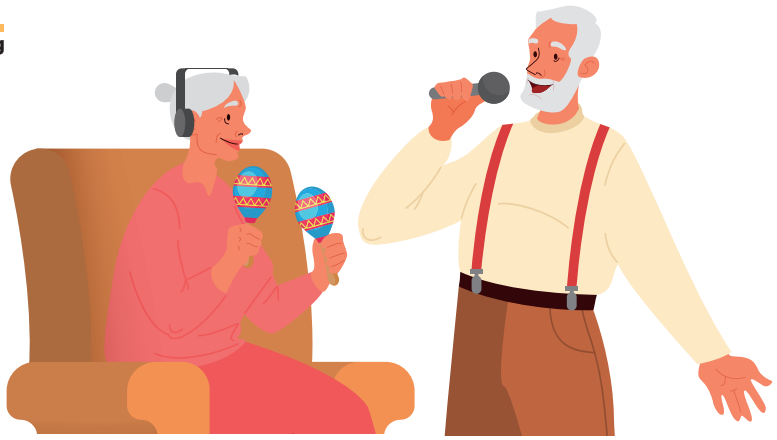

MUSIC THERAPY

Musical interventions
Music medicine – Neurologic music therapy

KEY POINTS

- To reduce signs of anxiety and depression and learn new information in the early stages of the disease; to reduce behavioural and psychological symptoms in the moderate to severe stages.
- This intervention involves memory, emotional and social processes.
- Observed effects are a decrease in behavioural and psychological symptoms, learning new information, an increase in social interaction and an improvement in well-being and quality of life.
- In group, individually or with family caregivers.
- For all people with dementia, regardless of the severity of the disease.

PRESENTATION

A. Definition

Music therapy is defined by the World Federation of Music Therapy (WFMT) as the use of music and/or its musical elements (sound, rhythm, melody, and harmony) by a qualified music therapist, with a client or a group, in a process designed to facilitate and promote communication, relationships, learning, mobilisation, expression, organisation and other relevant therapeutic objectives in order to meet physical, emotional, mental, social, and cognitive needs[1]. There is a traditional differentiation between two main techniques: active music therapy, which consists of using sound-producing objects, musical instruments, or the voice, and receptive (or passive) music therapy, based on listening to music. In practice, it has been found that music therapists tend to combine both techniques.

B. Fundamentals

Music therapy is one of the four major disciplines of art therapy (visual arts, music therapy, drama therapy and poetry therapy). Music therapy historically appear in the field of art therapy, with firstly a psycho-analytic approach. Thus, biological and neurological processes have been often missing from the concerns of music therapists for a very long time, even though the musical experience largely implies sensory, physiological, and neurological mechanisms. Thanks to the progress in neurocognitive research in the field of music cognition, notably using brain-imaging techniques, the better understanding of the neuropsychological mechanisms at work while listening to or practicing music has brought a renewal of music therapy practices. This scientific work has shed light on the active ingredient underlying the benefits of musical interventions[2].

Music interventions for people with Alzheimer's disease are today driven by these scientific literature[3]. During the first stage of the disease, when distress, depression and anxiety are associated with the fall of cognitive performances, receptive musical therapy as psycho-musical relaxation technique is very useful to reduce these disorders[4]. During the severe stage, when verbal communication decreases and apathy becomes the biggest behavioural disorder to handle, music intervention as singing workshops are very pertinent to fight against the apathy and to stimulate verbal communication. Thus, at all stages of severity of the disease, receptive or active musical interventions have complementary impacts. Music can be relaxing or stimulating, and this dual quality brings to music intervention an undeniable interest in neurodegenerative diseases.

THEORETICAL BACKGROUND

A. Processes involved

In order to improve the specificity of approaches, it is crucial to better understand the underlying mechanisms that lead to the positive effects of music interventions. Three main mechanisms help researchers and clinicians to optimally design music interventions according to their therapeutic targets.

- Sensory and emotional appreciation: people with dementia are able to perceive and understand the emotional connotations of musical material and to react to its listening. They usually maintain their sensory and emotional musical appreciation when other cognitive (especially verbal) abilities are completely impaired, even in the severe stages of the disease. Although there is a debate about the alteration of the perception of emotions in neurodegenerative diseases, aesthetic judgment and emotional appreciation seem largely preserved in dementia, especially in Alzheimer's disease[5]. This preserved responsiveness to music allows using the well-known emotional and neurophysiological effects of music on mood and behaviour.
- Mnesic processes: memory of old songs and tunes listened to in their youth are very resistant to the amnesia and semantic memory has been shown to be relatively well-preserved, even at severe stages of the disease[6-7]. This could enlighten why music is a preferred material to use in reminiscence therapy, to trigger autobiographical memories and engage people with dementia in reconnecting with their past and identity, which could in turn contribute to diminishing anxiety or depression. Moreover, music could be used as a mnemonic proxy to decrease the difficulties of verbal learning, particularly at the beginning of the disease.
- Social cognition: music is often a very social activity. Even when listening to music by ourselves, it often triggers our sense of belonging to a social group or reminds us of our relationships. This social aspect of music may be crucial in supporting the communication and connection between people with dementia, their family caregivers or care staff[8].

B. Neurophysiological correlates

It has been well established that listening liked music has an arousing effect, associated with dopamine release[9-10], which awaken people and make them temporary more efficient in different kinds of tasks. This could explain why music can sometimes alleviate apathy of people with dementia. Calm music has been shown to reduce our feeling of stress, as well as the body's physiological response to stress (e.g., decrease of cortisol[11]). This could contribute to explain why music may have a soothing effect and decrease anxiety and aggressive behaviours of people with dementia. Thus, the emotions driven by music could also explain why music could facilitate the encoding of new information[6; 12].

SCIENTIFIC EVALUATION

The benefit of musical intervention is sometimes difficult to demonstrate based on scientific research using strict evidence-based criteria[13]. In the latest update of the review for the Cochrane Database started in 2003[14], researchers perform a meta-analysis including 620 participants. Their conclusions are that music-based therapeutic intervention probably reduces depressive symptoms but has little or no effect on agitation or aggression. A meta-analysis performed from 353 identified papers, corresponding to 1.757 participants allocated to music intervention or control, show that music therapy had positive effects on disruptive behaviour and anxiety, and a positive trend for cognitive function, depression and quality of life[15]. Thus, although not all types of music interventions have been subject to measures of effectiveness, standard interventions (receptive or active) show a validated impact for the reduction of behavioural disorders and cognitive and social stimulation in people with dementia.

By default, musical interventions have an excellent cost-effectiveness ratio, as they are interventions that can be inexpensive, especially for passive listening or singing activities, and do not require special skills of people. The costs to be considered correspond to the staff time dedicated to the animation of these activities (which is the least expensive solution), and possibly to the installation of a room dedicated to musical activities. Of course, it is recommended that the intervention (even when it is simply a matter of listening to music) be mediated by a professional recruited specifically for this purpose, which will increase its scope and effectiveness.

IMPLEMENTATION AND PRACTICAL ADVICE

A. Training and/or knowledge required to provide the intervention

Numerous master's level courses concerning music therapy practices exist today, even if the professional recognition of these courses is quite heterogeneous between countries. These courses increasingly include content concerning cognitive neuroscience studies and offer practical training courses that allow future graduates to become familiar with a specific pathological population. In the context of the management of neurodegenerative diseases, it is essential that practitioners understand the neurocognitive disorders and the consequences on their behaviour. Methodological training is also recommended so that practitioners know how to assess the impact of their interventions.

B. Practical and clinical advice

THERAPEUTIC INTENTION	RECREATIONAL INTENTION
Participants profile Apart including people who are singing out of tune in a choral workshop, all people with dementia, regardless of the stage of severity of the disease, can benefit from this type of intervention.	To restore people self-esteem by showing them that they are still able to participate to and enjoy an activity and to communicate this pleasure with other people, family caregivers or care staff.
Indications ■ Behavioural disorders: mainly anxiety and depression at the beginning of pathology; apathy and language disorders for people with dementia at moderate to severe stages. ■ Cognitive stimulation: reminiscence therapy, semantic and autobiographic memory stimulation, language fluency, motor coordination. ■ Social cognition: social exchanges, cognitive and affective empathy.	Listening to or singing popular hits is a basic activity in specialised institutions, which can basically be a cultural animation, but can have a real impact on the health of the participants if this activity has targeted objectives and is part of an overall care strategy of the medical team.
Contra-indications Some people might not be receptive to certain types of musical intervention. Beyond an assessment of the auditory perception, it is important to estimate if music stimulation conveys positive emotions and therefore potentially represents a "reward" for a participant. Before recommending a musical intervention, using a scale like the Barcelona Music Reward Questionnaire (BMRQ) could be very relevant in order to measure whether music is an area of interest for the person. Deafness or severe hearing impairment without hearing aids.	Rare risk of opposition or crying in some people. Therefore, we should not be afraid to suggest listening to unknown music or songs, which may please the participants without the risk of bringing back difficult memories. Deafness or severe hearing impairment without hearing aids.
Contributors Preferably, the practitioners should be dedicated professionals with academic training in music therapy for people with dementia.	It is always interesting to involve family caregivers in these activities, especially if they take place at home.
Setting of intervention Use a dedicated space (music room), or by default ensure that the activity is ritualised in the same institutional context or at home.	The location of interventions can also provide an important context for social interaction or shared cultural references.
Dosage Individual or group sessions of 4 to 8 participants. ■ Period: cycle of 6 to 8 sessions. ■ Frequency: one by week at least. ■ Duration: one to one hour and a half session. *Ensure that participants with hearing impairments are properly fitted with hearing aids.*	Individual or group sessions of 4 to 8 participants. It can be interesting to end a cycle of interventions by a public presentation or by listening to a concert thematically related to the music used in the workshops. *Ensure that participants with hearing impairments are properly fitted with hearing aids.*
Session sequencing **1** Recall the context, introduce the people; **2** Warming up (in case of active interventions and singing workshops); **3** Content/specific work of the workshop; **4** Playful conclusion.	It is important to repeat the same content from one session to the next throughout an intervention cycle. The repetition will allow a better adaptation and a pleasure that increases over the sessions.
Observance / Attendance It should be observed during the sessions that people become increasingly comfortable and enjoy the workshop.	It is sometimes possible to observe outside of workshop times people singing tunes heard during music interventions. Try to start an exchange based on these spontaneous productions.
Assessment ■ In terms of psycho-social benefits, there are many geriatric scales to measure well-being or self-esteem, as well as mood scales [Behavioural Pathology in Alzheimer's Disease Rating Scale (BEHAVE-AD), Neuropsychiatric Inventory (NPI), Cohen-Mansfield Agitation Inventory (CMAI), etc.]. ■ At the cognitive level, it is possible, for example, to measure the increase in the feeling of familiarity for the music heard in workshops, and to measure the quality of recalling personal memories in reminiscence workshops. Other cognitive measures are possible[3].	Filming and planning small concerts at the end of a cycle of workshops allows to fix the progress and the pleasure taken in the activity.

FOR MORE INFORMATION

- Cuddy L., Belleville, S., & Moussard, A. (2020). *Music and the Aging Brain,* Academic Press.
- World Federation of Music Therapy (WFMT): https://wfmt.info/

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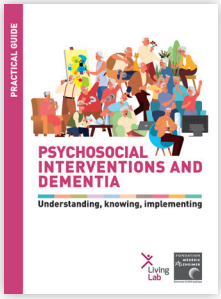

This sheet corresponds to a chapter of the guide ***Psychosocial interventions and dementia: understanding, knowing, implementing*** directed by the Fondation Médéric Alzheimer.

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