Hi Tech Devices Facilitating Auditory Training & Speech Language Therapy for Children with Hearing Impairment

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***Abstract*- The application of Information Technology is warranted in all aspects of life. This paper highlights the facilitation of speech and language acquisition and development in children having congenital bilateral profound sensorineural hearing impairment. A group of more than 150 bilingual children, aged 2-8 years benefitted from augmentative use of computer-based speech and language therapeutic techniques targeted towards development of linguistic abilities and literacy skills with input of information through the natural channels of hearing and vision. This led to their successful integration in mainstream society. The myriad of benefits allow us to conclude that Information Technology is an essential need of the day to inculcate both knowledge of the world, and skills to cope with challenges that individuals with hearing impairment face in today's times. Hence, both teachers and students must employ computer literacy from the early school years.**

Keywords- bilingualism, Information Technology, language acquisition, mainstream education, hearing impairment, multimodal input, speech language therapy

I. INTRODUCTION

We undoubtedly take our communicative abilities for granted, have a pitiful attitude towards individuals with hearing impairment, and even called them 'dumb' till a few years ago. Although the cochlear implant, now near half a century in age, created major prosperous variations in therapy, it remained mandatory to start using the cochlear implant within the first year of life to see it bring success in all realms of life.

The cochlear implant undoubtedly, created avenues that had been otherwise denied to children with hearing impairment. Those who received it within the first two years of life and did not have multiple disabilities acquired their speech and language skills almost age appropriately. However it remained inaccessible to many due to high costs and proved less miraculous to those receiving it after their seventh birthday. It is this group of the not so privileged children that we worked with here in Pakistan, using technology on a different plane.

II. RATIONALE

The two primary channels of input for information are the visual and auditory channels, with the latter not functioning optimally, the former seems to get sharper, naturally; thus visual input complements the receipt of auditory information remarkably. We unconsciously focus on the speaker's lips to speech read when s/he is whispering to us in a crowd. It is this natural ability which became the basis for this methodology of developing communication in children with Hearing Impairment.

The benefits of multisensory stimulation have been discussed by many researchers. According to one study (Power & Hyde, 1997), *'the superiority of multisensory approaches is well established and these should be the methods of choice in communicating with children having hearing impairment.'* Similarly, another set of studies have shown that simultaneous multisensory stimulation improves perception by reducing ambiguity and has multiple additional benefits (Stein & Meredith, 1993).

Keeping the benefits of multisensory input in mind, a computer-based program that included auditory as well as visual stimuli for language stimulation and auditory training of children with hearing impairment and language delay was developed. Visual information was presented in the form of written words and pictures but facial expressions and lip reading, was kept as natural as possible - without any extra emphasis on either. The program targeted development of morphosyntactic aspects of language, listening and cognitive skills, such as auditory/visual sequencing &

memory, and literacy. In order to ensure carry-over and transfer of skills onto spontaneous language, all children were given print outs and written material for home practice.

III. LITERATURE REVIEW

In today's technologically advancing world, use of hi-tech devices is becoming more and more prevalent in all fields of work. *'With the advent of multimedia computing and the Internet, the role of computers in language instruction has become an important issue confronting a large number of instructors around the world',* (Warschauer & Healey, 1998). In the practice of speech and language therapy for children with different types of speech and language delays and disorders, use of hi-tech devices for developing speech, language and literacy skills is also catching on quickly.

The advantages of using hitech devices to facilitate learning are manifold. According to Tanner (2011), *'Exposing students to new and different technologies while working towards language and/or speech goals will help children adapt to a future involving continued use of technology*'. He goes on to say that the use of technology in the treatment of speech/language disorders results in improved efficiency as it has shown to maintain the attention, motivation and interest of the students.

According to Foley & Staples (2006), *'High tech devices hold the greatest promise for independence during guided reading because they provide users with access to large and varied vocabulary as well as the potential for more complex, generative and spontaneous language use"*. The role of computer programs in enhancement of vocabulary development and reading comprehension has also been highlighted by Constantinescu (2007).

The use of technology in speech therapy is better known as a means of alternative communication, wherein hi-tech devices are used as a substitute 'voice' for the user. However, as Cleuren (2003) points out, speech technology is not only a means of compensating for handicaps but is an essential tool in the diagnosis and therapy of people with speech, language, hearing or learning disorders.

It is critical that speech language pathologists, early interventionists and educators realize the role of technology in language development. The importance and viability of using technology to the address the communication needs and facilitate acquisition of communication skills or rehabilitation of individuals with impairments in different modes of communication has been highlighted by the likes of Currie et al (1996).

When working on developing language and literacy skills, all the emphasis goes on the primary mode of input, i.e. hearing. However, the role of the other input channels, particularly vision, cannot be ignored. Richards & Dolati (2011) suggest that *'because of the directly verbal nature of language teaching and learning, many language teachers are either often not aware of or underestimate the potentially constructive role visual learning aids can play in enhancing the language learning…'* They further state that *'Although there has been much less research on the visual as distinct from verbal nature of learning, there is an interesting body of research evidence which supports the idea that student learning is positively affected by presenting visual and verbal aids together.'*

Piper et al (2010) state that representation of stimuli in multiple modalities *'reinforce and reaffirm spoken, written and auditory forms of language'*. According to Ronkainen (2011), the use of the auditory-verbal method and multimodal communication styles in speech therapy help enhance the listening skills and vocal communication of children with cochlear implants.

One of the main purposes of developing language and literacy skills in children with hearing and/or language impairments is to help them integrate into mainstream society. Lanfer (2006), in his paper on mainstreaming children with hearing impairment, highlights the importance of equal opportunities by quoting Lawrence Siegel; *"deaf and hard-of-hearing children deserve a quality, communication-driven program, which is formally articulated in law, and requires appropriate communication assessment, communication development opportunities, and communication access not just for academics, but for interactions with peers, teachers and staff; deaf and hard-of-hearing role models; and access to extra curricular and other important school activities.*" The goal should be to enhance and accelerate language development so that the child makes up for the lost language acquisition time, and is able to integrate into an educational and social system with other same-aged peers.

IV. METHODOLOGY

A. Study Group

The computer program was carefully designed over a span of three years, and was used with over 150 children-majority of them having bilateral profound sensori-neural hearing impairment. Their ages ranged from two and a half years to eight years. Since most of them had been fitted with hearing aids or cochlear implants at a later age, they had lost out on the initial few years or the *critical age of language acquisition*. Consequently, their language skills were significantly delayed and they faced difficulty in being mainstreamed. Ninety-five percent of the children came from bilingual backgrounds, with Urdu, Punjabi, Sindi or Gujrati as the primary language, and English as a secondary language. However, they chose to adopt English as their first

language in order to integrate into the mainstream schools. The use of electronic aids, in the form of this computer program, was adopted to help make up for lost time by accelerating and enhancing the development of language and listening skills.

B. Method of Instruction

As mentioned before, the program targeted development of semantics, morphosyntax, listening and cognitive skills and literacy.

1. Listening & Cognitive Skills

Hearing and vision are the main channels of input for all, therefore it became mandatory to cross the obstacle of hearing impairment through appropriate and timely fitting of amplification devices thereby ensuring that hearing became the primary input channel for verbal communication. Additionally, good auditory processing skills are a prerequisite for the development, recall and retrieval of verbal language skills. The program therefore aimed at enhancing listening skills, from the very beginning of therapy, regardless of the age at intake. The skills targeted included auditory recognition, auditory discrimination, and auditory memory & sequencing. All responses were recorded on record sheets for comparisons and references and to quantify success being achieved. The data sheets are attached in Appendices A-C.

a. Auditory Recognition of Words

The children were trained to progressively identify single, two, three, four and multiple words from closed sets of pictures. The closed set for multiple words went up to about fifteen pictures per set. At the sentence level, the children were initially exposed to simple noun phrases and verb phrases, and later to noun clauses and verb clauses in complex sentences. The clinician would provide the child with auditory stimuli only, wherein the target word or sentence was spoken and the child had to identify it and repeat after the clinician. The children were also expected to match the pictures on the screen to the correct picture cards.
For younger children, each picture was not only labelled but also given an associated sound, in keeping with the early stages of language development, i.e. For e.g. if a picture of a car was shown, it was labelled as 'car' as well as 'peep-peep.' Additionally, sounds occurring in incidental language experiences were also taught through the program. For e.g. pictures of hot objects such as the sun, tea or fire, were associated with vocal sound effects, such as 'ssss' or 'foo'.
These tasks furthered progressed towards development of semantic skills and auditory memory, wherein the child was expected to match pictures to pictures and objects to pictures. Matching was based on categories of nominals, descriptives and position words. The skills were then carried-over to functional communication. Examples of the record sheets and stimulus words and sentences used, are given in Appendix A.

b. Auditory Discrimination of Word Pairs and Sentence Pairs

The stimuli for sentence pairs consisted of pictures only, whereas minimal word pairs included pictures along with written words for older children and pictures only for younger children. The minimal pairs were presented in all word positions, i.e. initial, medial and final positions. The targeted pairs were b/p, b/m, p/m, k/g, t/d, f/v, s/z, s/sh, g/d, k/t, ch/sh. The child was expected to point out the picture or written form of the spoken words, from amongst a closed set of pictures. For older children, both the closed and open sets comprised of monosyllabic, bisyllabic and multisyllabic words. They were expected to discriminate between maximally and minimally different pairs of sentences and words. Examples of the record sheets and stimulus words and sentences used, are given in Appendix B.

c. Auditory Memory & Sequencing

The earlier stages of sequencing and memory tasks consisted of closed sets of up to five words, pictures or numbers. The child was expected to circle a sequence of two, three, four or five pictures/words in the same order as they were presented. Examples of the record sheets and stimulus words and sentences used, are given in Appendix C.

In later stages, the child was trained to complete four to five step tasks. In the closed set activity, the child was given instructions related to objects placed in front of him. For example, the clinician placed a cup, a knife, a spoon, and a plate in front of the child. The child was then given a set of instructions, such as,

'Put the knife in the plate, stir the cup with the spoon and put the cup in the plate.'

In the open set tasks, there were no objects in front of the child. The type of instructions given were,

'Clap your hands, tell me your name, say balloon, and open the door.'

The child was expected to complete all steps in the same order that they were spoken.

Additionally, the child was trained to recall and retell story sequences. The clinician would tell the child a short story verbally, and then ask the child to relate the events of the story in the correct sequence. This activity was carried over at home by the children's caregivers. The caregivers were asked to practice story sequencing by integrating it with mathematic word problems. For example, *'Sarah had a long*

day at school. It was summer time so it was really hot. When school was over, she drank a glass of milk from the water cooler. When she got home from school, she put down her bag, took of her shoes and drank another two glasses of water. She then went to take a nice cool shower. How many glasses of water did Sarah drink altogether?'

2. Language Skills and Literacy

Language development was targeted in the same sequence and stages as it is naturally acquired by children with normal hearing, keeping in mind its multiple areas and components. Broadly speaking, the areas that were targeted through this program included semantics and morphosyntax. The program consisted of stimuli in the form of twenty two different pictures with short, written descriptions of each picture. They were categorized according to complexity, for age ranges of five to six years, six to seven years, seven to eight years and eight to nine years. Each picture was followed by a short description and a list of its relevant vocabulary. The vocabulary included nouns, verbs, adjectives and pronouns. The child was also expected to match words to other words with similar meanings in order to enhance vocabulary.

Each picture was then described in multiple forms of the same sentence. The purpose of this was to highlight the use of pronouns, tense markers, auxillaries and possessives. For example,

*Lisa sleep**s** on the bed.*
*Lisa **is** sleep**ing** on the bed.*
*Lisa is sleeping on **her** bed.*
***The girl** is sleeping on her bed.*
***She** is sleeping on her bed.*
*This is Lisa**'s** bed.*

Once all the sentences had been targeted, interrogatives were addressed next. The same sentences were then converted to 'Wh-' questions, which the child was expected to answer, using prior knowledge of the earlier sentence tasks and learning from the model provided by the therapist of sentence reversals. For example,

The girls name is Lisa
***What** is the girl's name?*
She is sleeping on her bed.
***Where** is she sleeping?*
Lisa is sleeping.
***Who** is sleeping?*

Sentence Construction

Once the auditory training and language stimulation part of the program had been covered, sentence construction was targeted. More than fifty verbs were targeted in Subject + Verb (SV) and Subject + Verb + Object (SVO) combinations. Once again, the program highlighted and emphasized on lexical development (common nouns, continuous present tense verbs, etc), and morphosyntactic development ('Wh-' questions, articles, etc).

The conjunctions used included *if, then, so, but, and, which, whose.* For younger children, only '*and*' and '*so*' were targeted using pictures. For older children, all conjunctions were targeted, using written words. Complex sentence building eventually progressed to two to three step narrations or story building.

Literacy

As far as literacy was concerned, only reading was targeted through the program. The writing aspect was left to the child's school. Reading skills and grapheme awareness was targeted right from the beginning of therapy. Language and literacy skills cannot be discussed as separate aspects as they went hand in hand in all parts of the program.

V. RESULTS & FINDINGS

The success of the children in this study was compared to a similar group of children who had not been exposed to this program. Success was measured in terms of literacy skills, language skills, listening skills, adjustment in school, curricular success, and the ability to socialize and integrate into mainstream society.

- The children adopted English as their primary language and were thereby able to receive English-medium education.
- They were not only admitted into mainstream schools, but also coped well.
- Their literacy skills were significantly better. They had strong reading skills, both in terms of reading comprehension and phonological skills. These strengths, in turn, manifested themselves in better writing skills. The children had better creative writing skills as well as the ability to answer questions in writing.
- They had better phonological skills.
  The computer program allowed the clinician to provide the children with repetitive speech drills with visual and auditory stimuli and a constant feedback loop.
- The children had better listening skills and had fewer problems with their amplification devices that would go undetected.
  The program increased the frequency of evaluation of the child's listening skills. This made it easier and quicker to pick out problems with the child's amplification device, thereby reducing the time that could have potentially been lost, had the problem not been detected.

- The children had much better social and communication skills. They were able to adjust with peers and interact with family members much more effectively.
- Those children who had gone through the entire set of listening exercises had much better recall and retrieval.
- The children found it much easier to assimilate the increasingly complex auditory information and to cope at school, as they progressed towards higher classes.
  The goal for strengthening auditory memory and sequencing skills was to train the child to assimilate verbal instructions in educational settings, with greater ease. As the child progressed to higher grades, the amount and complexity of verbal instructions in school naturally increased. Improving auditory memory and sequencing skills reduced the chances of auditory fatigue for the child.
- Identification of words was easier with bi- and multisyllabic words in the initial stages of auditory training.
- In the auditory discrimination tasks, children found it easier to discriminate between simple noun/verb phrases, and showed minimal errors. In the more complex sentences, morphosyntactic errors were quite common.
- Language skills were more developed in these children due to repetitive instruction and training, using multimodal input.
  The children's language skills were developed in terms of:
    - Lexicon
        - Proper and Common nouns
        - Verbs
        - Prepositions
        - Adjectives
    - Morphosyntax
        - Pronouns
        - Auxillaries & articles(a, an, the, is, are, am, were, was, will, will be)
        - Morphemes for tenses (-ed, -ing, -s)
        - Possessives (her, his, theirs, -‘s)
        - Plurals
        - Negatives (not, doesn't, isn't, wasn't, hasn't, haven't, didn't, don't)
            - Used with verbs, adjective, nouns, and to express absence
        - Interrogatives (all wh- questions)
        - Comparative and Superlative degree

VI. CONCLUSION

Through this research study it was determined that;

- Hearing is critical for the development of speech, language, communication skills, and learning. The later a child with hearing impairment is identified and amplified, the more the time for language acquisition and development is lost. By comparing language delay and development amongst children who were lucky enough to receive amplification and early intervention in the first two years of life, and those who weren't so lucky, the value of early intervention was highlighted.
- Appropriate and effective amplification is a must. Children with hearing impairment require frequent and timely retesting of their amplification devices to ensure that their potential is maximized. If the amplification device is not in good working order, the child has a compromised mode of input and he will not be able to learn as much as he could have with an efficient device.
- Multimodal input, i.e. both auditory and visual input, is fundamental for communicating with children with hearing impairment. Both input channels are utilized in natural communication and communication with these children. However, in the latter it helps significantly to enhance the visual stimuli through pictures and written words. It is important to keep other visual stimuli, such as lip movements, gestures and facial expressions as natural as possible.
- Increasing the magnitude of visual stimuli makes it easier for children with hearing impairment to conceptualize, memorize, retrieve and recall.
- Using pictures for communicating in the early stages encourages younger children to communicate with their peers and family members.
- Using high tech devices and utilizing Information Technology is crucial for developing communicative abilities. Recent developments in technology, such as the tablet, have revolutionized society. Considering the fact that computers and Information Technology are the need of the day, it is beneficial for children to be exposed to high tech devices from an early age. Aside from developing communicative skills, high tech devices such as the tablet require reduced manual dexterity, which is a great advantage for those children with multiple disabilities.

VII. RECOMMENDATIONS

- Early Intervention is the key to maximizing language learning during the critical period. All children with hearing impairment and language disabilities in general, must not only receive language stimulation at an early stage, but also be exposed to stimulating computer programs and other high tech devices that enhance learning.

- The Information Technology industry must collaborate with early interventionists and speech language pathologists to develop high tech devices and programs in multiple languages, in regions such as the Indian subcontinent, where the language used in school and that spoken at home are usually different. The focus must not only be on a small section of society, but on the population at large.

- A course in Information Technology must be made mandatory in all early intervention and speech-language therapy programs, in order to ensure that every interventionist and speech pathologist is familiar with using high tech devices.

- Teachers for children with hearing impairment must be familiar with high tech devices and programs for training such children.

- Schools must have Information Technology equipped classrooms that nurture knowledge and skills of all children, including those having hearing impairment.

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A p p e n d i x A : R e c o r d

	3) Consonant word Discrimination									
	sun		bun							
	gun		bun							
	run		sun							
	gun		sun							
	gun		run							
	gun		sun							
	4) Consonant word Discrimination									
	house		mouse							
	house		horse							
	hawk		horse							
	force		horse							
	hot		horse							
	5) Consonant word Discrimination									
	Little		candle							
	sandal		candle							
	sandal		rattle							
	cattle		rattle							
	funnel		tunnel							
	funnel		table							
	cable		table							
	apple		pineapple							
	apple		pencil							
	6) Consonant word Discrimination									
	trees		tea							
	trees		key							
	tea		tree							
	tea		D							
	key		tea							
	key		D							
	ski		key							
	ski		C							
	C		tea							
	bee		tea							
	bee		c							
	B		wheat							
	bee		wheat							
	peas		wheat							
	peas		B							
	wheat		meat							
	wheat		meet							
	peas		meat							
	B		meat							
	7) Consonant word Discrimination									
	bone		bowl							
	boat		bowl							
	boat		bone							
	boat		toast							
	toad		toost							

Sheets/Word & Sentence List for Test of Auditory Discriminat

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Auditory Discrimination- Words

(1)	Had	Hand	Lit	Lift
	Lad	Land	Lot	Loft
	Sad	Sand	Wet	Wept
	Said	Send	Rat	Rapt
	Led	Lend	Bet	Belt
	Set	Sent	Net	Knelt
	Wet	Went	Head	Held
	Bet	Bent	Code	Cold
	Let	Lent	Pet	Pelt
(2)	Lip	Clip	Lane	Plane
	Lean	Clean	Lot	Plot
	Lap	Clap	Less	Bless
	Low	Glow	Lock	Block
	Lad	Glad	Lead	Bleed
	Lag	Flag	Lap	Flap
	Lash	Flash	Loss	Floss
(1)	Top	Stop	Stock	Sock
	Tone	Stone	Stick	Sick
	Teel	Steel	Stuck	Suck
	Till	Still	Stack	Sack
(2)	Pot	Spot	Spin	Sin

	Pill	Spill	Spell	Sell
	Pan	Span	Spit	Sit
	Poke	Spoke	Speak	Seek
(3)	Lip	Slip	Mile	Smile
	Low	Slow	Mere	Smear
	Late	Slate	Might	Smile
	Lap	Slap	Mall	Small
(4)	Wing	Swing	Scold	Cold
	Well	Swell	Soar	Sour
	Corn	Scorn	Sky	Sigh
	Car	Scar	Skip	Sip
(5)	Cool	School		
	Key	Ski		
	Can	Scan		
	Skip	Sip		
(1)	Write	Writes	Hand	Hands
	Bat	Bats	Find	Finds
	Shirt	Shirts	Bed	Beds
	Sweet	Sweets	Rod	Rods
(2)	Lip	Lips	Cub	Cubs
	Soap	Soaps	Rib	Ribs
	Hop	Hops	Nib	Nibs
	Map	Maps	Tab	Tabs
(3)	Cake	Cakes	Bag	Bags
	Book	Books	Leg	Legs
	Take	Takes	Sing	Sings
	Lick	Licks	Jog	Jogs

(4)	Cough	Coughs	Give	Gives
	Bluff	Bluffs	Dive	Dives
	Sniff	Sniffs	Hive	Hives
	Laugh	Laughs	Drive	Drives
(1)	Rush	Brush	Ram	Pram
	Ring	Bring	Ray	Pray
	Rim	Brim	Robe	Probe
	Rake	Brake	Rice	Price
(2)	Rag	Drag	Rack	Track
	Raw	Draw	Ray	Tray
	Rank	Drank	Rip	Trip
	Rum	Drum	Rot	Trot
(3)	Ram	Gram	Rack	Crack
	Rope	Grope	Rash	Crash
	Ross	Gross	Rib	Crib
	Rain	Grain	Row	Crow
(4)	Rock	Frock	Three	Tree
	Rye	Fry	Thrust	Trust
	Rail	Frail	Through	Troupe
	Rose	Froze	Thrive	Drive

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Auditory Discrimination- Sentences

1. The boy was eating.
   The boy was writing.
   The boy was running.
   The boy was sleeping.

What was the boy doing?

2. The boy was crying.
   The boy was drinking.
   The boy was playing.
   The boy was swimming.

What was the boy doing?

3. The boy was reading.
   The boy was walking.
   The boy was painting.
   The boy was jumping.

What was the boy doing?

4. The boy was talking.
   The boy was hurt.
   The boy was clapping.
   The boy was kicking a ball.

What was the boy doing?

5. The boy was catching a ball.
   The boy was awake.
   The boy was buying a book.
   The boy was pasting on a paper.

What was the boy doing?

6. The girl was talking.
   The girl was hurt.
   The girl was clapping.
   The girl was kicking a ball.

What was the girl doing?

7. The girl was eating.
   The girl was writing.
   The girl was running.
   The girl was sleeping.

What was the girl doing?

8. The girl was crying.
   The girl was drinking.
   The girl was playing.
   The girl was swimming.

What was the girl doing?

9. The girl was reading.
   The girl was walking.
   The girl was painting.
   The girl was jumping.

What was the girl doing?

10. The girl was catching a ball.
    The girl was awake.
    The girl was buying a book.
    The girl was pasting on a paper.

What was the girl doing?

11. The man was talking.
    The man was hurt.
    The man was clapping.
    The man was kicking a ball.

What was the man doing?

12. The man was eating.
    The man was writing.
    The man was running.
    The man was sleeping.

What was the man doing?

13. The man was watching a T.V.
    The man was drinking.
    The man was playing.
    The man was swimming.

What was the man doing?

14. The man was reading.
    The man was walking.

    The man was driving.
    The man was holding an umbrella.

What was the man doing?

15. The woman was talking.
    The woman was hurt.
    The woman was clapping.
    The woman was washing the dishes.

What was the woman doing?

16. The woman was working on a computer.
    The woman was awake.
    The woman was buying a book.
    The woman was driving a car.

What was the woman doing?

17. The woman was holding an umbrella.
    The woman was holding a bag.
    The woman was holding a briefcase.
    The woman was carrying a book.

What was the woman doing?

Appendix B: Record Sheets for Test of Auditory Recognition

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Listening Screening- Words

Date	No	Words/Picture	Says words correctly	Says words incompletely	Recognizes word/picture	Does Not Recognize the word/picture	Auditory Recognition	Therapists Signature
	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							
	30							

Appendix C: Record Sheets for Test of Auditory Memory & Sequencing

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Listening Screening- Words

Name: _____ **Date:** _____

Closed set stimulus: nos 1-10 numbers spoken at a distance of less than 2 meters in a quiet environment, wearing _____(amplification)						
	Numbers Spoken			Numbers as heard by child		
1						
2						
3						
4						
Closed set: words spoken at a distance of less than 2 metres in quiet environment						
	Words Spoken			Words as heard by child		
5						
6						
7						
8						
Closed set: bisyllabic words spoken at a distance of less than 2 metres in quiet environment						
	Words Spoken			Words as heard by		
9						
10						
11						
12						
Closed set: sentences about a picture of _____ shown to the child, who points to the picture being spok en about and repeats the sentences. Sentences spoken at a distance of less than 2 metres in quiet environment						
	Sentences Spoken		Response	Sentences as heard by child		
13						
14						
15						
16						

Therapist:_____

Date:_____