

PRIORITY BRIEFING

The purpose of this briefing paper is to aid Stakeholders in prioritising topics to be taken further by PenCLAHRC as the basis for a specific evaluation or implementation research project. This paper was prepared in 2-3 days.

Can group singing help long term aphasia?

Question ID: 5

Question type: Intervention

Question: Can group singing help long term aphasia?

Population: Subjects aged over 50 yrs, who have suffered a left brain stroke at least two years ago and have been diagnosed with chronic "non-fluent aphasia"

Intervention: Offer a 10 week intensive program of weekly four-hour workshops to practice group singing of music selected by participants of the group. These workshops will be lead by an experienced choral music teacher (who will be paid). Maximum numbers for the group would be 15 and minimum numbers would be 8. Ability to read music is not necessary.

Control: Treatment as usual with a speech and language therapist (four hours weekly for 10 weeks).

Outcome: Outcomes to be measured before and after the singing workshops and at least one 6 month interval. Individual Standard Aphasia Measures administered by Speech and Language Therapists to assess speech improvements. Emotional and social outcomes which might be improved by working together purposefully in a group. This study will contribute to the growing knowledge of brain plasticity by suggesting the relationship between speaking and singing.

*Please note the details in the box are from the original submission and have been edited where necessary for clarity and precision

Aphasia: Aphasia is an acquired communication disorder that impairs a person's ability to process language, but does not affect intelligence. Aphasia impairs the ability to speak and understand others, and most people with aphasia also experience difficulty reading and writing. Aphasia is caused by damage to the parts of the brain that are responsible for understanding and using language. Common causes of brain damage that can trigger aphasia include stroke, severe head injury, brain tumour and conditions that damage the brain and nervous system over time e.g. Alzheimers disease. There are three types of aphasia: Broca's aphasia (non-fluent) is where a person has great difficulty speaking and can only manage to string a small number of words together in short, halting sentences, however, it is usually possible to understand the meaning of their speech; Wernicke's aphasia is where a person is able to speak normally and use long, complex sentences, but the actual words that they use do not make sense, or they include nonsense words in their speech; Global aphasia is the most

severe form, someone with the condition has difficulty with all forms of communication, including speaking, reading, writing, correctly naming objects or people and understanding other people's speech.

The Health Problem:

Information available from the NHS suggests that Aphasia is one of the most common problems arising from conditions affecting the brain. Speakability, a charity for people affected by aphasia, estimates that there are currently 250,000 people in the UK who have aphasia, with 20,000 new cases occurring each year. SIGN guidelines for management of people after stroke (2010) report that the proportion of people with stroke demonstrating aphasia at initial assessment after stroke varies from 20% to 38%. In one study 12%, 6% and 20% have mild, moderate and severe impairment, respectively and 19% continue to have aphasia at six months.

Most people affected by aphasia are 65 or over. This is because stroke and common progressive neurological conditions, such as Alzheimer's disease or other types of dementia, tend to affect people in this age group. The outlook for people with aphasia depends on the cause of the condition, the extent of the initial brain injury and the severity of symptoms. However, most people with aphasia will make at least some degree of recovery and many will recover fully.

Currently, Speech and Language Therapy (SLT) is the service for people with aphasia. SLT is a general term used to describe a range of different treatments that can help problems with speech and language. It is suggested that after stroke this therapy should be provided intensively for at least two hours per week in order to achieve improved outcomes.

There is just one support group specifically for people with aphasia in Devon and none in Cornwall, although several more general stroke support groups exist.

Information on costs and local data could not be found.

Guidelines:

The SIGN guideline for Management of Patients with Stroke: Rehabilitation, Prevention and Management of Complications, and Discharge Planning (2010) state that aphasic stroke patients should be referred for speech and language therapy. Where the patient is sufficiently well and motivated, a minimum of two hours per week should be provided. Choral support is not mentioned.

The national service framework for long term conditions states that the aim is to allow 'people with long term neurological conditions living at home to have ongoing access to a comprehensive range of rehabilitation, advice and support to

meet their continuing and changing needs, increase their independence and autonomy and help them to live as they wish'

NHS Priority:

Regional

SW SHA Priorities framework 2008-11

We have identified no specific stated priorities for the development of services to address aphasia, although stroke and other long-term conditions are highlighted.

QIPP states a priority to adopt best practice care pathways for long term conditions.

Local

NHS Cornwall and NHS Devon have both highlighted a priority to reduce the number and impact of strokes.

Existing Research:

Published research

There has been research in this area dating back to the 1970's but very little is large scale trials. In 2010 a Cochrane review¹ looked at the effectiveness of music therapy for acquired brain injury, including stroke. The review included only seven studies and concluded that Rhythmic Auditory Stimulation could improve physical parameters of gait in stroke patients but that there was not enough research to be able to make assumptions for any other outcomes. We identified two small studies looking at the effectiveness of Melodic Intonation Therapy (MIT - a specific style of singing) on improving speech impairments in Broca's aphasia (non-fluent)^{2,3}. Both studies imply a positive effect of MIT on the word production of patients severely affected with aphasia. The remaining two studies^{4,5} discuss the mechanisms by which these effects may occur. There seems to be a gap in this area which may require trials of effectiveness and cost-effectiveness.

Ongoing research

Amongst many studies looking at aphasia only one clinical trial was found in this particular area. This study is underway in the U.S. investigating the effectiveness of Melodic-Intonation-Therapy and Speech-Repetition-Therapy for Patients With Non-fluent Aphasia. This study is due to complete in December 2012 and is expected to involve approx. 30 participants.

Feasibility:

Information from the James Lind Alliance reports a large number recent questions or concerns regarding aphasia and communication (60 out of over 500 questions). There is a "Singing for the Brain" group which meets fortnightly in

Dartington although it is not specific for aphasia it may be a useful resource for further information.

References:

1) Bradt, J., L. Magee Wendy, et al. "Music therapy for acquired brain injury." Cochrane Database of Systematic Reviews(7). 2010

BACKGROUND: Acquired brain injury (ABI) can result in impairments in motor function, language, cognition, sensory processing and emotional disturbances. This may severely reduce a survivor's quality of life. Music therapy has been used in rehabilitation to stimulate brain functions involved in movement, cognition, speech, emotions and sensory perceptions. A systematic review is needed to gauge the efficacy of music therapy as a rehabilitation intervention for people with ABI. **OBJECTIVES:** To examine the effects of music therapy with standard care versus standard care alone or standard care combined with other therapies on gait, upper extremity function, communication, mood and emotions, social skills, pain, behavioral outcomes, activities of daily living and adverse events. **SEARCH STRATEGY:** We searched the Cochrane Stroke Group Trials Register (February 2010), the Cochrane Central Register of Controlled Trials (The Cochrane Library Issue 2, 2009), MEDLINE (July 2009), EMBASE (August 2009), CINAHL (March 2010), PsycINFO (July 2009), LILACS (August 2009), AMED (August 2009) and Science Citation Index (August 2009). We handsearched music therapy journals and conference proceedings, searched dissertation and specialist music databases, trials and research registers, reference lists, and contacted experts and music therapy associations. There was no language restriction. **SELECTION CRITERIA:** Randomized and quasi-randomized controlled trials that compared music therapy interventions and standard care with standard care alone or combined with other therapies for people older than 16 years of age who had acquired brain damage of a non-degenerative nature and were participating in treatment programs offered in hospital, outpatient or community settings. **DATA COLLECTION AND ANALYSIS:** Two review authors independently assessed methodological quality and extracted data. We present results using mean differences (using post-test scores) as all outcomes were measured with the same scale. **MAIN RESULTS:** We included seven studies (184 participants). The results suggest that rhythmic auditory stimulation (RAS) may be beneficial for improving gait parameters in stroke patients, including gait velocity, cadence, stride length and gait symmetry. These results were based on two studies that received a low risk of bias score. There were insufficient data to examine the effect of music therapy on other outcomes. **AUTHORS' CONCLUSIONS:** RAS may be beneficial for gait improvement in people with stroke. These results are encouraging, but more RCTs are needed before recommendations can be made for clinical practice. More research is needed to examine the effects of music therapy on other outcomes in people with ABI. **MUSIC THERAPY FOR ACQUIRED BRAIN INJURY:** Acquired brain injury can result in problems with movement, language, sensation, thinking or emotion. Any of these may severely reduce a survivor's

quality of life. Many innovative therapy techniques have been developed to help recover lost functions and to prevent depression. Music therapy involves using music to aid rehabilitation. Specific treatments may include the use of rhythmic stimulation to aid movement and walking, singing to address speaking and voice quality, listening to music to reduce pain and the use of music improvisations to address emotional needs and enhance a sense of wellbeing. We identified and included seven studies (involving 184 participants) in this review, all of which were carried out by a trained music therapist. The results suggest that rhythmic auditory stimulation may be beneficial for improving measures of walking, but there was insufficient information to examine the effect of music therapy on other outcomes. Further clinical trials are needed.

2) Straube, T., A. Schulz, et al. (2008). "Dissociation between singing and speaking in expressive aphasia: the role of song familiarity." Neuropsychologia **46**(5): 1505-1512.

There are several reports on the ability aphasic patients have to sing familiar songs, despite having severe speech impairments. Based on these observations it was also suggested that singing might improve speech production. However, recent experimental studies with aphasic patients found no evidence to illustrate that singing improves word production under controlled experimental conditions. This study investigated the role of singing during repetition of word phrases in a patient severely affected with non-fluent aphasia (GS) who had an almost complete lesion of the left hemisphere. GS showed a pronounced increase in the number of correctly reproduced words during singing as compared to speaking excerpts of familiar lyrics. This dissociation between singing and speaking was not seen for novel song lyrics, regardless of whether these were coupled with an unfamiliar, a familiar, or a spontaneously generated melody during the singing conditions. These findings propose that singing might help word phrase production in at least some cases of severe expressive aphasia. However, the association of melody and text in long-term memory seems to be responsible for this effect.

3) Schlaug, G., S. Marchina, et al. (2008). "From Singing to Speaking: Why Singing May Lead to Recovery of Expressive Language Function in Patients with Broca's Aphasia." Music Percept **25**(4): 315-323.

It has been reported that patients with severely nonfluent aphasia are better at singing lyrics than speaking the same words. This observation inspired the development of Melodic Intonation Therapy (MIT), a treatment whose effects have been shown, but whose efficacy is unproven and neural correlates remain unidentified. Because of its potential to engage/unmask language-capable regions in the unaffected right hemisphere, MIT is particularly well suited for patients with large left-hemisphere lesions. Using two patients with similar impairments and stroke size/location, we show the effects of MIT and a control intervention. Both interventions' post-treatment outcomes revealed significant improvement in propositional speech that generalized to unpracticed words and phrases; however, the MIT-treated patient's gains surpassed those of the control-treated patient. Treatment-associated imaging changes indicate that MIT's

unique engagement of the right hemisphere, both through singing and tapping with the left hand to prime the sensorimotor and premotor cortices for articulation, accounts for its effect over nonintoned speech therapy.

4) Jeffries, K. J., J. B. Fritz, et al. (2003). "Words in melody: an H(2)15O PET study of brain activation during singing and speaking." Neuroreport **14**(5): 749-754.

We used H(2)15O PET to characterize the interaction of words and melody by comparing brain activity measured while subjects spoke or sang the words to a familiar song. Relative increases in activity during speaking vs singing were observed in the left hemisphere, in classical perisylvian language areas including the posterior superior temporal gyrus, supramarginal gyrus, and frontal operculum, as well as in Rolandic cortices and putamen. Relative increases in activity during singing were observed in the right hemisphere: these were maximal in the right anterior superior temporal gyrus and contiguous portions of the insula; relative increases associated with singing were also detected in the right anterior middle temporal gyrus and superior temporal sulcus, medial and dorsolateral prefrontal cortices, mesial temporal cortices and cerebellum, as well as in Rolandic cortices and nucleus accumbens. These results indicate that the production of words in song is associated with activation of regions within right hemisphere areas that are not mirror-image homologues of left hemisphere perisylvian language areas, and suggest that multiple neural networks may be involved in different aspects of singing. Right hemisphere mechanisms may support the fluency-evoking effects of singing in neurological disorders such as stuttering or aphasia.

5) Belin, P., P. Van Eeckhout, et al. (1996). "Recovery from nonfluent aphasia after melodic intonation therapy: a PET study." Neurology **47**(6): 1504-1511.

We examined mechanisms of recovery from aphasia in seven nonfluent aphasic patients, who were successfully treated with melodic intonation therapy (MIT) after a lengthy absence of spontaneous recovery. We measured changes in relative cerebral blood flow (CBF) with positron emission tomography (PET) during hearing and repetition of simple words, and during repetition of MIT-loaded words. Without MIT, language tasks abnormally activated right hemisphere regions, homotopic to those activated in the normal subject, and deactivated left hemisphere language zones. In contrast, repeating words with MIT reactivated Broca's area and the left prefrontal cortex, while deactivating the counterpart of Wernicke's area in the right hemisphere. The recovery process induced by MIT in these patients probably coincides with this reactivation of left prefrontal structures. In contrast, the right hemisphere regions abnormally activated during simple language tasks seem to be associated with the initial persistence of the aphasia. This study supports the idea that abnormal activation patterns in the lesioned brain are not necessarily related to the recovery process.