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Language therapy in the management of post ischemic stroke motor aphasia: A comparative study

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Abstract
Background: A significant non-communicable illness with growing socioeconomic significance in ageing populations is stroke. Speech and language issues are frequent aftereffects of stroke that have a substantial negative influence on the everyday lives of stroke survivors. Any stroke or language stage can be affected by a stroke, which may cause one or more aphasias. Aphasia is caused by a disruption of the early stage involving the language message's structure and norms.
Objective: To assess the efficacy of traditional language therapy vs traditional language therapy combined with constraint-induced language therapy in the treatment of Broca's aphasia following an ischemic stroke.
Material and Method: Convenient sampling was used to select 30 individuals with Ischemic Stroke Broca's Aphasia who meet the study's inclusion criteria. Study design that is almost experimental. A four-month period was spent doing the study (5 sittings per week). Conventional language therapy and Constraint induced language therapy techniques were used.
Results: The mean value of Group B was 32.6 and that of Group A was 21.07, with a mean difference of 11.53 indicating a substantial increase in language function in Group B as a result of the intervention.
Conclusion: According to the findings, conventional language treatment combined with constraint-induced language therapy is superior to conventional language therapy for improving language function in ischemic stroke-related Broca's.

Keywords: Aphasia, language therapy, speech, stroke, quality of life

Introduction

Stroke is a prominent non-communicable condition with rising socioeconomic relevance in ageing populations. According to the World Health Organization's (WHO) Global Burden of Disease study [1], stroke was the second greatest cause of death globally and the third major cause in industrialised countries in 1990, accounting for around 4.4 million deaths globally [2]. The most recent estimates indicate that 5.51 million stroke-related deaths occurred worldwide in 2002, with two-thirds of those deaths occurring in poorer countries. Strokes typically leave long-term disabilities behind and have a huge psychological and financial impact on patients, families, and healthcare professionals [3].

Stroke survivors frequently experience speech and language issues, which have a big influence on their everyday life [4]. Reduced speech and language abilities negatively impact an individual's social, professional, and recreational activities and can cause social isolation and loneliness. Given how crucial communication is to a stroke survivor's quality of life, it is crucial that rehabilitation specialists identify and treat the speech and language abnormalities linked to stroke [5].

The problem of aphasia can be caused by a stroke, which can affect any stage of speech and language. Aphasia is a result of the language message's earliest stage, which involves its structure and norms, being disrupted [6]. A multimodal language condition called aphasia is characterised by impairment to the brain regions responsible for language formation, comprehension, and understanding of language's constituent parts (i.e., phonology, syntax, morphology & semantics) [7].

Non-fluent aphasia or motor aphasia is what it is. Speech production in this kind of aphasia is severely diminished and mostly restricted to brief utterances of under four words. Patients with Broca's aphasia typically have restricted language access and laborious, awkward sound generation.

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The patient may read and interpret speech rather well, but they may have trouble writing. Due to the speech pausing, Broca's aphasia is also referred to as a "non-fluent aphasia" [8].

Rehabilitation's main objective is to get the patient back to his or her usual communication patterns. The physiotherapist may employ both traditional and constraint-induced language treatment to accomplish the goal [9]. Exercise, Naming, Repetition, sentence completion, adhering to the therapist's directions, and Conversation are all components of traditional language therapy. Relearning basic communicative skills is a goal of traditional language therapy [10].

Communicational activities would greatly benefit from the combination of traditional language treatment and constraint-induced language therapy. The western aphasia battery is a frequently used criterion to assess the effectiveness of therapeutic interventions. Thus, the goal of the study was to assess how constraint-induced language treatment and standard language therapy fared in terms of helping stroke patients communicate better [11].

Methodology
Study Design: Quasi Experimental Study Design.

Setting: Data was collected from OPD – Jaipur Physiotherapy College and Maharaj Vinayak General Hospital. The study was conducted for a course of 4 months (5 sittings per week).

Sample Size: 30
Inclusion Criteria
▪ Age group - 40-60 years.
▪ Both sexes.
▪ Right-handed persons
▪ Primary Language is Tamil.
▪ Adequate hearing and vision to participate in language therapy
▪ Unilateral Left CVA involvement
▪ Moderate to moderately severe aphasia.
▪ Non-fluent aphasia
▪ Cognition > 11(MMSE).

Exclusion Criteria
▪ Degenerative or Metabolic illness.
▪ Severe depression or psychiatric disorders.
▪ Brainstem stroke.
▪ Recurrent stroke
▪ History of other neurological impairment (e.g. dementia)
▪ Deaf and dumb
▪ Severe apraxia of speech.

Procedure: Constraint induced language therapy
A suitable selection strategy was used to enlist a total of 30 individuals with Ischemic Stroke-related Broca's aphasia who matched the inclusion criteria. After receiving informed consent, they were divided into two groups, Group A and Group B, each with 15 patients.

Pre-tests were thus administered using the Western Aphasia Battery before the start of therapy, with results being recorded for both groups. Following a demonstration that clarified conventional language treatment, group A

participants had conventional language therapy under supervision for a total of four months [10].

After receiving an explanation of Conventional Language Therapy with Constrained Induced Language Therapy, Group B individuals underwent 4 months of Conventional Language Therapy with Constrained Induced Language Therapy. The Western Aphasia Battery post-test was administered at the last session, and the results were recorded.

In the end, the recorded findings were examined in order to compare the treatment methods by contrasting the pre- and post-test outcomes [12].

Study Parameters
1. Western Aphasia Battery
2. Token Test.
3. Mini Mental State Examination
4. Porch Index of Communicative Abilities (PICA).

Statistical Methods: Both the paired and unpaired t tests were statistical methods employed in the investigation.

For each patient treated with Conventional Language Therapy and Constrained Induced Language Therapy in Ischemic Stroke Broca's Aphasia individually, the paired "t" test was performed to determine the statistical significance between the pre and post-tests.

Comparing the statistically significant difference between Groups A and B was done using the unpaired "t" test.

Results

Table 1: Pre and Post test data of Group A & Group B

S. No	Group- A Conventional Language Therapy		Group- B Conventional Language Therapy with Constraint Induced Language Therapy	
	Pre-Test	**Post-Test**	**Pre-Test**	**Post-Test**
1.	44	63	45	75
2.	46	61	45	73
3.	42	69	42	75
4.	43	61	44	80
5.	45	65	43	81
6.	44	65	50	80
7.	43	60	49	73
8.	44	66	44	75
9.	49	70	43	75
10.	50	73	43	80
11.	43	67	45	72
12.	44	66	43	80
13.	42	62	42	75
14.	45	68	46	81
15.	45	69	44	82

Table 2: Pre and Post test data of Group A on Broca's Aphasia Evaluation

	Mean	**Mean difference**	**Standard deviation**	**Paired 't' test**
Pre test	44.6	21.07	3	26.31
Post test	65.67			

Table - 2 Group - A Represents the mean values, mean difference, standard deviation, and paired 't' value between pretest V/s posttest values of Patient Rated Broca's Aphasia Evaluation for group A who have been subjected to Conventional Language Therapy.

It shows the analysis of Broca's Aphasia Evaluation; the paired 't' value of pre vs post sessions of group A was 26.31 at 0.05 level of significance, which was greater than the tabulated value of 2.15. This showed that there was a statistical significant difference in between pre Vs post test results. The pretest mean was 44.6, the post test mean was 65.67 and mean difference was 21.07, which showed that there was a decrease in Broca's Aphasia Evaluation in posttest indicating the recovery of selected samples in response to intervention.

Table 3: Pre and Post test data of Group B on Broca's Aphasia Evaluation

	Mean	Mean difference	Standard deviation	Paired 't' test
Pre test	44.53	32.6	4.29	29.41
Post test	77.3			

Table - 3, Group - B Represents the mean values, mean difference, standard deviation, and paired 't' value of Broca's Aphasia Evaluation for group B, who have been subjected to Conventional Language Therapy and Constraint induced Language therapy.

Table 3 shows the analysis of Broca's Aphasia Evaluation; the paired 't' value of pre Vs post sessions of group B was 29.41 at 0.05 level of significance, which was greater than the tabulated value of 2.15. This showed that there was a statistical significant difference in between pre Vs post test results. The pretest mean was 44.53, the posttest mean was 77.13 and mean difference was 32.6, which showed that there was a decrease in Broca's Aphasia Evaluation in posttest indicating the recovery of selected samples in response to intervention.

Table 4: Comparative values on Broca's Aphasia Evaluation

	Mean	Mean difference	Standard deviation	Paired 't' test
Group A	21.07	11.53	3.7	8.54
Group B	32.6			

Table 4 shows the analysis of group A and group B with Broca's Aphasia Evaluation. The unpaired 't' value of 8.54 was greater than the tabulated unpaired 't' value of 2.05 at 0.05 level of significance which showed that there was statistically significant difference between group A and group B. The mean value of group A was 21.07 and the mean value of group B was 32.6, and the mean difference was 11.53 which showed that there was a greater improvement in group B when compared to group A.
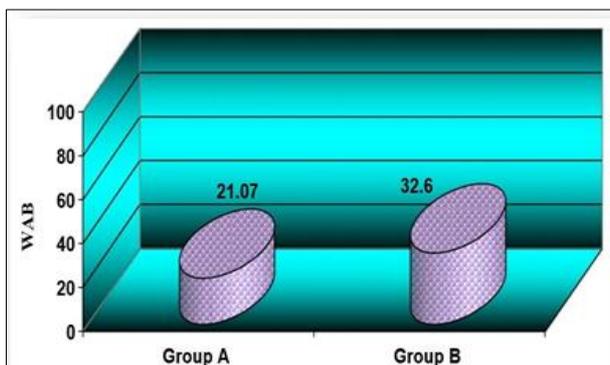

Fig 1: Mean difference of Group A and Group B – Western Aphasia Battery

Discussion and Conclusion

In order to improve language function in ischemic stroke patients with Broca's aphasia, the study compared the efficacy of conventional language treatment with conventional language therapy combined with constraint induced language therapy.

When analyzing and interpreting the Language function in group A, the paired "t" value of 26.31 was higher than the tabulated paired "t" value of 2.15, indicating that there was a statistically significant difference between the pre and post results at the 0.05 level of significance and 14 degrees of freedom. After 4 months, there were improvements in language functional status as a result of conventional language treatment, with the pretest mean increasing to 44.6, the posttest mean increasing to 65.67, and the mean difference increasing to 21.07.

The paired "t" value of 29.41 was higher than the tabulated paired "t" value of 2.15 in the analysis and interpretation of the Language function in group B, indicating that there was a statistically significant difference between the pre and post results at the 0.05 level of significance and 14 degrees of freedom. After 4 months of conventional language treatment combined with constraint-induced language therapy, there were gains in language functional status as evidenced by the pre-test mean of 44.53, post-test mean of 77.13, and mean difference of 32.6.

There was a statistically significant difference between the pre-test Vs post test results of group A and group B, as indicated by the unpaired "t" value of 8.54, which is higher than the tabulated "t" value of 2.05, at a threshold of significance of 0.05, and 28 degrees of freedom. The mean of group A was 21.07, the mean of group B was 32.6, and the mean difference was 11.53, indicating that group B significantly improved in terms of language functional status in response to therapy as compared to group A.

The present study demonstrated that there was a significant improvement in language functional status for patients with ischemic stroke and Broca's aphasia treated with conventional language therapy and on strain-induced language therapy, according to statistical analysis and interpretation of the findings.

Traditional language therapy has improved because it makes language abilities more effective and powerful.

With constraint-induced language treatment, traditional language therapy may be improved because it boosts both parallel and hierarchical processing within the central nervous system, which causes storage regions of the brain and improves the effectiveness of recovery.

The findings of this study indicated that there was appreciable improvement in both groups, according to statistical analysis. The findings also indicated that experimental Group B participants had significantly improved their language functional level compared to control Group A participants. Based on the findings, this study came to the conclusion that Broca's aphasia caused by an ischemic stroke can benefit from both conventional language treatment and conventional language therapy combined with constraint-induced language therapy. As for increasing language function in ischemic stroke Broca's aphasia, conventional language treatment combined with constraint-induced language therapy is more successful than conventional language therapy alone.

Conflict of Interest: There is no conflict of interest.

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