

# Soundwaves

Fall 2007

## Julia's Journey: Beeps to Speech



Julia

"Julia," "Julia" ... a slight nod indicated she heard the first call but couldn't break away from the singing dogs on the waiting room TV. Exhibiting typical five-year old behavior, she reluctantly turned toward the sound of her name. As she walked down the clinic hallway with her parents for her annual hearing test, Julia is too young to understand the journey that brought her here. "Beep, beep, beep," Julia raises her hand each time she hears the faint sounds in the soundproof test booth. Julia is listening with her recently activated cochlear implant in her left ear. Now after three months of use, she reacts with the confidence of a seasoned pro. Of course, she has been participating in hearing tests all her life.

Julia has a profound sensorineural hearing loss in both ears. With this degree of loss she is unable to hear anything softer than a lawnmower or a chainsaw, and these sounds would be a mere whisper to her. Julia's hearing loss was identified at birth after failing a newborn hearing screening. She was fit with high-power hearing aids in both ears at two months of age at Children's Hospital of Wisconsin Masters Family Speech and Hearing Center. Hearing aids will pick up sounds through a microphone and amplify them to compensate for the degree of hearing loss, and then send the increased sound down the ear canal. After using amplification consistently and starting early intervention services at three months of age through a Birth-to-Three Program at the Center for the Deaf and the Hard of Hearing, Julia was not making the progress towards developing speech and language skills. Julia and her parents participated in a multi-disciplinary team evaluation at the Medical College of Wisconsin Koss Cochlear Implant Program to determine candidacy for a cochlear implant. Julia was seen by a speech-language pathologist, psychologist, social worker, and surgeon, Dr. P. Ashley Wackym who is the John C. Koss Professor and Chairman of Otolaryngology and Communication Sciences at the Medical College of Wisconsin. She also had many visits with the audiologists. "Beep, beep, beep" at this age of fifteen months, Julia would look around for the sounds coming from the speaker in the soundbooth and see a lighted toy if she was correct. The hearing aids were amplifying the low and mid frequencies (pitches), but not all of the high frequencies of speech. She was not hearing the ssss, fff, hhh, ppp, shhh, ttt sounds. She was found to be a candidate and she underwent cochlear implantation of her right ear at nineteen months of age. There were many more visits to the audiologist to have the device programmed as Julia adapted to all the new sounds she was hearing with her implant. "Beep, beep, beep," Julia was back in the soundbooth and hearing sounds with her right implant at soft levels for all the test frequencies. She was able to detect the sounds, but she needed to learn how to recognize and use the sounds she was beginning to receive from her cochlear implant.

A cochlear implant is a prosthetic device which is a treatment option when hearing aids are not providing adequate benefit. A cochlear implant is not able to restore normal hearing ability; however, with consistent use and (re)habilitation, a recipient can function similar to an individual with a mild hearing loss. Cochlear implantation has been approved for use in the United States for adults since 1985 and for children since 1990. There are three manufacturers of cochlear implants available in the United States: Advanced Bionics, Cochlear Americas, and MED-EL Corporation.

**Julia's Journey** (continued on page 2)

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## Julia's Journey

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Children as young as 12 months old routinely undergo cochlear implantation in our program. In special medical cases and with early intervention in place, infants at six months of age have been implanted. When cochlear implants were first introduced only one ear was implanted; however, most of our children with bilateral severe/profound hearing loss are receiving implants in both ears. Many of our children implanted in the past are now returning for implantation of their non-implanted ear.

Julia had been using her right-sided cochlear implant for three years when her parents decided to seek a cochlear implant for her left ear. She had continued to wear her hearing aid in the left ear, but the benefit it provided was only for sound awareness. Julia participated in another multi-disciplinary evaluation and underwent her second implantation at six weeks shy of her fifth birthday. Because this left ear had not been stimulated fully by the hearing aid, Julia started another adaptation process not only to hear all the new sounds in the left but also to recognize sounds with both implants together. She's had both implants activated at 9 months and is successfully mainstreamed into a regular kindergarten class along with her normal hearing peers. Julia started the school year with something new to her, a wireless FM system that sends the teachers voice directly to both processors! The journey for Julia continues.

The key to Julia's success and continued progress has been early intervention. Her parents have taken advantage of those opportunities and the information, technologies, and resources that have been provided at the earliest possibilities. Each year in the United States, more than 12,000 babies are born with some degree of hearing loss, which is 33 babies a day. Studies have demonstrated these children can have delays in speech, language, and cognitive (thinking) development. Most babies have a hearing screening soon after birth, typically before they leave the hospital. That is the first step. Unfortunately, according to national data released in May 2007, by the Alexander Graham Bell Association for the Deaf and Hard of Hearing one-third of babies who fail their newborn hearing screening do not go on to have a complete evaluation and diagnosis, and many do not receive follow-up care. Early intervention, including the use of amplification and participation in a birth-to-three program (including listening and speech training) is critical. A child is never too young to have their hearing tested, and months matter!

**Note:** This is one of several early intervention articles submitted to "Toy Tips & Parenting Hints Magazine" to be featured in their spring issue. For more information, go to Toy Tips!® at: <http://www.toytips.com/>

## Battery Update

**Cochlear America Freedom users:** The rechargeable batteries are covered for normal wear/tear for 1 year from the date of shipment from Cochlear. If you find the battery is slipping out of the controller, check to see if the "O-ring" is missing. It is a thin black band that goes around the bottom and keeps the battery securely inside the BTE controller. The O-rings are now available for replacement rather than needing to have the entire battery replaced. Please note the Freedom battery charger is under warranty for 90 days.

**Advanced Bionics recipients:** The rechargeable batteries are under warranty for 90 days; therefore, do not hesitate to report a problem after receiving a new battery that seems to be malfunctioning. The battery charger is covered for 3 years from the date of the initial fitting of the processor.

**MED-EL Corporation Tempo+ users:** The manufacturer recommends using Ray O Vac 675 zinc air batteries that are labeled as "High Power" or "Ultra Extra." Batteries can be purchased from Koss CI Program or MED-EL Corp. Recipients have reported the following websites for obtaining batteries:

[www.hearingbatteries.com](http://www.hearingbatteries.com)  
[www.microbattery.com](http://www.microbattery.com)  
[www.hearingusa.com](http://www.hearingusa.com) or 1-800-687-5406  
 Dudley's at 1-800-879-9635

MED-EL Corp recipients have reported using Xcell High Power zinc air batteries or ZeniPower 675 High Power batteries with equal success, and others have reported longer battery life from Power One 675 zinc air batteries.

### **General reminders:**

- Rechargeable batteries: It is best to rotate among the batteries. It might be helpful to number the bottom or side of each battery with 1, 2, 3, or A, B, C. Marking the battery also helps to identify if you are having a problem with one rather than all of your batteries. Remember not to write on any gold contacts. Refrain from touching the contacts as it will leave skin oil behind and can affect the connection. If you see green residue, it's a sign that the contacts are getting moisture exposure and a dri-aid kit should be used routinely. Clean the contacts gently with medicinal alcohol pads or a swab dipped in alcohol.
- Zinc air (throw-away batteries): Always change all three of the batteries in your processor at the same time. Never store your unused batteries in the refrigerator or a bathroom (both have too much moisture), or near a heat source or in direct sun.
- Batteries are extremely harmful if swallowed; please watch use around children and pets. If they are consumed, rush to emergency for immediate treatment.
- Recycle your batteries if possible. There is more information about recycling batteries on page 5.

## MRIs and Cochlear Implants

Magnetic Resonance Imaging (MRI) is a non-invasive way for your doctor to examine your body, particularly the brain, spinal cord, and soft tissues. It uses magnetic fields and radio waves to create cross-sectional images of your head and body. Your doctor uses these detailed, clear images to identify and diagnose a wide range of conditions. Since MRIs produce high resolution images, they are often used to diagnose central nervous system disorders such as multiple sclerosis. Other uses include identifying bone and joint injuries, damage and infections; locating tumors and functional disorders in organs such as the lungs and liver; and detecting blood vessel plaques and blockages.

A cochlear implant has an internal receiver-stimulator and an external speech processor that attach magnetically. The internal magnet would have been placed during the implant surgery. Because of the interaction between the internal magnet and the strong magnetic fields used for MRIs, you cannot have an MRI unless the internal magnet is **first surgically removed**. Not all devices have a removable magnet so not all devices are MRI-safe. You and your doctor must contact your cochlear implant surgeon and cochlear implant manufacturer prior to deciding if an MRI is an appropriate test for you.

## Medical Alert Bracelets

In case of accidents, some cochlear implant patients have decided to wear medical alert bracelets to inform medical personnel of their implants. There is no specific recommendation for the information that should appear on the bracelet, however, it is important that people are aware you have a cochlear implant and that you cannot have an MRI. Other information could include your cochlear implant manufacturer's phone number and that you are deaf so medical personnel will know you are likely not to hear them.

## Aural Rehabilitation

Most of us need to read instructions or get a little training before we feel comfortable using some new technology or doing something unfamiliar.

Aural Rehabilitation (AR) is really just the user manual for a cochlear implant (CI). Could every CI user benefit from AR? Certainly. Should every CI user have it? The answer to that is a little more complicated.

AR helps to identify patient-specific problems, establish individualized goals, and work toward those goals in a systematic way. Goal setting is a collaborative effort, but clearly reflects the patient's personal goals in real-life situations. Goals must be realistic and the therapy approach should compliment the patient's learning style.

- Some CI users are very insightful and fiercely independent and only require a short course of treatment to guide their independent efforts.
- Others prefer a more structured approach and attend therapy on a regular basis.

Regardless of visit frequency, all treatment programs proceed along a continuum of task complexity (easy to more difficult), all require independent practice at home, and all transition fairly quickly from the clinic to real life. To make this transition easier, the patient eliminates bad habits (e.g. shutting down or faking it), learns effective compensatory and listening strategies, and becomes more assertive in the communication process.

Along the way, listening environments might be modified to make them more listener friendly. Communication partners might be counseled about their speech habits and how that might impact the CI user. AR is a multifaceted process that never really ends, regardless of the approach or time spent in treatment.

Should every adult CI user jump on the AR bandwagon? The answer is a resounding **NO** if the answer is **YES** to any of the following interview questions:

- ① Are you here because someone made you come?
- ② Would it be a hardship (cost, distance) for you to come?
- ③ Are you completely satisfied with the benefits of your CI?
- ④ Do you feel that your communication skills are functional?
- ⑤ Do you believe you can do better on your own without the help of therapy?

Progress is always patient dependent. It depends on the patient's level of motivation, active participation in the therapy process, and consistent carryover of acquired skills. The decision to participate in AR should not be made lightly. It requires careful thought based on specific needs. It has to feel right to be right.

## One More Year of Early Childhood?

Is my child ready? Will one more year of early childhood be beneficial? These are the two main questions that many parents face as they prepare their child for the transition from early childhood to elementary school.

To make a well-rounded, thorough decision regarding kindergarten readiness, parents/guardians need to consider several aspects of their child's development: communication, academic readiness, and social behavior. It is important not to look at just the short-term goal of kindergarten but rather to consider the overall readiness of your child for future grades. Has your child accumulated the academic groundwork to maintain grade-levels in reading and math?

During kindergarten and first grade your child will learn to read, but will your child be ready to learn and read in the second grade? Consider the pace of academics and content areas taught as your child travels through the grade levels. We want your child to be successful. Before entering kindergarten your child will need not only the basic concepts of communication, pre-academics, and social behavior, but also the ability to apply them in multiple environments.

When discussing this with your son or daughter's early childhood educators, keep in mind the following:

- Communication - How does your child's vocabulary and word usage skills compare to his/her kindergarten classmates? How clear are your child's messages to familiar and unfamiliar listeners?

During a day in kindergarten your child will receive auditory directions from multiple staff members and multiple peers within a noisy environment. The more developed your child's vocabulary and language structure is, the easier it will be for your child to decipher the messages. Your child will be exposed to new content information. If your child has had at least a brief exposure to the material, the message will be understood with greater ease and confidence.

- Academic Readiness - How well does your child understand basic concepts such as shapes, colors, letters, or numbers?

Not all children are ready to read at the same age. If your child is busy observing and exploring the world around him/her and not ready to use a paper and pencil, your child may miss crucial information. Learning the fundamental steps of reading begins in kindergarten. Without the fundamentals, reading can become difficult.

- Social Behavior - Does your child take turns and share with ease? Does your child become frustrated often, to the point of losing emotional control? Is your child able to participate appropriately in group activities (sitting quietly, taking turns, playing with others)? Is your child ready to self-advocate (ask for clarification, watch the speaker, report equipment failure, able to change his/her batteries)?

Remember, your decision should be done as a team with your early childhood educators. Don't just think about kindergarten. It is very important to consider the years to come.

### Your Support Helps



Over the years, many have inquired about making donations to our department, the Department of Otolaryngology and Communication Sciences. These gifts are valuable as they enhance the patient care programs and research on this campus.

**Checks may be made out to:**

Medical College of Wisconsin  
Koss Cochlear Implant Program

**Mail gifts to:**

MCW Koss Cochlear Implant Program  
Department of Otolaryngology and  
Communication Sciences  
9200 West Wisconsin Avenue  
Milwaukee, WI 53226

### Information Correction

#### ***Freedom Microphone Protector Covers***

Cochlear Americas has changed their original instruction for use and care of the Freedom processor Microphone Protector covers.

**Originally**, they had suggested that the covers could be re-used if they were gently washed and thoroughly dried. They have found this has actually worsened the problem due to the nap of the inside Gortex lining becoming altered in the process.

**Cochlear Americas now recommends** the Microphone Protector Cover as a single-use product that should be routinely replaced with a new cover on a quarterly basis in order to maintain optimal function of the microphone(s).

## Research Corner

In this edition of the Research Corner, we would like to highlight one of our cochlear implant clinical trials for which we are currently enrolling participants. This study is being conducted nationally and is sponsored by the Med El Corporation. The study involves implantation of an investigational device for use in what is termed "electro-acoustic stimulation," or EAS.

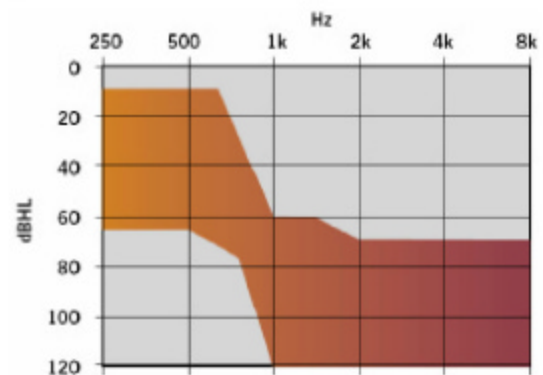
The EAS approach differs from traditional cochlear implantation in two ways:

- ① EAS candidates have better hearing in the low to mid pitches than traditional cochlear implant candidates.
- ② The EAS processor is both a cochlear implant and a hearing aid. The hearing aid portion provides amplification in the low to mid pitches where the hearing is functional, and the cochlear implant portion electrically stimulates the high pitches where the hearing loss is most severe.

There are several criteria that need to be met for an individual to be considered a candidate for participation in the EAS study:

- Hearing thresholds need to be in the mild to moderate hearing loss range for low to mid pitches and in the severe to profound hearing loss range for the high pitches. The range of thresholds appropriate for this study are shown as the shaded area on the audiogram (right).
- There are criteria regarding speech perception performance along with other biographical factors that need to be met to be included in this study.

If you are interested in being screened for candidacy for the EAS study, please contact Jane Kellerman at 414-805-5586 or e-mail: [jkellerm@mcw.edu](mailto:jkellerm@mcw.edu)



## Recycling Batteries

A large number of batteries, rechargeable and nonrechargeable, are used each day to keep hearing technology working properly. Typical nonrechargeable batteries include alkaline, zinc-air, and silver-oxide. These can be used with various types of cochlear implants and hearing aids. Most cochlear implant 675 high power batteries are the zinc-air.

Rechargeable batteries can include Nickel-Cadmium NiCd, Metal Anhydride, and Lithium ion. These would include the rechargeable batteries used in Advanced Bionics cochlear implant devices as well as the rechargeable AA batteries used in the body worn Cochlear Corporation and MedEl devices.

Advanced Bionics' batteries can be returned to the company and they will recycle them for you. An even easier method is to take them to a local drop-off site in your area. Environmental Health and Safety Online provides a location look-up for all drop-off sites for rechargeable batteries. The web address is:

[www.ehso.com/ehso2.php?URL=http%3A%2F%2Fwww.rbrc.org/consumer/uslocate.html](http://www.ehso.com/ehso2.php?URL=http%3A%2F%2Fwww.rbrc.org/consumer/uslocate.html)

(Just enter your zip code or city and the drop-off sites will be listed.)

Many Batteries Plus stores, Home Depots, Wal-Marts, and Best Buys will accept used rechargeable batteries for recycling.

Nonrechargeable batteries can be recycled, but the drop-off sites are limited. Remy Battery Company accepts ALL batteries for recycling at no charge. They are located on 6270 N. 76th Street in Milwaukee. Their phone number is (414) 358-2800. For drop-off sites outside of the Milwaukee area, check the web address: <http://wisconsin.earth911.org> (Drop-off sites are listed by zip code.)



## Activities and Cochlear Implant

"Dad...can I play football?" "Mom...can I play in the inflated jumping pit at my friend's party." "Can I go on a scuba diving trip?" Implant users and family members will call from time to time inquiring (a) whether or not it is safe to participate in a certain activity or sport, and if so (b) what precautions should be taken? Life is full of risks. However, when choosing activities informed decision-making is key. For this reason, our team and the implant companies have made several recommendations (see chart below).

Recommendations have been made with two key focuses: protection of the implant user and protection of the implant and equipment. Protection of the individual most notably involves protection of the head while at the same time allowing comfort, practicality, and optimal sensory input to respond to instructions and warnings.

Advancements in surgical techniques have decreased the number of implant "migrations" (the implant moving in the head). Nevertheless, an implant user should not partake in activities such as martial arts where repeated, blunt head trauma is likely. For activities where contact with the head and/or implant could occur, precautions are suggested in order to (a) minimize the impact of the external equipment being pressed into the internal components during contact and (b) reduce damage to the internal and external implant components. Head protection should be checked for proper fit as well as adequate padding at the implant site. Initial evaluation should be verified by a representative from your local sporting good store at the time of purchase. Likewise, periodic re-evaluation is suggested particularly because of growth and development, as well as general wear and tear which may alter the fit.

Other aspects to consider relate to the protection of the implant and the equipment. The implant is a mechanical device and will malfunction if proper precautions are not taken against moisture and static electricity. For this reason, the following recommendations are offered:

For moisture control use:

- activity covers
- waterproof bags for equipment

- Dri-Aid storage kits
- headbands for absorbing perspiration
- also, thoroughly dry hair before using implant equipment

For static electricity control:

- wear cochlear equipment under clothing to avoid direct contact with static
- use proper adaptive cables with accessories
- take external equipment off when playing on plastic play equipment
- take spare processor in a carry-on bag versus check-in bag at the airport
- touch a non-moving object before touching your processor and refrain from touching a TV or computer screen
- wear clothing that minimizes static electricity (cotton or linen) and use fabric softener and static guard sprays
- keep relative humidity at 60-70% (70° F/21°C)

**Most importantly**, when undergoing diagnostics or any procedure (i.e. dental anesthesia, electrolysis, MRIs, neurostimulation, placement of other implants, or ANY surgery) your healthcare provider should be in contact with your surgeon or the company's medical representative to ensure accurate safety precautions are taken.

Is it safe to play football, play in a jumping pit, or go scuba diving? There are no "black and white" answers to these questions. Bottom line, it is important for implant users to have open communication with their implant team regarding interests and concerns, to be aware of the potential risk factors and precautions involved with a given activity, and to make an educated decision as to whether or not the benefits of a given activity outweigh the overall risk.

### Activity Chart

<b>Activities considered safe:</b>	walking, tennis, hiking, sun bathing, running, badminton, bowling, aerobics/Tai Chi <b>Precautions:</b> <i>Do protect equipment from the elements (sand, moisture).</i>
<b>Activities requiring caution:</b>	air hockey, basketball, biking, bungee jumping, canoeing, football, gymnastics, hockey, horse riding, ice skating, laser tag, motorcycle riding, playground equipment (slides, inflated jumping pits), roller coasters, sailing, scuba diving, skateboarding, skiing (water or snow), sky diving, snorkeling, soccer, surf boarding, sun tanning booths, swimming, trampoline and treadmill use <b>Precautions:</b> <i>Remove external equipment, wear head protection (scrum caps, neoprene bands, helmets), protect device from static electricity</i>
<b>Activities NOT recommended:</b>	boxing, kick boxing, martial arts, rugby, wrestling

## Vocabulary

Vocabulary development is important to children of all ages. For hearing impaired children, vocabulary can often be an area of weakness. We need to continuously work at building those skills, both receptive and expressive.

- Receptive vocabulary: refers to the ability to comprehend or understand the meaning of words. (Example: "bridge" can mean a structure over water, a dental appliance, or a card game.)
- Expressive vocabulary: is the number and kinds of words a child can say or sign.

Often a hearing impaired child has a higher expressive vocabulary than a receptive vocabulary because he/she is able to label pictures or objects, but may not always understand the many meanings of the word.

Some children learn a word in a specific setting, and have difficulty generalizing it to new situations. It is important that children understand the meaning of words, as well as how to use them expressively. We want children to understand and label a variety of words, including nouns, verbs, adjectives, prepositions, pronouns, etc.

### ***Here are a few ideas to facilitate vocabulary growth:***

- Reading:
  - Talk about the pictures and the words in the book.
  - Describe the characters' actions, facial expressions, and clothing.
  - Feel free to reduce the number of printed words in a book to keep your child interested.
  - Expand the meaning of the words and talk about how the story relates personally to them. (Example: "Elmo is taking a bath. He is giggling. You like baths. You play with your toys in the tub too.")
- Daily activities:
  - Talk throughout your day describing routine activities, such as playing, eating, bathing, and bedtime. (Example: "This peanut butter is sticky. Be careful, the soup is hot, just like my coffee. I really like crunchy vegetables like carrots and broccoli, but I don't like them soft and mushy.")
- Discuss your feelings:
  - Share your feelings or simple problems. Invite your child to talk about situations with you. (Example: "That lady was not nice. That makes me mad. I'm angry that she was rude.")

- Expand school vocabulary:
  - Take opportunities to use words learned in school in a new way. (Example: "You talked about forests at school. Let's take a walk and see how many different kinds of trees, leaves, and branches we can find.")
- Play games:
  - Word games like "I Spy." (Example: "I spy something green and shiny.")
  - Alphabet games (Example: "I went to the store and I bought Apples"... the next person names an item starting with B, etc. )
  - Box games like "Scrabble" or "Cranium." They encourage the use of many kinds of words.

Ask your child to tell you about new words he/she is saying or signing. Your child could do this by describing it, using it in a sentence, or pointing to it.

**MAKE SURE** your child understands the words he/she is using and reading. His/her vocabulary skills will expand both receptively and expressively.

Vocabulary is a never ending journey of learning. We ALL learn new words every day.

## 8th Annual Cochlear Implant Picnic

We had another year of record-breaking attendance at the 8th Annual Koss Cochlear Implant Program Picnic. Over 100 recipients and their families participated. The new location, Elm Grove Park, was a hit! The picnic provided a great setting for recipients and their families to share experiences. The adults had the opportunity to meet and talk with friends while enjoying Saz's barbeque.

The kids enjoyed meeting Brad Beach, the mascot of the Milwaukee Wave. They were able to race Brad as well as attempt to score goals against him - a few got in! Brad also posed with the kids for pictures. As in past years, face painting provided a fun opportunity for the kids to express themselves.

The raffle provided a great closure to the festivities. The winners walked away with a signed Packer's football, Webkin, North Face backpack, Milwaukee Buck's tickets, movie passes, a Brewer's bobble head and more. We look forward to this event every year and hope to see you there next summer!

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## 2007 Calendar

<u>Date</u>	<u>Meeting</u>	<u>Time</u>	<u>Location</u>
November 29, 2007	Parent/Adult Support Group Mtg. (P. Ashley Wackym, MD, Guest Speaker)	6:00 - 8:00 p.m.	Community Conference Center Bldg. 8700 Watertown Plank Rd., Room 2

