

Cochlear Implants

Author: Jennifer Braswell Christy, PT, PhD

FACT SHEET



Vestibular Rehabilitation
Special Interest Group



1111 North Fairfax Street
Alexandria, VA 22314-1488
Phone: 800-999-2782,
Ext 3237
Fax: 703-706-8578
Email: neuropt@apta.org
www.neuropt.org

Cochlear Implants and Vestibular Disorders

What is the link between the cochlea and vestibular system?

The vestibular system is a tiny organ located in each inner ear that detects head movement, contributes to a person's balance and also allows steady vision during head movements. The cochlea is linked to the vestibular system and many children who are born with severe hearing loss also have vestibular problems. A cochlear implant is an electronic device surgically placed into the cochlea to enable sound transmission to benefit individuals with hearing loss. Children as young as 12 months of age can receive cochlear implants. Research shows that vestibular dysfunction, poor balance and instability of vision may occur in children who receive cochlear implant surgery.

How can I recognize a vestibular problem in my child?

Children with vestibular problems tend to have poor balance and fall often. Babies might be delayed in learning to sit, stand and walk. Older children may experience delays in gaining higher level motor skills (e.g. hopping, skipping, and walking on a balance beam). Although children rarely complain, they might also have trouble focusing their eyes during head movement (e.g. reading a sign when walking or running). If the cochlear implant surgery affected the vestibular system, the eyes might beat quickly away from the side of the surgery (nystagmus) and your child might complain of a spinning sensation (vertigo). The nystagmus and vertigo should go away after a few days but the balance problems and poor vision could remain².

How can a physical therapist help my child with a vestibular problem?

A physical therapist can assess your child's balance and motor skills with tests to determine if he/she is functioning at an age appropriate level. The therapist can also do special tests to screen for vestibular problems³. If these tests are abnormal, your child will be referred to the otolaryngologist for further testing. If problems with balance or motor skills exist, the physical therapist can prescribe exercises. There are also special exercises to help your child learn to see clearly during head movements. The therapist will show you and your child the exercises in the clinic, and then give you exercises to incorporate into your child's daily routine. Research shows that these exercises, if done aggressively for at least 12 weeks, can improve motor skills, balance and gaze stability^{4,5}.

Cochlear
Implants

FACT SHEET



Vestibular Rehabilitation
Special Interest Group



1111 North Fairfax Street
Alexandria, VA 22314-1488
Phone: 800-999-2782,
Ext 3237
Fax: 703-706-8578
Email: neuropt@apta.org
www.neuropt.org

Cochlear Implants

Cochlear implants are also beneficial for adults with profound hearing loss caused by damage to the hair cells in the cochlea. Adults with sensorineural deficits are not candidates and are prescribed hearing aids. A patient who has undergone a labyrinthectomy for Meniere's Disease or an acoustic neuroma can benefit from a cochlear implant. Also, adults hearing loss from degenerative vestibular loss may be able to benefit from a cochlear implants. 1-4 weeks after the implant is surgically inserted, the patient returns to the clinic to have it activated and the external sound processor is connected by a magnet to the internal device. Therapy is done to help the brain adapt to hearing new sounds.

References:

1. Janky KL, Givens D. Vestibular, visual acuity, and balance outcomes in children with cochlear implants: A preliminary report [published online July 15, 2015]. *Ear and Hearing*. 2015. <http://www.ncbi.nlm.nih.gov/pubmed/26182202>. Accessed July 21, 2015.
2. Rine RM, Wiener-Vacher S. Evaluation and treatment of vestibular dysfunction in children. *NeuroRehabilitation*. 2013;32(3):507-18.
3. Christy JB, Payne J, Azuero A, Formby C. Reliability and diagnostic accuracy of clinical tests of vestibular function for children. *Pediatric Phys Ther*. 2014;26: 180-189.
4. Rine RM, Braswell J, Fisher D, Joyce K, Kalar K, and Shaffer M. Improvement of motor development and postural control following intervention in children with sensorineural hearing loss and vestibular impairment. *Int.J.Pediatr.Otorhinolaryngol*. 2004;68:1141-1148.
5. Braswell, J. and Rine, R. M. Preliminary evidence of improved gaze stability following exercise in two children with vestibular hypofunction. *Int.J.Pediatr.Otorhinolaryngol*. 2006;70:1967-1973.

Updated August 2015