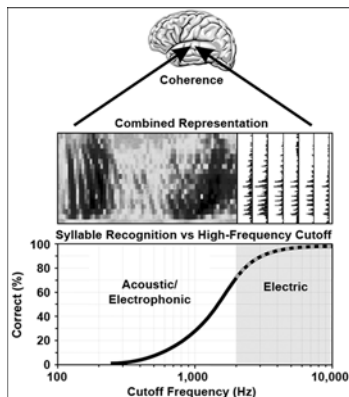


Personal reflections on the multichannel cochlear implant and a view of the future

Graeme M. Clark, Laureate Prof Emer, AC, FAA, FRS, MS, PhD, FRCS, FRACS



Profoundly deaf people can have trouble mixing socially, and children born deaf rarely develop spoken language compared with persons who hear. Both groups can benefit from the cochlear implant. It has a microphone that passes signals to a small processor worn behind the ear. Coded information is

then transmitted through the skin to the implanted unit behind the ear. This transmission stimulates the hearing nerve in the inner ear, and the responses pass to the brain where they are understood as speech. Most profoundly deaf people can benefit from and should seek professional help. Cochlear implants can also benefit people personally and emotionally and brings them greater job opportunities.

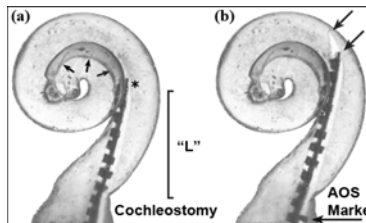
Cochlear implants: Current designs and future possibilities

Blake S. Wilson, Michael F. Dorman

The cochlear implant is the most successful of all neural prostheses developed to date. It is the most effective prosthesis of restoration of function, and the number of people who have received a cochlear implant outnumber the recipients of other types of neural prostheses by orders of magnitude. We provide an overview of cochlear implants from the perspective of two designers of implant systems. The design and performance of present-day systems are described, as are strengths and limitations of those systems. Possibilities for improvement and future designs are presented in the concluding section.

Considerations for design of future cochlear implant electrode arrays: Electrode array stiffness, size, and depth of insertion

Stephen J. Rebscher, MA, et al.

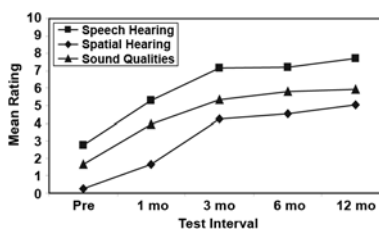


A cochlear implant is an implanted device that directly stimulates the hearing nerve in individuals with severe or profound hearing loss. It has become an impor-

tant tool in clinical management of these disorders. As a group, veterans are likely to experience an increased rate of hearing loss. We evaluated the physical characteristics of cochlear implant electrode arrays and related these characteristics to the incidence of damage in the inner ear after implantation. This information will support the future development of improved electrode arrays and will inform people considering cochlear implant surgery.

Restoring hearing symmetry with two cochlear implants or one cochlear implant and a contralateral hearing aid

Jill B. Firszt, PhD, et al.

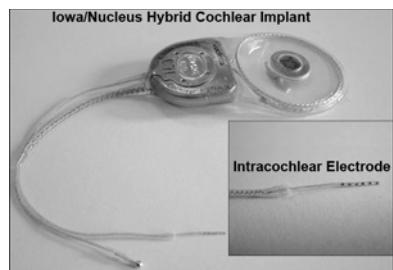


Listening with both ears versus one ear alone offers numerous advantages. Binaural effects include being able to hear better when speech and noise occur in the

same room, to hear soft speech, and to locate either the person talking or the sound in the environment. Research findings in recipients of two cochlear implants or recipients of a cochlear implant in one ear and a hearing aid in the other suggest improved binaural listening. Veterans with bilateral severe-to-profound hearing loss may be candidates for these sensory devices. If recommended by a hearing professional, patient evaluation and use of bilateral sensory devices are highly encouraged.

Integration of acoustic and electrical hearing

Christopher Turner, PhD, et al.



Hearing aids cannot satisfactorily improve speech recognition for some individuals with severe high-frequency hearing loss; however, these individuals may retain too much residual hearing to qualify as candidates for a cochlear implant. Studying results from the Iowa/Nucleus Hybrid cochlear implant, which is designed to preserve patients' residual low-frequency hearing while supplementing high-frequency hearing, we found that it improved subjects' speech recognition in competing backgrounds and demonstrated their ability to integrate acoustic and electrical hearing, even under conditions of severe distortion

to normal cochlear place-frequency mapping. This apparent plasticity of the auditory system may lead to some new developments for improved cochlear implants in the future.

Music perception in cochlear implant users and its relationship with psychophysical capabilities

Ward R. Drennan, PhD; Jay T. Rubinstein, MD, PhD

A portion of the veteran population is severely or profoundly hearing impaired as a result of many different causes, such as head trauma, noise-induced hearing loss, ototoxic drugs, or genetics. These people are often treated with a cochlear implant. The quality of life of these veterans could be improved dramatically with improvements to cochlear implant technology that improve music perception. This review discusses research relevant to hearing music with a cochlear implant.