

Finding the Perfect Pitch

Breaking ground in the new music and speech alliance

By Bob Stott

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Often touted as the “universal language” by anthropologists and musicians alike, music has been said to be able to express raw emotions by transcending words, communicating what would otherwise be impossible to convey. While many professionals might scoff at this affront to the thousands of years that go into building a verbal language, the musical hardwiring of the human brain is nothing new to science.

For as long as mankind has walked the earth, music has been integral to its existence, a primal expression inspired by the natural rhythms in its environment. Whether a whistled imitation of a birdcall, a primitive drumming imitating a heartbeat, or a chant to soothe a crying infant, music appears to have been a constant companion from the infancy of the species.

More recently, modern science has opened another chapter in the expansion of human understanding of the relationship between music and speech. The elements that make up music – notes and pitches – are somewhat different than the elements that make up spoken language, but brain scans have shown that areas stimulated by music and speech consistently overlap. Moreover, the oral movements and vocal production found in both music and speech also originate from identical areas in the brain.

Due to these striking similarities, music therapy has begun to establish itself as a versatile ally in enhancing spoken language development – therapists utilizing music as a tool to aid individuals afflicted with a variety of communication disorders.

A Mother’s Song

At the age of 2 – a Hallmark period of trial-and-error moments for producing words and the nonsensical babbling in between – Katie Eshleman’s daughter, Carly, was silent. Afflicted with verbal apraxia, an oral-motor planning disorder, Carly knew what she wanted to say but the muscles of her mouth had difficulties forming the sounds.

“We worked with early intervention, and what’s wonderful about that is the therapists give parents strategies each and every week to help complement what they focused on in therapy that week,” says Eshleman.

“For example, Carly might have been working on the ‘h’ sound in therapy, and the therapist would make me a take-home list that says: Remind Carly to blow the air like this with a ‘ha’ sound; play a giggle game using ‘hahaha’; and work on the word ‘hat’. Each week, I would have two or three strategies to help me complement what she was doing in speech therapy.”

As other parents of special needs children can attest, the barrage of suggestions for treatment options and differing advice from different therapists was so overwhelming that Eshleman eventually tried to do everything at once – so much so that she wound up getting nothing done. Amid the flurry of tips and new therapy techniques, a final solution came to Eshleman quite naturally: music.



"I don't even remember how the song went, but it started that every morning when Carly would wake up, I would sing 'open up the window,' with the goal being that she would use the word 'up,' since she was at that stage where she wanted Mommy to pick her up, and I'd get 'ah-ah-ah,'" says Eshleman.

"So, we would sing "o-pen up, the win-dow" and, sure enough, one day I said 'o-pen...' and she went 'up!' And we opened up the window."

As a music therapy graduate of [Hahnemann University](#) in Philadelphia, Eshleman had previously worked with children on the autistic spectrum, as well as adolescent girls with cerebral palsy. She had also worked extensively in more specialized groups, such as social interaction for adolescent girls with cerebral palsy. In an effort to bridge the widening communication gap with her daughter, Eshleman decided to bring music therapy into the regimen.

"And then I kind of thought back on all my music therapy training, and I thought, oh now wait a second, this makes sense," says Eshleman. "Our speech therapist was always telling me to give the words context. You know, if you sit and say the word 'hat' 20 times, it really doesn't mean much unless your child is looking at a hat."

When Eshleman informed Carly's speech therapists of her success with her collection of made-up songs, they thought it was a wonderful idea – many of them already sang toddler songs, such as "The Wheels on the Bus," with Carly during the therapy sessions. Eshleman's music therapy could provide a different form of vocal practice, and the therapists wholeheartedly supported it, going so far as to spread the word of Eshleman's approach to other families that they worked with.

Messages in the Lyrics

As Eshleman continued to create songs to assist in Carly's speech development, she focused predominantly on the bilabial sounds – the "B," "P," "W," and "M" sounds which require the use of both lips to produce and form the building blocks for language. While these songs were developed to meet Carly's specific speech impairments, Eshleman also realized that these songs would also benefit her nephews who were on the autistic spectrum and also had apraxia.

"I thought, what a great idea for a Christmas present," says Eshleman. "I would record all of these songs, and give it to them as Christmas presents, because I've seen how well Carly has responded. So, I started recording a CD with my guitar teacher who had a recording studio in his home."

Two months and 20 hours of recording time later, "[Sing Out](#)" was born. The 12-track CD, which includes eight original songs, is Eshleman's first venture into music writing and features her own vocals and guitar performances. Writing for a specific audience in mind, Eshleman has slowed down the music in the songs in order to allow the listener to think out and form the sounds. Using the "Sing Out" CD and techniques advised by her speech therapists, Carly has made tremendous progress.



Katie Eshleman with her daughter, Carly, the inspiration for the "Sing Out" CD.

"We sing a "peek-a-boo" song," says Eshleman. "That has a kinesthetic piece to it – you know, we use our hands and play peek-a-boo. Sometimes when we are making sounds, whether it's singing or just guided practice, I use touch cues which I learned from the therapist, which is just to touch her lips to send the message that it's time for them to work – it's time to wake up our lips. We also do some fun oral motor activities. Like you put Cheerios on a plate, and she can lick them up to practice getting her tongue to move. Those are some other activities outside of singing that we kind of structure to help facilitate her oral motor abilities, and her speech then as a result."

In the future, Eshleman says she intends to make another CD which will focus on alveolar sounds, including the letters "S," "T," "D," and "Z." Alveolar sounds are articulated with the tongue against or close to the superior alveolar ridge behind the teeth and provide a particular challenge to individuals with apraxia. Still, Eshleman's focus remains very close to home.

"When people have asked me, why did you pick those particular sounds, I tell them that it's because those are the sounds that Carly was working on at the time. She is still very central to this whole process. At the moment, I am four songs into the next CD. My hope with this process is that because I've been through this before it won't take quite as long because I do get so nervous! However, this time I feel that I'll be going into the recording session a stronger guitar player since I've been working a lot on my guitar skills."

The Music Within

More than four years ago, collaborative therapists and colleagues Amy McConkey Robbins, MS, CCC-SLP, and Chris Barton MM, MT-BC began co-leading therapy sessions for young children with hearing loss, including those with cochlear implants and other communication disabilities. By integrating music into traditional therapy or intervention, they found that they were able to enhance the communication development of their patients using an innovative approach called Tune Ups, which was quickly recognized by Sylmar, Calif.-based [Advanced Bionics](#).

Known predominantly for its cochlear implant system, Advanced Bionics has also demonstrated a profound commitment to what happens after implantation, ensuring that new implantees do not become non-users for lack of attention. To this end, Advanced Bionics has created an online rehabilitation resource – [The Listening Room](#) – that provides free activities and resources that foster the development of listening and oral language skills for children with hearing loss.



Christine A. Barton, MM, MT-BC works with 5-year-old Dmitry, a child who has had two cochlear implants.

Adding the **Tune Ups program** to its range of applications, Advanced Bionics has created a service not just for children with hearing loss, but also those with Down Syndrome, autism, language impairments, or simply those who require any kind of oral rehabilitation.

"When you buy Tune Ups, you get the CD that has all the songs on it, each of which will focus on a specific skill, and we have a booklet that comes with it," says Robbins.

"In the booklet, Chris and I have written how you might use each song for a particular group of children – how you might adapt it to make it easier or harder. The booklet contains all the words to each of the songs as well as all of the music. A person who's musical could play the melody on an instrument. Then we have teaching tips about using music with children – the first of which is that your voice is the most important music instrument."



Amy McConkey Robbins, MS, CCC-SLP, works with Annabelle – a cochlear implant recipient – and her mother during a therapy session.

Working with children in early intervention, Robbins has seen firsthand the benefits of integrating speech therapy techniques with musical and instrumental melodies. For example, while working with hearing-impaired children up to three years old, who are accompanied by their parent during the therapy sessions, Robbins will start with a figure of a lady bug.

"If I hold it up and say, 'lady bug, lady bug,' and look at him, the expectation is I want him to imitate," says Robbins. "With music I can make up a little musical tune that has a nice melody and soothing song, and sing it. And then I'll hand the lady bug to Mom and she'll sing. The baby's watching, so we've got joint attention and eye contact, and that's very important. The baby's being invited to participate, and what you see is babies will start following the pattern that normally hearing babies do."

She continues, "The first thing they do in response to music is they move their body. So you'll see these little rocking motions, or they'll kind of jive in the high chair, you'll see their little hips going back and forth. It is an almost innate response, particularly when we've modeled it. When I sing, I might be moving my head, or we do a lot of gentle patting on the baby's shoulder, or we put the baby on our lap and bounce them to the rhythm."

Struggling to be Heard

New cochlear implantees can be bombarded by a whole host of sounds in the typical household – alarm clocks, toilets flushing, phones ringing, doorbells ringing, pets barking. Learning these sounds and deciphering between them can be quite challenging for a cochlear implant user. Therefore, symphonic music, with multiple instruments overlaid one atop another, would simply be a gauntlet of noise and would not be suitable music for beginner's therapy.

"The speech processor that goes with the implant is designed primarily to reproduce speech as accurately as possible – that's its function," says Robbins. "One of the big ways that music differs from spoken language is that music has a much broader pitch range than our speaking range. We will use music that goes on many octaves, where as in our speaking voice, we might speak only in a couple octaves maximum. Part of the issue with implants has been they weren't designed primarily to replicate music."



Using music, Barton gradually coaxes Dmitry's perception of sound and rhythm.

A cochlear implant can replicate some aspects of music very well, such as rhythm, beat, phrasing, loudness. However, what it lacks is the precision in pitch. When Robbins and Barton are working with children, they are trying to get to the rhythm through singing and saying the words because rhythm, pausing, and timing are crucial in spoken language. As Robbins demonstrates, a deaf speaker can articulate all the correct sounds, but if their timing isn't right and the pauses aren't there, their speech is simply not intelligible.

"Working on music helps spoken language rhythm," says Robbins. "After we learn the song just by voice, we might add a drum beat. We might do the rhythm by patting our hands on our knees as we sing or patting our hands on the table while we sing. Or we might use these little handbells and ring the bell on the downbeat. Gradually, we expand the child's ability to tolerate voice, plus an instrument, plus another instrument. "

She adds, "We always have to be careful though, that the instrument doesn't drown out the voice. My colleague Chris Barton has taught me this. One of the most common music instruments that people have in their neighborhood preschool are little wooden sticks that children can rub together. Chris will cut them in thirds so they make a much softer sound; this way the child still gets the tactile feel and the beat."



Dmitry tries his hand at playing guitar during a therapy session.

As music therapy continues to expand its alliances with the field of communication disorders and speech therapy, pioneers on both sides of the divide are coming together with innovative methods to enhance therapeutic approaches and improve patient care. In this bold new collaboration, the rigid lines between specialties are beginning to blur, setting a new precedent for successful crossovers in the therapeutic field.

Robbins adds, "We think Tune Ups can be the avenue by which somebody who doesn't have training in music therapy – and virtually nobody in speech pathology is formally trained in music therapy – can feel comfortable incorporating music into their practice. It's just the springboard. The idea isn't that for the next 10 years you'll play these songs every week in your therapy sessions. We really want you to use the songs, learn them, read the teaching tips, and then make them your own. We're just providing a starting point."

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