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—Daniel Rådberg
Senior Design Engineer
and CAD Manager
Cochlear

Unique method for bone implants creates a shortcut for hearing

Today there is a steady upwards demand curve for this technology and the beginning of busy days to come for Cochlear, a manufacturer of implantable hearing solutions.



Image courtesy of Cochlear Bone Anchored Solutions AB

Medical technology may not initially be associated with computer-aided design (CAD). However, with the use of advanced CAD in Autodesk Inventor® and other specialized software applications, Cochlear managed the technical development of all the tiny details necessary for bone conduction hearing solutions.

“3D was revolutionary when it was introduced; we immediately started using Inventor and experienced a huge difference,” says Daniel Radberg, Senior Design Engineer and CAD Manager at Cochlear Bone Anchored Solutions in Molnlycke, Sweden.

“Unlike those who produce and assemble our equipment, we do not work under a microscope to see the details; however we do have the ability to digitally magnify what we are working on. For us, the challenge is in managing small tolerances. We

work with parts in hundred's and thousandth's of a millimeter. It was a challenge to view these parts with the previous software programs we used, but in 3D it works perfectly.”

Cochlear's product development department has been very busy. The next generation of implantable bone conduction hearing solutions is in the pipeline and in addition to each new device, there is a need for new specialized tools and surgical instruments.

Since a sound processor that is connected to an implant is a lifelong commitment to the one who wears it, equipment on all previous models must be fully maintained and supported. “Hear now and always” is the motto of Cochlear, which is taken very seriously throughout the entire organization.

Development and design teams work side-by-side to choose materials and make joint decisions in order to create slim, sleek and light products.

You Can Hear Birds Sing

It was Professor Per-Ingvar Branemark at Sahlgrenska University Hospital who first discovered the possibilities with hearing implants, while he was employed there to develop the well-known technique for dental implants. To examine how well dental implants had evolved to grow with the bone, his team used sound waves. Eventually the results of these studies are what drove the development of the technology used in Cochlear's Baha®, an implantable bone conduction hearing solution. Today, approximately 55,000 users worldwide benefit from this innovation, which provides a significantly better quality of hearing than most conventional, air conduction methods.

Other hearing aids often amplify all sounds around the wearer, including annoying noises. A bone conduction sound processor distinguishes sounds so that sounds such as bird's chirp and ocean waves can be magnified at the appropriate level. In addition, calls can be made and conversations followed even in a noisy environment such as a large family gathering.

This brings with it increased quality of life and more opportunities to handle everyday situations in a way that is not tiresome for those who are hard of hearing, such as telephone calls and conferences in the workplace.

"It is an unusually exciting and meaningful job for a product development engineer," says Daniel Radberg. "As part of the research and development team, we work closely with scientists. We understand that in the end, product improvements change the lives of users. Occasionally we have the opportunity to have direct contact with users, such

as those participating in our clinical trials, and also with surgeons who operate with the implants. To get such feedback, and then try to translate it into practical development work, is really exciting."

In addition, they leverage other technologies.

"By working with both mobile telephony and dental implants, we understand how technology from very different worlds can work in the context of hearing aids."

It's Like Going To The Dentist

Many patients are lining up for the operation, because getting a Baha® implant is as simple as going to the dentist. All it takes is one hour to place the implant behind the ear with the use of local anesthetic. Since the actual sound processor is connected to the implant, it can be removed with a simple press of a button, to bathe, shower or swim, making it easy and practical. This method for hearing is gaining greater popularity as awareness grows. A bottleneck for Cochlear, as with many other fast-growing technology companies, is the ability to recruit competent staff that can excel at new product development and have the ability to produce quickly.

Becoming More and More Global

Cochlear in Molnlycke, Sweden, was originally a part of Nobel Biocare, but was spun off as its own business in 1999 under the name Entific Medical Systems. Some years later, in 2005, the company was purchased by current owner, Cochlear Limited in Australia who also works with implant technology for the deaf and hard of hearing.

"Our software supplier relationship with Cadcraft AB is great. Now that we have grown into a global

corporation, they have helped us in creating a number of flexible solutions," says Daniel Radberg. Our parent company, Cochlear Limited in Australia also uses Autodesk products, which makes the groups well integrated technically," he notes.

The Importance of Design

In addition to having high-quality technology, sound processors must include details such as being pleasing to the eye and easy to wear. At Cochlear, engineers work closely with industrial designers when new products are developed. Color and shape are important; the device must match hair color and keep with the fashion trends. Development and design teams work side-by-side to choose materials and make joint decisions in order to create slim, sleek and light products. "In this area, we win more time using compatible software. This is something we considered for the future," says Daniel Radberg.

For further information visit www.autodesk.com/inventor



Image courtesy of Stefan Ideberg

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