



The effect of melodic intonation therapy on Language recovery in people with non-fluent aphasia: a narrative review of the evidence



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Abstract

Background: Melodic intonation therapy is a language recovery method for non-fluent aphasia, utilizing rhythm and melody training. However, reviews are limited due to inconsistencies in methodology and evidence results. **Objectives:** The study aims to review evidence on the impact of melodic intonation therapy on language recovery in non-fluent aphasia patients. **Methods:** an electronic database search on ScienceDirect, PubMed, Google Scholar, and Semantic Scholar was conducted to identify randomized clinical trials investigating Melodic intonation therapy. We limited our queries to peer-reviewed, English-language journal articles describing trials of Melodic intonation therapy for patients with non-fluent aphasia. **Results:** The review concluded with six randomized trials revealing a positive effect of melodic intonation therapy on expressive Language, repetition, naming, and communication, but no effect on story-telling tasks. **Conclusion:** Although there is a positive effect of melodic intonation therapy, it is insignificant due to limited evidence and requires more contributions with larger sample sizes.

Keywords

Non-fluent aphasia;
Melodic intonation therapy;
Language recovery;
Expressive language;

الكلمات المفتاحية

الحبسة الغير طليقة؛
العلاج الايقاعي النغمي؛
الاسترجاع اللغوي؛
اللغة التعبيرية؛

أثر العلاج الايقاعي النغمي على الاسترجاع اللغوي لدى المصابين بالحبسة الغير طليقة: مراجعة سردية

ملخص

يعتبر العلاج الايقاعي النغمي أحد المقاربات العلاجية لاسترجاع اللغة في الحبسة باستخدام التدريب على الإيقاع والحن ونظرا لجدية الموضوع وقلة المراجعات الادبية فان دراستنا هدفت الى استعراض وتحليل نتائج الابحاث المرتبطة بالموضوع من خلال الكشف عن تأثير العلاج الايقاعي النغمي على الاسترجاع اللغوي لدى المصابين بالحبسة الغير طليقة. تم إجراء بحث إلكتروني في قاعدة البيانات على ScienceDirect و PubMed و Google Scholar و Semantic Scholar لتحديد الابحاث التجريبية في العلاج النغمي الايقاعي. من خلال الانتقاء وفق المعايير المحددة بتأثير العلاج الايقاعي النغمي على الاسترجاع اللغوي لدى المصابين بالحبسة الغير طليقة. بعد الانتقاء تم مراجعة ستة دراسات تجريبية أظهرت وجود تأثير إيجابي للعلاج الايقاعي النغمي على اللغة التعبيرية والتكرار والتسمية والتواصل، ولكن لم يكن هناك تأثير على مهام سرد القصص. على الرغم من وجود تأثير إيجابي للعلاج بالتغنيم اللحني، إلا أنه غير مهم بسبب محدودية الأدلة ويتطلب المزيد من المساهمات بأحجام عينات أكبر. على الرغم من وجود تأثير إيجابي للعلاج الايقاعي النغمي، إلا أنه غير دال بسبب محدودية نتائج الدراسات ويتطلب المزيد من الدراسة التجريبية بحجم عينات أكبر.

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Doi:

I- Introduction :

Language is a cognitive process that occurs in areas of the brain and is contributed by cognitive processes in understanding, producing, and acquiring its components and functions in oral and written language. A brain injury leads to language dysfunction that appears in symptoms of language pathology and aphasia. Aphasia is characterized by phonological, morphological, syntactic, semantic, and pragmatic dysfunctions, and disorders in language comprehension or production according to their classification as fluent or non-fluent. Non-fluent aphasia is one of the most common language disorders after stroke, where patients suffer from difficulty in producing speech and understanding speech well. This leads to significant challenges in the patient's daily life, requiring effective therapeutic interventions to improve language abilities. Treatments for aphasia are based on language recovery and training planning based on the patient's strengths and weaknesses. Whether the aphasia is fluent or non-fluent through non-impaired linguistic functions. Melodic Intonation Therapy (MIT) is a promising method for restoring language function in patients with non-fluent aphasia. MIT is one of the therapeutic approaches recently indicated in clinical practice to improve language production, repetition, orofacial movement, rhythm, prosody, and intonation. MIT is based on training patients to rhythm and repeat words, sentences, music, and singing, using auditory comprehension, working memory, and improving motor skills. MIT combines rhythm and tone to stimulate speech centers in the brain, particularly those affected by stroke. By using musical rhythm and tonal patterns, the brain regions responsible for movement and speech are activated, helping patients regain the ability to speak. The therapy is based on the principles of neuroplasticity and neural reorganization, where the brain forms new connections or improves coordination between intact areas to compensate for damaged cells. Several studies (Haro-Martínez et al., 2019; Van der Meulen et al., 2016; Jungblut et al., 2022; Schlaug et al., 2008; Saur et al., 2006; Thiel et al., 2005) have shown that MIT can improve speech ability and enhance neural connections between language areas of the brain, as well as improve cognitive functions like comprehension and naming. The evidence supporting MIT is diverse, with neuroimaging techniques such as functional magnetic resonance imaging and positron emission tomography used to track changes in neural activity during therapy. These techniques provide valuable insights into how the therapy contributes to brain reorganization. Evidence (Haro-Martínez et al., 2019; Van der Meulen et al., 2016; Conklyn et al., 2012; Van der Meulen et al., 2014; Jungblut et al., 2022; Silva et al., 2021) has hypothesized the possibility of the effectiveness and feasibility of MIT on language recovery in non-fluent aphasia patients through neural reorganization and neural plasticity that contribute to and stimulate intercellular connections. Some magnetic neuroimaging evidence (Van der Meulen et al., 2016; Jungblut et al., 2022; Saur et al., 2006; Bhogal et al., 2003; Schlaug et al., 2008; Thiel et al., 2005; Geva et al., 2006; Hartwigsen et al., 2010) has shown that MIT activates and stimulates the right hemisphere, and the activation extends to the left hemisphere based on neural connections. This includes the effect of training therapy on linguistic recovery by stimulating the production of language rhythmically and musically and repeating stimuli through the interaction of language and movement. In addition, it helps to improve motor abilities that contribute to speech. Our study aims to review the evidence about the effect of MIT on language recovery and retrieval of language functions and verbal communication among people with fluent aphasia. This narrative review aims to provide a comprehensive analysis of the neural and behavioral effects of MIT in the treatment of non-fluent aphasia, highlighting the current scientific evidence supporting its effectiveness in language retrieval and neuroplasticity, enhancing our understanding of how the therapy affects the brain and encouraging exploration of its future applications in neurotherapeutics.

II– Methods and Materials:

Methods:

This narrative review aims to synthesize and analyze the current evidence on the effectiveness of MIT in restoring language function in patients with non-fluent aphasia. A comprehensive search was conducted for studies that evaluated the impact of MIT on speech and language production. The following steps outline the approach used to select and analyze the relevant studies.

Search Strategy:

The search was conducted in databases: ScienceDirect /PubMed/Google scholar/ Semantic Scholar using keywords and terms “Melodic Intonation Therapy”, “Therapy in non-fluent aphasia”, “Music therapy”, “Language recovery”, “rhythmic tonal therapy,” “melodic intonation therapy,”, “non-fluent aphasia,”, “speech therapy,”, “neuroplasticity,” and “stroke”.

Databases were reviewed using search terms. In addition, the reference list of the included articles was carefully hand-searched to identify other studies of possible interest further. References of each included article were carefully scrutinized to identify other studies of possible interest further. All relevant articles were screened based on their titles, abstracts, and keywords.

Selection Criteria:

Inclusion Criteria:

Studies related to MIT and language recovery in people with non-fluent aphasia in any language community with randomized trials were included. All randomized studies, a single-blind randomized trial, and a multi-site randomized

trial on the treatment of melodic intonation in non-fluent aphasia published up to 2023 were included. Studies were included according to the following criteria: (a) being an original paper published in a peer-reviewed journal, (b) being an English language paper, (c) recruiting and reporting data for adults with non-fluent aphasia, (d) reporting findings from MIT and language recovery while comparing speech therapy.

Exclusion Criteria

All studies that did not meet the inclusion criteria were excluded. Studies were excluded if they (1) focused on children; (2) investigated Aphasia therapy interventions; (3) all the studies, meta-analyses, and review articles on MIT and language recovery.

Data Extraction and Analysis

From the selected studies, data on the following were extracted:

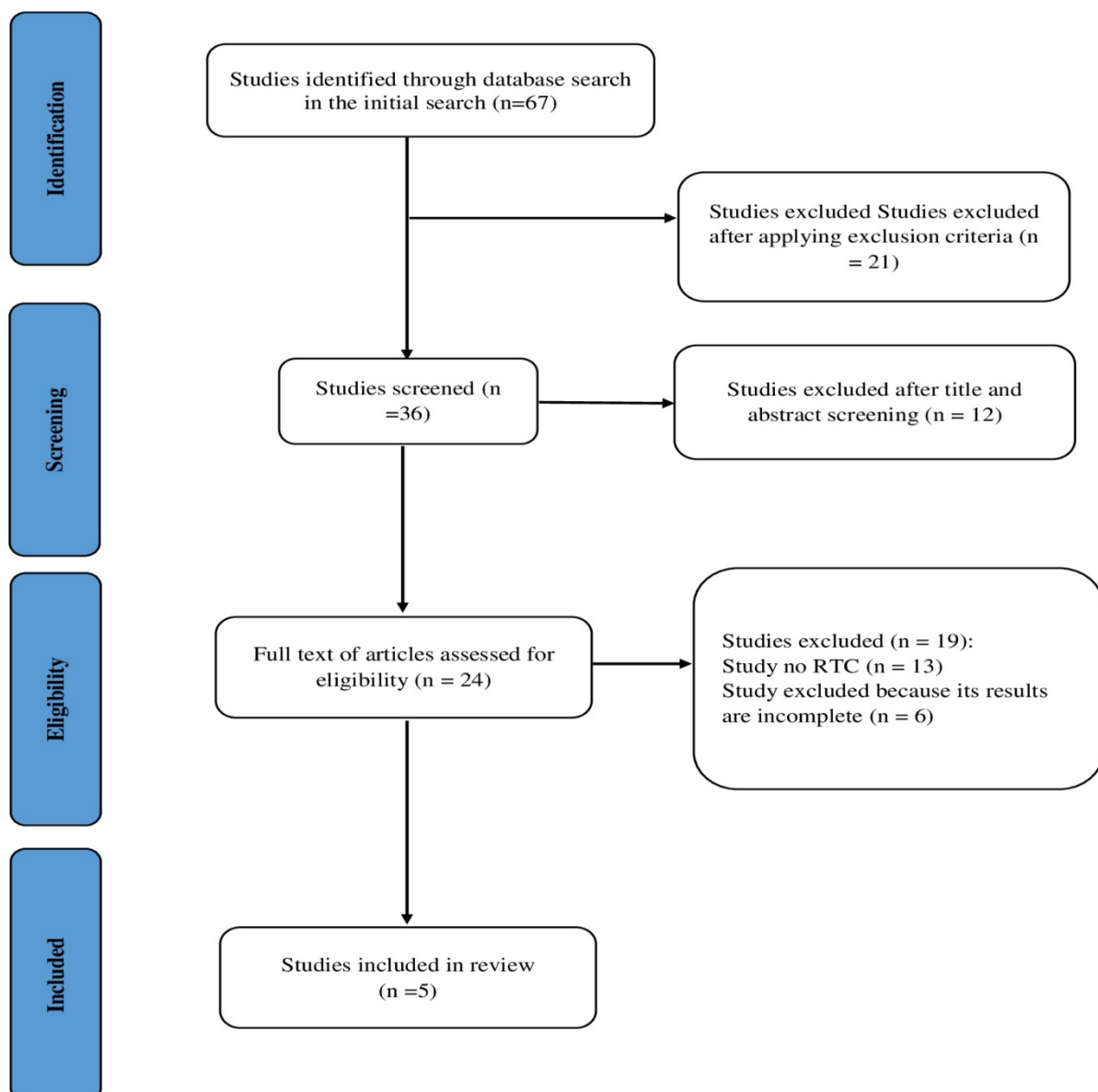
Patient Characteristics: Age, gender, stroke-related aphasia type.

Therapeutic Intervention: Specific protocols and duration of MIT applied.

Assessed domains: Affect speech production, and language abilities (e.g., comprehension, naming).

The extracted data were analyzed to identify common themes regarding the therapeutic efficacy of MIT, and its implications for language recovery in non-fluent aphasia.

Figure 1: PRISMA flowchart showing the Search, inclusion, and screening process



III- Results and discussion :

Synthesis of findings:

Data were summarized qualitatively to highlight the effectiveness of MIT. Emphasis was focused on evidence-based findings that provided insights into how the treatment causes changes in language recovery. The aim of the review was to provide a comprehensive understanding of how MIT contributes to language recovery in patients with aphasia and its potential mechanisms of action. With this approach, the review seeks to provide a clear and unified summary of the evidence surrounding MIT, its mechanisms and its clinical implications for aphasia rehabilitation. We searched the mentioned databases at the beginning of January 2024 and obtained more than 30 studies after an initial screening of titles and abstracts. Articles that did not meet inclusion criteria and did not have a treatment for melodic intonation in non-fluent aphasia were excluded. Six articles were included in the final review. Most studies did not differ in study design, sample size, or therapeutic interventions, as most were consistent.

Jungblut et al. (2022) investigated the effectiveness of directed rhythmic and melodic vocal training compared with language therapy on the expressive abilities and executive functions of aphasia patients, as well as the effectiveness of long-term music training for language and motor disorders. The training was administered to 20 aphasia patients, divided into an experimental and a control group. The training included singing, melody, rhythm, fluency, timing, sequencing, planning, auditory processing, phonological-lexical processing, and executive functions. Results showed significant effects of rhythmic and melodic vocal training on expressive language, motor speech, spontaneous speech, articulation, prosody, intonation, repetition, naming, and executive functions in people with aphasia. Improvements were also seen in receptive language due to improved auditory comprehension and the processing of prosody, through an enhanced ability to segment linguistic structures and phonological encoding at the level of working memory. Rhythmic and melodic vocal training therapy demonstrated improvements in time perception and coordination, verbal fluency, and oral motor activity. Furthermore, the effects extended to the activation of brain regions in the left hemisphere, specifically the dorsolateral prefrontal cortex, which contributed to improved language recovery according to MRI assessment.

Zhang et al. (2021) conducted a randomized trial to examine the effects of MIT, based on music therapy principles, compared to speech therapy in patients with non-fluent aphasia. The study aimed to assess the impact of these treatments on language recovery, focusing on dimensions of the Boston Diagnostic Aphasia Examination, including spontaneous speech, repetition, listening comprehension, and naming. A total of 40 aphasia patients were divided into two groups: an experimental group that received MIT and a control group that received traditional speech therapy. Participants were evaluated using the Boston Diagnostic Aphasia Examination both before and after the treatment period. The results showed that MIT had a more significant positive impact than speech therapy. Improvements were observed in areas such as spontaneous speech fluency, oral expression, repetition, imitation, auditory comprehension, word recognition, naming, and the execution of instructions. These outcomes were attributed to the extended duration and intensity of treatment, as well as the auditory stimulation and tone imitation involved in MIT.

Haro-Martínez et al. (2019) conducted a randomized pilot trial to evaluate the effects of MIT in individuals with non-fluent aphasia after a stroke. This study aimed to investigate the effectiveness of MIT. The study involved 30 participants with post-stroke non-fluent aphasia. The study was randomized, with participants being randomly assigned to either the experimental group, which received MIT, or the control group, which underwent standard speech therapy. The control group received standard speech therapy, which generally focuses on language comprehension, word retrieval, and sentence production, without the incorporation of musical or rhythmic elements. This allowed the researchers to compare the outcomes of MIT against conventional speech therapy, evaluating the unique contributions of the rhythmic-musical component in language recovery. The MIT intervention was delivered over a series of therapy sessions tailored to the needs of each individual. During therapy, patients were encouraged to use pitch, rhythm, and melody to produce words and sentences, to promote speech fluency. The intensity of the intervention and its duration were designed to ensure that patients were exposed to sufficient therapeutic input to observe potential improvements. The control group, in contrast, participated in traditional speech therapy, which focused primarily on improving language skills through conventional methods like repetition, naming tasks, and conversation practice. Both therapies were provided in a structured manner, with frequent assessments to track progress. The results of the study indicated that participants who received MIT demonstrated notable improvements in speech fluency, communication effectiveness, and overall language abilities. The MIT group showed more significant progress in producing spontaneous speech and retrieving words during conversational exchanges. This was in contrast to the control group, which showed more modest improvements, primarily in language comprehension and structured speech tasks, rather than in spontaneous or natural speech.

Van Der Meulen et al. (2016) conducted a study on the effect of MIT on chronic aphasia and compared it with the results of a previous publication regarding the impact of therapy on acute aphasia, trying to determine if the same results were replicated and to uncover the determinants associated with the patients. A randomized trial was conducted on 17 cases of chronic aphasia (10 in the experimental group and 7 in the control group), providing melodic intonation treatment to the experimental group and evaluating tasks of repetition, naming, auditory comprehension, everyday language, and story retelling. The results reported an improvement in the repetition of trained and untrained items after treatment with melodic intonation. When comparing the performance of the experimental and control groups in language improvement, it became evident that treatment with melodic intonation is effective only in repeating trained items, without generalizing

the effect to untrained materials or word retrieval and verbal communication in daily life. The impact of melodic intonation therapy was limited, and patients were unable to maintain treatment gains. The study did not find any patient-related variables significantly related to the success of MIT other than treatment intensity, where intensive training led to greater improvement in the trained subjects.

Van der Meulen et al. (2014), investigated the effectiveness of using MIT in language production in people with non-fluent aphasia and investigated the effect of the timing of MIT on treatment outcomes and the determinants of the effect. MIT was administered over 3 intensive time periods to an experimental group ($n = 16$) in 3 time periods focusing on spoken production and a control group ($n = 11$) in the 2 time focusing on spoken comprehension and nonverbal communication. The study showed a significant effectiveness for the experimental group using melodic intonation therapy, which has a beneficial effect on language production among people with aphasia. The MIT group showed improvement in repetition, naming, and daily verbal communication, with the exception of storytelling. However, the evidence is not strong due to the small sample size, and suggests intensification of treatment provides a positive therapeutic effect. The effect of treatment is associated with a smaller improvement in outcomes in the control group. Although the effect of intervention time on neurological effects during recovery has not been investigated, early treatment may lead to greater improvement.

Table N°01: Data extraction from MIT and Language recovery in people with non-fluent aphasia studies included in the review

Study	Groups of participants; age and number	Objectives	Intervention type	Study design	Assessed domains	The result	Country
Jungblut et al. (2022)	Age Range: 20–70 years. Number of Participants: 20 individuals with chronic non-fluent aphasia. Experimental group: Received directed rhythmic-melodic voice training. Control group: Standard aphasia therapy.	To evaluate the efficacy of directed rhythmic-melodic voice training for improving speech and language abilities in patients with chronic non-fluent aphasia and to examine associated neural changes using imaging.	Experimental Group: Directed rhythmic-melodic voice training, emphasizing rhythm, melody, and voice exercises. Control Group: Standard aphasia therapy.	Randomized controlled trial with behavioral assessments and imaging (e.g., fMRI) to evaluate therapeutic effects.	Speech production (fluency and articulation). Language comprehension. Neural activity and structural brain changes via imaging.	Participants in the rhythmic-melodic voice training group showed: Significant improvements in speech fluency and articulation. Enhanced language comprehension. Changes in neural activity, particularly in regions related to language processing and motor control. Results suggest rhythmic-melodic voice training may be highly effective for chronic non-fluent aphasia, with both behavioral and neural benefits.	Germany
Zhang et al. (2021)	Age Range: 18–70 years. Number of Participants: 40 patients with non-fluent aphasia post-stroke. Experimental group: Received MIT. Control group: Received traditional speech therapy.	To investigate the effects of MIT compared to speech therapy on language recovery in post-stroke patients with non-fluent aphasia, particularly focusing on language domains assessed by the Boston Diagnostic Aphasia Examination.	Experimental Group: MIT (based on music therapy principles). Control Group: Traditional speech therapy.	Randomized controlled trial.	Using the Boston Diagnostic Aphasia Examination, the study evaluated: Spontaneous speech Repetition Listening comprehension Naming Additional aspects included: Oral expression Auditory comprehension Word recognition Execution of instructions	MIT led to significant improvements in: Spontaneous speech fluency Oral expression Repetition and imitation Auditory comprehension and tone imitation Naming and word recognition These improvements were linked to the intensity and duration of treatment, as well as auditory stimulation.	China

bHaro-Martínez et al. (2019)	Age Range: age means 61-65. Number of Participants: 30 individuals with non-fluent aphasia post-stroke. Experimental group: Received MIT. Control group: Received standard speech therapy.	To assess the effectiveness of MIT compared to standard speech therapy in improving language and communication abilities in patients with non-fluent aphasia following a stroke.	Experimental Group: MIT. Control Group: Standard speech therapy.	Randomized pilot trial.	Speech production (fluency, accuracy, and expression). Functional communication abilities.	Participants receiving MIT showed significant improvements in: Speech fluency and production. Functional communication effectiveness. These benefits were more pronounced than in the control group, demonstrating MIT's potential as an effective therapy for non-fluent aphasia.	Spain
Van Der Meulen et al. (2016)	Age Range: 18–80 years. Number of Participants: 27 individuals with chronic aphasia. Experimental group: Received MIT (MIT). Control group: Received conventional speech therapy.	To evaluate the efficacy of MIT compared to conventional speech therapy in improving language abilities in individuals with chronic aphasia.	Experimental Group: MIT (focused on melodic and rhythmic elements). Control Group: Conventional speech-language therapy.	Pilot randomized controlled trial.	Language skills and recovery, focusing on: Spontaneous speech Naming Repetition Communication effectiveness	Participants in the MIT group demonstrated greater improvements in speech production, particularly in: Spontaneous speech fluency Repetition Communication efficiency in real-life settings These results highlight the potential of MIT to enhance functional language use in individuals with chronic aphasia.	The Netherlands
Van der Meulen et al. (2014)	Age Range: 18–80 years. Number of Participants: Not explicitly mentioned. Experimental group: Received MIT. Control group: Received a control intervention, with delayed MIT.	To investigate the efficacy and optimal timing of MIT for improving language skills in patients with subacute severe non-fluent aphasia.	Experimental Group: MIT. Control Group: Control intervention, followed by delayed MIT.	Randomized controlled trial	Speech production (fluency and articulation). Language comprehension and communication effectiveness.	MIT improved verbal communication in patients with subacute severe non-fluent aphasia. Delayed initiation of MIT resulted in less improvement, suggesting that earlier intervention may lead to better outcomes in speech and language recovery.	The Netherlands

Discussion

This review aims to study the effect of MIT on language recovery in people with non-fluent aphasia by reviewing all the studies that included MIT and language recovery. In general, the results of the evidence were consistent regarding the effect of therapy on expressive language, language production, and tasks of the Boston Aphasia Battery, including repetition, naming, and comprehension except for storytelling, the therapy did not affect storytelling skills. Evidence has shown that there is an effect of treatment in the early phase that continues over a period of time. Despite the limitations of the studies in the small sample size and the difficulty of patients completing treatment, the effect is clear and significant on the performance of individuals in language production and expressive language tasks. The limited effects of therapy at the beginning of treatment in the early stage and intensification, and the end of the treatment effects after a maximum of three months from the end of treatment. The positive effect of MIT was based on the brain's compensatory ability, neural plasticity, flexibility, the ability of cells to compensate in a connexions manner, and the patient's ability to repeat speech rhythmically and melodically. This helps the patient to recover linguistically and encourages language production, although it is only temporary for a short period. Zhang et al. (2021) hypothesize that the processing of melodic information is in the right hemisphere and plays a compensatory role for the affected left hemisphere in aphasia patients when

producing singing, melodic, and rhythmic speech, and this is an explanation for the effectiveness of melodic intonation therapy. Treatment with melodic intonation for patients with non-fluent aphasia, in the evidence reviewed, showed a cumulative effect over time and intensification through auditory stimulation, training on repetition of stimuli, activation of naming responses in the manner of singing, vocal and motor characteristics, repeated use, and activation of cognitive abilities. Evidence showed an improvement in communication skills, expressive, productive, and motor language skills, and spontaneous speech as a result of rhythmic, melodic, and prosodic vocal training, as a result of working memory, and phonological skills such as phonological awareness. Despite this, the effect remains insignificant due to the limited sample size and duration of treatment. It requires more experimental contribution with a large sample size, control of the treatment time, and control of its effect at time points.

Studies that have reviewed the effect of MIT on language recovery in patients with non-fluent aphasia show that this therapeutic approach has a significant efficacy in improving language and oral expression functions. Based on the research evidence, the results can be discussed according to the following points:

1. Effectiveness of the treatment in improving language and expression skills:

Studies, such as Zhang et al. (2021) and Haro-Martínez et al. (2019), have shown that MIT led to significant improvements in expressive fluency, articulation, and naming. This improvement was more pronounced in patients who received the treatment compared to groups that underwent conventional therapy.

Positive effect on expressive language: The treatment enhanced language fluency, especially in tasks that required spontaneous speech and repetition.

Trained versus untrained tasks: The study by Van Der Meulen et al. (2016) showed that improvement was limited to trained tasks only, suggesting that the treatment may be more effective if designed to extend the benefits to untrained contexts.

2. Impact on auditory perception and comprehension:

While most studies have focused on expressive language, some research has observed positive effects on auditory comprehension and cognitive functions, as demonstrated by Jungblut et al. (2022).

Impact on comprehension: The treatment-improved patients' ability to process linguistic structure and vocal intonation, which helped enhance auditory comprehension.

The role of rhythm and intonation: The use of rhythm and intonation contributed to improving the ability to distinguish words and linguistic structures, which supports the enhancement of working memory functions.

3. The role of timing and intensity of treatment:

Van Der Meulen et al. (2014) indicated that the timing and intensity of treatment initiation play a crucial role in achieving positive outcomes. Early intervention: Patients who started treatment in the early stages of recovery showed greater improvement compared to those who received treatment later. Intensive doses: The higher the intensity of treatment and the number of sessions, the greater the chances of achieving positive outcomes, as confirmed by Zhang et al. (2021).

Brain reorganization and the role of neuroplasticity: Studies using neuroimaging techniques, such as Jungblut et al. (2022), have provided evidence that MIT contributes to brain reorganization by stimulating neuroplasticity.

Activation of the left prefrontal cortex: Functional imaging showed increased activity in areas responsible for language and motor functions, such as the left prefrontal cortex, suggesting a redirection of language functions to alternative areas.

Bilateral brain effect: The right areas of the brain, responsible for processing music and rhythm, benefited in enhancing communication with the damaged language areas on the left side.

Despite the positive results, studies indicate that there are specific challenges that need to be addressed: Small sample size: Most studies included small samples, which limits the generalizability of the results. Sustainability of benefits: Some patients were unable to maintain therapeutic gains after the sessions ended, as in the study by Van Der Meulen et al. (2016). Practical application: Providing intensive therapy can be logistically challenging.

Future recommendations

Design comprehensive treatment programs: expand treatment to include untrained tasks and improve practical contexts.

Long-term research: study the sustainability of long-term benefits.

Integration of treatments: combine MIT with other therapeutic modalities to enhance outcomes.

IV- Conclusion:

MIT is a promising intervention for restoring language skills in people with non-fluent aphasia. Cross-sectional studies have shown significant effects in improving expressive language skills, including fluency, articulation, and naming, as well as enhancing auditory comprehension. Evidence suggests that the effectiveness of this therapy depends

on the combination of rhythm and tonality, which stimulates neural plasticity and contributes to the reorganization of neural networks, especially in the left prefrontal cortex and the areas responsible for music processing in the right hemisphere.

A review of evidence from five randomized controlled trials highlights the impact of MIT on communication skills, expressive language, linguistic production, repetition, naming, spontaneous speech, and dimensions of the Boston Diagnostic Aphasia Examination. However, its overall effectiveness is limited by small sample sizes and insufficient control over treatment durations. Future research should address these limitations by including larger sample sizes, examining the timing of early versus late intervention, and identifying factors that influence treatment response in individuals with non-fluent aphasia. While MIT has demonstrated significant improvements in expressive fluency and auditory comprehension, further studies are essential to refine treatment protocols, expand benefits to untrained skills, and ensure long-term sustainability of outcomes. Notably, the timing and intensity of MIT play a critical role in its success. Early initiation of therapy and higher treatment intensity are strongly associated with better therapeutic outcomes. Future research should focus on optimizing treatment design, investigating its long-term effects, and assessing its efficacy across diverse populations. In summary, MIT is a valuable intervention for enhancing communication abilities and quality of life in individuals with aphasia. By harnessing the principles of neuroplasticity, this approach offers a pathway to restore language function and promote broader cognitive and emotional recovery.

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