

Critical Review: Is Melodic Intonation Therapy (MIT) Effective at Treating Non-Fluent Aphasia, According to Recent Studies?

Is Melodic Intonation Therapy (MIT) Effective at Treating Non-Fluent Aphasia, According to Recent Studies?

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Non-fluent aphasia typically results from damage to the language regions in the left hemisphere of the brain and leads to a presentation of expressive language difficulty. Melodic Intonation Therapy (MIT) is one possible treatment of non-fluent aphasia, aiming to capitalize on the musical aspects of speech, such as melody and rhythm, in order to engage regions in the right hemisphere of the brain that can support language. This paper aims to update and re-evaluate the current state of the evidence on the effectiveness of MIT. A variety of computerized databases and search tools were used to search for articles, using the following search terms: Aphasia, Non-fluent. Melodic Intonation Therapy, Intervention. Articles selected for inclusion in this review were limited to clinical trials and case studies examining the effectiveness of MIT or adapted MIT. Papers evaluated in this review included four case studies One control trial and two randomized control trials. Results indicate that MIT may be an effective therapy for treating non-fluent aphasia. The evidence is suggestive, however, higher level evidence is needed. In presentations of non-fluent and Broca's aphasias, MIT or modified versions of MIT may be considered on a case, by case basis as a possible treatment.

Introduction

Aphasia is a language disorder that can occur following stroke or head injury. It has two subtypes: fluent aphasia (fluent production of verbal expression, but with little meaning), and non-fluent aphasia. Non-fluent aphasia is characterized by expressive language difficulties (little or no verbal production), word finding difficulties and agrammatism.

Non-fluent aphasia typically results from damage to the language regions in the frontal cortex in the left hemisphere of the brain, often involving an area called Broca's Area (Schlaug et al. 2008). It has been suggested that homologous language regions in the right hemisphere could be recruited to help support expressive language in clients with non-fluent aphasia (Schlaug et al. 2008).

Despite the impairments with speech, verbal expression through singing in non-fluent aphasia are typically intact (Norton et al 2009). Melodic Intonation Therapy (MIT) is one possible treatment of non-fluent aphasia. MIT was first described in 1973 by Albert, Sparks, and Helm (Albert, M.L., Sparks, R.W., & Helm, N.A., 1973). MIT aims to capitalize on the musical aspects of speech, such as melody and rhythm, in order to engage regions in the right hemisphere of the brain that can support language. MIT is a structured treatment program that uses patterns of intonation along with rhythmic tapping to encode phrases, following a

hierarchy from less to more complexity and more to less support from the clinician.

In a review of the effectiveness of MIT therapy conducted by Van der Meulen et al. (2012.) it was concluded that there was a lack of evidence from well-designed group studies, and that questions regarding MIT remain. Many of the articles referenced in this study were published before the year 2000. This paper aims to update and re-evaluate the current state of the evidence on the effectiveness of MIT.

Objectives

The primary objective of this paper is to determine whether melodic intonation therapy is effective in treating non-fluent aphasia, according to recent literature.

Methods

Search Strategy

A variety of computerized databases and search tools including: PubMed, Medline, and the Western Libraries database tool were used to search for articles. The following terms were used: Aphasia, Non-fluent. Melodic Intonation Therapy, Intervention. The reference lists of articles were also searched for relevant studies.

Selection Criteria

Articles selected for inclusion in this review were limited to clinical trials and case studies examining the effectiveness of MIT or adapted MIT. Only articles available in English between 2000 and 2017 were included.

Data Collection

Papers evaluated in this review included **four case studies**: Baker, F.A. (2000), Hough, M. S. (2010), Wilson, S. J., Parsons, K., & Reutens, D. C. (2006), and Zipse, L., Norton, A., Marchina, S., & Schlaug, G. (2012); **One control trial**: Schlaug, G., Marchina, S., & Norton, A. (2008); **and two randomized control trials**: Conklyn, D., Novak, E., Boissy, A., Bethoux, F., & Chemali, K. (2012), and Van der Meulen, I., Van de Sandt-Koenderman, W. M. E., Heijnenbrok-Kal, M., Visch-Brink, E., & Ribbers, G. (2014).

Results

Case Studies:

Baker (2000) Described two case studies in order to determine if modified melodic intonation therapy (MMIT) could be effective where traditional MIT had not previously been successful. The therapy was delivered by a music therapist or in consultation with a speech pathologist. The subjects were a 30 year old male and a 32 year old female, both with left hemisphere injuries. In this study, the modifications made to traditional MIT included: phrases that were more melodic in structure, phrases with greater pitch ranges, accepting responses that only contained key words not full phrases, and composing all phrases around a central harmonic structure. Outcome measures consisted of evaluating how many phrases could be produced with and without prompting, and the total number of new words gained pre to post treatment. Results of this study indicated that subjects who underwent MMIT recalled a greater number of words both with and without prompting.

Analysis: The modifications from traditional MIT therapy were well described, as were the methods of implementing the therapy. However, rationale for the measures and tests used were not clearly described or well justified. The reason for use of MMIT over MIT was also unclear. The measurements used by the researchers were also not justified. No formal statistical measures were described and results were presented in raw numbers and percentage change. Statistics on the significance of these changes pre to post treatment could have been implemented. Overall, this study provides

somewhat suggestive evidence of the effectiveness of MIT therapy in treating non-fluent aphasia.

Hough (2010) describes a case study of a 69 year old male with Broca's aphasia, in order to examine the effectiveness of a modified version of MIT in increasing verbal output. The modifications to MIT in this case included removal of the tapping element (some modeling of the tapping was retained without requirement for the subject to produce it). In this case the therapy was administered by a speech-language pathologist. Outcomes measured were pre-generated phrases that were trained during the treatment period as well as generalization phrases that were introduced in the final week. Evaluation of outcomes included correct production of the phrases of each condition. The subject showed improved verbal output on both trained and generalized phrases, and maintained results at 2 follow up points (2 and 4 weeks). Trained phrases showed statistically significant improvement, whereas the generalization phrases were noted as observations.

Analysis: The author had a clearly stated rationale for the modifications included and the methods were well described. The article also included a thorough evaluation of outcomes and statistical measures. The statistical analysis was appropriate for this study design, including before and after measures across multiple baselines. Overall this study provides compelling evidence for the effectiveness of MIT in increasing verbal output in non-fluent aphasia.

Wilson et al. (2006) conducted a case study with a 52 year old male who presented with Broca's aphasia, in order to examine the efficacy of MIT in treating Broca's aphasia. Treatment was conducted by a music therapist and followed protocol for MIT described by Helm-Estabrooks in 1983. The subject also had 2 control conditions, which included phrases that were: 1) repeated with no melodic intonation and 2) unrehearsed. The phrases that were trained with MIT and rehearsal showed improved production compared to the unrehearsed phrases. The phrases that were trained using MIT however, were better retained than the rehearsed phrases when evaluated at 2 follow-up points (1 and 9 weeks post treatment).

Analysis: The design was appropriate to answer the clinical question and the author included a detailed description of the methods and evaluation. The statistical analysis was appropriate, using a repeated measures ANCOVA across time and group. Overall this study provides highly suggestive evidence for the efficacy of MIT in treating non-fluent aphasia.

Zipse et al. (2012) conducted a case study of a twelve year old female who presented with Broca's aphasia in order to evaluate the efficacy of adapted MIT for a subject who does not meet criteria for this therapy, and determine whether changes in the brain could be observed with MIT therapy. The MIT used in this study followed the traditional MIT methodology, and was given for 1.5 hours, 5 times a week for 16 weeks. Outcomes measured included functional speech and language measures including analysis of content information units (CIUs) during conversation and picture description, as well as production of trained and untrained phrases. fMRI imaging was also conducted to determine whether therapy could contribute to neurological changes in the brain. The subject showed improvement on trained and untrained phrases, as well as an increase in CIUs during functional speech and language tasks. The subject also showed increased activation in the right hemisphere, however, this decreased at follow-up (1 month post treatment).

Analysis: The research question was well described and supported, and the multiple baseline approach used in this approach was an appropriate design to answer the research question. The authors conducted fMRI imaging on the subject's twin sister at the same timepoints as the subject. This was an appropriate control to help rule out any changes due to normal growth and development, as the subject is pre-adolescent. The adaptations to MIT that were used in this study, however, were not well described, and the rationale for the methods were unclear. Additionally, no statistical analysis was reported, and with this study being a multiple baseline approach, statistical analysis is warranted. Overall, this study provides somewhat suggestive evidence for the effectiveness of MIT in treating Broca's aphasia.

Control Trials:

Schlaug et al (2008) conducted a control trial with 2 subjects (male, 47 and 58 years old), in order to examine the effectiveness of MIT therapy on improving the language skills of one individual with non-fluent aphasia. For this study two patients were recruited that were both diagnosed with non-fluent aphasia and exhibited similar etiologies. The subjects were randomly allocated to either the experimental condition or the control condition. The subject in the experimental condition received MIT and the subject in the control condition received speech repetition therapy (SRT). The subject in the control condition, received MIT therapy after 40 sessions of control therapy, while the subject in the experimental condition continued to receive MIT therapy. Language and imaging (fMRI) assessments were conducted at baseline, and after 40 and 75 sessions of therapy. Outcome measures

included: conversational interview and picture descriptions. An fMRI evaluation was also conducted to measure changes in the location of brain activation while engaging in speech tasks. The authors found that the patient given MIT improved significantly in speech output and confrontation naming, and showed changes in the location of brain activation from left to right hemisphere in certain cortical areas. While the control patient did show improvement as well, the patient who received MIT for the duration of the study had greater improvement on all outcome measures.

Analysis: The patients were well matched were thoroughly described by the authors. No statistical analysis was reported, rather a summary of the outcomes measured for each patient were reported at each time point as a percent change. Given that this study followed a multiple baseline approach, formal statistical measures are indicated. Overall, this study provides suggestive evidence of MIT as an effective therapy for non-fluent aphasia.

Conklyn et al. (2012) conducted a randomized control trial with single blind design in order to evaluate the effectiveness of early treatment with a modified form of MIT in patients with Broca's aphasia. Their study included 30 subjects who were 18 years of age or older, and who presented with Broca's aphasia. The subjects were randomly assigned to either the experimental condition or the control condition. The experimental group received MIT therapy and the control group received discussion sessions, similar in nature to clinical counselling about aphasia. Both groups had sessions conducted by a music therapist averaging 10-15 minutes per session. The modification to MIT used with experimental group included: phrases whose melodies closely matched the natural intonation of the spoken phrases and the use of full phrases during initial treatment. Outcomes measured included three questions to test responsiveness (e.g. "if you are thirsty and need a drink of water, what do you say to the nurse when she comes in?"); and three statements to test repetition (e.g. "I need a drink of water"). The results of this study revealed that the experimental group showed significantly better improvement than the control group for the responsive questions, but no significant differences between groups was seen for the repetition statements.

Analysis: The purpose for the study was well described and the research question was clear. The study design (single blind) was appropriate for this type of study. The authors included very detailed descriptions of the methods and results. The statistical analysis was appropriate including both pre and post measures within groups and overall differences between groups.

However, not all outcome measures resulted in significant differences between groups, therefore, overall, this study provides suggestive evidence of MIT as an effective therapy for non-fluent aphasia.

Van der Meulen et al. (2014) conducted a randomized control trial involving 27 subjects (18-80 years old) who presented with non-fluent aphasia, in order to examine whether MIT is effective in increasing language production in subacute non-fluent aphasia. Subjects were randomly assigned to either the experimental group who received MIT therapy or the control group, who received control intervention (not focused on verbal expression) followed by delayed MIT. Therapy was conducted during the sub-acute phase, when therapy interacts with the spontaneous recovery processes. Of the 27 participants, 16 were in the treatment group and 11 were in the control group. The results were compared between the groups after 6 weeks of therapy, and again at the end of therapy. After the first comparison, the control group were then given MIT therapy, and the treatment group continued with MIT therapy, thus having both groups receiving MIT for the final 6 weeks of the study. Outcome measures included: the Aachen Aphasia Test, the Sabadel story retelling test, the Amsterdam Nijmegen Everyday Language Test and the MIT repetition task. The authors determined that the treatment group showed significant improvement on all but one outcome measure (Sabadel), and that their improvement was significantly greater than that of the control group. They also found that the treatment group showed improvements that generalized to untrained material.

Analysis: The purpose for the study was well described and the research question was clear. The study design used was appropriate to answer the research question, and the authors described the methods clearly and with great detail. While the SLPs conducting the therapy were not able to be blinded to the groups, those administering and scoring the assessments at each point were blinded to group allocation. The authors noted that in a few cases, blinding was not maintained when participants spontaneously informed the researcher of their group allocation. They did not mention exactly how many participants this was. It is important to note that the study was conducted in the Netherlands with native Dutch speakers. Therefore, it is unclear the extent to which the weight of the results could be applied to English and other languages. The authors determined that they would need at least 15 participants per group in order to detect statistically significant differences over time between the groups. Due to patient withdrawals from the study, this number was not achieved. Otherwise, the statistical analysis used is appropriate to the study design. Overall this article

provides suggestive evidence that MIT is an effective therapy for non-fluent aphasia.

Discussion

Overall the findings from the studies indicated that MIT may be an effective therapy for treating non-fluent aphasia. The evidence is suggestive, however higher-level evidence is needed. The results of this study agree with the findings of Van der Meulen et al. (2012.), who determined that there was a lack of evidence from well-designed group studies, and that questions regarding MIT remain. Higher level evidence is needed, which ideally should come from randomized control trials involving a large number of participants. Unfortunately, it is difficult to recruit subjects who satisfy inclusion criteria in large enough numbers to reach statistical significance, furthermore, many patients do not wish to participate in a control trial where there is a chance they may be allocated to the non-treatment group. This makes recruitment even more difficult for studies of this nature where a therapy/treatment method is being evaluated.

Some limitations to this study to consider were: that there were differences among the studies as to the nature of the modifications to MIT or protocols used, making comparisons difficult; In some studies the therapy was administered by a music therapist and in others by a speech-language pathologist; There were violations to the study designs (violating blinding and revealing control condition); and there was a variety of speech and language outcomes measured, as well as therapy time, frequency and timing post onset of aphasia.

Conclusion

This study determined that the current evidence is suggestive that MIT is an effective therapy for treating non-fluent aphasia.

Clinical Implications

Given the limited strength of the evidence, caution should be used when implementing the findings of this study. However, in presentations of non-fluent and Broca's aphasias, MIT may be considered on a case by case basis as a possible treatment. The clinician should have a clear method for evaluating the success of the treatment for the client as therapy is implemented in each case. Modified versions of MIT (as described by the papers included in the study) may be useful in cases where traditional MIT and other speech/language therapies have not been successful.

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