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Meditation and Breath Work

The Missing Link in Neurorehabilitation

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Financial Disclosure Statements

Jennifer Llado

-Founder of **Bright Side Therapy, LLC** which produces adult SLP treatment products including the *Meditation FlashBook*.
-Author of **Mindful Healthcare: 20 Brief Exercises to Get in the Zone with Your Patients**

Brenda Lovette

-Founder of **Healthy Expression**, which provides coaching, nutrition education, products and holistic SLP services to clinicians and clients.

Jennifer and Brenda

-Webinar: **Meditation & Breath Work for Clinicians**
-Co-Author and receive royalties for **Relaxation & Mindfulness after Brain Injury** tip card by Lash & Associates



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Learning Objectives

After this course, participants will be able to:

- Explain the positive effects of meditation on the brain resulting in improved mood, stress level and cognitive-linguistic performance.
- Describe potential methods for integrating meditation practices into traditional speech therapy sessions to improve patient outcomes.
- Describe various meditation and breath work practices relevant to enhancing rehabilitation.

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Agenda

Introduction (5 min)
 Guided Meditation & Discussion (5 min)
 Meditation and the Body (10 min)
 Meditation and the Mind (10 min)
 Meditation and the Brain (10 min)
 Evidenced-Based Practice (30 min)
 Guided Practice (10 min)
 Questions (10 min)



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Heart-Centered Meditation

- Place your hand (left if possible) on your heart.
- Imagine that you are breathing in and out through your heart while thinking about something you love.



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The “little” voice



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Meditation Defined

To engage in mental exercise such as concentration on one's breathing or repetition of a mantra for the purpose of reaching a heightened level of awareness.

Warning: *The spiritual connotation associated with meditation can be a barrier for some*

This presentation will give you the science and tools to describe and utilize meditation in an evidenced-based way



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Allostasis

- Parasympathetic / Sympathetic Nervous System
- Homeostasis vs. Allostasis
- Allostatic load



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Relaxation Response

A physical and mental state of rest (Benson)

4 Elements:

- Quiet Environment
- Object to Focus On*
- Passive Attitude*
- Comfortable Position



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The Effect of Meditation on the Body



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Meditation and the Body

- Activates the relaxation response
- Decreased pain
- Decreased blood pressure
- Decreased cortisol
- Decreased heart rate
- Optimized immune system responses



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Effects on Cortisol

Cortisol = stress hormone

Participants: 30 second-year medical school

Practice: 4 day mindfulness training program

Measures: Serum cortisol levels pre and post meditation and mental health questionnaire

Results: Statistically significant decrease in cortisol level after meditation program.



Turakitwanan,W (2013). Effects of mindfulness meditation on serum cortisol of medical students. Journal of Medical Association of Thailand.

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Heart Rate Variability (HRV)

Variation in the time interval between heartbeats
Sympatho-vagal balance

Participants: 18

Practice: Mindfulness Based Stress Reduction (MBSR) vs. controlled respiration vs. spontaneous breathing

Measures: heart rate, respiratory rate, Perceived Stress Scale

Results: MBSR improved sympatho-vagal balance compared to controlled respiration



Najjar, P. S., Puppala, V. K., Dickinson, O., Duval, S. Duprez, D., Kreitzer, M. & Benditt, D. (2014). Modulation of the autonomic nervous system assessed through heart rate variability by a mindfulness based stress reduction program. International Journal of Cardiology.

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The Effect of Meditation on the Mind



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Meditation and the Mind

- Decreased stress
- Decreased pain
- Decreased anxiety
- Decreased depression



Najjar, P. S., Puppala, V. K., Dickinson, O., Duval, S., Duprez, D., Kreitzer, M. & Benditt, D. (2014). Modulation of the autonomic nervous system assessed through heart rate variability by a mindfulness based stress reduction program. International Journal of Cardiology.

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Depression & Brain Injury

Participants: 559 adults with complicated to mild TBI

Measures: Patient Health Questionnaire Depression and Anxiety modules & European Quality of Life Measure. Interviews conducted at 1 month, 6 months, 8 months, 10 months and 12 months post TBI

Results: 53.1% met criteria for major depressive disorder (MDD) at least once in the follow period.

“Assessment and tx of TBI typically focus on physical and cognitive impairments, yet psychological impairments represent significant causes of disability.”



Bombardier, C. et al. (2010). Rates of Major Depressive Disorder in Clinical Outcomes Following Traumatic Brain Injury. Journal of American Medical Association. 303(19): 1938-1945.

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Decreasing Anxiety

Participants: 93 individuals with generalized anxiety disorder

Practice: MBSR vs. Stress Management Education (control)

Measures: Hamilton Anxiety Scale, Clinical Global Impression of Severity & Improvements, Beck Anxiety Inventory

Results: MBSR improved stress reactivity and coping



Najjar, P. S., Puppala, V. K., Dickinson, O., Duval, S. Duprez, D., Kreitzer, M. & Benditt, D. (2014). Modulation of the autonomic nervous system assessed through heart rate variability by a mindfulness based stress reduction program. International Journal of Cardiology.

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The Effect of Meditation on the Brain

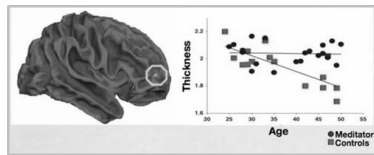


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Meditation and the Brain

- Increased cortical thickness
- Decreased activity in the amygdala
- Increased grey-matter in the hippocampus and the temporo-parietal junction
- Increased cerebral blood flow in the prefrontal cortex, thalamus, putamen, caudate nucleus and midbrain
- Increased gyrification



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Evidenced-Based Practice for SLPs



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Meditation & Cognition

Statistically significant improvements in:

Memory

Alexander et al., 1989; Newberg et al., 2010a; Grant et al. 2010, Innes et al., 2012

Executive functions

Alexander et al., 1989; Newberg et al., 2010a

Attention

Alexander et al., 1989; Pagnoni & Cekic, 2007; van Leeuwen et al., 2009; Prakash et al., 2012

Language

Alexander et al., 1989; Newberg et al., 2010a; Marshall et al., 2014 & 2015



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Kirtan Kriya Instructions

While sitting with a straight spine and eyes closed, repeat the mantra “Saa Taa Naa Maa” with your hands in your lap using the finger positions as described below:

Sa: Touch index fingers to thumbs

Ta: Touch middle fingers to thumbs

Na: Touch ring fingers to thumbs

Ma: Touch little fingers to thumbs

Sing in a normal voice (2 minutes)

Sing in a whisper voice (2 minutes)

Say the mantra silently to yourself (4 minutes)

Reverse: whisper (2 minutes), normal voice (2 minutes)

Inhale deeply and stretch your arms above your head and sweep them down slowly on the exhale.



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Kirtan Kriya

Participants: 15 adults (3 Alzheimer's, 5 MCI, 7 age related memory impairments) ages 52-77

Frequency/Duration: 12 minutes daily x 8 weeks

Measures: WAIS, category fluency, Trails A + B, Logical Memory task pre and post program

Results: increase in cerebral perfusion in prefrontal, parietal, and auditory cortex, improvement in verbal fluency, part B in Trail making test and logical memory in the meditating group.



Newberg, A. B., Wintering N, Khalsa D.S., Roggenkamp H, & Waldman M. R. (2010). Meditation effects on cognitive function and cerebral blood flow in subjects with memory loss: A preliminary study. J Alzheimer's Dis. 20(2).

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Kirtan Kriya



Newberg, A. B., Wintering N, Khalsa D.S., Roggenkamp H, & Waldman M. R. (2010). Meditation effects on cognitive function and cerebral blood flow in subjects with memory loss: A preliminary study. J Alzheimer's Dis. 20(2).

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CONTINUED™

Kirtan Kriya & Music

Participants: 60 adults with subjective cognitive decline (strong predictor of Alzheimer's)

Frequency/Duration: KK- 12 minutes/day x 3 months. Music- 12 minutes of listening/day x 3 months

Measures: Memory Functioning Questionnaire, Trail-making test A/B, Digit-Symbol Substitution Test at baseline, 3 months and 6 months



Innes, K. Selfe, T.K., Khalsa, D.S., Kandati, S. (2017). Meditation and Music Improve Memory and Cognitive Function in Adults with Subjective Cognitive Decline: A pilot randomized controlled trial. *Journal of Alzheimer's Disease* 56 (3): 899-916.

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Kirtan Kriya & Music

Results: Both groups showed marked and significant increases at 3 months in memory and cognitive performance ($p < 0.04$). At 6 months, gains were maintained or improved ($p < 0.006$)

Conclusions: "Meditation and music listening can significantly enhance both subjective memory and objective cognitive performance in adults with SCD and may offer promise for improving outcomes in this population."



Innes, K. Selfe, T.K., Khalsa, D.S., Kandati, S. (2017). Meditation and Music Improve Memory and Cognitive Function in Adults with Subjective Cognitive Decline: A pilot randomized controlled trial. *Journal of Alzheimer's Disease* 56 (3): 899-916.

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Yoga & Meditation Pilot

Participants: 25 adults 55+ years of age with MCI split into 2 groups: 14 in yoga and 11 in memory enhancement training (MET)

Frequency/Duration: Yoga-1 hour a week and KK meditation 12 minutes/day. MET- curriculum divided over 12 weeks with 60 minutes sessions

Measures: fMRI, GDS, Rey-O delayed recall, CVRF, CIRS, HVLIT delayed



Eyre, H.A, Acevedo, B., Yang, H., Siddarth, P., Van Dyk, K., Ercoli, L., Leaver, A., St. Cyr, N., Narr, K., Baune, B., Khalsa, D. & Lavretsky, H. (2016). Changes in Neural Connectivity and Memory Following a Yoga Intervention for Older Adult: A pilot study. *Journal of Alzheimer's Disease* 52: 673-684.

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Yoga & Meditation Pilot

Results: Yoga group showed statistically significant improvement in depression and visuospatial memory.

fMRI showed increased verbal memory performance connectivity between DMN and frontal medial cortex, pregenual anterior cingulate cortex, R middle frontal cortex, posterior cingulate cortex and L lateral occipital cortex. Increased verbal memory also correlated with increased connectivity between language processing networks and L inferior frontal gyrus.

Increased visuospatial memory correlated inversely with connectivity between superior parietal networks and medial parietal cortex.



Eyre, H.A, Acevedo, B., Yang, H., Siddarth, P., Van Dyk, K., Ercoli, L., Leaver, A., St. Cyr, N., Narr, K., Baune, B., Khalsa, D. & Lavretsky, H. (2016). Changes in Neural Connectivity and Memory Following a Yoga Intervention for Older Adult: A pilot study. *Journal of Alzheimer's Disease* 52: 673-684.

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Yoga & Meditation Pilot

Conclusion: “KK yoga and MET were both effective in improving memory functions (namely memory recall) and functional connectivity-related to verbal, attentional, and self-regulatory performance.”

“Yoga may be as effective as MET in improving functional connectivity in relation to verbal memory performance.”



Eyre, H.A. Acevedo, B., Yang, H., Siddarth, P., Van Dyk, K., Ercoli, L., Leaver, A., St. Cyr, N., Narr, K., Baune, B., Khalsa, D. & Lavretsky, H. (2016). Changes in Neural Connectivity and Memory Following a Yoga Intervention for Older Adult: A pilot study. *Journal of Alzheimer's Disease* 52: 673-684.



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A Preventative Strategy for Neurological Disease

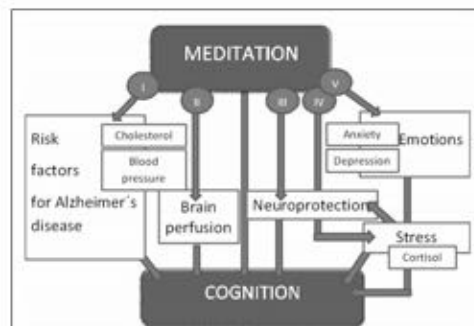


FIGURE 1 | Suggested influence of meditation on cognitive functions.

The figure shows proposed ways how meditation impacts cognitive functions. The effect of meditation on cognition is both direct and indirect (I–V): meditation positively influences hypercholesterolemia and hypertension which represent risk factors for Alzheimer's disease (I). Further it increases cerebral blood flow (II) and has a protective effect on the cortical thickness (III). Meditation further reduces stress (IV), anxiety, and depression (V). All these mechanisms lead to better cognitive functions.

Macinik, R. Sheardova, K. Cermakova, P. Hudecek, D. Sumec, R. & Hort, J. (2014). Effects of meditation on cognitive functions in context of aging and neurodegenerative diseases. *Frontiers in Behavioral Neuroscience*, 8: 17.



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Mindfulness & Brain Injury

Participants: 25 participants ages 18-62 (10 stroke, 5 TBI, 7 autoimmune, 3 others with post injury period of >10 months)

Frequency/Duration: 10 week group with weekly 2-hour sessions of the Mindful Attention Program (MAP)

Measures: Difficulties in Emotional Regulation Scale, Freiberg Mindful Inventory, CA Verbal Learning Test-II, Paced Auditory Addition Test Continuous Performance Test of Attention



Azulay, J. & Mott, T. (2016). Using Mindfulness Attention Meditation (MAP) with Mixed Brain Injury Population to Enhance Awareness and Improve Emotional Regulation. Journal of Psychology and Clinical Psychiatry 6 (5).

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Mindfulness & Brain Injury

Results: Clinically meaningful improvements noted in emotional regulation, moment-to-moment awareness and on measures of central-executive aspects of working memory and regulation of attention

Conclusions: “A Mindfulness Attention Program designed for brain injury can positively impact emotional regulation with a mixed brain injury population.”



Azulay, J. & Mott, T. (2016). Using Mindfulness Attention Meditation (MAP) with Mixed Brain Injury Population to Enhance Awareness and Improve Emotional Regulation. Journal of Psychology and Clinical Psychiatry 6 (5).

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Unilateral Nostril Breathing Instructions

- Block the LEFT nostril
- Breath in and out through RIGHT nostril.
- Work towards doubling the exhale.



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Unilateral Nostril Breathing

Participants: 11 individuals post L CVA ages 31-74

Practice: 1-hour instruction once a week for the 1st 4 weeks and 5-40 minutes of home practice daily x 10 weeks

Measures: attention (RTT, CPT), language (ADP, COWAT), spatial abilities (BJLOT), depression, anxiety before, during, and after UNB treatment.

Results: UNB significantly decreased levels of anxiety. Performance on language measures increased for the individuals with aphasia

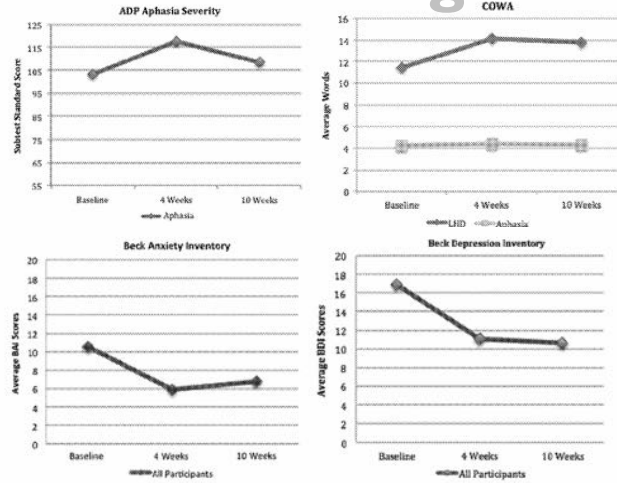


Marshall, R., Basilakos, A. Williams, T & Love-Myers, K. (2014). Exploring the benefits of unilateral nostril breathing practice post-stroke: attention, language, spatial abilities, depression, and anxiety. *Journal of Alternative and Complementary Medicine*. 20(3): 185-194.

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Unilateral Nostril Breathing



Marshall, R., Basilakos, A. Williams, T. & Love-Myers, K. (2014). Exploring the benefits of unilateral nostril breathing practice post-stroke: attention, language, spatial abilities, depression, and anxiety. *Journal of Alternative and Complementary Medicine*. 20(3): 185-194.

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Unilateral Forced Nostril Breathing

Participants: 3 participants with aphasia

Practice: 40 minutes per day at home following instruction plus conventional aphasia therapy

Measures: WAB-R, CADL-2, Apraxia Battery for Adults (if needed) pre and post intervention

Results: Increase in CADL-2 scores, slight trend of increasing WAB-R aphasia quotients



Marshall, R., Laures-Gores, J. Williams, T. DuBay, M. & Bryant, T. (2015). Unilateral forced nostril breathing and aphasia--exploring unilateral forced nostril breathing as an adjunct to aphasia treatment: a case series. *Journal of Alternative and Complementary Medicine*. 21 (2):91-9.

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Guided Practice



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Breath Work Observation

- Be still
- Notice your breath
- Attend to the way the muscles work
- Find the breathing reflex
- Be aware of emotions, thoughts etc.



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Breath Work

Breath in 1...2...3...4

Breath out 1...2...3...4

Breath in 1...2...3...4

Hold breath 1...2...3...4...5...6...7

Breath out 1...2...3...4...5...6...7...8



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Clinical Application



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continued™

Translating Mindfulness into Concrete Goals

Areas of Focus: Attention, Memory, Language

Examples:

- Pt will utilize strategies to establish focused attention during functional tasks in 4/5 trials given mod cues.
- Pt will demonstrate recall of multistep instructions in 4/5 trials with min cues.



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Translating Mindfulness into Documentation

Meditation Activity	Corresponding SLP Goal
Heart-centered meditation	Client will utilize strategies to establish focused attention during functional tasks In 4/5 trials given mod cues.
Treatment Note Client demonstrated loss of focused attention d/t internal distraction on 2 occasions during today's 30 minute session. Client benefited from mod cues to recall and initiate mindfulness technique. After 3 minutes of guided practice, client was able to maintain focused attention for the remainder of task.	



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Barriers

- **Scope of practice**
- **Patient buy-in**
- **?**



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Resources

- **National Center for Complimentary and Integrative Health**
 - <https://nccih.nih.gov/health/meditation>
- **Smart Phone Apps**
 - Headspace
 - Calm
 - Mindfulness Bell
- **Holistic SLP Mastermind Group**
 - <https://www.facebook.com/groups/1630109593907211/>



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Questions & Comments...

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