IQ VARIATIONS CONSEQUENT TO SPEECH AND LANGUAGE THERAPY AMONG HARD OF HEARING CHILDREN

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C E R T I F I C A T E

This is to certify that the dissertation entitled "IQ Variations Consequent to Speech and Language Therapy Among Hard of Hearing Children" is the bona fide work in part fulfillment for M.Sc. Speech and Hearing, carrying ICO marks, of the student with Register No.18.

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C E R T I F I C A T E

This is to certify that this dissertation has been prepared under my supervision and guidance.

Guide. T. Bharathy Raj

15.5.72.

D E C L A R A T I O N

Thia dissertation is the result of my own study undertaken under the guidance of Mr. J. Bharath Raj, Reader in Psychology, All India Institute of Speech and Hearing, Mysore, and has not been submitted earlier at any University for any other diploma or degree.

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C O N T E N T S

INTRODUCTION

Many Western studies have been reported comparing the hard of hearing and normal groups with reference to mental development. One group of such studies (Pintner & Reamer et al. 1920) have pointed out that the hard of hearing as a group are about 2 years retarded mentally as compared with the normal.

But according to some other group of studies that there is no significant difference between normal and hard of hearing as far as mental development is concerned. Inspite of this controversy, the general agreement is that the hard of hearing children on the average are two years retarded mentally. These conclusions have been debated ever since, with increasing evidence that the basic problem is not mainly the observed mental inferiority, but a group of concomitant factors consequent to hearing impairment. Hence, it warrants to indicate the factors which seem more critical to the total capacities of the hard of hearing group.

Many workers have emphasized the importance of speech stimulation and experience in the mental development of children with normal sensory capacities. Piaget (1950), especially has stressed the significance of hearing, vision and symbolism as the foundations of intelligence. The importance of language in the education of the hearing impaired is a long accepted thing.

As the hard of hearing cannot hear the spoken language and therefore do not have a model language pattern to follow, present defective speech and in some cases with profound hearing loss, limited speech or no speech at all.

However, the question raised most frequently concerns the connection between intelligence and language. A philosophical position commonly held is that without language there is no thought and inferentially there is no human intelligence. This implies that if language development is precluded, mental development will be affected. If mental development varies mainly as a reciprocal of the limitation in language acquisition, it follows that if the language limitation can be alleviated, more normal development of mental capacities can be enhanced. It has been hypothesized in some other studies that this line of retardation is correctable, through special training procedures in speech and language with hard of hearing children.

An area of considerable theoretical interest and of practical value would be to see whether a real improvement in intellectual level will follow consequent to speech and language therapy, and, if so, to what extent. Such a study has been made before, with reference to a ease of (twins) delayed speech and language development.

It may quite well be possible that such therapy or training offered may be beneficial to the hard of hearing group even bringing about improvement in overall intelligence. If it does,

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it will assume immense significance therapeutically.

Another point is, that the hard of hearing do not present problems limited to the intellectual area alone. Research findings pertaining to social maturity of hard of hearing children from early life have pointed out limitations to reach optimum social maturity levels as well. The conclusion that those with profound hearing loss from early life have increased dependency is confirmed by the experience of educators as well as research workers who recognize that this sensory deprivation is of considerable consequence in the total behavior of th$ individual.

A basic question confronting all who work with the hearing impaired is the extent to which this greater dependency, this greater need for assistance, can be alleviated. However, it is not assumed that all dependence can, or should be, overcome. Unlike the hearing child, the hearing impaired child needs consistent training in social maturity over a long period of time. Hence, it may be assumed, that such a program warrants the inclusion of a detailed program of instruction as a regular part of the educational curriculum, in attainment of social maturity at all age levels.

The preceding discussion justifies the urgency of carrying out research studies oriented towards the estimation of the degree of slowness or retardation presented by the hearing impaired as a group. Quite possibly this degree of slowness or

retardation could be related to the severity of hearing impairment. Along with the light to be thrown on the effect of hearing impairment on the mental development, it would be of clinical significance to study how hearing impairment affects social maturity. As presumed if it were to be brought out through experimental studies that mental development and social maturity are affected by hearing impairment, and also that these can be improved upon through the speech training procedures even over long duration, such a result would be of paramount importance to clinicians. We could also draw up programs, the optimum duration of which could be determined empirically with the incorporation of chosen speech training procedures for indicated cases.

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REVIEW OF RELATED LITERATURE

Intellectual functioning of deaf and hard of hearing persons has been studied extensively in the West since the advent of IQ tests in the early 1900s. The early work has been identified mainly in the studies of Pintner and his associates (Pintner & Reamer et al 1920). From his studies it was reported that children who are hard of hearing were below average in mental capacity. The findings of Pintner and Reamer's study, when investigated on 2,172 children in the 26 schools of the deaf, was that the subjects were on the average 2 years retarded mentally. However, criticism against this finding was (a) test was a group test (b) seme items were verbal. Another study conducted by Kendall (1957) by taking 392 hearing impaired children, ranging in age from 18-65 months and using 328 normal group serving as controls concluded that - (1) no significant difference in intelligence between hearing and hearing impaired children at any level. (2) In the cases of severe mental retardation the causes of deafness was attributed to Rh factor, rubella, meningitis, streptomycin treatment, etc. (3) No significant difference in sub-groups of hearing loss. For this investigation he used the Merrill-Palmer Scale (Stutsman 1931).

Berlinsky (1952) has given a complete review on the early development of testing. As a result of reviewing the various studies, Berlinsky concludes that in general, the deaf show

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slightly lower general intelligence than persons with normal hearing. He found such factors as age of onset and adventitious or congenital hearing loss to have no effect. Levine (1963) contends that the deaf are similar to the hearing in terms of potential, but that cognitive functioning is less well-integrated in the deaf.

Zeckel and Vanderkolk (1939) used the Portens Maze Test in a study comparing the congenltally deaf with the normal hearing. The inference was that the deaf children were mentally retarded and that the deaf girls were inferior to boys. Their explanation was that deafness from birth had an impact on psychological processes in general, and that the marked language limitation resulted in a permanent effect on mental development. It is interesting that these early workers emphasized the conjunction between deafness and intelligence. "They did not say that both inferior mentality and deafness were present, but attributed the intellectual defecit to a reciprocal effect of the deafness itself." (Myklebust 1964).

McCay Vernon (1969) concludes after surveying the research on the psychological and sociological conditions of the severely hearing impaired, that these data reveal an essentially normally distributed intellectual potential and cognitive capacity. However, he reports that the data on educational achievement and level of vocational attainment indicates that the hearing impaired population is grossly below the national averages.

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Burchard and Myklebust et al (1942) opine that to be valid as a measure of the intelligence of the hearing impaired youngster an IQ test must be a nonverbal performance type instrument. Verbal test with hard of hearing children are almost always inappropriate. They measure language deficiency due to hearing loss rather than intelligence (Brill 1962, Levine 1960, Myklebust 1962). The results indicated that when individual performance tests were used, children in schools for the hard of hearing were of average intelligence. Then, these findings indicates a contradiction to those of Pintner.

Vernon and Brown (1964) contend that "Nonverbal tests provide the only valid measure of intelligence of the deaf child since any verbal test would reflect his language deficiency. This contention also has drawn many comments. Donald G. Doehring (1965) questions the predictive validity of nonverbal IQ scores. A verbal IQ would undoubtedly tend to underestimate the total adaptive ability of the deaf child, but it does not necessarily follow that a nonverbal test will provide a valid estimate. The validity of the intelligence test must be judged relative to the intended use of the test score. Do nonverbal IQ scores provide useful predictions regarding the verbal learning abilities of deaf children? However, he concludes his comments thus - 'the above comments are not intended to imply that the nonverbal IQ tests should not be given to deaf children, but simply to emphasize the point that a nonverbal IQ must not be interpreted uncritically,

and also to suggest a need for development of new procedures to assess the verbal capacities of deaf children.'

Another early study by Mackane (1933) resulted in a similar finding that the IQ of a given individual can vary with the test used, and that some hearing impaired children may be less than a year retarded on performance scales and yet be 2 years retarded on language tests.

With reference to verbal intelligence among hard of hearing children Luria A.R. (1961) states that - 'Because of severe linguistic deficiency in the great majority of deaf children. The deaf child will have limited experience of the regulatory function of language and will not be able to assimilate his auditory environment by means of verbal mediation in the manner open to the child with normal hearing'.

Another controversy is regarding abstract reasoning among hearing impaired children. Vernon (1969) states that - "more sophisticated fallacy is that deaf and hard of hearing persons have a lowered capacity for abstract thought". Research on the relationship of language to thought as it is manifested in deaf and hard of hearing persons shows clearly that the potential for abstract thought is as prevalent among deaf people as among the hearing (Furth 1966, Lenneberg 1967, Vernon 1967). Only in those cases of hearing loss where the disorder or condition causing the hearing loss sometimes levels residual brain damage which affects intelligence and thought patterns.

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Examples of such conditions are meningitis, complications of Rh factor, premature birth, maternal rubella, and certain genetic syndromes (Hardy 1965, Hardy et al 1966, Vernon 1967, 1968, 1969). On contrary to these findings Oleron (1953) emphasized that the hard of hearing have difficulty in making deductions from clues that are not observable. Templin (1950) has also studied the abstract reasoning processes of deaf children and found them to be significantly inferior to the hearing. Furth (1966) has suggested that this type of failure might be derived from experiential defecits and language incompetency, forms of cultural deprivation rather than deficiency of abstract intelligence.

Vigotsky (1962), Luria (1961), Werner (1963) and Bruner (1964) have postulated that mental growth occurs only as a symbol system arises and language forms the basis for the development of intelligence. Hence, in the case of hard of hearing children without brain damage the development of intelligence can be facilitated through special speech and language training.

Although there have been a number of studies available pointing out the difference in intellectual levels between the hard of hearing and normals, there is a great need regarding the studies pointing out improvement in intellectual level consequent to speech and language training procedures. With reference to this, there are those who maintain that Speech and

language training procedures to the hard of hearing do improve their intellectual levels of functioning. Again there are those who do not subscribe to this point of view.

Among the first attempts to understand more about the thinking that goes on behind the performance test IQ's of the deaf was the investigation by Levine (1956), of a group of deaf adolescent girls selected for 'typicality'. Test battery included both the verbal and performance test - Wechsler-Bellevue Intelligence Test for Adults. Analysis of the total results revealed that although the deaf subjects were quantitatively on an IQ par with the hearing, there were distinctive and significant deficiencies in patterns of thinking and reasoning, in conceptual maturation and in level of abstractive ability. These deficiencies appeared to the investigator to resemble a picture of "underdevelopment" of mental potential and the hypothesis was advanced that they are correctible, through more effective educational procedures. Abstract deficiency was also reported by Templin (1950) and again the educator is alerted to the fact that - "since retardation persists even when intelligence is controlled, a heavy share of the burden of this deficiency must be attributed to the specific training of the deaf subjects". The validity of this observation appears to be supported by Smith (1962) in which both the verbal and performance portions of Wechsler Intelligence Scale for children (WISC) was used with congenital, mild hearing loss and late onset of hearing loss. As expected

there was great difference between congenital hearing loss group to mild and late onset of hearing loss group. The important point however, is that the investigators report of increase in verbal IQ of the congenitally deaf with continued education, thereby showing the closeness of the relationship between IQ and educational advantage.

For a hearing impaired child, language is a means by which educational goals can be achieved. In recent years importance is being given to the preschool training of the hard of hearing children. It has been confirmed that these years are most conducive to language development. Mental development ultimately depends on language development (Burchard 1954). On the same issue, that is, speech and the development of mental processes in children, the Russian scientists Luria A.R. and Yudovlch (1959) have done a study in the case of twins who were delayed in speech and language development.

Language which incorporates the experience of generations, of mankind, is included in the process of the child's development from the first months of life. By naming objects and so defining their connections and relations, the adult creates new forms of reflection of reality in the child incomparably deeper and more complex than those which he could have formed through individual experience. This whole process of the transmission of knowledge and formation of concepts, a

basic way in which the adult influences the child, constitutes the central process of the child's intellectual development.

The 'word' has a basic function not only because it indicates a corresponding object in the external world but also because it abstracts, isolates, the necessary signal, generalises perceived signals and relates them to certain categories; it is this systematization of direct experience that makes the role of the word in the formation of mental processes so exceptionally important (Luria 1959).

Vigotsky (1934), was one of the first to express the view that speech plays a decisive role in the formation of mental processes, and that the basic method of analysing the development of higher psychological functions is investigation of that reorganization of mental processes which takes place under the influence of speech.

Intercommunication with adults is of decisive significance because the acquisition of a language system involves a reorganization of all the child's basic mental processes; thus, the word becomes a tremendous factor which forms mental activity, perfecting the reflection of reality and creating new forms of attention, of memory and imagination, of thought and action. Vigotsky also arrived at the fundamental conclusion that human mental development has its source in verbal communication between child and adult, that, a function which is earlier divided between two people becomes later the means

of organization of the child's own behavior. Luria (1959) has raised the same issue with reference to hearing impaired children. Excluded from speech communication because of his defect in hearing he does not possess all those forms of reflection of reality which are realised through verbal speech.

Luria further infers that - if the child's speech activity can be changed in a relatively short time it becomes possible to investigate variations in mental processes which arise as a direct consequence of this development of speech.

For this contention, Luria studied twins with retarded development of speech. For the selection of this type of case, the explanation given was in cases of retardation in the development of speech, an artificially hastened acquisition of speech may lead not only to the enrichment of speech activity, but also to a substantial reorganization of the child's whole mental development. Hence, he concludes that, if there is retardation in speech communication, consequently there must also be underdevelopment of all those aspects of mental activity which depend on the acquisition of full value speech. Consequently an educational experiment of this kind could contribute to the solution of that most important psychological problem, the role of speech in the formation of mental processes.

Luria and Yudovich (1959) have studied this proposition by taking identical twins with retarded speech development.

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It has long since been noted that there is a certain tendency to retardation of speech when twins grow up together. Since their lives are linked in the closest way, and they understand each other in the course of joint practical activity, twins are not faced with an objective necessity for transition to speech communication so frequently as other children. Their speech was severely retarded since they used only a small number of barely differentiated sounds. History reported that they did not speak at all upto the age of 2 years and at the age of two and a half years they were able to speak only 2 words. At the age of 4 - a very few sounds which they used in play communication. At the age of 5 - they were able to articulate a few sounds and Many sounds were not pronounced at all. The twins behaved in a lovely competent manner, they were of average Intelligence, and other factors were normal but for retarded speech. One of the twins served the purpose of control for the investigation. Their play was monotonous and they showed no ability to construct or used play material imaginatively. Their intellectual operations thus remained very limited, and this factor induced to study them separately. Subsequently, a special systematic training in speech with one of the twins, with the aim of developing perception of speech, the habit of making use of developed sentences etc. was conducted.

Outcome of this study was very rapid, and 3 months after the experiment began, there was already a substantial

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improvement in the twins' speech. Barring some subtle mistakes in phonetics and grammar, their speech has approximated the normal speech of their counterparts. There was meaningful play between them; there arose the possibility of productive constructive activity in the light of formulated aims, and to an important degree there was a distinct series of intellectual operations which shortly before this was in embryonic state. In the course of further observations the investigators state that they were able to note cardinal improvements in the structure of the twins' mental life - hence they concluded - "We could only attribute to the influence of the one changed factor - the acquisition of a language system".

Thus the same point of view also has been given by Renfrew (1963). After reviewing Luria's study she contends that "this experiment demonstrates how closely linked the speech process can be with mental development". Further she states that - " if we accept the speech and mental development are closely related, it seems to me that in the education of the mentally handicapped stress should be laid on the development of the understanding and use of speech".

Therefore the results of above mentioned study tend to show that with the creation of an objective necessity for speech communication, one can estimate the extent to which language exercises this formative influence on mental processes. In the light of this finding a generalization of this can be

extended that the same results can be expected, if speech and language training was given to hearing impaired children, in order to facilitate their intellectual growth.

Swing, A.W.G. (1963) emphasizes the paramount importance of providing home training apart from therapy for the hearing impaired children. The conclusion of this study is that the progress in linguistic development and mental growth can be made possible through home training for the children during their first 4 years of life. Gessell (1956) has pointed out 'a great majority of children who are normal learn to talk before the age of three. So no one would dispute that this is of incalculable importance to their general mental growth and social development'.

* There is a dynamic relationship between vocalization and socialization. The foundation for speech training should be laid in infancy, remembering, however, that the 'Fundamental objective is not speech, but socialization'(Gessell A. 1956). There should be an unremitting emphasis on intercommunication. In the first 5 years of life, the cardinal objective on the management of the hard of hearing child is the conservation of all possible communication. Socialization to promote the optimal growth of personality is the basic practical problem.

The most disabling consequence of a speech and hearing problem is the restriction it imposes on social participation

(Myklebust 1950). Social maturity as an aspect of human behavior refers to the attainment of independence. All maturation and growth assumes progression toward a fully developed organism. From the point of view of social competence this means that maturation is the process through which one achieves independent behavior, especially as it relates to the acquiring ability to care for oneself.

Doll (1953) has defined "Social maturity as the ability to care for oneself and to assist with the care of others". Doll recognized that it was necessary to have a measure of the effectiveness of an individual's interaction with his society, a measure of the extent to which he attains the specific social competences expected from the society in which he lives. He termed this broad aspect of human behavior as 'Social maturity' and devised the Social Maturity Scale to measure it. It must be stressed that in measuring social competence, we are not considering mental brightness, integrity of sensory capacities or motor abilities, or the adequacy of emotional adjustment. Rather, we are measuring the person's total attainment in terms of performance, what he does with his capacities, his ability to care for himself and to assist with the care of others. This is a question of considerable importance in psychology and education of those with moderate and profound hearing impairments.

In the development of the Social Maturity Scale, Doll divided social maturity into six areas. These areas are

comparable to the various factors of intelligence measured by standard tests of mental ability. The major 6 attributes are - Self-help, Self-direction, Communication, Locomotion, Socialization and Occupation. As it is evident, because of the marked imposition of hearing loss in communication it can be presumed that this area would be most affected by this sensory deprivation, if it is sustained in early life.

Avery (1948) investigated the social competence of 50 pre-school deaf children and reported that they fell at the average level.

Treacy (1955) investigated the social maturity of deaf and hard of hearing children and its relationship to factors of intelligence. The mean chronological age (CA) for the deaf group was 9 years and 2 months; the hard of hearing, 10 years and 2 months. The findings were the hard of hearing fell within the average range, while the deaf fell at the lower limits of normal. Treacy attributed this to their obviously greater facility in language but generalizations could not be drawn because of the small sample involved.

Another important contribution of this study was that the comparison of the social maturity scores with chronological age as measured by the Primary Mental Abilities Test. In the Primary Mental Abilities Test, perception consists of visual-perceptual speed. The implication is that when deafness is profound and dates from early life, it is the visual perceptual

processes which must assume a leading role in the development of independent behavior. Hence these findings can accent a hypothesis that when a sensory deprivation such as hearing loss occurs, other capacities take on a more critical role. There was another finding of importance in this study. For the hard of hearing group there was significant correlation in positive direction between social competency and chronological age. As the hard of hearing child became older, he increased in social competence. This is the expected finding. In marked contrast, with reference to the deaf it was negative, that is, in the opposite direction. As the deaf child became older, he became less socially competent. Other studies by Streng and Kirk (1938), Myklebust (1954) contend that it is this level of social maturity which is difficult to achieve when profound hearing loss present since early life.

The correlations between intelligence and educational achievement scores and social maturity are also significant. Again it is apparent that there is a relationship between intelligence and social maturity in hearing impaired children. Then it can be stated thus, that higher educational achievement might be reflected in higher social competence. Likewise, if the social competence level can be increased, educational attainment also may be raised. The limitations in social maturity manifested by children having deafness from early life is essentially due to the limitation of language before the age of 15 years. Hence it is evident that, if the language

limitation can be reduced, this too will result in an increase in social maturity.

Social maturity scale is a measure of genetic maturation relative to the degree that an individual has become independent. It measures the extent to which he cares for himself and assists with the care of others. This scale is a generalized measure of individual differences. It incorporates all aspects of the individual such as intelligence, personality, motor ability, socialization, etc. In case a person presents a sensory defect, an intellectual defect or an emotional defect he will obviously fail on some of the items of the test. The limitations in these capacities will obviously be reflected is an under-achievement on the scale. The scale provides a measure of how the individual uses his capacities rather than providing a determination of the capacities per se (Myklebust 1950).

In studies so far reviewed, though no reference has been given to the assessment of social age in the case of hard of . hearing children by speech and language training procedures, a point of note has been made in alleviating social incapacitance through effective training in developing speech and language.

One of the well standardized developmental scales available for the measurement of social competence is the Vineland Social Maturity Scale. In fact, a number of studies

which aim to obtain a measure of social competence have used this scale.

This short account in literature reveals that more emphasis is laid on the controversy between the hard of hearing and normal group with reference to their level of intelligence - whether the hard of hearing as a group are retarded or not. Some issues are concerned with the type of instrument employed - verbal versus performance tests. But research regarding the studies pointing out the improvement in intellectual level consequent to speech and language therapy seems to be very less. However, mention has been made by Levine (1963) that retardation is correctible by special training procedures. Luria (1959) has done a similar type of study by employing retarded speech and language cases who were retarded in abstract use of language due to limited acquisition of speech. Renfrew (1963) agrees to this contention by emphasizing that speech processes and mental development are closely inter-linked attributes in a child.

Swing's study concentrates mostly on the home training program and thereby the influence of that in the development of language and mental growth.

The fact that speech and language therapy procedures when tried with the aurally handicapped brings about improved communication is beyond debate. With this improvement in

communication one can expect an overall improvement in learning, adaptation and behavior also. If this contention has substance the improved communication must elevate the level of intellectual functioning. The importance of language teaching for the hard of hearing is an indisputed matter. Dr. Silverman (1955) states that 'one point we have reached - almost universal agreement is that language is the keystone upon which successful education of the deaf ultimately rests'.

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STATEMENT OF THE PROBLEM

The major aim of the present study is to investigate whether a real improvement in intellectual levels will be found among the hearing impaired children consequent to speech and language therapy.

There are conflicting opinions about the slowness or what is often described as a "Functional lag" in mental development among the hearing impaired when compared with the normal. Pintner and Reamer (1920), Myklebust et al (1960) have come out with the finding from results of their studies that this lag is by about 2 years. On the contrary, Levine (1963) and others have pointed out that there is no significant difference between the normal and the hard of hearing,

As the present study envisages to measure quantitatively changes in IQ scores, it is also proposed to put it to test whether among Indian children there is any slowness or retardation when compared with the normal children.

In a study like this it becomes necessary to evaluate speech and language levels of children before and after therapy. It is also true that at present in our country we do not have any standardized instruments for purposes of evaluation. Therefore, only a qualitative description of these levels have been attempted which would give us an idea about their speech and language levels prior to, and, after therapy.

Presuming that speech and language therapy procedures when tried with the hearing impaired children does bring about improved communication and in turn, bringing about an over all improvement in learning, adaptation and behavior, it is necessary to describe through what procedures such changes are taking place. Therefore an attempt has been made to give a precise description of the specific speech and language therapy procedures tried with the clinical experimental group.

Time and again, several studies have pointed out how age becomes an important variable related to learning potentialities. The subjects used in the present study were all children. For practical purposes the clinical experimental group has been divided into 2 groups. One younger and the other older on the basis of age. On the basis of the experimental studies reported, the younger group must prove to be better than the older group in learning potentialities which would be reflected in IQ scores. A subsidiary object of the present study is to assess the validity of this contention.

The degree of hearing loss itself becomes a Variable affecting the acquisition of speech and language and the levels of intelligence reached after speech and language therapy. It is to be expected that moderate hearing loss cases must obtain better IQ scores and better acquisition of speech than the severe hearing loss cases, although the type

of speech and language training procedures are the same for both the groups. This also has been included as the subsidiary objective of the present study.

A study like this would throw light on the possible cultural factors that may bring about changes in IQ scores or acquisition of speech. Although this aspect has not been included within the compass of the present study it may bring out certain factors which may further be investigated.

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DESIGN OF THE EXPERIMENT

In view of carrying out the present research study two groups were used. One, the Clinical Experimental and th+ other the Clinical Control. A normal reference group was chosen from the school screening data with the specific purpose of comparing the differences in mental levels between the hard of hearing and the normal children.

I 1. The Clinical Experimental Group

This group consisted of 29 hard of hearing children registered and investigated at the All India Institute of Speech and Hearing, ranging in age from 5 to 10 years. Only boys were selected for the group in order to eliminate the factor of facility in language learning among girls. All those cases with history of brain damage and/or with a finding of mental retardation of a gross kind were scrupulously eliminated from the study. The cases included had been investigated in the audiology department and had bean diagnosed as moderate or severe cases of hearing loss. All these cases were using hearing aid as recommended by the Institute. None of them was attending normal schools. For experimental purposes this group was subdivided into 4 groups. The mean chronological age for this group was 8.17 years.

1) Moderate Hearing Loss
2) Severe Hearing Loss

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3) Younger age group

4) Older age group

2. Clinical Control GrouP

This group consisted of 28 boys ranging in age from 5 to 10 years. This group of cases had also been registered at the All India Institute of Speech and Hearing and had been diagnosed as either moderate or severe hearing loss cases. All these cases had been advised speech therapy but in spite of this, as the cases were staying in moffusil villages around Mysore they could not visit the Institute for therapy. On a number of factors this group could have been equated with the clinical experimental group and hence considered as the Clinical Control Group. The mean chronological age for this group was 7.33 years.

3. Normal Control Group

Tnis group consisted of 29 boys varying in age from 5 to 10 years with a mean chronological age of 7.22 years. All the boys chosen for this group were taken from the school screening data.

All the cases from the three above mentioned groups were speaking Kannada language at home.

II Psychological Tests Used

For the purpose of evaluation of intelligence two of the

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widely used tests of intelligence namely, (1) Seguin-Form Board Test, (2) Vineland Social Maturity Scale, were used. The fact that the former test had been tried on a large group of Indian children and norms being available and that our groups ranged in ages only from 5 to 10 years favored very much the use of this test in the present study. This test is similar to many other non-verbal test tried with the hard of hearing children elsewhere.

As there were certain items from the original Vineland Social Maturity Scale which were not fitting into the Indian Cultural pattern, the Indian adaptation of the Vineland Social Maturity Scale devised by Dr, Malin has been used.

By using these tests mental age and social age were derived for the two groups and then converted into IQs and SQs as per the standard procedures.

III Speech and Language Evaluation

At the time of registration of the cases from the clinical experimental and the clinical control groups were evaluated for speech and language and a description of their status has been presented in the next chapter. These cases were evaluated by the speech therapists and were recommended for therapy in the Clinic.

A similar evaluation done by speech therapists after

6 months of speech therapy has also been provided in chapter.

IV Speech and Language Therapy Procedures

"Language depends on the establishment of an auto-corrective feedback system to which audition provides the main vehicle for successive approximation to adult models. The hearing child learns to use language long before he learns the grammatical rules. The process is a cumulative One, achieved through infinite redundancies of experience. The deaf child must learn language by special means which requires conscious attention" - Dicarlo (1964).

The deficiencies arising from hearing disability among hard of hearing children in terms of language may be manifest in many ways. It includes inadequate articulation, limited or nil vocabulary, inadequate auditory descrimination and inadequate or no grammatical structures. Sometimes there will be no speech at all, except for some vocalizations, i.e., no meaningful speech. Ordinarily, audition enables the infant to associate spoken stimuli uttered by family members with other auditory signals emanating from the environmental events and activities. It also enables the infant to relate his own vocal utterances with those of other person's and with other auditory stimuli from other events. The continual association of speech stimuli from self and others

together with auditory stimuli from countless non speech activities and events results in language development and environmental homeostasis.

The environment in which man learns and develops is multifaceted. The presence and characteristics of these are perceived by normal human organism through the availability of the several sensory modalities like visual, auditory and certain tactile organs. Sounds are transmitted from their sources as vibratory energy. Olfactory, gustatory, proprioceptive and other tactile features are perceived more directly.

Much of the symbolic and non-symbolic stimuli utilized in learning about and adjusting to environmental influences is auditory in nature. The world in which we live is never silent. Countless sounds emanate from environmental activities and are transmitted to distances as vibratory energy, and perceived by the human organism by use of the auditory organs. The utilization of vision in the language learning process is important but not critical to a normal hearing individual. With these implications interacting it necessitates that the therapy with hard of hearing children should be of multisensory approach. The speech and language therapy procedures as tried with the clinical experimental group were as follows.

1) Auditory Training - Discrimination between find and gross sounds

2) Speech stimulation - Speech training in terms of teaching sounds in isolation at syllable levels: discrimination between different sounds.
Correcting misarticulations.
Developing vocabulary

3) Speech and Language Training
Speech Reading
Concept Formation - color
number
self
writing
Problem Solving, arithmetic
Use of grammer,
Speaking at sentence level from simple 2-word sentences to a more complex level.

1. The main purpose of giving auditory training is to make the awareness of sounds through the use of squeaker toy objects, records and other noise makers. Thereby teaching the child to associate the sounds with the respective Objects. Helping him to localize the sound and naming properly in the environment. Discrimination practice is to show the difference between sound by proper reinforcement for correct

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identification to further the interest.

2. Speech Stimulation - Training the child to learn the basic foundations of sounds in isolation and at syllabic level. Correction of misarticulations encouraging spontaneous speech. Developing vocabulary was done by making use of picture cards, objects, etc. Vocabulary development of the child reveals much about the semantics or meanings derived by the child from his environment. It also provides insight into the realms of cognition and reasoning. Teaching a particular sound in isolation and in a word with meaning, either through picture cards or objects goes simultaneously. This vocabulary introduced in a structured method expects the child to learn the meaning of the word, how to say it, how to read it, and how to use it in written language simultaneously.

3. Speech and Language Training.

a) Speech reading: Another sensory mode which has been employed for the understanding of speech by hard of hearing children is that of vision. The correct identification of thoughts transmitted via the visual components of utterance has been called speech reading or lipreading.

According to O'Neill (1968), the teaching of speech reading operationally encompasses facilitation of the following four areas: (1) the development of communication

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efficiency; (2) the acquisition of speech; (3) development of language; (4) educational, social and vocational management.

b) Teaching simple concept formation - like, Color concept, Numerical concept, self, etc. To identify the different colors, matching and in association with numerals, and counting. Color blocks or Colored picture cards or by using any other sources which are available in the teaching situation. This helps in increasing vocabulary and language enrichment.

c) Writing: Teaching the child to write, alphabets, at syllabic level and at simple to complex sentence level. On dictation, and by copying.

d) Arithmetic: Simple arithmetic like addition, subtraction, multiplication, division, etc.

e) Use of simple grammatical structures: Verbs, Adjectives, Pronouns, Prepositions. Time elements like to-day, yesterday - in a meaningful context.

f) Speaking at sentence level: From simple 2-3 word level to a more complex level within the permissible limits.

These are not the clear cut steps in the realm of therapeutic procedures. Many of them are overlapping and some may supercede the other - for instance, Color concept.

To motivate the child and to develop interest in the therapeutic situation these were introduced in the playful situation and then they were being taught. Only primary colors were taught first. They were also taught how to discriminate, identify and match different colors.

All these procedures were made use of during the period of speech and language therapy with the clinical experimental group. All through the therapy period and outside the children of this group were wearing the hearing aids. Apart from trying these procedures the parents were given specific instructions to carry out the same type of speech training at home with these children.

V Experimental Design

The clinical experimental group will be tested on intelligence and social development prior to, being put on speech and language therapy. The results of this evaluation may be called E_1. A similar evaluation for the same group will be carried out after 6 months of speech and language therapy. This we will call E_2.

Similarly the clinical control group will be evaluated on the same lines prior to, and after therapy, for the clinical experimental group. This clinical control group will serve as control group as no language and speech therapy is provided to it. The evaluation of this group we will

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call C_1 and C_2.

The difference between E_1 and E_2 ($E_1 \sim E_2$) will be found. It is expected as per the hypothesis that significant improvement will occur after speech and language therapy. If this be true E_2 will be greater than E_1 ($E_2 \sim E_1$).

As there would be chance factors and other factors like, improvement in language with age etc., the clinical control group has been used. As per our hypothesis there may not be a significant difference between Ci and Cg ($C1 \sim C_2$) as this group is not subjected for speech and language therapy ($C_1 \sim C_2 = 0$).

(i) As per the stated hypothesis E_2 must be greater than E_1; whereas C_2 should not be significantly greater than C_1, i.e., it should be

(i) $E1 \sim E_2$ should be significant
and b) $C_1 \sim C_2$ should not be significant.

If the difference between E_1 and E_2 is much higher than the difference between C_1 and C_2 as found from our experiment, the obtained results confirm our hypothesis. To test this is the major aim of the present study.

The above contentions will be tested both with reference to the IQ scores and the SQ scores of the Clinical experimental and the Clinical control groups.

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(ii) As in the prevailing circumstances it is not possible to measure quantitatively speech and language levels, only a descriptive information has been presented. A qualitative description of the speech and language levels for the clinical experimental and the clinical control groups has been done both prior to, and, after therapy. As per the hypothetical expectation the speech and language level attained by the clinical experimental group after the therapy period must be over and above the speech and language level of the clinical control group at the time of second evaluation. This has to be put to test, although on an impressionistic basis.

(iii) The controversy over the functional lag between the normal and the hard of hearing children with reference to mental development was pointed out earlier. By taking a normal group as mentioned earlier in this chapter and finding out the average IQ of this group and the clinical experimental group it would be possible to substantiate whether there will be a functional lag as mentioned in many studies. If there is a functional lag, how much it is quantitatively. Also as figures are available for both these reference groups in terms of mental ages a comparison of the average mental ages of both these groups will indicate the functional lag in terms of mental age.

(iv) It was stated earlier that the clinical experimental

group has been divided into two groups, one younger and the other older, on the basis of age. The hypothetical contention here is that the younger group after therapy should have obtained significantly higher IQ scores than the older group as their learning potentialities are better than the older. This has to be put to test.

(v) As the degree of hearing loss itself is a variable considerably influencing the acquisition of speech and language and even improvement in intelligence, the clinical experimental group has been divided into two groups, namely, moderate hearing loss and severe hearing loss. Evaluations done on both these groups prior to, and after therapy when compared with each other should point out significant IQ gains by the moderate hearing loss group than the severe hearing loss group. This hypothetical contention will also be subjected to test.

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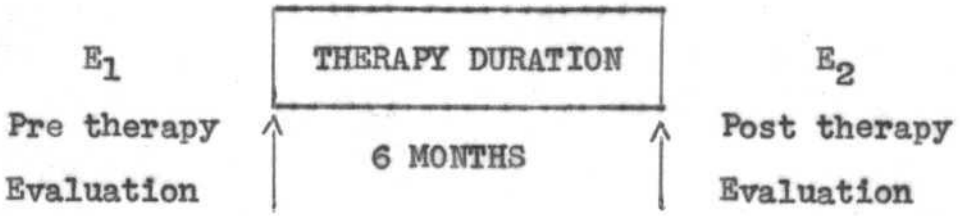
PICTORIAL REPRESENTATION OF DESIGN OF EXPERIMENT

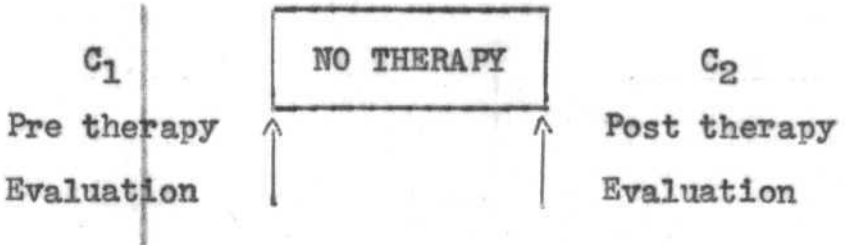
Gain in IQ and SQ Scores

G.P. (1) : Clinical Experimental Group E.

(1)



G.P. (2) : Clinical Control Group C.



as per hypothesis,

(a) $E_2 > E_1$ but (b) $C_2 > C_1$

(c) $E_1 \sim E_2$ —> Should be significant

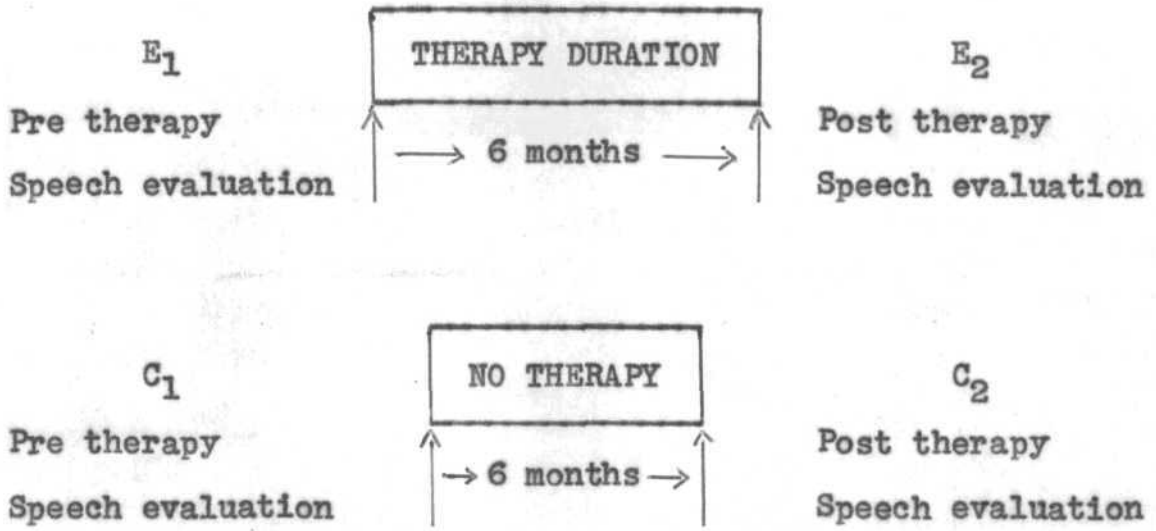
(d) C i ^ C2 --> Should not be significant

$(E_2-E_1) - (C_2-C_1)$ Should be significant

(Both with reference to IQ and SQ Scores).

(ii) Speech and Language Levels

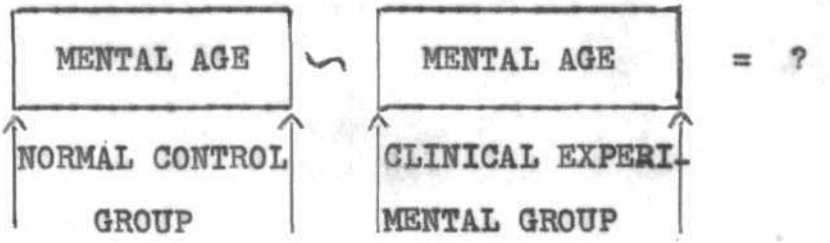
G.P. (1) : Clinical Experimental - E.



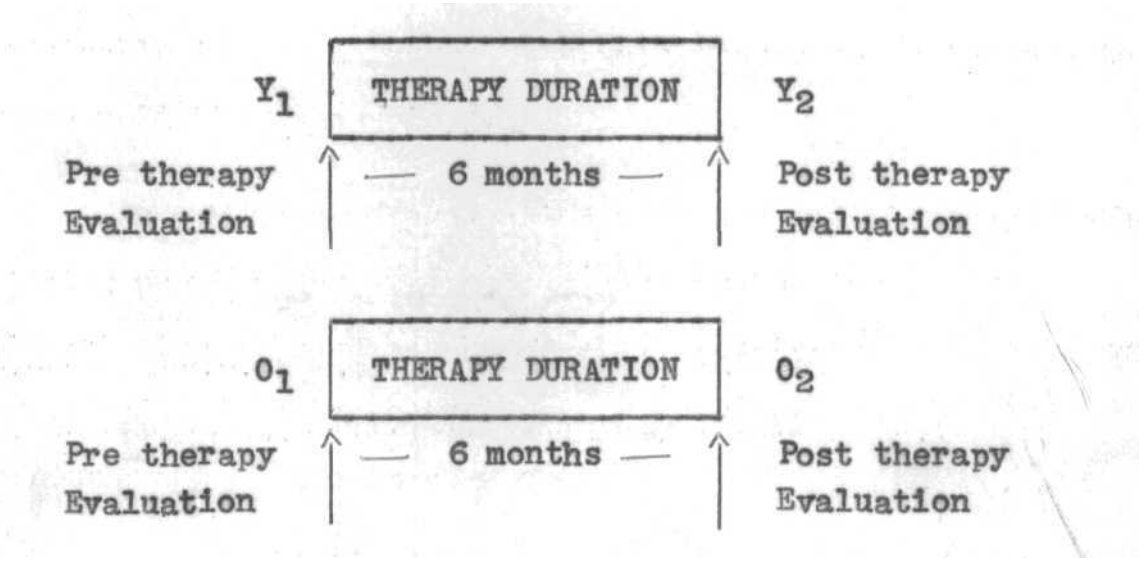
a) E_1 and C_1 ----> Description of speech and language levels prior to therapy

b) E_2 and C_2 ——> Description of speech and language levels after therapy

(iii) Comparison of average mentaL, ages (MA) between Normal Control Group and Clinical Bxperimental Group



(iv) Younger Vs Older Age Group with reference to IQ gain Y and 0 (in Clinical Experimental Croup)



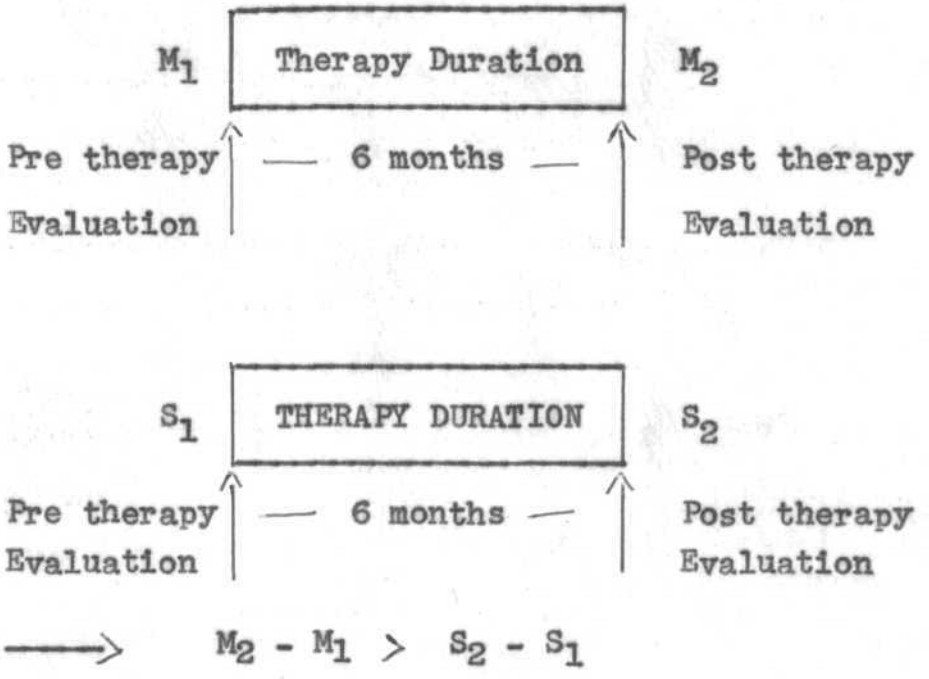
(a) $Y_2 - Y_1 = ?$

(b) $O_2 - O_1 = ?$

(c) $Y_2 - Y_1 > O_2 - O_1$

(v) Moderate Vs Severe Hearing loss with reference to IQ gain M and S

(in Clinical Experimental Group)



$\longrightarrow \quad M_2 - M_1 > S_2 - S_1$

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TABLE 1. Clinical Experimental Group. Pre-therapy Evaluations E_1
SEGUIN-FORM BOARD TEST AND VINELAND SOCIAL MATURITY SCALE

Sl.No.	Case No.	CA	Test Trials T_1	T_2	T_3	MA	TQ	SA	SQ
		yr+month							
1	2021	9+3	20"	19"	16"	10½	117	10.00	112
2	2206	9+1	19.2"	16"	21"	10½	117	10.00	112
3	2207	5	48"	35"	39"	5	100	5.70	114
4	2729	6+2	45"	41"	44"	4½	75	7.00	116
5	757	8+2	28"	26"	25"	6½	82	7.80	97
6	699	8+1	26"	19"	17"	9½	118	10.00	125
7	197	10	20"	15"	17"	11	110	10.50	105
8	832	7+2	35"	38"	32"	5½	79	7.30	104
9	643	10+1	25"	15"	21"	11	110	10.00	100
10	720	10+1	55"	35"	31"	5½	55	7.50	75.5
11	536	6+2	46"	36"	39"	5	84	7.00	116
12	373	7	52"	38"	45"	5	72	7.00	100
13	1600	9	50"	30"	23"	7	73	7.00	77
14	1644	6	38"	26"	32"	6½	108	6.60	110
15	1662	9+2	33"	30"	18"	9½	105	10.00	112
16	1583	10	25"	21"	28"	8	80	7.10	71
17	1311	9	21"	17"	23"	10	111	10.00	112
18	1816	7+1	42"	50"	36"	5	72	7.00	100
19	1087	10+2	25"	20"	22"	8	80	8.00	80
20	1034	9+2	24"	20"	16"	10½	117	10.00	114
21	3445	8+4	32"	25"	28"	6½	82	7.30	104
22	3360	9	32"	23"	20"	8	89	10.00	112
23	3707	9+1	34"	23"	25"	7	78	9.00	100
24	3646	5+3	52"	46"	50"	4	80	5.00	100
25	4527	6	42"	27"	42"	6	100	7.00	116
26	4495	9+3	32"	23"	17"	9½	102.0	10.00	112
27	1980	8+2	22"	18"	20"	9½	118	8.00	100
28	722	9+4	28"	21"	15"	11	122	9.00	100
29	4477	8+2	30"	25"	28"	6½	82	7.60	87.5

TABLE 2. Clinical Control Group 'C_1' Pre-therapy Evaluation
Seguin-Form Board and Vineland Social Maturity Scale Test

Sl.No.	Case No.	CA	Test Trials T_1	T_2	T_3	MA	IQ	SA	SQ
		yr+ month							
1	K-323	7+2	35"	46"	35"	5	71.4	6.80	93
2	K-803	5+2	53"	49"	45"	4	80	4.80	92.3
3	K-337	10+1	23"	15"	20"	11	110	10 00	100
4	K-962	7	25"	35"	23"	7	100	7.10	100
5	K-1252	6+3	60"	45"	40"	4½	75	6.80	114
6	K-1875	7+6	41"	24"	22"	7½	100	7.70	101
7	K-1592	10+2	25"	30"	32"	6½	65	10 00	100
8	K-845	7+2	37"	28"	32"	6	85	7.50	104
9	K-1243	6	50"	40"	55"	4½	75	6.00	100
10	K-551	6+2	40"	29"	30"	6	103	7.00	116.6
11	K-279	7+5	45"	35"	38"	5	67	7.00	100
12	1070	3+2	22"	27"	30"	7½	94	8.00	100
13	5122	7	40"	35"	35"	5	71	5.70	81.40
14	2919	5+1	50"	60"	60"	3½	70	5.00	100
15	4539	10+2	32"	28"	27"	6	60	9.60	94.10
16	4386	5	45"	48"	36"	5	100	6.10	122
17	4899	9+3	43"	26"	20"	8	86	9.60	103.3
18	4113	9+3	30"	27"	31"	6	67	9.30	100
19	4514	6+6	40"	36"	33"	5	77	7.00	106
20	4430	8+4	25"	20"	17"	10	125	10.00	119
21	2813	7+3	35"	40"	39"	5	71	7.00	95
22	4476	8+3	32"	28"	26"	6	75	8.70	104.3
23	4647	6	35"	28"	30"	6	100	6.70	111.6
24	3880	7	35"	28"	33"	6	85	7.00	100
25	3910	5+2	43"	45"	35"	5	100	6.20	118
26	3327	6+6	50"	30"	35"	5½	91.3	6.00	90.7
27	3055	8+4	28"	30"	36"	6	75	8.00	95.2
28	3477	9+3	27"	25"	20"	8	86	8.00	86.9

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TABLE 3. 'Clinical Experimental Group' Ep. Post-therapy Evaluation

Seguin-Form Board Test and Vineland Social Maturity Scale Test

Sl.No.	Case No.	CA	Test Trials T_1	T_2	T_3	MA	IQ	SA	SQ
		yr+month							
1	2021	9+7	16"	18"	17.2"	10½	117	10.60	109.00
2	2206	9+7	22"	15"	19"	11	116	10.60	109.00
3	2207	5+6	39"	36"	31"	5½	100	6.00	106.00
4	2729	6+6	42"	27"	35"	6	92	7.60	115.00
5	757	8+6	27"	19"	22"	8½	100	9.00	104.60
6	699	8+7	16"	19"	23"	10½	123	10.40	119.50
7	197	10+5	20"	14"	17"	12	120	10.80	103.30
8	832	7+5	27"	26"	29"	6	80	8.60	101.30
9	643	10+7	20"	13"	15"	13	123	10.70	100.00
10	720	10+4	28"	45"	30"	6	60	9.60	92.30
11	536	6+7	43"	31"	28"	6	92	7.60	113.40
12	373	7+4	55"	45"	36"	5	72	7.60	102.70
13	1600	9+6	39"	28"	26"	6½	69	8.60	89.50
14	1644	6+3	32"	23"	24"	7	116	7.60	120.00
15	1662	9+6	32"	35"	17.2"	9½	100	10.50	109.30
16	1583	10+5	25"	23"	19"	8½	85	9.60	91.40
17	1311	9+5	21"	16"	18"	10½	117	10.30	108.40
18	1816	7+6	40"	33"	28"	6	80	8.60	114.00
19	1087	10+4	21"	25"	27"	8	80	9.00	86.50
20	1034	9+6	18"	21"	16"	10½	117	10.40	103.30
21	3445	8+6	30"	25"	23"	7	32	3.60	100.00
22	3360	9+5	20"	18.2"	19"	9	100	10.60	111.50
23	3707	9+7	29"	24"	30"	6½	69	10.00	103.00
24	3646	5+4	55"	48"	49"	4	80	6.00	106.00
25	4527	6+6	29"	35"	27"	6	92	7.60	115.00
26	4495	9+6	25"	17"	21"	10	105	10.00	113.60
27	1980	8+7	25"	19"	16"	10½	123	10.00	113.60
28	722	9+6	19"	17"	15"	11	116	9.30	104.20
29	4477	8+7	26"	28"	32"	6½	32	7.60	87.20

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TABLE 4. Clinical Control Group C_2. Post-therapy Evaluation

Seguin-Form Board and Vineland Social Maturity Scale Test

Sl.No.	Case No.	CA	Test Trials T_1	T_2	T_3	MA	IQ	SA	SQ
		yr+month							
1	K-323	7+7	38"	46"	35"	5	67	7.60	100
2	K-803	5+7	60"	55"	40"	4½	82	5.60	100
3	K-337	10+6	28"	15"	20"	11	105	10.20	96.20
4	K-962	7+5	55"	30"	35"	5½	73	7.50	100
5	K-1252	6+9	65"	58"	40"	4½	65	6.60	110
6	K-1875	8	35"	22"	25"	7½	84	8.60	107.5
7	K-1592	10+6	25"	28"	20"	8	80	10.40	98.1
8	K-845	7+7	36"	28"	30"	6	80	7.50	97.4
9	K-1243	6+5	45"	32"	40"	5½	85	6.60	101.5
10	K-551	6+6	40"	30"	30"	6	92	7.20	109
11	K-279	8	28"	25"	30"	6½	82	8.60	107
12	1070	8+6	20"	25"	28"	8	94	8.60	100
13	5122	7+6	35"	30"	25"	6½	87	8.60	113
14	2919	5+6	55"	60"	50"	3½	64	6.60	117
15	4539	10+4	23"	25"	20"	8	80	9.60	92.3
16	4386	5+6	45"	36"	38"	5	84	6.60	117
17	4899	9+7	25"	19"	23"	8½	89	9.60	100
18	4113	9+6	20"	25"	25"	8	84	9.60	100
19	4514	7	40"	35"	35"	5	72	8.10	115
20	4430	8+9	25"	21"	16"	10½	123	10.20	114
21	2813	7+6	35"	40"	40"	5	67	7.60	100
22	4476	8+8	35"	25"	25"	6½	77	8.70	100
23	4647	6+6	35"	30"	35"	6½	100	6.60	100
24	3880	7+5	40"	35"	30"	5½	73	7.40	98.6
25	3910	5+6	40"	35"	38"	5	91	6.20	110.7
26	3327	7	35"	29"	27"	6	85	6.60	94.2
27	3055	8+8	30"	26"	35"	6½	77	8.60	98
28	3477	9+9	27"	25"	20"	8	86	10.00	101.0

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TABLE 5. Showing Means and Sigmas of IQs and SQs on Pretherapv evaluation, for the Clinical Experimental and Clinical Control Group

	IQs		SQs	
Group E & C	Mean	σ	Mean	σ
Clinical Experi-mental Group	94.20	18.30	104.50	17.00
Clinical Control Group	85.90	16.70	105.57	9.20

TABLE 6. Shoving Means and Sigmas of IQs and SQs on Posttherapy evaluation for the Clinical Experimental and Clinical Control Group.

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TABLE 7. Showing the obtained 't' values for the difference in mean IQs among the Clinical Experimental and Clinical Control Groups, prior to, and after therapy

Group	M_1	M_2	$M_2 \sim M_2$	M_D	SD_D	SEM_D	t	df
$E_1 \sim E_2$	94.20	97.60	3.40	2.87	7.61	1.40	2.50	28
				't' value significant at 0.05 level				
$C_1 \sim C_2$	85.90	84.80	1.10	-1.32	11.20	1.43	-0.92	27
				't' value not significant at both the levels				

TABLE 8. Showing Social Ages of the Experimental and Control Groups prior to, and after therapy

Group	CA	SA	Group	CA	SA
E_1	8.17	8.18	C_1	7.33	7.40
E_2	8.50	9.10	C_2	7.66	8.15
	0.33	0.92		0.33	0.75
	$E_1 \sim E_2$	$E_1 \sim E_2$		$C_1 \sim C_2$	$C_1 \sim C_2$

	SA
$E_1 \sim E_2$	0.92
$C_1 \sim C_2$	0.75
	0.17

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TABLE 9. Shoving the obtained SQs for the Experimental and Control Groups subjected to 't' test of Significance,

Group	M_1	M_2	$M_1 \sim M_2$	M_D	SD_D	SEM_D	t	df
$E_1 \sim E_2$	104.50	104.85	0.35	2.24	7.10	1.31	1.70	23
$C_1 \sim C_2$	105.57	104.50	1.07	1.50	8.91	1.14	1.31	27
		't' value not significant at both .05 and .01 levels						

TABLE 10. Shoving the differences in IQs between the Experimental Group and the Normal Control Group with the 't' value .

Group	M_1	M_2	E N $M_1 \sim M_2$	E^{σ_1}	N^{σ_2}	t	df
$E_1 \sim N_2$ (Normal Control)	94.20	100.40	6.20	18.30	17.30	4.96	56
			Significant at both the levels				

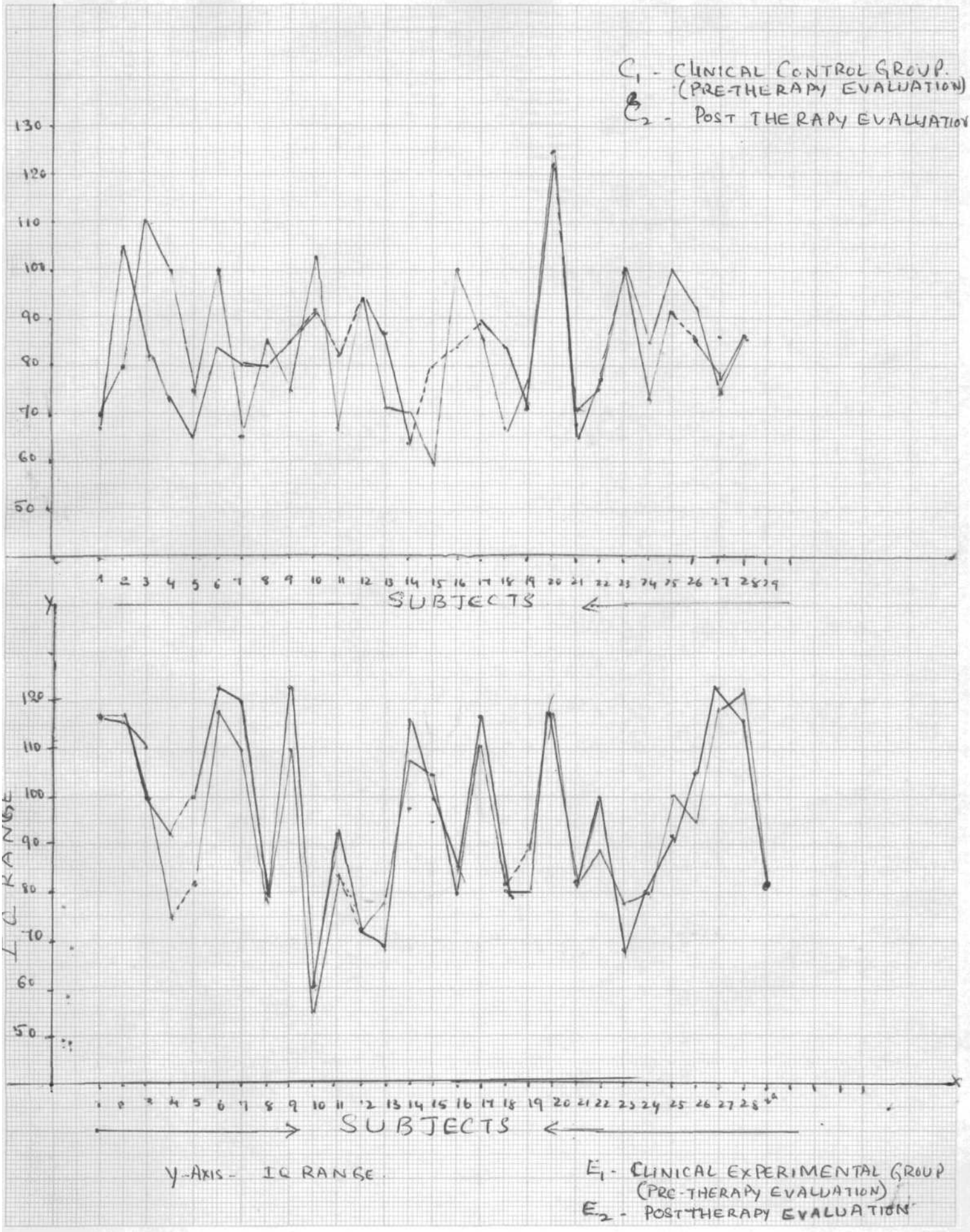
TABLE 11. Showing the Mean IQs of Y and O Groups subjected to 't' tests of Significance

Group	M_1	M_2	$M_1 \sim M_2$	M_D	SD_D	SEM_D	t	df
$E_1 \sim E_2$ Y Y Younger age grou N=9	86.5	92.20	5.70	3.80	7.2	2.40	1.58	8
			Not significant at both the levels					
$E_1 \sim E_2$ 0 0 Older age N=20	97.50	101.00	3.50	2.55	7.10	1.61	1.58	19
			Not significant at both the levels					

TABLE 12. Showing the Mean IQs of Moderate and Severe Hearing loss Group subjected to 't' test of Significance.

Group	M_1	M_2	$M_1 \sim M_2$	M_D	SD_D	SEM_D	t	df
Moderate Hearing loss N=5 $E_1 \sim E_2$	112.5	118.5	6.00	3.60	3.50	1.56	2.30	4
		Not significant at both the levels						
Severe Hearing loss N=24	90.30	94.00	3.70	3.37	7.41	1.54	2.18	23
		't' value Significant at 0.05 level						

o 0


C1 - CLINICAL CONTROL GROUP. (PRE-THERAPY EVALUATION)
C2 - POST THERAPY EVALUATION.
130
120
110
100
90
80
70
60
50
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29
SUBJECTS
Y
120
110
100
90
80
70
60
50
I Q RANGE
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28
SUBJECTS
Y-AXIS - IQ RANGE.
E1 - CLINICAL EXPERIMENTAL GROUP (PRE-THERAPY EVALUATION)
E2 - POST THERAPY EVALUATION

ALL INDIA INSTITUTE OF SPEECH AND HEARING, MYSORE-6

AUDIOGRAM

Name:

Date:

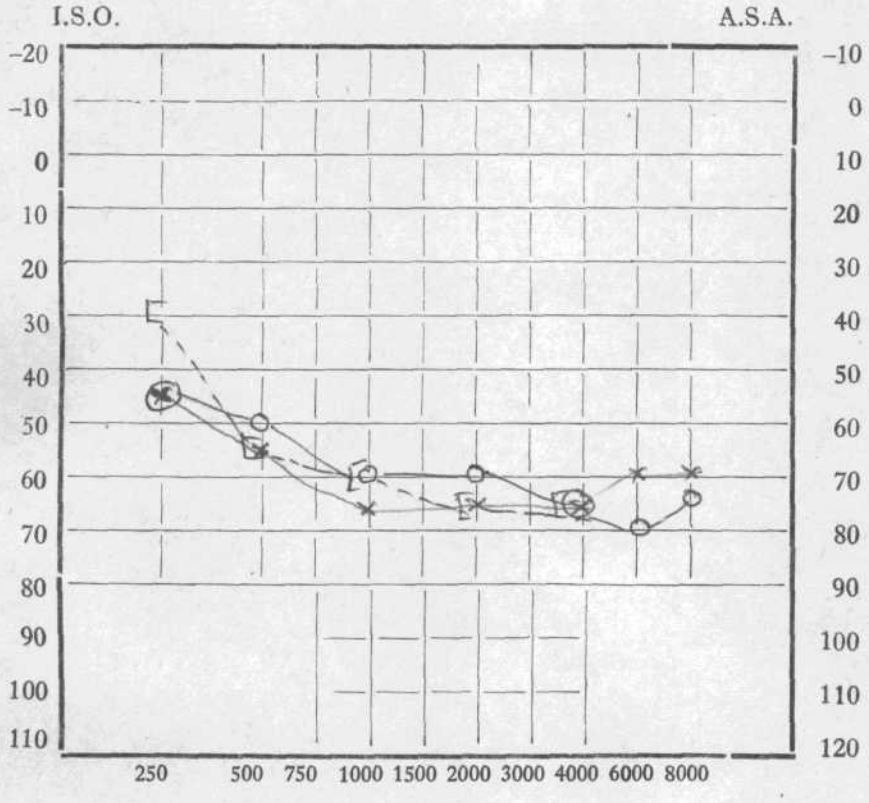
Age:

Test No.:

Case No.:

Tested By:

Rt. Lt.



AIR CONDUCTION

Un-masked ○ ×

Masked △ ▽

BONE CONDUCTION

Un-masked [ ]

Masked ⌈ ⌉

A. C. not heard ↙○ ×↘

B. C. not heard [↓ ↑]

Audiometer used: Beltone 15 CX

Procedure:

Standard/~~Play~~ Audiometry.

	Right	Left	Aid in Ear Right	Left
3 frequency Average	57dB	62dB		
S.R.T.	60dB	60dB		
Discrimn (P.B.Max)				

A case of Moderate Bilateral Sensori-Neural loss of Hearing.

SPECIAL TESTS

	Right Ear 500	1000	2000	4000	Left Ear 500	1000	2000	4000
SISI								
ABLB								
STENGER								
T.D.T.								

P.T.O.

Test Conditions

Interpretations and
Recommendations

Hearing aids tried

Model Recommended

Earmoulds :

ALL INDIA INSTITUTE OF SPEECH AND HEARING, MYSORE-6

AUDIOGRAM

Name: –

Date:

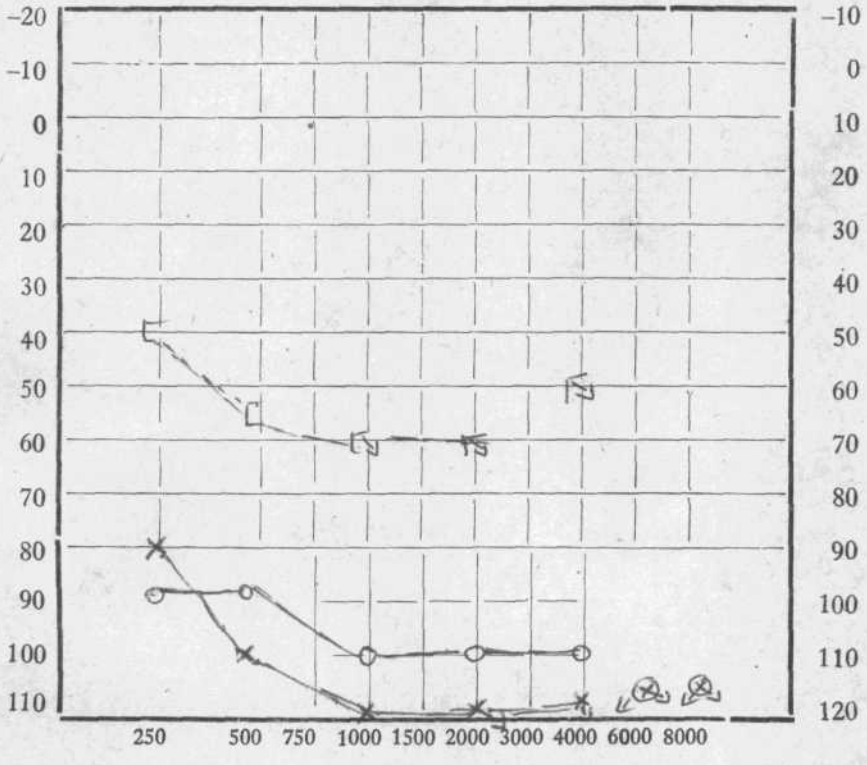
Age: –

Test No.: –

Case No.:

Tested By:

Rt. Lt.



Cycles per second

AIR CONDUCTION

Un-masked ○ ×

Masked △ ▽

BONE CONDUCTION

Un-masked [ ]

Masked [ ]

A. C. not heard

B. C. not heard

Audiometer used: Beltone 15 CX

Procedure:

Standard/~~Play~~ Audiometry.

	Right	Left	Aid in Ear Right	Left
3 frequency Average				
S.R.T.				
Discrimn (P.B.Max)				

A case of Bilateral Severe Sensori-Neural Loss.

SPECIAL TESTS

	Right Ear 500	1000	2000	4000	Left Ear 500	1000	2000	4000
SISI								
ABLB								
STENGER								
T.D.T.								

P.T.O.

Test Conditions

Interpretations and Recommendations: Bilateral Severe Sensori Neural loss.
Hearing - Aid.

Hearing aids tried

Model Recommended

Earmoulds :

RESULTS AND DISCUSSION

The results obtained from the administration of Seguin Form Board Test and the Vineland Social Maturity Scale are presented in Table 1. Three trials were given on the Seguin Form Board Test and the shortest time score was used in obtaining the mental age of children. In each case this was further converted into IQ by the formula $IQ = \frac{MA}{CA} \times 100$. Indian norms as derived from the All India Institute of Speech and Hearing Psychology Department were used in obtaining the mental ages.

Social ages were first obtained on the Indian adaptation of the Vineland Social Maturity Scale and this was further converted into SQs by the formula $SQ = \frac{MA}{CA} \times 100$.

Table 1 gives the data of the Clinical Experimental Group in the form of MAs, IQs, SAs and SQs. These results were obtained previous to therapy.

Table 1. Showing the pre therapy evaluations of the Clinical Experimental Group in MAs, IQs, SAs and SQs.

The same procedures were followed in administration, scoring and interpretation of tests for the Clinical Control Group. The results obtained for this group consisting of 28 subjects has been provided below.

Table 2: Showing the pretherapy evaluations of the Clinical Control Group in MAs, IQs, SAs and SQs respectively

Six months after the pretherapy evaluations for both the groups evaluations were done by using the same tests. During the therapy period of six months the Clinical Experimental Group had received speech and language therapy as specified in the previous chapter.

Table 3 provides the results for the Clinical Experimental Group.

Table 3: Showing the post therapy evaluation of the Clinical Experimental Group in MAs, IQs, SAs and SQs.

The results of the Clinical Control Group in MAs, SAs, IQs and SQs are provided in Table 4.

Table 4: Shoving post therapy evaluation of the Clinical Control Group in MAs, IQs, SAs and SQs.

Means and standard deviations for the IQs and SQs scores for the Clinical Experimental and the Clinical Control Group were calculated for the pretherapy evaluations and they are provided in the table below.

Table 5: Showing Means and sigmas of IQs and SQs on pre-therapy evaluation for the Clinical Experimental and Clinical Control Group.

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On the same lines means and sigmas of IQs and SQs scores on post therapy evaluations were calculated for the Clinical Experimental Group and the Clinical Control Group respectively.

Table 6: Showing means and sigmas of IQs and SQs on post therapy evaluation for the Clinical Experimental and Clinical Control Group.

The table provided below gives a comparison of the mean IQs for the Clinical Experimental Group and the Clinical Control Group prior to, and after therapy. The mean differences in IQs among the experimental and the control have been subjected to 't' test of significance.

Table 7: Showing the obtained 't' values for the differences in mean IQs among the experimental and control groups prior to, and after therapy.

The obtained results for the experimental and clinical groups in terms of social ages has been provided below prior to and after therapy.

Table 8: Showing Social Ages of the experimental and control groups prior to, and after therapy subjected to 't' test of significance.

Table 9: Showing the obtained SQs for the experimental and clinical groups subjected to 't' test of significance.

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Table 10: Showing the differences in IQs between the experimental group and the Normal Control Group has been provided with the 't' test of significance applied.

The experimental group was subdivided into 2 groups Y and O. Y group consisting of 9 children varying in ages from 5-7½ years and Older group (0) consisting of 20 children varying in ages from 7½-10 years. The mean age of the Y group was 6.90 and the mean age of the 0 group was 8.50. Data obtained are provided below.

Table 11: Showing the results of Y and 0 groups in terms of mean IQs subjected to 't' tests of significance.

Nextly on the basis of the degree of impaired hearing the experimental group has been further subdivided into moderate hearing loss group M and severe hearing loss group S. The results of these groups in terms of mean IQs are provided below.

Table 12: Showing the mean IQs of M and S groups being subjected to 't' test of significance.

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DISCUSSION

Table 1 (Pro therapy evaluation of Experimental group) shows the chronological age for each case of the experimental group with time scores in 3 trials of the Seguin Form Board and the calculated MAs on the basis of lowest time score in 3 trials MAs have also been converted into IQs.

Social ages as derived from the Indian adaptation of the Vineland Social Maturity Scale have been given against each case with the SQs.

Minimum IQ for the whole group was 55 and maximum IQ 122. Minimum SQ for the grouu was 71 and maximum SQ 125. By taking the chronological age provided MAs and SAs have been converted into IQs and SQs respectively.

Similar procedures have been followed in the case of the clinical experimental group after therapy. Table 3 provides all the data on similar lines. The minimum IQ for the group was 60 and the maximum IQ 123. Minimum SQ for the group was 87 and the maximum SQ was 120. We find that with reference to IQs with regard to both minimum and maximum scores they are higher in the case of post therapy evaluation of the experimental group which definitely points out an improving trend. The range in the pre therapy evaluation data is 67 and 54 in the case of post therapy evaluation data which obviously points out a restriction in the range of

variability during post therapy evaluation. This also means that towards the latter part of therapy the whole group was becoming more homogeneous with reference to mental development.

In the pre therapy evaluation minimum SQ is 60 with maximum SQ of 123. The difference between the two is 63 which forms the range in SQs for pre therapy evaluation data. In the post therapy evaluation data as can be seen from Table 3, the minimum SQ score had become 37, maximum score 120. The range this time was 33 pointing out a narrowing of variability with reference to social development. However, the fact that minimum SQ has become 87 in post therapy evaluation from the minimum SQ 60 in pre therapy evaluation points out definitely a surge towards better social development.

So, with the above data one can come to a general inference that both with reference to IQs and SQs there is a definite improvement in the experimental clinical group during the post therapy evaluation than pre therapy evaluation.

On similar lines Table 2 and Table 3 provide data for the clinical control group during pre therapy evaluations. The minimum IQ for the control group was 60 and maximum was 125. The minimum SQ was 31 and maximum SQ was 122. The

range in IQ was 65 and in SQ 41. From Table 4 provides post therapy evaluation data for the clinical control group. The minimum IQ was 64 and the maximum IQ was 123 with a range in IQ of 59. Minimum SQ was 92 and maximum SQ 117 with a range of 25. When we compare the findings of the 2 groups we do not find a similar significant shift in the IQ and SQ scores in the clinical control group at the post therapy evaluations.

Even in the clinical control group we find that the ranges in IQs and SQs have become narrowed down pointing out that the group is becoming more homogeneous, but this is not as significant as it has been seen in the experimental group.

It can be seen from Table 5 that the mean IQ for the experimental group is 90.40 with a sigma of 18.0 and a mean SQ of 104.0 with a sigma of 17.0. The mean IQ for the control group 85.90 with a sigma of 16.70. The mean SQ was 105.57 with a sigma of 9.20. A direct comparison of these values can be had by looking at Table 6 which again provides the same IQ, SQ scores at post therapy evaluation. It can be found Rises in IQs and SQs are evident in the post therapy evaluations of the clinical experimental group.

However, the somewhat reduced scores of mean IQ and SQ in the clinical control group at post therapy evaluation when compared to pre therapy evaluation required scrutiny.

But the difference does not seem to be significant. But even then it is against to expectation as we should anticipate higher mean IQ scores and higher mean SQ scores even in the clinical control group, possibly this could have happened because of the more reliable evaluation in the clinical experimental group because they were under close watch at the institute right through. But the clinical control group was seen only at the times of evaluations.

Table 7 provides the obtained results for the experimental and control groups prior to, and after therapy separately. The clinical experimental group which obtained a mean IQ of 94.20 prior to therapy obtained a mean IQ of 97.60 after therapy. The difference in means, namely, 3.40, has been subjected to the tests of significance following the single group method.

A 't' value of 2.50 was found which is to be interpreted as being significant at 0.05 level of probability. In other words, the gains in the IQ scores of the clinical experimental group through the speech therapy procedures is to be interpreted as statistically significant.

Also, when a similar comparison was had of the mean IQs of the clinical control group prior to, and after therapy, the difference in mean IQs turns out to be 1.10. Following the single group method the 't' value obtained was 0.92 which must be interpreted as not significant at both 0.05

and 0.01 levels of probability.

Both these important findings mentioned above are quite in line with our expectations as mentioned in the section on Design of Experiment.

Mean Social ages obtained for the experimental and control groups have been laid down in Table 8.

The experimental group which obtained a mean SA of 3.18 prior to therapy obtained a mean SA of 9.10 after therapy. The mean difference turns out to be 0.92. The clinical control group obtained a mean SA 7.40 prior to therapy and a mean SA 8.15 after therapy, thereby giving a difference of 0.75. Comparatively the above difference is smaller in the control group when compared with the difference in experimental group. The difference between Experimental and Control 'groups is only 0.17 which does not appear to be a significant difference. But even then this difference is in favor of the clinical experimental group only. This means that the speech training procedures followed have brought about some improvement in social development although it may not be significant.

This is perhaps because the improvements that took place in social development were mostly restricted to the therapy situation and not beyond.

The mean social ages of the two groups were converted

into SQs and the mean differences of the clinical experimental group and clinical control group prior to, and after therapy has been found when subjected to 't' test of significance the 't' value for the E group was 1.70 and for the C group it was 1.31 which must be interpreted as not being significant at both 0.06 and 0.01 levels of probability. This only confirms our interpretation given for the previous table.

As mentioned in the design of experimentation whether there would be difference in IQ levels between the clinical experimental and the normal control groups has also been subjected to test. The Mean IQ for the normal group was 100.40 and the mean IQ for the clinical experimental group was 94.20 with a mean difference in IQ of 6.20 in favour of the normal control group.

't' value was found to be 4.96 which must be interpreted as a significant difference between 2 groups at both 0.05 and 0.01 levels of probability. This obviously means as far as the functioning levels of intelligence are concerned the normal group is definitely better to clinical experimental group. The functional lag between the two groups in terms of mental ages could not be calculated because of the disparity in the mean chronological ages of the two groups.

To see whether there would be significant differences between the younger and the older age groups, the experimental clinical group was split into two groups younger

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and older as suggested in the design of experiment section. The Mean difference of the younger age group between the pre therapy and post therapy evaluation vas 5.70 and 't' value of 1.58. Similarly the mean differences of the older age group between the pre and post therapy evaluations came to 3.50 with a 't' value of 1.58. As per these findings it must be interpreted that the mean differences among these groups were not significant at both 0.05 and 0.01 levels of probability. Moreover, younger group constituted only 6 subjects whereas older group consisted of 20. The groups themselves being small one must be cautious in coming to any definite conclusions about these findings. As far as this experiment goes no significant superiority was shown by the younger age group in learning potentialities over the older age group.

As per the design of experimentation the clinical experimental group was subdivided into moderate hearing loss and severe hearing loss cases to be whether there would be differences in terms of learning potentialities.

In the moderate hearing loss group the mean difference was found to be 6.00 with the 't' value of 2.30 which points out the above mean difference is not significant at both 0.05 and 0.01 levels of probability. The severe hearing loss group showed a mean difference of 3.70 with a 't' value of 2.18. The mean difference should be interpreted as Significant at 0.05 level only. These findings suggest that

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the severe hearing loss group show a significant improvement than the moderate hearing loss. But again as the group themselves were very small it is difficult to come to any definite conclusions. Perhaps by using larger number of subjects both the groups the results would be more reliable.

A qualitative description of speech and language levels prior to, and after speech and language therapy has been provided here. Most of the cases came with a complaint of hearing loss and no speech and it was evaluated. Very few cases had a very limited speech confined to only 2 syllable words or some vocalizations. Most of these vocalizations were not meaningful and uttered as spontaneously in play situation. As the quantitative indices are not available at present, the acquisition of speech and language levels of each case has been given here in a nutshell in a descriptive manner.

Clinical Experimental Group N=29. 5-10 years

Case 1.

Evaluations	CA	MA	IQ	SA	SQ	Hearing loss
Pretherapy	9	10½*	117	10	112	Moderate Bilateral
Post therapy	9+7	10½	117	10+6	109	S-N loss

Speech evaluation - Speaks in single word sentences but not intelligible always limited vocabulary of 4-5 words.

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Calls mummy, daddy (in Kannada appa, amma). This case is attending therapy since 3 years.

Language comprehension is good. Can answer to simple questions in short simple sentences. Not much of misarticulation. Very good at arithmetic. Can do addition and subtraction of any number of digit series. Can do difficult subtraction problems 'by borrowing one' method quickly. Other problems like addition of simple fraction - 1¼+¾ etc. Speech is quite intelligible. Can write on dictation and also copies simple passages from III grade Kannada books. He knows the concept of 'Time-elements' (today, tomorrow, etc.), pronouns (I, he, etc.), singular-plurals, genders, opposites. Attempts to use these concepts while speaking. Knows days of the week, month and time. Vocabulary about 200-250 words.

Case 2.

Evaluations	CA	MA	IQ	SA	SQ	Hearing loss
Pretherapy	9+1	10½	117	10	112	Bilateral Severe S-N loss
Post therapy	9+7	11	116	10.60	109	

Came with the complaint of hearing loss and delayed speech. Audiological evaluation revealed a severe degree of bilateral sensory neural hearing loss and recommended hearing aid and auditory training.

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Speech evaluation prior to therapy - Delayed speech. The boy can say only appa and amma. Therapy was advised. The boy is attending therapy since 2 years.

Speech evaluation, after therapy - Could count from 1-100, days of a week, months of the year. Could speak in 3-4 word sentence level. Articulation is quite intelligible, there is yet slight misarticulation pertaining to the substitution of cha/sa and 1/r. At the time of final evaluation he could articulate r correctly, but it was inconsistent. It needs stabilization. Very sharp and quick in doing arithmetic. Vocabulary of about 150-200 words.

Case 3.

Evaluations	CA	MA	IQ	8A	SQ	Hearing loss
Pretherapy	5	5	100	5.7	114	Bilateral
Post therapy	5+6	5½	100	6.0	106	Severe S-N loss

Speech evaluation prior to therapy - Hearing loss and no speech. Only babbling. Advised therapy. The case is attending therapy since a year.

Speech and Language Level - After therapy

a) Could discriminate between sounds of drum beating and pipe.

b) Could identify, discriminate and match colours like

Blue, Red, Yellow, Black, Green, and say these but not intelligible.

c) Could name and tell a few animals like dog, cat, monkey, rat, elephant, pig, etc. Could name body parts.

d) Could articulate all vowels and a few consonants like - /0/, /p/, /b/, /m/, /n/, /l/, /v/, /h/.

e) Could understand the concepts like - Run, jump, walk. Executes commands.

f) Vocabulary of about 15-20 words.

g) Could write all vowels and some consonents on dictation.

Case 4.

- Evaluations	CA	MA	IQ	SA	SQ	Hearing loss
Pretherapy	6.2	4½	75	7	116	Bilateral
Post therapy	6.6	6	92	7.6	115	Severe S-N loss

Speech, evaluation - Says amma, appa and mama in reference. Uses gestures for communication and comprehends the same. Case is attending therapy since 8 months.

Speech evaluation - After therapy

a) Vocabulary about 40-60 words

b) Articulation is fair except for a few sounds like /k/, /r/, /s/, /sh/ etc.

c) Attempts to speak most of the time.

d) Reluctant to do arithmetic and to write.

e) Could discriminate between drum, pipe sounds.

Evaluations	CA	MA	IQ	SA	SQ	Hearing loss
Pretherapy	8	8½	82	7.8	97	Bilateral Severe S-N loss
Post therapy	8+6	8½	100	9.0		

Speech evaluation - No vocabulary. No meaningful speech. Communicates through gestures.

Post therapy evaluation - (Attending therapy since 2 years)

a) Vocabulary of about 20-25 words.

b) Could count from 1-10.

c) Could write all alphabets (of Kannada) and tell them orally. Could name colors, body parts, a few objects and animals.

Case 6.

Evaluations	CA	MA	IQ	SA	SQ	Hearing loss
Pretherapy	8		118	10.4	125	Bilateral Moderate S-N loss
Post therapy	8+7	123	123	10.4	119	

Speech, evaluation - prior to therapy

Delayed speech and language due to hearing loss. Vocabulary about 4-5 words.

Speech evaluation, - after therapy

Vocabulary is fair. Articulation is almost all sounds is good. Speaks in 3-4 word sentences which is quite intelligible.

Evaluations	CA	MA	IQ	SA	SQ	Hearing loss
Pretherapy	10	11	110	10.5	105	Bilateral Severe S-N loss
Post therapy	10+6	12	120	10.8	103	

Speech evaluation - prior to therapy

Hearing loss and no speech.

Speech evaluation - after therapy (Attending therapy since 4 years)

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Vocabulary is quite good (300-350 words). Can lipread well. Articulation is comparatively good. Very competitive and active, in group competition lessons. Very quick in solving arithmetic problems like addition, subtraction and multiplication. Could count and write upto 100. Speaks in 3-5 word sentences.

Case 8.

Evaluations	CA	MA	IQ	SA	SQ	Hearing loss
Pretherapy	7	5½	79	7.30	104	Bilateral Severe S-N loss
Post therapy	7+5	6	80	8.60	10130	

Speech evaluation, - prior to therapy

No speech. Boy is imitative and gtimulable. Advised therapy.

Speech evaluation - after theravv

Vocabulary is satisfactory though it is not upto age level (approximately 100-150 words). Articulation of consonants and vowels are fairly good. Discriminates between the sounds of drums, xylophones, kanjira and pipe. Interested in learning new things. Does not like to play out-door games always but prefers to sit quiet. Sometimes he will be very naughty. Could do simple addition and subtraction problems.

Case 9.

Evaluations	CA	MA	IQ	SA	SQ	Hearing loss
Pretherapy	10+1	11	110	10	100	Bilateral
Post therapy	10+7	13	123	10.70	100	Severe Senso-ri Neural loss

Speech evaluation - prior to therapy

Hearing loss and no speech. Advised hearing aid and therapy.

Speech evaluation - after therapy (Case is attending therapy since 4 years)

Good vocabulary. Could read, understand and retell the 10 lessons of I grade book. Most of the time attempts to speak. Very active and competitive in play activities and competition exercises in class. Interested in doing arithmetic. Writes on dictation and copying. Lipreads well.

Case 10.

Evaluations	CA	MA	IQ	SA	SQ	Hearing loss
Pretherapy	10	5½	55	7.50	75.50	Bilateral
Post therapy	10+4	6	92	9.60	92.30	Severe Sensorl-Neural loss

Speech evaluation - prior to therapy

Delayed speech and language development and severe hearing

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loss. No meaningful speech. Communicates through gestures.

Speech evaluation - after therapy

The boy is attending therapy since a year and six months.

1. Could say a few vowels and a few consonants.

2. Vocabulary of 5-10 words.

3. Could point out body parts when asked for.

No remarkable progress. Could be due to nil stimulation at home. The boy is very irregular for therapy in spite of the reminders sent to his parents.

Case 11.

Evaluations	CA	MA	IQ	SA	SQ	Hearing loss
Pretherapy	6	5	84	7.0	116	Bilateral
Post therapy	6+7	6	92	7.60	112.40	Severe S-N loss

Speech evaluation - prior to therapy

Hearing loss and no speech.

Speech evaluation - after therapy

Vocabulary 10-15 words. Not motivated to learn. Always gloomy. Could say a few vowels and consonants.

Voice is very weak. Speech stimulation only through informal play activities.

Case 12.

Evaluations	CA	MA	IQ	SA	SQ	Hearing loss
Pretherapy	7	5	72	7	100	Bilateral
Post therapy	7+4	5	72	7.6	102.70	Severe Sensori-Neural loss

Speech evaluation - prior to therapy

Hearing loss. Can say 3 or 4 words. Mama and amma are used meaningfully.

Speech evaluation - after therapy

Vocabulary about 15-20 words. Could name animals in pictures like /naiyi/, /a:ne/, /ha:vu/, /huli/. Could say balehannu (plantain). No proper stimulation at home and very irregular for therapy.

Case 13.

Evaluations	CA	MA	IQ	SA	SQ	Hearing loss
Pretherapy	9	7	78	7	77	Bilateral
Post therapy	9+6	6½	69	8.60	89.50	Severe Sensori-Neural loss

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Speech evaluation - prior to therapy

Attributes of speech normal. Comprehension not upto age level. Has vocabulary of 5-10 words.

Speech and Language evaluation - after therapy

Attending therapy since a year and a half.

1. Could discriminate between pipe and drum sounds.
2. Vocabulary of about 20-25 words.
3. Could count from 1-10.
4. Could write all Kannada vowels and a few consonants on dictation.

6. Not motivated to learn.

Always looks gloomy. Very irregular for therapy. No speech stimulation at home. One of the reasons that may be accounted for is, the boy is staying in his uncle's house and they report that they have no time to teach.

Case 14.

Evaluations	CA	MA	IQ	SA	SQ	Hearing loss
Pretherapy	6	6½	108	6.60	110	Bilateral Moderate Sensori Neural loss
Post therapy	6+3	7	116	7.60	120	

Speech evaluation - prior to therapy

No speech. Babbles.

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Speech evaluation - after therapy

Attending therapy since 2 years.

1. Vocabulary fair.
2. Could name colors, count from 1-10; matches colors, associates numbers with objects. Could identify and name the body parts.
3. Sings the nursery rhymes with action.
4. Good voice and articulation.
5. Very active in group therapy activities. Does well in competitive games. Parents'cooperation and training at home is good.

Case 15.

Evaluations	CA	MA		SA	SQ	Hearing loss
Pretherapy	9+2	9½	106	10	112	Bilateral Severe Sensori Neural loss
Post therapy	9+6	9½	100	10.50	109.30	

Speech evaluation, - prior to therapy

Hearing loss and limited speech. Only 2 words (appa and amma) used meaningfully.

Speech evaluatation - After therapy

Attending therapy since a year.

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1. Vocabulary 15-20 words.

2. Could discriminate between pipe and drum.

Hyperactive and distractive. Irregular for therapy and lack of proper parental stimulation has been attributed for his decline in improving speech.

Case 16.

Evaluations	CA	MA	IQ	SA	SQ	Hearing loss
Pretherapy	10	8	a0	7.10	71	Bilateral Severe Sensori Neural loss
Post therapy	1046	8½	85	9.60	91.40	

Speech evaluation - prior to therapy

Hearing loss and no speech.

Speech evaluation - after therapy

Attending therapy since 2 years.

1. Vocabulary of about 20-25 words which he could tell. He could understand about 45 words.

2. Color concept - knows 3 colors.

3. Number concept - could only count 1-10.
Could not name all the body parts.

3. Excepting one or two vowels, he could say other vowels and a few consonants.

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4. Could not follow simple commands except 'come'.

Case 17.

Evaluations	CA	MA	IQ	SA	SQ	Hearing loss
Pretherapy	9	10	1ll	10	112	Bilateral Severe Sensori Neural loss
Post therapy	9+5	10½	117	10.30	108.40	

Speech evaluation - prior to therapy

Vocabulary confined to 5-6 words only.

Speech evaluation - after therapy

1. Performs well in auditory training (l) awareness of sound; (2) gross discrimination.

2. Could speak in 2-3 word sentence level.

3. Vocabulary of about 70-80 words.

4. Uses pronouns (I, she, he, etc.) and time element in verbal speech.

Case 18.

Evaluations	CA	MA	IQ	SA	SQ	Hearing loss
Pretherapy	7+1	5	72	7.00	100	Bilateral Severe Sensori Neural loss
Post therapy	7+6	6	a0	8.60	114	

Speech evaluation - prior to therapy

Hearing loss and no speech.

Speech evaluation - after therapy

Attending therapy since 7 months.

1. Vocabulary of about 20-30 words.

8. Could name and say body parts.

3. Could say almost all vowels correctly and a few consonants.

Case 19.

Evaluations	CA	MA	IQ	SA	SQ	Hearing loss
Pretherapy	10+2	8	80	8	80	Bilateral Severe S-N loss
Post therapy	10+4	8	80	9	86.50	

Speech evaluation - prior to therapy

Hearing loss and no speech.

Speech evaluation, - after therapy

1. Could say only a few vowels and consonants.
2. Discriminates drum sound.

Not much progress is there. Case is not motivated to learn. Does not take active part in grbup activities and

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sits blinking. Parental stimulation at home to speak is not satisfactory in spite of the counseling being given.

Case 20.

Evaluations	CA	MA	IQ	SA	SQ	Hearing loss
Pretherapy	9+2	10½	117	10	114	Bilateral Moderate S-N loss
Post therapy	9+6	10½	117	10.4	108.30	

Speech evaluation - prior to therapy

Hearing loss with limited speech.

Speech evaluation - after therapy

Attended therapy for 3 years and discontinued in view of attending normal school. But again coming to therapy since 8 months.

1. Vocabulary of about 200-300 words.
2. Speaks in sentences meaningfully - 3-6 word level.
3. Articulation is quite intelligible.
4. Could comprehend and answer for simple questions.
5. Could count upto 40 and in association with objects.

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6. Could construct and tell simple sentences from a picture story book.

7. Voice is good.

Competitive and very active in group exercises. Likes to play throw ball and foot ball; speaks most of the time than gesturing. Parental stimulation at home is good.

Case 21.

Evaluations	CA	MA	IQ	SA	SQ	Hearing loss
Pretherapy	8+2	6½	82	7.30	104	Bilateral Severe S-N loss
Post therapy	8+6	7	82	8.60	100	

speech evaluation - prior to therapy

Except 'amma' the boy does not produce any other word. Gesture is being used for communication.

Speech evaluation - after therapy

Attending therapy since 8 months.

1. Vocabulary of about 10-15 words.

2. Could say a few vowels and consonants intelligibly.

3. Could identify, match all the colours and could say 3 colours.

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Case 22.

Evaluations	CA	MA		SA	SQ	Hearing loss
Pretherapy	9	8	89	10	112	Bilateral Severe S-N loss
Post therapy	9+5	9½	100	10.60	111.50	

Speech evaluation, - prior to therapy

Vocabulary of only 2 words (appa and amma).

Speech evaluation - after therapy

1. Vocabulary of about 20-25 words.
2. Could count upto 10.
3. Could identify primary colours.

Evaluations	CA	MA	IQ	SA	SQ	Hearing loss
Pretherapy	9	7	78	9	100	Bilateral Severe S-N loss
Post therapy	9+6	6½	69	10	103	
		9				

Speech evaluation - prior to therapy

Hearing loss and limited speech. Vocabulary of 2-3 words.

Speech evaluation - after therapy (Attending therapy since 7 months)

1. Vocabulary of about 20-25 words.

2. Could associate these words with objects and pictures.

Case 24.

Evaluations	CA	MA	IQ	SA	SQ	Hearing loss
Pretherapy	5	4	80	5	100	Bilateral Severe S-N loss
Post therapy	5+4	4	80	6	106	

Speech evaluation - prior to therapy

Vocabulary of 2-3 words but not in meaningful use.

gpeech, evaluation - after therapy

1. Could say a few vowels and a few consonants like /b/, /p/, /m/, e. j

2. Could name parts of the body.

3. Imitates the sounds well and lipreads.

Case 25.

Evaluations	CA	MA	IQ	SA	SQ	Hearing loss
Pretherapy	6	6	100	7	116	Bilateral S-N loss
Post therapy	6+6	6	92	7.60	115	

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Speech evaluation - prior to therapy

Says amma, babbles a lot and is stimulable.

Speech evaluation - after therapy

1. Could say all the vowels and a few consonants.
2. Vocabulary - 10-15 words.

Uses signs most of the time than speech. This has been informed to parents, not to encourage this.

Case 26.

Evaluations	CA	MA	IQ	SA	SQ	Hearing loss
Pretherapy	9+3	9½	102	10	112	Bilateral Severe S-N loss
Post therapy	9+6	10	105	10	112	

Speech evaluation - prior to therapy

Communicates through gestures. Pitch is too low. Cannot read or write.

Speech evaluation. - after therapy

Attending therapy since 10 months.

1. Vocabulary of about 25-30 words.

8. Could count upto 20.

3. Could use these in meaningful simple sentences.

Case 27.

Evaluations	CA	MA	IQ	SA	SQ	Hearing loss
Pretherapy	8+2	9½	118	8	100	Bilateral Moderate S-N loss
Post therapy	8+7	10½	123	7.60	87.50	

Speech eva^uati,on, - prior to therapy

Hearing loss and no speech.

Snatch evaluation - after therapy

1. Vocabulary of 10-15 words.
2. Could write upto 200, but could not say even upto 5.
3. In isolation he could say all vowels and a few consonants.
4. Sharp at arithmetic. Does problems quickly and correctly.

Parents not cooperative, otherwise the progress in speech of the case would have been more improved.

Case 28.

Evaluations	CA	MA	IQ	SA	SQ	Hearing loss
Pretherapy	9+2	11	122	9	100	Bilateral Severe S-N loss
Post therapy	9+6	11	116	9.80	104.20	

Speech evaluation - prior to therapy

No speech due to hearing loss. Babbles.

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Speech evaluation - after therapy

1. Could say all the vowels and consonants intelligibly in isolation.
2. Vocabulary of about 200-280 words.
3. Discriminates between drum, pipe, xylophane, squeaking toys and dog barking, train, etc.
4. Could speak in small simple 2-3 word sentences.
5. Competitive and active in group activities.

Case 29.

Evaluations	CA	MA	IQ	SA	SQ	Hearing loss
Pretherapy	8+2	6½	82	7.60	87.50	Bilateral Severe S-N loss
Post therapy	8+7	6½	77	7.60	87.20	

Speech evaluation - prior to therapy

Could say 2 or 3 words, but not in meaningful use. Signs for communication. Voice is too soft (feeble).

Speech evaluation - after therapy

1. Could write all the vowels and some of the consonants after repetition.
2. Could say a few consonants and a few vowels correctly after stimulation.

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3. Recognizes three colours.

Poor attention span. Stimulation at home is not regular and have been counselled for this.

Qualitative description of speech and language evaluation in Clinical Control Group prior to. and after therapy period. for the clinical experimental group.

As it has been mentioned earlier this group did not receive therapy for some of the cases, the parents were asked to train the child at home after giving proper instructions. The initial speech and language evaluations done on these cases revealed that most of the cases were without speech and some cases had a very limited vocabulary confined to appa, amma or anna and mama. Among these cases, some were using it appropriately and the others irrelevantly or in spontaneous speech. Most of the cases presented a picture of poor concept of colour, number, etc. Some eases could write a few alphabet on intensive stimulation. Only one or two cases had a vocabulary of 10-15 words when compared to the first evaluation which indicated a mere 2-3 word vocabulary. These cases could write a few vowels and consonants on dictation. Numerical concept was confined to counting from 1 to 10. Otherwise, this group presented no improvement in . their speech and language levels. ^

CONCLUSION AND SUGGESTIONS

Certain inferences can be drawn from the present piece of research. The study can be considered as more of an exploratory type than purely experimental because of the lack of rigour with reference to the choice of the sample, matching of the groups, pre therapy-post therapy evaluations, etc. So, at best the conclusions that are drawn can be considered tentative. But as these conclusions are very much in line with our expectations, suggest these inferences to be valid to a considerable degree. The following main conclusions has been drawn.

1. There is a definite improvement in IQ and SQ scores of the clinical experimental group consequent to speech therapy procedures (Table 1-4).

2. The clinical Experimental group shows a tendency to move towards homogeneity consequent to speech training procedures (Tables 1-4).

3. The gains in the IQ scores of the clinical Experimental group consequent to speech training is statistically significant.

4. The gains in IQs of the clinical control group consequent to speech training is not statistically significant.

6. The Clinical Experimental group shows a slight increase in social maturity when compared with the Clinical Control group.

6. The Clinical Experimental group shows a definite lag (functional) in Mental development when compared with the normal group.

7. There is no significant difference between the Younger and Older age groups among the Clinical Experimental groups with reference to their learning potentialities.

8. In the present study, the severe hearing loss group show significant higher learning potentialities than the moderate hearing loss group.

9. Significant improvement in speech and language occurs in the Clinical Experimental group consequent to speech therapy procedures.

Some suggestions can be set forth from the experiences in the present study which would serve as guidelines for the similar research studies in the future.

It was felt that the N of both the Clinical Control and Clinical Experimental groups was comparatively small. It is

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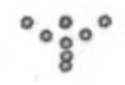
advisable to use a larger N in both groups so as to come to more reliable conclusions.

For purposes of evaluation of speech and language both during pre therapy and post therapy evaluations only a descriptive attempt has been done. It is preferable to use standardized instruments in order to get a quantitative measurement of the improvement.

In addition to the performance tests used here some of the culture-free tests like the Leiter International Performance Scale should be used for purposes of measuring intelligence.

Although ideally speaking the clinical experimental group and the clinical control group should have been matched this ideal was too much to hope for in those circumstances. However, it is preferable to use these two groups having matched them at least on some of the important variables which would influence the test scores.

It was felt that the speech therapy period on which the clinical experimental group was put was too short (6 months only) to accrue solid benefits from therapy. It is advisable therefore that the therapy period be about the length of one year.



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