor movements, it is important to keep the temporal flexibility of the song in mind when planning so that changes in tempo do not compromise the temporality of the song. If the participant's aphasia is accompanied by a motor speech disorder, this therapeutic procedure can be a way forward for the participant[18].

[17] Thaut, Corene P; *"Musical Speech Stimulation."* Handbook of Neurologic Music Therapy, edited by Michael H; Thaut and Volker Hoemberg, Oxford University Press, 2014, pp. 146–49.

[18] Johnson, Sarah B. *"Therapeutic Singing."* Handbook of Neurologic Music Therapy, edited by Michael H Thaut and Volker Hoemberg, Oxford University Press, 2014, pp. 185–195.

Neurological Music Therapy

A study with 21 subjects compared the effects of interventions known as Neurologic Music Therapy (NMT) and Speech Language Therapy (SLT) between groups of nonfluent aphasia patients. Subjects receiving NMT (12 subjects) received a combination of music-based speech therapy consisting of individual TS and MIT as described above and speech therapy in parallel. The SLT group (9 subjects) received individual language-based speech therapy. Both groups were further subdivided into chronic and subacute subgroups. The Korean version of the Western Aphasia Test (WAB test) was used to measure the results. The NMT chronic group showed significant improvement in aphasia quotient (AQ), spontaneous speech, retelling, and naming, and the SLT chronic group showed significant improvement in retelling. The NMT subacute group showed significant improvement in spontaneous speech, comprehension, and naming, whereas no change was measured in the SLT subacute group[19].

Ronnie Gardiner method

The Ronnie Gardiner Method (RGM) is based on multisensory stimuli - visual, auditory, kinetic and tactile. In order to stimulate neuroplastic processes, the sessions involve moving to highly rhythmic, energising music. At the same time, participants are encouraged to perform a planned sequence of movements by coordinating the limbs. Graphic diagrams with blue and red symbols are used to guide the precise execution of the sequence. As the exercises can be performed sitting or standing, people with mobility difficulties can be included in the therapy. After ten weeks of intervention with a group of eight people with chronic aphasia, all participants showed significant improvements in verbal fluency. Two individuals also showed positive improvements in auditory comprehension and reading skills[20].

Expressive Music Speech Therapy

Describing a therapeutic process over nine years, this case study shows how music and music therapy can contribute to the recovery of lost

[19] Lim, Kil-Byung, et al. “The Therapeutic Effect of Neurologic Music Therapy and Speech Language Therapy in Post-Stroke Aphasic Patients.” In *Annals of Rehabilitation Medicine*, vol. 37, no. 4, Aug. 2013, pp. 556–62.

[20] Schütz, Marika J. *Can The Ronnie Gardiner Method Improve Language, Communication and Quality of Life For People with Aphasia?* Jan. 2002, doi:10.13140/rg.2.1.2350.7442. (accessed on 01. 08. 2024.)

speech and language skills while providing emotional support to the patient. The case study subject is an intellectual senior male with severe global aphasia and apraxia of speech due to a stroke at the age of 50. Described as Expressive Music Therapy, the study details the therapeutic goals, pace of progress and methodology at each stage of the 9-year rehabilitation process. Prior to the therapy, the patient communicated only through gestures, facial expressions and non-verbal sounds, and understood only about 50% of simple words. The developmental goals of the first 5 years were to produce non-verbal sounds, pitch accuracy, melody line following, concentration, satisfaction and self-expression in weekly individual music therapy sessions. Once the patient was able to read and pronounce monosyllabic words by the beginning of Year 6, the therapist encouraged him to sing to improvised melodies supported by singing and rhythmic harmony accompaniment. He chose words, phrases and expressions that he felt were related to the patient's emotions. In this way, he enhanced creativity and motivation for self-expression, which led to an acceleration of speech production. Later, the recognition of a parallel relationship between musical and linguistic structures helped the production and retrieval of more difficult sentences, with rhythmic, chordal accompaniment following the melody of the speech. Finally, another therapeutic goal was to replace automatic expressions with autonomous and adequate responses[21].

Active music therapy based on free improvisation

This improvisational music therapy method is based on the interaction between a specially trained music therapist and the patient. In a study describing a self-developed method, the authors describe the results of a randomized empirical trial with people with chronic aphasia, which was conducted for 15 weeks, two sessions per week, for a total of 30 sessions. At the same time, subjects also attended the same number of speech therapy sessions. The control group, on the other hand, received only speech therapy for a similar length of time. The number of participants in the two groups was 10-10. Through the communication channels of their own singing voices and rhythmic-melodic instruments, the patient and therapist build a non-verbal relationship with each other by free improvisational play, creating an active-intersubjective relationship. When the measurements taken during the experiment were evaluated, significant improvements in spontaneous speech and vitality were observed among the subjects receiving the combined therapy. In contrast,

[21] Hartley, Meghan L., et al. "The Role of Music and Music Therapy in Aphasia Rehabilitation." In *Music and Medicine*, vol. 2, no. 4, 2010, pp. 235–42.

the performance of those receiving only speech therapy did not show a significant positive shift in any of the areas examined[22].

Therapy based on folk song singing

The therapy was applied to 25 native Hungarian speakers between 2021 and 2023, all of whom experienced an improvement in their word reading skills after the end of the therapy. The length of the therapy is determined by needs and possibilities. The duration of the sessions may vary from 30 to 60 minutes, depending on the patient's workload.

The method is based on active singing with no genre restrictions. Considering the fact that the Hungarian folksong treasure is extremely rich and is still part of Hungarian education, we use folk songs as a tool in our therapeutic practice. The aim of the therapy is vocabulary expansion. We always select the songs for the sessions according to a topic, e.g. colours[23], animal names, names of flowers, names of everyday objects, common adjectives, verbs, etc. The target group of the therapy is patients with severe nonfluent aphasia. It can be used as a stand-alone therapy or as a complementary therapy in parallel with speech therapy sessions.

Information is conveyed through multiple channels, auditory and visual, including figurative and phonemic, in order to link sound and meaning, to aid association and to increase the effectiveness of the learning process. Captionless and captioned illustrations are used to depict the nouns, verbs and adjectives in the lyrics of the songs. The target words themselves, as well as visualised representations of the word combinations that form a syntactic unit with them, are shown in the images. For example, the understanding of the word "red apple" in the text is aided by a picture of a red apple and a separate red spot. The patient is asked to sing the song and then to recite the text without melody, using rhythmic speech and following the prosody of live speech. The target words are spoken independently, in context, and by speaking the entire stanza, facilitating speaking at interrelated linguistic levels.

[22] Raglio, Alfredo, et al. "Improvement of Spontaneous Language in Stroke Patients with Chronic Aphasia Treated with Music Therapy: A Randomized Controlled Trial." In *International Journal of Neuroscience*, vol. 126, no. 3, Mar. 2016, pp. 235–42.

[23] Juhos-Kiss, Eszter and Pusztafalvi, Henriette. "Nyelvi És Beszédkészség Fejlesztése Énekeltetéssel Broca Afáziában. Színek Újratanulása. Esettanulmány *(Developing Language and Speech Skills through Singing in Broca's Aphasia. Relearning Colours. Case Study)*." In *Parlando: Zenepedagógiai Folyóirat*, 2022, https://www.parlando.hu/2022/2022-1/Juhos-Pusztafalvi.pdf. (accessed on 01. 08. 2024.)

The selection criteria for integrating the song material into therapy are that the vocabulary of each song contains at least one target word. The relatively low ambition of the songs helps to ensure ease of pronunciation. Therapy sessions are conducted according to the following protocol, preferably on a daily basis. (See Table 1)

Table 1

Time-frame (min)	The session	Applied practices	Tools needed	Comments
5	Vocal warm up	Singing a syllable created by a consonant and a vowel in constant pitch, or in scale in pitch range major third or perfect fifth	The singing voice of the patient and therapist	By keeping the consonant, the vowel can be changed continuously. Purpose: to relax the muscles involved in sound production, to practise articulation
5	Preliminary measurement	Naming target words from the vocabulary of the songs selected for the session	Uncaptioned and captioned versions of image of the target words	The order of the images should be changed occasionally
15-45	Sing folk songs selected for the intervention	Singing songs one after the other, then highlighting, re-singing and saying the key lines and target words in a spoken voice. All this with and without visual cues, with mental recall of the associated images.	The singing voice of the patient and therapist	When sung entirely, the singing is accompanied by vertical hand tapping to the rhythm of the text, or, if the song is in even meter, by horizontal right-left movements with a steady beat.
5	Control measurement	Naming target words from the vocabulary of the songs selected for the session	Uncaptioned and captioned versions of image of the targetwords	The order of the images should be changed occasionally

Protocol for therapy sessions

All the methods presented, based on musical elements, emphasise the promising role of music therapy for aphasia. In our study, we have not attempted to rank the different methods in terms of their effectiveness. In each case, it is the therapist's task to choose the method that is most promising in the therapeutic process, taking into account the diagnosis and the patient's individual mental and psychological state and motivation.

Conclusion

In light of the results of our previous research[24], it can be concluded that a disproportionately small number of trained music therapists are employed in domestic health and social care institutions. One of the many reasons for this is that even within aphasia therapy teams, few people are aware of the existence of music therapy methods for the treatment of aphasia and their direct and collateral effects. According to the literature, the use of the music therapy methods presented has led to improvements in some domain of language skills such as spontaneous speech, verbal fluency, articulation, naming, auditory comprehension, reading skills, prosody, among the target group. However, it is important to note that the effectiveness of the methods presented is known from measurements on relatively small groups of participants, and further research is needed.

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