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ADULTS

SURVEY RESULTS

We surveyed the adult implant users from St Thomas' Auditory Implant Programme. 79 patients responded (EAS + traditional cochlear implant). We found that 20% of implanted adults reported listening to music some of the time, 10% listened to music all of the time, but the majority listened to music occasionally or not at all. There was a statistically significant correlation between patients' age & how often they listened to music such that younger patients were more likely to listen to music (significant at $p < 0.001$). There also appeared to be a trend relating to patients' age and type of music. Younger implant users listened to more pop & rock music. Older users preferred classical / orchestral music.

RESEARCH OUTCOMES

Pop and rock music genres have a greater emphasis on beat and rhythm, which is better represented in CI processing strategies.

Orchestral / classical music is often more complex in the number of instruments and harmonies, and relies more on the melodic aspects of music, which are not as accurately encoded in cochlear implants.

So, the type of music patients listen to may be related to their success and enjoyment of music?

Comparing our outcomes with published research:

- ❑ Lassaletta et al 2008: "Music enjoyment and perception are possible with a cochlear implant". This is evident from our survey results.
- ❑ Looi et al 2008. "Single instrument performances are easier than complex multiple instruments to listen to". This is similar to the qualitative feedback we received in the survey.
- ❑ Mirza et al 2003. "Listening to music after implantation was more likely in younger patients". This was statistically significant in our survey.

These findings have prompted us to incorporate more music into our rehabilitation with our adult patients.

REHABILITATION OFFERED – MUSICAL ATMOSPHERES

None of the staff at St Thomas' is a trained musician but we are keen to support patients by using resources such as 'Musical Atmospheres' to enhance their enjoyment of music again.

In last 6 months there has been more structured musical listening experience offered to all patients:

- ❑ Individual music sessions - Focus on equipment, general advice and Musical Atmospheres.
- ❑ Group music sessions - Focus on equipment, general advice, Musical Atmospheres as well as opportunities to share experiences with others.

We are already starting to see the benefits of encouraging involvement in music.

TIPS TO CONSIDER FOR REHABILITATION

- ❑ Encourage the use of visual aids - attend live performances, follow lyric sheets
- ❑ Early maps - music likely to be disappointing. Music will sound better with a stable map.
- ❑ Can create a music-focussed map.
- ❑ Feedback from patient, SALT, Musical Atmospheres will guide fine tuning
- ❑ Encourage contra-lateral HA use
- ❑ Encourage to retry music after CI upgrades
- ❑ Can listen to music during daily commute using CD player/iPod/MP3/radio
- ❑ Consider the acoustics + BGN
- ❑ Good equipment e.g. speakers
- ❑ Ideally at home when relaxed and in quiet, comfortable surroundings
- ❑ Need time, patience and perseverance

Suggested music:

Johnny Cash – deep voice, country music, simple
John Denver
The Carpenters – clear
Marvin Gaye - Motown
Eva Cassidy
Abba
Andrea Bocelli

The St Thomas' Musical Journey

Music perception through an implant depends on audiological and non-audiological factors and outcomes vary from patient to patient. Patients who listen to music more often and who are open to new musical experiences can enjoy and appreciate music. Music is not an activity in isolation but can be embedded in social interactions and enhance quality of life. Clinicians need to increase their expectations and encourage children and adults to participate in their own musical journey.

PATIENT COMMENTS

"I wish to share my joy that I'm sitting here listening to Radio 4 news, having just listened to Desert Island Discs!! I'm hearing almost perfectly without any direct link. This is wonderful as I'm sorting my office chaos out and it does help to have something to listen to as I work without wires and loops around my neck and ears!! What a miracle, eh?"

"I listen to the same music every day and when I'm driving my car I have the volume up and even play the same music over. I also watch my son Michael when he sings and he helps me a lot."

"My parents gave me an iPod for my birthday and I've loaded it up with lots of different sorts of stuff. Some works really well, mainly older music up to about 1995. Newer things are more heavily produced and harder to follow. Overall, it's going well and I'm enjoying listening on the train into work which comes to a couple of hours a day"

"My own experience is that actually going to live performances is the best way to get back into the swing of things" ..

"It didn't take me long to appreciate the music as I love hearing sounds of the music, but to hear the words it's still on going and when I do hear the words that I haven't been able to before I am excited and feel on top of the world. When I play my music I lose myself in it and I always forget that I have a hearing problem, that is until I can't pick up certain words."

"I thought I would let you know I have been to my first outdoor concert. Wow! It was fantastic, a whole new world. The concert was Love and War at Arundel Castle last Sunday evening. Another treat from my daughter and what a treat it was. I have also downloaded more songs onto my MP3. I am going to another music evening tomorrow night with friends, I am so lucky."

"Like all old people I am frightened of new technology but Lizzie has worked out how to load and play my iPod. I have just listened to the overture to "Die Fledermaus" and realised how much I have been missing all the years since my hearing became deficient. I had not fully grasped how much music has meant to me over the years."

"I have had a most fantastic time this weekend listening to songs I thought I would never hear again. I tried Don Williams singing 'You're my Best Friend' and oh WOW! It was amazing. My daughter is treating me to an MP3 player as she is sharing my wonderful experience with me. I am thrilled to bits as you can imagine".

REFERENCES

- ❑ Lassaletta L, Castro A, Bastarrica M, Pérez-Mora R, Herrán B, Sanz L, de Sarriá MJ, Gavilán J. *Musical perception and enjoyment in post-lingual patients with cochlear implants*. Acta otorrinolaringológica española, May 2008, vol./is. 59/5(228-34), 0001-6519
- ❑ Looi V, McDermot H, Mckay C, Hickson L. *Musical Perception of Cochlear Implant Users compared with that of Hearing Aid Users*. Ear and Hearing, Vol 29, No. 3. 421-434.
- ❑ Marcus, H. (2001). *An investigation into the value of music for deaf people*. Sheffield: University of Sheffield.

FORM 1

Child A: Date 1st rating: 01/10/07

Date final rating: 05/11/07

Attention			
Constant Supervision Required	Shared with support 5 mins then redirection required	Shared with support 5-10 mins minimal redirection	Self directed

Turn Taking			
Doesn't wait	Waits with support for their turn	Waits for turn but doesn't watch others in group	Waits for their turn and watches others in group

Communicative Intent		
Child does not initiate- waits to be prompted	Child initiates for request only	Child initiates for a variety of purposes (request, comment)

Story			
Shows little interest in story	Show interest and participates when prompted	Anticipates what comes next in story (gesture/speech/sign)	Remembers and uses words/phrases from story

Professionals Comments:

A has made significant improvements with her attention. At times during the session she did show self directed attention. A spontaneously copied words during the session and used her signs and vocalisations to comment, greet and label. A has shown an increasing interest in stories over the sessions and is keen to participate in the musical activity in the story

Parental Comments

"Every time she hears music she starts to dance"
"It is nice for A to mix with other children and learn to sit down and listen to a story"
"I have enjoyed bringing A to the music sessions and would like her to have an opportunity to come again"

FORM 2

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A Musical Journey Through the Rainforest	
Child's Name:	DOB:
Amplification: HA / CI / Bilateral CI	Duration HA / CI use:
Date of 1st rating:	Date of final rating:

Attention			
Constant supervision	5 minutes then redirection required	5-10 minutes with minimal redirection	Shared (Self directed)

Turn-taking			
Doesn't wait	Waits with support for their turn.	Waits for turn but doesn't watch others	Watches others in grp

Playing Musical Instruments

Plays rhythmically with music:	Never	Sometimes	Most of the time	Always
Imitates correct tempo:	Never	Sometimes	Most of the time	Always
Imitates quiet vs loud:	Never	Sometimes	Most of the time	Always
Imitates rhythmic patterns:	Never	Sometimes	Most of the time	Always

Singing Participation

Doesn't join in even when prompted	Joins in with group when prompted	Joins in spontaneously	Initiates or repeats songs spontaneously
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Singing a Glissando (Sliding high to low pitch)

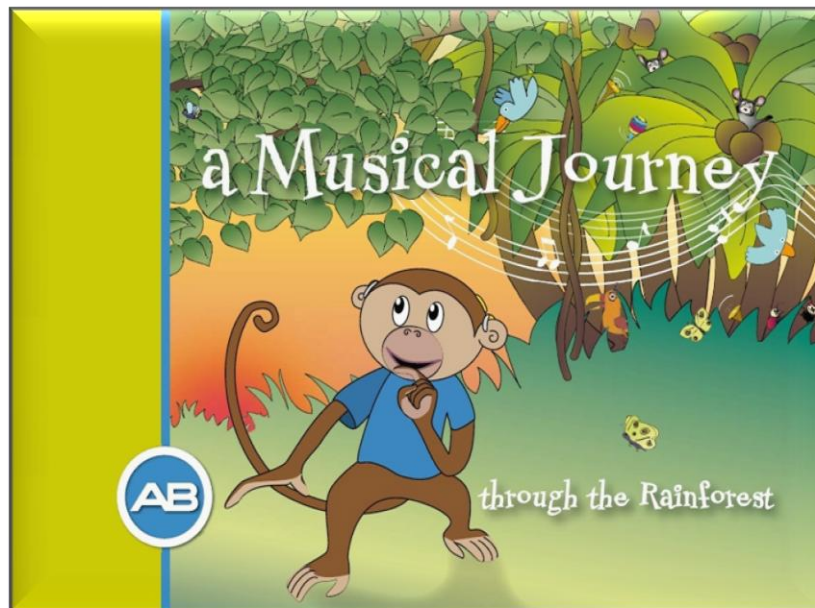
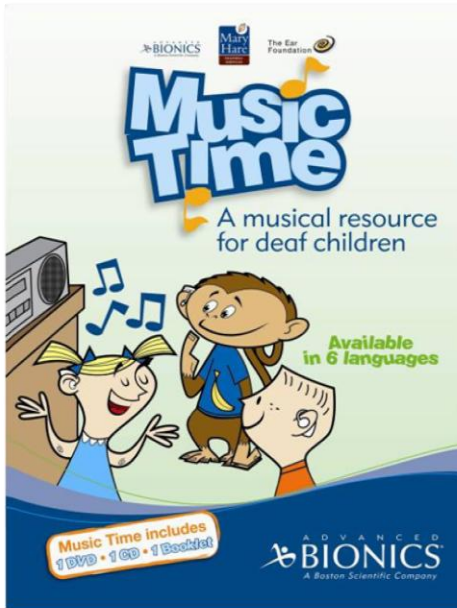
Yes No

Singing an Ascending Scale

Monotone. No change in pitch	Minimal change in pitch.	Sings ascending scale but intervals & pitch not accurate	Sings ascending scale with mostly accurate intervals & pitch
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Singing in Tune (I'm so Sad Song)

Child doesn't attempt song	Some notes are in tune but mostly not	Mostly in tune with some incorrect notes	Sings song in tune with accurate pitch
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CHILDREN

When parents choose cochlear implantation for their child, there are expectations they will become involved in a range of auditory activities including music. The benefits of music are documented across many areas of child development including musicality, listening skills, spoken language, social interaction, memory, emotional expression, cognitive ability and motor skills (Marcus 2001). Music with deaf children has been shown to improve their listening, creativity, participation and ability to relate well to others (Robbins & Robbins 1980; Band 1980). Secondary benefits include improved eye contact, an opportunity to build relationships with peers and a sense of achievement both individually and as part of a group (Keiner, 1984).

For several years we have worked in conjunction with Chris Rocca & Cathy Bowker to run blocks of music sessions for paediatric implant users. Sessions involved playing instruments, singing, dancing & listening to stories put to music. We monitored children's progress by rating before and after each block (see Form 1). Children showed improved attention & turn-taking. They communicated more spontaneously & for a variety of purposes. They engaged more with stories & started to anticipate what was coming next. Parents reported an increase in their child's interest in music & an increase in the musical activities done at home.

Our rehabilitation team now have sufficient experience & confidence to conduct music sessions independently using the resources 'Music Time' & 'A Musical Journey Through the Rainforest'. We aim to model these resources in schools, demonstrating how music can be used to develop attention, listening, language, speech & musical skills. We are offering predominantly one-off sessions although a block of six sessions is currently underway at one HI unit. The impact of these insets is being monitored in an audit looking at how HI units adapt their music programmes after the inset as well as monitoring children's outcomes after participating in music sessions. A new rating form has been created to rate children's progress after participating in music sessions based around 'A Musical Journey Through the Rainforest' (see Form 2). We will be reporting on these results at a future date.

USING A MUSICAL JOURNEY THROUGH THE RAINFOREST

This resource is designed for use with children aged 2-6 years. For children 2-3yrs the focus is on developing their pre-verbal skills, early musical skills & vocalising. Groups work well for this age group. Children aged 3-4yrs can work through the resource either individually or in a group. They often have more language for taking in the story. Children aged 5-6yrs use the resource to extend their spoken language & develop their singing. It is a great resource for children with complex needs as it's motivating, hands-on & repetitive.

How to use it

1. Look through the book. Name the animals & instruments. Match the instruments in the picture with real instruments. Play the instruments together.

2. Listen to the instrument tracks & identify the instrument. Gradually increase the number of instrument to choose from. Use the picture cards & have the child post the card for the instrument they hear.

D	I'm so Sad song
C	Crocodile – playing correct 3 time with music Sloth – quiet & slow 3 time play with control Beetle – sustained and short blowing
B	Lizard – vocal glissando & approximate ascending scale Toucan – rhythmic patterns Frog – responding to dynamic & tempo changes
A	Snake – rhythmic playing with tempo changes Parrot – rhythmic playing, change position of playing Butterfly – wind chimes are an easy instrument to play

3. Tell the story & playing the instruments tracks. Gradually build up the number of instruments & songs you do. Consider the difficulty of each instrument / song.

4. Focus on the singing sections – the Lizard song & the 'I'm so Sad' song.