Rehabilitation Manual: 2

Habilitation for Hearing-Impaired Young Children

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A Word from the Editor

In 1995,the National Rehabilitation Center for the Disabled (NRCD) became a World Health Organization (WHO) Collaborating Center for Disability Prevention and Rehabilitation. As a project for 1996, the Center began working on the publication of a "Rehabilitation Manual," the objective of which is to provide information concerning the rehabilitation of people with various disabilities. In publishing this manual, our intention is to describe and present a systematic framework for the rehabilitation of the disabled in Japan. This manual may be used to arrive at solutions to problems which may exist in various countries and regions, or as reference material for review to assist future development in this field. Those of us at the Center would be delighted if this work generates insights for further discussion and practice.

The three manuals: "Habilitation for Hearing-Impaired Young Children," "Prosthetics and Orthotics in Japan," and "An Introduction to Personal Adjustment for the Visually Disabled" have been written by instructors among the division of education and training of professionals at the NRCD. However, I would like to emphasize that the concepts described in this manual are commonly acknowledged throughout Japan.

The content planned for this publication project extends over all dimensions of rehabilitation, including the service frameworks, administrative policies, laws, specialist technologies, and methods for developing and educating specialists for each respective disability. Accordingly, we expect this to become an ongoing project. If an active exchange of opinions and communication between specialists develops through this process, it will further promote the development of rehabilitation of the disabled. We invite any type of criticism, opinions and/or general inquires from the readers.

March 1997

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Habilitation for Hearing-Impaired Young Children

I. Introduction

The early education of hearing-impaired young children has developed substantially in Japan in the past 20 to 30 years. These children have grown up to express themselves and discuss their own identity as a hard-of-hearing people, their possibilities in life, and the education and habilitation they received in the past. This development underscores the importance and effectiveness of early identification and early education of hearing-impairment. At the same time, it helps us to forecast and influence the future direction of habilitation for hearing-impaired young children.

The main objective of this booklet is to provide information concerning the current status of habilitation for hearing-impaired children, especially pre-school children in Japan. The programs described are practiced in fields of education, medical care, and welfare. Habilitation systems vary from country to country due to differences in culture, public policy, and social environment. Therefore, the needs of the people in a particular country or region are likely to be unique. Because of these differences, Japanese habilitation systems may not necessarily hold true for another country or region. The most realistic approach for a habilitation program is to determine the method, within the restrictions faced, that best matches the regional characteristics. We hope that you will find useful hints and ideas in this booklet that can be applied in your country or region.

Japanese early habilitation has achieved dramatic improvement in the past few decades. Numerous profoundly hearing impaired people (with hearing levels of 100dB or more) are now able to speak fluently, use the telephone, and enjoy listening to music. Some of these individuals use sign language to cross the barrier between hearing-impaired and normal hearing. In spite of the challenges they have faced, these people have developed excellent communicative abilities. They have grown up to become respectable, contributing, and, in some cases, highly recognized members in our society. Their success stories underline the need to change the conventional way of viewing the hearing-impaired. Nevertheless, Japan's social environment still presents the hearing-impaired with many difficulties. Some issues in the educational system, in the work place, and in the information systems that compensate auditory input still need to be addressed. Solutions to these problems are being suggested by the

hearing-impaired themselves, and should involve the combined efforts of parents and professionals as well.

Achievements to date in habilitation took substantial time and effort and can be attributed to the early identification of hearing impairments followed by adequate early habilitation emphasizing maximum use of residual hearing by wearing hearing aids. This resulted in changes of people educating their children at home, where the emphasis is on communication in day-to-day home activities, rather than a total dependence on school education.

The habilitation programs presented in this booklet are mainly based on the auditory-oral approach which supports the idea of involving the parents in the habilitation program. This approach is the most commonly used method for habilitation of hearing-impaired young children in Japan. It should be noted, however, that the auditory-oral approach does not exclude the idea of manual communication systems or the total communication approach. It is important to take into account individual differences in each child and to the most appropriate means available, considering his or her global development.

It is fundamental that habilitation programs for hearing-impaired children be diverse and be individualized. We sincerely hope that our readers will bear this premise in mind.

II. Medical and Psychological Aspects of Hearing-Impaired Children

1. What is Hearing?

Any damage or disease to any portion of auditory mechanism causes problems in hearing. Suffers of such damage are thus called the "hard-of-hearing." The state of hearing handicapping varies depending on the severity of the impairment and the particular site of the lesion.

Hearing sensitivity is usually described by a hearing level using a quantitative unit of sound intensity called decibel(dB). The degree of hearing impairment is classified by the average hearing level usually tested by pure-tone audiometer. Fig.1 shows the WHO classification criteria for the degree of hearing impairment. With regard to the intensity of the human voice, a whisper is approximately 20 dB, normal conversation is

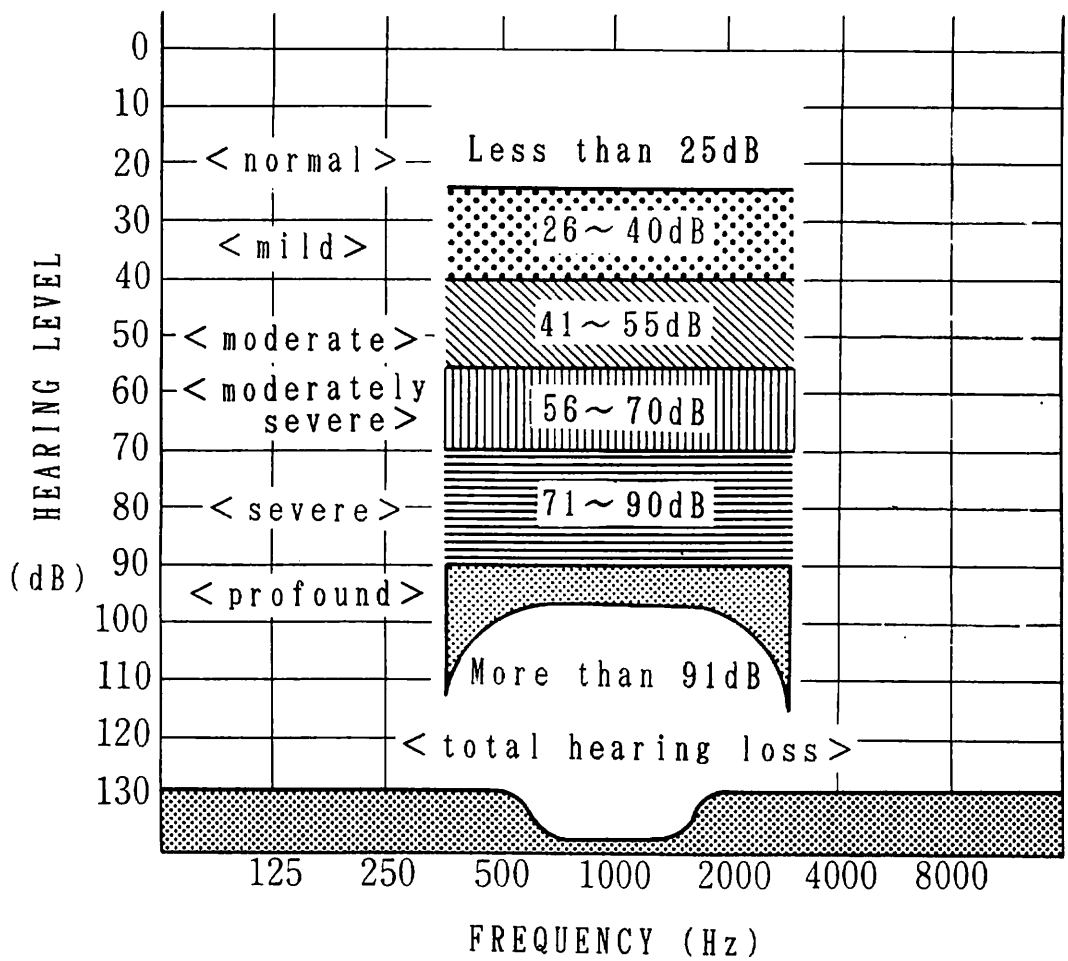


Fig.1 WHO classification criteria for the degree of hearing impairment

approximately 50 dB, and yelling in someone at their ear is approximately 90dB. It is possible to some extent to predict the hearing disability based on such a respective criteria (Fig.2).

Examining the speech range in the Japanese phonetic system (Fig.3), it is clear that the range spans an extremely wide area, as do environmental sounds. The average hearing level, on the other hand, is the arithmetic mean of 500 Hz, 1,000 Hz and 2,000 Hz, and this numerical value alone is insufficient to explain the characteristics of hearing of individuals. At the very least, an audiogram which shoes the hearing level for each frequency in the range 125 Hz to 8,000 Hz, respectively, is required as fundamental data. By drawing an audiogram, the configuration of hearing from low frequency to high frequency (e.g. flat form, abrupt high-tone loss, etc.) becomes clear. Information provided by an audiogram is useful in many respects, especially for adjusting hearing aids.

The ear comprises organs of hearing and organs of equilibrium (Fig.4). The hearing organ is divided into the conductive system and the sensorineural system according to the acoustic pathway. The former

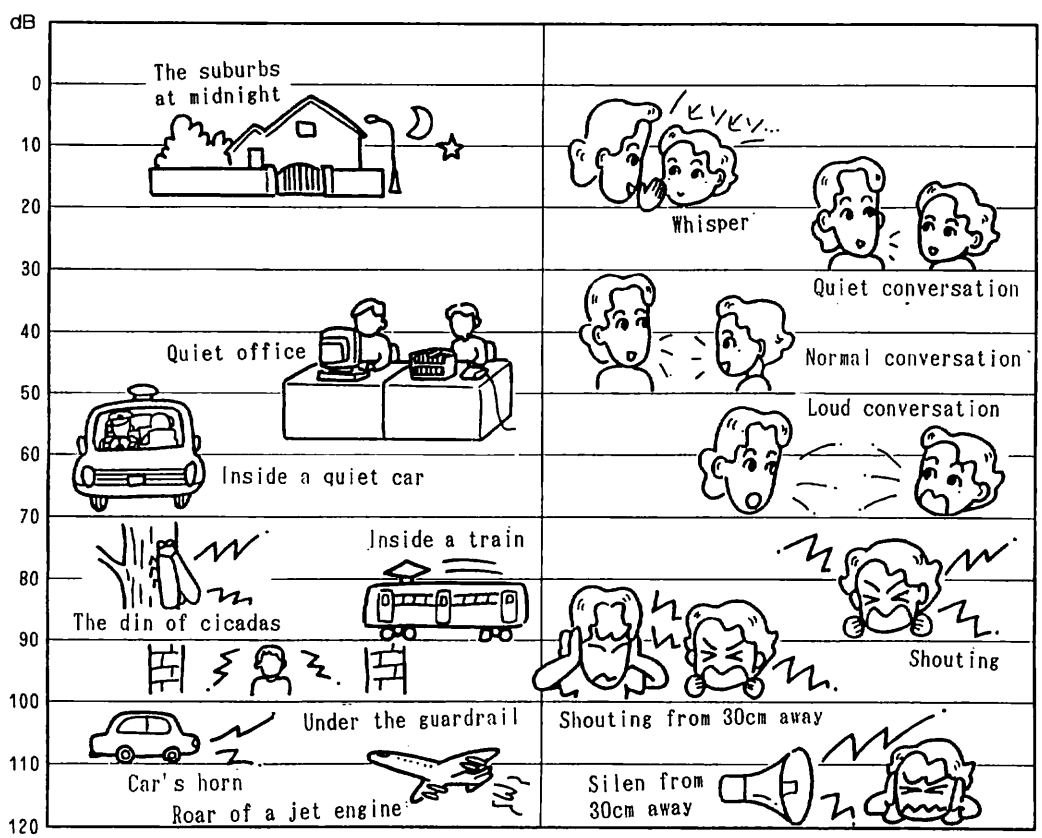


Fig.2 Hearing Indicators Using Voices and Enviromental Sounds (H.Imai and C.Kanayama, 1993)

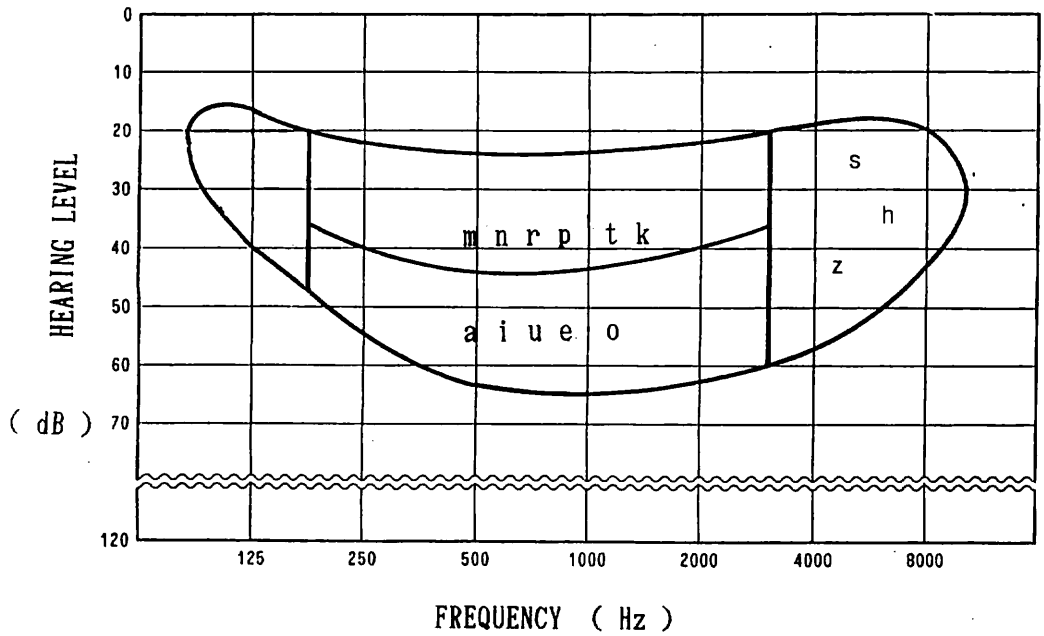


Fig.3 Speech range of Japanese phonemes
(H.Imai and C.Kanayama, 1993)

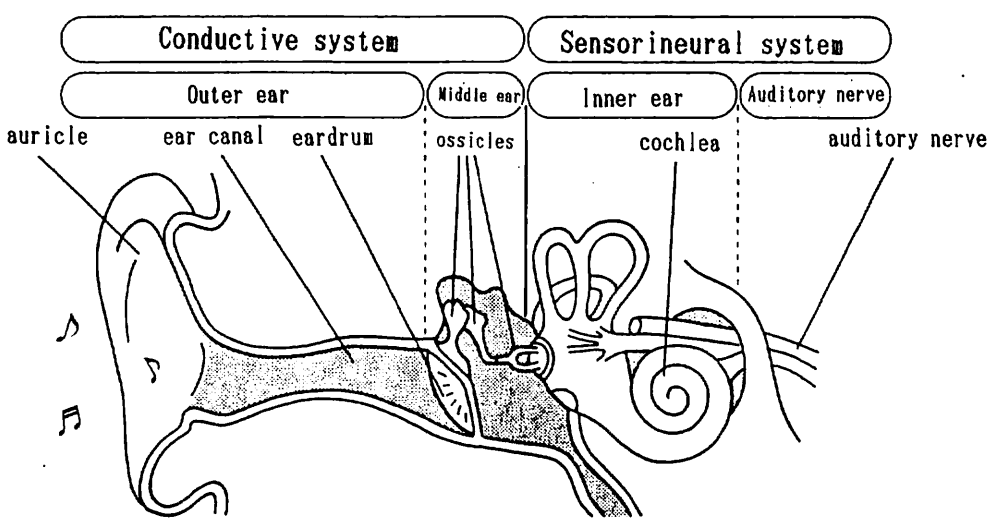


Fig.4 A diagram showing the main components of the ear
(H.Imai and C.Kanayama, 1993)

comprises the external ear to the middle ear, and the latter comprises the inner ear to the auditory cortex in the brain. There are three major types of hearing loss: conductive hearing loss, sensorineural hearing loss, and mixed hearing loss. The sensation of hearing is different depending on the types of hearing loss. The effect on everyday communication is different by each type of loss even though the pure-tone average level appears the same. For example, a person with conductive hearing loss is able to maintain speech intelligibility if the stimuli is made loud enough for a normal hearing person, while a person with sensorineural hearing loss displays difficulty in speech perception. Such a person claims that the sound is heard, but that the words become distorted. In many cases of sensorineural hearing impairment, recruitment effects are observed and a louder sound can be perceived as too noisy.

With respect to the criteria for hearing impairment, there are no common definitions. The boundaries between normal hearing and mild hard-of-hearing, and between profound hard-of-hearing and deafness are not necessarily clear. In Japan, the terminology used for hearing impairment is defined from different aspects as shown below.

(1) determined by the hearing level

(2) determined by the usefulness of the residual hearing

In addition, totally separate from the above, there is a movement of advocating the Deaf Culture by people who use sign language as their first language. They actively identify themselves as deaf with pride and are trying to appeal the existence of their own culture.

2. Psychological Considerations for Hearing-impaired Children

When considering the human life, the importance of vision is often stressed more than hearing. In reality, hearing is a more important sense in the existence of humans than many would imagine. Ramsdel (1970)[1] classifies the functions of hearing as follows.

(1) Primitive level - the most basic level. Feels sounds without paying attention. The person keeps emotional stability by linking with outside world psychologically.

(2) Signal/alarm level - recognition of the outside world. By being aware of sounds, the person is alert to circumstances around him and becomes possible to avoid danger and make an adequate judgment.

(3) Symbolic level - level at which speech sounds are heard, learned and managed. Communication and thought will be logical, clarified, and systematized in a practical manner.

Through hearing, we are able to contact with the outside world in real time, and by doing so we can exist in a stable manner. It is easy to feel how hard it is to be deprived of hearing. One can experience mild-hearing loss by putting earplugs in both ears. This makes you feel as if a wall has been created between you and the outside world, losing the sense of reality, a person feels isolated.

Hearing is a sense that opens up 24 hours a day and in all directions. It is said that vision is a spatial sense and that hearing is a sense of time. Hearing is important in developing a concept of time. In addition to the time concept, hearing plays a significant role in spatial perception. It is particularly important for perceiving what is happening when there are no visual signals. Hearing is also strongly related to attentiveness, and it is possible block out unnecessary sounds and listen selectively. In particular, hearing makes it easier for babies to share their feelings with people around them. Thus, promoting communication.

It is , therefore, a mistake to view hearing disabilities solely as a problem of language development, especially in the early infant stage. We should ponder the effect of hearing-impairment from a broad perspective and consider habilitation in using residual hearing at a maximum level and/or other alternative means to supplement hearing including the entire lifestyle of the child.

3. Difficulties Caused by Hearing Impairments

<Primary Handicap>

Cannot hear or unable to hear auditory signals adequately

<Secondary Handicap>

(1) Communication

- difficult to understand what the other person is saying
- difficult to monitor one's own voice and speech

(2) Psychological and Emotional Stability

- sense of loneliness, isolation, and depression
- losing interests, motivation, and energy
- repression of cultural amusements such as music, radio, and TV

(3) Behavioral Management

- maintaining safety (e.g. difficult to avoid traffic)
- mis-judgment of own circumstances
- learning and maintaining physical skills

(4) Acquisition of Language

- learning language
- learning speech

<Tertiary Handicap>

Hearing disabilities will affect the following developmental matters one after another if appropriate measures are not taken. With adequate guidance, and treatment disabilities in these areas can be minimized, and hearing-impaired people can lead fulfilling and happy lives. The effects of hearing disabilities on development are listed below.

(1) Development of cognition and thoughts
(2) Social and emotional development
(3) Academic skill and learning ability
(4) Adapting to home, community, school, and workplace
(5) Developing independence and self confidence

4. Parameters Related to Individual Performance

A great difference among individuals exists in hearing handicapping that is related to the following parameters.

<Individual Factors>

(1) Degree of hearing deprivation, configuration of hearing loss, and region of damage or disease.
(2) Age at onset of hearing loss or deafness
(3) Individual disposition such as intelligence, learning ability, and personality

<Social and Educational Factor>

(1) Age when impairment identified, age when appropriate placement/intervention was taken, and the time lag between the identification and intervention.
(2) Quality of medical care and education programs
(3) Parents' skills
(4) Living environment

5. Worlds of the Hearing and the Silent

Problems stemming from hearing impairments do not occur solely as problems unique to hearing-impaired children and adults. Many problems arise as a result of having to live in a society oriented toward people with normal hearing. Sometimes, it is hard for a hearing person to understand a person who has difficulty in hearing, and vise versa.

For example, hearing children can recognize that their father has come home when they hear the car stopped outside, hear footsteps, and hear the entry door opening even before the father even says "I'm home." The child has already decided how to react to his father for he had obtained the information through hearing.

For hearing-impaired children, however, the father appears all of a sudden in front of them. Some fathers claim that their children are so occupied by television that they do not say "Welcome home." It may not be true. The child simply did not expect his or her father to be home. Because so many things occur suddenly, hearing-impaired children are unable to prepare their feelings for each event. Thus, their actions differ from the flow of actions of people who can hear.

The same applies for babies. Their mother appears and disappears all of a sudden. Normal hearing babies that are able to hear can perceive where their mother is even if she is outside of their field of vision. The baby will know the action of his or her mother by sounds alone; working in the kitchen, flushing the toilet, shutting the door, moving from one place to another, etc. No wonder some hearing-impaired young infants are extremely anxious and unable to apart from their mothers for a second.

Normal hearing children are able to absorb a large quantity of information from other people's conversations, even if they are not being spoken to directly. For example, listening to the parents' conversations (e.g. where they are going tomorrow, when and what they will do, who will come with them), the child will know what to expect. Therefore, hearing-impaired children are often not conscious of the content of conversations in their surrounding environment, which hearing people take for granted.

Hearing-impaired children are often thought of as being violent and uncontrollable. This becomes evident in their manner of handling of objects, opening and closing of doors, and the way they try to communicate with others. Normal hearing people control their actions in accordance with the sound made, but this becomes difficult for the hearing-impaired person as he or she cannot hear the sound properly. This can sometimes lead to

problems. For example, a hearing-impaired child, who finds it difficult to notice when someone is calling them, is often tapped on the shoulder by hearing playmates. In imitating this behavior, a hearing-impaired child may unintentionally anger his or her hearing playmate by tapping too hard on their shoulder. Many incidents of trouble arise as a result of such minor misunderstandings.

The problems caused by hearing impairments cannot be solved through the efforts of the hearing-impaired person alone. It takes both hearing people and hard-of-hearing people to understanding each other. Therefore, it is important for hearing families with a hard-of-hearing child to change their lifestyle. Simply paying attention to visual cues instead of totally relying on hearing information can make the hearing-impaired child's life much easier. The mutual understanding of hearing world and silent world is the key to reducing the sense of loneliness and isolation experienced by hearing-impaired children.

III. Current Status of Habilitation for Hearing-Impaired Children in Japan

1. Training Institutions

Habilitation for hearing-impaired children in Japan is provided in institutions such as nurseries for hearing-impaired children, kindergarten sections of schools for the deaf, rehabilitation centers, hospitals, and private institutions.

<Nurseries for Hearing-Impaired Children>

Nurseries for hearing-impaired children were approved by the Ministry of Health and Welfare in 1975. There are 26 institutions of this type spread throughout the country at present. These facilities are open to young infants up to age 6, who have not yet enrolled in formal school. The capacity of each facility ranges between 30 to 50 children. So the national population of children utilizing such nurseries is approximately 850. Costs for the habilitation are determined in accordance with the income of the parents or guardians. Facilities, equipment and staff placement are prescribed by standards of the Ministry of Health and Welfare. These staff are specialists in auditory training, nursery school teachers, clerical workers, and nutritionists. Although there are some nurseries that have been set up independently from other institutions, in most cases they are set up as a part of comprehensive welfare or medical centers. Counseling, evaluation, diagnosis at these facilities, and training are carried out comprehensively. Children attend these centers one to three times per week. They are provided with individual training, group training, lunches, and outside activities. Educational programs for parenting and home visits are also carried out. Medical care services, such as hearing management after diagnosis of hearing impairment, is also included.

With respect to training methods, the auditory-oral approach is used at most institutes, but some facilities utilize cued-speech and sign language training depending on the state of the children. In many cases, the aim of the training is the child's acquisition of spoken language. Almost all children attend a regular kindergarten as a parallel activity to the nursery to help integrate them with normal hearing children.

<Kindergarten Section of Schools for the Deaf>

There are 107 schools for the deaf in Japan, with 1 national, 1 private and 105 public. The Ministry of Education commenced promoting the establishment of kindergarten sections in 1962. Currently, 99 schools have these types of kindergarten sections. As of May 1996, 1,374 children aged three or older were enrolled in 385 classes. There are three grades in these kindergarten sections, from the three-year-old class to the five-year-old class. As a rule, enrollment is in April, just as it is for regular school in Japan. There is no formal enrollment procedure for infants aged 0 to 2 years, such young infants come under the care of the educational consultation divisions at these same schools. Schools for the deaf in Japan have a history dating back more than 100 years. Their main thrust has been the education of hearing-impaired children. However, the number of children wishing to enroll in these schools is decreasing, underscoring the increasing need for integration into regular school, and the rising number of rehabilitation institutions available apart from schools for the deaf.

The teaching method varies from school to school. Apart from auditory-oral approach, and increasing number of schools are combining this method with cued speech. In terms of the language media used, a flexible approach has generally been taken, now adjusting to the age and state of the children involved more than ever before. In resent years, there has been a movement amongst the deaf people to actively demand their own approach, one of most important ingredients being the Japanese sign language for educating the young children. At the moment, this issues has left us with an on-going debate.

<Hospitals and Rehabilitation Centers>

We have recently witnessed the emergence of rehabilitation centers, health centers, and children's care center in Japan. These centers are also contributing towards the habilitation of hearing-impaired children. In addition to these centers, some hospitals also hire specialists for auditory training, and are actively engaged in hearing evaluation, diagnosis and the habilitation of hearing impaired children. Examples include our own organization, the National Rehabilitation Center for the Disabled as well as Teikyo University Hospital, a private institute. These are described in further detail below.

National Rehabilitation Center for the Disabled

The National Rehabilitation Center for the Disabled (NRCD) was established in 1979. The NRCD plays a combined role as a comprehensive functions rehabilitation center, hospital, college and research institute. Habilitation of hearing impaired children is carried out in the hospital's speech-language and hearing therapy division (2nd Functional Rehabilitation Division). This division was originally independent as the National Center of Speech and Hearing Disorders, having been engaged in early habilitation emphasizing the uses of the auditory sense for over thirty years. Rehabilitation is performed on individuals regardless of their age. From new born babies to the elderly, the center's services include examinations, evaluations, diagnosis, treatment, selection and fitting of hearing aids, as well as (re) habilitation in conjunction with the department of Otolaryngology. The department is capable of a complete care/treatment extending operations in addition to cochlear implant surgery and rehabilitation.

The auditory-oral approach at the NRCD is mainly used for training infants, with emphasis placed on parental support. Almost all of the children are integrated into regular kindergartens and nurseries. The training is generally given on a one-to-one basis for one to two hours once or twice a week, with group training carried out on some occasions. As there are no specific age restrictions, long-term care is possible, and training is even given past primary school age if necessary. The cost for these services is covered by medical insurance.

As the college division educates and trains speech therapists, the NRCD's hospital facility is also responsible for clinical practice of its students.

Teikyo University of medicine: Speech-Language and Hearing Clinic

Audiologic examination, diagnosis, treatment, fitting and guidance for wearing of hearing aids as well as the habilitation of hearing-impaired people is all integrated within this institution. The clinic's objective is to actively and flexibly respond to the needs of clients by integrating medical care and education. Research activities are also enthusiastically engaged in.

The division of early education for hearing-impaired children is almost independent in its function, with its system centering around physicians, speech therapists, social workers and hearing aid dispensers.

One of the special features of the clinic is its home training program. This program was initiated in 1973 at Teikyo University, and now receives in excess of 100 parents annually. Based on the principle that parents play a central role in the education of their children, a total of 9 lectures provided on a weekly basis. The course is intended to promote the parents' understanding of hearing disorders and to provide practical knowledge for raising the hearing-impaired child. At the end of the course, a suitable educational institution for each child is recommended. However, some children remain in the center for guidance until they enter an elementary school. The main approach for training is the auditory-oral approach.

Making the most of the advantage of unification of medicine and education, the clinic is expected to take initiatives in cochlear implant program for children.

<Private Institutions>

There are few private institutions for hearing-impaired children in Japan. Among these, The Hearing Clinic for Hearing-impaired Children and Their Mothers (The "Haha-to-ko" Class), currently known as "TRI-ANGLE", made a great contribution to early education for hard- of-hearing children in Japan.

Mutual Association for the Advancement of Children with Hearing Impairment: TRIANGLE

The institution was founded in 1966 as a facility affiliated with the Hearing Research Laboratory of the Kobayasi Scientific Research Institute. It was quick to commence early identification and early education of hearing impaired children. The clinic practiced instruction using the "Natural-Mother Method," which focused on the utilization of hearing and communication between mother and child. The results of this method are discussed in detail in "Survey on graduated children of the "Haha-to-ko" Class (1993)[2]." The efficacy of early education and integration are evident in people who were trained at the clinic since early childhood. When the research activities on this project were completed at the institution in 1995,

the parents support group of the clinic formed private institution called "TRIANGLE" the corners of which represent the Child, the Parents, and the Specialists. In addition to the clinic's training, its main activities include publication of books and newsletters and running theatrical troupe whose performers are hard-of-hearing children.

2. Habilitation Programs for Hearing-impaired Children.

With respect to habilitation methodology, several methods are currently used for training hearing-impaired children in Japan. These include the auditory-oral approach, cued method, total communication, simultaneous use of finger spelling with speech, and stress on written language. The training method varies according to the philosophy of the institution and the specialist in charge. There is no one "right" of "wrong" in approach. The training method should be selected and practiced based on whether or not it would meet the particular needs of the individual child. The majority of schools for the deaf use adapted cued-speech. Other institutions such as hospitals and rehabilitation centers, commonly place an emphasis on the auditory-oral approach.

Whatever the means of the training, maximum use of residual hearing achieved (by using hearing aids) is in the best interest of all parties involved. Many institutions are no longer hesitant in incorporating natural gestures and signs in the initial stages of habilitation. Being able to choose different approaches, in a way, may reflect a maturation in society is attitude toward the hard of hearing. Training hearing-impaired children is no longer considered merely a matter of developing a language, but of taking a human being as a whole--considering his of her personality, overall development, family relationship, environment, and so on. Given this new holistic perspective, there is an urgent need to prepare individualized programs for hearing-impaired children.

Another current issue to be considered is the cochlear implant. There were 811 cochlear implantees as of March 1997 in Japan, of which children aged 10 or younger accounted for 5%. Though it is not a common practice to implant to congenital hearing-impaired children, there is no shortages of demand for this procedure. However, at this time, many issues need to be discussed before appropriate guidelines for performing cochlear implants can be established. Cochlear implantation must be considered as

a means to aid hearing in the same manner as hearing aids. Accordingly, it is necessary to implement adequate training for utilizing the hearing acquired from such implants.

There is also an issue of the sign language to be considered. Sign language is an important means of communication for the hearing impaired. Recently there has been greater social awareness of sign language, and it has become easier for the hearing impaired to use sign language. Despite the social interests of sign language, a confrontation arises between traditional Japanese sign language and sign language adapted to Japanese grammar. Whether the sign language should be introduced in the early stages of habilitation/education or not, and how it should be incorporated into the auditory-oral approach is an important future issue.

3. Significance of Auditory Approach

There have been many practical reports on the results of utilization of residual hearing by means of the auditory approach. Its efficacy is enormous, not only for mild to moderate hearing impairments, but also for severe to profound hearing impairment with adequate fitting of hearing aids. The speech perception ability rises even higher when combined with lip-reading.

<Effectiveness of the Auditory Approach>

- Monitoring his or her own voice
- Acquisition of natural speech patterns
- Improvement of ability to receive speech
- Improvement of communication skill through speech
- Facilitation of speech and language learning
- Promotion of integration into school or workplace
- Interchange with hearing world using his or her auditory skill

As Pollack (1973)[3] notes in his quote of Dr.Huizing, "this is a process of integrating hearing in the deaf child's personality." Thus, the sense of hearing affects not only one's capacity for spoken language, but also the proper functioning of their remaining senses as well. If children succeed in obtaining auditory images of people, objects, phenomenal changes, and situational changes, they are able to use these images in meaningful ways. Their possibilities for developing auditory culture, such as enjoying music

and radio are enhanced and, as a consequence, their lives are enriched. For example, there are actually some people with profound hearing loss of 100 dB or more who enjoy playing musical instruments and listening to background music.

<Strategies for the Auditory Approach>

The best use of hearing cannot be achieved solely through the fitting and usage of hearing aids. Ling (1980)[4] asserts that the utilization of hearing improves through daily auditory experience by formal auditory training. It is based at first upon developing the child's desire to hear and his or her ability to pay attention. These abilities can be nurtured by helping hearing-impaired children to develop sympathetic relationships as humans, and by fostering feeling of attachment and trust. The child will then be able to direct his or her attention in accordance with the interests of other people, and to perceive what has been said in a meaningful way. The basic principles underlying the auditory approach are described as follows.

(1) Early identification and early intervention/education
(2) Appropriate fitting of hearing aid
(3) Development of listening attitude
(4) Equipping of auditory-oral environment
(5) Development of images of sounds (auditory concept)
(6) Continuation of auditory learning/training
(7) Strengthening of auditory-vocal feedback
(8) Strengthening of auditory speech perception
(9) Awareness of meaningfulness of auditory learning
(10) Stable relationship with good communication partners

IV. Training Systems of Specialists in Habilitation for Hearing Impaired Children in Japan

1. Role of Specialists

Specialists in the education and habilitation of hearing-impaired children ought to be the people who entirely support the children and their parents. They need to be sufficient and flexible when programming rehabilitation strategies to meet the needs of children, since each individual child shows great diversity. The first and the most important aspect of the work in training children is "watching children" and "knowing children." "Watching children" obviously does not hold the literal meaning of simple visual observation. It implies the use of whole senses to directly come in contact and sense the feelings and needs of the child. The specialist must possess the substantial knowledge required to understand the rationale of the child's behavior. Finding the proper balance between his watching and knowing is an important quality for the clinician. In contrast to natural science, clinical practice, to a large extent, relies on accumulation of intuition, experience, and analogies. "Full observation" can only be experienced directly through taking charge of the children. The observation again is not a mere objective observation of the child. It can only be achieved by understanding the child within the context of the triangle relationship between the child, specialist, and parents.

Habilitation for hearing-impaired children includes medical care, examinations, evaluations, hearing aid fitting, training, counseling for parents, and integration into kindergarten or formal school. This requires a cooperative effort together with physicians, hearing aid dispensers, welfare related workers, teachers, and others. Specialists in education and auditory habilitation of hearing-impaired children must obtain the requisite knowledge and special skills to negotiate and coordinate with other related staff.

<Desirable Literacy and Competence for Specialists>

(1) High standards of morals and humanity
(2) Excellent communication attitude and skills
(3) Adequate knowledge and practical skills
(4) Scientific mind and logical thinking
(5) Cooperation with other specialists
(6) Social responsibility

2.Education and Training Systems of Specialists

The most important factor in obtaining good results in habilitation is the upbringing of human resources, though this is neither an easy nor simple task.

In Japan, those specialists currently involved in the habilitation and education of hearing-impaired children are teachers at schools for the deaf and hearing clinicians. These teachers are legally obliged to acquire a license to teach at schools for the deaf, in addition to the regular teaching certificate. However, in reality, only slightly more than 30% actually possess such qualifications. As for the hearing clinicians, the quality of the services provided vary somewhat because some of the people working as therapists lack professional training. This is not illegal in Japan since no national standard has yet been set for these qualifications. Although undergoing specialized training does not, by itself, guarantee that a clinician will be "good," the professional training and development of such practitioners is an urgent issue that needs to be addressed.

<Training Specialists in Speech-Language Pathology & Audiology>

Professional Training courses in Speech-Language Pathology & Audiology began in 1971 at the Training Center affiliated with the National Center of Speech and Hearing Disorders (NCSHD). The Prerequisite for applying to the course was graduation from a four year university program and training was carried out over a one year period. At that time in Japan, no curriculum was provided at the college level for Speech-Language Pathology & Audiology, except a few courses in special education for obtaining a teaching license. Considering the state of universities at that time, the government set up a one year program with a substantial curriculum of 1,545 hours at the NCSHD. The aim of the program was to train personnel to handle habilitation of both speech-language and hearing disorders. Following some revisions by the NCSHD in 1979, the training program has continued to the present time under the organization of "The Department of Speech-Language Pathology and Audiology, College, National Rehabilitation Center for the Disabled." The course was extended from one to two years in 1992. Thus, enabling the enhancement of clinical practice. Despite these recent advances, the curriculum concerning audiology remains inadequate based on the perspective of the habilitation of hearing-impaired children. Specialization in Audiology, independent from Speech-Language Pathology, has been slow to develop in Japan. Skills of pediatric

audiologists and educational audiologists are in high demand for the direct training of hard-of-hearing children. Consequently, an enhancement of the current curriculum is called for in the near future.

Training of Specialists in Speech-Language Pathology & Audiology in Japan is currently (as of March 1997) performed at 16 institutes. There are three four-year-university programs, one three-year-junior college program, and 12 vocational colleges with programs 2 or 3 years in length. When combined, these institutions are expected to produce more than 550 graduates each year. In addition, there are two graduate programs available with a research framework gradually being developed. An example of a training curriculum is shown in Fig.5.

Graduates from these institutes are employed in the fields of medical care and welfare for the most part, while a few accept positions in the education field. As for the qualifications for becoming a hearing clinician, "certification" is now being granted by private authorities since no national standards have been established yet.

<Training Special Teachers in School Education>

The education system in Japan today is a product of the School Education Law of 1947. Special schools, such as schools for the deaf and schools for the blind, require teachers to have specialized licenses in order to educate such children. In reality, however, only approximately one third of teachers at schools for the deaf hold the required license. In other words, under the current circumstances, one can teach hearing-impaired children without any knowledge of hearing and without holding a proper teacher's license. In order to solve this problem, a variety of certification courses and distance education programs are now being offered to help teachers obtain the necessary qualifications. In contrast, teachers in charge of hearing-impaired classes at regular schools are not required to possess any special licenses. For these teachers, there are short- and long-term training programs and lecture courses offered at professional education centers and the National Institute of Special Education. These aim to train sufficient teachers for the education of hearing-impaired children.

Medical Considerations

Basic Science	Clinical Science
Medicine in general	Clinical medicine
Public health	Rehabilitation medicine
Anatomy	Otolaryngology
Physiology	Clinical neurology
Pathology	

Psychological Considerations

Psychology in general	Personality
Human development	Psychometry
Learning	Clinical psychology

Phonetic/Linguistic Considerations

- Phonetics
- Linguistics
- Psycholinguistics
- Physics of sound and speech

Sociological Considerations

- Social welfare
- Leagal aspect

Methodological Considerations

- Statistics
- Information science

Clinical Considerations of Speech-Language Pathology and Audiology

Perspectives

Introduction to Speech-language Pathology
Introduction to Audiology

Specific Areas

Audiometry	Stuttering
Hearing aid procedures	Functional articulation disorder
Hearing disorder in adults	Organic articulation disorder
Hearing disorder in children	Dysphasia
Multiple handicap	Dysarthria
Cerebral palsy	Voice disorder
Delayed language development	Aphasia

Practicum

Supervised work study programs at speech and hearing clinic

Fig.5 Structure of Curriculum for Training Specialist in Speech-Language Pathology and Audiology

<Clinical Training>

There are three types of clinical training:(1) Within the school curriculum itself, (2) Freshman-training, which immediately follows graduation, and (3) Clinical training as a part of Continuing Education. The objectives of clinical training are to improve techniques and to pursue the knowledge to become a sufficient specialist under the guidance of a skilled instructor in a practical setting. Graduate training for physicians has already been systematized and is continually being enhanced in Japan. Unfortunately, such training for specialists in speech-language pathology and audioloy has not yet been fully organized in Japan, although there is sufficient awareness of the need for it. According to a survey carried out by Hirota (1991)[5], 73% of schools for the deaf and 84% of nurseries for hearing-impaired children facilitate the clinical training of junior staff. The most common training period was between six months to one year, followed by shot-term training of less than three months. Table 1 shows the nature of the training course, answering to the specific needs of the junior staff.

Table 1
Needs of training content for junior staff according to national survey

	School for the Deaf	Nursery schools for hearing-impaired children
A	Auditory-oral approach ---------95% Language learning in daily activities ------90% Auditory learning ----------85% Audiological evaluation ------83%	Auditory-oral approach ------93% Audiological evaluation ---93% Hearing aid fitting ---------93% Language learning in daily activities ---87% Parents program ----------87%
B	Teaching program and educational materials ---73% Hearing aid fitting ----------66% Parents program ----------66% Speech teaching ----------61%	Auditory learning ----------80% Teaching program and educational materials ---80% Evaluation of global development ---80% Speech teaching ----------73% Parental support; The motivating force ---67% Hearing aid fitting ---------67%

A : Content indicated by 81% to 100% of facilities
B : Content indicated by 61% to 80% of facilities

With respect of Continuing Education programs for experts, little training is available in spite of needs expressed by seasoned practitioners. Considering the enhancement of the quality and lifelong education of these specialists, continuing education is a crucial issue. Up until now in Japan, skilled clinicians have taken on the role of clinical training themselves, and obtained excellent results accordingly. Obviously, the habilitation of hearing-impaired children does not end after the infant or pre-school periods. Its effect is optimized only when long-term care is provided and a comprehensive program is achieved adapting to the individual child's growth and development. It is, therefore, important for clinicians and specialists to receive continuing education and training services at least every few years in order to increase their knowledge and help them deepen their insights into human nature. This all comes back to the child.

V. Early Identification of Hearing Impairments

1. Audiologic Testing Procedures for Children

Auditory evaluation and diagnosis technologies are important in enabling early identification of hearing disorders. There are many types of auditory evaluation methods for children. The following points are particularly important for examination and diagnosis.

(1) Implement with an understanding of the characteristics of respective examinations.
(2) Evaluation must be carried out by examiners well versed in the testing procedure and who understand the development of auditory behavior and response, especially in infants.
(3) Adequate observation should be carried out associated with auditory behavior of the child confirmed in everyday situations.
(4) Multiple examinations should be performed for a comprehensive diagnosis.
(4) Diagnosis shall be made not based on a one time examination but repeated examinations.
(6) Diagnosis shall be made from a comprehensive perspective after administering developmental evaluations.

The following tests are commonly used for the audiologic evaluation of children:

<Behavioral Observation Audiometry>

Applicable age: Newborn Infants.

Procedure: Calling names, musical instruments, and other various sounds are used as conditioning stimuli outside the view of the baby. Behavioral responses of children to sounds presented are observed: eye-widening, eye-blinking, sucking, startling, head turning, and so on. The place of examination and stimulus methods and materials used should be modified in accordance with the child's age and condition. As auditory behavior varies in accordance with the maturation of the child, judgments needs to be made based on knowledge of auditory behavior for each developmental stage of the child.

Features: The developmental maturation of the child can be evaluated. The test makes a rough estimate of hearing, entailing diagnosis of

hearing loss in conjunction with other tests such as Auditory Brainstem Response (ABR) and Conditioned Orientation Reflex Audiometry (COR). Behavioral Observation Audiometry (BOA) is highly effective as a screening tool for auditory function. A thorough examination is required for decisive diagnosis for the identification of hearing impairments (Fig6).


(2m27d)


(2m27d)


(3m5d)


(4m2d)


(7m0d)

Fig.6 Auditory Behavior of Infants

<Conditioned Orientation Reflex Audiometry>

Applicable age: Young infants-optimal age is around one year.

Procedure: Light flashes immediately after a signal is presented as reinforcement. The examiner observes the reflex, localizing the sound source of the child. Conditioning and maintaining interest are the keys to this testing.

Features: Air-conduction testing in both ears is possible. Use in conjunction with BOA is effective (Fig7).

<Play Conditioning Audiometry>

Applicable Age: Two to five years of age.

Procedure: A child is conditioned to respond to sound by playing with toys. For example, when a button is pressed responding to sound stimuli, a train may move, or the child may be able to see inside a peep show box. If the child press the button when no stimuli is given, nothing will move. As the child matures, playing activities, such as building blocks and inserting pegs, can be modified to motivate the child. The child is now ready to perform the standard audiometry of adults.

Features: Using speakers, air conduction in both ears is measured. Using an earphone receiver, hearing thresholds for both air conduction and bone conduction in each ear are measured (Fig.8).

<Standard Pure-tone Audiometry>

Applicable age: Five years of age and older.

Procedure: If a sound is heard, a signal is given to the examiner in a fixed manner. Hearing thresholds of air conduction and bone conduction of each ear are measured. This is a standard audiometric test which may also be administered to a young child if he or she is capable of concentrating on sound.

<Auditory Brainstem Response Audometry>

Applicable age: Newborn baby to any age.

Method: Electrodes are attached to the top of the scalp recording the electrical evoked response to auditory stimuli from the inner ear to the brainstem. The response is then calculated using a computer.

Features: ABR is an objective examination and highly reliable audiometer for newborn babies. It has made great contributions to early

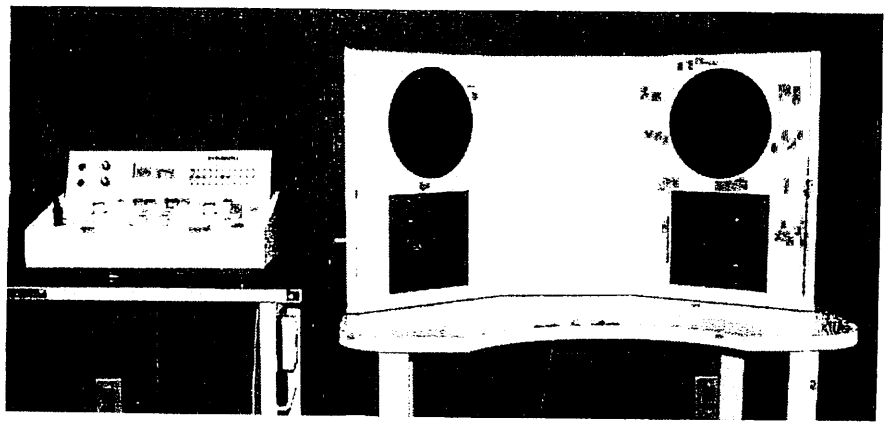


Fig.7 Conditioned Orientation Reflex Audiometry Unit

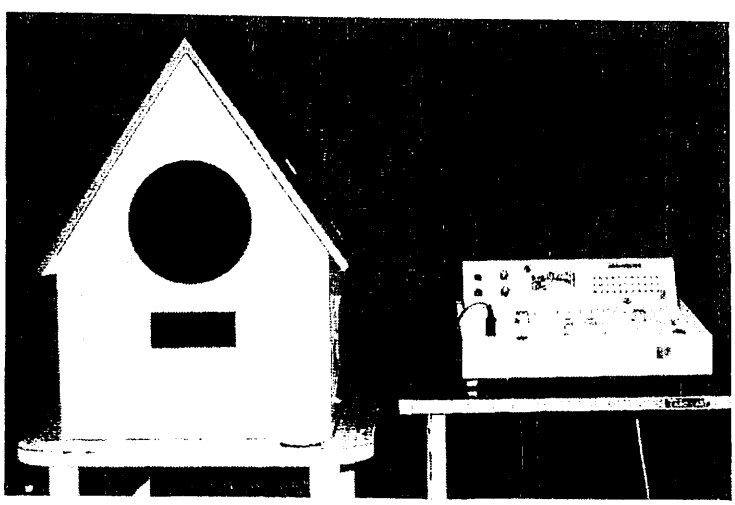


Fig.8-A Peep-Show Test Unit

Fig.8-B Play Audiometry

identification of hearing-impaired infants. However, there is a short coming of this audiometer: Fact that the test does not detect low tone deafness. A careful step must be taken for children who show suspected abnormalities in electroencephalograms. A comprehensive judgment with results of BOA or COR and overall development evaluation is typically necessary.

<Tympanometry>

Applicable age: Young infants to any age.

Procedure: Tympanometry is performed by loading the eardrum with air pressure and measuring the compliance of the eardrum and ossicular chain under conditions of changing air pressure in the external ear canal.

Features: This is a useful test for diagnosing conductive hearing loss and is particularly effective in discovering the middle ear effusion, which often occurs in childhood. It can be administered on infants. Although typanometry is a reliable test for determining middle ear function, it is not recommended for detecting the degree of hearing loss.

2. Medical Check-up Systems for Early Identification of Hearing Impairments

The incidence of hearing impairment is hard to estimate. It is estimated that 0.1～0.3 percent of school children have moderate hearing loss or more. According to the results of medical checkups carried out on school children from primary school to high school in Sendai City, since 1981 until 1988, the rate varied from 0.58% to 0.85%. These figures include mild hearing impairments caused by Otitis Media.

Through early identification of hearing impairments and by taking appropriate steps sooner, it is possible to reduce the handicap in future years. However, the impairments are left with no proper treatment, even with mild hearing loss of 30 to 40 dB, it is clear that this will often lead to emotional instability or a slump in academic skills.

Children with severe hearing loss are often first noticed by their parents or family. According to the data from the TRIANGLE (1988 to 1989)[2], 61% of the 160 children had had their abnormality noticed in the home before the age of one, and 91% before the age of two. The majority of these were severe hearing impairments, with 72% of the total having hearing

loss of 81 dB or more. Of the 211 people diagnosed as hearing-impaired in 1992 and 1993 at the Otorhinolaryngology Department of the Teikyo University Hospital, 36% were discovered before the age two[6]. Of these up to three-years-old, 55% were discovered as hard-of-hearing, of which 34% had hearing loss of greater than 70 dB. In these cases, 74% of the total abnormalities of hearing were discovered by parents. However, 16% of the children were delayed in identification despite hearing loss exceeding 71 dB. Generally speaking, identification of hearing loss of 70 dB or less is delayed in many cases. It may be identified after noticing unintelligible articulation and delays in speech development. Some children are identified after becoming involved in group activities in kindergartens or nurseries.

<Health Screening for Infants and Young Children>

In order to promote early identification, the education of parents and enhancement of medical examination systems is necessary.

Health screening for infants and young children is administered mainly at health centers fully supported by the government in Japan. Screening for hearing impairments is administered to children of 3-months, 18-months, and 3 years of age. While there are different implementation methods in each region, emphasis is placed on discovering severe hearing impairments by 18 months and mild to moderate hearing impairments before three years of age. The following measures need to be considered to implement medical examinations effectively.

(1) Survey of high risk factors for hearing impairments
(2) Questionnaire concerning hearing
(3) Screening methods

18-Month Infant Health Screening in Tokushima Prefecture [7]

In Tokushima prefecture, as a part of an 18-month Infant Health Screening program, hearing screening has been performed since 1987. It comprises a check using a questionnaire and auditory screening test. For the auditory screening test, an infant audiometer of a warble tone at 50 dB is used. Table 2 shows the medical examination results up until 1995. Of the 46,252 children examined, 12 (0.03%) were identified as having hearing loss. Approximately 70% of all 18 month infants underwent the examination.

As the result of this screening process, the age of identification of hearing impairments has dropped significantly from an average age of 2.1 to 1.2 years. The children have been treated by teachers at schools for the deaf since being involved in the medical examinations. As a result, transition from identification to intervention education has shifted smoothly. It must also be noted that special care is also provided for parents.

Three-Year-Old Infant Health Screening

Auditory screening was added to the three year old infant health screening in 1990 in Japan and is now implemented nationwide. Although the screening program varies by the region, the following tests are performed as the minimum standard: (1) questionnaire concerning hearing, (2) implementation of auditory response at home, (3) tympanometry, (4) puretone audiometry, and (5) otological examination. The main objectives of the screening are to identify any degree of hearing impairment, middle ear effusion, unilateral hearing loss and/or severe hearing impairment suffered as a result of carelessness. The auditory examinations carried out at home comprise (1) a response to a whisper and (2) a response to fingers being

Table 2
Number of children undergoing screening and number of hearing-impaired children identified

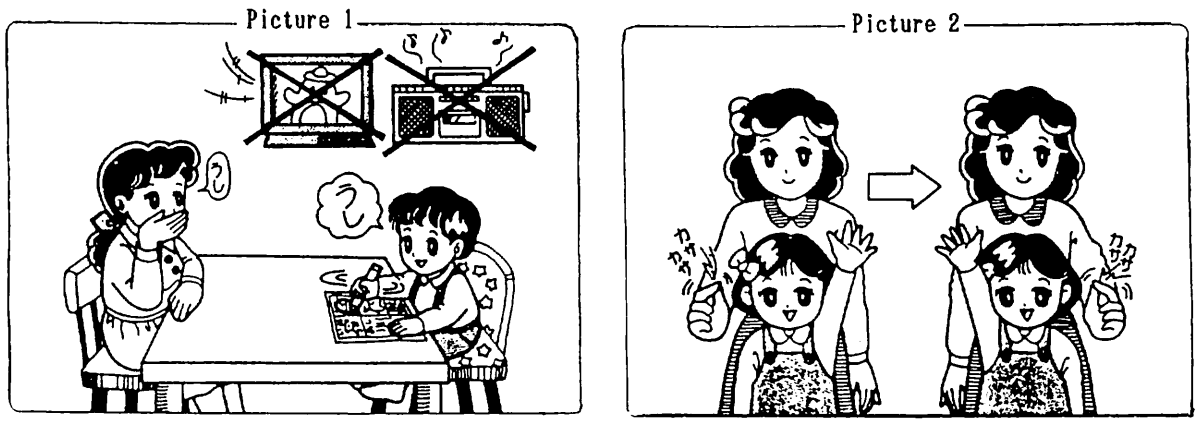
Year	Total No. of child. examined	No. of child. required following up	No. of child. for deep evaluation	No. of hearing impaired-child.
1987~1988	16, 730	94	6	4
1989	5, 227	48	8	1
1990	5, 413	58	9	2
1991	3, 865	41	5	1
1992	3, 805	58	6	0
1993	3, 670	47	5	1
1994	3, 715	70	5	1
1995	3, 827	65	6	2
Total	46, 252	481	50	12
Percentage		1%	0. 1%	0. 03%

rubbed together (Fig.9). An explanation of the necessity of the screening methods, together with the questionnaire is mailed, and parents are requested to bring the completed forms in when the child has his or her three-year-old health screening. According to Tanaka (1994) [8], patients referred from health centers to hospitals have increased 300% since the health screening process began. Of these, 70% of the children were identified as having hearing impairments. These results clearly demonstrate the effectiveness of the medical examination system combined with the enlightenment of parents.

3. Transition from Identification to Intervention

The early identification of hearing impairments is meaningless unless it is connected to placement for treatment and habilitation without delay. If appropriate intervention is not given, the parents will become more anxious and unable to raise their children normally. Thus, early identification must always be considered together with early habilitation.

Special guidance concerning hearing impairments should provided for parents immediately after their child has been diagnosed as hard-of-hearing. It is then important to accept them with a presence of mind, discuss the necessary reaction and provide support so that they will know



Hearing Screening by Whispering

Hearing Screening by Rubbing Fingers Together

Fig.9 Method of Hearing Checkup for Three-Year-Old Children Implemented at Home in Tokyo (Extract)

what to expect for the future. Explanations are required of the possibilities for medical treatment, the fitting of hearing aids, referral to education and habilitation institutions, and their responsibilities in the home. Practitioners must listen to the conditions in the home and the opinions of the parents carefully, accepting their feelings of anxiety, grief, and depression while sympathizing with and supporting them. The placement, either medical treatment or habilitation, should be advanced in parallel to the needs of the parents. It may also be useful in some cases to introduce a family that has gone through the same experience. In Japan, there is a parent support group which is called "The Association for Parents of the Hearing-impaired Children." Parents can also receive psychological support by participating in such associations (Fig.10).

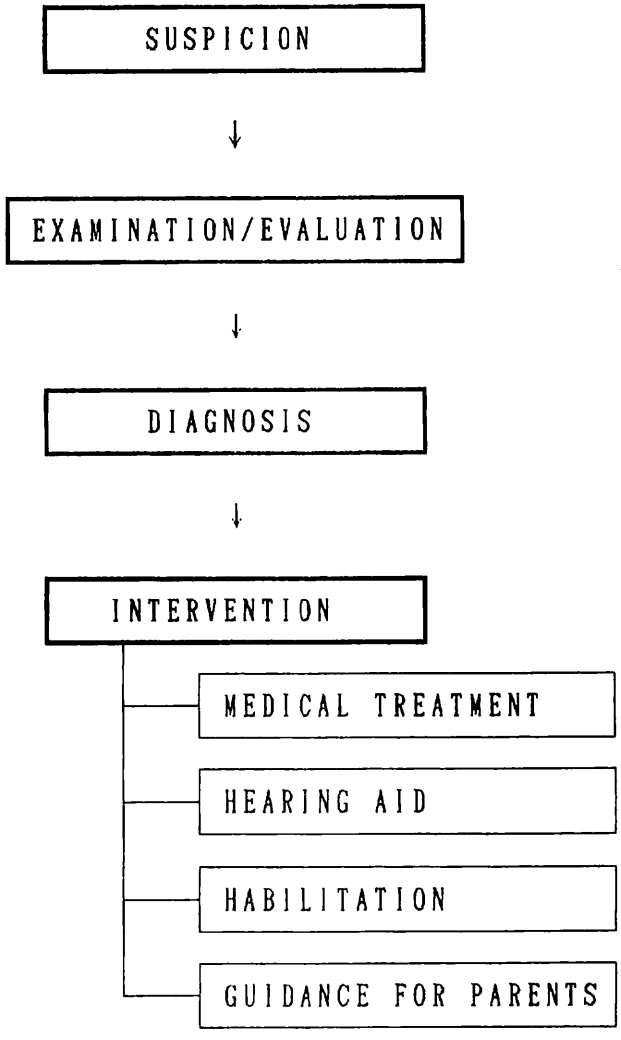


Fig.10 Process of Identification to Intervention of Hearing Impairment

VI. Hearing Instruments

1. Hearing Aids

(1) Types: Hearing aids are electronic devices which amplify sounds to brings them more effectively to the ears of the user. There are many types of hearing aids : Body aids or body worn (BW), Behind-the-ear aids (BTE), In-the-ear aids (ITE), Eyeglass aids (EG), and Baby-type aids. Specialists must understand the advantages and the disadvantages of each hearing aid before fitting. If the outer ear canal is closed, (i.e. atresia of the external auditory canal), bone conduction hearing aids can be fitted (Fig.11).

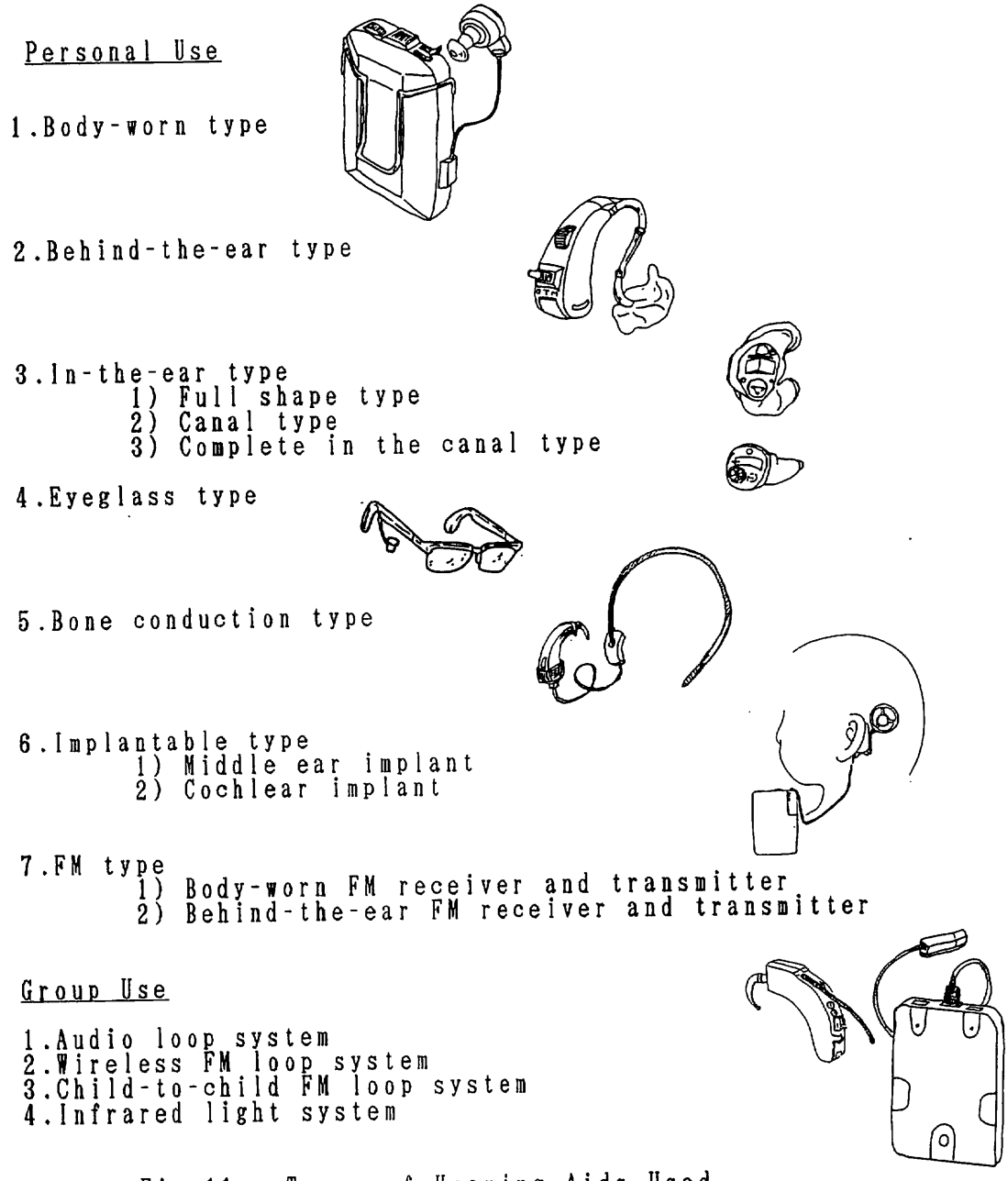
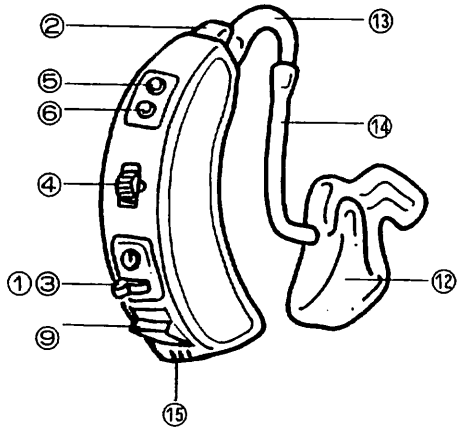


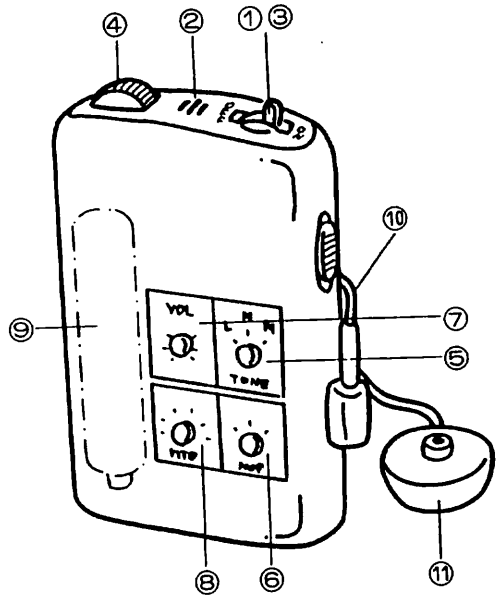
Fig.11 Types of Hearing Aids Used in Japan (N.Onuma,1996)

(2) Components: A hearing aid consists of three major components: a microphone, an amplifier, and a receiver which functions to adjust the volume and tone of the sound (Fig.12).

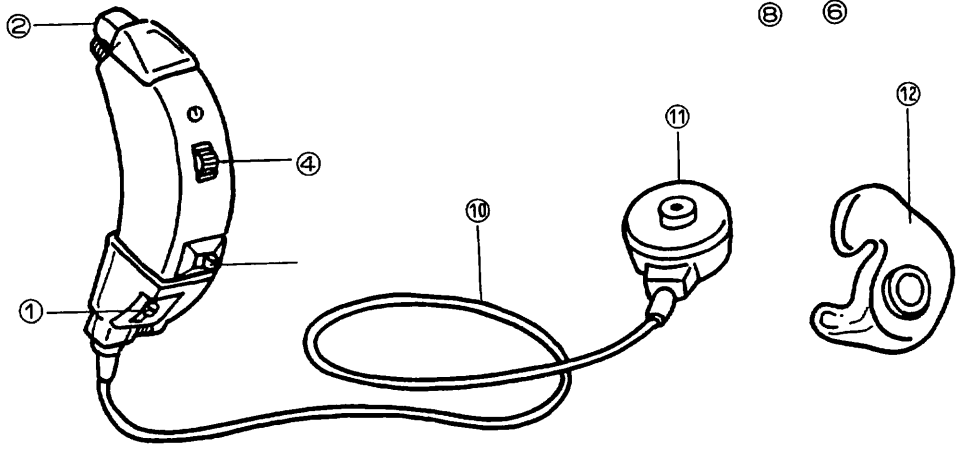
Behind-the-ear hearing aid



Body-worn hearing aid



Baby type hearing aid



① On/Off switch ② Sound inlet (Microphone) ③ M/T switch ④ Volume control
⑤ Tone control ⑥ Limiting output ⑦ Sub-volume control
⑧ M/T balance control ⑨ battery compartment ⑩ Earphone cord ⑪ Earphone
⑫ Earmold ⑬ Sound tip ⑭ Sound tube ⑮ Audioinput

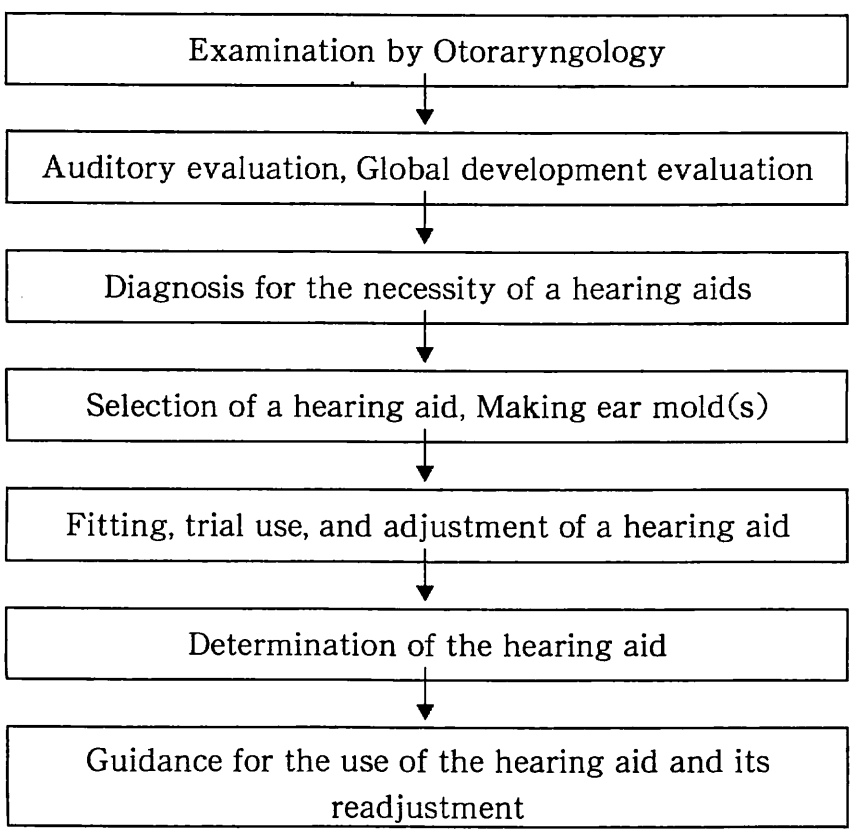
Fig.12 Components of Hearing Aids (H.Imai and C.Kanayama,1993)

(3) Performance: The performance of hearing aids is evaluated using electroacoustic hearing aid measurement devices conforming to the specifications defined by Japanese Industrial Standards (JIS).

The characteristics of hearing aids are obtained by measuring reference frequency response, frequency response at 90 dB, maximum output sound pressure, distortion level, and so on. This information is then used for selecting and/or fitting hearing aids.

2. Selection of Hearing Aids.

A process starting from the medical examination to fitting of the hearing aid is described as follows.



Initial evaluation involves the administration of the audiometric and global development tests to determine whether or not the child can benefit from hearing instruments. Selection of the hearing aid is determined by a specialist accoding to the state of the child. The majority of children currently use BTE devices, although some young infants wear BW and/or

Baby-type Aids depending on their hearing level, age, and state as determined by the specialist.

The Baby-type hearing aid is a modified version of the BTE that enables the infant to wear the receiver on his or her shoulder instead of the ear by utilizing a connecting cable. Recently, even young infants have been recommended for wearing BTEs. It is thought that the Baby-type aid may be effective for infants whose auricles are not yet mature enough to hold the hearing aid.

The BW type aid is worn on the chest, so that it can emphasize low frequencies, called body baffle effects, and provide feedback on the child's own voice. BTE type aids with light-weight and high gain are now available on the market, and are generally recommended because they can easily be worn in both ears.

In cases such as cogenital atresia of the external auditory canal in which it is difficult to fit earphones, bone conduction type hearing aids are used.

Once the type of hearing aid is decided upon, an ear mold must be made. In fitting a hearing aid for a baby, it is crucial that the ear mold fits closely to the ear canal in order to eliminate acoustic feedback. It is also necessary to make new ear molds every three to six months since children grow rapidly at this age.

Hearing aid fitting is viewed as one essential component in the wider process of aural rehabilitation. Fitting methods are usually based on psychoacoustic data obtained from auditory evaluation, especially pure-tone thresholds. Behavioral changes are also good indicators for assessing the effectiveness of the aid, so it is important to monitor the child's reactions in everyday situations.

<Checkpoints>

(1) Improvement of reaction to sounds
(2) Changes in voice quality and quantity
(3) Psychological changes
(4) Presence of uncomfortable reaction
(5) Aided threshold

With respect to the expenses of purchasing hearing instruments, hearing impaired people deemed disabled under Japanese law are subsidized by the government in purchasing and repairing of hearing aids, ear molds, cables, and batteries.

3. Guidance for Wearing Hearing Aids

It is not realistic to expect immediate benefits simply by wearing hearing aids. In particular, it is difficult to judge the effects on babies. Parents are inclined to think that a hearing aid will bring a miracle and that the child should be hearing various sounds as normal. They should be informed that auditory function needs time to be developed and learned and advised about what behavioral changes to observe, e.g. the amount and volume of voice used, changes in facial expressions, and emotion stability. The realization of the benefits from a hearing aid may take some time for profoundly hearing impaired individuals.

Parents should be told to enjoy discovering sounds with their child, making him or her aware of the existence of sounds, locating the sounds, and having the child determine the source of the sound. Thus, it is necessary to make a conscious effort to listen to sounds. Parents should take into account distance when talking to the child: moving closer to the child, looking at their face, speaking expressively, and smiling. Some parents stop talking to children or using their voice when children are not aided. Even when the child is not wearing hearing aids, the parents should keep talking to them. They should always be thinking about alternative means to make the child hear and feel sounds, such as raising the volume of their voice or letting the child touch their face or throat. Specific instructions, as such, are given to parents repeatedly. Reaction to sounds in everyday situations are checked and (re) adjustment of hearing aids is repeated as necessary. By this means, the optimum listening environment is created.

Parents must be helped to understand the characteristics of hearing aids in order to help their children make the best use of them. Daily recording of hours of the use or behavioral changes when aided leads to stable use of the hearing aid.

<Instructions for Hearing Aids>

(1) Mechanical aspects and characteristics of hearing aids
(2) Maintenance and management of hearing aids
(3) How to wear the hearing aid
(4) Assessment of aided performance
(5) Practical instruction to make the child listen to sounds and voices
(6) Matters demanding special attention

Maintenance and management of hearing aids include daily checks of its function and cleaning. Maintenance, in addition to regular inspections

of device performance, in value daily inspection of the instrument. This should be the responsibility of parents while the child is too young to handle it, but it is best that the child gradually becomes able to take responsibility for this, at least changing the batteries when signals are not sent.

Hearing aids are very vulnerable to shocks and humidity, so they require regular care. It is necessary to take adequate care to protect them from sweat, rain, and water. Hearing aids should be stored in an airtight container with Silica gel to keep them dry.

4. Hearing Assistive Devices

Assistive Devices for hearing are hearing prosthesis that augment listening ability. A hearing aid is a representative example. Other assistive devices include Loop induction systems, FM transmission/amplification systems, and Infrared hearing systems. In addition, telephones for hearing impaired people and a variety of other devices have been developed to make their daily lives easier. FM hearing aids and telephones can be useIful not only for grown-ups, but also for children. Some assistive devices that compensate for the hearing sensation include facsimile transmission, visual caption decorders, vibrotactile devices, and others.

VII. The Auditory-Oral Approach in Practice

1. Principles

Whichever methodologies are used the habilitation of hearing-impaired children, they must be considered in combination with the individual child's characteristics and global development. The child comes first, not the method. All children are different, as are their parents. The auditory-oral approaches ultimate effectiveness depends on the treatment program's alignment with the child's chronological and developmental age, state of hearing, learning ability, personality, home environment, and the philosophy of the parents.

(1) Early identification and early habilitation.
(2) Maximum use of residual hearing with optimum fitting of hearing aids.
(3) Firm family support, especially from parents.
(4) Acquisition of communication and language competence.
(5) Promotion of child's global development.
(6) Diversity of program and emphasis on individualized programs.

The utilization of hearing is developed when people have abundant listening experience in a meaningful situations. It is, therefore, essential to provide a quality auditory and oral environment for the hard-of-hearing child. Such an environment promotes the child's motivation to listen, express, and learn language spontaneously. Auditory learning is subject to a variety of parameters such as efficiency of amplification, age, provision of hearing environment, and the latency of communication partners, such as parents. Because parents play such an important role in their child's language development, they must also be provided with appropriate guidance.

For those lacking the kind of vision mentioned above, systematic auditory training for developing listening skills as well as the use of supplementary methods, (e.g. natural gestures, sign language, finger spelling, cued speech and letters) ought to be provided as needed.

An auditory-oral program, such as the one shown in Fig.13 (Nakamura, 1993)[9], comprises the following components: medical treatment/management, hearing aids, parental guidance, therapy in auditory and language learning, and adaptation to society. Specialists must work together with physicians, hearing aid dispensers and kindergarten teachers, to coordinate a holistic program for a child

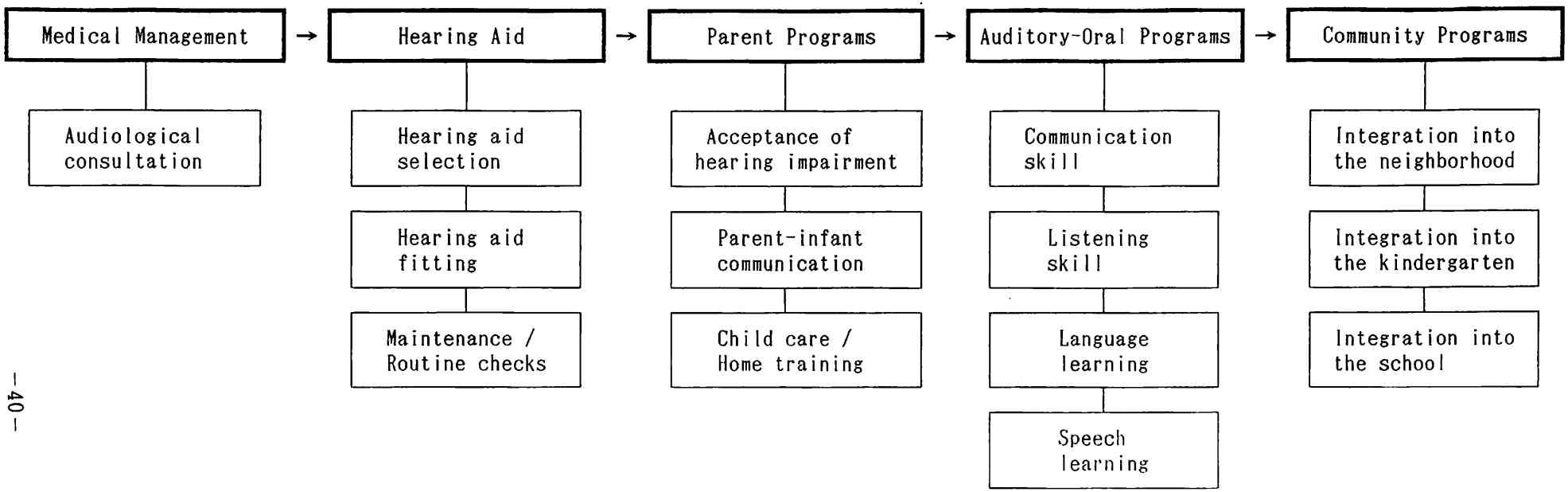


Fig.13 Model of habilitation program for hearing-impaired children

2. Parental Support Program

Parents play an important part in the effective implementation of early habilitation of hearing-impaired children. A good relationship with parents and clinicians alike are the key to successfully achieving the objectives of the rehabilitation program.

<Goals of the Parental Program>

(1) Understanding and acceptance of their child's disability.
(2) Sensitivity to the child's feelings, interests and concerns.
(3) Sympathizing with the child.
(4) Relating to the child in an enjoyable way.
(5) Communicating at the child's level.
(6) Be a good communication model for the child.
(7) Providing a proper hearing environment.
(8) Providing a rich speaking environment.
(9) Practicing meaningful activities repeatedly.
(10) Applying what is learned into daily activities for the child to understand.
(11) Getting support from all family members.

<Activities of the Parental Program>

(1) Promoting the role and responsibility of Parents.
- Counseling
- Guidance concerning the hearing disability and the child's future prospects
- Introducing to other parents who experienced the same difficulties

(2) Assisting in building skills as communication partners for children.
- Observation of means of communication between specialist and child
- Practical training of mother's and child's communication in play and everyday life situations

(3) Gaining knowledge and understanding of hearing impairments
- General knowledge of hearing and its functions
- The nature of the child's hearing loss and its care
- Hearing aids and their management
- Needs for medical treatment and audiologic assessment

(4) Understanding the child's development and learning
- Overall developmental of children
- Needs for auditory and speech-language learning

(5) Understanding the child's personality, development, and learning behavior

- Promoting sensitivity of parents through parent-infant interactions
- Use of diaries and video tapes

Specialists must provide instruction with careful consideration of parents' feelings, way of thinking, personality, and economic situation. In response to the state of mental shock, which immediately follows the diagnosis of hearing impairment, the hearing specialist must sympathize with the parents, and encourage a feeling of acceptance.

3. Intervention in Parent-infant Communication

<Pre-Linguistic Period>

Children learn to trust people through their affectionate relationships with their own mothers. The special bond between mother and child is created by means of sympathetic communication. Communication during the pre-linguistic period does not occur in the form of words, but in terms of vocal plays, facial expressions, eye movements, and body contact. Of these, the vocal plays are particularly important for attracting attention and communicating emotions such as anger, happiness, and sadness. Normal hearing parents spontaneously communicate with their babies using their own voices. However, voice communication becomes difficult for hard of hearing children. As a result, the affectionate relationship between mother and child becomes weak in some cases. Therefore, the first step that should be taken in habituation is to amplify sounds to make sure that they get through to the baby. Amplified sounds combined with rich facial expressions and gestures help the baby to understand the message communicated to him or her.

It is important that the mother sense the child's feelings quickly, respond sympathetically, and express her affection clearly. When the child understands the mother's intention, the child will, without fail, respond. In this way, the path of communication between the hearing-impaired baby and the mother is opened up and their relationship is strengthened.

<Instruction in Means of Communication Skill>

90% of the parents of hearing-impaired children are normal hearing people. Consequently, a variety of communication problems arise between

such parents and their offspring. It is important to note that the place where communication occurs is the place for learning language. In addition to location, the following issues require special consideration in promoting language development in daily communication situations.

(1) Means of communication
(2) Combination of communication modes
(3) Eye contact, eye movement and direction
(4) Position of the child
(5) Feedback
(6) Manner of speech (e.g. intensity, articulation, speed, intonation, and timing)
(7) Use of words (e.g. length, structure and vocabulary)
(8) Communication attitude (e.g. sympathy and responsiveness)
(9) Repetition
(10) Language model

In order to promote optimum communication, close observation with appropriate understanding and careful listening to what the child is trying to say are important. It is crucial that parents simply wait without becoming directive, accepting their child's inadequate expressions, and their giving feedback or display models in a way the child can understand. Since speech sounds disappear the moment they are spoken, appropriate repetition is necessary for the child to remember the acoustic image of speech.

The specialist gives parents guidance on communication skills with showing adequate communication model and / or using video tapes of parent-infant interactions.

4. Auditory Learning

<Steps in Auditory Learning>

(1) Awareness of sound
(2) Association of the acoustic stimuli with its source
(3) Gestalt recognition of sound-generating objects
(4) Memorization of sound images
(5) Identification (prediction) of the meaning of the sound

<Strategies of Auditory Approach> (Kanayama, 1991) [10]

(1) Convey the vocal message with affection
(2) Show an interest in the sounds and voice emitted from the child

(3) Develop an attitude to associate sound with its sources, especially to what the child shows interest in.
(4) Make the child relate between sounds and his or her own daily activities
(5) In order to develop auditory images, provide the child with a wide range of experiences associating sounds to nature, in social activities, changes in things and scenes, the emotions and actions of humans, and so on.
(6) Broaden the world of hearing
(7) Develops and attitude of enjoying listening to sounds
(8) Establish the child's auditory feedback function by having them express sounds with their own words.

Striving towards the utilization of hearing is the systematization of hearing directly or indirectly in response to the person's existence itself or social adaptation. In the course of this process, it is necessary for the child to have many verbal and non-verbal hearing experiences in his or her daily activities. This should include, not only listening to sounds, but also touching sounds themselves, and creating sounds, (i.e. giving the child ample sensomobile experience).

Sounds overflow in everyday life and the listener needs to select what they need to hear from all kinds of sounds. This selective hearing ability is related to the child's spontaneity and optimism. If spontaneity is not developed adequately, the ability to select cannot be developed. The ability to take appropriate action, by selecting information that must be focused on at any given moment (in relation to the surrounding situation), is the key to developing the ability to gather and select information for the hearing-impaired child.

Speech contains both segmental characteristics and suprasegmental characteristics. The hearing perception of speech by hearing-impaired children can involve the insufficient development of segregating those double characteristics in speech. That is to say, the child continues to rely mainly on suprasegmental information, such as the intonation and rhythm of speech, but not segmental characteristics such as the perception of the syllables and phonemes which make up speech. After speech has been learned or adequate situational cues are given, even minimal cues of rhythmical information will suffice for the brain analyze its content by filing in sounds

and words to determine the meanings of speech. However, part-way through the learning process, it is necessary to incorporate phonetic information and develop the phonetic structure of language. In order to ensure that the auditory image of speech is adequately formed, it is a good practice to consider listening carefully, repeatedly, to promote auditory-vocal feedback, and to use visual means of communication such as letters of the alphabet, etc.

5. Speech and Language Learning

The learning of language may be considered to have three aspects: (1) vocabulary - syntactic aspect, (2) semantic aspect, and (3) pragmatic aspects. In general, these three aspects are learned inseparably in an extremely natural manner for normal hearing children, as long as they are in a normal communication environment. In the history of speech and language training of hearing-impaired children, however, there has been a tendency for one of these aspects to be strongly focused upon. Instruction in the formal training format of the past often resulted in the practice of language in which, even if the person knew the words and their meanings, they were unable to use them appropriately in a practical manner. This resulted in an increased awareness of the importance of learning in the same way as the language learning methods used by normal hearing children. Furthermore, it should be noted that the use of residual hearing makes it easier to learn words in daily communication situations, and that the importance of communication for the hearing impaired is increasing even further. An important point which we need to be aware of is that in the communication process, people are so geared toward content that they disregard syntax. There should be a proper balance of syntax, semantics, and pragmatics in learning language.

<Steps of Learning Speech>

(1) Perception and understanding
(2) Imitating use
(3) Induced use
(4) Spontaneous use

Being able to use words freely illustrates the ability for instantaneous processing of words. Hearing-impaired children process those

words using two senses - hearing and vision (lip-reading.) It is, therefore, more important than anything else for them to develop the auditory and visual pathways for the processing of speech. Ordinary people are inclined to focus on speech production, rather than on speech perception. However, for hearing impaired children, the stress must be placed on speech perception and auditory comprehension. It is necessary to repeatedly listen to words in order to adequately form and acoustic image of speech. In everyday situations, it is sometimes possible to understand a whole sentence by catching only the keywords. One can understand the meaning by leaving out particles or prepositions that sometimes are not audible if the listener can decipher content words which usually have strong intensity. This is acceptable if language is acquired properly. However, such a way of understanding in the peli-linguistic stage negative impacts language learning. When the child is in a language learning period, the overall picture of the words must be adequately perceived.

Generally, in any country, children play many games with words. By repeating these word games, the content of language is broadened and mastered. For example, there are a variety of pleasing words, magic words, idiomatic expressions in games, picture books, picture-card shows, songs, play-acting, card games, capping of verses, riddles, and crossword puzzles. These stretch from babies to older children. When raising a hearing-impaired child, create many games using these word games and enjoy them with the child. It is good to give fixed names and created words to activities that small children seem to enjoy and to create a fixed format for such games. Reenactment games, which repeat something experienced earlier, and games like shops and doctors, which recreate a particular situation can be quite useful.

By modifying a variety of teaching materials to the age and interests of the child, he or she will come to enjoy language learning. Another important element of learning language is learning through experience. In particular, daily activities are the best opportunity for experience and expanding communication. Before anything else, hearing-impaired children ought to be positioned as members of the family, regardless of their handicap. Children learn the basic way of living and inherit and create culture and values from living the lives of humans. It is necessary to communicate and interact with the child, so that they can envision how people normally live. If daily activities are performed with the child, he or

she develops a feeling of integration, sympathy with other family members, and achieves a feeling of satisfaction. A variety of work capacities are improved and expectations for activities are created. In repeating this process, the child learns words that they need to live their lives. Children up to the age of three years have a surprising ability to observe daily activities. However, after that, their way of viewing things becomes more generalized and less sophisticated. It is important to associate from time to time their experiences in daily activities (e.g. brushing the teeth, washing a glass, etc.) with specific words during this crucial period when children show strong interest in the daily routines of their parents. The following is a mother's record with her child referred to as "D".

Today I showed my son a picture of a bathroom drawn yesterday and said "Let's clean the bath tub, shall we?" To which he replied "hh, let...clean." Then he went to the bathroom together with his sister. After they worked together clearing the bath tub and shower, they ran water in the bath tub. We went back to the bathroom later, and D said "full" and then turned off the tap. The three of us also put out our bedding together. When I told D, "Pull it there, D," he pulled it with all his might, and the three of us perspired while putting the bedding out. His sister said she had a sweaty neck, so D and I touched her neck together and I said "It's sticky. It's sweat. What about your neck, D?" And we touched each other's necks.

As this record shows, mutual affection and trust are formed by coping with the child's pace and sharing experiences together. The child is able to actively learn words in meaningful situations and have a variety of firsthand experiences.

6. Integration

Generally speaking, integration refers to the education of hearing-impaired children is regular school settings. However, a hearing-impaired child is born into a hearing household, and there are many normal hearing people in the community. Thus, it is natural and a matter of course in our society that normal hearing people and hearing impaired people live together. Consequently, normal hearing people ought to understand the world of the hearing-impaired, and vise versa. Integration may, therefore, be referred to as a concilation and coordinational based on the mutual understanding of both parties. It is required then, as the first step, to achieve natural integration among the hearing-impaired child and their family members.

Based on this philosophy, Kanayama (1991)[19] proposed integration in steps as outlined below.

(1) Home integration (Infant period)
(2) School integration (School education period)
(3) Social integration (Adult period as a member of society)

<Making Friends for Hearing-impaired Children>

In achieving smooth integration, we should be aware that hearing-impaired children are forced to exist as a minority in this society. Among an overwhelmingly large number of hearing people, hearing-impaired children are subject to a great deal of emotional stress. Children may often feel isolated or left out due to a lack of information in addition to their difficulty in communicating. For these reasons, it is important to create the opportunity for them to be together with friends who share the same disability. Japan has instructional institutions for hearing-impaired children as well as associations of parent groups in various regions, both of which perform a variety of activities. When children are still young, parents and children meet together and exchange information and feelings. Within these groups children can find friends with similar disabilities. In addition, by coming into contact with older hearing-impaired children and adults, the younger children are provided with role models for their own futures. Children have the right to have both hearing friends and hearing-impaired friends. Having the same group of friends from a young age enables the child to accept his or her own hearing impairment and act both affirmatively and positively. When these children become high school students, university students, and working members of society, these friendships create opportunities for meeting each other, exchanging information, and becoming involved in recreational activities together.

The integration of hearing-impaired children, taking the approach of ensuring that the child is not segregated from other peers, results in the success of true integration. The disability of being hearing-impaired, therefore, cannot be viewed merely as a disability of language competency. As the child develops, he or she will experience a variety of problems at various stages of development. Therefore, it is important to create support and follow-up frameworks with long-term perspectives.

<Towards Mutual Understanding>

In promoting integration, people must be educated to understand the state and condition of what it means to be hard of hearing. Because normal people take hearing so much for granted, it is difficult to make them aware of the ways in which hearing is used in their everyday lives and existence. Therefore, it is recommended that specialists, parents, school teachers and students use ear plugs to experience a pseudo-hearing impairment situation. By doing so, the people involved can gain new perspectives about the way they think about bearing.

7. Life-Long Support Programs

Hearing impairment is not a disability that is curable. Even with the advanced technology of hearing prosthesis, proper guidance of language learning advances and speech developments, various problems such as hearing management, adjustment of hearing aids, proceeding higher education, finding employment, and social acceptance still remain. A considerable number of people also face the problem of establishing their own identity, especially in puberty and adolescence. This is often observed in those with mild and moderate hearing impairments who experience problems accepting their disabilities.

Adequate support systems to combat these problems have yet to be put into place in Japan. Some specialists are responding individually, while parental associations also provide advice. Currently in Japan, groups of hearing-impaired people, themselves, have great power in challenging these problems. Associations of hearing-impaired and deaf people in various regions are holding consultations, working in the government, and setting about establishing information centers for the hearing disabled. These organizations are also actively involved in providing information on hearing aids, life supporting goods, and available regional services.

An increasing number of hearing-impaired students are getting high education in college, and services of sign language interpreters and note-takers are gradually improving. In addition, while a heavy reliance on volunteer remains, understanding among schools and students in general is improving.

On the other hand , the Tsukuba Technical Junior College for hearing-impaired students was opened in 1987. It is a three year junior college that has four departments (Design, Mechanical Engineering,

Architectural Engineering, and Electronic Information Engineering) five offering majors. In the past, almost all of the people entering colleges were graduates of normal high school. Now, however, with improvement in education for the hearing-impaired, such as Tsukuba Technical Junior College for hearing-impaired students, there are increasing opportunities for graduates of deaf schools to enter university. Approximately 10% of hearing-impaired people now pursue higher education.

In Japan today, as in many other developed nations, rapid modernization, advanced economic growth, and the conveniences of an information-oriented society have come with a cost. Problems such as psychosomatic disorders, neurosis, and mental illnesses have become more prevalent. Of both hearing-impaired and normal hearing children, an increasing number are requiring psychological care for truancy, bullying, and discrimination. Consequently, there is a greater need for counselors and psychiatrists who also have knowledge of hearing impairment and are able to communicate satisfactorily with hearing impairment children and adults.

The habilitation of hearing-impaired infants involves not simply speech and language therapy services. It entails establishing a comprehensive habilitation system that responds to the variety of problems surrounding these children and takes into account their lifestyle from infancy through to adulthood.

VIII. Conclusion

The habilitation and education of hearing-impaired children in Japan has reached a great turning point. In the past thirty years, educational placement and habilitation programs have changed enormously. Almost all hearing-impaired children were educated at schools for the deaf up until to a few decades ago. Now, however, has become possible to select the means of education as well as the institute for rehabilitation, such as hospitals, rehabilitation center, and nursery schools for the hard-of-hearing. These recent results demonstrate the value and effectiveness of auditory learning. In this evolutionary process, it has become clear that the objective of habilitation and education should not simply be to have hard-of-hearing people treated just the same as the normal hearing people. The ultimate objective of habilitation and education for hearing-impaired people is to support the affirmative and positive development of his or her own life as an accepted member of society. These people should regard their "hearing-impairrment" as one of their individualities and while it is inconvenient, it should not be viewed as unfortunate. Hearing-impaired people are starting to reveal their disability as a matter of course, rather than hiding it. Accordingly, they are beginning to demand understanding and the necessary support from government and society.

Initially, integration largely depended on the effort of the individual hearing-impaired child. However, the successes of these "pioneer" children has given others the strength to create understanding by removing the prejudices against hearing impairment held by many normal hearing people. In Japan today, concern is now beginning to focus upon the support systems for hearing-impaired children that are integrated into mainstream school education.

On another front, the deaf are starting to discuss their opinions concerning education and habilitation from the standpoint of deaf culture. They are promoting "sign language" as the first language of the deaf. Such a movement is providing a good opportunity to question the direction of education and habilitation for hearing-impaired children in Japan. The most important step in these processes is developing adequate human resources. In the past, Japan did not have the educational framework in place for Speech-Language Pathology and Audiology. Consequently, speech clinicians, a unique group in the Japanese workforce, had to generalists -

dealing with disabilities in both speech-language and hearing. Times have changed, however, and we have now reached an era which requires advanced specialty in both the areas of speech-language and hearing disabilities. In the future, the fundamental issue is to develop specialists who have advanced skills and knowledge, who are able to regard a child as an individual, and who can instruct them with along-term vision.

We hope that the education and habilitation of hearing-impaired young children will continue to advance in Japan, as it has done since the 1960s. Only through the continued efforts educators, and policy makers, in combination with an increasing public awareness and understanding of the situation of the hard-of-hearing can we hope to give them the chances in life that so many of us take for granted. We must continue to strive to meet the specific needs of each child, and to treat everyone of them as an individual person. In doing so, perhaps we can all learn some valuable lesson about ourselves and our society.

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Note:*This material is available in Japanese only.