

How does a student music therapist, working within a multi-disciplinary team, address the physical, communication and cognitive needs of two patients who have experienced a left hemisphere mid-cerebral artery (MCA) stroke?

An exploratory case study

An exegesis presented in partial fulfilment
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Masters in Music Therapy

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Abstract

This case study describes a student music therapist's experience in a rehabilitation ward working with two patients who had experienced left hemisphere mid cerebral stroke. Each patient's individual music therapy sessions were documented during their stay in the rehabilitation unit and for a further two months in the community. A variety of music therapy methods were used which specifically targeted patients' needs and capabilities. The research focused on methods used to support patients' physical, communication and cognitive rehabilitation, because these are paramount in patients regaining their independence. The case study involved secondary analysis of data collected over a four month period.

Key findings suggest that music therapy, may have helped these patients with their speech retrieval. Improved gross and fine motor control was demonstrated in one patient using percussion instrument playing and keyboard mastery as the music therapy methods. Breathing exercises enabled phonation in a man who was non-verbal. Other findings suggest that singing familiar songs, listening to self-selected music and moving to music may have aided cognitive recovery in all of these areas. Although the psychosocial areas were not included in the study, both men looked forward to music therapy sessions and demonstrated improved mood when engaged in music therapy. Music therapy seemed to alleviate frustration and anxiety in the rehabilitation setting for one of the men. Further, family involvement in music therapy was positive for both men. This research suggests that music therapy could have contributed positively to the men's rehabilitation and further research focussing on the psychosocial aspects of music therapy in this setting is recommended.

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Introduction

The setting for my research is a stroke rehabilitation ward in the lower North Island of New Zealand. Music therapists have not yet worked specifically in stroke rehabilitation wards in New Zealand. This contrasts with other countries, such as United States of America (U.S.A.), Germany and Australia, where it is becoming more common for music therapists to be members of a multi-disciplinary or inter-disciplinary team within hospital settings (Knight & Wiese, 2011).

This opportunity has enabled me to provide music therapy to patients both in a rehabilitation ward and in the community and to explore the different ways that music therapy can be used to address a variety of physical, cognitive, emotional and social difficulties patients and their families are confronted with post stroke.

The hospital team I worked with included physicians, nurses, physiotherapists, occupational therapists, speech therapists, therapy assistants, a dietician and a social worker. My clinical liaison was a specialist stroke rehabilitation consultant on the ward, who had considerable experience in stroke rehabilitation in the U.S.A.

During my encounter with this system I observed a focus on physical and cognitive rehabilitation, where patients were encouraged to re-learn motor skills, or learn compensatory techniques for every day living, such as standing, pivoting, or punting¹. Patients are usually very motivated to participate in therapy because they want to return home and regain their independence. However often the overwhelming nature of a stroke can leave patients frightened and confused. My music therapy training has given me an understanding and awareness of patients' emotional needs and obviously a large part of my practice had me considering the needs, feelings and capabilities of my patients when working with them. I was aware of allowing patients enough time and space to communicate with me in whatever way they were able. However I wanted to focus on the physical, cognitive and communicative aspects in my research, because these issues seem to be paramount for patients during the acute recovery phase. Recent advances in the field of neurological music therapy are demonstrating that melody and rhythm in particular, can significantly aid patients with their recovery, because music therapy seems to be able to address several areas at once: the physical, the cognitive, the communicative and the emotional.

¹ Punting is the action of using the functional foot to mobilize a wheel chair.

This case study focuses on my experience working as a student music therapist with two men who had each been severely affected by a left hemisphere mid-cerebral artery (MCA) stroke. I had the opportunity to work with both men in the facility, and then continue my treatment with them in the community. Both men suffered similar strokes, and yet their on-going individualized music therapy treatment has been different due to differences in their age, personalities, health, disabilities and plasticity of the brain. For privacy reasons real names have been substituted for pseudonyms throughout this document.

My research question arose out of my natural curiosity about how music therapy might address various problems patients have following a stroke. A preliminary question emerged several weeks after I began my placement and was refined as I collected my data.

How does a student music therapist, working within a multi-disciplinary team address the physical, communication and cognitive needs of two patients who have experienced a left hemisphere mid-cerebral artery (MCA) stroke? An exploratory case study

Literature Review

Stroke and head injuries are the third leading cause of death, and one of the leading causes of long-term disability in New Zealand and U.S.A. (Stroke Foundation of New Zealand, 2011; Goldstein, Bushnell, Adams, Appel, Braun et al., 2011). In New Zealand there are an estimated 45,000 stroke survivors, 35% of whom have aphasia² or other communication disorders such as apraxia³ or dysarthria⁴ (Engelter, Gostynski, Papa, Frei, Born, Ajdacic-Gross, Gutzwiller & Lyrer, 2006). In addition, the rate of decline of stroke is slower in New Zealand than in other high-income countries. This demonstrates that in the future more therapists will be needed in rehabilitation wards to improve outcomes for patients, including music therapists.

Patients often require long-term on-going care because their physical, psychological, and cognitive abilities are affected. However, evidence-based trials have demonstrated that early medical treatment and therapies can lead to improved outcomes and quicker recovery (Langhorne, Bernhardt & Kwakkel, 2011).

Patients who have experienced stroke present with wide ranges and levels of abilities. Partial or complete loss of movement and strength can be the most recognizable effects of stroke. However confusion and problems with cognition and memory are also serious problems for people post stroke, (Knight, & Wiese, 2011) and can make communication difficult or seemingly impossible for patients.

Fatigue is a common issue affecting most patients post stroke, adversely affecting a patient's physical and psychological recovery. The rehabilitation process may take longer due to fatigue (Fletcher, 1992). Factors which can further increase a patient's fatigue level may include age, medications, smoking history, alcohol consumption and pre-existing conditions such as hypertension, diabetes, or visual and aural disturbances (Chestnut, 2011).

² Aphasia is a language disorder affecting speech output. Impairments in language processing include fluency, comprehension, naming and repetition.

³ Apraxia is a disorder of motor speech programming. Patients have difficulty coordinating the palate, the tongue, larynx and pharynx and the rate of movement.

⁴ Dysarthria is a neuro-motor speech disorder involving disturbances in the muscles controlling speech. Speech can be low in volume and slow, lacking in fluency with distorted intonation.

Stroke

Patients can present with different types of stroke or cerebral vascular accident. The most common stroke is an ischemic stroke (approximately 88% of all strokes). This is caused by a blockage of the artery supplying blood to the brain. Another type of stroke is a haemorrhagic stroke. Sudden high blood pressure can cause arteries within the brain to rupture, resulting in blood pooling into the brain (Baker & Tamplin, 2006).

A left hemisphere stroke usually impacts on a patient's physical functioning and their communication. It often affects the motor control and sensory experience of the right side of the body, causing right hemiparesis or hemiplegia. The right upper limb, right lower limb and right side of the trunk is often affected, causing problems with balance and gait. Language disorders for example Broca's aphasia⁵ and Wernicke's aphasia⁶ are also common following a left hemisphere stroke. Disturbances such as perseveration, short attention span, poor short-term memory and right side neglect⁷ can also be associated with a left hemisphere stroke (Baker & Tamplin, 2006, pp. 27-28).

A right hemisphere stroke on the other hand can affect patients in very different ways. Problems can include behavioural changes, problems with hand/eye coordination and the proprioception of body parts. Visual disturbances on the left side including neglect of objects in the left visual field may occur as a result of a right hemisphere stroke (Baker & Tamplin, 2006).

Rehabilitation

The main aim in stroke rehabilitation is for the patient to reach the optimum level of physical independence. Secondary aims include cognitive recovery and speech and communication recovery (Duff, 2009). Duff explains that a proactive involvement by the patient is fundamental to a good outcome. This involvement enables patients to set goals which can then be broken down into manageable portions by the therapists. This is thought to facilitate a patient's long-term physical and psychological adjustment (Norris-Baker 1981, as cited by Duff, 2009). The rehabilitation process involves regular team meetings where members

⁵ Broca's (expressive) aphasia is a non-fluent type of aphasia characterized by limited word output and misarticulated sounds. Patients have poorer production than comprehension.

⁶ Wernicke's (receptive) aphasia is a type of fluent aphasia characterized by incessant or rapid speech with normal fluency. Word finding or incorrect words and auditory comprehension are problematic.

⁷ Right side neglect is where a patient fails to notice objects in the right visual field.

communicate and coordinate specific patient treatment (Duff, 2009). Most patients are very motivated, however patients who exhibit behaviours such as lack of insight or initiation, depression or apathy may take longer to recover.

The therapeutic team works towards achievable goals, to enable patients to achieve a realistic level of independence. The principles of rehabilitation involve goal setting, high intensity practice, and task specific training. Physiotherapists work with patients to improve limb movement, flexion and extension, balance, coordination between limbs and gait (Langhorne et al., 2011). Occupational therapists work on specific skills with patients, practicing every day tasks such as dressing, showering, and preparing meals, as well as practicing sequenced tasks; for example pivoting and transferring from a bed to a wheelchair. Individualized programs are designed to address cognitive impairments and assess a patient's safety in the home environment. Speech therapists assess speech problems associated with stroke, and work with patients to improve their swallowing technique, language comprehension and fluency (Langhorne et al., 2011). Music therapists can work alongside these professionals, within a multi-disciplinary team, to address a range of physical, cognitive, social and psychological difficulties to support motor learning and physical rehabilitation.

Neuroscience and music therapy

Over the last twenty years, the fields of neuroscience, music cognition, music therapy and rehabilitation have come together to unfold a fascinating line of research demonstrating brain plasticity. This body of research is demonstrating the experience-dependent plasticity of the brain, and is the beginning of a real change in understanding cognition, learning and rehabilitation (Thaut, 2005).

Thaut elucidates that one of the core elements of any language structure is rhythm. So it follows that the first area of focus was the study of the neurobiology of rhythm. These new insights helped to establish a new role for music in rehabilitation. Early neurophysiology studies demonstrated that sound could arouse and excite the spinal motor neurons creating a priming effect (Rossignol & Melville-Jones as cited by Thaut, 2005). Furthermore, this priming effect was shown to prepare the motor system in the brain to facilitate the execution of movement (Thaut, 2005). For example, the rhythmic patterns of music have been shown to help patients with Parkinson disease overcome periods of “freezing” because music acts as a sensory sequencer providing neural “movement” command signals that are not generated in time by the areas of the brain affected by the disease. Rhythmic sounds have been

demonstrated to entrain the timing of muscle activity, providing a physiological template for cueing the timing of movements (Thaut, 2005).

Biomedical studies have shown that music can have other physiological effects on the body, including changes in heart rate, respiration, blood pressure, muscle tension as well as biochemical responses (Bartlett, as cited by Altenmuller & Schlaug, 2013). Studies have demonstrated that dopaminergic neurons in the meso-limbic brain area are activated during pleasurable musical experiences. The release of dopamine is thought to be critical to the neurobiology of reward, learning and attention. (Keitz, Martin-Soelch & Leenders as cited by Altenmuller et al., 2013), which in turn promotes plastic adaptations in the brain areas involved in tasks to be learned (Altenmuller et al., 2013). These studies demonstrate the importance of pleasurable activities for patients who have experienced stroke. Listening to music, music making and singing may have a positive effect on patients' enjoyment, attention, focus and general wellbeing within the rehabilitation environment.

The multi-sensory nature of music and cognitive recovery

Music experience is one of the richest human experiences, involving a large number of brain regions across various domains, including emotional, sensory-motor and cognitive (Altenmuller et al., 2013). Neurological studies have shown that music can act as a mediating stimulus, engaging human behavior and brain function by arousing, guiding, organizing, focusing and modulating perception, attention and behaviour (Thaut, 2005). Särkämö and Soto, (2011) contend that the multi-sensory nature of music making and listening stimulates multiple systems within the brain. Further it is believed that this multi-modal stimulation facilitates cross talk and connectivity between key regions of the brain. Evidence from MIR and PET studies suggests that the auditory cortex and other temporal lobe areas especially in the right hemisphere, are active during passive music listening and actively respond to pitch changes and timbre (Särkämö & Soto, 2012).

Rhythm for improving physical outcomes

There is evidence suggesting that rhythm is highly effective in enabling patients with stroke to relearn automatic motor functions such as coordination, balance, flexibility and timing (Knight et al., 2011; Thaut & Abiru, 2010). Thaut, McIntosh, Rice and Prassas (2010) have developed a unique neurological music therapy program called Rhythmic Auditory stimulation (RAS), where rhythm is said to organize the brain.

Rhythm is used to aid the priming and timing of movement, thereby assisting the patient to relearn tasks such as walking, and arm swing. RAS uses an entraining device, such as a metronome, which is set at a pre-determined speed. It may appear that a patient simply entrains to a beat, however collaboration between the physiotherapist and music therapist is fundamental so that appropriate goals, suitable cadence and adaptations necessary for each individual can be identified (Knight et al., 2011).

The evidence for RAS has been widely reported. Thaut and Abiru (2010) measured the effect of RAS on gait patterns. Results showed that a pattern of auditory-motor synchronization emerged for most participants. Stride time symmetry, as well as stride length improved significantly, as well as weight bearing time on the paretic side. Participants also demonstrated a more balanced muscular activation pattern between their two limbs, as well as a smoother gait trajectory (Thaut & Abiru, 2010).

Further studies indicated that RAS used as an external cue for gait training benefitted patients post stroke. Thaut, McIntosh, and Rice (1996) formalized RAS and found a 164% improvement in cadence, stride length and velocity of stroke patients compared with a 107% in the group receiving conventional treatment. Significant results were also achieved when RAS was used during treadmill facilitated gait training with hemi-paretic stroke patients (Schauer & Mauritz, 2003).

Many researchers have incorporated musical components into rehabilitation programs, which have added an enjoyable component to the repetitive nature of rehabilitation (Jeong & Kim, 2007). Millard and Smith (1989) demonstrated that patients could maintain exercise for longer periods with music therapy than with conventional therapy only, due to its soothing qualities.

Several studies based on Thaut's RAS protocol have been trialed, including a study where the emphasis was placed on rhythm, personal music choice, and verbalizing emotional issues. A pilot study with 36 participants was part of a community based stroke intervention program, using an RAS music-movement program. Eighteen participants were assigned to the experimental group and eighteen to the usual treatment group. In addition singing familiar songs and clapping was included to add a further level of engagement. Patients were also encouraged to voice their concerns and feelings. The music therapy treatment took place over eight weeks for two hours per week. Results demonstrated that the intervention

produced increased flexibility in the arms and an increased degree of ankle extension. Gait velocity, symmetry and stride length improved more compared to the control groups. In addition, more positive moods and improved interpersonal relationships were also reported (Jeong & Kim, 2007).

Staum's 2000 systematic review of music therapy in physical rehabilitation concluded that there was a paucity of RCT's in this area and not enough music therapy interventions had reached significant levels. However a systematic review in 2009 has produced consistent results, leading Weller and Baker to conclude that music therapy techniques are comparable with current treatments for gait rehabilitation and have the potential to decrease the duration of rehabilitation and costs in gait rehabilitation (Weller & Baker, 2009).

Improving upper limb outcomes

A common long-term problem that patients often present with following a stroke is impaired arm function, due to hemiparesis. A number of treatments have been effective in improving arm function such as constraint induced movement therapy, mental practice, robotics and electro-myographic biofeedback (Langhorne et al., 2009). Evidence from stroke rehabilitation, motor learning research and neuroscience indicates that activities that are functional, repeatedly practiced and include feedback have the potential to form long-term neuroplastic changes in the brain (Van Wijck, Knox, Dodds, Cassidy, Alexander & MacDonald, 2011). In addition, recent neuroimaging studies have revealed that task-specific therapeutic activities have the ability to forge neuro-plastic changes in the brain (Hubbard, Parsons, Neilson & Carrey, 2009).

A modified version of Jeong and Kim's music movement program examined physical function, range of motion, muscle strength and psychological outcomes in two groups of patients; a control group and music-movement group (Jun, Roh & Kim, 2012). The patients were assigned to two groups within two weeks of the onset of stroke. One group received routine treatment and the other group received music-movement therapy for sixty minutes three times a week for eight weeks. Patients also sang along to self-selected songs, using visual cues on a screen. Results demonstrated that patients participating in music-movement therapy benefitted from the program demonstrating an overall improvement both in shoulder flexion and elbow flexion of the weak arm, and improved mood state compared with the control group. The researchers advise that music-movement therapy for stroke patients should begin as early as possible in the rehabilitation setting (Jun & Kim, 2012). This

research is significant because it demonstrates music's ability to stimulate multiple areas of the brain simultaneously, which can have a positive effect on patient's psychological and physiological health as well as improving range of motion and motor coordination.

Drumming with the hands using a twisting and swinging action across the body has been shown to improve the natural swinging action of the arms (Knight et al., 2011) and improve trunk strength and balance in patients with hemiplegia or hemiparesis. RAS has been demonstrated to improve gait and associated arm-swing patterns (Ford, Wagenaar & Newell, 2007). The action of crossing the hands when drumming enables patients to cross the midline. This is important, specifically because it engages both hemispheres of the brain (Thaut & Abiru, 2010) and enables patients to focus more easily.

The above studies demonstrate the potential of therapeutic musical activities in the rehabilitation setting, and that the results may be more significant when physical and psychological outcomes are incorporated into music therapy programs.

Fine motor skills

Music supported therapy (MST) was trialled to rehabilitate fine motor hand skills in patients who had suffered a stroke (Schneider, Munte, Rodriguez-Fornells, Sailor & Altemuller, 2010). Participants were screened so that only those who had residual movement in their affected arms and thumbs were included in the study. Patients were divided into three groups. Thirty two patients received fifteen half hour sessions of MST in addition to physiotherapy. A control group of fifteen patients received fifteen sessions of constraint-induced therapy in addition to physiotherapy. A third group of thirty patients received conventional physiotherapy only. For patients in the MST group, a MIDI piano consisting of eight diatonic notes was one of the devices used. The other device was an electronic drum set consisting of eight pads designed to produce the same diatonic notes. Patients' gross motor skills and fine motor skills were tested, using exercises and learned tunes. Each exercise was first played by the instructor and then repeated by the participant. The exercises and tunes increased in difficulty, enabling participants to move on to the next level. The four principles used in this training were repetition, auditory feedback, shaping and emotion. Results demonstrated significant improvements in timing, precision and smoothness of fine motor skills as well as increased motor agility in patients' fingers in the MST group. Patients described their music supported training as highly enjoyable and a highlight of the rehabilitation process. The improvements in the MST group were greater than in the

physiotherapy or constraint-induced therapy groups. Interestingly, conventional physiotherapy did not produce an improvement in most of the parameters assessed. However gross motor movements did not seem to benefit substantially more from MST compared with functional motor training. (Schneider et al, 2010). As well as demonstrating that movement repetition and auditory feedback can improve functional motor training, an increase in neuronal connectivity between sensory motor and auditory regions was also demonstrated using EEG-coherence measures (Altenmuller et al., 2009). It seems likely that motivational and emotional factors might have also contributed to the success of these programs.

Cognition and memory

Changes in cognition and behaviours can be very challenging for patients and their care-givers following a stroke. Very few studies have examined how music can influence cognitive functions, however music has been shown to serve as an effective mnemonic device to facilitate verbal learning and recall in patients with memory disorders (Thaut, 2005). Thaut espouses that music engages and orders perceptual behaviours, providing a focus and structure for attention and motivation (Thaut, 2000).

It has been demonstrated that music therapy methods involving playing instruments require skills such as problem solving, sequencing, choice making, listening and the different elements of attention (Thaut, 2005). Furthermore, group music therapy can extend a patient's skills by including social behaviours such as turn-taking and reasoning (Magee, 2009).

Specifically composed songs have been used to facilitate dressing (Gervin, as cited by Hitchen, Magee & Soeterik, 2010). A patient who had suffered a traumatic head injury had problems with sustained attention, sequencing tasks and initiation (Hitchen, et al, 2010). He was unable to follow verbal instructions without becoming angry and frustrated. A song was composed about brushing teeth by the music therapist in collaboration with an occupational therapist and speech language therapist. The task was broken down into a series of steps. A familiar blues style was used and the prosody of the song matched the direction of the brushing. Findings included increased participation and task completion, acquisition of language, less episodes of challenging behaviour during functional tasks, and less anxiety. Live music matched each step of the process in accordance with the patient's perseveration and attention difficulties (Hitchen et al, 2010). Results demonstrate that sung instructions, which are broken down into small steps, may be more beneficial than spoken instructions for

patients who are having difficulties performing simple tasks following a stroke or head injury.

A single-blind randomized controlled trial was designed to see if daily music listening would facilitate the recovery of cognitive functions and mood following the acute recovery period following a stroke (Särkämö & Soto, 2012). Sixty patients were randomly assigned to a music group, and language group or a control group. Over a period of two months the music and language groups listened to self selected music or audio books, while the control group had no listening material at all. Results demonstrated that verbal memory and focused attention improved significantly more in the music group compared to the language and control groups. The music group also showed less depression or confusion. These findings reveal that music listening can enhance the recovery of focused attention and verbal memory during the acute recovery period following a stroke (Särkämö & Soto, 2012). The evidence demonstrates that for patients who are suffering from fatigue and confusion, listening to music and active music making may provide a positive focus and enable patients to feel less confused and more aware of their surroundings.

Aphasia

Aphasia is a disturbance of the comprehension and/or formulation of language most often following a left hemisphere stroke. In 95% of right-handed patients, and 78% of left-handed patients, the Broca and Wernicke's areas of the left hemisphere make up the dominant hemisphere for language processing. However, MIR scans have shown that multiple brain areas outside those regions are also required for language processing. The right hemisphere is thought to support some language functions such as the figurative aspects of language and speech prosody (Anglade, Tiel & Ansaldi, 2014).

A review of neuroscientific and neuropsychology studies has demonstrated that language and actions are closely linked in the Broca's area (Pulvermuller, 2005). Once exclusively looked upon as a language area, it is now thought that the Broca's region also integrates gesture, action and music with speech. For example listening to speech specifically modulates the tongue muscles (Fadiga et al., as cited by Johansson, 2012) and perceiving language activates the hand motor cortex (Floel et al., as cited by Johansson, 2011). Observing facial movement when speaking involves a network of multi-modal brain regions (Skipper, et al, as cited by Johansson, 2011). It is now hypothesized that gestures may facilitate word retrieval in patients with aphasia (Raymer, Singletary, Rodriguez, Ciampitti, Heilman & Rothi, 2006).

Music therapy specifically because of its ability to integrate language, melody, rhythm and gesture may be useful for patients recovering from aphasia (Johansson, 2012).

Developments of several music therapy protocols have emerged whereby singing and rhythm are thought to facilitate speech in patients who have had a left hemisphere stroke, by activating the previously underutilized speech centres of the right hemisphere. It has been established that music therapy can play a unique role in the treatment of patients because music processing utilizes different pathways in the brain from verbal processes (Belin, et al 1996).

Music therapy protocols for aphasia

Melodic intonation therapy (MIT) and modified melodic intonation therapy (MMIT) have emerged from speech language therapists and music therapists working with patients with aphasia. MIT was developed by neurological researchers Sparks, Helm and Albert in 1974, after observing that although patients with aphasia could not speak, they were often able to sing. MIT used a limited range of pitches and each phrase was “composed so that the inflection pattern, rhythm and stress were similar to the speech prosody of that sentence” (Sparks, R., Helm, N., & Albert, M. (1974). MIT was considered to be particularly effective with patients who had severe left hemisphere damage, because the right hemisphere appeared to be able to take control of the facilitation of speech processes. However, Norton and her colleagues found that the average time taken to develop a patient’s speech using MIT was between 75-90 hours, because the phrases were very simple and short (Norton, Zipse, Marchina & Schlaug as cited by Conklyn, et al, 2012).

A more recent development of MIT called modified melodic intonation therapy (MMIT) uses whole sentences rather than two word phrases. Unique melodic phrases are composed, by matching the prosody and rhythm of the sentence. Conklyn concludes that when MMIT is used the effect is faster than MIT, and can in fact be immediate. A significant change in patients’ responsive scores occurred after only one session of MMIT, compared with the control group (Conklyn et al., 2012).

Baker’s modified melodic intonation therapy program (1995) addresses speech deficits in patients with severe non-fluent aphasia. The phrase structure of MIT is sacrificed for a musical structure that is easily encoded in a patient’s memory and then retrieved. Increasing the interaction between the music and speech processing areas is the main aim of this

protocol. Baker states that it is crucial that music functions as a mnemonic aid, thus enabling a patient to internalize the phrases and use them as a trigger for verbal language. The evidence is strong that MIT is a very effective method for some patients, however it has not always been successful with some patients with Broca's aphasia or chronic aphasia (Jungblut, Suchanek, & Gerhard, 2009)

A protocol to support speech training for patients suffering from chronic aphasia and Broca's aphasia has been established in Germany (Jungblut, 2009; Jungblut, Huber, Mais, & Schnitker, 2014). Patients with this condition generally have no spontaneous speech. The method is based on the parallel processing strategies between music and language, and addresses patients' residual melodic abilities. The protocol comprises the components of singing, intonation, prosody, breathing (German: *atmung*), rhythm and improvisation, (SIPARI). The breathing exercises 'encourage elementary vital processes as the basis of vocal sound and prepare a patient for phonation'. Mental preparation is an important training element where patients are taught to sing a melody in their head before actually singing it. Rhythmic exercises are practiced to support the phonological and segmental capabilities of the left hemisphere, while improvisations are thought to facilitate non-verbal communication.

The SIPARI method has been successfully used with patients with Broca's aphasia and global aphasia, in both group contexts and individually. Standardized language tests have been used in each of the studies to measure the efficacy of the treatment. A significant improvement in speech performance was achieved, demonstrating that patients are now able to participate verbally in every day life (Jungblut, 2009). Jungblut's research into SIPARI has been included in the Cochrane Review (2010) and demonstrates a robust music therapy method that can facilitate some speech recovery within this population, thereby improving patients' communication, socialization and quality of life.

Apraxia of speech

Acquired apraxia of speech (AOS) is a communication disorder of learned actions associated with the breakdown in the planning of movements needed for speech and is almost always accompanied by aphasia. AOS is characterized by a slowed rate of speech, difficulties in sound production and disrupted prosody (McNeil et al., 2009 as cited by Wambaugh, Nessler, Cameron & Mauszycki, 2012). Patients may experience a range of difficulties from a complete inability to speak, through to presenting as relatively fluent but with slow speech or minor sound distortions. Repeated practice is a common general approach common to speech

and language therapists (Wambaugh et al, 2012). Speech language therapy treatments designed to control the rate and/or rhythm of patients' speech production, have been shown to have positive effects for patients with AOS. In a study with 10 patients using a single subject design, where both repeated practice and rate/rhythm control treatment was used, improved articulation resulted for most participants (Wambaugh, et al, 2012).

Baker and Tamplin have designed a music therapy protocol that begins with a song selected containing the words or phrases that a patient has difficulty with. The patient is instructed to sing the phrase two or three times, then chant the same phrase with rhythmic emphasis, then finally the patient is asked to speak the phrase. Exaggerated visual cues are important aids in this process. Lastly the patient is asked to insert the word into a new sentence. Baker and Tamplin suggest that errors will decrease with repeated practice (Baker & Tamplin, 2006). Apraxia of speech can be a frustrating and isolating disorder for patients, and these music therapy methods may offer patients a better chance of recovery. Interestingly repeated practise seems to be the key to success for patients.

The therapeutic relationship in music therapy

The Association of Professional Music Therapists states that “music therapy can provide a framework in which a mutual relationship is set up between client and therapist. The growing relationship enables change to occur, both in the condition of the client and in the form that the therapy takes” (Bunt & Hoskyns, 2002).

The humanist music therapist is trained to relate and connect with patients both verbally and through music making. Music therapists can create a safe and containing environment for patients, where empathy and unconditional regard are paramount (Bunt & Hoskyns, 2002). Furthermore, music therapists have the advantage of ‘the music being able to do the talking’. This is important for patients who are confused and fatigued, or have conditions such as aphasia, which makes communication difficult or impossible.

Music therapists are trained to ‘just be with’ a patient (Bunt & Hoskyns, 2002). This can certainly be very challenging at times, especially when patients are emotionally labile. However, it is important to work with patients using music and silence to allow the patient's emotions to modulate.

Engaging in music therapy can offer patients an immediate focus by bringing them into the present moment. Aigen suggests that this can be a valuable experience for patients who have

cognitive difficulties or difficulties expressing emotion (Aigen, 2014). He further states that music therapists reveal more of who they are than other related therapists, because they are part of the musical encounter. This suggests that music therapists are unique because “a music therapist’s sensibilities, expressiveness and limitations are present in the live music making with clients” (Aigen, 2014). This advantage makes building a relationship with patients easier because a musical bond can be established early on, providing trust and containment.

Ansdell suggests that clients become aware of their own music, from the response they get from the music therapist. This makes possible the feeling of being understood and accepted by someone else. The musical exchange is a physical, emotional and intellectual experience resulting in a deeper experience for patients (Ansdell as cited by Aigen, 2014).

The therapeutic relationship between patient and the music therapist is central to a positive outcome. Music therapists can instill a sense of hope in patients when patients are starting to have to make adjustments during the rehabilitation period (Baker and Tamplin, 2006, pp. 193, 199). Because music is a non-threatening medium, a relationship between the participant and the music therapist can more easily be established through music making.

Individualized music therapy is important, and must not be confused with merely playing music to patients. Studies have shown that the wrong piece of music can make a patient more anxious and irritable; therefore it is imperative that a music therapist who is highly skilled is given the task of developing an individualized therapy tailored to each patient’s needs and responses.

Summary

As is evident from the literature review, stroke and head injuries are a leading cause of long-term disability. It is therefore imperative in the future that a variety of therapies are available for patients to access, for improved outcomes. Over the last twenty years research in the field of neuroscience has been demonstrating the experience-driven plasticity of the brain and the positive effects that music can have on the brain. Furthermore, the multi-sensory nature of music has been demonstrated to facilitate cross-talk and connectivity between key regions of the brain. Participating in music therapy is therefore potentially valuable to patients who have experienced a stroke, because music making and listening to music can arouse attention and behaviour, providing a focus, and stimulating multiple systems throughout the body.

It has been demonstrated that rhythm in particular can have a priming effect, preparing the motor system of the brain to facilitate the timing and execution of movement. Rhythm is also particularly important for facilitating the timing and execution of speech, for people who have developed aphasia and/or apraxia following a stroke or head injury.

Music processing utilizes different pathways in the brain from verbal processes. This is an important finding because research since 1974 has demonstrated that patients with aphasia generally find singing and chanting easier than speech. Because chanting and singing integrate language with melody, rhythm and gesture, a network of regions can be stimulated, further aiding the recovery of speech.

Jeong and Jun have demonstrated that the addition of music during functional tasks can provide a focus for patients who are focussing on increasing the range of upper limb movement. Further, moving to music is easier and more pleasurable for patients than moving or exercising in silence and can facilitate a larger range of limb movement.

The music therapist is trained both to connect with and establish a safe and containing relationship with the patient as well as specifically tailoring a program to suit patients' individual needs. The music therapist is also trained to observe and "be with" a patient, which is very important particularly in the first few days following a stroke, where confusion and fatigue may be overwhelming for patients. Music making is non-threatening and pleasurable, however it is crucial that the sensitivity and skill of the music therapist ensures that music making is appropriate and that patient's are neither under or over stimulated.

This led me to examine the following research question: "How does a student music therapist, working within a multi-disciplinary team address the physical, communication and cognitive needs of two patients who have experienced a left hemisphere mid-cerebral artery (MCA) stroke? An exploratory case study"

Methodology

Aim

The aim of this study was to explore a student music therapist's practice in a rehabilitation ward, as this is a new area of practise in our country. The intention was to explore data generated from my usual practice with a view to developing questions for further research.

Method

A case study method of inquiry was used in this research. Creswell describes a case study method of inquiry as enabling the researcher to describe a case in depth by developing a detailed and in-depth analysis of data from multiple sources (Creswell, 1998). I was interested in examining the music therapy methods that I used with each patient and discovering commonalities and differences between the two cases.

The study drew on existing data from my practice over a four-month period. This time frame was pre-determined at the beginning of my practice, and data was collected and analyzed from a variety of sources, including patient progress notes, descriptive notes on my patients from my journal, and audio recordings.

Methodology

The project used secondary analysis of data (Heaton, 2004) also known as clinical data mining (Epstein, 2010; Liamputtong, 2013). Secondary analysis of data involves looking back over pre-existing data already collected as part of a therapist's usual clinical practice. The data included clinical notes, meeting notes and a reflective learning journal. The clinical notes contained a small amount of information about the patients and their conditions, however the majority of the data was descriptive, and therefore suitable for qualitative research. Through the collection of data and my experience on the ward and in the community, a question began to emerge.

Data Analysis

I used thematic analysis to answer my question. Vaismoradi et al. (2013) suggest that "thematic analysis is a flexible and useful research tool, providing a rich and detailed, yet complex, account of the data". Thematic analysis is a flexible method of analysis that "seeks to arrive at an understanding of a particular phenomenon from the perspective of those experiencing it" (Vaismoradi et al, 2013 p.400). Braun (2006) states that patterns and themes

within the data can then be identified, organized and reported, creating themes that can then be coded to indicate that each passage is an example of a particular theme.

Clinical notes were typed up and hand written notes were annotated onto my existing data for both participants. From these I was able to reflect and think about what had taken place and find new and deeper meaning. Re-reading and reflecting on the data and adding further comments was important to find important information that might be hidden in the text. Codes were then created from the data, and arranged and re-arranged (for example; raw data, extended codes, descriptions of each code). The process involved inductive coding. Questions arose, such as what themes had features in common with other themes? Which themes stood alone? And in what situations did examples of these themes arise? Gomm and his colleagues suggest that new questions may also arise from reading and re-reading the data (Gomm, Hammersley and Foster, 2009, p. 244-251). Defining the themes became the next step in the process. Reflective thinking about the development of themes enabled the themes to emerge. (See Appendix 1 and Appendix 2 for excerpts of the initial codes). When writing up my findings, I grouped each theme into three main groups; cognitive, physical and communication in order to better answer my question.

I found some of the themes were common to both men, while other themes were unique to each man, because of their conditions and the individual nature of each man's condition.

Notation of audio recordings

I used standard western musical notation to transcribe the music in this study. The transcriptions of audio recordings clearly replicate the audio recordings. Symbols such as pauses were used to suggest a rest of no particular note value, rather than having to writing the music in strict time. Spoken words from myself and the patient were written above the staves to differentiate from the sung lyrics.

Ethical Issues

The researcher is a music therapy student in her second year of study. She will abide by the Code of Ethics for the Practice of Music Therapy in New Zealand (New Zealand Society for Music therapists, 2006), and the Code of ethical conduct for research, teaching and evaluations involving human participants (Massey University, 2010). Associate Professor Sarah Hoskyns and Dr Daphne Rickson (New Zealand School of Music) have gained approval from HDEC and Massey University, to monitor student research undertaken as

observational studies, theoretical or case study research (HEC: Southern A Application – 11/41). Master of Music Therapy ethical template for student research in NZSM526 undertaken as observational studies, theoretical or case study research).

Informed consent was obtained from all indirect participants, or their guardians, where they were directly implicated in the research data. Consent was obtained in writing from both participants.

The following documentation was prepared:

Information sheets and consent forms for:

- a. The organization involved
- b. The multi-disciplinary team members who are indirect participants directly implicated in the research data.
- c. Patients, or their guardians, who are directly implicated in the research data

The student researcher consistently maintained ethical mindfulness.

Summaries of the research results will be disseminated to all health professionals.

Bill's Findings

I began working with Bill seven weeks after he was admitted to the rehabilitation ward. He was a seventy year old man who had suffered a massive left hemisphere mid cerebral (MCA) stroke. While in hospital, Bill had developed pneumonia through the release of fluid into his lungs, and was unable to swallow. A nasal gastric (NG) tube had been inserted through his nose to stop him aspirating. Bill had issues with the discomfort of the tube and this made him very agitated. He had developed hemiparesis down his right side, affecting his right leg, arm and right side of his torso. He also had pre-existing diabetes. The speech language therapist diagnosed him with receptive and expressive aphasia, as well as verbal apraxia and dyspraxia. Bill was non-verbal, and his gestural communication was also severely affected. Added to this, confusion from the stroke fostered anger and frustration. However, I learned early on that he was very musical and he had played the guitar before the stroke. In fact his family described him as a perfectionist on the guitar. Bill had music therapy for two months while in the rehabilitation ward and then further sessions in his home twice weekly. The music therapy sessions that took place were both individual sessions and sessions with family members. Because Bill was non-verbal, participating and being with his family members seemed to facilitate communication and he was able to feel part of the extended family once more. The data for my research was collected between 14th March 2014 and 30th June 2014.

Physical

Fatigue

Severe fatigue is common in patients following a stroke. I carefully monitored the length of his sessions in an on-going way. Short 10-15 minute music therapy sessions were appropriate in the first few weeks, and were extended to 45 minutes or an hour as Bill regained his strength.

Breathing exercises and oro- motor development

When I first started working with Bill he was non-verbal, and his breathing very shallow. I encouraged him to sing with me and initially he was able to mouth some of the words to a song, however no sound emerged. This upset him very much. I used deep breathing exercises to enable his singing voice to emerge and strengthen the muscles in the diaphragm and oro-motor areas. Deep breathing exercises were also used to develop motor control in

both areas. In the first few weeks I used written instructions and verbal cueing to ensure that he relearned the steps and timing required for the preparation of making a sound. This was important because his hearing seemed to be impaired. As the weeks went on his hearing improved and I was able to instruct him verbally. I also used slow songs with long notes and/or a wider vocal range to encourage deeper breathing; for example ‘A E I O U’, ‘Aleluia’ and ‘Dream’.

Familiar songs and long-term memory

I used familiar songs with Bill because they were easier for him to sing as they tapped into his long-term memory. I asked family members to help me construct a song list. Bill and his wife also found an old booklet of songs from a boat trip they had made on the Earnslaw a few years previously. Together they highlighted songs that were familiar to them and Bill was able to make his own choices from the booklet as well. I found that familiar songs elicited personal responses, and brought back shared memories. Sometimes Bill and his wife would look fondly at each other and at other times he became very emotional. I also sang fast songs with him, because he enjoyed experiencing the excitement of a fast song again, even if he could not sing all of the lyrics. Sometimes Bill was able to initiate singing a harmony to a song or add an embellishment. For example in the song ‘The way you do the things you do’ he would sing an echo in the chorus in a really low voice, as he had recalled from the original recording.

Songs that focused on Bill’s needs

I used a variety of songs and styles, to keep Bill’s interest during the sessions. He and his wife suggested songs he could sing that had slow simple lyrics and children’s songs; for example ‘Smile Awhile, Omar Rabbity and Old MacDonald’. I chose ‘Dance me to the end of love’ where the chorus consisted of ‘la’s to enable my patient to practice one sound, and focus on his intonation.

Bill would often choose to sing ‘Volare’, which we played with a Latin beat, because it was exciting for him to play. He was able to keep a steady beat on the claves while we both sang and I played syncopated rhythms on the keyboard.

I wrote client-centred songs specifically focusing on his oro-motor needs. For example practicing a sequence of different face shapes which I modeled; ‘Come on and smile’ or practicing a particular sound that he could not easily sing. I used a blend of slow and fast

songs so that he would not lose interest. It can be very difficult for a patient when they have lost the ability to speak. Singing seemed to reduce his frustration and anger.

Sensation and proprioception

Lack of sensation and lack of proprioception in the face is common after a stroke. I took the lead from the speech and language therapist who practiced different facial expressions with Bill to promote physical awareness of the tongue, lips, jaw, eyes and nose. I wrote a song to practice specific expressions and I modeled them so that he could practice each face shape while I sang “Come on and smile” (see Appendix 3). The song enticed Bill to copy my facial expressions, and there was a bar’s rest between each face shape to give him time to process the information and form the correct expression. I also practiced vowel sounds with him, by slowly modeling the different shapes e.g. ‘ah, ooh, ee, and ay’ sounds.

Movement to music

I encouraged movement in a variety of ways, to improve his muscle tone. Certain songs just make people want to move. I would move my body in a sideways motion while singing and playing, and sometimes he would naturally copy my movements as he sang. Moving to music increased Bill’s physical activity. I used paddle drums to develop more control and strength in his non-affected non-dominant arm. I also found that paddle drums were useful for encouraging self-expression and playfulness. I used bongo drums to encourage Bill to sit upright in his wheel chair, and twist his torso while singing and playing. I also encouraged him to cross his hand over to the other drum when playing to encourage more stretch in his arm and a twist in the torso area.

Instruments to develop independence

I found that playing an instrument independently was encouraging and empowering for Bill. I used instruments such as the harmonica, egg shakers and bongo drums to encourage a sense of independence, as they can all be played using one hand. Holding musical instruments in the weak hand can motivate and strengthen grasp. I would place one clave in his affected hand, supported by a pillow, so that he could tap the beat or rhythm with his other hand. Bill gained a slight grasp from the thumb and first finger and in time he was able to maneuver the two claves himself to reach a level of independence.

Collaborating with other therapists using specific music

I sometimes collaborated with other therapists when working to achieve his goals. For example on one occasion the physiotherapist assisted with limb movement while I improvised lyrics that guided Bill to step sideways, and swing his hips while hanging on to a bench. The song “Let’s swing our hips as we step to the right” enabled him to swing his hips naturally and he was able to step more easily.

Playing with the elements of music

The clever use of dynamics can increase muscle activity. I encouraged Bill to play percussion instruments louder by increasing the volume of the piano and my voice. I sometimes also increased the speed, which added an element of fun for him. Because he was a musician, he knew how to end songs, so we would communicate non-verbally with eye contact and facial expressions, about how the song would end. This brought us both much enjoyment and satisfaction.

Gross motor skills

I encouraged Bill, who was severely fatigued and had dyspraxia, to play a drum. I modeled playing the drum with the flat of my hand, however he began to play using one and then two fingers. Over the weeks his skill improved so that he was able to use the flat of his hand.

Cognitive

Confusion is common for patients following a stroke. I asked Bill questions that were short and simple, however it was not always clear whether he truly understood during the first few weeks. I found that the processing of information and his short-term memory was effected. Following instructions was sometimes problematic, because his understanding was based on only one or two key words and the meaning was often misinterpreted. In the first few weeks I offered him an egg shaker or claves, and invited him simply to play along with me. I offered him the choice of a song or an instrument to play at each session. I enabled him to choose by pointing to a song from a list. Sometimes writing “fast or slow” on a piece of paper was helpful to determine his mood, or the direction he wanted the session to go in. Bill was also listening to his own music, between music therapy sessions.

I found that his melodic recall improved as the weeks went by. I often focused on melody using songs with a small number of lyrics e.g. ‘Dream’ or Omar Rabbitty and A E I O U. He and his wife chose to sing children’s songs. I also focused on Bill singing a whole song for enjoyment rather than always focusing on specific lyrics. This became a time he could just relax and sing and not worry about anything.

Recalling rhythm patterns

Once Bill was able to play the beat, I used one bar rhythm patterns to try to improve his rhythmic recall, and short-term memory. Leaving a gap between each new rhythm was important, so that he had time to process the new one. He was able to copy one bar rhythms, however two bar rhythms were problematic for him. I chose not to focus on this because I had read that rhythm recall could be really difficult for some patients after a stroke. I moved my focus to soloing or improvising on the bongo drums, which he really enjoyed.

Mastery on an instrument or voice

I used singing as a method because singing was a pleasurable non-verbal form of communication for him and his family. Further he was able to gain a sense of achievement through singing. He was able to sing in tune with practice. He was able to play the harmonica because it was a familiar instrument from before his stroke. Bill’s confidence developed as the weeks went by, and with encouragement from his wife he continued to play and practice it.

Client-centred songs

I wrote an improvised song to practice singing his name ‘We’re singing the blues for Bill’. I also wrote songs to practice sequencing and following instructions. ‘Come on and smile’. The song was sung and facial expressions practiced simultaneously. Songs for moving and twisting were also written specifically for him. For example ‘Twisting at the beach with a hula hula sway’ (see Appendix 4).

Elements of music

I increased the speed of a song or slowed it down to observe Bill’s response. I would play a tune on piano while he played claves and increase or decrease the tempo. I would then ask him to alter the speed of the tune at his will and I observed his understanding of the task. He

gained much enjoyment from this, especially when I had to play a tune at twice the speed. This was a chance to show me his fun-loving and cheeky personality.

Instruments for self expression

I used a variety of instruments to encourage self-expression. I played using a variety of tempos and styles, to stimulate and encourage focused attention. The variety of styles sometimes encouraged verbal communication with family members. I used the word 'solo' rather than 'improvise' when working with Bill to encourage self-expression. This was a word he seemed more comfortable with.

Personal preference

I wrote client-centred songs that were easy to sing and provided meaning for him. I used familiar songs because they were easier and more likely to motivate him. I watched Bill's toe and/or leg tapping to ensure we played songs at his speed, especially when he played the harmonica.

Group sessions in the hospital

I found that group sessions in the rehabilitation unit were not very successful, because of the acute nature of Bill's illness. I found that he was not always able to work with other patients because he was very focused on his own needs and own musical tastes. However he really enjoyed the family sessions we had together, perhaps because the environment felt safe to him.

Communication

Gestural communication

I collaborated with others to determine the meaning of Bill's gestural communication. I modeled gestural communication to remind him that he could communicate in this way. I followed the speech language therapist's lead by offering him a choice of two items, because he was non-verbal. For example I would say 'Would you like a clave or egg shaker', and he would respond by taking one of the instruments out of my hand.

Written communication

At the end of each session Bill liked to communicate with me by pointing to his diary. I wrote short comments on how the session went, or I would remind him of his next session. I compiled a list of songs after talking to family members, so that he was able to make a choice by pointing to the song he wanted.

Verbal communication

I used closed questions to enable him to give a 'yes' or 'no' response. I realized that he was not always able to give accurate verbal responses; sometimes he would say 'no' when he meant 'yes'. I asked family members to clarify whenever possible. I offered instructions in a clear, slow voice and kept sentences simple and short. I acknowledged each new word that he offered; for example one day I said hello to him and he replied 'hello' back. I always talked directly to my patient rather than family members because I wanted to be respectful, and because I wanted to encourage spontaneous speech.

Communicating with family members

Family members were able to help with important background information such as Bill's personality before the stroke, and his likes and dislikes. I asked family members to help me compile a list of his favourite songs and styles. I was available for family members to communicate about how they were feeling or coping, as I understood that being a caregiver could be very isolating and stressful. Family members offered comments about how they thought he felt about music therapy. For example on one occasion his wife communicated that music therapy was really helping him, and that he was enjoying it very much.

Family involvement

Bill's wife asked me if it was all right if family members could sometimes join in the sessions, as it enabled him to socialize and communicate with them non-verbally. His son on one occasion shared a story about the song 'Pokarekare Ana' and later he commented to me about how music therapy meant so much to his father, because he was able to sing and interact with his family.

Sharing bongos

I would model a simple beat with both hands on one drum and ask Bill to copy me. I would play a game where we “talked” to each other using a call and response. This game would be played with much enthusiasm, and often cheeky responses. He was able to demonstrate his sense of humour on the bongos, using lots of accented beats.

Sharing the paddle drums

I held and manoeuvred paddle drums while Bill beat the drums with one beater. He practiced beating in time and we worked on his hand/eye co-ordination, as well as trying out a variety of different rhythms. I would swap roles so that Bill held and manoeuvred one paddle drum. This would turn into a playful game, where he became very excited and he tried to outwit me by moving the drums really fast and into a variety of different positions.

Samuel's findings

I began working with Samuel five weeks after he had been admitted to the rehabilitation ward. He was a twenty two year old man who had suffered a left hemisphere mid cerebral artery (MCA) stroke. Due to considerable swelling in his brain from the stroke, a procedure known as a left hemicraniectomy was undertaken. This procedure entails removing a piece of the skull until the swelling disperses. The bone is then replaced at a later date. Once in the ward, the speech language therapist diagnosed him as having expressive aphasia and apraxia.

When I first met Samuel he was only able to speak a handful of simple words in English. Adding to his condition was the fact that English was his second language. However he presented as a very friendly and expressive person who seemed remarkably happy. He did not however fully comprehend much of the information the doctors tried to explain to him in the first few weeks, due to general confusion. However when he realized what had caused his stroke he was extremely upset and refused therapy for over a week. I worked with him in the rehabilitation ward for just under a month, and then music therapy sessions were held twice weekly in his home for a further seven months. The data was collected between 11th February 2014 and 30th June 2014.

Physical

Fatigue

Severe fatigue is common in patients following a stroke. I carefully monitored the length of Samuel's sessions in an on-going way. Short 10-15 minute music therapy sessions were appropriate in the first few weeks, and were extended to 45 minutes or an hour as he regained his strength.

Songs that focused on Samuel's needs

I used a variety of songs and styles, to keep his interest during the sessions. Songs with slow simple lyrics and slow tempos seemed to be most appropriate when working with him. I chose a song where the chorus consisted of 'la's' to enable Samuel to practice one sound in 'Dance me to the end of love'.

Repetition and practice seemed to be paramount to my patient's improvement. I wrote music-centred songs specifically focusing on his oro-motor needs e.g. practicing a particular

word that he was not able to speak verbally. We would sing the song several times together and then he would chant it then finally attempt to speak the word. I used a blend of slow and fast songs during the session so that Samuel would not lose interest.

Sharing a piano keyboard and improvising

In the first few weeks Samuel improvised at the piano with me, using chords in his left hand, while his right hand “floated” above the keys and come down softly with the occasional flourish. The large range of the keyboard offered him an opportunity for exploration and experimentation. I was able to encourage his awareness of timing and melody while sharing the piano. This was a pleasurable experience for him and seemed to build his confidence. Initially there was a lot of shoulder movement as he tried to try to control his affected arm. As his wrist flexion and motor coordination in his arm improved he was able to play first year piano pieces with both hands.

Motor control, strength and sensation

I used paddle drums to develop motor control and strength and increase the sensation in Samuel’s weak arm. I monitored the timing of each drumbeat and also the strength of his two arms, by making him aware of matching the volume of sound between the two drums. I also found that paddle drums were useful for encouraging self-expression and playfulness. When playing the bongo drums, I encouraged Samuel to cross his hands to gain more stretch in his arms and torso areas.

Playing paddle drums, bongo drums and the cabassa seemed to increase the sensation in his right affected arm. He would sometimes rub his arm after he had been playing for a couple of minutes and say ‘nice’. One day after playing the keyboard with both hands he held out his hand for me to shake. He said ‘yes’ when I asked him if this was the first time he had been able to do this.

Practicing the strumming technique on the ukulele was also a method I used to enable Samuel to experience more sensation in his right arm, hand and wrist. I discovered that a smooth, even strum required good motor control and flexion of his wrist. I measured this by monitoring the volume and consistency of sound he produced and by observing whether all of his fingers were involved in the strum or only one or two. I often had to check with him that he was aware of using all his fingers to improve the quality of the strum.

The elements of music

The clever use of dynamics can increase muscle activity. I encouraged Samuel to play percussion instruments louder by increasing the volume of the piano and my voice. I encouraged him to make larger and faster arm movements by increasing the dynamics. Some instruments are intrinsically loud e.g. tambourine. The tambourine excited him, and he seemed to want to play it louder, and sometimes also faster. I encouraged him to play at different volumes and speeds.

Gross motor skills

I used hand drums, paddle drums, tambourines, and egg shakers to develop Samuel's gross motor skills. I encouraged him to use the flat of his right hand when playing a bongo drum, rather than using one or two fingers, which was easier for him. He was able to play the egg shakers with both hands. In order to achieve an even sound, the egg shakers require a very precise and controlled movement; he was able to flex his elbow and wrist and coordinate the movement well.

Fine motor skills

I used the piano to develop and improve the fine motor skills in Samuel's weak right hand. Although his thumb, and 1st and 2nd fingers developed more strength over the months, his 4th and 5th fingers were particularly weak and he was not always able to use them independently.

In April we were trying to choose a familiar song to add to his repertoire. I asked him if he could write down the name of one of his favourite singer. I was extremely surprised that he started writing with his right hand, and appeared to have much more control than previously. He wrote the words "Tony Braxton" in beautiful handwriting.

Cognitive

Confusion is common for patients following a stroke. I used short and simple questions when speaking with Samuel, however it was not always clear whether he truly understood my questions, especially during the first few weeks. I found that both the processing of information and his short-term memory were effected, because he did not always notice if I had changed a rhythm pattern.

I discovered that following instructions could be problematic, because his understanding was based on only one or two key words and the meaning could be misinterpreted. For example, I asked him how his mother was, as she had been unwell. He immediately went and woke her up and she asked me what I wanted to talk to her about.

I provided Samuel with a variety of listening repertoire, to enable him to experience new singers, genres, unusual timbres, and different rhythms to stimulate, excite or relax him. He had an emotional response to some of the music and told me he would often go to sleep at night with the music playing.

Melodic recall

I found that my patient's melodic recall had not been affected by the stroke. In fact his melodic recall was excellent. This encouraged me to find songs where the focus was on the melody rather than the lyrics e.g. popular Aria's using 'la' or 'da'. I also focused on my patient singing a whole song for enjoyment, rather than continually focusing on articulation and checking that every word was correct. For example 'Time after time' would often be sung as 'Sime after sime'. This seemed to be a common problem where he would sing 'keen' instead of 'been'. The initial letters of words were often problematic for him.

Familiar songs and oro-motor skills

I used familiar songs with Samuel because they were easier to sing as they tapped into his long-term memory. For example singing the song 'Saving all my love for you' elicited an emotional response, and brought back fond memories for him. Surprisingly most of the lyrics he sang were correct. Sometimes he was able to independently sing a harmony to a song we were working on. For example the song 'Aleluia' was a song where the lyrics were easy and so he was able to focus on melodic components rather than the lyrics. He often initiated a spontaneous harmony in a song, once he was familiar with the melody. Another time I embellished the melody slightly and he was able to copy my embellishment a third lower.

Recalling rhythmic patterns

Once Samuel was able to play a constant beat, I used one and two bar rhythm patterns in an attempt to improve his rhythmic recall, and short-term memory. Changing the pattern was sometimes difficult for him, as he would often persevere on the first pattern, not realizing

that the pattern had changed. I discovered that leaving a gap between each new rhythm was important, so that he had time to process the new one.

Patient initiating own practice and developing independence

I found that once he had relearned certain musical skills, Samuel was motivated to practice to further improve his piano playing and singing. He began to develop more confidence in his abilities. He noticed when he could manage to sing or play a piece from the beginning to the end.

Improvisation on a bongo drum

I encouraged Samuel to begin an improvisation on a bongo drum once he had developed more confidence. I also encouraged him to take the lead and invent new rhythmic patterns, which was often challenging for him.

Mastery on the keyboard

Samuel had learned the keyboard at intermediate school and his long-term muscle memory regarding reading music was still intact. I used a first year piano tutor book to observe whether he was still able to read notes, and discovered that he was able to progress to reading both clefs on the piano. I counted each bar out loud with him as he played to remind him to keep in time. Counting out loud with me also enabled him to regain an understanding of note values and meter. He seemed to develop good motor control in his thumb, and first and second fingers, however his 4th and 5th fingers remained weak, which was a constant sense of frustration for him. As my patient progressed in the tutor book, he independently noticed different fingerings in the notation. He independently adjusted his fingers as required.

Client-centred songs

I gave my patient a tambourine to play, and then we sang a simple improvised song called “Tambourine” together. We also practiced saying the word verbally and this was achieved. I wrote a song to practice sequencing and following instructions. Songs that required divided attention enabled my patient to practice singing and moving simultaneously. I wrote a client-centred song called ‘Let’s walk around the room’. The movements involved walking, pointing to the ceiling, having to stop, then go, and swinging his arms as he walked to a syncopated rhythm. He was able to sing some of the words of the song and perform the movements simultaneously.

Elements of music

Sometimes Samuel would initiate an increase in volume at different points in a song, expressing his emotional reaction to a particular song. He seemed to have an innate sense of where the climax of a song was and at these points he would sing louder and more expressively. Samuel was able to sing the lyrics of most songs at a slow tempo. I had to take songs slowly to allow him time to process the information.

Instruments for self expression

I used a variety of instruments to encourage self-expression, which included the keyboard, bongo drums, paddle drums and egg shakers. The variety of styles sometimes encouraged verbal communication with my patient and family members. The piano was the main instrument that he used to express himself.

Personal preference

I wrote client-centred songs that were easy to sing and provided meaning for my patient. Familiar songs were used also because they were easier for him to sing and more likely to motivate Samuel. For example 'Unbreak my heart' and 'Saving all my Love'. As the months went by, Samuel became interested in jazz and his interest in singing jazz standards increased.

Matching the patient's pace

I would wait for him to form a chord on the piano before moving on to the next chord. This was important because it sometimes took time to recall the next chord.

Communication

Gestural Communication

I attended and responded to my Samuel's gestures. After observing the speech and language therapist working with my patient, I followed her lead by offering him a choice of two instruments, or two songs, so that he could easily respond.

Written Communication

At the end of each session I communicated with him by writing in his diary, reminding him of his next session.

Verbal Communication

I used closed questions to enable Samuel to give a 'yes' or 'no' response. I realized that my patient was not always able to give accurate verbal responses so I sometimes asked family members to clarify whenever possible. I offered instructions in a clear, slow voice and kept my sentences simple and short. Talking directly to him would sometimes encourage spontaneous speech, and I would acknowledge each new word that Samuel offered. If he could not recall a word, I would offer suggestions about what he might be trying to say. After a few months he was sometimes able to verbalize part of a sentence, for example "I'm finding it hard to.....". I would suggest possible words that could complete the sentence, to which he could agree or disagree. I used singing to help him recall words, composing short improvised phrases using the word the patient could not find. For example the word 'music' was a difficult word for him to say. I wrote a spontaneous song called 'music makes the world go round', however the word was not accurately sung, so I then broke the word down into two syllables 'mu' and 'sick' and asked him to sing 'mu' and then 'sick'. We then put the two syllables together. He was elated when he realized he could say the word. However later when his mother asked him what his name was he said 'music'. Such is the complexity of aphasia.

Communicating with family members

Family members were able to assist with background information about Samuel, such as his progress, what course he was doing at university, his personality and likes and dislikes. Family members independently offered comments about his speech retrieval and how they thought music was helping. On one occasion his mother said, "Every day he is saying more words and he is reasonably fluent in his first language now. Music has helped him with his speech and memory and he's really happy too".

Vocal improvisation

I used familiar formats such as the 'Blues' to enable Samuel to express himself and try out spontaneous lyrics and nonsense syllables. Improvising was utilizing his working memory.

Samuel was able to understand the form of the blues and added extra spontaneous words such as ‘Oh baby’ and ‘aahs and oohs’. I also used a ‘call and response’ technique to enable him to communicate in a playful manner with me. I used a jazz scatting technique; for example I would sing ‘du du wah’ and he would either repeat back my scat or respond with something new. Improvising using the voice would often encourage laughter. He had a naturally flamboyant personality, and added spontaneous gestures which I encouraged and matched.

Instrumental improvisation

In the first few weeks I used the black notes on the piano to encourage improvisation based on the pentatonic scale. Samuel had control over how and what he played and was comfortable playing at a slow speed (approximately 66 bpm). I took a supportive role using sparse bass notes.

Later on I encouraged him to begin an improvisation, which was challenging for him. Encouraging him to lead was something that had to be developed slowly, because he was very unsure of himself due to general confusion from the stroke. However this seemed an important first step to encourage him to start thinking independently regarding his real life choices.

Family involvement

I occasionally invited family members to join in the sessions, as it enabled Samuel to communicate nonverbally and share his joy of music making. On one occasion I asked his mother if she would like to play the ukulele while he played the tambourine. She was happy to and they seemed to enjoy the musical experience together. Family members were often in the adjoining room listening to what we were doing.

Sharing bongos

I would model a simple beat with both hands while standing opposite my patient and ask him to copy me. I would also play a game where we “talked” to each other using a simple ‘call and response’ game.

Sharing the paddle drums

I held and maneuvered paddle drums while Samuel beat the drums with beaters. He was able to practice beating in time and simultaneously improve his hand/eye co-ordination. I would

sometimes suggest a simple rhythm to get my patient started by moving the paddle drums backwards and forwards in a teasing manner. He could then try out a variety of different rhythms. I would swap roles so that he held and maneuvered the paddle drums himself. This would often turn into a playful game, where he would become excited and swing both paddle drums around in large circles, laughing.

Vignette

This is a music therapy session that took place in early May 2014. At this stage Samuel had returned home and I had been working with him for a total of two and a half months. He lived with his mother, father, sister, brother-in-law and two young children in a small three-bedroom house. Samuel did not have a great deal to do during the day so he could become quite bored. I had recently organized part funding for the purchase of a keyboard for him, so that he had an instrument to play, thus relieving some of his boredom. He was not able to leave the house on his own, as he had had a left hemispherectomy (part of his skull was removed due to swelling of the brain). He wore a special helmet to protect his head. This was important because further injury or infection would have been detrimental to his progress.

In this session I was focusing on Samuel's physical and cognitive development by encouraging him to master specific tasks such as mastery on the keyboard, ukulele and paddle drums. Samuel's arm was getting stronger every week but he still had a lack of sensation in his right arm, and the fine motor control of his right hand fingers was weak. At earlier sessions I had noted that the cabassa and the claves were instruments that Samuel had enjoyed playing. He would often rub his affected arm afterwards saying "Nice". I realized from my reading that he was experiencing more sensation in his arm and therefore playing percussion instruments became an important part of the treatment. Playing them in time and with precision became another focus, whereby we could work on improving his motor coordination.

I used learning and recalling chords on the ukulele and keyboard to improve his memory and recall. Reading music, chords and lyrics were also a large part of his music therapy treatment.

Samuel

As was usual, Samuel was standing outside the door of his house ready to greet me, as I pulled in the driveway. As we walked up the path to the house I asked him what he had been doing all week. He pointed to the sheet of music through the window and smiled. I replied, "That's great, you've been practicing". He smiled again as we entered the house and sat down.

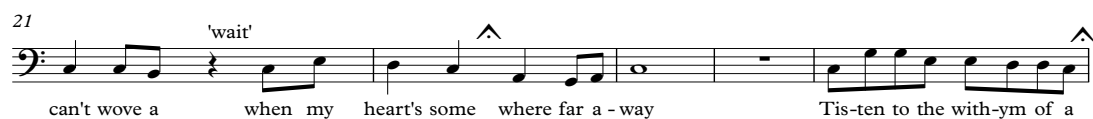
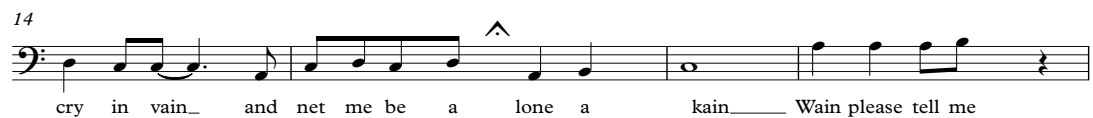
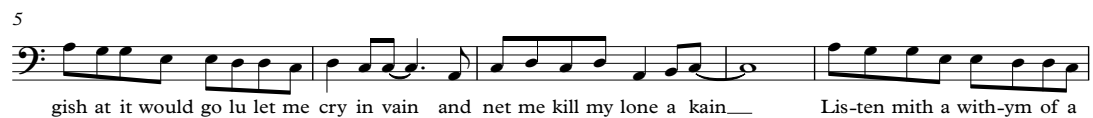
I planned to work on physical motor coordination and cognitive skills this particular day. Samuel had a lack of sensation in his right arm, and his motor coordination had also been affected by the stroke. As I worked on developing his technique, I would be encouraged that the action of strumming the ukulele was developing a smoother and more coordinated movement in his right arm. Learning, recalling and fingering the different chord shapes in his left hand was also improving and developing his cognitive skills.

He picked up his ukulele and I asked him to show me the chords he had been practicing. We reviewed several chords C, A minor, F, E minor, G7 and A7. He knew all of the chords and we began by strumming two bars of each chord. Through practice his strumming was becoming more even and the tone fuller, although occasionally I had to remind him to play using all of his fingers. Lack of sensation in his arm and impaired motor co-ordination had meant that sometimes he only used one or two fingers. He was not always aware of this, and had to be reminded. We sang the name of each chord as we played C, 2, 3, 4, A minor 2, 3, 4 and so on. When we reached the F chord we both sang F, 2, 3, 4, with our “very low voices” and laughed very loudly together.

I occasionally had to remind him to strum. This was because I was also playing the ukulele and when his attention was divided, because he was watching his other hand and singing, it was easy to forget. After we had reviewed the chords, I asked him if he would like to play ‘Rhythm of the rain’. I placed the music on the stand and we began to play and sing together. Samuel had a rich full voice with very good breath control. He had a wide vocal range, and good intonation. His timing was also good, however the physical and motor coordination problems affected his timing. He strummed the ukulele while reading the chord chart and lyrics. This was only the second occasion we had played the song all the way through. At the previous session he had practiced the quick changes in the song and we had gone over them several times. This particular day we played the song through four times, pausing to give him time to maneuver his three fingers into the G7 chord. Forming the G7 chord was more difficult for him, but this would be typical for any new ukulele student. His strumming was in time, and he knew the melody of the song very well, however the initial consonant of some of the lyrics were often incorrect. This is one of the difficulties patients with aphasia have when they are learning to speak again. You can observe the difficulties Samuel had forming words in the transcript. Even from verse to verse the initial consonants of some

words would change. Consonant clusters such as 'th' and 'fl' were impossible for him at this stage.

Rhythm of the rain - transcription of voice



I suggested to Samuel that I sing the song this time so that he could focus on his strumming. The next transcription demonstrates Samuel's strumming. You can see from the transcription that his strumming was relatively even most of the time, however sometimes he would cut some of the notes short because he would accidentally hit the body of the ukulele or the muscles in his right arm would tighten up, or he would just simply make a mistake. He managed to play some up-strums as well as down-strums, as you will see from the transcript.

Samuel's strumming

O.k now I want you to focus on your strumming



I had recorded the song 'Time after time' to enable him to learn it aurally. I thought this might be a way he could also practice his computer skills. I had recorded the song at a slower pace than the original so that he could sing along more easily. I asked him if he could transfer the recording to his desktop. He was able to do this and he played the song and said he really liked it. I checked the tempo with Samuel and suggested that once he knew the song he might try picking out the notes on his keyboard. He thought that this was a good idea and was happy for me to leave it with him.

I asked him if he would like to play the paddle drums. He looked really excited, but I warned him not to go too fast, because the last time the muscles in his hand tightened up. He just laughed! I pulled the two paddle drums out of my bag, and modeled one beat on the left drum and two beats on the right, thinking that a 3/4 pattern might be a change from the usual 4/4. I gave him the beaters, and he began to play. He hit the drums hard and in time and seemed very focused, his eyes darting from one drum to the other. After a while I suggested he cross his hands over so that his left hand was playing the right drum and vice-versa. He was able to do this extremely well. Crossing the mid-line during drumming encourages cross-talk between the two hemispheres of the brain and can be particularly helpful for patients who have had a stroke. After a while I suggested that I held the beaters and he held the paddle drums, and I encouraged him to lead. He was not very confident with this, so I moved the drums teasingly backwards and forwards. Eventually he chose a pattern and we played for a short time. Then he became excited and started moving his arms in really large circles and laughing. Soon he began to look tired, so I suggested he stop and we both laughed.

We moved back to the keyboard, as he wanted to play "Rhythm of the Rain" on the keyboard. I played bass notes to support the chords that he was playing in his left hand, and he began to sing the song simultaneously. He then stopped, looked at my fingers and asked me "How?" I took this to mean he was wondering how my bass notes fitted with his chords. I explained that I played the bottom note of each chord to give the song more depth. Samuel appeared to understand, because he said "Oh" and after we played the song through four or five times, he said "Wow!" I asked him, "Wow, because you are pleased with what you are doing?" and he said "Yes!" enthusiastically. I had been telling him each week that he was improving, and often he would say "Really?" as if he didn't believe me. I thought on this day for the first time he had noticed his progress. I looked at my watch and we had worked for an

hour, so I suggested we stop and I began packing up. As I left he said “Bye, bye” to a pretend person, hinting that he would have loved to come with me in my car. I thought that it must be so difficult for him when he is house bound all day. I felt for him and said “Nice session Samuel, I’ll see you on Monday”.

When reflecting later on this session I noticed that I had used a number of different methods, instruments and songs all in one session. I can see that I was trying to offer Samuel variety so that he would not get bored. Although I recognised that Samuel sometimes tired easily, I did not always remember that his ability to concentrate would not necessarily sustain for a whole hour. In addition he may have been over-stimulated at certain points in the session, which could have had a negative impact on his recovery. In the ensuing sessions we had two breaks, where we stopped, had a drink or relaxed. I also realised, after transcribing ‘Time after time’, that focussing on practicing one phrase of the song would be beneficial for Samuel. I certainly did this in the following music therapy sessions and he was eventually able to correctly articulate most of the lyrics of the song.

On the other hand, my visits twice-weekly offered Samuel an opportunity for socialisation, as he was very isolated due to his condition. It was also important for me to develop a positive client/patient relationship with him so that he was able to trust me and feel comfortable and contained within the sessions. I ensured that I was reliable, supportive and encouraging during the months I visited him. As a result he seemed to enjoy our music therapy sessions and in particular singing with me. As Samuel’s cognitive ability improved so did his confidence. This manifested itself into Samuel being able to make choices for the first time since his stroke which certainly enabled him to regain his communicative independence.

General Findings

Physical

Fatigue

Severe fatigue is common in patients following a stroke. Monitoring the length of sessions in an on-going way is important. Short 10-15 minute music therapy sessions are appropriate in the first few weeks, and can be extended to 45 minutes or an hour as patients regain their strength.

Breathing exercises

Deep breathing exercises can be used to increase the volume of patients' voices or enable the singing voice to emerge. Slow songs with long notes are easier for patients to sing and will encourage slower and deeper breathing.

Oro-motor development

Deep breathing exercises can also be used to strengthen the muscles in the oro-motor area and develop motor control both in the diaphragm and in the oro-motor areas. Often patients need to be reminded to take a deep breath. Exaggerated modeling from the music therapist is important, especially for patients with apraxia. Written instructions and verbal cueing will ensure that patients relearn the steps and timing required for the preparation of making a sound.

Familiar songs and long-term memory

Familiar songs are often easier for patients to sing, because they tap into patients' long-term memory. Family members can help construct lists of familiar songs. Familiar songs are important to use because they often elicit personal responses. It can sometimes be appropriate to sing fast songs with patients, even if they can not sing all of the lyrics. This enables them to enjoy experiencing the excitement of a fast song again.

Songs that focus on the needs of patients

Using a variety of songs and styles, to keep patients' interest during the sessions is worthwhile. Songs with slow simple lyrics and children's songs can be easier for patients to sing. Choosing songs where the chorus consists of 'la's or 'da's' can enable patients to

practice one sound. Latin songs, with syncopated rhythms can be fun to use because they can be more exciting for patients to play. Client-centred songs can be specifically composed, focusing on patients' oro-motor needs e.g. practicing a sequence of different face shapes, modeled by the music therapist, or practicing a particular word that the patient cannot say. From the research it was found that singing often reduced frustration and anger.

Proprioception

I discovered that lack of sensation and lack of proprioception in the face is common after a stroke. It can be valuable to practice modelling different facial expressions with patients to promote physical awareness of the tongue, lips, jaw, eyes and nose. This can be done slowly and in an exaggerated manner, to enable patients to achieve success. Client-centred songs can also be written to practice different expressions or particular sounds.

Movement to music

It is important to encourage movement in a variety of ways, especially when patients have hemiparesis. This is because the muscles may waste away if they are not used. The music therapist can move her body in a sideways motion while singing and playing, to encourage patients to copy the movements as they sing.

Paddle drums can be used to develop motor control and strength in patients' weak arms. It is important to observe the timing of each drumbeat and the strength of the two arms by monitoring the volume of sound produced between the two drums. Paddle drums can also be useful for self-expression and playfulness.

Bongo drums encourage patients to sit upright in their wheel chairs, and twist their torsos while singing or playing along to music. Patients can also be encouraged to cross hands when playing bongo drums to enable more stretch in the arms and torso areas.

Practicing the strumming technique on the ukulele not only improves physical motor coordination in the upper limbs, but is a way patients can also experience more sensation. A smooth, even strum requires good motor control and flexion of the wrist. Observing whether all of the fingers are involved in the strum and ensuring that patients are aware of using all their fingers to improve the quality of the strum is also valuable.

Instruments to develop independence

Patients can be empowered when they are able to play an instrument independently. Instruments such as the harmonica, egg shakers and bongo drums can encourage a sense of independence, as they can all be played using one hand. However, holding musical instruments in the weak hand can motivate and strengthen grasp. Music therapists may be able to place one clave in the affected hand, supported by a pillow, so that patients can tap the beat or a rhythm with their other hand. In time some patients may be able to maneuver the two claves themselves and reach a level of independence.

Collaboration with other therapists

Collaboration with other therapists can further assist patients to achieve their goals. Occupational therapists may be able to assist with limb movement while the music therapist improvises lyrics that guide a patient to lift his feet while sitting. Patients may also be able to practice standing and side stepping, assisted by a physiotherapist, while the music therapist sings an improvised song.

The elements of music

The clever use of dynamics can increase muscle activity. Patients can be encouraged to play percussion instruments louder by the music therapist increasing the volume of her piano playing and voice. This may also encourage patients to make larger and faster arm movements. Some instruments are intrinsically louder than others and some patients may become excited, wanting to play louder, and faster. It is also important to encourage patients to play softly, which is often more difficult because it requires a more precise movement.

Gross motor skills

Hand drums, paddle drums, tambourines, egg shakers, claves are suitable for developing patients' gross motor skills. I encouraged patients who might only be able to play a drum using one or two fingers to use the flat of the hand, by visually modeling the movement.

Fine motor skills

I discovered that the keyboard is a very effective instrument for developing and improving fine motor skills in patients' weak hands. This is because the piano keyboard has an even and

gentle resistance. Some fingers are often weaker than others, and so finding novel ways to play a note using a weak finger is important.

Communication

Gestural communication

I discovered that gestural communication is very effective with patients with aphasia, particularly in the first few weeks following a stroke. Keeping questions or statements short is important to ensure that patients do not become confused. Family members and other experienced staff are often able to determine the meaning of patients' gestural communication when their gestures do not seem to be in keeping with what they might be trying to say. I followed the speech language therapist's lead by modelling gestural communication to remind patients of appropriate gestures. I kept questions simple for patients by visually offering a choice.

Written communication

It can be helpful to communicate with patients by writing in their diaries, offering short comments on how the session went, or reminding them about the next session. Patients often respond well to song lists, which can be compiled by the family and music therapist. This enables patients to make a choice by pointing. However an individual approach for each patient is important, because some patients may have problems reading words in the first few weeks post stroke.

Verbal communication

I discovered that closed questions to enable patients to give a 'yes' or 'no' response were most appropriate in the early stages of recovery. Family members would often clarify a patients' 'yes' or 'no' response if I was confused. It is respectful to speak directly to patients, offering instructions in a clear, slow voice and keeping sentences simple and short.

Communicating with family members

Family members are often able to help with important background information such as the patient's personality, and patient likes and dislikes. Being available for family members to communicate about how they are feeling, or coping, is important because the patient and

family can feel very isolated during this period of rehabilitation. Family members may offer comments which provide helpful feedback and encouragement.

Voice Improvisation

Familiar formats such as the 'Blues' and 'call and response' techniques can enable patients to communicate in a fun manner. Gestures can be encouraged to further assist patients with the production of sounds. For some patients, improvised songs can be useful for enabling patients to express how they might be feeling. However, other patients may not be comfortable with vocal improvisation.

Instrumental improvisation

Patients who are not familiar with the piano can be encouraged to improvise, using the black notes which make up the pentatonic scale. Patients can have control over style and tempo. The music therapist can take a supportive role, providing suitable bass notes or alternatively playing in the top range of the piano.

Family involvement

It can often be appropriate to invite family members to join the sessions, because it may encourage communication and interaction. Family members may also share the joy of music making with patients, which facilitates non-verbal communication.

Sharing a piano

The large range of the piano offers patients a chance for melodic and rhythmic exploration. It can be a vehicle for encouraging patients' awareness of timing and melody, because their playing can be supported by the music therapist. This can be pleasurable and confidence building.

Sharing bongos

The music therapist can model a simple beat by standing opposite the patient, playing the bongos and asking them to copy the rhythm with their hands. A call and response game can also be played where the therapist and patient "talk" to each other.

Sharing paddle drums

Paddle drums can be used for a variety of reasons with patients who have experienced stroke. The music therapist can hold and manoeuvre the paddle drums while the patient beats the drums with beaters. In this way patients can practice beating in time to improve their hand/eye co-ordination. Suggesting a simple rhythm to get the patient started by enticingly moving the paddle drums slightly backwards and forwards can encourage participation. Patients can then try out a variety of different rhythms. Swapping roles so that the patient holds and manoeuvres the paddle drums himself can be fun for some patients. The patient can also practise matching the volume of both drums. This is particularly effective if one arm is weaker than the other.

Cognitive

Confusion is common for patients following a stroke. I found that the processing of information and short-term memory is often also effected in patients post stroke.

Following instructions can be difficult for some patients if their cognition has been effected. A patients' understanding is commonly based on only one or two key words and the meaning can be misinterpreted.

In the first few weeks patients can be offered egg shakers or claves, and invited to simply play along to the music. This can be enjoyable and alleviate confusion. A variety of listening repertoire, for example familiar songs, new material and different genres, can be used to stimulate, excite or relax patients. Patients should be encouraged to choose a piece of music dependent on their mood and/or energy levels. It is common for melodic recall to be unimpaired in patients following a left hemisphere stroke. This means that the music therapist can focus on melody, using songs with a small number of lyrics or popular Arias.

Practicing rhythm patterns

If patients are able to play the beat, one and two bar rhythm patterns can be used to improve rhythmic recall, and short-term memory. Leaving a gap between each new rhythm is important, so that patients have time to process the new one. Patients may not be able to recall rhythms and will sometimes perseverate on one rhythm. This can be alleviated by saying "stop" and demonstrating the new pattern to the patient.

Patient initiating own practice

Once skills had been developed again, motivated patients may continue to practice to further improve their music skills.

Mastery on an instrument or voice

Often the ability to read notation is unimpaired in patients who have suffered a left hemisphere stroke. First year piano tutor books can be used for patients who may have played an instrument before their stroke. Mastery of singing can be a pleasurable method because patients who are non-verbal may still be able to sing, and achieve enjoyment and success.

Client-centred songs

Composed or improvised songs can be used for patients to enable them to practice singing words that they cannot necessarily speak. When this is achieved, the patient can then practice speaking the word. Songs can be composed to practice sequencing movement with words.

Elements of music

The music therapist may increase or decrease the speed of a song to observe a patient's response. Sometimes patients may initiate an increase in volume at different points in a song. Some instruments encourage patients to play them louder, e.g. tambourine.

Instruments for self expression

A variety of instruments can be used to encourage self-expression. A variety of tempos and styles will stimulate and engage patients, enabling patients to focus more easily. Having a selection of styles may encourage verbal communication with family members.

Personal preference

Client-centred songs that are easy to sing and provide meaning for patients are likely to be more motivating for patients.

Matching the patient's pace

Being aware of the time it takes for a patient to form a chord before moving on to the next chord is important. Other observations may include noticing a patient's toe tap, to ensure a song is played at a suitable tempo.

Group sessions in the hospital

I discovered that due to the high fatigue levels of patients in the first few weeks following a stroke, group sessions were not always appropriate. Acutely ill patients are not always able to work with other patients. Often patients can be focused on their own needs, and too unwell to be aware of other people's musical choices. However, small group sessions with two or three patients, may be more manageable and less threatening for patients.

Discussion

The purpose of this study was to explore the different ways a student music therapist might work with patients in a stroke rehabilitation setting. I had read about a variety of specific music therapy approaches and techniques such as ‘melodic intonation therapy’ and ‘rhythmic entrainment’ and was eager to work with them in practice. However while on the ward, I learnt that stroke was complex and when working in a person-centred way it is not always appropriate, and certainly not easy to choose a specific approach that targets just one identified area of need.

The first two weeks of my placement were spent observing the doctors and physiotherapists, occupational therapists and speech and language therapists working with patients. From these observations and through conversations with my clinical liaison I began to develop an understanding of the different presentations of stroke and identified that my work would focus mainly on supporting patients’ physical, cognitive and communication rehabilitation. I was aware that Baker and Tamplin (2006) stress that considering the whole person in relation to their adjustment and emotional needs is important for a music therapist too. However, they add that patients are often highly motivated to regain their independence and ability to relearn functional skills. It is logical therefore that my findings focused on music therapy to address my patients’ physical, cognitive and communication skills. Similarly acknowledging the individual nature of stroke is fundamental to treatment. While certain characteristics are common to the diagnosis of a left hemisphere MCA stroke, such as aphasia, hemiparesis and apraxia, it is widely recognized that every patient will respond, adapt or compensate differently depending on their general health, plasticity of the brain and psychological wellbeing. Therefore it is logical that the two patients I have focused on in this research would be diverse in presentation and response to treatment.

I found that it was important for me to develop clinical language that other therapists were able to understand. My music therapy liaison offered advice and encouragement, in order that I might be perceived in a more professional way. This was helpful both in gaining acceptance by the team and enabling the other therapists to understand what was happening to patients during music therapy. Baker and Tamplin suggest that terms such as ‘independence’ rather than ‘self esteem’ or ‘self expression’ can help with acceptance within the rehabilitation team (Baker and Tamplin, 2006). I did however use musical terms when no other options were appropriate.

Each member of the multi-disciplinary team worked on their own or in pairs with patients, within their own particular discipline. I generally worked on my own with patients, developing my own goals or working on team goals. Although collaboration with other therapists did take place occasionally, some therapists were not used to working with other therapists from a different discipline and other therapists seemed to me to perceive music therapy as novel or entertaining rather than therapeutic. This is a common problem that can occur when setting up a music therapy practice in an established rehabilitation centre (Tamplin, 2006). Staff understanding and perception of music therapy can also vary. Tamplin advocates that staff understanding regarding the role of music therapy can be improved and evolve through on-going education, particularly in the field of cognitive and physical rehabilitation (Tamplin, 2006).

Although patients differ in their levels of physical disability, music therapists can respond and adjust their treatment to meet patients where they are. Music therapists inherently can explore the potential of a person, focusing on the musical methods that they enjoy and are able participate in. As the therapeutic relationship grows and trust develops, the therapist can slowly introduce new methods to extend and challenge the patient.

It was difficult attempting to break down the music therapy methods I used into physical, cognitive and communicative because often a particular method addressed several areas simultaneously.

Singing for word retrieval and expression

One of the key findings in this study was that for patients who are in the acute stages of aphasia, and unable to retrieve words necessary for speech, singing can offer them access to language, and a means of expressing themselves. This has been widely reported in the literature since the Sparks, Helm and Albert's seminal paper of 1974. Music therapy has been shown to play a valuable role in aphasia rehabilitation (Lucia, 1987, as cited by Jungblut), and has the ability to enhance word retrieval, improve breath capacity and correct articulation errors (Aldridge, 1991a, 1996, 2000a). However, currently in New Zealand patients with aphasia cannot access music therapy in a rehabilitation ward.

Physical aspects of aphasia

For patients who are unable to physically produce a sound, because of disorders such as aphasia and apraxia, deep breathing exercises can be really beneficial. Research on voice

training for patients with chronic aphasia and apraxia provided me with helpful information and protocols (Jungblut, 2014, Baker & Tamplin, 2006). I observed that these exercises enabled my patient to produce sounds. In addition, deep breathing and singing simple sounds increased the volume of his voice, and improved the tone of his voice. Being able to sing is very encouraging for patients and their families. Singing had both an emotional and containing affect for Bill, where he was able to feel safe in his home environment and share fond memories through singing with his family. I found that visual cueing and modeling made the planning and timing of forming pitched sounds easier for him. Cueing and modeling techniques are discussed in the literature on patients with aphasia and apraxia (Baker and Tamplin, 2006).

The aphasia and apraxia conditions are complex and I discovered that patients present with vastly different problems. I discovered that often patients phonate the melody and/or approximate many of the lyrics. I observed that although some lyrics may be sung correctly others could be misarticulated. I used repeated practice and visual cueing to improve patients' abilities to articulate words correctly. Baker & Tamplin (2006) and Jungblut (2014) agree that repeated practice improves a patient's ability to articulate words. I used different exercises with more complex sounds to help Samuel practice certain consonants that he had difficulty producing. The transcription is an example that demonstrates regular misarticulation of the initial consonant in a song. This can be a common problem for patients with aphasia, and well known among speech and language therapists (Square-Storer & Roy, 1989). Tamplin recommends that repeated practice will alleviate many articulation errors when working with patients (Baker and Tamplin, 2006)

Familiar song singing and musicians

When music is already a big part of one's life a positive and immediate response is likely to occur when music therapy is part of the rehabilitation program. This occurred for both men in this study. Research has demonstrated that musicians have earlier and larger brain stem responses to both speech and music stimuli presented in auditory and visual conditions (Musacchia et al. as cited by Tomaino 2010). In a case study of an eighty year old musicologist who had developed aphasia following a stroke, Tomaino (2010) posed the question "Is the potential for recovery in speech greater for musicians following a stroke than normal populations?" The research examined the effects of daily speech therapy and music therapy over a period of four months. The music therapist used familiar over-learned songs

as a method to retrieve the patient's speech. Results demonstrated a high level of speech retrieval, pointing to the fact that being a musician may have facilitated a quicker recovery (Tomaino, 2010).

I used self selected familiar songs as a method with Bill. He seemed to enjoy singing and did not mind repeating songs two or three times during a session. The repeated action of practicing sounds over and over again seemed to be really helpful for Bill. Musicians are often very particular about what styles of music they enjoy and this was certainly the case for both men. For Samuel singing familiar songs certainly encouraged spontaneous speech. Because he enjoyed singing so much he practised singing along to recorded music in his own time.

Instruments to improve gross and fine motor skills

It was very clear from early on that Bill's motor impairments were severe. Although I collaborated with an occupational therapist on one occasion when he was practicing side-stepping, I could not focus on this particular area when he returned home, because assistance from another therapist would have been required. Nevertheless collaboration may have been meaningful for Bill, and may have resulted in improved outcomes for him.

However, I was able to use singing and playing percussion instruments as a way of engaging him physically. This method seemed to improve his posture and gently exercised the muscles in his functional arm and torso area. The repeated action of playing a steady beat along to a familiar song may have improved Bill's physical, and cognitive recovery. Van Wijck states that activities that are repeatedly practiced and include feedback can have the potential to from long-term neuroplastic changes in the brain (Van Wijck et al, 2011). Playing percussion instruments and singing provided an enjoyable focus and he was often engaged for up to an hour, allowing for breaks between songs. Jun, Roh and Kim (2012) describe the value of combining physical music movement therapy with therapeutic singing. Millard and Smith (1989) have reported that patients were able to maintain exercise for longer with music. The 'feel good' and 'fun' aspect of playing with others certainly contributed to Bill's enjoyment and may have had an impact on his psychological wellbeing. This is certainly apparent in studies where physical and psychological outcomes have benefitted recovery.

In contrast to Bill, I was able to work independently with Samuel on improving his gross motor skills, mainly because he was able to walk and lift his affected arm, albeit slowly.

Slow repeated practice enabled him to progress from having to use a lot of shoulder movement to play a drum, to being able to hit a drum with minimal shoulder movement and using the flat of his hand. Jun, Roh and Kim describe the combined use of percussion instruments with song singing to improve shoulder flexion and elbow joint flexion in patients. Sharing a drum and visual modeling was the method I used to support Samuel. Significant improvements in his fine motor skills occurred from first improving his gross motor skills. He gained a significant improvement in his wrist flexion from playing percussion instruments, specifically the cabassa and egg shakers. Eventually he was able to play the keyboard with his affected right hand. Baker and Tamplin have described protocols for the use of the cabassa specifically to improve wrist pronation and egg shakers to improve arm flexion (Baker & Tamplin, 2006).

Keyboard tunes and exercises were used to improve his fine motor skills in order for him to gain more control of his individual fingers. Studies with patients using electronic drum kits and MIDI keyboards have demonstrated that repetition, auditory feedback, shaping and emotion resulted in significant improvements in timing, precision, and smoothness of fine motor skills (Schneider et al. 2010).

Strumming a ukulele exercised Samuel's affected arm and he seemed to develop more sensation after playing. The action of strumming a ukulele is a very specific action and requires a precise movement. This method may have contributed to improved motor development in his upper limb.

Engagement and cognition

Both men had a high level of engagement during their music therapy sessions. This included sustained eye contact and very good auditory skills. The engaging quality of music is widely reported and suggests that music therapy may stimulate multiple areas simultaneously; for example the auditory, tactile, emotional, and sensory motor (Thaut, 2005). This seemed to be the case for both men. This may be one of the reasons why music therapy is a valuable therapy in the rehabilitation setting. Engaging activities such as music can enhance attention, memory and focus, as well as stimulating the limbic system responsible for modulating emotion and memory (Thaut, 2005).

Listening to music and cognitive improvement

Cognitive improvement may have been attributed in part to the amount of listening they did. I encouraged both men to listen to music between music therapy sessions. Bill listened to his own albums at home, often having an emotional response when old memories were triggered. I offered Samuel some jazz listening material, which introduced him to a new musical genre. They both seemed less confused and appeared to gain more understanding of verbal language following the introduction of music listening. For example, during a keyboard session Samuel asked me 'why' when pointing to the sharp in the key signature. He wanted to know why the F he was playing in the lower register sounded wrong, and was looking for a sharp sign in the lower register. This was quite tricky for me to explain, however he seemed to understand my explanation. The literature proposes that daily listening to self-selected music after an MCA stroke can significantly enhance auditory sensory memory and have a positive effect on cognitive recovery (Särkämö & Soto, 2012). Särkämö explains that multiple systems in the brain are stimulated through listening to music (Särkämö & Soto, 2012).

Unaffected musical abilities

One of the noticeable features of working with patients who have had a left hemisphere stroke is that many musical abilities are unaffected. Both men's melodic recall, and expressive ability was relatively unaffected. Samuel's ability to read piano music and improvise also seemed unaffected by the stroke, although his pace was slowed due to processing problems. Both men were able to not only enjoy the musical experience but also experience success and progress. According to published literature reviews (Taylor, 1988, 1989) studies on cerebral localization of musical processing using a series of different measures, have demonstrated that the right hemisphere is responsible for processing musical pitch, melody perception, visual pattern recognition, timbre, discriminating volume differences, and expressive rhythmic and melodic behavior, such as improvisation. This is consistent with what I observed during music therapy sessions with both men.

Areas of difficulty

Both men had problems recalling rhythms. Even one bar rhythms were sometimes repeated back incorrectly. Both men would sometimes persevere on one rhythm several times, possibly because they did not perceive a change. The perception of rhythm and lyric

performance and the sequential analytical aspects of music are situated in the left hemisphere, (Taylor, 1988, 1989). It is therefore not surprising that both Samuel and Bill had problems with lyric performance and rhythmic recall.

Communication

One of the most difficult aspects when working with a patient who is non-verbal is communication. As a music therapy student I had the advantage of 'letting the music do the talking'. For Bill, who had been a proficient guitarist, it seemed to make sense right from the start that he might participate and share musical experiences with me, and this could be a way for him to communicate. Because we both knew and understood the experience of being members of a band we also shared a common language regarding taking solos or ending songs. This musical language was conveyed using eye contact and facial expressions. Music therapy also offered Bill a safe environment, where he could just play music with me, and feel some sense of normality again.

At the beginning of the music therapy program Samuel was able to communicate verbally and gesturally, although his vocabulary consisted of a very small selection of words. However, I found we could communicate in a relaxed and fun way through improvisation. Improvisation, specifically simple jazz scatting, opened up a world of simple nonsense syllables that Samuel was able to sing and simultaneously compose his own melodies. He spontaneously introduced gestures, which I immediately copied, matched and encouraged. Research has demonstrated that language and actions are closely linked in the Broca's area, integrating action, gesture and music with speech (Pulvermuller, 2005). Furthermore, perceiving language activates the hand motor cortex (Floel et al., as cited by Johansson, 2011). The gestures he made were noticeably linked to his mouth shapes and seemed to help him produce certain sounds and rhythms. There is no literature specifically on the use of jazz scatting and gesture with patients with aphasia, although Jungblut (2014) and Baker and Tamplin (2006) advocate using improvisation as a method to enable patients to express their feelings, such as sorrow and grief, as well as releasing pent-up tension (Baker & Tamplin (2006). Later, when Samuel's verbal output had increased, I used vocal improvisation to enable Samuel to express how he was feeling, his losses, and his concerns about his new life. It is feasible that jazz scatting and gesture could be used with some patients with aphasia, to access spontaneous language retrieval. Further research using specific techniques such as jazz scatting could be undertaken.

Although I did not use specific methods such as MIT or SIPARI in a prescribed way, I sometimes composed a phrase with the word he wanted to recall within it and used the steps set out in Jungblut's protocol to enable him to achieve this. Jungblut's SIPARI method advocates a step-by-step process of mental singing, singing, chanting and then speaking to enable speech retrieval. (Jungblut et al, 2014)

Family group sessions

Facilitating family group sessions was very empowering for patients. Playing instruments and singing facilitated non-verbal communication with his family members and friends. A family group session became commonplace for Bill, both in the rehabilitation ward and at home. Family group sessions seemed to offer him a way to express himself again and feel part of the family, which took away some of the frustration and anger around being non-verbal. There does not appear to be any research on facilitating family group sessions in the rehabilitation setting, however Baker and Tamplin (2006) discuss facilitating family group sessions as a clinical recommendation in the rehabilitation setting. Family group sessions were certainly empowering for some patients and their family and friends and further research is needed in this area.

It was important that I communicated with family members. Family members were able to communicate information to me regarding their physical difficulties with the patient, their isolation and access difficulties and their personal feelings about their new role and responsibilities. Family members are challenged to redefine their roles and learn to adjust to changes in communication and intimacy following a loved one suffering a stroke (Palmer & Glass, 2003, Knussen et al, 2005). Furthermore, while a patient is in the acute and chronic stages of recovery, caregivers are at an increased risk of depression (Berg, et al. 2005). Therefore it is important that patients and their families have continued support from therapists throughout this period of recovery.

The music therapy principle of working with patient strengths and building up their musical skills

One of the key principles in music therapy is working with patients' strengths; working out what patients are able to do and slowly building their musical skills by introducing new instruments or a new song. Increasing my patients' musical skills was confidence building when they were otherwise dependent on family members. Furthermore, these step-by-step

accomplishments were very rewarding, because the patients and their families would notice a change in their loved one's response to the therapy. For example Bill had initially been very uncomfortable playing the harmonica, however he allowed himself to be challenged physically and psychologically and through his wife's encouragement had the confidence to improvise. His fear of failure seemed to wane the more often he improvised. Samuel had a similar experience when he was not only able to master playing the keyboard, but also read notation. An exciting development also occurred several months later when Samuel asked me if he could perform 'My funny Valentine' to the music group. The group was touched by his performance and Samuel related afterwards that performing was what he now wanted to pursue.

Conclusion

From the literature and this current research, it seems that music therapy is a valuable therapeutic intervention that can be relatively easily introduced into a stroke rehabilitation setting. The stroke rehabilitation ward is a clinical environment which is often an unfamiliar and stark environment for patients when they are unwell and vulnerable. The addition of music therapy in the clinical environment can provide a motivating, stimulating or relaxing experience for patients and therefore enhance the existing therapy program.

Music therapy is non-threatening and empowering, where patients are able to participate at whatever level they are comfortable with. The music therapist is flexible and able to work with patients at the bedside or in the lounge, depending on their mobility. So it follows that when patients are too unwell to participate in other therapies, they may still be able to participate in music therapy. This can be very encouraging for staff, patients and their families, especially when families are experiencing grief, physical disability, loss of income, or a change to their role in the family. Furthermore, music therapy can provide a positive focus or distraction for patients and their families when they are coming to terms with these feelings.

Verbal communication can sometimes be difficult or sometimes impossible for patients following a stroke, and the research has demonstrated that singing can offer an alternative way for patients to communicate and express themselves. This is an important finding, because patients and their caregivers may be at risk of depression if they develop aphasia or apraxia. Furthermore, the research has demonstrated that singing may aid speech retrieval in some patients with Broca's aphasia and/or apraxia. This means that the addition of singing may equate to a quicker recovery for these patients, if music therapy is part of the program.

Because I was working in a clinical environment, I developed a natural curiosity about the brain. The members of the multi-disciplinary team were extremely helpful, answering any questions I posed to them about patients' behaviour or conditions. This information was crucial in helping me understand what patients might be experiencing and what their particular needs were. As I developed my practice, experienced different presentations of stroke and continued my reading, I became more confident working with my patients. Once I developed an understanding of how a patient may present from information passed on to me by the team, I was able to begin a professional relationship with the patient using a specific method with confidence.

Working with patients can be difficult, especially when they have communication difficulties. However musical engagement can be a way for patients to communicate non-verbally, and enable them to feel more at ease with those around them. Currently patients may sit with family members and friends in the lounge, not knowing what to say or do. Expressions of anger, frustration and feelings of worthlessness can be temporarily alleviated when patients are engaged in music therapy. Further when patients participate in music therapy they can be much more relaxed and much easier for staff to manage.

Speech therapists will sometimes apply compensatory techniques to people who have no verbal output. Jungblut's research has demonstrated a successful method that music therapists may use to enable phonation for people with long-term aphasia and apraxia. This technique offers patients potential verbal language, as well as hope for the future.

One of the main features of music therapy is its flexibility. Music therapy can be used on its own or in collaboration with other therapies. Music therapists may work collaboratively with speech therapists, physiotherapists and occupational therapists, where there is the potential to address several goals simultaneously, decrease the amount of time spent in rehabilitation and therefore improve outcomes for patients.

A range of methods can be explored with patients that can be used successfully both in the clinical environment and in the community. Through the skill and experience of a music therapist, these methods can be developed as patients recover.

Active participation at any level is probably one of the the key features of music therapy in the clinical environment. Music therapy is a enjoyable and relaxing art therapy which would be a wonderful addition to the current therapy program.

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Appendices

Appendix 1. Initial codes: Bill.

Codes	What I did	What was I thinking therapeutically	Why	Patient Response
Physical	I wanted to try 2-step breathing	I had read that breathing exercises may be helpful for patients with aphasia and apraxia	Patients' breathing is commonly very shallow, and the exercises may help enable phonation	He was able to follow my written instructions and perform the 2-step breathing exercises
Physical	Began to play a song he really liked to see if he would move to the song.	If the song facilitates movement this may be beneficial.	I move as I play and sing it and maybe he will copy my side-ways movement	He moved his torso to the music and tapped his toe

Appendix 2. Extended codes: Bill

Codes	Extended codes	Raw data	Code description	Theme	Patient response
Physical	Breathing exercises and oro-motor development	I wanted to try 2-step breathing exercises	I had read that deep breathing exercises may be beneficial for patients with aphasia and apraxia	Deep breathing can strengthen the oro-motor areas and enable phonation	He was able to follow my written instructions and perform the 2-step breathing exercises
Physical	Movement to music	Moving to a song he really likes "The way you do the things you do"	If the song helps facilitate movement this may be beneficial	I move as I play and sing it, and maybe he will copy my side-ways movement.	He moved his torso to the music and tapped his toe

Appendix 3: A song to encourage different face shapes

Sample of a song composed to encourage Bill to practice different face shapes.
Time between the different face shapes was important to allow Bill time to comprehend the changes.

Come on and "smile"

Andrea Robinson, 2014

The musical score is written in 4/4 time on a single staff. It includes lyrics and musical notation for a song designed to encourage face shape practice. The score is divided into four lines of music, each with a measure number (1, 5, 7, 11) and a key signature (C or G7).

Line 1 (Measure 1): (Breathe) C
Come on and smile come on and smile

Line 2 (Measure 5): F7
show me your smile Come on and o - pen your mouth_____

Line 3 (Measure 7): C
(Op - en) give a big yawn____ (Yawn) (yawn) And

Line 4 (Measure 11): G7
swal - low (Gulp gulp) and hum_____ come on and

Appendix 4: A song for moving and twisting

Twisting at the beach

Andrea Robinson 2014

The musical score is written in 4/4 time with a key signature of one sharp (F#). It consists of four staves of music, each with a corresponding line of lyrics underneath. Chord symbols (G, G7, C, D7) are placed above the staff lines. The lyrics are: 'Twist-in' at the beach with a hu-la hu-la hu-la sway', 'Twist-in at the beach Be my ba-by to-day___', 'Sip-ping Clip-per Tin-is Lookin' out o-ver the bay___', and 'Twist-in at the beach with a Hu-la hu-la sway___'. The melody is simple and repetitive, using quarter and eighth notes.

G G⁷

Twist-in' at the beach with a hu-la hu-la hu-la sway

5 C G

Twist-in at the beach Be my ba-by to-day___

9 G

Sip-ping Clip-per Tin-is Lookin' out o-ver the bay___

13 D⁷ G

Twist-in at the beach with a Hu-la hu-la sway___