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[Intervention Review]

Music interventions for acquired brain injury

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ABSTRACT

Background

Acquired brain injury (ABI) can result in impairments in motor function, language, cognition, and sensory processing, and in emotional disturbances, which can severely reduce a survivor's quality of life. Music interventions have been used in rehabilitation to stimulate brain functions involved in movement, cognition, speech, emotions, and sensory perceptions. An update of the systematic review published in 2010 was needed to gauge the efficacy of music interventions in rehabilitation for people with ABI.

Objectives

To assess the effects of music interventions for functional outcomes in people with ABI. We expanded the criteria of our existing review to: 1) examine the efficacy of music interventions in addressing recovery in people with ABI including gait, upper extremity function, communication, mood and emotions, cognitive functioning, social skills, pain, behavioural outcomes, activities of daily living, and adverse events; 2) compare the efficacy of music interventions and standard care with a) standard care alone, b) standard care and placebo treatments, or c) standard care and other therapies; 3) compare the efficacy of different types of music interventions (music therapy delivered by trained music therapists versus music interventions delivered by other professionals).

Search methods

We searched the Cochrane Stroke Group Trials Register (January 2016), the Cochrane Central Register of Controlled Trials (CENTRAL) (2015, Issue 6), MEDLINE (1946 to June 2015), Embase (1980 to June 2015), CINAHL (1982 to June 2015), PsycINFO (1806 to June 2015), LILACS (1982 to January 2016), and AMED (1985 to June 2015). We handsearched music therapy journals and conference proceedings, searched dissertation and specialist music databases, trials and research registers, reference lists, and contacted relevant experts and music therapy associations to identify unpublished research. We imposed no language restriction. We performed the original search in 2009.

Selection criteria

We included all randomised controlled trials and controlled clinical trials that compared music interventions and standard care with standard care alone or combined with other therapies. We examined studies that included people older than 16 years of age who had ABI of a non-degenerative nature and were participating in treatment programmes offered in hospital, outpatient, or community settings. We included studies in any language, published and unpublished.

Data collection and analysis

Two review authors independently extracted data and assessed the risk of bias of the included studies. We contacted trial researchers to obtain missing data or for additional information when necessary. Where possible, we presented results for continuous outcomes in meta-

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analyses using mean differences (MDs) and standardised mean differences (SMDs). We used post-test scores. In cases of significant baseline difference, we used change scores. We conducted a sensitivity analysis to assess the impact of the randomisation method.

Main results

We identified 22 new studies for this update. The evidence for this update is based on 29 trials involving 775 participants. A music intervention known as rhythmic auditory stimulation may be beneficial for improving the following gait parameters after stroke. We found a reported increase in gait velocity of 11.34 metres per minute (95% confidence interval (CI) 8.40 to 14.28; 9 trials; 268 participants; P < 0.00001; moderate-quality evidence). Stride length of the affected side may also benefit, with a reported average of 0.12 metres more (95% CI 0.04 to 0.20; 5 trials; 129 participants; P = 0.003; moderate-quality evidence). We found a reported average improvement for general gait of 7.67 units on the Dynamic Gait Index (95% CI 5.67 to 9.67; 2 trials; 48 participants; P < 0.00001). There may also be an improvement in gait cadence, with a reported average increase of 10.77 steps per minute (95% CI 4.36 to 17.18; 7 trials; 223 participants; P = 0.001; low-quality evidence).

Music interventions may be beneficial for improving the timing of upper extremity function after stroke as scored by a reduction of 1.08 seconds on the Wolf Motor Function Test (95% CI -1.69 to -0.47; 2 trials; 122 participants; very low-quality evidence).

Music interventions may be beneficial for communication outcomes in people with aphasia following stroke. Overall, communication improved by 0.75 standard deviations in the intervention group, a moderate effect (95% CI 0.11 to 1.39; 3 trials; 67 participants; P = 0.02; very low-quality evidence). Naming was reported as improving by 9.79 units on the Aachen Aphasia Test (95% CI 1.37 to 18.21; 2 trials; 35 participants; P = 0.02). Music interventions may have a beneficial effect on speech repetition, reported as an average increase of 8.90 score on the Aachen Aphasia Test (95% CI 3.25 to 14.55; 2 trials; 35 participants; P = 0.002).

There may be an improvement in quality of life following stroke using rhythmic auditory stimulation, reported at 0.89 standard deviations improvement on the Stroke Specific Quality of Life Scale, which is considered to be a large effect (95% CI 0.32 to 1.46; 2 trials; 53 participants; P = 0.002; low-quality evidence). We found no strong evidence for effects on memory and attention. Data were insufficient to examine the effect of music interventions on other outcomes.

The majority of studies included in this review update presented a high risk of bias, therefore the quality of the evidence is low.

Authors' conclusions

Music interventions may be beneficial for gait, the timing of upper extremity function, communication outcomes, and quality of life after stroke. These results are encouraging, but more high-quality randomised controlled trials are needed on all outcomes before recommendations can be made for clinical practice.

PLAIN LANGUAGE SUMMARY

Music interventions for acquired brain injury

Review question

We reviewed the evidence for the effects of music interventions on functional outcomes in adults with acquired brain injury.

Background

Acquired brain injury (brain damage through accident or illness, including stroke, that is unlikely to degenerate further) can cause problems with movement, language, sensation, thinking, or emotion. Any of these can severely reduce a survivor's quality of life. Many new treatments have been developed to help recover lost functions and to prevent depression. Music interventions involve using music to aid rehabilitation. Specific treatments may include using rhythm to aid movement and walking; playing music instruments to improve movement; singing to improve speaking and voice quality; listening to music to improve pain management, mood, or thinking; and playing and composing music to improve a sense of well-being.

Study characteristics

We aimed to identify research studies that tested music interventions combined with standard care for adults with acquired brain injury who were receiving rehabilitation in hospital or community settings. We looked for research that tested the effects of music interventions on walking, moving, communicating, thinking, emotions, pain, and well-being. Interventions included moving to music, singing, listening to music, composing, playing musical instruments, or a combination of these. We identified and included 29 trials involving 775 adult participants. The evidence is current to June 2015.

Key results

The results suggest that music interventions using rhythm may be beneficial for improving walking in people with stroke, and this may improve quality of life. Music interventions may be beneficial for improving the speed of repetitive arm movements and communication in people with stroke. Music interventions that use a strong beat within music may be more effective than interventions where a strong

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beat is used without music. Treatment delivered by a trained music therapist might be more effective than treatment delivered by other professionals. Information was insufficient to examine the effects of music interventions on other outcomes. We found no studies that reported on harmful effects.

Quality of the evidence

The quality of the research was generally low. We found only one study that we considered as having a low risk of bias. The quality of the evidence for walking speed and stride length was moderate. The quality of the evidence for other aspects of walking was low. The quality of the evidence for the speed of repetitive arm movements was very low, as was the quality of the evidence for overall communication. The quality of the evidence for quality of life was low. Further clinical trials are needed.