Critical Review:
Do mind-body therapies improve language outcomes in persons with aphasia?*

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As mind-body therapies become increasingly popular and better known, it is important to investigate how they might enhance treatment of speech and language disorders. This critical review examines the role of mind-body therapies in the treatment of persons with aphasia and whether they improve language outcomes in these individuals. A literature search of electronic databases identified six articles meeting the selection criteria. Study designs include four single-subject experimental designs and two within-subjects designs. The results of the research suggest that in some cases, mind-body therapies improve language outcomes and could play a role in enhancing traditional language therapy.

Introduction

Complementary and alternative medicine (CAM) is gradually making its way into the traditional Western medical model and is being recognized as a viable treatment by both clinicians and patients (Laures & Shisler, 2004). Mind-body therapies fall under the CAM umbrella. These therapies seek to enhance the mind's positive impact on the body. With the growing popularity and knowledge of these treatments, it is important to understand how they might play a role in speech and language therapy (Marshall & Basilakos, 2014). If mind-body therapies positively impact language recovery in aphasic individuals, they could act as an adjunctive treatment to enhance conventional speech-language therapies in the future (Marshall & Basilakos, 2014).

There are a number of proposed mechanisms by which mind-body therapies facilitate language in individuals with aphasia. Relaxation therapy and yogic breathing techniques claim to reduce anxiety, frustration and tension, thereby freeing more cognitive resources for language processing. It is suggested that this increase in resources results in improved performance (Laures & Shisler, 2004). These techniques are especially appropriate to investigate in aphasic individuals because they can experience increased anxiety when having trouble word-finding and communicating in general (Marshall & Watts, 1976). Improving attention is another mechanism through which language abilities are thought to be enhanced (Orenstein, Basilakos, & Marshall, 2012). It is suggested that some of the linguistic deficits that persons with aphasia experience are as a result of reduced attention. Mindfulness meditation targets attention and proposes to increase attentional abilities through regular practice (Orenstein, Basilakos, & Marshall, 2012). Based on this foundational knowledge, the present review seeks to determine whether mind-body therapies improve language outcomes in individuals with aphasia.

Objectives

The primary objective of this paper is to critically examine the existing literature on mind-body therapies and their effect on language outcomes in persons with aphasia. Implications for clinical practice and future avenues for research will be addressed as well.

Methods

Search Strategy

Electronic databases including CINAHL, PubMed, Scholars Portal, and Google Scholar were searched using the following terms: (mind-body therapies AND aphasia). In addition, Google Scholar was used to identify articles citing those originally found.

Selection Criteria

The articles selected for this review included those that employed a mind-body therapy including relaxation therapy, yoga, and mindfulness meditation, with individuals with aphasia. Included papers were required to use a language outcome measure in assessing the effects of the mind-body therapy. No restrictions were placed on the research design.

Data Collection

The literature search revealed six papers that met the aforementioned selection criteria: four single-subject experimental designs and two within-subjects designs.

**This paper was created as a required assignment for the CSD9639 Evidence Based Practice for Clinicians course at Western. While it has been evaluated by course instructors for elements of accuracy and style, it has not undergone formal peer-review.*

Results

Single-Subject Designs

Murray and Ray (2001) examined the effect of relaxation training on the spoken language abilities of one adult with chronic, nonfluent aphasia. Additionally, they assessed whether relaxation training or syntax stimulation would yield greater improvements. A single-subject alternating treatment plus baseline design was used to study a 59-year-old male with chronic aphasia. He was over 14 years post-stroke and his spoken language abilities were consistent with a nonfluent aphasia profile. The subject was exposed to two treatment conditions, relaxation training and syntax stimulation, within each session. The order of the treatment conditions was randomized across sessions and probes were administered at baseline, midpoint, posttreatment, and randomly within treatment. The subject received treatment twice a week for one-hour per session over eight weeks. The subject's spoken language abilities were measured through picture sequence description tasks and conversational language samples. The percent grammatical utterances, mean length of utterance (MLU), percentage of content information units (%CIU), and percent successful utterances were calculated from each sample. The researchers found that relaxation training was associated with increases in the subject's spoken language abilities, however the syntax stimulation treatment produced greater gains overall, with the exception of MLU. When treatment order was analyzed, the findings indicated that when relaxation training preceded syntax stimulation, language abilities were greatly enhanced.

Murray and Ray (2001) employed a very thorough methodology including inter and intra-rater reliability and a measure of the relaxation level achieved using the Behavior Relaxation Scale. In addition, they assured the picture sequence description tasks were equivalent by piloting the tasks with five age-matched controls. The researchers also included three follow-up treatment sessions at 13 months post-treatment. However, it would have strengthened the study to have followed the subject longer and to have looked at generalization outside of the treatment room. Further, the researchers did not statistically analyze the data; therefore the significance of the results cannot be determined.

Given the strengths and limited weaknesses of Murray and Ray's (2001) study, the evidence presented is suggestive. The findings suggest that relaxation training not only enhances expressive language ability, but also increases the efficiency of a traditional syntax treatment. Therefore, in clinical practice, it may be of benefit to precede traditional language treatment with relaxation therapy. Future studies should consider examining relaxation therapy as a technique practiced by the patient at home in order to evaluate whether it could be guided independently.

Orenstein, Basilakos, and Marshall (2012) investigated the effects of mindfulness meditation on three aphasic individuals. Using a multiple baseline single-subject design, they examined whether mindfulness meditation improved language in addition to divided attention and overall sense of effort. All subjects included in the study had mild to moderate chronic aphasia and were between the ages of 45 and 59. Baseline measures were taken using subtests from the Boston Diagnostic Aphasia Exam (BDAE) to assess receptive language and a connected speech sample using four stimuli from the BDAE was used to calculate CIU (correct information units). Mindfulness meditation (MM) training was then conducted with each subject. During MM practice, subjects were seated in an upright position and attempted to focus on their breathing. While the MM training was verbal, learning the actual technique was intended to be experiential and therefore could still be communicated to the three subjects with mild-moderate comprehension deficits. Following MM intervention, the language measures were administered again. The results revealed no change in performance on the language measures suggesting that MM does not improve language in persons with aphasia. However, results indicated that mindfulness meditation might improve overall efficiency of task completion as measured by reaction time.

Strengths of Orenstein et al.'s (2012) research was using multiple baselines to determine that the subject's performance was stable for five consecutive sessions before initiating treatment. This enabled the researchers to conclude that changes seen in the subject were likely due to the treatment rather than chance. Also, the subject characteristics were given in great detail. A few areas were overlooked in the study. First, the data were not analyzed statistically, so nothing can be said of the statistical significance of their results. Second, there was no mention of blinding or procedures to conceal the study's purpose to the individual who performed the language assessments. Consequently, there may have been biases in the language results. In addition, the researchers did not evaluate examiner reliability. Lastly, the language tests used were not resource demanding, with all subjects demonstrating reasonably high scores pre- and post-treatment. If more demanding language tasks were used, differences may have been seen.

It is difficult to draw conclusions from this study due to the lack of statistical analysis, possible examiner bias

and limitations in the measures used. More research is needed using more resource demanding language tasks and the inclusion of additional linguistic measures such as MLU. Overall, this study provided equivocal evidence that mindfulness meditation does not result in language gains in people with aphasia.

Lynton, Kliger, and Shiflett, (2007) examined whether Kundalini yoga practice would improve aphasia in chronic stroke patients. Three individuals, who had chronic, mild aphasia and an Aphasia Severity Rating (ASR) score of four, were included in the study. This pilot study used a single-subject AB design to evaluate the effects of twelve weeks of Kundalini yoga practice on language outcomes as measured by the BDAE. The subjects attended classes twice a week for one and a half hours, for a total of twenty-four classes over the intervention period. Following the intervention, all three subjects demonstrated improvements on 15 of the 25 BDAE language measures as compared to their baseline and a reduction in their aphasia as evaluated by the ASR.

The measures used in Lynton et al.'s (2007) study were reasonable, reliable, and valid, strengthening the overall design. The measures evaluated all aspects of language, giving a very thorough picture of each subject's language abilities. Limitations of the design included the absence of statistical analysis. The experimenters did not expect to find statistical significance at an alpha level of 0.05, thus analysis was not performed on the group as a whole. So, although improvements were seen on the outcome measures, the lack of statistical treatment of the data makes it difficult to draw definitive conclusions about the strength of this trend. Additionally, multiple baselines were not taken to establish a stable baseline for each subject. Therefore, it cannot be concluded with certainty that the yoga intervention was the source of the improved language outcomes. It is just as likely that the changes observed were due to variability within each subject.

Due to the limitations of this research, this study provided equivocal evidence that Kundalini yoga practice improves language outcomes in people with aphasia. The positive results illustrate the potential benefits of Kundalini yoga in persons with aphasia, but due to the limitations of the study it is possible that the results could be due to chance. All subjects were reported to have continued with their yoga practice, which suggests that this intervention was maintainable and motivating, which would make it a feasible therapy to implement.

Mohapatra, Marshall, and Laures-Gore (2014) studied a 63-year old woman, who had expressive aphasia as a result of a stroke. The woman was a bilingual speaker of English and Hindi. Using an AB study design, the researchers examined whether the practice of Ashtanga yoga and anulom vilom (alternate nostril breathing) would improve her language abilities. Anulom vilom is a yogic breathing technique believed to influence the sympathetic nervous system, anxiety, and grip strength. The participant engaged in seventeen weeks of anulom vilom practice for twenty minutes each day along with her yoga practice. Her language was assessed with the Western Aphasia Battery-Revised (WAB-R) pre, mid, and post-treatment. She presented with a mild anomic aphasia and an Aphasia Quotient (AQ) of 84.9/100 upon initial assessment. Following the seventeen-week yoga and breathing regime, her scores improved on all the WAB-R language measures with the exception of auditory comprehension, and her AQ was 92.6/100. The results of the study indicated an overall improvement in language.

The strength of Mohapatra et al.'s (2014) study was the thorough case history and intensive description of subject, prior to and throughout the study period. This provided a rich context with which to evaluate and interpret the results. There were some limitations of the research. Firstly, it was reported that the WAB-R was translated into her native language of Hindi as needed. This presents a problem because any change made to a standardized test changes its sensitivity and specificity. Secondly, at the time of the intervention, the participant was only three-months post-stroke, and had likely not reached her recovery plateau. Therefore, it is difficult to determine what changes were due to potential spontaneous recovery and what can be attributed to the intervention. Lastly, the researchers do not provide adequate details about the yoga practice such as duration. This limits the ability of others to replicate the treatment.

This study was successful in providing an avenue for further research, but the numerous issues limits the ability to draw firm conclusions from this paper. Further studies are needed to identify the specific mechanism of the observed changes. Overall, this study provided equivocal evidence that Ashtanga yoga and anulom vilom improve language outcomes in people with aphasia.

Within-Subjects Design

Marshall and Watts (1976) evaluated whether the verbal communication of aphasic individuals would improve following relaxation training. Sixteen adults with moderate to severe aphasia who were between 4 to 70 months post-stroke were evaluated using a within groups crossover study design. Verbal communication

was evaluated using a verbal test battery (VTB) of four fifteen-item tests assessing the subject's ability to give the function of an object, name each object, produce each object within a carrier phrase, and repeat the name of each object. This battery was administered following a control period (no treatment) and a period of relaxation training. Each subject participated in a relaxation and control period and the order of these was randomized for each subject. The administration and scoring procedures followed those outlined in the Porch Index of Communication Ability (PICA). Statistical analyses were also done using a 2 x 2 repeated measures Latin square design. The researchers found that following relaxation training, subjects scored significantly higher overall on the VTB and on the naming score.

A strength of Marshall and Watts (1976) study design was the inclusion of video recording to ensure interrater reliability and reduce bias. All sessions were video recorded and scored by an experimenter who was blind to whether the subject had received the relaxation or control condition. The agreement between the taped and live scoring was greater than 95% and suggests that the score was a true representation of the subjects' abilities as reflected by the VTB. The researchers also randomized the order of the control period and relaxation treatment, so we can conclude that no priming effect occurred and the order of administration did not affect the results. A relative weakness in their design was the nonspecific procedure outlined for the relaxation treatment. Although the researchers used the relaxation procedures as outline by Jacobson, the experimenter used their own terminology when instructing subjects to make the relaxation more natural and spontaneous. This presents a problem for replicating the exact procedure in a follow-up study.

The findings from Marshall and Watts' (1976) study provided a compelling level of evidence suggesting that simple administration of relaxation training in aphasic individuals may enhance their verbal performance. This could be a clinically feasible procedure to implement in addition to traditional language therapy.

Marshall et al. (2014) explored the benefits of unilateral nostril breathing (UNB) practice post-stroke and its effect on language in individuals with and without aphasia. UNB is a type of breathing practice outlined in ancient yoga texts. A nonrandomized mixed clinical trial was used to study eleven post-stroke individuals with left hemisphere damage. Five individuals with left hemisphere damage without aphasia (LHD) and six individuals with aphasia (IWA) were included. This design allowed the experimenters to observe the effect of UNB over time, and to compare the LHD and IWA groups. Each subject participated in a ten-week UNB program consisting of four weeks of guided instruction followed by six weeks of individual practice. Prior to beginning the UNB program, after four weeks, and after ten weeks, the subjects were evaluated using multiple tests including the Aphasia Diagnostic Profile (ADP), Controlled Oral Word Association Test (COWAT), and Revised Token Test (RTT) to assess language ability. A repeated measures analyses of variance revealed that, overall, the LHD group had significantly higher scores on the COWAT than the IWA group. Moreover, there was only a significant increase in COWAT scores from baseline to the end of the ten weeks for the LHD group. Neither group showed significant changes on the RTT. The ADP was used to assess individuals with aphasia only. The IWA demonstrated significant improvements on six of the ADP measures at the four-week mark. However, at the end of the ten-week program only one measure of language ability (Gestures subtest) remained significant. The researchers hypothesized that this loss of gains made may have been a result of changing to an independent breathing practice at the four-week mark.

The statistical analyses used by Marshall et al. (2014) enabled them to make strong assertions regarding the validity of their results. They had adequate power and set their significance levels appropriately at 0.05. The within-subjects design reduced the variance associated with individual differences and gave power to their findings. The subject characteristics were given in detail and groups were similar at baseline in terms of important factors like time post-stroke and level of aphasia severity for the IWA group. Additionally, the methods were detailed and described sufficiently for replication by other researchers, which improved the strength of the study. Limitations of the research include the absence of a control condition. With a control group it is possible to look at the impact of the independent variable. Since all of the subjects received treatment there was no comparison group to determine conclusively if the treatment had an effect. Also, the research design did not mention the concealment of the study's purpose and hypothesis to the examiners and UNB practitioner. Inadequate blinding of the study's purpose and participant group could lead to biases in the data collection and treatment implementation.

Although significant results were found suggesting that UNB had improved language abilities, they did not hold over the entire ten weeks. Further investigation is necessary to rule out the possibility that this was due to the change in administration of the UNB (instructed vs. independent) partway through the study. This paper offers suggestive evidence that instructed practice of UNB improves language outcomes in aphasics. UNB

may be an effective treatment option, but more evidence is needed to support these findings.

Discussion

The papers reviewed offered different levels of evidence and validity, but overall the findings are suggestive that mind-body therapies improve language outcomes in persons with aphasia.

There were some overall limitations of the literature reviewed. Firstly, the single-subject designs, with the exception of Orenstein et al. (2012), did not include multiple baselines in the design and the within-group studies reviewed did not include age- and sex-matched controls. The absence of multiple baselines and matched controls prevent definite empirical conclusions. Secondly, statistical analyses were not employed in the single-subject designs, so the significance of the results could not be determined in order to draw definitive conclusions. Lastly, with the exception of Murray and Ray (2001) who included follow-up treatment sessions, the literature reviewed did not include follow-up studies or maintenance measures that would have allowed for investigation of long-term effects. Therefore, more rigorous investigation of mind-body therapies is warranted in the future.

Overall, there were some universal strengths of the research. All of the research reviewed report only positive results supporting mind-body therapies. On the whole, the treatment programs were simple and well described making them an easy therapy to replicate and integrate into treatment. The literature reported that many of the subjects continued with their mind-body therapy practice following the study period. This suggests that these interventions are motivating and maintainable, making them feasible therapies to implement.

Future studies should include the use of age- and sex-matched control or multiple baselines in single subject designs and appropriate statistical analysis. The addition of follow-up studies and maintenance measures would allow for investigation of the effects over the long term. Future directions for research could include studies looking at the ability of patients to successively carry out the various mind-body therapies independently. It would be helpful to see how patients could use the therapy without the direct supervision of a clinician. Further research documenting the physiological effects of these therapies on persons with aphasia would be beneficial in order to fully understand how such a procedure aids communication. In addition, research evaluating the participants' baseline levels of anxiety and attention would be useful. Since the proposed mechanism behind mind-body therapies is that they act to decrease anxiety and increase attention, it is important to determine if participants benefit more from mind-body therapy depending on their baseline level of attention and anxiety.

Conclusion

There is suggestive evidence that mind-body therapies improve language outcomes in persons with aphasia. Due to the small body of literature published, further studies replicating the results would substantiate these initial findings.

Clinical Implications

Currently mind-body therapies are not commonly used in speech and language therapy. However, in a survey by Marshall and Basilakos (2014), the majority of clinicians said that they would consider using them with their clients. Knowing that clinicians are open to the possibility of employing these techniques, it is relevant to discuss how they might fit into clinical practice in the future. Overall, the literature reviewed provides preliminary support for the use of mind-body therapies in persons with aphasia. However, before these therapies are incorporated into practice more research is needed. The proposed role of mind-body therapies in language treatment would be more facilitative and as Murray and Ray (2001) demonstrated, mind-body therapies may be beneficial to use prior to traditional language therapy to optimize its effect. Additionally, mind-body therapies are very accessible and low cost, making them a promising adjunctive treatment.

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