



US DEPARTMENT OF DEFENSE

BLAST INJURY RESEARCH PROGRAM COORDINATING OFFICE

Facial, Hearing, and Visual Injuries

Mechanisms and Mitigation of Hearing Loss from Blast Injury

Collaborating with groups from NMCSD, Applied Research Associates, and the University of Virginia in an investigation of blast-induced hearing loss from TBI, Cochlear Boulder LLC has successfully developed a procedure to test whole cadaver heads using ARA's mobile shock tube, which is uniquely useful to this line of research and allows blast simulation to be safely performed near a medical research facility. Several forms of hearing protection were assessed, important to military protections, and they have shown that mitigation of ossicular displacements and intracochlear pressures secondary to blast and intense harmonic noise may be possible through stiffening/damping the ossicular chain, and that this may be achieved without adversely affecting auditory perception within the spectrum critical to speech perception. This research award has been completed and future studies are planned using actuators derived from Cochlear Boulder's MET to actively prevent injurious ossicular displacements. The actuator can be used in a fully implantable hearing system to remediate existing hearing loss, and at the same time, can be used to attenuate or block extreme ossicular displacements from blast exposure.