



# Hearing Impairment



## *What is Hearing Impairment?*

Hearing impairment (HI) implies that a person's hearing threshold is above the normal range of -10 to 15 decibels (dB), and is considered to be "significant" when the degree of hearing loss is moderate grade (41-55 dB) or worse in the better ear.

The extent of hearing loss differs according to the severity and nature of the impairment. One or both ears may be involved. High or low frequency sounds may be selectively affected. The underlying problem may lie with the outer or middle ear, the cochlea and /or hearing nerve, which will determine the choice of treatment.



## *How does Hearing Impairment affect a child?*

### *Hearing*

The extent of hearing loss differs according to the severity and nature of the impairment. This can range from inability to perceive loud noises such as those from air traffic and road construction to hearing during normal conversations.

### *Language*

The child's oral communication and language development are affected. Vocalizing and babbling may stop after the first few months. Development in vocabulary, grammar and social use of language falls progressively behind those of normal-hearing peers. Patterns of speech and pronunciation errors are noted in these children.

### *Intellectual development*

It has been shown that hearing impairment itself does not hinder intellectual growth if the individual's mental abilities are otherwise normal. However, HI may result in restricted opportunities for learning and social interactions, which may prevent the child from developing to his/her fullest potential.

### *Social and behavioural development*

The decrease in verbal interaction may affect the development of bonding or relationship between the infant and his/her caregiver and peers. Behavioural problems may also occur as secondary effects when the child grows, as a result of ineffective communication with peers and poor self-image.

### *Co-existing conditions*

Some children with HI may also have mental retardation, cerebral palsy or visual impairment. It may be part of congenital syndromes in which hearing is affected.



### ***Does my child really have Hearing Impairment?***

Some developmental conditions commonly seen in children may be confused with HI. These include autistic spectrum disorder, severe language delay, mental retardation and severe behavioural disorders.



### ***What causes Hearing Impairment?***

Genetic causes account for roughly 50-60% of children. These include gene mutations, chromosomal abnormalities (e.g. Down Syndrome) and genetic syndromes (e.g. Waardenburg Syndrome).

Other causes of HI may have non-genetic origin. Sensorineural hearing loss may be caused by multiple factors including: intrauterine infections or certain drugs taken by the pregnant mother, adverse events during delivery, brain and ear infections, and trauma or tumours affecting related structures during infancy and childhood. Conductive hearing loss may result from infection or obstruction of the ear canal and middle ear such as impacted ear wax and secretory otitis media resulting in “glue ear”.

Central auditory processing disorder (CAPD) is a condition where the interpretation of auditory information by the brain is delayed. Individuals with CAPD often have difficulty processing subtle features related to verbal sounds, such as pitch, sequence and identification especially in a noisy background.



### ***How common is Hearing Impairment?***

Globally the prevalence of infants born with HI varies from 1-2 per 1,000, and that due to damage within the cochlear or hearing nerve in newborns is 1.4 per 1,000.

In Hong Kong, 649 children under the age of 15 years were registered in 2004 with significant HI in the Central Registry for Rehabilitation (0.6 per 1,000), and 362 students with HI were registered in special schools in the same year.

Of the 201 children diagnosed at the Department of Health's (DH) Child Assessment Service (CAS) with significant HI in 2003-04, 30% also had borderline developmental delay or mental retardation, 10% had motor delay, 6 % had cerebral palsy and 3 % had significant visual impairment.



## *What is the mainstay of treatment for children with Hearing Impairment?*

### *Medical treatment*

Treatment of the underlying cause is possible in some conditions (e.g. earwax removal, antibiotics for otitis media, grommet insertion for middle ear effusion). Genetic counselling for genetic and syndromal conditions is needed.

### *Hearing aids (HA) and Assistive Listening Devices (ALD)*

HAs on both sides are preferred if possible. However, HAs may not be useful if the cause is a defect in the auditory nerve. ALDs such as FM amplification units are sometimes used in addition to HAs to enable better detection of sounds and understanding of speech.

### *Auditory and speech training*

Residual hearing should be maximized through high quality amplification, favourable acoustic environment and special training programmes (enhancement of auditory awareness). These involve training through daily life situations and delivery of planned teaching programmes with the aim to facilitate the connection in enrolment of sound to meaning, objects and concepts, the understanding of language and quality language interaction.

### *Cochlear implant (CI)*

When the auditory nerve responsible for hearing is considered to be intact in a person with significant HI, CI may be considered. The CI is a device consisting of a receiver-stimulator, which is implanted below the skin, and connected to an external receiver. It is usually considered for individuals with severe to profound hearing loss. It should not be used in individuals with deafness caused by nerve damage, cochlear malformation, central auditory pathway damage or active middle ear disease. Post implant rehabilitation involves intensive auditory, speech and language training and specialist guidance.

### *Language and communication training*

Auditory-verbal therapy focuses on listening to enhance the development of speech and language of the child. Involvement of parents from the very beginning of aural rehabilitation is very important. Parents are advised to use more verbal communication. Other aims of training include improving articulation and voice quality, improving comprehension by using contextual, auditory and visual-speech cues and learning remedial strategies to deal with communication breakdowns.

### *Psychosocial support for parents and child*

Counselling to parents at the time of diagnosis and teaching of strategies for enhancement of the parent-child attachment/bonding, such as increased use of physical touch, visual stimulation and facial expression, are recommended.



### *Can children with Hearing Impairment grow up normally?*

The development of a child with HI is dependent on the nature and degree of hearing loss, age of onset and diagnosis, age at which amplification is introduced, developmental characteristics of the child, psychosocial factors and educational experience. Early diagnosis and timely treatment are important factors for favourable outcome.



### *Does a child with Hearing Impairment need special education?*

#### *Preschool*

Special preschool programs for children with significant HI are provided by the Hong Kong Host Lions special child care centre, Bradbury special child care centre of the Hong Kong Society for the Deaf, and Suen Mei Speech and Hearing early education and training centre. Integrated programmes in child care centres as well as special child care centres for children with disabilities are also provided with additional resources to help children with HI.

## *School age*

In recent years, there has been a shift in enrolment from special schools to mainstream schools for children with HI. Special schools for HI students include the Lutheran School for the Deaf and Caritas Magdalene School. Mainstream schools provide varying degrees of special education support to students with HI. These include outreach services by special schools for HI or through special funding assigned to these mainstream schools.

Whether sign or verbal language should be the child's first language is still controversial. Various approaches include oralism, sign language, total communication (signing and verbal language used simultaneously) and bilingualism (which involves the introduction of natural sign language together with verbal language). The ability of the child to maximize the use of residual hearing is an important factor when considering which approach to use.



## *What services are available in Hong Kong to help children with Hearing Impairment?*

### *Early Identification*

Since the year 2000, DH's Family Health Service and some Hospital Authority neonatal units have been providing universal newborn screening programmes using the Distortion Product Otoacoustic Emission or Automated Auditory Brainstem Response testing. DH's Student Health Service (SHS) provides screening for Primary 1 to Secondary 7 students who join their voluntary annual health check programmes. Those suspected to have hearing impairment will be referred to SHS's special assessment centres for confirmatory diagnosis.

### *Diagnostic Services*

Audiological services are provided in both DH's CAS and the Audiology Service Section of the Education & Manpower Bureau. In addition, the Hospital Authority's ENT departments also provide diagnostic assessment for children identified under their own services and those referred from other agencies.

### *Treatment and Further Management*

Medical and surgical interventions for the management HI, are offered by the Hospital Authority or the private sector. Since 1995, three centres for cochlear implantation have been established including Queen Mary Hospital, Prince of Wales Hospital and Queen Elizabeth Hospital. Up to 2004, a total of around 500 adult and paediatric patients have undergone CI surgery, and the age for this operation has been lowered to around 18 months for young children.

HAs and ALDs can be obtained through EMB or the private sector. Speech and auditory training is available in hospital speech therapy clinics under the Hospital Authority, non-government organizations, EMB and the private sector.

### *Parent Support and Training*

Parent resource centres, support groups and parent training programmes are organized by a wide variety of institutions including government and non-government organizations, such as The Hong Kong Society for the Deaf, cochlear implant centres, special schools and CAS of DH.



## **References**

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## **Relevant Websites**

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| Hong Kong Society for the Deaf                               | <a href="http://www.deaf.org.hk">http://www.deaf.org.hk</a>   |
| Audiology Awareness Campaign                                 | <a href="http://www.audiologyawareness.com">http://www.audiologyawareness.com</a>   |
| Hear Talk Foundation, Hong Kong                              | <a href="http://www.heartalk.org">http://www.heartalk.org</a>   |
| Special Education Service, Education and Manpower Bureau, HK | <a href="http://www.emb.gov.hk/index.aspx?langno=1&amp;nodeid=238">http://www.emb.gov.hk/index.aspx?langno=1&amp;nodeid=238</a> |
| Hearing Loss Association of America                          | <a href="http://www.hearingloss.org">http://www.hearingloss.org</a>   |
| Australian Hearing   | <a href="http://www.hearing.com.au">http://www.hearing.com.au</a>   |



Child Assessment Service, Department of Health  
Hong Kong Special Administrative Region Government