Position Paper on Cochlear Implants in Children

Position:

The Canadian Association of Speech-Language Pathologists and Audiologists (CASLPA) supports cochlear implantation in children where appropriate candidacy requirements, management and intervention/rehabilitation have been established.

Rationale:

Cochlear implants are widely recognized as an appropriate intervention for children with bilateral severe to profound sensorineural hearing loss[1]. Pediatric cochlear implantation first received Health Canada approval in 1990. Since that time, many organizations throughout North America, including CASLPA have developed position papers in support of cochlear implants for use with children who have bilateral severe to profound sensorineural hearing loss (ASHA, 1992; CASLPA, 1995; EAA, 2005; NAD, 2000). In a 1995 position paper, CASLPA first documented its support of implantation for children where the following conditions were met: 1) comprehensive pre-implant assessment, 2) thorough parent counseling regarding the risks and benefits of a cochlear implant, and 3) comprehensive rehabilitation program following activation of the implant (CASLPA, 1995). Now, ten years later, the evolution of technology and the compilation of empirical data have clearly demonstrated the efficacy of these devices in allowing children with bilateral severe to profound sensorineural hearing loss to develop oral communication skills (Moog and Geers, 2003). Changes in technology, candidacy criteria and the accumulation of a large body of evidence on the effectiveness of pediatric implantation in the last decade (ASHA, 2004) have prompted CASLPA to review and update the 1995 position paper.

Recommendations:

CASLPA supports cochlear implantation as an appropriate intervention for children with bilateral severe to profound sensorineural hearing loss. Cochlear implantation in children should be considered only after the following has been completed: a comprehensive audiological, speech-language and medical evaluation of the child, a complete exploration of parental expectations, and commitment to implantation and (re)habilitation. Typically children will undergo a trial period with appropriate amplification in conjunction with an aural (re)habilitation program emphasizing the development of auditory/oral skills. In the case of older children and adolescents, exploration of their expectations, motivation, commitment and willingness to participate in (re)habilitation is recommended. To ensure that cochlear implantation provides children who have bilateral severe to profound sensorineural hearing loss with the option of improved access to sound and oral communication, CASLPA recommends the following:

- Cochlear implant centers adopt an interdisciplinary team approach for the assessment of cochlear implant candidates and subsequent management of implant recipients. The cochlear implant team should have a core of medical, audiological and speech and language professionals who are knowledgeable and experienced working with children with hearing loss and hearing technology. The

team should also include professionals with expertise in psychology, social work, and education of the deaf/hard of hearing (Archibold, 2002).

- Candidacy criteria be monitored and re-evaluated as new evidence becomes available and as technology evolves.
- Cochlear implantation be followed by a comprehensive (re)habilitation program emphasizing the development of listening skills within a communication context with a focus on oral communication.
- Ongoing assessment of the child's educational and communication needs should be part of the follow-up.
- Professionals maintain and update their knowledge and clinical skills in order to keep abreast of changes in the technology, literature, and the field in general.
- Hearing professionals should be familiar with the position and concerns of the Deaf culture in order to provide counseling to parents, older children and adolescents on the cultural, educational and psycho-social issues surrounding cochlear implantation.
- Cochlear implant teams evaluate and document outcomes in their clinical populations and identify research priorities in pediatric cochlear implantation.

Background:

A cochlear implant is a medical device designed for use with patients with severe to profound bilateral sensorineural hearing loss. It consists of an external speech processor that captures sound and converts it to a digitized signal. This signal is then transformed into electrical energy that is transmitted to a series of electrodes or contacts surgically implanted in the cochlea. The electrodes stimulate the auditory nerve ultimately allowing the brain to perceive the signal as sound (Wilson, 2000).

Cochlear implant devices require approval from Health Canada. These devices have been shown to be effective in improving auditory only speech understanding although considerable variation in outcomes exists among patients.

Candidacy assessment, surgery and device fitting should be performed by the cochlear implant team. The team should consist of an interdisciplinary staff that may include, but is not limited to the following professionals: audiologists, speech-language pathologists, otolaryngologists, auditory-verbal therapists, psychologists, social workers, and educators of the deaf and hard of hearing. The cochlear implant team should work closely with and, wherever possible, involve the professionals in the child's community who will be providing ongoing support and (re)habilitation i.e. educators of the deaf, teachers and teacher assistants.

Individual outcomes following implantation vary significantly from child to child. Factors which may affect outcomes include: duration of hearing loss, amount of residual hearing, age of identification and intervention, age at implantation, status of the cochlea/cochlear nerve, other medical conditions and degree of involvement in a (re)habilitation program post-implantation.

Criteria for candidacy continue to change as technology and surgical procedures advance allowing a greater range of individuals with hearing loss to benefit from cochlear implant

technology. The age of implantation has decreased in the past decade and children with more residual hearing are being considered cochlear implant candidates. Children with complex developmental conditions may also benefit from cochlear implants.

Research in the area of bilateral cochlear implantation continues to show promise particularly for listening in noise and for directionality (Kuhn-Inacker, Shehata-Dieler and Helms, 2004; Litovsky et. al., 2006). Electroacoustic stimulation is becoming more of a possibility as less invasive surgical techniques are explored and improved electrode arrays are designed to preserve residual low frequency hearing. Future developments in cochlear implants can be expected to include investigations of fully implantable devices. Presently, all cochlear implants have been shown to be effective in improving auditory-only speech understanding despite variability in patient outcomes.

There is a need for on-going research and exploration of the effectiveness of different (re)habilitation and educational strategies with children with cochlear implants. Long term follow-up is essential to evaluate the impact of cochlear implants on the lives of children with significant hearing loss and their families.

Suggested Reading:

National Initiative for Telehealth (NIFTE): National Initiative for Telehealth (NIFTE) Framework of Guidelines. September 2003, Ottawa; NIFTE www.nifte.ca

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A position paper represents the direction CASLPA has taken on a particular topic or provides guidelines for particular areas of practice. These positions are time-bound, representing the thinking at a particular point in time.

Footnotes:

[1] Audiological criteria may change over time. There may be specific exceptions to this criterion to be determined by the individual cochlear implant program. Examples might include children with auditory dys-synchrony/neuropathy, permanent mixed hearing loss, poor discrimination, and meningitis.