Single needle perforation of the round window membrane to facilitate cochlear implantation

Technology #cu15002

Currently, cochlear implant surgery involves perforation of the round window membrane (RWM), using a tool such as a Rosen needle, hypodermic needle, or Beaver blade, prior to placement of cochlear implant electrode leads. These imprecise and too-large tools can result in the creation of imperfect perforations in the RWM, and also increase the potential for surgical complications, including perilymph leakage, inflammation and infection. This technology allows surgeons to precisely control the size and shape of the hole created in the RWM, while minimizing pressure changes within the cochlea during insertion, reducing the risk of trauma and associated hearing loss.

Safe, effective, and precise perforation of the round window membrane during cochlear implantation with a single-needle tool

This technology facilitates cochlear implantation by creating a precise, circular perforation in the RWM to aid in electrode entry and placement. With its thin, hollow, serrated tip, this device minimizes pressure changes within the cochlea during insertion, limiting the potential for intracochlear trauma and hearing loss. Further, by precisely controlling the size and shape of the RWM perforation, this technology creates a better fit between the implanted electrodes and surrounding membrane. This minimizes the risk of membrane tearing and lead slipping, and reduces leakage of the cochlear perilymph into the middle ear, limiting the possibility of infection.

This technology has been tested and shown effective for perforating the RWM of guinea pigs, as well as other membranes, including bovine corneas and artificial membranes.

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Applications:

- Perforation of the round window membrane during cochlear implant surgery
- Could be used to make precise incisions in other tissues and membranes, including during ophthalmic and specialty surgical procedures

Advantages:

- Improves accuracy of perforation size and shape
- Minimizes trauma to patient’s inner ear
- Results in a better fit between implanted electrodes and surrounding membrane
- Limits potential for pressure damage and hearing loss
- Decreases risk for inflammation and infection
- Minimizes risk for surgical complications during cochlear implantation
- Minimizes leakage of cochlear perilymph

Patent Information:

Patent Pending
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Related Publications:

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