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The Long Winding Road of the Cochlear Implant

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This is a transcript of a talk given by Professor Bill Gibson at the Cicada Australia AGM in 2012

CICADA is doing a fantastic job. The magazines are unbelievably good these days. I congratulate the old and new committees for the work that they're doing. I'm honoured to be asked to give this talk today, and it's just a little bit of history and maybe a peek into the future of the cochlear implant and how I became involved.

We call it the Long Winding Road. It was a long winding road.

Before I begin, I'd like to give a little bit of background. The problem with having a hearing loss for both an adult and child, is that they think when you put your hearing aid in, not only are deaf, but you're also dumb.

Now, it's not too bad for adults we can at least express our annoyance at that, but it's very different for children. For a child who is born deaf, without their hearing, they can't develop their speech. In German and other languages, "dumb" means not only stupid, but also you can't speak. So it was always known that if you were deaf you were also dumb.

The poor people who were born deaf used to have a miserable existence in the middle ages, and still do in some undeveloped countries where they don't get the opportunity to learn to speak.

Abbe de l'Epee, from the National Institute for Deaf Mutes, literally broke the chains away for the people who were born deaf. He developed sign language. That was the first sign language in the world, and when he developed it, people realised that people who were born deaf had exactly the same range of intelligence as everybody else. Suddenly they could communicate and were able to talk to each other and for others through sign.

He was succeeded by Itard in Paris. He was famous for finding the boy in the woods near Bordeaux, who was thought to have been brought up by wolves. They picked the child up at eight, and he could hear twigs snap, but they could never teach him to speak because it had gone to the stage where his brain had developed so far that it could no longer have the capacity to learn speech. One of the first lessons we learned about the need to intervene early.

He was succeeded by Prosper Meniere, who then took over the institute. Prosper was a bit unpopular because he tried to design operations to help the deaf children. In particular, he pierced their eardrum, and in some cases they had what was called "glue ear", and when the glue came out, they could hear, but it didn't work for all the children. So they probably objected to the treatment.

Since his time, lots of people have tried to do operations to help deaf children to hear and be able to pick up speech. The first thing that developed was ear trumpets. This is a picture of Beethoven and also another musician, Bach, who was very deaf. And this is a range of his ear trumpets which did amplify a little bit, but not enough to help people who were born deaf.

Then came Alexander Graham Bell a famous Scotsman who developed the telephone. Based on his idea, they developed the first hearing aids and it was thought at one stage that once they had been developed, we can fit them to deaf children and they would hear everything and be able to speak. Sadly, that was not the case.

This is a picture of Alexander Graham Bell in his older age, meeting Helen Keller, who was a lady who was both deaf and blind. She always reckoned that her deafness was what held her back, because she couldn't communicate properly with people.

So the technique then became auditory oral. It meant to teach children to speak, they gave them what hearing they could, and then asked them to look at the lips and to try to repeat speech sounds that they couldn't hear. So when someone said "shop", and they went "op", "No, watch the lips, shop."

Until recently, people were taught this way and it was very laborious and slow and only really the children who had dedicated parents could make progress.

Typically the speech that they heard through their hearing aid missed the consonants. So if somebody said something like "she go shopping", they heard "nm nopping" and they would speak with the vowel sounds and that was very difficult for a nonskilled listener to understand.

So just before back in the 1960s/1970s, we developed a thing called "total communication". This meant that the children who were deaf went into school and they were taught to use signed English. That means that they had to sign every single word in a sentence in the correct order. The thought was that it would help them to learn to read because they were doing it in the right order.



They were allowed to use whatever they had lipreading, anything that helped. It was incredibly slow to sign every word, and what deaf people really did hate about it was it was too slow. They moved to a thing called when they left school called Auslan, which was Australian sign language. There's also British sign language and there's American sign language. They're all different. They throw away their hearing aids on leaving school, join the deaf community, where they were welcomed and they usually marry somebody who was also deaf.

So Australian sign language is very fluent, and you can sign Australian sign language as quick as you can speak. So it was a great advantage to them. So everybody thought that was fantastic, and if a child had hearing loss over a certain level, they should learn sign. So simultaneously the early cochlear implants were being developed, and the efficient deaf can remember the fiasco of the hearing aid, the aid not giving them enough to hear properly, and were very cagey about cochlear implants.

The first cochlear implants were done by two French men, Algerian French men, Djurno and Eyres. They did the first implant operations in 1957. They put a bare wire inside the inner ear just one wire. The person who could hear a whole lot of pitch changes and what we call the rhythm of sound. It made everybody in the world get terribly excited about this.

In America in 1961 William House and Doyle began their work and then Blair Simmons, et cetera. Burian and Hochmayer in 1976 started their work. It was felt at that time that the cochlear implant was too experimental, that they should just stick to one wire inside the ear, and the mould had to be broken. So there were gloomy predictions that intracochlear electrodes to destroy the cochlear nerve, leaving children without any natural hearing; cochlear implants would never replace complex inner ear mechanisms and could never give the ability to hear speech.

So there was an embargo placed in the 1970s. Then Graeme Clark claim along. He did look like the mad scientist. People were very sceptical, and he said, "I'll put 22 electrodes inside the ear and people will hear speech." Crazy.

He was greatly helped by Paul Trainor, who started the Nucleus company which then spawned Cochlear, and he did really help Graeme tremendously by commercialising or making it available to everybody, Graeme's device.

In 1983 I left the country that won all the gold medals and came to Australia with my family, Alex you will recognise me on the left and my children.

I went to work at the Royal Prince Alfred Hospital. I was greatly helped by a man called Barry Scrivener, who suddenly died in 2001. I was asked to go to a meeting of senior ENT surgeons in Melbourne to say what I was going to do as the new professor. I said, "I think I will do the cochlear implant that Graeme Clark has invented. They went "What? What are you doing that for?", but Barry said "Go ahead. Let's do it". Everybody agreed.

We did the first two people in 1984, one year after I arrived. I was also helped by John Ward, who was the vicechancellor at the university, who supported me by establishing a foundation to support the cochlear implant program, and also supported the idea of the cochlear implant program being started in Sydney.

PROFESSOR GIBSON: Do you recognise this person? - Sue Walters. She was one of the first people to have an implant in Sydney. So that really was historic because she was the first person in the world to demonstrate that you could hear speech without lipreading. You can't lipread the telephone. I took that down to the meeting in Melbourne where the senior surgeons were, and I showed them what the implant could do and they went, "We'll do the next item", and passed quickly on to other business.

But that was fantastic, and that video then went around the world to show what could be done. Even in Melbourne they were impressed, you know, because I think you beat some of their people in being able to use the telephone.

We did the first group of adults, and you may recognise some people there. That is Sonny Bennett, that's Shirley Hanky, Alan Jones is somewhere in there there he is; Kath Westbrook. So by 1986 we had 20 adults that had received cochlear implants.

We decided to have a club, and I originally had this idea that we could form the Cochlear Implant Club and Deafness Association. I got told off by the adult deaf society, who said "You are not allowed to use the word 'deaf'. Deaf means you use sign language. If you are completely unable to hear and have a cochlear implant, you are not deaf". So we had to change that and we changed the name to the Cochlear Implant Club and Advisory Association.

So we had to take the "AD" from "Advisory" to keep the same picture, because Paul Hanke had drawn the cicada for us.

Actually, that turned out to be the best thing, because really the function of Cochlear Implants Club and Advisory Association is

to help people who are making up their mind if they want a cochlear implant, and to meet somebody who has got a cochlear implant, and be able to find out all the ins and outs from them is much more effective than meeting the surgeon.

So the Cochlear Implant Club started to hold BBQs. Sometimes it rains and we go under the eaves.

This is an outing to Bowral and Orange, which was great fun and I hope there will be more to come. So CICADA has been wonderful, as you can see today.

But back to the children. I was working at the Children's Hospital at Camperdown, which is now closed it's gone to Westmead. In 1987 we did the first group of children. We did Holly, the first that's the girl at the front. She is now a lawyer and she is 28/29. These were the two teenagers that we did that didn't do so well because we did them too late, and this was Pia.



Pia Jeffrey was the one that really caused the consternation throughout the world. Remember people remembered how the hearing aid had not really helped congenitally deaf children, and the thought of putting a cochlear implant into them was horrendous to a lot of people. The teachers of the deaf said "This is the wrong thing to do", and the Deaf Society themselves said "We're just trying to make people have the right to be deaf into sort of halfhearing adults", so it was not accepted.

So this was Pia, our first child. This is showing her response to the first sounds that Pia heard, because in those days we could only do children that had no hearing. We weren't allowed to do them if they had any hearing remaining.

My son went out and got me this from the newsstand, 'Pia's first sound', and it went through the world that we had done a congenitally deaf child. I got a sack full of mail condemning me for it. I've still got some. People were very upset that we had done such a bold thing. They said "You shouldn't have put a cochlear implant into a child that was born deaf". It was interesting because it was one of the first children world wide, certainly to get the multichannel.

However, the publicity was good for us and as a result the Honourable Peter Anderson provided an enhancement grant to the Royal Prince Alfred Hospital so we could do 10 public patients a year. We thought this was fantastic. The Yenebis family gave us a large donation to build a cochlear implant centre at the Children's Hospital in Camperdown, and they started to build this unit. And it was built, but then there was opposition within the hospital. They said that the freshly built Yenebis Centre should not be used for cochlear implants. We were thrown out and the unit was used for audiology, but not cochlear implants.

So I went then to Chatswood. These children were mainly at Chatswood Public School. We rented a house in Anderson Street, and in that house the children came to have their programs adjusted, and their lessons. The Honourable Peter Collins then came and gave us some money for children as well, so the program could be set up.

There were two major downs. The first was there was an inquiry into the foundation, saying that there had been misappropriation by a teacher. That teacher was subsequently cleared. The neighbours in the house that we were renting claimed that the house was a brothel. A father, Greg Bartels, was the Mayor of Willoughby, and said, "You shouldn't rent a house, you have to have a licence if children are in it and you're teaching them." So he helped us to get another centre which was in Willoughby Road, and he got all the paperwork was done, it was all very financial, and we grew the number of children then up to about probably 50 children, but the house became terribly small.

Then we had two ups. First of all, we were able to get Christopher Rehn to act as our general manager. He is now the CEO of the Royal Institute For Deaf and Blind Children. We miss him, but he is doing a great job there, and we now have McLeod, Rod, helping us here.

The New South Wales Department of Health decided to give us accommodation here in the women's psychiatric wing of Gladesville Hospital. The red bit here is what we were allocated. We thought everything had come true, all our dreams had come true. At that stage we had two units. We had the Children's Cochlear Implant Unit and the Royal Prince Alfred Hospital Cochlear Implant Unit. The Royal Prince Alfred Cochlear Implant Unit was being run by this young lady who some of you may know, Monica Bray.

Eventually after about three or four years, we merged the two programs and we became Sydney Cochlear Implant Centre.

In 2004 we reached 1,000 people who had had cochlear implants, which we thought was fantastic. If we thought that would have happened in the '80s, we would have thought that was unlikely.

John Howard you will see him hiding next to me came and opened it, and we refurbished everything.

We now have 36 members of staff here and there's three surgeons, including myself. The number of implants has grown over the years. So we now have 343 surgeries that have been performed, and we have an active base of 2,670 people who are using our services. Things have progressed.

PROFESSOR BILL GIBSON: So this was the little girl that we were criticised for giving a cochlear implant to. Now, if anybody thought she would be able to speak like that as an adult, they would have said that was impossible. So that was fantastic.

I've now been joined by Cathy Birman and Melville Da Cruz. So we have three surgeons here. We have set up a Cochlear Implant Centre in Newcastle, where there is quite a lot of members of staff. It's an active unit. We have set up another centre in Canberra. We've set up a centre in Gosford, Lismore, and we're soon to establish one in Port Macquarie and Parramatta. Sorry about the spellings.



So over 3,000 recipients. How things have changed! If a child receives a cochlear implant before the age of 18 months and has no other disabilities this isn't a child, this is a gnome, actually 100% of them will be able to communicate using speech and go to regular school with the same opportunities as their hearing siblings, which is fantastic.



All schools in New South Wales have basically abandoned total communication and signed English for the younger children. They still do it for the older children. We have an Auslan school at North Rocks, and they're encouraged to use Auslan rather than signed English.

The surgery used to take four or five hours, and we used to shave all the hair off the side of the head. It was a large incision and you spent three or four days in hospital. Now we make a little incision behind the ear. The surgery takes about two hours, and it's a tiny incision. They leave hospital usually the next morning.

How things have changed. We now do bilateral implants. We didn't imagine we would be putting two into the same person. This was one of our first victims or patients I should say Steve Pascoe, who was one of the first people to have a bilateral, used both cochlear implants.

We now offer cochlear implants to people who have useable, low frequencies, and only have a highfrequency loss. So multi-electrode arrays provides the best outcome, and over the 30 years there has been no evidence that anybody has lost any neural elements, and the electrical hearing levels do remain steady. Sue is pleased about that.

It has always been accepted that any remaining hearing would be lost.

Now, we find that there are people with an audiogram where they can't hear the high frequencies, who can't do very well with a conventional hearing aid. With the speech audiogram they're not picking up those high frequencies. So research started using a small electrode which went partially into the ear and it was found you could keep some of the hearing. Then we put a longer one inside the ear and the hearing results have been good.

So now cochlear has developed an even longer electrode and we can put that in a lot of people's ears and they can still keep those frequencies. So the old adage that to have an implant and you loss hearing has changed.

The first lady was Carol Holden who had a MEDEL implant on 23 January 2009, and she was only deaf in one ear, but had terrible tinnitus. Our audiologist did the first map and we were amazed within five minutes she was able to get 95% of sentences right just using the implant, implanted ear. So we're now looking at doing a series of patients who only have a hearing loss in one ear.

One of my interests is Meniere's disease. We are now looking at the possibility that people have Meniere's disease. In the old days it would destroy their balance and sometimes their hearing, or their hearing would be destroyed by the disease. Now we can operate on the ear, put an implant in so not only do they get their balance back, but they also get their hearing back in the affected ear. So things are changing.

We're looking at smaller and smaller processes. This is looking into the future. So a simple one to use because the current implant is a bit complicated sometimes. We will just have a simple setting for what you really need; yes.

I'm hoping that MEDEL Cochlear will one day be able to produce a speech processor that can be mounted on the coil so the whole lot goes under the hair and the thing will become invisible. So maybe one day that will be a possibility and you won't have to wear it around the back of your ear.

So the consequence I tell this in my lectures for doctors and audiologists who fail to tell people about cochlear implants is they will pass on to hell. Very scary for them. They need to know this lesson.

So thank you for listening to this little story about the cochlear implant and how it developed here. The duck ends my story, and he says he hopes he will be able to smash deafness forever.

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Comments

#6 Guest 2014-03-27 14:26

Efficiency is the key to successful rent a fence prices time management. But apparently, even people who can not read well need a place to eat, but can expect a 20 percent reduction in rent a fence prices calcium channel activity. Either way, environmental and health code enforcement is weak, and the work itself requires a lot of importance. It acts as a catalyst to reignite passions.

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[Quote](#)

#5 Guest 2014-03-27 12:57

It's romantic--and reusable Write a love note to your dearest on toilet paper and tape.

Once all other products have been removed, the paper cups were removed without a new bidding process. The Natural Resources Defense Council NRDC says that at porta potty buffalo ny least 400, 000 trees a year that give their lives to become toilet paper according to National Geographic.

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