

REPORT OF THE 33RD WORLD CONGRESS OF AUDIOLOGY, 18–21 SEPTEMBER 2016, VANCOUVER, CANADA

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The 33rd World Congress of Audiology (WCA 2016) was an assembly of researchers and medical doctors from 42 countries which took place from 18 to 21 September 2016 in Vancouver, Canada. The Institute of Physiology and Pathology of Hearing was represented by Prof. Henryk Skarzynski, Prof. Krzysztof Kochanek, Ass. Prof. Piotr H. Skarzynski, Ass. Prof. Wiesław W. Jędrzejczak, and MD Kamila Osinska. Over the 4 days of the Congress, 72 studies were presented in 12 oral sessions and 164 posters in 4 poster sessions. The main topics were electrophysiological studies on hearing and their use in diagnosis, imaging studies, the genetic basis of hearing, innovations in hearing aids, teleaudiology, and cochlear implants and their use in various groups of patients.

Lack of hearing in the older population was a featured topic. Hearing loss in this group of people is enlarging world-wide, and ideally an elderly person should be under the care of an audiologist. In Canada in 2015 the number of people over 65 years was larger than those aged 0–14 years. Many solutions for older patients were presented, including remote consultations to fit hearing aids. During the cochlear implant session it was reported that in recent years there has been a significant increase in the number of patients over 60 years who have received implants.

Numerous technical innovations for hearing aids and audiological diagnostic devices were presented. Emphasis was placed on hearing support systems. The new trend for hearing aids is to make them self-adjusting, so that settings are made without the need to see a hearing professional. The settings are applied by use of a mobile phone or tablet. In addition, a new generation of hearing aids has appeared. They include a laser, a detector of light, and a microactuator, which stimulates the eardrum directly. This type of hearing device avoids acoustic feedback and provides equal amplification of audio signals from 0.5 to 5 kHz.

A contact hearing aid was also shown during the conference. It is a device consisting of an electronic part which generates vibrations and surrounded by a silicone shell, prepared individually for each patient. The device takes the form of flake, which touches the eardrum ring and hammer, causing them to vibrate. It has lower hearing thresholds for low frequencies compared to conventional hearing aids. What is more, users report a significant change in hearing their own voice while using the contact hearing aid. Daily use and its hygiene were widely discussed after the presentation.

New directions in hearing aid development were presented. Of interest to researchers were improvements in sound reception directivity. Since vision is the best marker of attention, one novel approach to directional hearing is to couple the electrooculogram to a hearing aid.

During the genetic session new trends in diagnosing genetic hearing loss and caring for patients were presented. The first presentation underlined how the possibilities for genetic diagnosis have widened over the last few years. Nowadays the analysis of the whole human genome costs about \$1000, whereas in 2003 it amounted to \$3 million, and in 1993 up to \$300 million. An innovative model of genetic hearing screening of newborns in Ontario, Canada, was presented. Collection of blood for genetic testing is combined with routine diagnosis for metabolic disease. The aim of the program is to diagnose diseases that can be treated or compensated, so that, with early intervention, irreversible consequences can be avoided. During this session, attention was also given to congenital cytomegalovirus infections. Numerically, 85% of all CMV infections are asymptomatic, while 2–23% carry the risk of sensorineural hearing loss. Moreover, the hearing loss can be revealed with time: it is estimated that 5% of asymptomatic infections reveal as a hearing loss before 5 months of age, and 15% of all asymptomatic cases before 72 months. The session finished with a presentation about the role of MTRNR1 mutations which cause hearing loss in a few days or weeks after the use of aminoglycosides.

During the cochlear implant session, unilateral deafness was widely discussed. Improvement in speech understanding in noise after this implantation is well known, but on the other hand, the hearing asymmetry – electric hearing in one ear and natural in the other – results in impaired perception of sounds in the correct hearing ear. Different results in speech understanding after cochlear implantation in single-sided deafness were reported. Auditory training after a CI requires more time and must be more intense than in cases of bilateral hearing loss, although patients do report significant benefits from the implant. However, the improvement in speech understanding after cochlear implantation in the case of unilateral hearing loss is lower than in the case of unilateral implantation for bilateral hearing loss. A discussion on why speech understanding in the good hearing ear is disturbed in cases of implantation of single-sided deafness ended the session. It was pointed out that the morphology of cortical potentials in

the temporal lobe of the healthy ear is changed after implantation, which may explain the disturbances in understanding speech in the normal ear.

The next session concerned studies on the middle ear. Ass. Prof. Piotr H. Skarzynski presented preliminary results of the use of the SP coupler in the case of the Vibrant Soundbridge middle ear implant. The presentation attracted a range of physicians and surgeons interested in implantable hearing devices. The results prompted wide discussion. The reasons why SP coupling gives the greatest amplification at medium frequencies, different from past experience with an FMT on the long branch of the incus, were discussed.

The last group of lectures related to the problem of hearing loss on a global scale. The delegate representing the World Health Organization gave an introductory lecture. She emphasized the importance of preventing hearing loss, the need for its early detection, and adequate therapeutic intervention. WHO estimates that 60 million people worldwide have disabling hearing loss. Some 330 million

people suffer from chronic otitis media and more than a billion are at risk for hearing loss due to reasons such as noise, ototoxic drugs, or infection. It is believed that 80% of hearing problems exist in populations with low income. WHO has set a task for the future of increasing awareness about the risk of hearing loss and to increase the availability and amount of medical resources. In addition, WHO aims to establish programs integrated with existing solutions in individual countries. The importance of cooperation between WHO, state organizations, scientific societies, manufacturers of hearing aids, universities, and researchers to develop joint programs and solutions were underlined.

The 33rd World Congress of Audiology was an opportunity to learn the latest trends in audiological research and solutions for hearing loss. Lectures, notably those concerning the geriatric population, indicate future directions of audiological research. Participants were invited to the 34th World Congress of Audiology to be held in Cape Town, South Africa, in 2018 and to the 35th in Warsaw in 2020, the latter to be organized by the Institute of Physiology and Pathology of Hearing.