

REPORT ON THE 8TH ASIA PACIFIC SYMPOSIUM ON COCHLEAR IMPLANTS AND RELATED SCIENCES, DAEGU, SOUTH KOREA, 25–29 OCTOBER 2011

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The Asia Pacific Symposium on Cochlear Implants and Related Sciences (APSCI) takes place once every two years in the Asia Pacific region. Scientists, engineers, surgeons, doctors, audiologists and speech therapists from all over the world present their work and exchange ideas during this international event. This year the conference was held in Daegu, South Korea, from October 25th to 29th and was hosted by the department of Otorhinolaryngology, School of Medicine, in Kyungpook National University, which is the second oldest university and one of the leading research universities in Korea. Over 1000 participants from 32 countries came to hear 430 presentations.

The theme of the meeting was: globalization beyond the walls of language, culture, and deafness. In his welcome address Professor Sang-Heun Lee, President of APSCI 2011 said, “as colleagues we have the chance to communicate beyond our own languages, experience a new culture, and hopefully find some new directions and solutions to the challenges of our medical profession.”

Some of the topics discussed included the importance of hearing preservation during cochlear implant (CI) surgery, bilateral and bimodal hearing, tonal languages and cochlear implants, brain plasticity, rehabilitation, single-side deafness and tinnitus, music perception, and future technology.

The guest of honor lecture, given by Professor Iwao Honjo from Kyoto University, focused on cochlear implants and

the brain. He pointed out that PET imaging in postlingually deafened CI users demonstrate that cortical activation does not decline with deafness duration, meaning that neuronal networks for speech perception continue to function for a long time. PET results in prelingually deafened children confirm the cross-modal plasticity of the human brain.

Jay Rubinstein from the University of Washington presented the first human studies of a Nucleus vestibular implant, which was preceded by 6 years of work in non-human primates. A middle-aged man with Meniere’s disease underwent successful vestibular implantation of all three semicircular canals, with good responses from all electrodes. Hearing, caloric responses, and rotational responses were lost. Using the device, the patient successfully suppressed one mild Meniere’s attack. Experience with Meniere’s patients will pave the way for the future treatment of other unilateral or bilateral vestibular disorders.

Preservation of residual hearing during CI surgery continues to be an important topic at international audiological meetings. Factors that can reduce the loss of residual hearing during implantation seem to be: use of less invasive electrodes, insertion of the electrode using atraumatic surgery, antioxidants to block cell-death pathways, and post-operative steroids. More surgeons now acknowledge that round window insertion leads to less trauma compared to cochleostomy and use the former as the method of choice for hearing preservation. Soft surgery using a round window approach was first proposed by Skarzynski in 2002 in order to preserve inner ear structures in patients with partial deafness, and at the time the method had many opponents. Electrode insertion trauma (EIT) can also be reduced by the use of “generally regarded as safe” (GRAS) antioxidants. Josef Miller, from the Karolinska Institute, listed β -carotene, vitamin C, vitamin E and magnesium as particularly useful and, given their safety, can do no harm.

Cochlear implantation is currently under consideration as a possible treatment for single-sided deafness (SSD), which is currently treated with the CROS hearing aid, the bone-anchored hearing aid (BAHA) and, more recently, the Sophono and SoundBite hearing devices. However, the current devices do not provide the benefits of binaural hearing since the sound is





directed from the poorer ear to the better ear. Cochlear implantation therefore seems to be a promising option for this group of patients. In her presentation, Susan Waltzman, from New York University School of Medicine, reported on better speech understanding and improved localization in patients with SSD using CI in the deaf ear.

During satellite symposia CI companies introduced new products. NEPTUNE is the latest sound processor from Advanced Bionics, claimed to be the world's first 'swimmable' processor which can work up to 3 meters underwater. Med-El has extended its family of FLEX electrodes by launching one 28 mm long that is suitable for 96% of all normal cochlear ducts. The FLEX electrode is now available in three different lengths (FLEX^{soft}, FLEX²⁸, and FLEX²⁴) for optimal insertion depth. A short FLEX²⁰ is still under development.

Practitioners from clinics in Japan, the Philippines, Hong Kong, Poland, South Korea, and India reported on the results of auditory brainstem implantation. The Polish patient was implanted with two Med-El brainstem devices, and is, at the present time, the only bilaterally implanted patient in the world. His open-set speech understanding, in response to electric stimulation of the ABIs, significantly exceeds that of other ABI patients.

A group from Kyoto University presented a glimpse of future technology – a novel therapeutic method that they developed which can restore hearing. They presented

a prototype of an implantable artificial auditory epithelium (AAE or HIBIKI). AAE is a piezoelectric membrane that converts mechanical vibration of the basilar membrane into electrical impulses which stimulate the auditory ganglion cells. AAE works without a battery, and so it is a totally implantable system that needs no external parts. However, there are some challenges. The electrical output generated by the device is presently too low to effectively stimulate auditory neurons. Thus, research continues into more powerful piezoelectric materials and into alternative ways of mimicking the outer hair cells.

Poland was represented in Daegu by a group from the Institute of Physiology and Pathology of Hearing. We reported on a new classification, hearing preservation and long term results in Partial Deafness

Treatment, application of BAHA in acquired and congenital ear malformations and results after sequential bilateral auditory brainstem implantation. Professor Skarzynski was invited to give a lecture during a ceremonial dinner organized by the President of APSCI, Professor Sang-Heun Lee.

Others widely discussed topics were rehabilitation, education, auditory neuropathy spectrum disorder, auditory implants, tonal languages and cochlear implants, CI in elderly patients, reimplantation, and fitting. They gave an overall impression of the current state of the art in CI. Since the beginning of cochlear implant technology, the benefits provided by the device have significantly improved. Congenitally deaf babies implanted at an early age now develop language at the same rate as normally-hearing infants. Simultaneous bilateral implantation in children younger than one year is safe, and electric stimulation provides a huge benefit for patients with partial deafness who, until recently, were beyond the scope of treatment.

The social highlight of this year's APSCI was an open-air evening banquet in the grounds of the Royal Palace at Geongju. It included musical and dance performances by children with cochlear implants.

Staying in Daegu – a city with many historic buildings registered as World Heritage sites by UNESCO – we enjoyed a taste of Korean hospitality and culture. We relished the flavors of Korean cuisine as we ate such delicacies as kimchi, tteokppokki, and eomuk.