



Jenny Perold

COCHLEAR implants are widely considered to be the most successful neural prosthetic device available. They are also the only prosthetic device which has the ability to restore an impaired sense, hearing.

Severe to profound deafness can have a devastating effect on an individual and their family, and in the case of children born deaf the loss of the opportunity to develop intelligible spoken language.

Cochlear implantation provides the potential for such children who are implanted early enough (ideally before 2 years) to learn spoken language, and for children with progressive hearing loss to maintain and develop the language they have learnt.

It enables adults with moderate to profound hearing loss to communicate through hearing and speech and have a vastly improved quality of life with greatly enhanced educational and vocational opportunities.

Cochlear implants have been proven to be a highly cost-effective intervention in the treatment of severe to profound hearing loss.

How does it work? Cochlear implantation is a process that involves the surgical implantation of an electrode array into the cochlea (inner ear) to provide direct electrical stimulation of the auditory nerve.

A sound processor is worn behind the ear which analyses and digitises the sound picked up by a microphone. The coded signals are then sent via a cable and coil across the skin to the internal implant.

The electrical signals are then relayed to the electrodes which stimulate the hearing nerve fibres. Electrical impulses are sent to the area of the brain where the sound is heard and interpreted.

In order to determine candidacy for a cochlear implant, a very careful selection process is followed. Each candidate presents with a unique set of capabilities and needs.

Age, onset, etiology and progression of deafness, cognitive and educational level, attention, spoken language competence, family and environment and personal motivation all influence the approach and considerations for assessment and long-term management.

For this reason cochlear implantation takes place within the context of an established and experienced cochlear implant team. The team includes audiologists, an ENT surgeon, radiologist, speech and language therapist, and educators.

A key factor in a good outcome for young children is age at implantation and duration of deafness.

Research has shown that 90 percent of children implanted before 18 months of age are able to develop normal speech and language skills and are most likely to be educated

A little device that is music to the ears

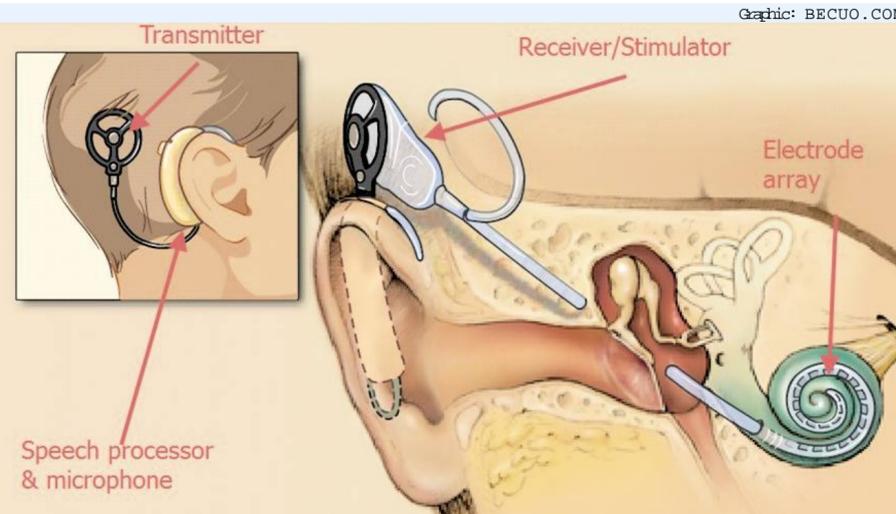
Cochlear implantation is a process that involves the surgical insertion of an electrode array into the cochlea (inner ear) to provide direct electrical stimulation of the auditory nerve. A team of experts provide deaf people with the gift of sound



AMYOLI, 2



SANDY SMITH, 82



ELECTRIC SOUND: Cochlear implants have been successful in young and old. The Tygerberg Hospital-Stellenbosch University Cochlear Implant Unit was established in 1986 and has given implants to some 550 people. South Africa has six programmes and about 1 800 people have had implants.

in mainstream schooling.

Therefore, neonatal hearing screening programmes need to be in place in order to identify newborn babies who may have hearing loss so that early referral takes place.

Studies have shown that 33 percent of children implanted between 3 and 4 years of age cope in mainstream schooling, and only 14 percent of children implanted by age 5 years will manage.

Some 90 percent of children born deaf are born to hearing parents, most of whom wish for their children to learn to speak.

The best outcomes for older children and adults are if they have had progressive or acquired deafness.

What is critical is that the hearing part of the brain (auditory

cortex) has received enough input from hearing aids so that the transition to electrical hearing provided by a cochlear implant is possible.

There is no upper age limit for implantation, as long as the person is fit enough to undergo surgery.

Sandy Smith developed a progressive hearing loss at the age of 68. He used a series of more powerful hearing aids as his hearing deteriorated, and by the age of 71 he was getting very little benefit from his hearing aids and had to rely on lip-reading for communication.

Sandy had become socially isolated and depressed, finding the handicap of deafness overwhelming. After careful assessment he was found to be a suitable candidate for a cochlear implant.

"Fourteen months ago, aged 81 years, I had a cochlear implant and since then my world has turned around.

"At home we can speak to each other normally and I can now communicate with shopkeepers, doctors and fellow golfers. I am also able to use a cellphone to a certain extent and can understand most announcers on television, although I still battle with some of the American films, and anyone who speaks too quickly."

The first step for a cochlear implant is an audiological assessment by an audiologist within the cochlear implant team who will obtain a detailed history and assess hearing and benefit obtained from hearing aids.

A good guideline to candidacy is when a person finds telephone communication very difficult.

In the case of children, a trial period of appropriate amplification with well-fitted hearing aids within an oral rehabilitation setting (such as the Carel du Toit Centre) is necessary.

Parents are taught how to work with their child to teach listening skills and the development of speech and language. The ear nose and throat (ENT) surgeon on the team will assess the patient medically. Radiology (CT and MRI scans) is done to ensure that the cochlea (inner ear) and hearing nerve are suitable for implantation.

The surgery is done by a specially trained ENT surgeon. There

are only a handful in the country. Surgery takes around three hours.

About three weeks after the surgery the sound processor is fitted by an audiologist who is specially trained in the field of cochlear implantation.

This process can take several weeks and includes programming the electrodes where use is made of special coding strategies that convert the acoustic sound into electrical energy.

The aim of programming is to provide a useful, comfortable sound that provides access to all the speech frequencies so that speech and everyday sounds are easily audible. Rehabilitation focuses on auditory training where the person is taught to make optimal use of the new sound.

Most people who have become deaf report that the sound has an "electronic" quality, but after a few days or sometimes even months the sound becomes more like they remember sound to be.

In the case of children, rehabilitation with a speech and language therapist is essential. Children should be placed within an educational programme which encourages the development of spoken language. Many children with hearing loss may have other difficulties, such as sensory-integration (see article below), behaviour or concentration difficulties which may need intervention by an occupational therapist, physiotherapist and psychologist.

In most first world and many developing countries, cochlear implants are provided by the state.

South Africa faces enormous challenges to meet the medical and educational needs of our population.

The majority of cochlear implant recipients obtain some funding from their medical aids, but usually also need to fundraise to cover the shortfall of the initial costs.

The Tygerberg Hospital - University of Stellenbosch Cochlear Implant Unit receives funding for a limited number of cochlear implants annually for hospital patients from Tygerberg Hospital.

Over and above the initial expense of the device, the long-term maintenance over the life time of the recipient is high. At present, therefore, socio-economic factors are an important consideration in cochlear implant candidacy.

Perold is an Audiologist in the Tygerberg Hospital-University of Stellenbosch Cochlear Implant Unit. For queries or more information contact the Tygerberg Hospital - University Stellenbosch Cochlear Implant Unit: 021 938 5080/6 or amum@sun.ac.za The website of the South African Cochlear Implant Group is www.sacig.org.za



BRIGHT FUTURE: Jamie Lewis is a keen surfer and has bilateral cochlear implants. Jamie can't go into the water with his devices but this doesn't stop him from catching waves.

Picture: SAMANTHA LEWIS

Taking the first step to switch on

Chevone Petersen

ON SOCIAL media we see the Twitter feeds, we follow people, we retweet, we favourite. But do we truly connect? I follow parents, professionals and organisations focusing on hearing impairment and recently made contact with SammyN* to learn about the person behind the tweets.

SammyN is a young mom of 2-year-old Amyoli*, who was diagnosed with profound hearing loss at 7 months. As a single parent and a full-time second-year civil engineering student, this news shocked her to the core. She knew that something wasn't quite right when at 6 months Amyoli didn't babble or respond to her noisy toys, but this could not have prepared SammyN for the journey of raising a deaf child with auditory neuropathy spectrum disorder (ANSD) in a culture where myths abound about disabled children.

Being Xhosa, one of her greatest challenges has been that of educating her extended family and her community. Her daughter has been referred to as "Isidodo" (when a child is slow or behind), some churches believe they can pray her to "normality", family believe she can hear because she responds, everyone has an opinion.

SammyN is a strong woman and she set out to educate her family about hearing loss by explaining that Amyoli responds to visual cues even though she cannot hear. "ANSD is a condition affecting how sound is transmitted from the inner ear to the brain and the ability to understand speech. It distorts sound," she says.

She included her family in speech therapy sessions with Amyoli in the hope that they will understand what their goals are and how they can help with her daughter's development.

This year SammyN decided to be a stay-at-home mom to commit full-time to her child's speech and occupational therapy. Amyoli only started walking, unaided, in June due to vestibular sense challenges (sensory integration - see article below). The past six months have also been devoted to research and to have tests conducted, such as MRIs and CT scans for cochlear implant candidacy.

Their communication method has predominantly focused on spoken and listening development (through hearing aids). However, mom and daughter have since both started learning South African Sign Language, "giving Amyoli the best of both worlds".

SammyN draws her strength from her grandmother and finds guidance and support through the HiHopes team.

Amyoli has been approved for a cochlear implant and surgery is set for today, thanks to the generosity of various donors.

SammyN lives in Pretoria, where Amyoli has limited access to the rehabilitation services she needs. Relocation to Cape Town is being considered and SammyN intends to visit the Carel du Toit Centre in Cape Town next month. Amyoli has been denied a disability grant even though she is profoundly deaf.

Petersen is the founder of *Decibels of Love*, a family resource group for hard-of-hearing children. She co-ordinates the experts and writes for the four part *Silent Ability* series in the *Health Times* leading up to *Deaf Awareness month, September*.

*These are their twitter names

Sensory integration of the vestibular system gives us the trust that we are securely connected to the Earth and will always have a safe place to stand

Romy Kruger

THE world is a busy place and seems to be getting busier. Life is fast-paced, there's always a lot going on and the to-do list is ever-growing. So how do we take in all that is going on around us while remaining focused on what's important? The answer is effective sensory integration of incoming stimuli.

Sensory integration is the way in which you process sensory information from your body and your environment so that it leads to an appropriate behavioural response.

So it is essential that sensory information is initially registered as meaningful, modulated within the body and suitably responded to.

When sensory input is well modulated, adaptive responses can be made, allowing us to reach an optimal state of arousal for learning and functioning.

We all know about our five senses: sight, sound, taste, smell and touch. But there are two lesser-known but important senses called the proprioceptive and vestibular senses.

Proprioception gives us an

awareness of where our body is in space. It interprets input from the proprioceptive receptors in the muscles and joints to help us guide movement and strength behind actions. For example, you grade your force according to whether you're picking up an empty glass or a full one.

The vestibular sense provides information about our head in relation to gravity. It is our movement sense. The receptors for the vestibular sense are located within the ear.

There are two kinds of receptors: some register linear, up and down,

movement and others rotational movement.

A person can experience dysfunction within only the linear receptors and not the rotational or vice versa.

The vestibular sense is intimately connected to the auditory (sound) as the receptors for both are within the ear.

The way in which vestibular activity influences auditory processing is not entirely understood, but it is known that these two sensory inputs travel side by side in a single nerve to the brain stem. They are neighbours and talk to each other.

When your sense of balance is disturbed, it is hard to forge relationships

VESTIBULAR DYSFUNCTION

Children with vestibular dysfunction may present with the following signs:

- Distress when moving backwards on the change table to have a nappy changed
- Distress when being picked up and having feet off the ground
- Difficulty tipping the head back in the bath for hair-washing or lying on the back when learning to swim
- Intolerance of any change of movement of the head
- Difficulty with balance
- Fear climbing up and down stairs
- Motion sickness
- Vertigo
- Maintaining the head in the upright position when bending down
- Difficulty maintaining standing balance with closed eyes



Kruger is a registered occupational therapist with special interest in sensory integration and autism. She can be reached at Krugerromy@gmail.com.