

TAKING MUSIC THERAPY INTO THE MAINSTREAM

MARCH 2018



INTRODUCTION:

Every 90 seconds, someone in the UK is admitted to hospital with an Acquired Brain Injury which could be the result of a traumatic head injury or a stroke.

More than one million people in the UK are living with the effects of brain injury and the estimated bill to the UK for treatment and social care is £15 billion.

The devastating impact radiates across families causing distress, relationship strain, financial hardship and an uncertain future. The injury has a huge physical and psychological payload.

Acquired Brain Injury can impact vision, speech, personality, balance, reasoning, memory, body temperature control, respiratory function and energy levels and the rehabilitation journey is slow, arduous and fraught with danger.

The issue is global with 50 million traumatic brain injuries registered a year with survivors coping with a range of disabilities and supported by varying levels of care. Research has shown that poor access to specialist rehabilitation services early in the care pathway reduces the patient's recovery and return to work prospects, lessens their opportunity

to play an active role in society and has a detrimental impact on the emotional well-being of carers.

With regular brain functions disrupted by ABI, the challenge is to use techniques that can by-pass damaged parts of the brain to stimulate the sensory areas that motor the everyday actions we take for granted.

Neurologic Music Therapy (NMT), an approach based on a wealth of clinical evidence, has been shown to have a profound influence on the brain by energising complex cognitive, communication, sensorimotor and affective processes to return degrees of function and promote a route to a more independent life for patients.

A **Cochrane Review**, published in January 2017, ruled that music interventions may be beneficial for gait, the timing of upper extremity function, communication and quality of life after stroke and called for more high-quality randomised control trials.

Music connects with the brain and opens up pathways to recovery. The challenges are enormous but the potential is exciting and the **2018 Chroma ABI** conference showcases the latest research and thinking which is powering new treatment protocols and raising hopes.

"It feels like music therapy is at a tipping point as proof grows that it is both clinically effective and cost effective," said **Daniel Thomas**, managing director of **Chroma**.

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"In today's economic and social climate where more people need effective rehabilitation due to Stroke, Parkinson's or more traumatic forms of brain injury, using neurologic music therapy is one of the most efficient ways of treating people."

*"Our partners which include **Hobbs Rehabilitation, Steps Rehabilitation***

*and the **HCA Healthcare UK** group of hospitals really understand that accessing music therapy alongside the traditional therapies optimises patient outcomes, and means they can get better and more independent quicker."*

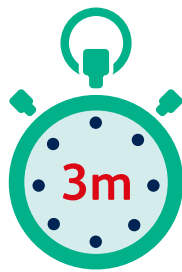


EVERY 90 SECONDS

Someone in the UK is admitted to hospital with an **ABI**

348,934

TOTAL ABI ADMISSION

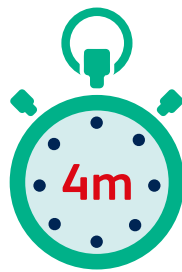


EVERY 3 MINUTES

Someone in the UK is admitted to hospital with an **HEAD INJURY**

162,544

TOTAL HEAD INJURY ADMISSION



EVERY 4 MINUTES

Someone in the UK is admitted to hospital with an **STROKE**

130,551

TOTAL STROKE ADMISSION

RE-WIRING THE BRAIN

ABI can cause rips, tears and the shearing of internal brain structures while a brain injury, such as a Stroke or as a result of a car crash, can affect the motor neurons and how the brain controls movement. The results are dysfunction across regular movement, the ability to regulate emotions, make decisions, plan, the memory, speech and even to find the right words to match a feeling or impulse.

Conventional treatment such as physiotherapy and speech and language therapy have a role to play but they do not access some of the automatic ways in which the brain responds to music.

Music provides a golden opportunity to tap into a natural response system and allows neurologic music therapists to work as a focal part of a rehabilitation team. This will improve a range of functions from the basic movement of fingers and lips to the more complex changes in emotion, personality and self confidence.

The goal is to return people with ABI to the best possible degree of independence and return them to their loved ones. The cost of early specialist rehabilitation such as NMT is off-set by longer term savings in the cost of community care. Research has shown that comprehensive early rehabilitation packages – with NMT as a component – can record a saving of £1.3 million per patient over a lifetime. (Ref Wood et al 1982. Oddy et al 2013)

The value of NMT is underpinned by more than 20 years of neuroscience research into music perception in the brain. It has identified how auditory neurons interact with our motor neurons to produce a regular pattern of motor-neural firing, based on the musical pulse. Tests proved that stimulating motor neurons with a regular auditory pulse helped restore symmetrical gait patterns in patients with Parkinson's Disease.

The findings, backed by more than 200 published academic articles, have built into the NMT model which employs 20 approved techniques that use music to shape physical and psychological responses.

“There is strong neurological evidence that music activates many different areas across the brain.”

MUSIC THERAPY IN ACTION:

“We are working with people who have been able to talk and walk and have enjoyed a full life then suddenly because of some catastrophic injury, stroke, head injury or other incident, they lose the capacity to communicate clearly and move,” says **Dr Wendy Magee**, a professor in the **Music Therapy Department**, at **Temple University, Philadelphia, US**.

“A human being is born with the capacity to express emotions such as distress, anger and pleasure through musical parameters such as volume, dynamic range, pitch and melodic contour. So, in working with people who have lost the ability to communicate we can see that music is an innate way to communicate feelings.

“There is strong neurological evidence that music activates many different areas across the brain. The motor system is very sensitive to picking up cues from the auditory system so when we hear music, particularly pulse or rhythm, it kicks straight into the motor system going around the brain.

“Music is part of what we do in society. We sing in choirs, play in bands and go to concerts. Music elicits emotions and conveys feeling states so it is very useful for people who have trouble communicating in words how they are feeling and how they are processing what is happening to them.”

Music becomes an auxiliary engine for the brain, acting almost like an emergency generator that kicks in during a power failure. The music signals provide the ignition to sensory networks.



NMT exploits the same impulses that impel people to dance to music or use music to enhance physical work-outs. Using music that is familiar to the patient further increases the engagement and improves mood. Other research has highlighted neuro-chemical changes in dopamine, opioids, serotonin, cortisol and oxytocin levels when we listen to or participate in music activity/making. (Ref **Chanda & Leviten** 2013)

Brain imaging on patients listening to personally preferred music that elicits shivers down the spine has shown that music lights up areas of the brain associated with pleasure and reward. *“This is important because, when we are talking about rehabilitation, it often involves interventions that are painful and repetitive making it difficult to stay engaged so finding a medium that facilitates motivation and pleasure is very powerful,”* she added.

The auditory signals from music shoot information around the brain, sometimes by-passing sections damaged by the ABI. *“Music can engage alternative pathways for a specific function, such as language, depending on the size of the lesion or even effect changes to brain structures,”* said **Dr Magee**, a former clinician and researcher at the **Royal Hospital for Neuro-Disability**, in London. *“Small studies have shown that music might excite activity around small lesions to activate function and, with larger lesions, it seems the healthy side of the brain might take on roles and mechanisms the damaged side was previously responsible for. This function transfer is backed by science but not large randomised control trials.*

“There can also be changes to structures after intensive music interventions, changes in neuro plasticity. One study has shown that important connective fibres in the brain increase in thickness and length and number of fibres.

“Anecdotally, you see some remarkable recoveries. One gentleman with a large traumatic brain injury from a road traffic accident was awake but not responsive to his environment yet he progressed over time to mouthing words when we sang to him in a group. His levels of awareness and physical capabilities slowly improved. A natural part of the recovery process can be a mood dip as people gather what has happened to them but music therapy was also able to help him with those moods.

“He couldn’t make vocal sounds but, through music therapy, he started to sing single words in meaningful songs. Intensive speech and music therapy work helped him sing his and family names along with short functional phrases like asking for a cup of tea. He made great physical and emotional gains.”

The music therapy specialist **Chroma** has case loads of evidence of clients improving under the influence of music therapy. A child patient having gait training was struggling to engage for more than five minutes with physiotherapy sessions because of the pain.

An NMT devised a series of musical interventions that created exciting, motivating sessions.

“He was able to bring playfulness into his physiotherapy sessions and his dad loved seeing his son show some of his playful nature again,” said **Chroma** managing director **Daniel Thomas**. *“The child’s step cadence went from 21 steps/minute to 56 steps/minute in less than three weeks.*

“We also have adult clients who increased the number of required movements from 5 per 5 minutes to 18 per 5 minutes as a result of including NMT within their rehab programme. NMT also allows the client to enjoy a new, positive relationship with their rehab.”

NMT works across the rehab spectrum from basic physical function to complex psychological and emotional needs.

Dr Magee added: *“Lives are devastated after brain injury. The incidence of family breakdown and divorce are incredibly high. The rehabilitation can be long and slow with really complex care but progress is possible for some very difficult cases.*

“Music therapy can provide continuing care for very slow to recover patients and it is not an expensive intervention. Everyone knows that music helps us to regulate our moods and in brain rehabilitation it is so important to provide that motivation to help keep people going when the work gets too hard. We need more research and evidence and to raise awareness among the public so they know what is possible.

“Families of people with ABI are often desperate for any intervention and, if they increased the demand for music therapy, it could help with provision.”



NMT RESEARCH DRIVES HOPE

The field of music therapy is crackling with research as scientists intensify their quest to decode the brain's response to stimuli in relation to brain injury, and dementia. The International Longevity Centre and Utley Foundation recently found emerging evidence to suggest that music may help to delay the onset of dementia and improve brain function and information recall.

Dr Laura Phipps, of **Alzheimer's Research UK**, also stated: *"NHS guidelines suggest music therapy as a possible way to help people with dementia deal with complex behavioural symptoms. As more studies start to explore the benefits of music in dementia, this report highlights the importance of developing robust and practical approaches to explore the benefits and cost-effectiveness of music interventions, which are often delivered in very diverse and tailored ways."*

The All Party Parliamentary Group on Acquired Brain Injury, along with the **UKABIF**, is campaigning to raise awareness and organisations such as **Chroma** and the **Child Brain Injury Trust** are pushing forward with policy reform and pilot studies.

REHAB FOCUS

Hobbs Rehabilitation and Chroma are working with software developers such as **VirtualWare Group** to bring together virtual reality (VR), rehabilitation and music. The aims are to build some of the automatic ways in which the brain responds to music into VR and rehab scenarios to optimise engagement and outcomes.

A gait rehabilitation app is being developed for the iPhone that will help patients manage and create their own rehab workouts. The app will track movement using accelerometers on the shoes of the patient to analyse how gait is improving.



Dr Jeanette Tamplin, of the **University of Melbourne**, has spent 20 years in neuro rehabilitation and is pioneering the use of Virtual Reality to improve the accessibility of music therapy programmes to rehabilitate patients.

Patients wear headsets that display animated images of inspirational places such as camp fire settings, riversides or high-up views of countryside to enhance the experience of singing and engaging in music therapy.

“This research is in the early stages and came from an initiative to make music therapy more accessible for people with spinal cord injury who found it difficult to get to a hospital or clinic for group sessions. It started as a video conference and we took it to the next level of VR to make the experience more immersive. The idea is that they can participate in group music therapy without having to leave their home.”

Dr Tamplin is also researching the effects of therapeutic choir participation for people living at home with dementia in a randomised controlled trial to show the impact of singing familiar songs in a social context. The added dimension to this research is the inclusion of partners.

“Music and singing draws people together naturally, whereas a lot of people don’t want to go and have cups of tea with other people living with dementia and just talk about the condition, as often happens in other support groups,” she said.

“The singing intervention is nourishing and something they can do with their partner so they can be husband and wife again, singing together, rather than carer and patient. The pilot study has provided really promising results.”

Music therapy techniques are advancing all the time and **Dr Tamplin**, who is also addressing the **Chroma** ABI conference, added:

“The effects of music therapy vary from person to person, depending on the injuries and goals but I have seen people having their language and speech functions return through music therapy, which is wonderful to see.

“There are amazing benefits for quality of life and social participation as well as functional improvements, such as speech or walking”

“Even people in the early stages of post traumatic injury or stroke who are really struggling to get any sound out can be helped. In the same way that babies learn to make sounds before words, in music therapy we normalise experimentation with voice and sound through music in the rehabilitation of speech.

“We can play around with the voice and use motivating elements of music, familiar music that people love and have positive associations with, to motivate them to use their voice and to get sounds out. It is sort of automatic – we will be singing a song and suddenly out comes a word.

“We think this works because the brain is using different areas to produce words through singing rather than the damaged speech and language areas.

“Rhythmic music also has an amazing effect on movement coordination. The hypothesis is that music can bypass damaged areas in the brain, providing a scaffold to do the part of the work the brain is not doing in co-ordinating movement. But there is also the basic ‘use it or lose it principle’ and music stimulates movement. When you exercise muscles they get stronger and the more you exercise, the stronger you get. In the gym, you work out longer and harder with music that motivates you.

“People who witness or experience music therapy in action are aware of its benefits, but there is still generally a low public awareness. However, the emotional responses, such as from

wives whose husbands haven’t been talking, and ripple effects are beautiful to see. In some cases, they can go out for lunch and chat after the session and it is like their old relationship starts to come back.”

The inspiring responses seen in many cases still need to be backed up by more clinical research and **Dr Tamplin** added: *“I want people to understand that we are an evidence-based profession and there are functional outcomes from music therapy.*

“There are amazing benefits for quality of life and social participation as well as functional improvements, such as speech or walking. Most people understand and use music in their daily lives to feel better, but I’d also like people to understand the research and evidence behind what we are doing in music therapy.”



THE LEGAL VIEW

Daniel Thomas, managing director of **Chroma**, said: *“It feels like music therapy is at a tipping point as proof grows that it is both clinically effective and cost effective.”*

“NMT can be beneficial in its own right but it can also encourage other therapies because it is a more palatable method of rehab. We are involved because we see it as an amazing and effective therapy”

Daniel added that courts, legal teams and case managers all had a professional interest in meeting a duty of care to victims and families to ensure best practice in each of their fields of expertise, and that NMT fitted well into this picture.

NMT is fully aligned to the **World Health Organisation’s** definition of health: *“Health is a positive concept emphasising social and personal resources, as well as physical capabilities.”* (WHO, 1986)

Caroline Klage, Partner and Head of the **Child Brain Injury Team** at leading London law firm, **Bolt Burdon Kemp**, specialises in legal claims helping patients recovering from serious trauma.

“NMT can be beneficial in its own right but it can also encourage other therapies because it is a more palatable method of rehab. We are involved because we see it as an amazing and effective therapy,” she said.

“For a lot of our clients whose attention span may be short, which can often be the case as a result of an acquired brain injury, it is a great way of getting them involved and bringing them on. But what is really special is that it can be done with siblings. The dynamics between the non-disabled and disabled siblings can be challenging but NMT can bring the family together in a fun activity.”

“I’m now starting to see it being recommended in reports as part of a care package. We underestimate the anxiety our clients feel and to be able to just let go and enjoy themselves has a huge mindfulness impact which is really worthwhile.”

*“As a firm **Bolt Burdon Kemp** is keen to support NMT and raise awareness of its benefits. We share the same mission as **Chroma**. We are driven by the desire to ensure our clients receive the best quality input at the earliest point possible, with a view to enabling them to flourish and thrive post brain injury. NMT definitely has a role to play in that.”*



COST EFFECTIVENESS

A study from **King's College, London**, and the **North West London Hospitals NHS Trust** highlighted the cost effectiveness of co-ordinated rehabilitation services.

Residential cognitive behaviour programmes were shown to result in £1.3 million savings per patient treated in the first year after traumatic injury. (Wood et al, Oddy et al)

Costs were saved by returning patients to greater levels of independence and more economic community care compared to hospital costs.

Figures from the **American Music Therapy Association** revealed a range of hospital and care costs savings by the introduction of NMT. Its study reported that children, on average, left intensive care facilities five days ahead of schedule, saving around £7,000 per patient.

It also discovered that NMT helped reduce anxiety and agitation in hospice patients leading to a reduction of falls. NMT also had a 100% success rate in eliminating the need for sedation for paediatric patients receiving EEG tests and a 94.1% success rate in other procedures, creating significant savings and reduced stress for young patients.

The value of Neurologic Music Therapy has been underscored by HCA Healthcare continuing its exclusive arrangement with Chroma to supply NMT services at two leading London hospitals after a successful pilot.

Patients at the Prolonged Disorders of Consciousness unit and the Rehabilitation units at the Wellington and Portland Hospitals achieved impressive results in verbal, physical and tactile performance.



“NMT is gaining momentum as a form of therapy in the UK and worldwide”

CASE STUDY 1

Hobbs Rehabilitation:

Hobbs Rehabilitation, which was founded in 2005, offers a patient-centred neuro rehabilitation service for adults and children across their 10 centres in the south of England.

It treats patients with conditions such as stroke, multiple sclerosis, Parkinson’s disease, cerebral palsy, acquired brain injuries, facial palsy and spinal cord injuries, and has partnered with **Chroma** to provide NMT services to help patients make progress across language, communication, speech, movement and motor control.

“Music is an essential part of all our lives. It evokes emotions, memories and movement. Using music as part of rehabilitation therapy is not only motivational to the patient and therapist but activates multiple centres of the brain to work simultaneously with great results that can be translated into functional responses,” said **Helen Hobbs**, co-founder and director of the award-winning organisation.

“In recent years there has been an increase in recognition of the effects of music and the arts therapies by traditional medicine.

Both an advancement in the accessibility of personalised music therapy and improved scanning techniques have meant not only an increase in the use of music within therapy but also in the recognition of its effects upon the brain activation.

We are now in a position to demonstrate its clinical effect and we should, as passionate clinicians, be pushing for funding for more interdisciplinary research to show improved outcomes for our patients.

*“NMT is gaining momentum as a form of therapy in the UK and worldwide, and we believe our new arrangement with **Chroma** will help to achieve better outcomes for many of our patients.*

“We would like it to be standard practise for a NMT trained therapist to be part of the interdisciplinary team.”

CASE STUDY 2

Steps

Chroma provides neurologic arts therapy services to Sheffield-based **STEPS Rehabilitation**, a 23 bedroom, state of the art, short-term (up to 12–18 months) residential and day intensive rehabilitation facility.

Clients are offered a wide range of therapies to maximise rehabilitation and clinical director **Toria Chan** said: *“In **Chroma**, we have a partner that clearly shows a great deal of care and expertise in their approach to each client. They are a superb team of professionals able to meet a wide range of arts therapy requirements.*

“It was very important to us that we partnered with someone who shared our general approach and ethos.

“We want to provide an environment where people who have suffered from neurological and multiple trauma injuries have the very best chance of reaching their maximum potential and our entire organisation and our centre are based on this approach.”