NYU Langone Health

Fall/Winter 2023-2024

Mind Matters

Alzheimer's Disease Research Center (ADRC)
Silberstein Alzheimer's Institute
Center for Cognitive Neurology

Table of Contents

Section 1:
Singing for Brain Health
By: Kendra Ray, PhD, MT-BC

Kendra Ray, PhD, MT-BC researches the effectiveness of music therapy on reducing symptoms of dementia.

Have you ever heard that singing is good for your brain health? According to the literature, singing decreases stress, preserves speech in people with dementia, improves opportunities for social engagement, and can lead to increased neuroplasticity. Let's unpack the benefits of singing for your brain.

Being in a state of stress can be detrimental to keeping your brain healthy, but adding singing to your daily routine can help you reduce stress. Researchers have found that singing reduces cortisol, which is a biomarker for stress. In addition, singing can help our brains release endorphins, those happy hormones. Find a special time in your day to sing. You might find it easier to sing in low-pressure situations, like singing in the shower or belting your favorite tunes in the car. Try humming your favorite songs during your daily walk.

For people with cognitive impairments, singing can spark conversation or help ease word-finding abilities. In a recent study, music therapy researchers Dassa & Amir (2021) from Bar-Ilan University, Israel found that singing improved speech parameters as well as the ability to sing in individuals with mild to moderate dementia who received eight music therapy sessions. Comparatively, the control group who received usual care demonstrated an increase in non-coherent speech during the same period.

In their 2023 report, the Alzheimer's Association suggested that it is important to decrease the risk of cognitive decline by staying engaged in activities.

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Engaging with other people is important for social interaction. Joining a church or community choir, such as The Unforgettables, offers a solution to improve social engagement and reduce loneliness. The Unforgettables is a chorus for people living with dementia and their caregivers and is based in New York. In addition to these benefits, you can also experience the advantages of singing mentioned earlier, such as reduced stress and the potential to make new friends who keep you engaged.

If you want to give your brain an extra boost, try learning new songs to enhance your neuroplasticity. Neuroplasticity refers to your brain's ability to adapt and change. When you learn to sing a new song or attempt to sight-read new music, you are aiding the development of new neurons and connections in your brain. Alongside singing, consider learning to play a musical instrument like the guitar or piano. A recent study conducted in Switzerland discovered that healthy adults aged between 62-78 who learned to play the piano, practicing for 30 minutes a day, five days a week, experienced increased brain volume, improved memory, and longer sleep duration after six months.

The next time you think about keeping your brain healthy, consider the benefits of singing. Your mind and body will greatly appreciate it. If you are interested in engaging with music in a more structured manner, you can find licensed and board-certified music therapists in your area by visiting www.cbmt.org or sign up for our study for people with dementia and their family caregivers at MJHS.org/study. Happy Singing!

Section 2:
Why Donate Your Brain to Science?
By: Arline Faustin, MD

Alzheimer's disease (AD) continues to be the most common dementia diagnosis among older adults and is clinically suspected by way of medical history, neurological exams, neuropsychological testing, analysis of biological samples and imaging. However, a definitive diagnosis of AD can only be given upon examination of brain tissue itself after death.

AD affects different areas of the brain, which explains why AD patients, over the course of the disease, may experience a wide array of symptoms, such as difficulty with memory, learning, speaking, swallowing or walking, as well as changes in mood or behavior. These various control centers can only be studied by examining the brain tissue at autopsy. This is why the gift of brain donation is invaluable to researchers trying to treat and prevent AD and to families looking for a conclusive answer to explain their loved one's cognitive decline.

The post mortem brain is comprehensively examined and histologically evaluated for the presence of the abnormal accumulation of two naturally occurring proteins, amyloid plaques and tau tangles. These proteins are associated with the damage of neurons seen in AD brains and the disruption of communication from neuron to neuron. Drug therapies for various diseases often work by targeting proteins. The goal in AD research is to prevent, slow down or eliminate the effects of these proteins and/or discover other contributing factors feeding this disease, a goal which can only be achieved collectively with the contribution of brain donation.

NYU Langone Brain Donation Program
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Section 3:
Lumbar Punctures: The Facts
By: Omonigho M. Bubu, MD, MPH, PhD with input from Elizabeth Weisberger and Anhiti Dharmapuri

Lumbar puncture (LP), otherwise known as a spinal tap, is a medical procedure in which a needle is inserted into the spinal column and a small sample of cerebrospinal fluid (CSF) is removed. Cerebrospinal fluid is a clear, colorless liquid that surrounds the brain and spinal cord. It serves the purpose of protecting the brain by acting as a shock absorber and providing buoyancy, clearing waste products from the brain, and regulating balance conditions within the central nervous system. A lumbar puncture is a common procedure that serves as a diagnostic tool for collecting CSF. It allows doctors to check for infections, inflammation, or various neurological diseases (such as Alzheimer's disease or AD) within thebrain and central nervous system. LPs help diagnose, monitor, and treat disorders of the central nervous system or infections of the brain, like meningitis, bleeding within the brain, or cancers of the brain and spinal cord.

Cerebrospinal fluid contains various proteins and peptides that researchers measure and analyze when investigating disorders and diseases. These are referred to as biomarkers. The most common biomarkers for AD found in CSF are amyloid beta peptides and tau proteins. An increased amount of these molecules in CSF is a potential indicator in detecting and diagnosing AD, as the CSF is very closely connected with changes in the brain.

Even with modern neuroimaging techniques, LP remains a vital diagnostic tool as CSF analysis provides important diagnostic information for many neurological diseases. In the case of AD, CSF analysis enables the identification of several biomarkers, which are now accepted as part of the established diagnostic criteria. In addition, an LP is the easiest procedure that allows assessment of CSF pressure. Further, LPs are often performed in research to discover novel diagnostic biomarkers and understand brain pathology.

To assess safety and acceptability of conducting an LP in a research setting where there was no acute medical condition or indication for an LP, a large international, multicenter study on LP that included 3,868 patients in a memory clinic setting demonstrated that LPs can be safely performed, with high acceptance rates. In order to perform a lumbar puncture, LP requires several procedural steps. First, you will be directed into a position that allows your back to be arched and flexed to widen the spaces in between the vertebrae where the needle will be inserted. Most commonly, you will be lying on your side with your knees drawn up to your chest or sitting upright and leaning forwards. Next, the puncture area is cleaned with antiseptic solution and a local numbing anesthetic is injected into the lower back. Then, a hollow needle is inserted between two vertebrae in the lower back and CSF is withdrawn (approximately one tablespoon). Lastly, the needle is removed and a bandage is placed over the puncture site. This procedure takes around 30 to 45 minutes.

Overall, there is very little risk to this procedure. During the LP itself, you may feel slight discomfort as the needle is inserted into the spinal column, but this discomfort is lessened with the use of a local numbing anesthetic that is injected at the puncture site. After the procedure, the most common side effect is a headache, but this usually goes away within a few hours. There is also a possibility for back pain or tenderness after the LP, which will dissipate within a few days. Serious side effects are generally uncommon. In the feasibility study cited above, the most important risk factors for post-LP complaints were related to the patient and procedure itself. Patient-related characteristics that increased the risk of post-LP complaints included a history of headache and fear of complications. Procedure-related risk factor for typical post LP headaches included the use of a cutting bevel needle type. A large needle diameter (≤22G, gauge [G]) was a risk factor for severe headache. The number of LP attempts was the only procedure-related risk factor for occurrence of local back pain.

LP can also be done for various research purposes, such as investigating neurodegeneration and AD. People with some medical conditions should not undergo LP, as the procedure may be harmful to them. Examples of those conditions include taking anticoagulant drugs, low blood cell count, or in cases where patients or research subjects have a mass in the brain. Ultimately, LPs is an informative, safe diagnostic and investigative tool that is incredibly beneficial to the future of AD research. Generally, when an LP is performed correctly, the procedure is well tolerated and accepted with a low complication rate.

Section 4:
Leqembi: A New Alzheimer's Disease Drug
By: Martin Sadowski, MD, PhD

On July 6, 2023, the US Food and Drug Administration approved Leqembi (Lecanemab), making it the first disease-modifying therapeutic holding traditional approval for the treatment Alzheimer's disease (AD). Leqembi is a brain penetrant monoclonal antibody administered through an intravenous infusion. It targets beta-amyloid a sticky protein, which accumulation in the brain sets off AD pathological cascade. Leqembi has been tested in patients with early AD, which are those in whom long-standing amyloid deposition already caused accumulation of hyperphosphorylated tau within nerve cells, and brain inflammation. In those patients Leqembi cleared preexisting amyloid deposits, reduced load of hyperphosporylated tau and attenuated brain inflammation, thereby showing evidence for reversing AD pathology.

After 18 months of clinical trial testing, patients treated with Leqembi showed 28% reduction in the cognitive deficit over the placebo group. Adverse effects included transient focal brain swelling and microhemorrhages, which also are known as ARIA-E and ARIA-H, respectively. Though fairly common, these side effects are mainly detected by surveillance brain imaging and in most cases produce no clinical signs or symptoms. They tend to occur at the beginning of Leqembi therapy.

Long-term benefits of Leqembi remain unknown and they are being researched in patients who have been receiving Leqembi for longer than 18 months. There also is an ongoing clinical trial in presymptomatic patients to determine, whether preemptive Leqembi treatment can prevent AD symptoms. Leqembi requires bi-weekly infusions, which might be a nuisance to some patients. Subcutaneous, self-injectable formulation of Leqembi is under development and shows substantial promise.

Section 5:
Steps in the Right Direction: How People Walk May Shed Light on Alzheimer's Disease Risk

By: Wajiha Ahmed, MD, and Arjun Masurkar, MD, PhD

Alzheimer's disease (AD) has long been thought of as a condition primarily driven by memory and other problems with thinking. More recently, our Alzheimer's Disease Research Center (ADRC) and other groups have found that AD may also impact mood, behavior, sensory problems, and physical health. Some of these indicators can manifest at very early stages of the disease, even prior to memory problems. One such physical sign is a subtle change in the manner in which a person walks, otherwise known as gait. Though we think of gait as representing the function of our legs, there is an incredibly complex control of our gait by the brain. Recently, gait has attracted a lot of attention as a marker of dementia. It has been observed that gait can become slower as AD progresses, even beyond what is expected for age. However, there are several other open questions. Do changes in gait predict memory loss and AD? Do changes in gait relate to biological signs of AD? And are there other aspects of gait other than speed, like its symmetry and consistency, that may also be important to assess? Cognizant of these questions, we integrated gait assessment as a part of the ADRC evaluations. While a participant takes several laps on a specially designed walkway with electronic sensors, we can precisely evaluate each step and consider speed, symmetry, and variability among the steps. The information collected during the assessment is then correlated with other measures collected during the exam, such as the cognitive testing, brain imaging, and blood biomarkers of AD.

Our hope is that this work will inform how gait assessment can be used as an early primary screening tool for AD, which could replace invasive and costly clinical tests typically used to diagnose and monitor the disease. Furthermore, embracing such analysis could provide an opportunity for early medical and lifestyle interventions to improve gait, quality of life and change the course of AD.

Section 6:
What's New at the Alzheimer's Disease Research Center (ADRC)

Scientific Contribution Award

We are proud to announce that Thomas Wisniewski, MD, Director of the Alzheimer's Disease Research Center (ADRC), was the recipient of the 2023 American Neurological Association Awards for Excellence in the category of Clinical and Scientific Excellence.

This award was established to recognize an individual who has made novel scientific contributions that reshape the field's conceptual understanding of specific neurological syndromes or diseases, novel or sustained contributions through the development of new therapeutics for neurological diseases, and/or a major contribution that transforms or expands diagnostic tools in neurology.

"The Longest Day"

On June 21, 2023, the Center for Cognitive Neurology wore purple to recognize the "longest day" – the day with the most light, the summer solstice. On the longest day, people from across the world come together to fight the darkness of Alzheimer's disease.

Oscar Wang; Michael Llanos; Akash Patel, MS; Raul Rocha, Henrieta Scholtzova, MD, PhD; Emily Schissler; Muhammad Soliman; Sean Murray, MS; Olivia Cho; Ludovic Debure wore purple to recognize the "longest day".

ADRC Annual Spring Seminar Event

2023 Spring Seminar speaker, Arjun Masurkar, MD, PhD, presented on the amyloid hypothesis in Alzheimer's disease research.

Diana Treitler received an award from ADRC Director, Thomas Wisniewski, MD, acknowledging 30 years of volunteer participation in the ADRC.

The annual NYU ADRC Spring Seminar in June 2023 was a success! We learned from clinicians about the amyloid hypothesis in Alzheimer's disease, music to reduce symptoms of dementia, and healthy eating for healthy aging, followed by a light reception. We also gave out certificates to ADRC volunteers who have been in the study for 10 years or more and commemorative plaques to those in the study for 30 or more years, including:

- Rebecca Rikleen
- Diana Treitler
- Northrup Beuchner

Volunteers are the heart and soul of the work in the fight against Alzheimer's disease. The gift of their time and dedication has enabled us to make breakthrough discoveries, devise cognitive assessments that are routinely used around the world, and improve patient and family care.

Brittany Marti and Emilie Geesey discussed clinical trial research opportunities at the 2023 NYU ADRC Spring Seminar.

Retirement Announcement

Dr. Thet Oo retired from the ADRC after 23 years.

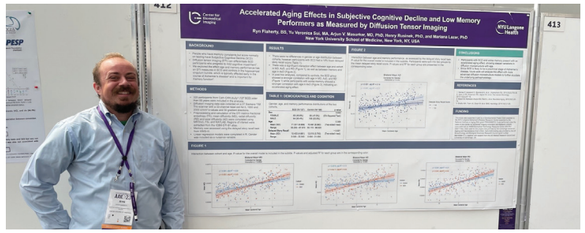
Congratulations to Dr. Thet Oo who retired this spring from the ADRC. He was the Program Coordinator for 23 years. We are grateful to Dr. Oo for his long and outstanding service at the ADRC. He will be deeply missed by both study volunteers and staff.

He reports that in his retirement he has been helping his 8-year-old granddaughter with homework, watching documentaries, cooking Burmese food, shopping at Costco, learning the piano, and occasionally singing karaoke.

Alzheimer's Association International Conference

Anthony Briggs, PhD; Mark Bernard, PhD; Carolina Boza, MPSc; Arjun Masurkar, MD, PhD, attended the Alzheimer's Association International Conference in Amsterdam.

The Alzheimer's Association International Conference is the world's largest meeting dedicated to advancing dementia science. Each year, the conference convenes researchers, clinicians and dementia professionals from all career stages to share breaking research discoveries that will lead to methods of prevention and treatment and improvements in diagnosis for Alzheimer's disease. Researchers from the ADRC attended in July 2023.



Ryn Flaherty presented a poster at the Alzheimer's Association International Conference.

Akash Patel, MS; Henrieta Scholtzova, MD, PhD; and Muhammad Soliman photographed in front of the Alzheimer's Association booth.

2023 Knight ADRC Conference

Anthony Briggs, PhD attended the October 2023 Conference on "Enhancing Participation of Historically Minoritized Groups in Alzheimer Disease and Related Dementias". He received a travel award, supported by the Alzheimer's Association.

Anthony Briggs, PhD, attended a workshop in St. Louis on increasing African American participation in research.

New Staff

Miren Josune Jauregui, MD, is a medical doctor in psychiatry with nearly 30 years of experience in Spain. She also has experience working as a therapist in New York City. Currently, she resides in New York City with her husband, who is a spine surgeon, and her son.

The field of cognitive impairment is multidisciplinary and by leveraging her extensive experience in psychiatry and therapy and her native Spanish, she contributes to research involving Spanish-speaking populations, which can be particularly valuable in such a diverse city. She is eager to expand her knowledge in the field of clinical research and cognitive impairments.

She enjoys listening to live music, especially attending concerts with those featuring her son, who is a musician. Additionally, she has a passion for going to the cinema and indulging in a good book.

Ava Duchin is a volunteer doing recruitment and psychosocial interviews for the ADRC. She is currently enrolled at NYU, majoring in neuroscience with a bioethics minor. Ava is on the pre-medical track, and is one of the class captains of her university's pre-medical fraternity (PhiDE).

In addition, she is a volunteer for Dr. Andrei Cimpian's Cognitive Development Lab and the Dasen lab at NYU Langone. Ava plans to attend medical school, where she hopes to further her study of neuroscience, either in a surgical or research aspect.

In her free time, Ava loves spending time with her friends, finding new coffee shops, traveling to new countries, and writing.

Refer A Friend

Alzheimer's Disease Research Center (ADRC)

Receive $50 for each friend you refer to the ADRC who completes the evaluation and enrolls in the study.

Thank you for participating in the Alzheimer's Disease Research Center study.

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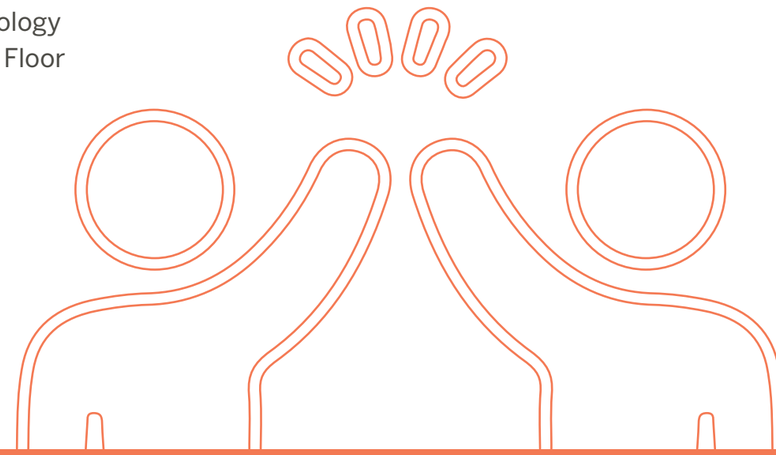

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