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Exploring the Effects of Dance and Movement in Aphasia Rehabilitation

Movement is accessible to almost everyone in varying capacities. The incredible ability that it holds to alleviate stress, improve mood and increase self-efficacy helps to optimize quality of life among those who dance regularly.

Language is considered our optimal, if not our only choice for communicating. Once we lose those language skills, opportunity for connection is damaged and individuals can be left feeling isolated and dejected. Broca's aphasia is an impairment in the abilities to formulate and express language. Often occurring because of stroke, brain injury or as a developing neurodegenerative disease. Individuals with Broca's aphasia can comprehend as the decoder what is being shared with them, but they are unable to express themselves linguistically. This impairment covers all language, spoken and written. The loss of language abilities strip an individual of their usual modality of self-expression and the ability to connect with others through participation in typical conversation.

We know that exercise is intertwined with numerous health benefits. Physical fitness can be practiced through high intensity, low intensity and endurance workouts. Dancing can fall under any of these categories, with different styles and variations in practice. Physical activities vary in their amount of cognitive and motor coordination requirements. This variation makes it possible to identify which types of physical activity can be beneficial for different populations. If we acknowledge dance as a multifaceted, we can see the potential for its role aiding in rehabilitation of fine motor, language and social skills. The complex motor skills that dance requires contribute to improved neurogenesis. Dancing has been shown to have the same effect on humans that an animal would experience living in an enriched environment (Katten-stroth et

al., 2010). At the cognitive level, dance requires procedural memory, visuomotor integration, rhythm and synchronization, as well as the learning and sometimes memorization of intricate motor sequences (Brown, et al. 2006). The process of dance also allows for emotional expression and feelings of connection with others, which are integral tools for mental health.

After spending countless hours in the studio, I can approach dance through two broad concepts. Structured, repetitive movement sequences that are memorized and the practice of fluid, instinctual and immediate improvisation sequences. Both require working memory function, as they entail quick selection and activation of movements with on-the-spot decision making. The action-observation network in our brains is also working to bridge the gap between the movement we're watching and the movement we're producing, allowing improvement in brain plasticity and working memory skills through all variations of dance.

Working memory does not only exist during movement, it also plays a large role in linguistic capacities: "Both language production and language comprehension rely on representations that need to be continuously and rapidly activated, selected, and combined." (Federmeier, K.D., et al. 2020). An increase in brain activity is seen with an increase in working memory (Jordan, A.D., et al. 2020). The practice of improvisation not only increases activity in the brain but allows for interpretation and expression. These two pillars of communication are disrupted by language processing disorders. Restoring individuality comes as a side-effect to aphasia rehabilitation. Losing our first point of connection strips us of more than just linguistic skills. I saw the potential of dance to act as a modality for aphasia rehabilitation. This inspired a movement intervention that also explored the potential for brain stimulation to inspire linguistic expression.

At a local therapy office, the participants who volunteered to join my project allowed me to take over their regular speech therapy appointments with a dance and movement intervention. I joined them for the hour or so that they shared. During this time the speech-language pathologist administered two word-naming assessments, broken up with an improvisational movement intervention between.

The first patient who agreed to participate in the movement intervention was clearly feeling nervous, avoiding eye contact and maintaining a reserved and withdrawn posture. As the speech-language pathologist worked through the initial item-naming assessment, it was clear that the impending dance lesson was weighing on the patient's mind. Losing spoken language strips an individual of previous knowledge on how to connect with others, and without the ability to create small talk and traditional social cues it was almost impossible for the participant to hide her nerves. I had never considered the vulnerability of losing conventional language skills until this first interaction. We can hide behind social etiquette and the norms of polite communication through our words. Once those words are lost, so is the ability to feign any state of mind or comfort level.

As the item-naming assessment wrapped up I prepared the movement portion. We would follow a guided improvisation script aimed at inspiring movement by describing familiar characteristics in nature. I prepared a list of prompts that I shared in order to incite movement, and after the initial concept was shared the participant was invited to move in ways that were inspired by the prompts. In order to assure maximum opportunity for comfort and safety, I invited the participant to stay sitting as we began. Describing water by all of the ways it moves and its existence in all forms invited gentle movement by the participant. Inspired by these descriptions, the speech therapist and I also joined in the movement by mimicking these images

while the patient remained sitting. She was still unsure of the whole process. Gradually, the patient began to move her feet, and soon also her legs. She remained seated for the entire intervention but did allow movement to travel upwards and inspire her arms, head and neck to join the dance. As we continued, with images of trees, wind and water influencing our movement, there was a clear improvement in everyone's moods. The initial uncomfortable barriers that separated us as strangers were broken down as we danced together. As for the patient, it was clear that her level of comfort was enhanced and her mood had improved.

Two other participants volunteered to join in on this exploratory pilot study. Similar occurrences during their sessions reminded me of the power and potential of dance. The second participant was eager to move and demonstrated a large improvement in her mood post-movement. The third came with her caregiver, her husband, who shared that they had first met while dancing. Learning this took me out of the space for a moment and reminded me of the incredible bridge that dance serves as to connect individuals, concepts and consciousness. Dancing with someone else, in pre-choreographed or in improvisational moments, connects individuals intimately without the need for language. Movement seems to go beyond what language can, especially when the trust and shared coordination required of dance come into play. Words are not always necessary when two individuals are able to connect through movement. This can be of value for individuals with aphasia and other language disorders.

Dance and movement are daunting, especially when self-consciousness and vulnerability have become a new state of normal. Feelings of depression among individuals with aphasia averages between 62% and 70% (Worrall, et al. 2016). This prevalence indicates that the loss of language skills greatly affects an individual's ability to hold a positive outlook on life. Once you are left vulnerable without language, it is impossible to craft any other reality or persona to build

confidence. The experience of living with aphasia is unique and dynamic for everyone. Coping mechanisms manifest themselves in various ways but rarely, if ever, is there a way to truly replace what the loss of language has taken. New experiences can be especially intimidating in this state and the commonly referred to concept of dance as being reserved for the talented brings about feelings of discomfort among many people, including those without aphasia.

I could see the obvious mood improvement in the first patient as we were finishing up the movement intervention. As the speech-language pathologist went back over the list of items for the word-naming assessment, I watched the patient sit with an improved posture indicative of her new confidence in the room. She answered each question with greater amplitude and smiled through the last bit of the assessment. Contrasting the first half of the intervention, during which she was uninterested in acknowledging the task at hand or the concept of a movement intervention, there was a new, confident presence in the room. I feel that there is a role for dance to play as a modality for aphasia rehabilitation, if not as an adjunct to already existing practices. Similarities across all patients post-intervention create themes of hopefulness and potential that were not present before the movement during each session.

Dance classes usually begin with most of us students lethargically rolling out their muscles, opting for stretches that require laying on the floor and lazily falling over our legs. No matter the time of day, week, month or year it always seems as though energy levels are dipping all across the studio before class begins. As we move through the exercises, the class builds to a *grande allegro* exercise across the floor that is indicative of the vigor we found throughout the class. I think that most dancers, instructors and choreographers can attest to a newfound vitality that is present at the end of each class. If I find myself in a late-night rehearsal, there is usually little to no chance that I will be falling asleep at an appropriate hour. A dance class before sitting

in a lecture hall always improves not just my mood and energy levels, but also my abilities to focus and think critically. The possibility for these improvements at emotional and cognitive levels to extend into aphasia rehabilitation by including dance as an adjunct to pre-existing practices is evidenced by the improvement in mood and confidence levels of the participants in the pilot study.

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