

a stable plateau. The latest phase of development has centered primarily on increasing stimulus resolution, preserving residual auditory ultrastructure and function, and implanting higher order neural pathways. To serve these objectives, electrodes have been designed to more closely approximate the spiral ganglion and be inserted virtually atraumatically. Implantation of the higher order pathways has already been performed with combinations of penetrating needles or electrode paddles at the brainstem. Prototypes even exist for stimulation as high up as the auditory cortex. We are now also witnessing the development of highly focused fiberoptic delivery systems for infrared laser energy as the stimulus source. A panel of surgeons and scientists, all of whom have been involved in both clinical and basic science of auditory implants, will debate the strategies being developed to foster the next leap in performance gains. The seminar will begin with a candid appraisal of the successes of currently marketed achievements including modiolar hugging electrodes, hearing preservation hybrid implants, compressed and split arrays for severely malformed and obstructed cochleae, and bilateral implantation. Minimally invasive surgical techniques will be examined with the questions posed: What truly constitutes a minimally invasive procedure? What technical features need to be retained in order to maintain necessary safeguards and precautions? The variable successes of auditory brainstem implantation will be reviewed with an eye toward future improvement. The panelists will then present their collective experience with emerging technologies aiming to push the envelope of performance higher into the future. The constant gains in microprocessor speeds will offer opportunities for development of novel processing strategies including current steering. The emerging concept of integrated drug delivery systems will require a careful re-exploration of the well-known design problems of hermeticity, durability, and ultrastructural trauma induction. Changes in stimulus energy source (eg, infrared laser) will undoubtedly require radical changes in device designs and coding strategies. It is the hope of the organizers that this miniseminar will benefit both the attendees and the panelists through the process of evaluative debate and exploration of new ideas.

**Educational Objectives:** 1) Understand the current status and future direction of hybrid “hearing preservation” cochlear implantation. 2) Understand the newest device and coding strategies including infrared laser optical based devices. 3) Be familiar with the current systems under development including vestibular prostheses, DACS and ABI.

## Endoscopic Middle Ear Surgery: Tips and Pearls

Joao-Flavio Nogueira, Jr, MD (moderator);  
Muazz Tarabichi, MD; Daniele Marchioni, MD

**Program Description:** Middle ear surgery can generally be performed with the aid of an operating microscope. However, under a potentially minimally invasive trans-canal approach, it is very difficult to operate on several sites using a microscope

alone unless the surrounding bone is removed and retro-auricular approaches are performed. Such sites may include the epitympanum as well as the inferior and posterior parts of the mesotympanum. Although it has been more than 15 years since the introduction of operative endoscopy to middle ear surgery there is still a very limited role for the endoscope in the surgical management of middle ear disease across the globe. There are several possible reasons for that, such as the current idea of a limited and marginal role for endoscopes in middle ear surgery, a potentially long learning curve through the hassles and tribulations of adapting newer techniques and newer instrumentation, and some resistance, especially with otologists who are very comfortable with the use of microscopes. The operating microscope provides a very good quality magnified image in a straight line, however, the surgeon’s field of view is limited to the narrowest segment of the ear canal when using a transcanal approach. On the other hand, endoscopes also provide a magnified vision that enables the ability to change rapidly from a close-up to a wide angle view, just by going closer or by withdrawing the instrument. Further, it provides an all-round vision to the surgeon who can rotate angled endoscopes to visualize the deep and hidden structures. In this miniseminar, we are going to discuss, with the help of very nice quality surgical movies, endoscopic anatomic dissection images and videos, virtual reality objects and also augmented reality capability the current techniques for endoscopic middle ear dissection, and surgical management of several middle ear diseases, such as tympanic membrane perforations, cholesteatomas, ossicular chain reconstruction and also stapedotomies, all performed with endoscopes discussing and commenting the equipment needed, surgical indications, also showing the potential advantages and disadvantages of the procedures, postoperative care and results and some interesting tips and pearls regarding this new way to surgically manage middle ear diseases.

**Educational Objectives:** 1) Learn and review the endoscopic anatomy of the middle ear, discussing anatomic landmarks. 2) Identify the actual indications and limitations of this minimally invasive approach. 3) Describe and demonstrate step-wise endoscopic middle ear approaches for several diseases of this area.

## Managing Cochlear Implant Complications

Natasha Pollak, MD, MS (moderator); J. Thomas Roland, Jr, MD; Peter S. Roland, MD; Ted A. Meyer, MD, PhD; Douglas A. Chen, MD

**Program Description:** This miniseminar is designed for otolaryngologists who include cochlear implants in the scope of their practice and would like to learn more about managing various intraoperative and postoperative complications, and special considerations as they inevitably arise. Particularly useful for otologic surgeons who have small to moderate cochlear implant case volumes, this seminar will address common as well as less common complications and provide a framework for systematically and effectively managing them.