

The mobile 3D C-arm Ziehm Vision RFD 3D – A well-suited tool for intraoperative imaging in cochlear implantation

More than 5% of the world's population – 360 million people – suffer from hearing loss in the inner ear greater than 40 dB in adults and 30 dB in children¹. Of those 360 million people, 328 million are adults (90%) and 32 million are children (10%). This figure implies that the proportion of people experiencing hearing loss is much higher than those who suffer from other common diseases like depression, migraine or diabetes mellitus².

People with hearing impairment can benefit from hearing aids, cochlear implants and other assistive devices¹. According to a study by the Food and Drug Administration (FDA), around 324 people with severe to profound hearing loss had been provided with a cochlear implant by the end of 2012³.

With the development of a new cochlear X-ray 3D visualization technique based on a mobile C-arm, the Ziehm Vision RFD 3D represents an innovative way to conduct intraoperative imaging during cochlear implantation. This procedure becomes more and more important as far as quality control is concerned. This paper briefly summarizes the results of initial clinical evaluation in terms of

their practicability and image quality for 40 patients, who were consecutively implanted with different implants. The radiation exposure levels were compared in an extra study that used a phantom applying the same common settings for the applications used by a CT and the Ziehm Vision RFD 3D.

General information

As technology progresses and information on the financial aspects become more readily available, the number of potential patients who could wear a cochlear implant rises within all age groups. Radiological imaging plays a vital role in the planning, implementation, control and therefore the success of a cochlear implant. With the Ziehm Vision RFD 3D, Ziehm Imaging offers an alternative to current gold-standard methods in the clinical routine of cochlear implantation.

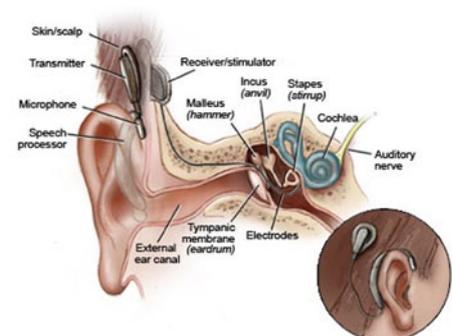


Fig. 1: Visual illustration of inner ear including a CI (Fig. 1)

Patient 2

As with adult patients, the eligibility for cochlear implants in pediatric patients can have various origins.

This 7-year-old male patient suffered from bilateral progressive hearing loss related to antibiotic therapy for newborn sepsis. Cochlear implantation on the contralateral side was performed a couple of years prior.

One of these innovative features, the low dose mode, reduces mA and optimizes kV by using the imaging system to enhance images and lower dose to the patient.

The Figures 5 sagittal view and 6 coronal view for this pediatric patient were acquired using the low dose mode.

Nonetheless, the image quality is more than suitable to show precisely the right position for the cochlear implant (CI512) and therefore helps the clinician control the placement intraoperatively and avoid unnecessary revision surgeries. With that, the Ziehm Vision RFD 3D helps to improve accuracy in the OR and enhances patient outcomes by lowering exposure rates.

Apart from placing the CI and checking the position intraoperatively to avoid unnecessary postoperative CT scans and potentially reduce the need for revision surgeries, the most important goal was to reduce dose to the lowest level possible. The innovative features of SmartDose reduce the dose for children of all ages and stages of development and in other dose-sensitive procedures.



Fig. 5: Patient 2, male, 7-year-old, sagittal view, University Hospital Duisburg-Essen, Germany

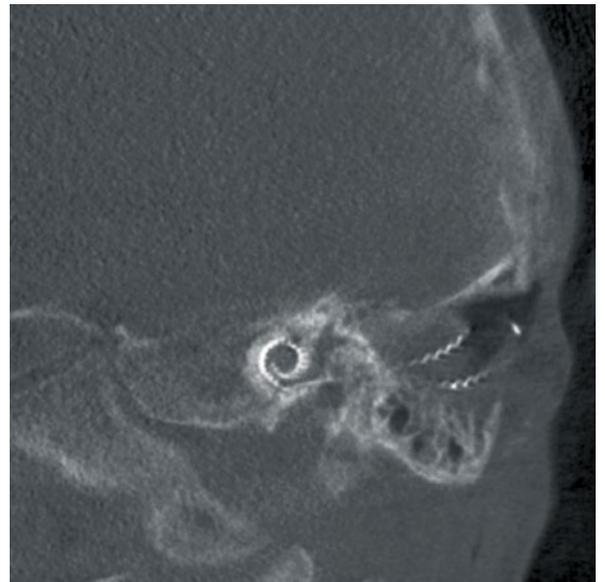


Fig. 6: Patient 2, male, 7-year-old, coronal view, University Hospital Duisburg-Essen, Germany

