

## **Aphasia - A Retraining Programme**

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### ***Abstract***

This study was conducted to find out the efficacy of Behavioural Intervention in the retraining of an aphasic. The patient had Broca's aphasia. Assessment was done using the Indianized version of the Western Aphasia Battery (WAB) at the beginning of therapy, after 20 sessions (mid-therapy) and after 40 sessions (post-therapy). After the initial assessment the therapeutic program was cited out using the aphasia retraining method developed at the Behaviour Therapy and Bio-feedback Unit of NIMHANS. The procedures were based on programmed instruction and operant conditioning. Results were analysed using the scores on 6 WAB parameters. Aphasia Quotient and overall language gains on the parameters of Spontaneous Speech, Auditory Verbal Comprehension, Repetition, Naming, Reading and Writing were computed and discussed. The findings revealed improvement on all the language modalities and a trend towards resolution to Transcortical motor aphasia. The efficacy of the Retraining procedure in this patient was established.

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Key words -

**Aphasia,  
Programmed instruction,  
Operant conditioning**

Around 240 aphasic individuals are referred for language therapy to the Department of Speech Pathology & Audiology of NIMHANS every year. Aphasia, or more appropriately Dysphasia, is the general term used for disorders of symbolization. The aphasic has difficulty in formulating, comprehending or expressing meanings. Often there is impairment of all functions [1].

Multidimensional definitions of aphasia categorize them into different types. One such definition by Walton [2] includes two major types i.e., motor and sensory aphasia. Motor aphasia results from a lesion in the neighbourhood of Broca's area. In the severest form the patient loses the power to speak completely or may say little more than yes or no. He nevertheless understands fully the spoken word and will readily obey commands. He is unable to express his thoughts in speech or

writing.

Aphasia therapy has generally been based on either of two streams of thought. That aphasia is a loss of language and therefore the lost information can be regained by reeducation and retraining; and that aphasia is a reduction of efficiency in gaining access to linguistic knowledge, therefore the retrieval strategies of the patient can be improved by stimulation [3]. Holland and Harris [4] used both reeducation and retrieval principles in their attempts to rehabilitate aphasics using programmed instruction. Following their lead Mishra [5] formulated a retraining package for aphasics and used it successfully with Broca's aphasics at the Behaviour Therapy and Bio-feedback Unit, of the National Institute of Mental Health & Neuro Sciences, Bangalore . This program also involved the use of relaxation. The outcome reported was positive.

Diferent types of therapy with aphasics have generally resulted in improvement in all language modalities [6], [7], [8], [9]. Patients with stroke showed the poorest recovery as compared with aphasics due to other causes [10], [11]. Broca's aphasics do better with therapy than Wernicke's and global aphasics [8], [12], [13]. The variables influencing therapy are: initial severity of aphasia [7], [14], time of initiation of therapy [15] and duration of therapy. Language gains can be attributed to therapy if therapy is initiated after the spontaneous recovery period.-generally 3 months post onset of aphasia [16].

The present study was carried out to study the effectiveness of a multisensory package program based on operant conditioning techniques in an aphasic.

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## Material and Methods

### Description of the patient

The patient was a 50 year old Broca's aphasic, diagnosed by the Department of Speech Pathology & Audiology . He had completed the 3 month period of spontaneous recovery following cerebro vascular accident, had premorbidly good knowledge of English as he had been a Reader in Chemistry. He had not undergone any other formal therapy for speech or language.

The design adopted was the single case study design with multiple base line assessments.

The tool used for assessment was the Indianized version of the WAB [17]. The tool is similar to the original WAB in the 8 areas covered. They are: Spontaneous Speech, Auditory Verbal Comprehension, Repetition, Naming, Reading, Writing, Apraxia and Constructional Tasks. The patient was assessed on the first 6 parameters pre, mid and post therapy.

Therapy was conducted over 40 sessions using the Retraining Procedure for Aphasics [5]. This therapeutic procedure has 6 steps which cover spontaneous speech and recognition, repetition, chaining from simple to complex sentences, detection of errors, comprehension and retention, writing and computations. The program for this particular patient tailored to the pretherapy baseline assessment is given below.

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## The Program

Multimodal language training (Listing, Speaking, Reading and Writing) was tailored to the baseline values derived from the pretherapy assessment through multisensory inputs (visual, tactile, auditory, kinesthetic).

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## **Spontaneous Procedure of Speech and Recognition**

The patient had read one 4 letter word after a phonemic cue was given. Therefore it was planned that therapy be started in the first step of the Retraining procedure for aphasics with 4 letter words, skipping the 2 and 3 letter stages. As the patient could not spontaneously initiate any word, phonemic cues were to be given for this.

In the first session the patient was found to be motivated to verbalize his day-to-day needs with appropriate words. In this regard 6 classes of words were chosen; these related to his family and himself, eating, dressing, washing, articles in the room and articles in the garden. Those related to eating that were first chosen are: water, drink, food, tea, coffee, idli, puri, rice. Initially the patient used only the verb 'want' in Kannada (beku) with these nouns. Pictures and the words stenciled on cards were used for this purpose. The patient was given phonemic cues to read the words. During therapy it was found that the patient could read the words after short pauses and not continuously. If the words were presented immediately he perseverated on a single word and could not correct himself. Through feedback on the tape recorder he was made to understand how he perseverated on single words. As a corrective measure, he learned to identify the words he perseverated on, indicate the same, and take a longer break before looking at the flashed cards and pictures. Over 20 sessions the patient could spontaneously read words that had more than 7 letters (eg. Building) and compound words (eg. Ink-pot). Initially the phonemic cue was faded out, later the pictorial representation was removed. As these were related to his immediate environment his family was involved in initiating his speech in the presence of the real objects. They were taught to allow him time to respond and to give him phonemic cues.

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## **Repetition**

Repetition of words followed the same classes as in the Spontaneous Speech procedure. Initially words of 3 or more syllables were used. Later 2 words were used with the syllabic count gradually increasing with the progress in therapy. Clarity in articulation was emphasized. In the process of repetition, the tape recorder order was found to delay the course, therefore immediate feed back to the patient was given by repeating his verbal output exactly as he said it. The patient often corrected his pronunciation and was verbally reinforced. By the end of 20 sessions the patient could repeat 6-9 syllables with few errors. The repetition was dependent on the combination of syllables. Repetition to progressively difficult words was continued after midtherapy assessment. By the end of 40 sessions the patient was able to repeat up to 10 syllables without any mistake.

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## **Reading**

The plan for therapy in Reading was to move in 2 directions: one, from words to alphabets, and the other, from words to sentences. The goal set for the first 20 sessions was to familiarize the patient with the names of alphabets, the latter was to be taken up in the next 20 sessions.

The step towards helping the patient to relearn the names of the alphabets to facilitate his reading was done by using a multisensory approach. Verbal stimuli were provided together with plastic alphabets. Tactile stimulation was given by asking the patient to write in sand and by writing on his palm and on his back. Slides were used to provide larger and more colourful visual stimuli to the patient. As chaining of alphabets from A to Z is an automatic mental event, the names of the alphabets were chained in familiar tunes which the patient learned to sing. The patient was found to repeatedly make the same mistake in chaining the alphabets verbally i.e., from Q (similar in sound to U) he often chained U V W X Y Z. By the end of 20 sessions he could correctly name and write A-F, T & P, could correctly choose the alphabet he was asked to pick up from 5-6 alternatives and could name all the alphabets one after the other except for the above mentioned error. Mnemonic cues were given to him for this purpose. Eg. He learned to associate his mirror image with the word 'I' and the alphabet 'i'; to say 'O' by making his mouth in the same shape as the alphabet. Prompting of the right sound and verbal and visual fading were used. Visual fading was done by decreasing the size and colour of the visual stimulus in both 3 dimensional and 2 dimensional representations. Verbal stimuli was faded till the patient could say the alphabets himself.

After midtherapy assessment, the patient progressed from reading one word to reading sentences of many words. Eg. One of the most complex sentences he read aloud was, "Two atoms of hydrogen and one atom of oxygen combine to form water". In the task of chaining words into sentences chemistry was the main focus as the patient was very highly motivated to do the tasks, as it was his vocation, constituting his 'prepotent' responses.

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### **Detection of errors, comprehension and retention**

To improve his auditory verbal comprehension the patient listened to passages progressively increasing in number of sentences and complexity of vocabulary after which he was asked certain simple questions. The patient was asked to name the days of week, the months and years. He could serially name them without any difficulty. However when asked randomly to name these (eg. which month comes before August?) he had difficulty in recalling. The patient answered with words and phrases and struggled to phrase sentences. Verbal perseveration was also common. The patient was able to detect the errors made by the therapist (purposely) while reading the passages. And he progressed from being unable to rearrange scrambled alphabets to being able to rearrange the alphabets of 4-5 letter words. This was easily done when the sentences used were familiar. Eg. Old is------(DGLO).

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### **Writing**

In the initial assessment in writing the patient could barely copy words even with his left hand, as he was right hemiparetic, therefore it was planned to initiate writing by asking the patient to copy the same words that were given to him in the tasks of spontaneous speech. Gradually his copying improved to whole paragraphs.

His spontaneous writing of alphabets and numbers was nil at the initial assessment. Dictation of the

words used in the spontaneous speech programme was the second step in writing . Finally the patient spontaneously started writing the alphabets he had learned. By the end of the 40 sessions of therapy he could write from A-Z and could write most of the alphabets to dictation. It was found that he repeatedly made mistakes with similar sounding and similar looking alphabets eg. m and n, i and e, u and q, u and n, b and d.

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## Computations

At the initial assessment, the patient was not able to write numbers with proper spatial placement. When presented with plastic numbers he was able to name them. It was found that he had spatial acalculia. Therefore with the use of the multisensory approach chaining of numbers from 1-10 was done both oral and written. Following this the patient was shown the spatial positioning from units, to lakhs. The patient quickly grasped these concepts as compared to the difficulty he had in relearning the alphabets.

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## Relaxation

The patient was given relaxation with the GSR apparatus in every session which was found to decrease his anxiety about speaking.

The post therapy assessment was done after 40 sessions and the patient was discharged after the program; further his retraining at home was given by his family for 2 weeks. Home work assignments to be done independently by the patient were also added.

The patient came for follow-up 2 weeks later and attended therapy for one week. Therapy was conducted on similar lines.

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## Results

The results are discussed in terms of pre, mid and post therapy assessments. The scores given are the values to ten points. Refere Table I for the scores.

*Table I - Scores of case I on the 6 parameters of the WAB converted to scores out of 10 points*

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## Aphasia quotient

The Aphasia quotient (AQ) was computed considering the scores on the tasks of Spontaneous Speech, Auditory and Verbal Comprehension, Repetition and Naming as specified in the WAB.

The AQ of the patient was found to improve from 28.5% to 37% in the first 20 sessions and the score rose from 38% in mid therapy to 52.8% in post therapy showing remarkable improvement. The scores are represented in Table I and Figure 1.

***.Case I. Scores pre, mid and post therapy on AQ***

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## **Overall improvements**

An analysis of the gains in scores over all the languages parameters as given in Table I are represented in Figure 2.

***.Case I. Overall percentage on the 6 language parameters pre, mid and post therapy***

He made the highest gain in reading (0.2, 2.5 4.5) and repetition (2, 3.4, 6.0) followed closely by writing (0.5, 2.5, 4.1) and auditory verbal comprehension (6, 5.75, 8.2). The gains in Spontaneous Speech and Naming were 2 points. His overall language gain was 28.3%.

The patient's spontaneous speech on pre therapy assessment was monosyllabic, often paraphasias. His speech was hesitant and effortful. At the post therapy stage his speech was telegraphic and he used occasional verbs and prepositional phrases. His auditory verbal comprehension was comparatively well preserved on pre therapy assessment. Following therapy he could comprehend sequential commands and reply correctly to all yes/no questions which he did not do on pre-therapy assessment. His repetition ability improved from 3-4 syllables to 10 syllables over therapy. On the naming tasks the patient required phonemic cues to give 2 paraphasic answers before therapy; following therapy he spontaneously replied to 4 questions.

His reading was restricted to silent reading at the pre-therapy stage, after therapy he could read sentences aloud. The sentences were as long as 12 words.

On the writing tasks, on pre-therapy assessment he could copy only 4 letter words correctly. On post therapy assessment he could copy whole paragraphs and could spontaneously write his name and address, all the English alphabets and 1-20 correctly.

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## **Discussion**

The patient was found to make language gains in all areas i.e ., comprehension, spontaneous speech, naming, repetition, reading and writing. This was the finding reported in previous studies as mentioned by Hagen [6], Basso et al [18], Shewan and Kertesz [8].

The therapy was conducted in other classes of words and not in the manner presented in the WAB to facilitate the generalization process. As the patient's performance improved in the therapeutic setting, generalizations to other situations occurred, as was reported by family members and elicited in the testing situations. This result was contrary to the finding of Doyle et al [19] who found that generalisation of syntax training did not occur over novel situations and it was in consonance with the finding of Van Riper [1], that generalisation to new situations occur.

It was found that spontaneous speech and naming improved the least which is in concordance with clinical observations made- that anomia and apraxic errors persist in most aphasics [4].

The preservation in the patients verbalizations were found to decrease with progress in therapy as he learned to identify them, refrain from verbalizing them and to speak after breathing in and out 5 times. Van Riper [1] also mentioned that in dealing with verbal preservation "one has to have them confess and cancel the preservation which does occur".

Spontaneous speech to questions was found to improve as the patient was given more time to integrate his answers. Clinical observations revealed that the reaction time for simple questions reduced over therapeutic sessions while for complex answers he was observed to have longer reaction time even at the end of therapy. Semantically/phonetically associated words and descriptions of words were also found to help the patient retrieve words. This was done in consonance with Marshall's suggestion [20] after his work in word retrieval with aphasic adults.

The anxiety in speaking in the patient was found to decrease with relaxation as was also observed by Ince [21] and Mishra [5].

The patient welcomed attempts made by his eldest son to help him with the tasks but he did not respond to attempts made by his wife or other children to help him in the tasks. Though the need to let them help him was explained the patient reacted angrily to their efforts. However the help of his eldest son was found to quicken the pace of therapy and help in generalization of learning as was found by Van Riper [1].

The patient's good response to therapy is well in consonance with the view of Eisenson [22] that outgoing personalities respond well to treatment.

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