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Cochlear Implant and hearing aid using electro-acoustic stimulation (EAS)

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Multichannel cochlear implants have been highly successful in restoring speech understanding to individuals with severe-to-profound hearing loss. Patients with high-frequency-loss but at the same time residual low-frequency hearing and relatively good speech perception abilities were no candidates for cochlear implantation in the past. Although trials with these patients had been done to restore the high-frequency hearing loss with short electrode arrays, the outcome had been very poor. The new Hybrid L electrode array of Cochlear promises the preservation of residual hearing after implantation and better speech understanding due to its length. Its outcome is now to be evaluated. Therefore 21 patients are implanted through the round window with a 22 electrode array of 15mm length. They are fitted with a Freedom speech processor for high frequencies and an ITE Phonak Valeo hearing aid for low frequencies. Until now 9 subjects are at least at 3 month post implantation. They show improved speech understanding in Monosyllabic words of 20% postop when using electro-acoustic stimulation in comparison to conventional hearing aids preop. In an adaptive speech test in noise they gain an improvement of 8dB in comparison to the preop results. Currently CI and ITE are separate systems. Therefore special attentiveness is necessary during the fitting procedure. As the Freedom speech processor is fitted with Custom Sound and the ITE with a special hearing aid software it is necessary to match both systems, e.g. concerning the frequency allocation table, the loudness balancing etc. Special techniques are used therefore. The first results showed an advantage of the electro-acoustic stimulation. The combined stimulation also gains good acceptance by the patients. To make the fitting of both systems more comfortable in the future a special fitting software as well as a combined speech processor for both electro and acoustic stimulation needs to be developed.

