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# STRICTLY THERAPEUTIC

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THE BENEFITS OF  
BALLROOM DANCING

Music consists of fundamental elements such as rhythm and melody. Temporal organization, patterns of pitch over time, phrases, chord sequences all contribute to the formation of complex relationships between individual structures. It draws heavily on our brainpower; through memory and pattern recognition. As such it is a fertile area of study for conditions relating to the brain. For example, steady beat detection is linked to the basal ganglia; its activity has been studied in rhythm discrimination tasks for Parkinson's disease patients and healthy participants. Discrete musical elements have significant influence on the brain structures responsible for maintaining coordination, movement and memory. At this point, something like the intense choreography of ballroom dancing becomes fascinating; it addresses all areas in this interlinked study.

When we listen to music, we often start to dance or spontaneously move to the rhythm and beat. Studies show increased induction of several brain areas involving motor, auditory areas (Grahn and Brett, 2007) and temporal lobe responsible for memory skills (Hines, 2018), while reproducing or responding to rhythm and beat. Often the same brain structures are activated for musicians and non-musicians – the basal ganglia and the cingulate cortex. However, for non-musicians during tempo, meter and pattern discrimination, additional structural activations in the brain – the bilateral posterior lateral cerebellar hemispheres, to be technical – were observed. Musicians had much higher activations during discrimination tasks, requiring more novel and complex strategies to process and act.

### **Activation of the brain parts during certain operations**

There is a significant connection between rhythmic auditory and rhythmic motor systems where the perception and production of rhythm underpins similar neural mechanisms. It has a strong influence on the organisation of movement in neural time and space. We know that rhythm makes the brain fizz, whether we move to it or not. The idea of an 'internal' beat is important, and the basal ganglia and supplementary areas are the important structures for this (Grahn and Brett, 2007). The cerebellum is also activated during rhythm listening tasks, and it is linked to our internal 'timing'. According to Konox and Jutai, music engages the most important and complex neural systems for attention and memory tasks. As an example, sensory memory, and even more precisely, echoic memory, is associated with auditory perception and allows us to perfectly remember a sound for two seconds, with melody and pitch 'held' in our working memory.

### **Sensorimotor rehabilitation**

The work of Paltsev and Elner shows that the auditory-motor pathway leads to an excitability of motor neurons. Rossignol and Melvill Jones went further, showing that cues from auditory rhythmic structures in turn affect muscle activation patterns – they make our legs shake in time! More recent studies show that our 'gait parameters', the way we walk and move, improve with rhythmic stimulus, with a regular rhythm being essential to reduced variability.

Play something syncopated and the effects are lessened. It is significant in case studies of Parkinson's by Hackney and Earhart, using ballroom dancing as a model due to the rhythmic and cooperative nature of the skill. Furthermore, McIntosh found in 1997 that when led by metronomic and musical-rhythmic cues in time – or coupling ranges – people with Parkinson's Disease were more able to synchronise their stride patterns. Additionally, the influence of dopaminergic medication on gait parameters was studied. In contrast, the medication that improves the production and uptake of dopamine in the brain, which is lacking in the basal ganglia of PD patients, had no influence on synchronisation patterns.

### **Cognitive rehabilitation for AD patients**

Since learning and recall are enhanced while combined with emotion, the importance of music to memory is an area of study. Researchers discovered that functions of short-term memory in patients with Alzheimer's Disease were enhanced when prefrontal-amygdala connections were activated. As projected, hippocampal networks were activated in healthy subjects (Thaut, 2008, p.76). It is crucial to remember that hippocampal neural connections decline in AD patients and the amygdala relates to emotional context. Therefore, emotions and memories associated with music hold significance for memory therapy. Music can facilitate short-term memory functions in dementia. Furthermore, it gives the foundations for wider studies in case of stronger clarity of musical memories than non-musical memories and their intact survival for longer periods of time in disorders connected with memory loss or cognitive deterioration.

### **Ballroom dancing and the elderly**

The significance of music and rhythm is not limited to subjects with Parkinson's or Alzheimer's. The ageing process affects us all; there is a progressive decline in our sensorimotor and cognitive functions, paralleled by an increased prevalence of diseases. A cheery prospect. However, by pursuing certain activities there is a therapeutic benefit. Ballroom dancing is a paired activity; it is done in partnership. This is important for simple reasons of interaction and participation. It also involves rhythm, memory and postural control, initiating movement and terminating it and connecting with a partner during the movements, anticipating and responding.

Ballroom dancing involves many hours of training focused on technique and maintaining the frame of a body. It improves posture and balance. According to Kattenstroth, amateur dance groups showed very good results in geriatric concentration tests. In comparison to non-dancers they had better hand-arm function, preserved muscle strength and sharper sensorimotor coordination. Furthermore, learning new steps is associated with geometric and three-dimensional thinking; this enabled a tangible and significant development in learning capacity, retention and action. In everyday terms, the benefits are positive. A focus group in Brazil involving elderly subjects learning different ballroom dances yielded warming outcomes. The participants appreciated the new opportunities dancing gave them, citing leadership

and independence, but also a freer sense of imagination and creativity. They referred to an 'uplift in self-esteem', but also other tangible effects – a greater flexibility and a sense of 'elegance in movement' (Lima, Vieira, 2007).

### **Alzheimer's disease and dementia**

Patients with Alzheimer's participating in a short-term waltzing programme were observed to make a significant progress in procedural learning (Rosler et.al 2002). While practising salsa, patients improved across measurable parameters, like the Berg Balance Scale which led to a significant decrease in risk of falls (Muir). This is a profound benefit; it is impaired cognition, balance and judgement that lead to falls, and falls are a significant danger for the elderly. Reduction of this kind of incident is life-changing and demonstrates the significance of dance therapies for the vulnerable.

In music therapy for patients with Alzheimer's, sensory stimulation and mental processes organisation are targeted. Studies show an improvement in speech and self-expression, drawing on the engagement in conversation between subjects, and an increase in interaction. (Aldridge, 1994) Dance and movement therapy led to an improvement in visuospatial abilities and planning tasks. A specific study using Latin ballroom dance lessons led to improvement in feelings of happiness for both patients and staff. The combination of music, rhythm and movement is compelling and does great things to brain activation.

**'In addition, rhythm in music has a significant influence on movement in time and space. Music engages complex neural structures associated with attention and memory tasks. It improves our perception, as well as our motor and cognitive skills.'**

Older couple dancing at home  
Credit © iStock / Getty Images Plus



# ‘...ballroom dancing has a unique combination of artistry, coordination, memory and interaction.’

Cognitive functions show a progressive decline in patients with dementia; dance therapy can be considered to have a significant therapeutic impact, none more so than the Argentinian tango, where attention is divided between balance and navigation.

## Conclusion

Ballroom dancing training has been studied to be a cognitive and sensorimotor task that helps improve memory and motor skills of patients struggling with Parkinson's and Alzheimer's Disease. It leads to brain structural and behavioural changes related to balance, gait and both working and long-term memory. The specific and dangerous physical symptoms of both Parkinson's and Alzheimer's – falls, resting tremor, bradykinesia – are ameliorated by music and dance therapy. The physical impact works in harmony with intangible but significant improvements like greater happiness.

Differences in the quality of movement in disabled elderly were observed in situations associated closely with music and dance performances. Crucially, these improvements were visible in more everyday life. Ballroom dancing had an impact on their stride length and flow, with improved balance and decreased risk of fall. Cognitive skills such as dual tasking and planning skills were improved in all areas – away from the dance floor.

Many positive effects of ballroom dancing, observed in both motor and cognitive skills of the elderly, were long-lasting. Life is more enjoyable for participants, they socialize more, interact, and it brings joy and greater satisfaction. It is perhaps worth noting that these benefits are also on tap for the rest of us! In terms of this investigation, it is conclusive: ballroom dancing has a unique combination of artistry, coordination, memory and interaction. It is a highly effective therapy for the elderly. **T**

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