Round Window Stimulation with an Implantable Hearing Aid (Soundbridge®) Combined with Autogenous Reconstruction of the Auricle -- A New Approach

Abstract:

Background: Congenital malformations of the auricle are often combined with atresia of the outer ear canal and malformations of the ossicles, representing aesthetic as well as functional deficits. Optimal treatment should therefore address both aspects equally. This report describes a new approach, combining the reconstruction of the auricle with implantation of an active middle ear hearing aid, stimulating the round window membrane. Method: A 33-year-old male patient, with bilateral ear microtia, fibrous atresia of the external ear canals and malformation of the ossicles due to Treacher Collins-Franceschetti syndrome was included in the study. In stage one, the cartilage framework of the new auricle, made of autogenous rib cartilage, was fabricated and implanted. During stage two, the auricle was elevated, a retro-auricular sulcus was formed and a Vibrant MED-EL Soundbridge® device was implanted. The transducer was coupled to the round window membrane. Results: Both functional and aesthetical results were favourable. Aided thresholds were between 15 and 30 dB in the frequency range of 0.75–6 kHz, monosyllabic word understanding at 65 dB SPL increased from 0 to 80%. Discussion: Combining aesthetic and functional rehabilitation, autogenous reconstruction of a new auricle together with the implantation of an active middle ear hearing aid, coupled to the round window membrane, is a promising new approach.