Providing music therapy to the unconscious child in the paediatric intensive care unit*

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Abstract:
This paper describes techniques used in the provision of music therapy to two children in a Paediatric Intensive Care Unit during the phase of admission when they were unconscious. The presentation of known songs and adaptations of known songs elicited a range of responses in these children. Further study of the role and effects of music with this patient group is required following positive outcomes for these children receiving music therapy while unconscious in an intensive care unit.

The Paediatric Intensive Care Unit
Admission to a Paediatric Intensive Care Unit (PICU) is a potentially traumatic event for the child and their family. The events which have precipitated the admission are often traumatic in themselves, let alone the adjustment required in order to cope with the strange, unfamiliar surrounds of a PICU.

"The first thing that strikes many visitors to ICU is . . . the relative silence that greets the newcomer. Children running up and down the corridor are absent but activity abounds with a constant checking of dials and screens and attention to bleeps from drips." (Lansdown, 1996, p 206)

The PICU is a busy place with a range of medical procedures frequently performed, often concurrently. Monitors display the child's pulse rate, oxygen level and blood pressure. Ventilators provide oxygen and support breathing. Arterial lines allow for ease of blood collection. Staff monitor children closely throughout each shift with information recorded every hour.

Children's reactions are dependent on their state of consciousness but typically include a low rate of verballisations, non engagement in activities, with anxiety and behavioural regression manifested (Thompson, 1985). PICU patients are at risk for overstimulation through the incessant noises of machinery nearby and the many procedures performed but paradoxically children are also at risk for sensory deprivation as a result of limited physical movement and limited variety or tolerance for stimulation.

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The child in the PICU is at greater risk of psychological trauma than patients cared for in other areas of the hospital. Jones, Fiser and Livingstone (1992) compared the frequency and severity of manifestations of anxiety, depression, delirium and withdrawal in paediatric patients hospitalised in PICU versus ward settings. Children in the PICU exhibited apprehension, anxiety, detachment, sadness and weeping more often than patients in the ward environment. Outcomes of their study indicate that critically ill children in PICU, children with prolonged or repeated hospitalisations and those with pre-existing anxiety and mood disorders are at greater risk than any other hospitalised paediatric patients for psychological trauma and behavioural problems resulting from hospitalisation.

Difficulties experienced by parents with children in PICU include the disruption to their lifestyle, adjustment to the unfamiliarity and intensity of the unit, feelings of helplessness and changes in their role of caring for the child. In an effort to reduce the stress of disruption to the parental role, staff can encourage parents to participate in their child's care thereby maintaining role identity in relation to the child (Fiser, Stanford & Dorman, 1984; Thompson, 1985).

The importance of parental involvement during a child's hospitalisation has been emphasised in literature outlining care issues for patients in PICU (Darbyshire, 1994). Two carers whose child was critically ill in a PICU commented:

"We did nothing... just sort of sat and watched him... cried a lot... wandered about... just in total turmoil... we couldn't do anything, we could just sit... We just sat and either watched him or sat and just thought... never said a word really, just sat and watched him" (Darbyshire, 1994, p.97).

Four significant stressors are present for the child and family in PICU.

a) physical stressors, for example pain and discomfort
b) environmental stressors, for example unfamiliar surroundings
c) psychologic stressors, for example the inability to communicate
d) social stressors, for example play deprivation and disruption of relationship with others.

Music is an appropriate means through which these stressors can be lessened for the child in the PICU. Music therapy is an appropriate intervention because:

a) familiar music can be comforting and supportive
b) orientation can be provided through the structured, ordered and familiar characteristics of music when disorientation is experienced
c) a means for expression can be provided through the interactive potentials in music therapy (all communication attempts can be incorporated meaningfully within therapist's responses to the child)
d) opportunities for engagement, stimulation, fun and interaction can be encouraged through music therapy.

Music therapy interventions focus on the child's capabilities by providing experiences which emphasise the healthy parts of a child's body (Dun, 1994). When a child has regained consciousness but is not yet able to move body parts or speak, improvised songs about what the child can see, feel and hear are provided to
encourage interaction and reality orientation as well as offering encouragement to the child in persisting with treatment.

The music therapist can encourage carers to take part in sessions regardless of the level of their child's consciousness. Opportunities are thereby created for meaningful interaction with their child reminiscent of the interactions prior to the hospitalisation.

**Literature review.**

Management of the auditory environment of the patient in a coma is important. Wood, Winkowski & Miller (1993) report that 15 patients (6 male and 9 female) displaying characteristics of a vegetative state responded well to sensory regulated procedures rather than sensory stimulation procedures. Modifying a patient's sensory environment was argued to facilitate information processing. By reducing the rate and complexity of stimulus exposure to a level appropriate to the patient's limited processing capability, increases in desirable behavioural responses were achieved.

In four pilot studies using single case study experimental design to examine the immediate effect of taped music as a form of stimulation in treatment of patients in persistent vegetative state, Wilson, Cranny & Andrews (1992) reported significant behavioural changes in two cases. These changes included increases in body movements and amount of vocalisations.

The Glasgow Coma Scale (GCS) is a measurement tool used to assess comatose states. It measures three clinical features: eye movement, motor response to pain stimuli or command, and verbal response. A numerical rating scale is used to assess level of consciousness as follows:

- **mild** = 13 and above
- **moderate** = 9 to 12
- **severe** = 8 and below

(Thaut, 1992, p. 258).

Aldridge, Gustorff & Hannich (1990) used improvised wordless singing in rhythmic synchronicity with the breathing of 5 coma patients who had GCS scores between four and seven. Changes in patient responses included alterations to breathing (slower and deeper), increase in fine motor movements and the patient(s) opening their eyes as well as the regaining of consciousness in some cases. Grabbing hand movements and head turning were also observed. They conclude that the unconscious patient who is struggling to orient himself or herself may seek the basic rhythmic context of their own breathing as the focus for orientation. Outcomes of their study indicate that improvised singing based on the individual's rhythmic pattern may be adapted by the music therapist to encourage an orientation response.

Given children's familiarity with a range of music and the preference of many children for favourite songs and tunes, music therapy is considered an appropriate stimulus based intervention to encourage orientation for this age cohort receiving medical care while in coma states.
Music therapy for Sally and Chris in the PICU:
Sally (aged 10) and her brother Chris (aged 7) were involved in a motor vehicle accident, which caused each of them to sustain severe multiple injuries. Their younger sister died in the accident and a carer received minor injuries. The children's injuries included a closed head injury and both were unconscious for a period of time following the accident.

Sally was given a GCS rating of 7 at the scene of the accident. At the time of her assessment she was uttering incomprehensible sounds, keeping her eyes closed and responding to pain stimuli. She was admitted to PICU where she was intubated and sedated. She was paralysed with a left hemiplegia and suffered a fractured right femur, cerebral edema, ruptured bladder and multiple pelvic fractures and facial lacerations.

Sally was in a coma for seventeen days and was hospitalised for seven weeks. She received five music therapy sessions while in coma.

Chris' injuries were severe and included a closed head injury with intracerebral haemorrhage, a left frontal lobe haematoma, left occipital haematoma and a slight midline shift, bilateral lung contusions, ruptured left hemidiaphragm, ruptured spleen (removed), retroperitoneal haemorrhage, pelvic fractures and a fractured left femur resulting in a through knee amputation.

Chris was given a GCS of 8 at the scene of the accident. He was admitted to PICU of the nearby hospital where he regained consciousness and demonstrated spontaneous eye opening. Following further complications due to his injuries, he was then transferred to the same PICU as Sally where he was intubated and sedated and became unconscious. He was in a coma for over twenty days and was hospitalised for thirteen weeks. He received thirteen music therapy sessions while in coma. Chris also had a history of Attention Deficit Hyperactivity Disorder.

At the time of referral for music therapy the initial needs identified for both children as described by the Clinical Nurse Consultant of the unit were for stimulation and arousal as everyone was "waiting for them to wake up". It was considered the children would respond to music stimulus as part of the process of their regaining consciousness.

Initial Assessment.
Following referral, an initial assessment was undertaken to determine the following:
• whether music therapy was indicated for these children
• ways that music therapy might be used to achieve communication with these children
• music preferences of the children.

The music therapy assessments for each child indicated that they had enjoyed music prior to the accident, that family members welcomed music therapy and that some engagement through music may be possible with these children.

The Music therapy program for Sally:
Assessment:
Sally's carers provided information regarding Sally's music preferences prior to the assessment session. These included Tom Jones, Elvis Presley, Michael Jackson,
Peter Andre and also music from the soundtracks “Lion King”, “Aladdin”, “Little Mermaid” and “Beauty and the Beast”.

Songs used with Sally while in coma included a song which described actions that she was able to do or had the potential to do, for example the actions breathe, hear and move were used (Slotteroff, 1983). Song material familiar to Sally was used included a version of “You’ve got a Friend” sung by Tom Jones, “Heal the World” by Michael Jackson and “Can you feel the love tonight” from the movie “The Lion King”.

Sally’s medical chart on the day of the assessment indicated that she was moving all four limbs during the night and was able to squeeze a hand when requested. She was also opening her eyes.

During this initial session there were no visible responses from Sally until the song “Do you know?”, which was used at the commencement of the session, was sung again. Sally opened her eyes slightly and moved her right arm over her chest. A further verse incorporating these actions was sung and a nursing staff member caring for Sally said “that’s great”, referring to these responses by Sally.

**General Description of Sessions**

In the five music therapy sessions conducted while Sally was in a conscious and then semi-conscious state, a range of responses were observed by the music therapist, the staff attending to Sally and Sally’s family members at bedside. These responses were noted in the medical chart after the music therapy session and also discussed during daily case review meetings in PICU.

**Significant Areas of Response**

**Communication:**
Sally often moved her limbs when the music therapist sang “Do you know?” and at times each movement corresponded to the words improvised by the therapist. When Sally moved another part of her body, the therapist improvised further verses describing what Sally was able to do and Sally would maintain this movement.

Family and staff members commented on the way Sally appeared to nod more often in response to questions following a music therapy session. The qualitative difference between singing and shouting Sally’s name to encourage orientation responses was also noted.

In Session 4 during the “Lion King” song, Sally moved her lips in what appeared to be an attempt to speak. Later that day family members reported that Sally was waving to them and was smiling. Similar responses were observed in Session 5. The following day Sally was transferred to the orthopaedic and neurosurgical ward. Her music therapy sessions continued. Two days after her transfer Sally was speaking single words and was able to sing a song from beginning to end.

**Motor responses in music therapy:**
A range of gross motor and fine motor movements were observed in each session. In Session 2 during the singing of “You’ve got a friend” Sally’s eyelids moved. In Session 3 during the songs “Do you know?” and “Lion King” Sally opened
her eyes, moved her head from side to side and her arm up and down. During the "Lion King" song a family member kissed Sally, commented on the music and Sally moved her head and opened her eyes again. During "Heal the World", Sally moved her foot and a doctor observing the session commented on this response. During the hour following this session, family members reported noticing more eye opening and limb movement.

Eye opening and physical responses, particularly where these are linked to intentional stimuli provided, are welcomed by the PICU team as indicators of emergence from deep coma. "An incomplete opening or even a lifting of the eyebrow (in response to stimulus) is a token of a responsive nervous system." (Gautier & Mohr, 1995, p. 962).

The night before Session 5, Sally had been unsettled overnight, pulling at her lines and exhibiting restless behaviours. Sally had music therapy immediately after her physiotherapy session. During the singing of "Heal the World", Sally shifted her focus from the music therapist to the guitar and also stretched out her arms to reach the guitar. This response was again observed during singing of the "Lion King".

**Facial Expressions:**
At the end of Session 3 during the song "Lion King", a tear appeared in Sally's left eye. Following this session, family members commented on noticing more examples of yawning and smiling from Sally indicating orientation and awareness hitherto not demonstrated.

Before Session 4 began, a nurse was redoing a dressing on Sally's leg. In response to this Sally screwed up her face, perhaps in discomfort or pain. During the first song of the music therapy session she produced extra saliva and her face appeared relaxed. Later that day family members reported that Sally was smiling to them.

**Responses of family members and staff:**
Family and staff members made comments during and after many music therapy sessions on the responses they had observed from Sally. There were many times when these observations were important to note as Sally was demonstrating awareness of her auditory and visual environment during the unique stimulation that music therapy provided.

Music therapy also aimed to provide support to relatives and staff at bedside. Staff and family commented on the relaxing and calming qualities of the music and often asked the music therapist to continue although the session was coming to a close. The music therapist observed that family members sat silently at bedside much of the day. During music therapy sessions, they would talk to Sally and touch her affectionately, asking her if she enjoyed the music. They also sang along with the music therapist.

**Summary:**
Sally presented a range of responses through the five music therapy sessions when she was in the PICU in a conscious and then semi-conscious state. These responses included crying, movement of all limbs, attempts to speak, eye opening and looking.
at the therapist and guitar; behaviours indicative of improvements in orientation and awareness.

The Music therapy program for Chris:
Chris’ preferences were established prior to the assessment sessions through discussion with his family. His favourite music included similar film/soundtrack music to his sister and as well as these interests he liked "Kiss" but above all, Slim Dusty.

Songs used while in coma:
The same “Do you know?” song (Skotoroff, 1983) was used as with his sister. Slim Dusty songs such as “Pub with no beer”, “I’d love to have a beer with Duncan”, “When the rain tumbles down in July”, a version of “Home Among the Gum Trees” by Slim Dusty, “Can you feel the love tonight” (from “Lion King”), “Chris’ Song”, a parody written by the music therapist using the melody of “Pub with no beer” and “There’s a hole in the bucket” were used.

Chris’ Responses at Assessment:
In the initial session no visible responses were observed until “Pub with no beer” was sung. The music therapist sang “la la” when she could not remember the words to the song. At this point, Chris’ pulse rate decreased slightly and his breathing became slower and deeper. In response to this, the therapist slowed the tempo of the singing to match Chris’ rate of breathing. At the conclusion of the session, using the same opening song, Chris’ pulse rate increased to the same rate as at the start of the session.

General Description of Sessions:
Chris presented a range of responses throughout the thirteen music therapy sessions conducted at bedside. Observations of these responses were reported by the music therapist, staff and family members and were noted in Chris’ medical chart.

Significant Areas of Response:
Communication/Facial Expressions:
In the early stages of Chris’ recovery, it was difficult to determine whether the responses Chris produced were signs of a desire to communicate or was the result of pain, discomfort or restlessness. As Chris’ alertness and orientation increased he became more restless and vocalisations and limb movements increased in number. During the song “Pub with no beer” in session 2, Chris pulse rate increased and his tongue and lips began to move. In session 3 Chris moved his lips during the “Lion King” song. While this may have been an indication of an intention to vocalise, it is significant as an indicator of orientation and awareness.

During the weekend before session 6 Chris developed high fevers and his agitation behaviours increased. This was due to a suspected infection. At the start of this session during the “Hello” song, Chris opened his eyes. The music therapist responded to this action by describing it in a song. During the song “Chris’ Song” which had been composed with the help of Chris’ grandmother in Session 4, Chris opened and closed his eyes frequently. This response was noted in many of the music therapy sessions.
During “Hole in the Bucket” in Session 8, a song that was a family favourite, Chris moved his lips and tongue several times. By Session 9 the medical chart reported that Chris was able to eye follow two different people. This improvement in awareness and orientation was consistent with responses observed during music therapy.

The weekend before session 10 Chris was moving all limbs, smiling, laughing, and eye following, and had no respiratory distress. In this session Chris focused on the music therapist and the guitar while the “Lion King” was sung. His tongue moved and at the end of the song he closed his eyes. When Chris was asked if he enjoyed the music, he opened his eyes. This indicated a direct response to stimuli (question) and was indicative of his level of awareness of his environment.

The music therapist suggested a Slim Dusty song and Chris opened his eyes again and raised his eyebrows. Chris continued to focus on the music therapist and guitar during the singing of “Home among the gum trees”.

The day before session 11, Chris was extubated. During the opening song Chris opened his eyes slightly and moved his lips. During “Pub with no beer” Chris opened his eyes and made a “mm” sound matching the tonic note of G major, the key used for “Pub with no beer”. Medical staff nearby heard this and moved closer to listen to Chris’ responses. The music therapist then played a song written with Sally to the tune of “I love to have a beer with Duncan”. The words were changed to “I love to have a juice with Chris”. Chris moved his lips and opened his eyes during the song. During “Hole in the bucket” Chris was smiling and his eyes were closed. He then vocalised again, this time on the tonic note in D major, the key used for “Hole in the bucket”, again on “mm”.

Vocalisations by people in coma are considered important indicators of arousal and awareness. Gautier and Mohr for example advise, “However minimal a mumble or grunt may be, it indicates a light coma” (Gautier & Mohr, 1995, p. 963).

During session 12, the music therapist began to sing “Pub with no beer” and left out the last word in each line. Chris then focussed on the music therapist and made an “eh” sound in the space where the word was required. The music therapist began to sing “la” to the tune of “Pub with no beer” and Chris stopped moving and was quiet. He focussed his gaze on the guitar. As the music therapist began to improvise using the same tune with the words “close your eyes” Chris yawned and reached out to place his hand on the strings of the guitar. As the music therapist played each string gently, Chris was opening and closing his eyes and eventually fell asleep. An increase in relaxation response was desirable given Chris’ previous agitation.

On the morning of Session 13, Chris’ physical agitation was discussed at the morning ward round. It was agreed he would not be sedated, as his responses were normal and desirable. At the commencement of the music therapy session Chris stopped calling out and focussed on the guitar. The music therapist began to sing another song Sally had written for Chris and he remained still and focussed. When asked if he enjoyed it, Chris responded by saying “ah” and moved from lying on his side to lying on his back. The ability to roll over unaided indicates
a light coma state and hence is a desirable response within any therapeutic interventions for the child emerging from coma.

Following the therapist singing “Pub with no beer”, Chris began to vocalise again on “ah”. These “ah” sounds were imitated by the therapist in the singing of the next song “When the rain...”. Chris then stopped calling out and remained still. This behaviour was observed to continue for a few minutes.

The music therapist improvised a song for Chris singing “I can hear you talking”. Chris remained still and quiet during this song. A nurse caressed him gently during this song.

Five days later Chris was transferred to the orthopaedic and neurosurgical ward. The next music therapy session took place 6 days after this transfer. Two days before this session it was noted in his chart that Chris was attempting to talk, saying “hello, mum, nanna”.

Upon seeing the music therapist approaching, Chris smiled. When asked what he thought was in the guitar case, he replied, without prompting “I know... a guitar”. His grandparents nearby were surprised to hear Chris respond spontaneously, as he had been requiring prompting to communicate. Chris spent this session strumming the guitar strings and speaking to the music therapist.

Motor responses:
A range of fine and gross motor responses were observed during music therapy. A few minutes after Session 5 where the music therapist had sung “Chris’ Song” (previously introduced in session 4), his grandmother called out to the therapist and said that Chris had moved his arm. This was particularly relevant as part of this song material composed with the help of Chris’ grandmother described this arm movement. It is difficult to determine whether the arm movement was a delayed reaction to the song but may well indicate awareness of the instructions sung in the music therapy session.

In Session 6, Chris’ grandmother was present and caressed his hand as the music therapist sang “Chris’ Song”. Chris opened and closed his eyes and moved his arm toward the guitar. During session 7, Chris moved his arms during both the “Hello” song and “Chris’ Song”. As his grandparents arrived, they suggested singing “Hole in the bucket”. As they joined in the singing of this song, Chris stopped moving about and his pulse rate slowed down. As this song was sung again during Session 9, Chris continued to move his limbs about.

In Session 10 during the hello song, Chris remained focused on the music therapist and guitar and watched the therapist’s fingers on the strings. His carer said that Chris enjoyed pulling the strings of a guitar which belonged to a family member. Chris then moved his arms.

Responses of family members and staff:
Family members and staff often joined in sessions by singing with the music therapist, caressing Chris during sessions especially when he became restless and speaking to him about the music (Sessions 2, 6–10). The music therapist involved family and staff members in song improvisations when they appeared anxious and sometimes heard them singing following a session.
In Session 8 after singing the song "Hole in the bucket" the nurse caring for Chris began to inquire about this favourite song and also "Chris' Song". Following the session the nurse could be heard humming and whistling the tune to "Chris' Song". Music therapy was accepted by staff as part of Chris' treatment regime. Interest in music therapy was welcomed by the music therapist, especially as the music therapy process relied on support from staff in the form of helpful observations about Chris' responses and suggestions as to useful approaches to be attempted.

During Session 9 Chris was restless and had been "thrashing about" in the bed. His fever was still high. During the hello song the nurse caring for him said "That's the most relaxed I've seen him all morning".

During Session 4 new song material was introduced including part of "Chris' Song", written with the assistance of Chris' grandmother. During Session 5 the music therapist introduced further verses of Chris Song to the child. There was no response observed. Chris grandmother arrived and the therapist spoke to her about the song. His grandmother commented on a particular verse about Chris' magic fingers making him well again. (Before the accident Chris would say to his grandmother that he had magic fingers. If she had a headache he claimed he could make her feel better just by touching her head).

A few minutes after the session, the grandmother called out to the therapist and said that Chris had moved his arm. The following session his grandmother continued to be involved in the session, laughing when she heard the verses the music therapist had written about Chris and his magic fingers.

Music therapy aimed to incorporate responses from and encourage interactions between carers and Chris to assist them to feel valued in their contribution to the daily care, including arousal stimulation and communication attempts, of the child.

Summary:
Music therapy elicited a range of responses from Chris during his period of unconsciousness including: vocalisations, body movements, changes in breathing, orientation to the therapist and guitar, and eye opening.

There were times during the final sessions in the PICU where Chris called out "ah" and "eh" during improvisations. Staff would come close to the bed to see what was happening at these times. Chris was moaning and was perceived to be distressed and restless. The music therapist used these vocalisations in improvised form to encourage communication with Chris. Often he would stop making these sounds and appear to listen to the therapist and then initiate his own vocalisations again. He would then stop moving about in his bed and for a short period of time appear to be attempting to communicate.

In supervision of these sessions, discussion included ways in which the therapist deals with a counterintuitive response in relating to behaviours of patients in coma. It is usual to interpret such behaviours as flailing and moaning as distress. For the unconscious or semi-conscious child in PICU not in a critical condition however, it may be useful to understand many of these behaviours as attempts to communicate and to engage accordingly, even while the sounds can be distressing to hear. If the therapist is uncertain about the value of encouraging these responses, reference to the goals of the team and the current state of the child's health is required.
Conclusion
Music therapy provided unique opportunities for two unconscious children in a PICU to be offered appropriate and meaningful stimulation to assisting demonstration of arousal and communication responses through a range vocal, motor and physical behaviours.

Four significant stressors for the child and family in PICU have been identified:

a) physical stressors, for example pain and discomfort
b) environmental stressors, for example the unfamiliar surroundings
c) psychological stressors, for example the inability to communicate
d) social stressors, for example play deprivation and disruption of relationship with others

(Whaley and Wong, 1989. p. 616)

Descriptions of the music therapy program provided to Sally Chris while in PICU indicate that the program addressed each of these critical areas of care. Music therapy assisted in providing opportunities to relax, to experience stimulation from familiar materials, to support communication and to interact with others.

Music therapy can be provided without disruption to the busy routines of these patients and the ward staff. The work was readily accepted within the clinical team with positive comments about its value being reported in evaluations provided from PICU staff at the conclusion of the program.

Music therapy has a role in supporting the effort of the family and carers to interact with their unconscious relative in ways reminiscent of life before the injury. This case material supports an ongoing role for research and practice of music therapy for children in coma in the Paediatric Intensive Care Unit.

References


