PROGRAMMED THERAPY TECHNIQUE FOR STUTTERERS

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My Mother

 .... for her sweet love

My Bhaiyas

 .... for what I am today

       &

My revered Guide

   Dr.Savithri, S.R.

 .... for her teaching, guidance,

       love and affection.

"Stuttering is a baffling disorder for both

client and clinician. It is amazing

that such an ancient, universal and

obvious human problem should defy

precise description, despite countless

scientific investigations, the basic nature

and cause of stuttering still remain a mystery"

- Emerick & Hatten

CERTIFICATE

This is to certify that the Dissertation entitled: "Programmed Therapy Technique for Stutterers" is the bonafide work in part fulfilment for the degree of M.Sc, (Speech and Hearing) of the student with Reg.No.M8911.

Mysore
1991

Director
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<u>CERTIFICATE</u>

This is to certify that this
Dissertation entitled: "Programmed
Therapy Technique for Stutterers"
has been prepared under
my supervision and guidance.

Savithri SR

Mysore   Dr.S.R.Savithri
1991   Guide

DECLARATION

This Dissertation entitled: "Programmed Therapy Technique for Stutterers" is the result of my own study undertaken under the guidance of Dr.S.R.Savithri, Lecturer in Speech Science. All India Institute of Speech and Hearing, Mysore, and has not been submitted earlier at any University for say other Diploma or Degree.

Mysore.   Register No.M8911
1991

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" Gratitude is the hardest of all
 emotions to express.
 There is no word capable of
 conveying all that one feels.
 Until we reach a world
 where thoughts can be
 adequately expressed inwords,
 'Thank you(
 will have to do ".

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INTRODUCTION

Stuttering is a mysterious question and a puzzle. Van Riper (1982) says that stuttering is more than a verbal riddle. According to him "it can be a devastating personal problem. It is also perhaps primarily a puzzle, the pieces of which lie scattered on the tables of speech pathology, psychiatry, neurophysiology, genetics, and many other discipline. At each of these tables, workers have painstakingly managed to assemble a part of the puzzle, shouting "Eureka" while ignoring the pieces of their own or other tables which fails. Regretfully, but hopefully, we suspect that some of the essential pieces are not merely misplaced but still missing."

Many definitions of stuttering have been offered in the past, some by stutterers and some by non-stutterers. Most of the definitions have been primarily descriptive in nature. They have included mention of abnormal amounts of hesitations, repetitions, and prolongations of sounds, syllables and words, and have described accompanying bodily movement which were obvious to the listener. Other attempts at definitions have ignored the observable behaviour and concentrated on underlying physiological dysfunctions or psychological disturbances which were felt to be the real problem, with the speech disruption merely symptomatic of these basic difficulties.

Wingate (1964) defines stuttering as a (i) (a) disruption in the fluency of verbal expression, which is (b) characterized by involuntary, audible or silent, repetitions or prolongations in the utterance of short speech elements, namely: sounds, syllables, and words of one syllable. These disruptions (c) usually occur frequently or are marked in character and (d) are not readily controllable.

(ii) Sometimes the disruptions are(e) accompanied by accessory activities involving the speech apparatus, related or unrelated body structures, or stereotyped speech utterances. These activities give the appearance of being speech-related struggle.

(iii) Also, there are not infrequently (f) indications or report of the presence of an emotional state, ranging from a general condition of "excitement" or "tension" to more specific emotions or a negative nature such as fear, embarrassment, irritation, or the like (g) The immediate source of stuttering is some incoordination expressed in theperipheral speech mechanism and the ultimate cause is presently unknown and may be complex or compound.

On the same line stuttering has been thought to be the result of miscoordination of the various systems involved

in the speech production (Mackay and MacDonald, 1985) and researchers (Hutchinson, 1975; Conture, McCall and Brewer, 1977; Zimmermann, 1980) have tried to analyze these mis-coordinations.

Several investigators have rigorously examined the possible cause of stuttering and it has been reported that there are many factors which play a significant role in the development of stuttering. These have been reviewed in detail by Bloodstein (1981); Van Riper (1982); Andrews, Craig, Feyer, Hoddinot, Homie and Neilson (1983). They include: (a) Emotional states such as anxiety and fear (Wischner, 1952; Johnson, 1955; Brutten and Shoemaker, 1967; Sheehan, 1970; Ickes and Pierce, 1973; Martin and Venables, 1980; Zimmermann, 1980; Bloodstein,1981; Van Riper, 1982), (b) Communicative stress including parental and other listeners attitudes and perceptions (Johnson, 1942; Hegde, 1982; Meyers and Freeman, 1985a; Martin and Haroldson, 1988), (c) Learning in various forms, for example acquiring beliefs about communicative skills or classical conditioning of negative emotions in response to speech related stimuli (Wischner, 1952a); (d) Geneti-cally transmitted or acquired deficit in sensorimotor skills (Cox, 1984); (e) Perinatal, medical, developmental

and language histories (Blood and Seider, 1981; Bloodstein, 1981? Andrews, Craig, Feyer, Hoddinot, Howie and Neilson, 1983)? (f) Cultural factors (Johnson, 1942; Snidecord, 1947; Stewart, 1959; Bloodstein, 1981; Van Riper, 1982); and (g) Organic factors.

Inspite of several theories and inspite of proposing various causes, stuttering therapy has not been cause oriented. Most often, there is no one to one relation between the cause a theory proposes and the therapy used. Because of its nature, stuttering therapy is a challenge for both the therapist and the stutterer. The treatment methods which were used earlier were basically suggestion, distraction and persuasion. The different techniques include: (1) Shadowing (Cherry, 1953); (2) Choral reading (Johnson and Rosen, 1937); (3) Syllable timed speech (Andrews and Harris, 1964); (4) Masking noise (Kern, 1932)? (5) DAF technique (Ryan and Kirk, 1974); (6) Conversational rate control therapy and breathstream management therapy (Curlee and Perkins, 1969)? (7) Intensive token economy therapy (Andrews and Ingham, 1970)? (8) Operant DAF therapy (Ryan and Kirk, 1974); (9) Precision fluency shaping program (Webster, 1974); (10) Resistant therapy (11) Negative practice; (12)Voluntary stuttering (Bryngelson, 1943); (13) Time out approach (Haroldson, Martin and Star, 1968); (14) systematic desensitization: (15) Rhythmic speech (Brady,

Ingham, Montgomery and Ullina (1983) is noteworthy in this respect. Their study suggests that it is possible to gain experimental control over a narrowly defined behaviour such as specified durations of phonation. We can expect to understand the treatment process better with this kind of research, in which specific treatment targets are isolated and experimentally manipulated. Once the effects on stuttering of manipulation of different treatment targets are isolated, their interactive effects can be studied. Research on the interaction of different treatment targets and procedures can help combine the most effective treatment components into a single treatment package.

In this context, the present study was planned to use therapy techniques suitable to the target dysfluencies shown by the stutterers and to assess the effectiveness of these individualized therapy techniques on stuttering. As Wingate (1964) states "the immediate source of stuttering is some incoordination expressed in the peripheral speech mechanism". In this study, specifically, attempts are made to locate these miscoordinations and therapy techniques are based on these.

1971)? (16) Progressive muscle relaxation; (17) soft contact (Van Riper, 1954); (18) Regulated breathing (Azrin and Nunn, 1979); (19) Airflow therapy (Schwartz, 1976); (20) Biofeedback (Craig and Cleary, 1982).

These techniques have been used in the treatment of stuttering to assess their effectiveness. Of these, prolongation is reported to be the most effective though the reasons are not known.

However, as there is a great variation among the stutterers in terms of their types of dysfluencies and the quantity of dysfluencies, sub-types of stuttering have been identified. Because of this, instead of following and using one technique, one can use two or more techniques depending upon the fluency problems of the subject (Hegde, 1990). Further Van Riper (1981) hypothesized that stutterers may stutter for different reasons, ie. different etiologies might underlie the stuttering observed among a group of stutterers. Following the logic of arguement one could subsequently hypothesize that different kinds of stuttering would be amendable to different kinds of treatments. According to Hegde (1990) "what is urgently needed is an experimental analysis of the effects of specific treatment components on the frequency of stuttering." A recent report by

REVIEW OF LITERATURE

It is well known that stuttering is a "disorder of many theories" (Jonas, 1977). As such, it is also a disorder of many therapies (Hegde, 1990). stuttering for many, if not most, seems to be a self evident problem. Conceptions of stuttering research on stuttering, and therapies for stuttering have evolved in tandem, sometimes linked tightly, sometimes loosely.

The cornerstone of therapy was laid by hypothesis introduced and research undertaken in the 1930s at the University of Iowa - when the speech pathology was in its infancy. During that time, the Orton-Travis theory of cerebral dominance (1931) guided most of the research of stuttering, and to a lesser extent it also guided such therapy as was then available. In the '40s and '50s research and therapy were driven to a considerable extent by anticipatory struggle ideas of Johnson and his associates (1959). During that time Johnson and Van Riper were the primary architects, but each had a quite different principal contribution to make. Johnson focused chiefly on the nature of the stuttering response; Van Riper, after completing early experiments dealing with the nature of stuttering, devoted most of his attention to the development, description, and clinical evaluation of treatment procedures and programs.

In 1933, subsequently, Johnson developed the concept of the <u>moment of stuttering</u>. The moment of stuttering had become the window through which the essence of the disorder could be seen. It was therefore a focal point for both theory and treatment.

During the era, Travis (1971) and his students were equally convinced that stuttering was a symptom of neurosis, hence required psychotherapy to resolve the underlying conflict. They saw the Johnson approach to treatment as symptom management, whereas Johnsonians were convinced that stuttering was not symptomatic of anything. In these era, theories had a profound influence on therapy as well as research.

Then came the advent of operant conditioning in the '60s and organicity studies in the '70s. Therapy and theoretical understanding of stuttering became unhitched for the most part. Operant conditioning demonstrated the effects of contingent consequences on stuttering, but it was not a theory of stuttering. It applied to stuttering only to the extent that stuttering can be modified by operant procedures, the assumption that stuttering was acquired by learning originally was not even required.

With demonstrations that fluent behaviour could be established and maintained by using operant technology, a wave of fluency establishment therapies ensued. The cause or causes of stuttering became irrelevant, and hence the vigorous (and the strong) searching for the causal explanations waned (Adams, 1978, 1984).

Currently stuttering can no longer be looked upon reasonably as an "anxiety motivated avoidance response". (Bloodstein, 1987) defines "stuttering as an anticipatory struggle reaction. In its clinical form it represents a relatively severe degree of tension and fragmentations that are a common occurrence in the speech of young children". Bloodstein goes on to say that, in its inception, stuttering does not require an avoidance reaction per se, but rather struggle responses associated with the threat of, or the experience of, failures in performing the complex motor acts of speech. According to him, uncertainty about speaking, which can arise from many different internal and external sources, leads to tension and fragmentations and repetitions in the surface struture of speech. Through learning, these responses by the stutterer become differentially associated with words, sounds, vocal tract pastures, and other physical events associated with

speaking. Likewise the severe struggle components that often become superimposed on the basic stuttering response are added over time through the dynamics that govern learned behaviour.

"It is both surprising and unfortunate that in the field of stuttering there are hardly any theories that are validated either deductively or inductively. It is surprising because stuttering has been one of the most researched of the speech and language disorders. It is unfortunate because a lack of agreement on the controlling variables of stuttering has led to fruitless theoretical controversies and inefficient therapeutic diversity. History supports the statement that stuttering is a disorder of many 'pseudo-theories' and therapies. This may be largely due to an abundance of non-experimental research" (Hegde, 1990).

"From the historical perspective, it cannot be said that effective stuttering therapies havebeen derived from stuttering theories" (Hegde, 1990).

Many of the current research trends are baaed on neurophysiologic model of one kind or another. These models postulate that neurophysiologic, neuromotor, or

central neural process, or a combination thereof, are causally involved in stuttering. As yet, no clear cut treatment procedures have been derived from these therapeutic positions, although this fact by itself does not necessarily cast doubt the validity of those hypothesis.

A possible reason why neurophysiologic research has not suggested new or more effective treatment, is that, for the most part, this kind of research has not been about the controlling variables of stuttering. It has been about stuttering itself.

The overall objective of all symptomatic therapies for adults who stutter, whether the focus is on "managing fluency" or "managing stuttering", should be the same, and that is, to help the person who stutters learn to speak as fluently as he is able, and the motivation to do so.

Recent developments in the treatment of stuttering have involved a shift from earlier therapeutic emphasis in which clinicians aimed to modify the form of clients' stuttering and to minimize its disruptive effects - what Gregory (1979) calls the "Stutter more fluently" approach. The traditional approach contrasts markedly with the "speak more fluently" approaches. These newer therapies focus on

what traditional therapies might regard as impossible aim of eliminating stuttering by training the client in speaking techniques that are incompatible with stuttering and that should, therefore, ensure continued fluency. The techniques used often involve distortion of some aspect of speech or some interference with the speech process which can be shaped to approximate normal sounding speech. In a recent metanalysis of stuttering treatment for which outcome data are available in the literature (Andrews, Guitar and Howie, 1980), some of these fluency management therapies emerged as extremely effective, in both the short and long-term gains they offered to stutterers.

The various fluency management programs include:

1. Prolonged speech techniques (with or without delayed auditory feedback (PST)
2. Airflow therapies (AT)
3. Rhythmic speech therapy (RST)
4. Biofeedback (BF)
5. Therapeutic packages
6. Individualized therapy.

1. <u>Prolonged speech techniques (PST):</u>

This procedure involves the instatement, sharping, generalization, and maintenance of fluent, prolonged speech. This technique has evidence of its effectiveness.

There are two hallmarks of the prolonged speech therapies: The unique speech skill which they train and the specific training procedures which they use. The speech skill-prolonged speech - originally referred to the slowing of speech by prolonging vowels, a pattern which usually occurs during artificially delayed auditory feedback of speech (DAF) at about a quarter of a second delay (ie 1/4 sec. delay). However, over the years, the term prolonged speech has embraced various combinations of gentle onsets of words, soft articulatory contacts, smooth transitions between sounds, and exaggerated con-tinuity of speech.

In early '60s Goldiamond, a behavioural psycholo-gist discovered that under DAF some stutterers sponta-neously used a prolonged style of speech in order to counteract the disruptive effects of DAF. As he found that DAF has an unexpected effect on reducing stuttering, he started using DAF -induced prolonged speech as direct peons of inducing a slow and prolonged speech pattern which is incompatible with stuttering.

Prolongation has been used by several researchers and it is claimed that prolongation serves as a destracter,

provides more time for the stutterer to move his articulator smoothy reduces prosodic load and enhances coarticulation.

PST-1: <u>Conversational rate control therapy and breathstream management therapy</u> (Curlee and Perkins, 1969).

Curlee and Perkins developed Goldiamond's approach further in their conversational rate control therapy. Based on the fact that the duration of auditory feedback delay determines the rate of the resulting speech, they used DAF to elicit slow prolonged speech, and then gradually increased stutterers' speech rate to normal by stepwise decreases in feedback delay. The feedback delay was decreased only when the client demonstrated zero stuttering at each step. They found that once the delay was eliminated, the client gradually extended his new, fluent speech pattern into the real world in increasingly demanding situations.

Curlee and Perkins (1973) found a dramatic reduction in stuttering frequency when measured overtly outside the clinics immediately after treatment. In their studies they found that the mean stuttering frequency decreased from 16% ss before treatment to 1.3% ss immediately after treatment. Also, they found that the speech of their treated patients often sounded abnormally slow and monotonous.

This abnormally slow and monotonicity in speech led to the development of the breathstream management techniques which has been developed and used by Perkins and his colleagues (1973).

This treatment retains the original rate control procedures, but emphasizes in addition, the achievement of normal sounding speech, via the management of breathstream, phrasing, and prosody. Perkins, Rudas, Johnson, Michael and Curlee (1974) found that this approach produced an improved long term results, both in terms of greater reduction in stuttering frequency and more normal speech rate. This treatment involves the consecutive acquisition of seven skills with mastery of each required before progression to the next is permitted. These skills are:- 1) Slow rate, (2) Phrasing, (3) Easy voice onset, (4) Soft contacts,(5) Breathy voice, (6) Blended words, (7) Normal stress. But the mastery of these skills is largely based on subjective judgements which, Perkins argues, are best made by the clinician (Perkins, 1981).

PST-2: Intensive token economy therapy: (Andrews and Ingham 1970).

This technique is a substitution of DAF induced prolonged speech for rhythmic speech. It was found that

the instruction and modeling of prolonged speech was as effective as DAF. Speech was then gradually shaped to normal rates in structured group conversations. As unique feature of this treatment was that client could be required to speak at quite specific rates at each step in therapy.

This technique contrasts with Perkins use of DAF to regulate speech rate in the sense that in Perkins technique DAF controls the speech rate externally whereas the Andrews - Ingram technique demands voluntary control from the patient.

In this technique the main criteria is zero stuttering at every step. The clients were hospitalized for 3 weeks of intensive treatment, and a full token economy was used. Clients were given penalties for stuttering and reward for achieving fluency and speech rate targets. The whole treatment phase was carried out in the conversational context including conversations around a circular table (with six clients and the clinicians). Transfer assignments were carried out in the real world with the help of tape recorders and they were later evaluated in the clinic. It has been reported that, with this method, the rate of speech becomesfluent within normal limit.

It seems that the token rewards are not crucial to rapid progress in this treatment (Howies and Woods, 1982), and in recent modifications of the program, token economy reward is not being used (Ingham and Andrew, et all 1983).

PST-3: Ryan: Operant DAF therapy:

This technique is based on the classical behavioural approach developed by Ryan and Kirk (1974). This program consisted of several steps to teach the patient to read, engage in monologue, and converse in slow, prolonged, fluent pattern with the aid of delayed auditory feedback apparatus. The first six steps as reported by Ryan and Kirk were to teach the patient to correctly identify stuttered words in reading and monologue. Criteria of one minute and 90% accuracy of identification were used in these steps. The next seven steps were in reading and used DAF starting with 250 msec, of delay, which was gradually reduced in 50 msec, steps untill the patient could read in the prolonged, fluent pattern without the DAF equipment. The next seven steps were the same except that these were in monologue. The final seven steps were the same except that these were in conversation. The patient had to reach to a criterion of five minutes of fluency in each of the 21 steps to pass

ie. the patient had to obtain a 5 minutes of stutter-free speech at each step. Verbal reinforcement, such as "Good", was administered for the completion of steps. This program included a carefully planned hierarchy of increasingly difficult to transfer assignments. The patients also conti- nued home practice through-out the transfer program. Dramatic decrease in stuttering frequency and the achievement of normal speech rates have been reported both immediately after treatment (Ryan, 1974; Ryan and Kirk, 1974) and in the long term. These data are based on in-clinic conver- sations with the clinician and no report regarding the stutterers behaviour outside.the clinic is available.

PST-4: Precision fluency shaping program:

It was developed by Webster in 1974. This approach is based on the premise that stutterers articulatory and phonatory gestures are distorted and require reconstruc- tion through intensive over learning of appropriate speech targets.

In this approach, the targets are stretched syllables, smooth transitions between syllables, slow change within syllables, diaphragmatic breathing and gentle onsets.

Clients work individually through a work manual which
guides intensive practice of these speech targets, first
in single syllable, then longer words and phrases. Pro-
longation (ie "stretched syllables") is checked with a
stop watch, and gentle onsets and continuity are acquired
with the aid of feedback from the computerized voice
onset monitor (VOM) which monitors voice amplitude at the
beginning of an utterance and its rate of increase.

In this program, the strict behavioural approach
is largely restricted to the overlearning of the stretched
syllable, gentle onset, and continuity targets. Other
targets are not quantified, speech rate increase is not
systematically programmed as it is in the DAF therapies,
and the transfer and maintenance phases of treatment are
much less strictly programmed than the intensive target
practice phase. However, the program appears to be
effective.

PST-5: Prince Henry program: (Andrews, Craig, and Feyer,1983).

This program is the outcome of Andrews-Ingham's
program and it is based on systematic acquisition and
generalization of a prolonged speech pattern. The speech
pattern taught is labeled as smooth motion speech. This

smooth motion speech is characterized by a gentle onset of phonation, continuous airflow, continuous movement of articulators throughout each utterance, soft contacts and extension of vowel and consonant duration. The required speech pattern is trained using instruction and modeling (not DAF), at a speech rate of 50 SPM which is approximately a quarter of normal rate. At this rate if the correct speech pattern is used, stuttering is virtually removed and secondary symptoms of stuttering disappear automatically. This speech rate is than gradually shaped to normal rate over the course of the week in gradual increment of 5 SPM. In this treatment program the patient is admitted in the hospital for 3 weeks and 12 hours daily treatment is given. After the patient has got control over this speech, tape recorded home assignments are given to maintain control over speech out side the clinical situation.

As this treatment is done in series of steps, at each step the patient must display zero stuttering. Each stutterers speech is rated on-line by the clinician, and constant feed back on fluency and speech rate is provided on individual display units training has also been incorporated into the program. Later on the program three other characteristics are also evaluated. They are intonation, presentation, and appropriate pauses.

It has been reported that by the end of the Ist week the patients are stutter-free in the clinic and they apeak at normal rates. Patients transfer these skills to real word situation during the second and third week. There are 30 assignments given to the patient. At third, sixth and ninth week and six months after the treatment. In this program the patients are required to came for follow-up.

In summary, the cut of evidence for prolonged speech treatments suggests that they are effective both in short and long term.

Although the prolonged speech treated stutterers rarely stutter and do not speak excessively slowly, their speech can be distinguished from nonstutterers Speech. However, it is not clear on what basis it is different. If the basis of this discriminability can be established, than it may be possible to improve the outcome of the so called prolonged speech treatments.

The effectiveness of these treatments does not appear to depend on whether they are intensive or spaced, group or individualized, molar or molecular in emphasis. Also the particular aspect of the "prolonged speech" that are

emphasized in training do not appear to be critical to the success of treatment although it is suspected that slowed articulation rate is more effective than simply increasing pausing. Also the continuity and soft contacts are more important. It may be that a major value of prolonged speech treatments is that they force a patient to slow down his speech sufficiently to allow him to pay attention to what he does when he is fluent and to reprogram his articulators accordingly (Curlee and Perkins, 1985).

It is not known why the prolonged speech therapies work. Some of the recent evidence of aberrant laryngeal behaviour, speech pattern and breath characteristics and abnormalities in speech motor control among stutterers suggests that the modification of these aspects of speech is a proper concern of stuttering treatment. Beyond that, the basis for the potency of these techniques remains a mystery.

2. Airflow therapies (AT):

Alongwith the prolongation techniques following airflow therapy techniques have been developed and used in clinical practices. These techniques include:

AT 1: Regulated breathing method (Azrin and Nunn, 1974):

The rationale is that stuttering is a habitual disorder of the initiation and maintenance of airflow, and

should be eliminated if the stutterer/emits speech behaviours that are incompatible with these airflow anomalies. The treatment is brief: one or two sessions, each of 2 to 3 hours. In recent treatment description (Azrin et al. 1979), breath management skills are practiced first in reading, then in spontaneous speech gradually decreasing the frequency of pauses. The result of this technique is impressive but the structured generalization of skills is minimal and restricted to the clinic and its environments. Also, the outcome is distinctively inferior to the prolonged speech therapies.

AT-2: "Flow and slow" technique (Schwartz, 1976):

This technique is based on the assumption that stuttering is the result of excessive tensing of the vocal folds before speech, which in turn produces feedback that triggers conditioned struggle behaviours. In order to counteract or neutralize this presumed malfunction ie. excessive tension of the vocal folds, stutterers in this technique are trained to initiate passive airflow prior to speech and to slow the first syllable of each utterance. Because of these two characteristics ie. flow the air

passively before speech and slow the first syllable of each utterance; this technique is named as "flow and slow" technique. The patient is given 5 days intensive practice of the flow and slow skills. But in increasingly long and complex sentences no details of supportive empirical evidence are given. Also, the power of this technique is still open for discussion as Schwartz has presented no objective outcome data. But there is no doubt that the manipulation of airflow can reduce stuttering dramatically in the short term, and it may be that the airflow techniques may prove powerful in more structured programs, or as an adjunct to other techniques.

3. Rhythmic speech:

This technique is based on the assumption that pacing words or syllables to a rhythmic stimulus reduces or eliminates stuttering. This technique developed by Brady(1971) is expected to improve the efficacy of rhythm-speech treatments. In this program, after speech has been shaped to normal rates, longer and longer units of speech are placed to each metronome beat, and unit lengths and varied to allow more normal speech cadence and juncturing. For this, Brady also developed a portable hearing aid - like metronome, which is worn by the client while they complete a

hierarchy of transfer assignments. The assignments are then repeated without metronome, although some stutterers find this impossible. But this technique has some draw-backs of its own. They are:

(i) Patients experience difficulty in maintaining normal speech rate without stuttering;

(ii) There is no hard data on speech outside the clinical situation or long-term performance? and

(iii) The potency of this technique is yet to be determined.

4. Biofeedback:

This technique is based on the assumption that stuttering is associated with (if not actually caused by) excessive tension in speech muscles, which in turn inter-feres with speech production. This assumption is supported by the evidence of excessive EMG levels in speech related muscles - in stutterers. Craig and Clearly (1982) report that the EMG activity is high prior to stuttered speech, and it reduces when stuttering frequency is reduced.

In this programs, clients are trained using biofeed-back to reduce masseter muscle tension to a maximum of 5 mV. Then masseter muscle tension is reduced before and during utterances of increasing length, first in reading and then

in spontaneous speech. Ninety-five percent fluency is required at each step before progress is permitted. This treatment hierarchy is completed first with direct EMG feedback and then with "indirect" feedback from the clinician. The skills are then generalized in a hierarchy of speech task.

When different therapy techniques that the researchers have written more on the need for attitudinal therapy than in its procedures. But it is evident that attitudinal therapy can hardly be justified on the assumption that stuttering and attitude are two separate problems of a stutterers. In all likelihood, stutterer's verbal state-ments and feelings concerning their stuttering (attitude) are a direct result of the stuttering itself. In this ease what needs- treatment the—stuttering itself. In this case what needs treatment is stuttering, and a successful treatment should eliminate whatever consequences the speech problem generated. Indeed, the results of atti-tudinal therapy and behavioural treatment that exclude it both support this contention. Martin and Haroldson (1969) did a study on attitudinal therapy and they reported that the attitudinal therapy may be ineffective not only in reducing stuttering, but also in eliminating negative attitude.

Additional data indicate that attitudes are effects of stuttering and what needs treatment is just stuttering. The well known treatment programs of Webster (1979) and Ryan (1979) do not include direct procedure to change the attitudes and feelings. Nevertheless, they have reported that as stutterers become more and more fluent, their infavourable attitudes decrease.

With this overview on stuttering therapies, it is evident that some techniques seek to modify the form of stuttering, notnecessarily its frequency. On the other hand, several other techniques are designed to achieve a significant reduction in the frequency of stuttering behaviour. These techniques also seek to establish speech that is considered normal with regard to the parameter of fluency, although this secondary goal has remained somewhat elusive. Here the direct concern is with stuttering itself and the main goal is to modify the form of stuttering, not necessarily its frequency.

An overview of different therapy techniques reveals that individual therapy techniques are based on certain assumptions which gives more importance to and focuses on limited dysfluencies presented by the stutterers. In this

approach all dysfluencies do not disappear and the long-term post treatment effect is not so effective.

5. Therapeutic packages:

To solve this problem and to rule out these limitations, the present trend has moved from individual therapy to a combination of several therapeutic techniques (therapeutic package). A therapeutic package developed by Perkins and his colleagues illustrates this. Perkins et al. (1976) consider stuttering to be a discoordination of the basic processes involved in the production of speech. From a conceptual standpoint, treatment is aimed at teaching the stutterer to use respiratory, phonatory, and articulatory processes in a coordinated manner to produce and maintain fluent-speech.

Initial goal of this program is to establish slow nonstuttered oral reading with the help of 250 miliseconds of delayed auditory feedback. Prolongation of syllable is emphasized. In gradual steps, the duration of the DAF is reduced. The real goal is to teach a normal breathflow with easy vocal attacks. Speaking short phrases with sufficient air capacity and continuous airflow is the specific target; normal prosody is then taught. Finally the

generalization procedures are implemented along with additional counselling. Perkins et al. (1976) believed that the treatment limited to a behavioural establishment of fluency is not complete. However, psychotherapeutic discussions are also considered of value in coping with the persistent use of avoidance tactics. With this therapeutic package, the relapse of stuttering to varying degrees was a problem. He reported that only 53% of treated patients maintained relatively permanent fluency.

Another therapeutic package has bean described by Azrin and his colleagues (1979). The predominant feature of this package is the regulated breathing. This regulated breathing component involves an extended duration of inhalation of some air, and uninterrupted, smooth airflow throughout the utterance. The other component of this method includes slightly prolonged vowels, general relaxation training, clear formulation of thoughts before speaking, deliberate pausing at natural junctures, and speaking, only a few words at a time. Azrin and his colleagues (1974) have reported that this method can eliminate stuttering rapidly. This certainly appears to be a desirable procedure, but its reliability is yet to be established. Several attempts hare been made at replicating the results of Azrin and colleagues (1974), but unfortunately the results have not been consistent or supportive.

1. Prolongation Speech Therapies.

Name of the Investigators and year	Name of the technique	Rational	No.of sub-jects	Age & sex	No. of se-ssion and duration	Results	Disadvantages
Vijaya-Lakshmi,A.R (1973)	Effect of 3 verbal stimu-li on fluency in stutterers	Stuttering can be redu-ced by high-lighting fluency	8		-	The carryover effect, the residual and overall effect of all the 3 sti-muli used did not attain significance.	Explanations for the results .not provided.
Curlee and Perkins (1969)	Conversatio-nal rate con-trol therapy & breathstream management therapy	Based on the principle that the du-ration of the auditory feedback delay deter mines the rate of speech (resulting)	14	Adults and adole scent	1-3 hrs of therapy/ week total 90 hrs.of treatment during a period of 6 weeks.	reduced. Stuttering^to practica-lly zero in conversation in the clinical labora-tory. Good generalization to outside clinical situa-tion. The mean stuttering fre-quency decreased from 16% SS before treatment to 1.3% SS immediately after treatment.	This technique need have no assumptions as to the cause or maintenance factors of stu-ttering. Abnormally slow, rate of speech and monotonous speech.
Andrew and Ingham(1970, 1973)	Intensive token economy therapy	Based on the contrasts with Perkins use of DAF to regulate speech rate. The main criteria was zero stutt-ering at ever^step	NA	NA	NA	The rate becomes fluent within normal limit	It seems that the token re-wards are not crucial to ra-pid progress in this treat-ment (Howies & Woods,1982)
Ryan(1971)	Operant DAF therapy	Based on classical behavioural approach (developed by Ryan)	5	chil dren betwe en 6-8 yrs	15-73 hrs	Children's speech became very fluent and children maintain the fluency.	
Ryan & Kirk (1974)	"	"	50	9-60 yrs.6 femal-es&44 males	NA	The treatment is effec tive in helping people of varying ages & stutt-ering. Severity to speak fluently. This program worked for people of widely varying ages of both sexes & with varying degrees of stu-ttering severity.	

1.	2.	3.	4.	5.	6.	7.	8.
Webster (1974,1975a, 1975b)	Precision fluency shaping program	Based on the premise that the stutterers articulatory & phonatory gestures are distorted & require reconstruction through intensive overlearning of appropriate speech targets.	NA	12 Female	NA	The strict behavioural approach is largely restricted to the over learning of the stretched syllable, gentle onset, and continuity targets.	The other targets are not quantified Speech rate increase is not systematically programmed as it is in DAF therapies. Transfer and maintenance phase are much less rigorously programmed than intensive target practice phase.
Howie et al. (1981)	Craig and Feyer Prince Henry program.	Based on systematic acquisition and generalization of a prolonged speech pattern gradual shaping of speech rate to normal & systematic transfer of skills acquired in the clinic to the real life situation.	36	Minimum age-21 years 34 males and 2 females.	NA	Stuttering was virtually eliminated & speech rate and attitudes towards communication were normalized. In most of the cases the 1 year post treatment evaluation showed overall improvement, however 40% of the cases showed deterioration influency.	Some of the patients again need treatment.
Andrews and Craig(1982)	"	"	NA	NA	NA	The post treatment effect is quite good	–
Andrews etal. (1983)	"	"	50	50 adults stutterers every year for 12 years.	3 weeks and 12 hrs/day	Patient who stutter at an average of 14% SS and speaking at 140 SPM, demonstrated virtually zero stuttering and speech rate within normal limit.	In general, while some of the patients are never heard to stutter, most of them still regard themselves as stutterers. Some have relapsed & again they are in need of treatment. Howie et al(1981)

2. Airflow therapies

1.	2.	3.	4.	5.	6.	7.	B.
Azrin and Nunn(1974)	Regulated breathing technique	Based on the rational that stuttering in a habitual disor-der of the ini-tiation & main-tenance of air-flow, & should be eliminated if the stutter-er emits speech behaviours that are incompari-ble with the airflow anoma-lies.	14(9 males + 5 fe-male:	Ave-rage age-36 years		Stuttering decreased by 95% after two weeks of treatment.	Great effort & resolve is nee-ded during the Ist few weeks to adhere to the new speaking pattern. Structured gene-ralization of skills is mini-mal and restric-ted to the clinic and its environ-ments. Result is based on clients"self-
Azrin and Hunn(1974)	"	"	14	NA	2 hours duration	The average number of stuttering episode decreased by 94% (next day). At the end of one month it decreased by 97% - 99% reduction observed in follow up.	recorded episo-des" which could to be highly un-reliable. Outcome is disti-nctly inferior to the prolonged speech therapies.
Schwartz's (1976)	"Flow and Slow"	Based on the assumption that stutter-ing in the re-sult of exce-ssive tensing of the vocal folds before speech, pro-ducing feed-back that triggers con - ditioned str uggled beha-viours.	N A	NA	5 days	"Symptom free" speech in large number of stu-tterers at long term follow up are inspiring	No details of supportive empi-rical evidence are given. It requires a better quantita tive backup.
Schwartz (1976) and Lee(1976)	–	–	NA	NA	NA	–	—
Azrin, Nunn &Frantz (1979)	Regulated breathing technique	Same as regu-lated breath ing (mention ed above)	21	Ave-rage age" 29 years	NA	Stuttering reduced by 97% during 4th week of treatment.	–
Andrews & Tanner(1982 b)	"Flow and Slow"	Same as "flow and slow" (mentioned above)				The immediate outcome of the 5 days of treat ment is less impre-ssive than prolonged speech therapies.	Untill hard data on long term out come is available nothing could be said about the lasting effect of this technique.

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3. Rhythmic speech

1.	2.	3.	4.	5.	6.	7.	-
Brady (1971) (cited in "Nature and treatment of stutter-ing" by Curlee and Perkins	"Rhythmic speech"	Based on the assumption that pacing words or syll ables to a rhythmic sti mulus reduces or eliminates stuttering.	NA	NA	NA	Short term outcome is similar to that of air-flow treatment. A mean of 2.5% SS observed in the clinic.	Patients experi ence difficul-ties in mainta-ing normal spee-ch rate without stuttering.Also, there is no hard data on speech outside the clinical situa-tion or the long term performance. The potency is yet to be deter-mined (Gotestom & Melin,1976)
Gotestam & Melin(1976) (Cited in Nature and treatment of stutt-ering by Curlee and Perkins.	"	"				"	
4. Biofeedback							
Gultar(1975) ISHR,1975 672-685	"Electromyo-graphic feed back"	Based on the assumption that stutter-ing is asso-ciated with (if not actua lly caused by excessive ten-sion in speech muscles, which inter feres with speech produc-tion.	4	NA	NA	Stuttering reduced markedly in all situa-tions nine months after treatment,for some stu-tterers it may suffice alone for treatment; for other it may be an adjunct to strategies	Different electro-des sides might be appropriate for different stutter-ers.
Craig and Cleary (1982)	Biofeedback	"	NA	NA	NA	NA	It is restricted to the reports of single cases. It is impossible to determine what are the powerful features of this technique. This technique may be appropriate for a subgroup of stu tterers only, for example, those with marked speech muscle tension symptoms.

Table-1: Studies using various therapy techniques for stuttering.

Table-1 summarise the studies conducted using various therapy techniques.

The review indicates that both therapy packages and single therapy techniques are used in the treatment of stutterers. The present study attempts to use individualized therapy techniques suitable for the dysfluencies exhibited by the patient and examining the outcome of therapy to assess the efficacy of the therapy techniques used.

METHODOLOGY

Subjects:

The subjects selected for the present study were 4 male stutterers between the age range of 18 to 25 years with a mean age of 21.25 years. All of them had normal hearing. (Within 20 dB for both air conduction and bone conduction) (ANSI Standard) and were intellectually normal as per the psychologists report. The severity of stuttering varied from mild to severe as diagnosed and rated at least by two speech pathologists apart from the present investigator at the All India Institute of Speech and Hearing. The age and dysfluencies of all the four subjects considered for this study are in Table-2.

During subject selection evaluation was done to rule out cluttering by the following testing:

   i) Test for auditory discrimination (Devaki, 1978)

  ii) Backward counting from 30, diminishing by 3

 iii) Story narration

  iv) Articulatory errors in speech and reading as defined by Weiss (1964):- omissions, post positions, metathesis, inversion, drawlers and interjections.

	Subject-1	Subject-2	Subject-3	Subject-3
1. Age	18 years	24 years	18 years	25 years
2. Sex	Male	Male	Male	Male
3. Language	Hindi/English	Hindi/English	Kannada/ English	Kannada English
4. Hearing	Normal	Normal	Normal	Normal
5. Intelligence	Normal	Normal	Normal	Normal
6. Education	B.Sc .student	BE Student	Diploma in Ins.Engg.	M.A .Student
7.1 Disfluencies Voiced/voiceless	-	-	-	+
7.2 Nonnasal/nasal	-	-	-	-
7.3 Omission	+	+	-	-
7.4 Metathesis		-	-	-
7.5 Inversions		-	-	-
7.6 Post positions		-	-	-
7.7. Interjections		-	-	-
7.8 Drawlers		-	-	-
7.9 Broken words	+	+	+	+
7.10 Incomplete phrase	+	-	+	+
7.11 Articulatory fixation	+	+	+	+
7.12 Prolongations		-	+	-
7.13 Hesitations	+	+	+	+
7.14 Filled pauses	+	+	+	+
7.15 Unfilled pauses	-	-	-	-
7.16 Parenthetical remarks	-	-	-	-
7.17 False starts	-	-	-	-
7.18 Repetitions				
Phoneme repetition	-	+	+	+
Syllable repetition	+	+	+	-
Part word repetition	-	+	+	+
Word repetition	-	-	+	+
Phrase repetition	-	-	-	+
Click sounds	+	-	-	+
8. Secondaries				
Eye blinking	+	-	-	+
Upper limb movement	+	-	-	
Lower limb movement	+	-	+ .	+
Torso movement	-	-	-	-
Lip movement	+	-	-	+
Head movement	+	-	-	+
Flaring of nostrils	-	-	-	+
Wrinkling of forehead	-	-	-	+
Wrinkling movement of eyebrow	-	-	+	+
9. Others				-
Holding the chair	+	-	-	+
Linking the fingers while speaking	+	-	+	+
Tension in/the neck muscle	-	-	-	+
Puffing cheeks	-	-	-	-+

Table-2: Details of the subjects selected for this study.

+ indicates presence
- indicates absence of a particular feature

Material:

Depending upon the language/languages spoken by the subjects, spontaneous speech samples were elicited by the therapist before, during and after therapy. Also language specific reading material appropriate to the age educational qualification of the subjects (Appendix-I) were used. Care was taken not to use the same reading material for the second time as it would have adaptation effect.

Method :

1. Development of proforma:

Stuttering features were classified under two broad categories: audible and visible features. Based on these features a performa was developed in which different aspects of fluency were taken into consideration. It is well known that the coordination of the articulatory, laryngeal and the respiratory system is essential for fluent speech and miacoordination leads to dysfluency. The items in the performa were so arranged that it waa possible to elicit miscoordination pertaining to various systems. The proforma so developed is presented below:

<u>Proforma</u>

Case No.   Supervisor:

Case Name: Clinician:

Age/Sex:

Language:

Detailed case history:

I. Articulatory system:

1. Misarticulation during the   moment of stuttering both
   in reading and speaking.
   i) Voice/voiceless, VL/VD, partially vd/voiced - present/absent
   ii) Non nasal/nasal -   -   Present/absent
   iii) Omission   -   -   present/absent
   iv) Metathesis   -   -   present/absent
   v) Inversion   -   -   present/absent
   vi) Post position   -   -   present/absent
   vii) Interjection   -   -   present/absent
   viii)   Drawler   -   -   present/absent
   ix) Broken words   -   -   present/absent
   x) Incomplete phrase   -   present/absent

2. Articulatory release on inspiration   -   present/absent
3. Articulatory fixation   -   present/absent

II. Respiratory system: a) Vital capacity

                        b) MAF

                        c) Abnormal breathing pattern

                        d) Inspiratory air in
                           during speech

III. Laryngeal system -
    (i) Presence of voicing for voiceless sounds and absence
        of voicing for voiced sounds (as observed on the
        laryngograph)

IV. Rhythm

a) Prolongations/hesitations, filled pauses/untilled
   pauses, paranthetical remarks/false starts.

b) Repetition of phonemes/syllable, part word
   repetition/word repetition/phrase repetition.
   Position of the repetition - initial/medial/final
   position of the word/sentence.

c) Others - Clicks sounds (if any) during the articulatory
   fixation/articulatory release.

V. Secondaries observed

  i) Eye blinking
 ii) Head movement
iii) Upper limb movement
 iv) Lower limb movement
  v) Torso movement
 vi) Lip movement
vii) Flaring of nostrils
viii) Wrinkling of forehead
 ix) Wrinkling and movement of eyebrow
  x) Others, like -
     - Holding the chair while speaking
     - Linking the fingers with full force while speaking
     - Tension/in the neck muscle
     - Puffing of cheeks.

Provisional diagnosis:

2. <u>Evaluation before therapy</u>:

Before the initiation of therapy, spontaneous speech and reading samples of the subjects were audio-recorded using a National Panasonic Tape Recorder. They were evaluated for the kinds of dysfluencies using the performs. All of them were evaluated for any laryngeal abnormalities using laryngograph and for any respiratory system abnorma- lities using the expirograph. Further, the total number of dysfluencies per unit time were also evaluated.

3. <u>Therapy</u>:

Individualized therapy techniques were selected based on the nature of dysfluency the subject presented with. The different therapy techniques used were airflow technique, exercise for articulatory coordination, exercise for laryngeal coordination, airflow exercises, soft contacts and generalization.

(i) <u>Airflow technique</u>: This was proposed by Schwartz (1976) and was further modified by him. The basic presumption behind this technique is that the stutterers airway should be wide open. Schwartz believed that stuttering is the result of excessive tensing of the vocal folds before speech, pro- ducing feedback that triggers conditioned struggle behaviour.

Initially, the patient should be trained to say /h/ sono-
rously and then the word with initial syllable prolonga-
tion. After the patient acquires this, /h/ can be made
silent. This technique has been found to be useful espe-
cially in patients who present repetitions of the initial
syllable. When repetitions were present, the subject was
taught to maintain a smooth airflow. Initially he was
trained to take a deep breath and expire gently through
the oral cavity. Once this was achieved, the subject was
asked to prolong the vowel on expiration and later this
was generalized to speech.

(ii) <u>Airflow exercises</u>: These exercises are based on
the assumption that stuttering is a habitual disorder of
the initiation and maintenance of airflow, and should be
eliminated if the stutterer emits speech behaviours that
are associated with these airflow anomalies. A sudden
inspiratory air intake especially in plosive release, suggests
that the air pressure behind the articulator is inadequate
to release the highly tensed articulators. This symptom
suggests inappropriate airway dynamics or increased arti-
culatory tension. When this symptom was present the subject
was taught to maintain a smooth airflow. Initially, he was

trained to take a deep breath and expire gently through the oral cavity. Once this was achieved, the subject was asked to prolong vowels on expiration and later this was genera- lized to speech.

(iii) <u>Soft contact</u>: The basic purpose of using this technique is to train the stutterers use the articulators more effectively. Originally this was proposed by Van Riper (1954). This method consists of approaching feared words with reduced tension in the lips and tongue and V.F. Other terms used for this technique are "Loose contacts", "Light contacts", etc. It was used in those subjects who exhibited articulatory fixation with excessive tension in the lips and tongue. In this technique the patients were asked to move the articulators with minimum (or no tension) in the lips, tongue and vocal folds. They were demonstrated how to make a soft contact of the articulators while speaking. An audi- tory feedback for the same was given to them.

(iv a) <u>Exercise for articulatory coordination</u>: Preci- sion fluency shaping program was developed by Webster in early '70s (Webster,1974). This program is based on the premise that stutterers articulatory and phonatory gestures are distorted and require reconstruction through intensive overlearning of an appropriate speech targets.

However, in the present investigation, Webster's pre-
cision fluency shaping program was not used. When the
patient showed miscoordination in the articulatory system, -
nasals for nonnazals, nonnasals for nasals or prolonged
nasals: - especially for the velopharyngeal port, a voluntary
control of the velopharyngeal port movements were tried
with. Here, initially the subjects were taught to feel the
nasal air escape for nasal continuants like /m/ and /n/;
and the oral escape for oral sounds like /a/ and /i/. When
they were able to differentiate this nasal and oral sounds
by airflow they were taught to alternate /m/ and /a/ or /i/.
This was done to voluntarily control the velopharyngeal
port movements, from open velopharyngeal port to close
velopharyngeal port. A rapid utterance of /m/ and /a/
followed this untill the patient could achieve it. This
control was later transferred to other speech sounds in
speaking as well as reading.

(iv b): <u>Exercise for laryngeal coordination</u>: When the
subjects showed voicing for voiceless sounds where the
vocal folds need to open, lack of voicing /h/ for voiced
sounds, where the vocal folds need to vibrate, it indicated
miscoordination of the laryngeal system. In order to correct
this inappropriate laryngeal gestures the subjects were made
to feel tactually the vibration of the vocal folds during
The prolongation of Vowels when this was established, the sub
were taught to feel the absence of vibration of the vocal fol

the production of unvoiced sounds such as /s/. Later the subjects were asked to utter /a/ and /s/ alternately ie. alternating the movements of the vocal folds from vibratory position to the open position. By doing this at a faster rate, the subjects could acquire voluntary control over the glottal gestures which was later trans-ferred to speech sounds while speaking or reading.

(v) <u>Generalization</u>: Once the patient was fluent with the therapist, he was introduced to strangers one at a time and he was engaged in a dialogue. When he achieved fluency with them he was to converse in a group. 'Transfer' phase was carried out for the replacement of stuttering by fluent speech. The experimenter accompanied the patient to real life situations where the patient made enquiries with strangers or purchased items in shops.

Depending on the type/types of dysfluency exhibited by the patient various techniques were selected and these techniques were introduced to the patient one after another. The technique suitable for the type of dysfluency with maximum percentage was introduced first. After the patient mastered this technique another was introduced depending on the type of dysfluency in order. The different types of

	Dysfluencies	Therapy technique used	No.of Sessions attended by the patient.
Subject-1	Articulatory fixation Repetitions of phonemes/ syllables/part word Inappropriate and improper air intake before/between speaking. Unable to speak in front of strangers.	Soft contact Schwartz'a modified airflow technique Airflow exercises Generalization and transfer.	11 Sessions of 60 minutes each
Subject-2	Syllable and part-word repetition in the initial position of a sentence Articulatory fixation Dysfluent speech in the presence of strangers	Schwart'z modified airflow technique Soft contact. Generalization. The patient was taken to a IInd BSc. (Sp. & Hg) class at AIISH where he was to speak and give lecture in front of 35 students.	5 sessions of 60 minutes each.
Subject-3	Sound s/syl1ables/part-word and word repetitions in the initial position of a sentence. Articulatory fixation Inappropriate and improper air intake while speaking Voiced sounds for voiceless sounds Di sEluent speech & hesita- tion while speaking with strangers	Schwartz's modified airflow technique Soft contact. Airflow exercises. Exercise for laryngeal coordination Generalization. The subj ect was made to face an interview board and a formal interview was taken(as per his imme- diate demand).	12 sessions of 60 minutes each.
Subject-4	Articulatory fixation Syllable repetition and part word repetition especially in the initial position of a word Inappropriate air intake while speaking. Voiced sounds for voiceless sounds. Dysfluent speech & hesita- tion while speaking with strangers	Soft contact Schwartz'a modified airflow therapy. Airflow exercises. Exercises for laryngeal coordination Generalization. The subject was made to give a lecture on Ramjanmbhumi issue in front of 27 audience. He was made aware of this and was counselled to voluntarily restrain.	22 sessions of 60 minutes each

Table-3: Dysfluencies and therapies used for the subjects in this study

dysfluencies and other therapy techniques used are in Table-3. Therapy was given in Hindi/English for the first twosubjects and Kannada/English for subjects 3 and 4.

In general, the patients were made aware of filled pauses,prolongations and secondaries were exhibited and were to repeat the utterance without these.

During the therapy speech samples were audio-recorded whenever outer patient achieved a particular step. Hence the number of recording differed for each patient. The number of sessions also differed for each patient which is presented in Table-3.

4.<u>Post therapy evaluation</u>:

The speech samples of the patients were audio recorded after the completion of therapy and the post therapy evalua-tion was performed by the investigator. All the recordings were made by the experimenter/therapist in a quiet room of the All India Institute of Speech and Hearing therapy clinic where only the experimenter and the patient were present. Different types of dysfluencies and the improvement in speech in terms of fluency was evaluated and recorded.

Completion of therapy in the first three patients was assessed as the achievement of complete fluency as per the evaluation of the therapist and the patient. However, as the fourth patient discontinued for some reason, the completion of therapy in this patient does not mean that the patient had achieved normal fluency.

5. Perceptual evaluation by the speech pathologists:

The pretherapy, post therapy and during therapy speech samples were audio presented to three speech pathologists (including the investigator) one at a time for perceptual evaluation. They were to evaluate the type and number of dysfluencies and were to comment on the ease and rhythm of speech. They were to identify and evaluate a dysfluency as defined by the experimenter.

6. Definition of dysfluencies:

Following were the different speech behaviours which were considered as dysfluencies. These behaviours were classified as dysfluencies based on the criteria developed by Johnson (1961)? Prins and Lohr (1972); Weiss (1964). The different dysfluencies are defined as follows:

Omission - It is a dysfluency characteristics in which the standard sound is replaced usually by a slight pause equal in duration to the sound omitted. There could be an omission of a particular sound or syllable in a sentence. If the initial sound or syllable is omitted then it appears to be a bit more difficult and meaning gets affected whereas if the final sound is omitted then the meaning is conveyed.

Metathesis - When two sounds or group of sounds inter-fere with each other the result is sometimes an interchange of place of those sounds or phonemes. If this interchange of phonemes is distant then it is called matathesis. For example: Amadi for amami (in Hindi)

Chipakka for Chikappa (in Kannada Language) etc.

Inversion - When two phonemes interchange within the word boundary then it was termed inversion,for example Pate recorder for tape recorder.

Post-position - It is characterized by post-poning the position of a sound. For example - tape tecorder for tape recorder.

Interjection - It is an event that can occur within words, between word, or before the word. Interjections

involve the insertion of some sounds or syllables, into an utterance, even though the interjected event does not enhance the meaning that the speaker is trying to convey. The sentence for example "Er.....Alert the em....uh....ployees that boss is here".

Drawlers - The patient keeps his mouth open as though frightened.

Broken words - This category of dysfluency is charac- terized by words which are not completely pronounced and which are not associated with any other category, or in which the normal rhythm of the word is broken in a way that defi- nitely interferes with the smooth flow of speech. For example -'I was g-(pause)-oing home(is an example of broken word.

Incomplete phrase - An incomplete phrase is one in which the thought or context is not completed and which is not an instance of phrase repetition. As for example - 'She was - and often she got there he came'.

Prolongation - Thisterm has been used traditionally to mean the extension of a sound beyond its appropriate duration. For example - "wwwwater".

Filled pauses - Filled pauses contain the sounds like "un", "um", or "ah". It is filled with sound in order to signal to the listener that the speaker wishes to continue without interruption although he is momentarily unable to proceed. This is used between the words.

Unfilled pauses - An unfilled pause is simply any period of silence greater than 270 m.sec.

Paranthetical remarks - It is characterized by fillers like - "well", "you know" etc.

False start - It is characterized by corrections of phrases or words.

Repetition - A repetition is defined as the utterance of the same phoneme syllable part-word, word, or group of words more than once. For example - "I want, I want to go". There can be a repetition within a repetition which count as a total of two repetitions. For example, "Put it in her wagon. Put it, put it is her wagon".

Articulatory fixation - It is characterized by fixation of the articulator in a particular articulatory position for an undully prolonged duration and usually occurs on plosives.

The evaluator may hear only tensed voicing during the period for which articulator is fixed or audibly there is a block.

Hesitation - The term hesitation has been used traditionally to refer to silent intervals of unspecified length or character in the flow of speech.

7. Measurement criteria:

The judges were to listen to the audio-recordings and were to evaluate dysfluencies according to these definitions and calculate as follows. Each instance of dysfluency was to be measured as one dysfluency. For example bo boy was to be considered as one repetition while bo bo boy was to be considered as two repetitions.

Percentage of dysfluency was to be measured by the following formula -

$$\text{Percentage of dysfluency} = \frac{\text{Total no. of dysfuency}}{\text{Total no. of words}} \times 100$$

The dysfluencies as measured by the investigator and the two speech pathologists before, during and after therapy were compared with each other. Walsh test was applied to findout the significance difference between the fluency in the pre and post therapy speech samples. Further, Spearmans rank correlation test was used to find out the correlattion between the perceptual evaluations of the judges. The data was tabulated to find out the efficacy of individualized therapy techniques.

STATISTICAL RESULTS

For qualitative measures of perceptual evaluations of speech samples recorded at varying sessions, Spearman's Rank correlation method was applied and the correlation values between different judges for all the subjects are mentioned in the following table.

	J_1 vs J_2	J_2 vs J_3	J_1 vs J_3
S_1	.73	.86	.91
S_2	.60	1	.60
S_3	.61	.56	.72
S_4	.60	.80	.80

Table-4: Values of coefficient of correlation.

On the whole what was found is that there was a high degree of positive correlations which indicates that there was a very close agreement between the perceptual evaluations done by different judges.

RESULTS AND DISCUSSION

The perceptual analysis of speech before, during and after speech therapy are presented for each subject and theresults are discussed.

Subject - 1: On perceptually analyzing the speech sample before, during and after therapy, it was observed that the total percentage of dysfluency had significantly reduced after therapy. Of the three, two judges reported 1.05% of dysfluency in the post therapy speech/sample. However, one of the judge (Jl) reported 6.14% dysfluency. Figure-1 illustrates the percentage of dysfluency before and after therapy.

A Spearman's rank correlation test was performed and the results indicated that there was a very high degree of correlation between the judges in terms of their perceptual evaluation. This indicates agreement between the judges with respect to the number and percentage of dysfluency. Table-4 represents the results of the rank correlation test.

Among the different dysfluencies, subject 1 had high percentage of repetition followed by articulatory fixation, prolongation, hesitation and unfilled pauses in spontaneous speech. But one ef the judge (J3) reported of high percentage

of articulatory fixation followed by repetition, articulatory release on inspiration, false start, parenthetical remarks, prolongation, filled pauses and drawler. In reading Hindi, the subject had high percentage of articulatory fixation and repetition followed by prolongation and hesitation. In reading English the subject had high percentage of articulatory fixation and repetition followed by prolongation, articulatory release on inspiration and hesitation (according to J1).

After 5 sessions of therapy, reading in Hindi and spontaneous speech was elicited and it was observed that the repetition hadreduced to 0% according to J2 and J3. However, J1 though reported, reduction in repetition evaluated it as 1.26%. In spontaneous speech, it was observed that there was a high percentage of repetition and hesitation followed by prolongation and unfilled pauses. Other dysfluencies were minimized. After 7 sessions of therapy the reading in Hindi and spontaneous speech was elicited. It was observed that in reading Hindi, there was a high percentage of prolongation followed by articulatory fixation and repetition. In spontaneous speech again the percentage of dysfluency has reduced and there was high percentage of repetition followed by hesitation, prolongation and articulatory fixation (according to J1).

	17.10.90 (Pretherapy)			25 Oct.'90		28 Oct.'90		2 Nov.1990		Comment & remar by the Judge
	Reading in Hindi	Reading in English	Spont sp.	Reading in Hindi	Spont sp.	Read-ing.	Spont. speech	Read-ing	Spont. speech	
Misarticulation										
Voiced/voiceless										
Nonnasal/nasals										
Omission of sounds/ words										
Metathesis										
Inversion										
Post position										
Interjections										
Drawler										
Broken words										
Incomplete phrase										
Articulatory release on inspiration	III	II								
Articulatory fixa-tion	IIII	II	III			I	I		I)	
Prolongation	I	III	II	I	I	II	I		II	
Hesitation		I	II	II	II		II			
Filled pauses			II							
Unfilled pauses			II	III	I					
Paranthetical remarks										
False start							II	I	III	
Phoneme repetition	III		TTTT	I		I	III		III	
Syllable repetition		I								
Partword repetition				I						
Word repetition		IIII	III				I	I	I	
Phrase repetition.	I	III	II		II					
Total no.of dys-fluencies.	12	16	21	8	6	4	10	2	11	
Total no.of words	151	134	125	158	175	185	168	58	179	
% of dysfluency.	7.94 %	11.94 %	16.8 %	5.06 %	3.42 %	2.16 %	5.95 %	3.44 %	6.14 %	

Table 4(a): Result of the perceptual evaluation done by the Ist judge for subject - 1.

Provisional diagnosis – Severe stuttering with secondaries   Language Hindi/English

	17.10.90 (Pretherapy)			25 Oct.'90		28 Oct.'90		2 Nov.1990		Comment & remark by the Judge
	Reading in Hindi	Reading in English	Spont sp.	Reading in Hindi	Spont. sp.	Read-ing.	Spont. speech	Read-ing	Spont. speech	
Misarticulation		—	—	—	—	—				
Voiced/voiceless			—	—				—		
Nonnasal/nasals					—					
Omission of sounds/ words										
Metathesis				— ●	—			—	—	
Inversion								—	—	
Post position									—	
Interjections										
Drawler					—	—				
Broken words										
Incomplete phrase										
Articulatory release on inspiration										
Articulatory fixation	₥₥ II	₥₥ IIII	₥₥ ₥₥	II		I	I	—	—	
Prolongation	II	—	II	II	I	I	I		—	
Hesitation	I		I	—						
Filled pauses	—							—		
Unfilled pauses			I		I					
Paranthetical remarks									II	
False start										
Phoneme repetition	III	III	₥₥ II							
Syllable repetition		I	I							
Partword repetition										
Word repetition		III	II							
Phrase repetition.		I	I							
Total no.of dys-fluencies.	13	17	25	4	2	2	2	0	2	
Total no.of words	130	129	60	137	45	233	183	57	190	
% of dysfluency.	10 %	13.17 %	41.66 %	2.91 %	4.44 %	0.85 %	1.09 %	0 %	1.05 %	

Table 4(b) :   Result of the perceptual evaluation done by the 2nd judge for subject - 1.

Provisional diagnosis – Severe stuttering with secondaries   Language Hindi/English

	17.10.90 (Pretherapy)			25 Oct.'90		28 Oct.'90		2 Nov.1990		Comments & remarks by the Judge
	Reading in Hindi	Reading in English	Spont sp.	Reading in Hindi	Spont. sp.	Reading.	Spont. speech	Reading	Spont. speech	
Misarticulation	----	----	----	----	----	----	----	----		
Voiced/voiceless										
Nonnasal/nasals										
Omission of sounds/ words										
Metathesis								•—		
Inversion										
Post position										
Interjections										
Drawler			–|–							
Broken words										
Incomplete phrase										
Articulatory release on inspiration			|||–							
Articulatory fixation	卌 ||||	卌	卌 卌 ||||	–|—				—|—	|}–	
Prolongation	||		|—	–||	•|	||	||—		—	
Hesitation							|_			
Filled pauses		–|	|–							
Unfilled pauses										
Paranthetical remarks										
False start			||							
Phoneme repetition										
Syllable repetition										
Partword repetition	–|		卌							
Word repetition		–||	+	–						
Phrase repetition.		–|								
Total no.of dys-fluencies.	12	9	30	3	1	2	5	1	2	
Total no.of words	202	205	181	141	70	235	220	75	189	
% of dysfluency.	5·94 %	4.39 %	16·57%	2.12 %	1·42 %	0·85%	2.27%	1·33 %	1·05 %	

Table 4(C): Result of perceptual evaluation done by the 3rd judge for subject-1.

	Dysfluencies	Pretherapy disfluency in percentage			Percentage of dysfluency after 5 sessions		Percentage of dysfluency after 7 sessions		Post therapy percentage of dysfluency after 11 session of therapy	
		Reading in Hindi	Reading in English	Spont. Speech	Reading in Hindi	Spont. Speech	Reading in Hindi	Spont. speech	Reading in Hindi	Spont. Speech
Judge-1	Articulatory fixation	2.64	1.49	2.4	0	0	0.54	0.59	0	1.11
	Repetition	2.64	5.97	8.0	1.26	1.14	0.54	2.38	1.72	2.23
	Articulatory release on inspiration	1.98	1.49	0	0	0	0	0	0	0
	Prolongation	0.66	2.23	1.6	0.63	0.57	1.08	0.59	0	1.11
	Hesitation	0	0.74	1.6	1.26	1.14	0	1.19	0	0
	Filled pauses	0	0	1.6	0	0	0	0	0	0
	Unfilled pauses	0	0	1.6	1.89	0.57	0	0	0	0
	False start	0	0	0	0	0	0	1.19	1.72	1.67
	Total % of dysfluency	7.94	11.94	16.8	5.06	3.42	3.16	5.95	3.44	6.14
Judge-2	Articulatory fixation	5.38	6.97	16.66	1.45	0	0.42	0.54	0	0
	Repetition	2.30	6.20	18.33	0	0	0	0	0	0
	Prolongation	1.53	0	3.33	1.45	2.22	0.42	0.54	0	0
	Hesitation	0.76	0	1.66	0	0	0	0	0	0
	Unfilled pauses	0	0	1.66	0	2.22	0	0	0	0
	Parenthetical remarks	0	0	0	0	0	0	0	0	1.05
	Total % of dysfluency	10.0	13.17	41.66	2.91	4.44	0.85	1.09	0	1.05
Judge-3	Articulatory fixation	4.45	2.43	7.73	0.70	0	0	0	1.33	1.05
	Repetition	0.49	1.43	3.86	0	0	0	0.90	0	0
	Prolongation	0.99	0	0.55	1.41	1.42	0.85	0.90	0	0
	Articulatory release on inspiration	0	0	1.65	0	0	0	0	0	0
	False start	0	0	1.10	0	0	0	0	0	0
	Parenthetical remarks	0	0	0.55	0	0	0	0	0	0
	Filled pauses	0	0.48	0.55	0	0	0	0	0	0
	Drawler	0	0	0.55	0	0	0	0	0	0
	Hesitation	0	0	0	0	0	0	0.45	0	0
	Total % of dysfluency	5.94	4.39	16.57	2.12	1.42	0.85	2.27	1.33	1.05
J1, J2 & J3	Misarticulation, voiced/ voiceless, Non-nasal/ nasals; Omission of sounds/words; Metathesis, Inversion, Post position, Interjection, Broken words, Incomplete phrase.	0	0	0	0	0	0	0	0	0

Table-5: Results of perceptual evaluation (Subject-1).
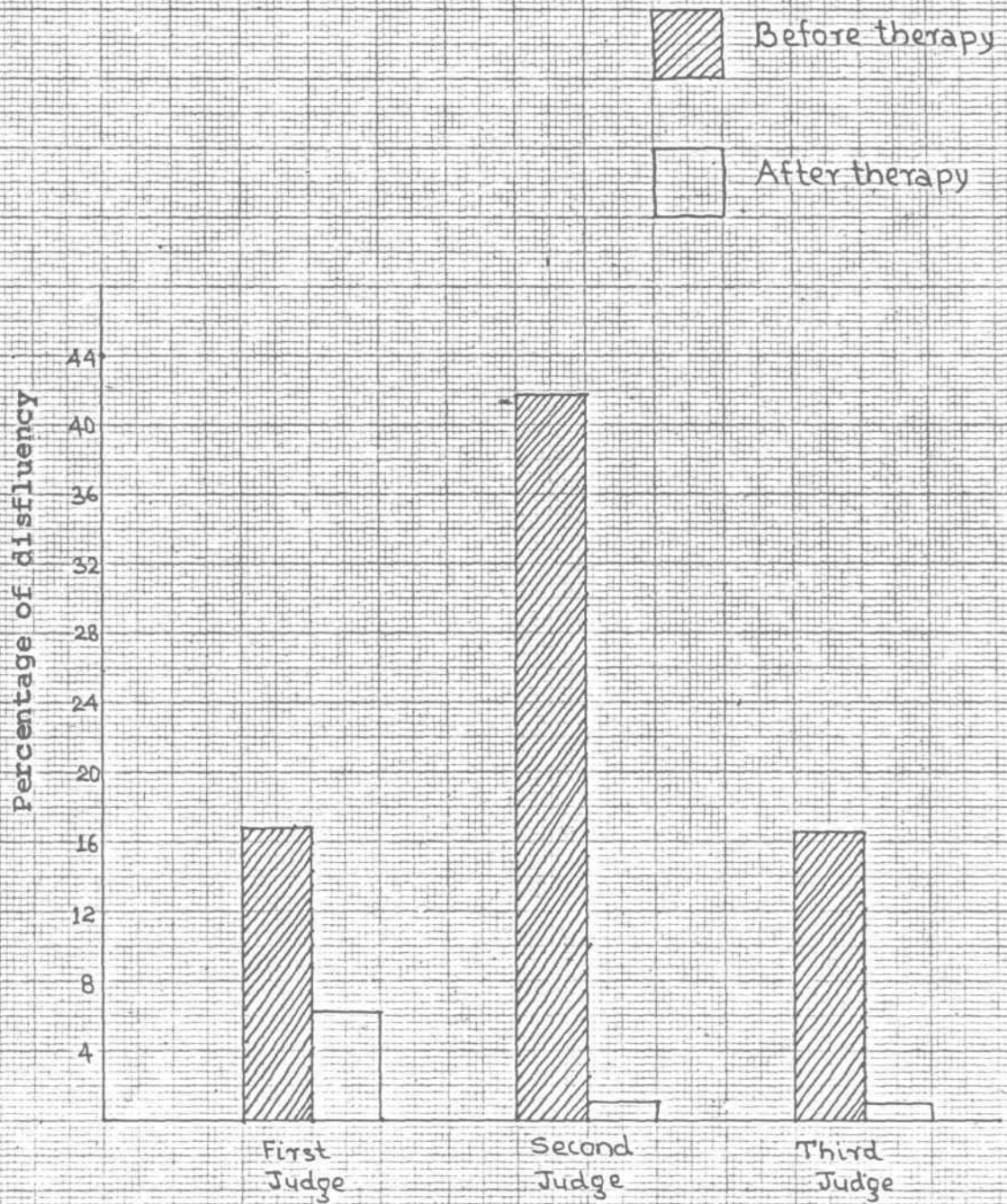
Fig.1 Total percentage of dysfluency in spontaneous speech before and after therapy (Subject-1)
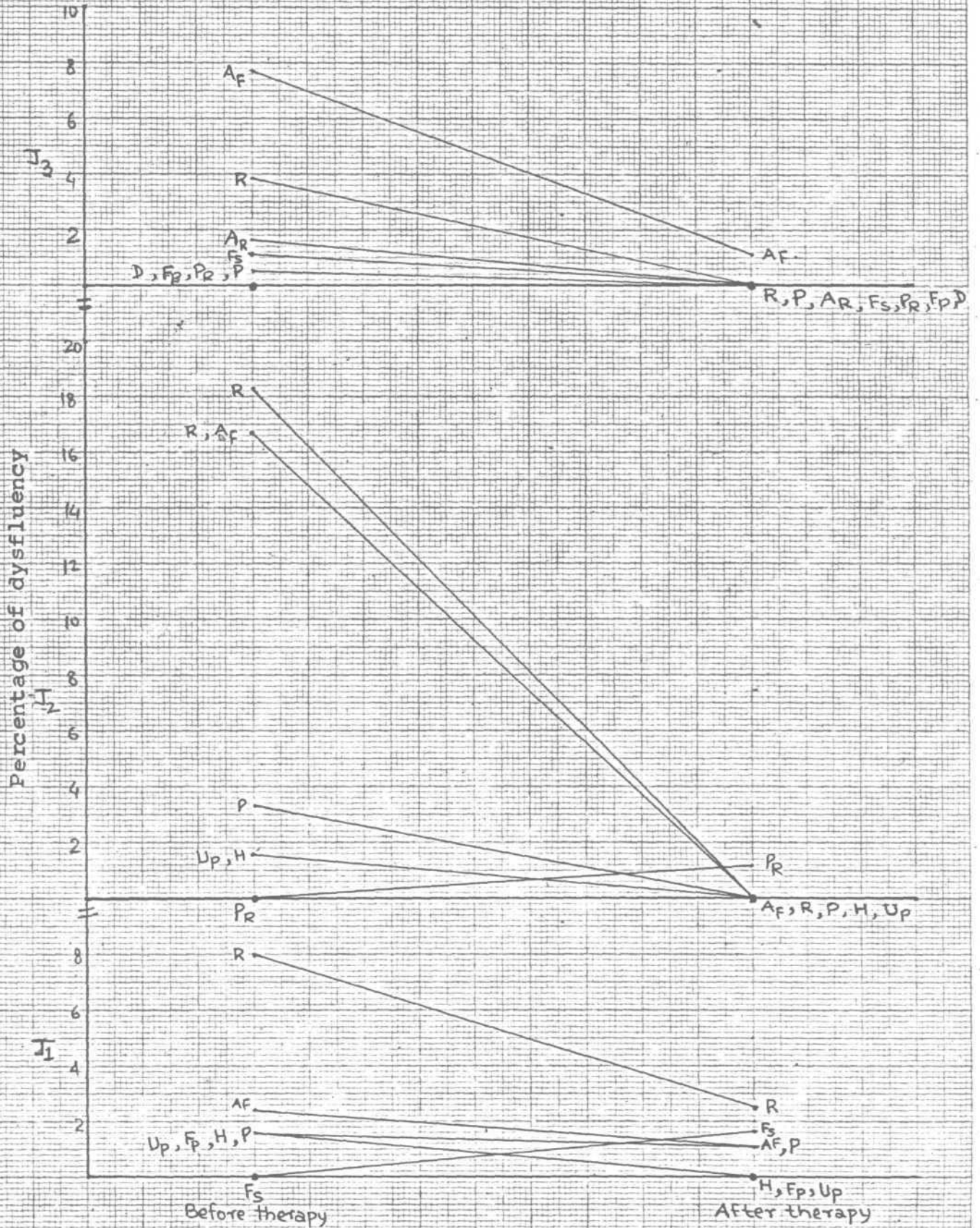
Fig 2: Percentage of different dysfluencies in spontaneous speech
before and after therapy(Subject-1)

In the post therapy speech sample two of the judges
reported 1.05% dysfluency and judge reported of 6.14% of
dysfluency in spontaneous speech and 3.44% while reading
Hindi with repetition and false start as features present
after therapy. Also, it was noticed by one judge that
the false start which was not present in pretherapy speech
sample was present in the post therapy speech sample. In
Hindi reading sample, J2 reported of 0% of dysfluency.
But in spontaneous speech articulatory fixation, false
start and prolongation were the features observed by J1.
However, J2 and J3 reported of articulatory fixation to be
present even after therapy. Figure-2 shows the different
types of dysfluencies present before and after therapy.
Table-5 depicts the percentage of dysfluency in all the
sessions as evaluated by all the three judges.

To summarize, there was a high correlation (.73 to 91)
between the evaluation of judges and in general, all the
three judges opined that the percentage of dysfluencies
decreased significantly after therapy. Of the several
features, the first feature to be reduced/eliminated were
prolongation, hesitation, filled pauses, unfilled pauses,
articulatory release on inspiration and repetition. Arti-
culatory fixation though reduced was not eliminated completely.

Subject-2: In S2, on perceptual analysis, it was observed that the total percentage of dysfluency reduced significantly after therapy. Of the three, two judges reported of 0% dysfluency in the post therapy speech sample. However, one of the judges reported a reduction in the percentage of dysfluency from 7.69% to 4.44%. Figure-3 illustrates the percentage of dysfluency before and after therapy.

Results of the Spearman's rank correlation test indicated that there was a high correlation between the three judges (in their perceptual evaluation) indicating agreement between judges with respect to the number and percentage of dysfluencies. Table-4 represents the results of the rank correlation test.

Among the different dysfluencies, S2 had high percentage of repetition followed by filled pauses, unfilled pauses, hesitation, paranthetical remarks and prolongation in spontaneous speech before therapy. However, one of the judges reported 2.26% of articulatory fixation. In reading Hindi, this subjedt exhibited high percentage of repetition and filled pauses followed by unfilled pauses, hesitation, prolongation and articulatory fixation. However, one of the judges reported high percentage of articulatory fixation followed by unfilled pauses and hesitation.

Provisional diagnosis: Mild stuttering

	25.9.90 Pretherapy dysfl.			1.10.90 3rd Sessn	10.10.90 5th Sessn	Remarks
	Spont. Speech	Reading in Hindi	Reading in English	Reading in Hindi	Spont. Speech	
Misarticulation						
Voiced/voiceless						
Nonnasals/nasals						
Omission of sounds/words						
Metathesis						
Inversion						
Post position						
Interjections			l			
Drawlers						
Broken words						
Incomplete phrase						
Articulatory release on inspiration						
Articulatory fixation		l			l	
Prolongation	l	l				
Hesitation	III	l	l		l	
Filled pauses	III	II	TH			
Unfilled pauses	III	l	–	III	III	
Parenthetical remarks	II		l			
False start				II	l	
Phoneme repetition	III		II	l		
Syllable repetition						
Part word repetition			III	II		
Word repetition	II	II	IIII	l		
Phrase repetition			II	II		
Total No.of dysfluencies	17	8	19	11	6	
Total no.of words	221	184	262	230	135	
% of dysfluencies.	7.69 %	4.34 %	7.25 %	4.78 %	4.44 %	

Table 6(a): Results of the perceptual evaluation done by the Ist judge for subject-2.

Provisional diagnosis: Mild stuttering

| | 25.9.90 Pretherapy dysfl. | | | 1.10.90 3rd Sessn | 10.10.90 5th Sessn | Remarks |
	Spont. Speech	Reading in Hindi	Reading in English	Reading in Hindi	Spont. Speech	
Misarticulation						
Voiced/voiceless						
Nonnasals/nasals						
Omission of sounds/words						
Metathesis						
Inversion						
Post position						
Interjections	I		IIII			
Drawlers						
Broken words						
Incomplete phrase						
Articulatory release on inspiration						
Articulatory fixation	III	III	II			
Prolongation		II				
Hesitation	I	I		I		
Filled pauses	I		II			
Unfilled pauses	III	II	HHH	I		
Paranthetical remarks						
False start						
Phoneme repetition						
Syllable repetition	II		II	I		
Part word repetition	I		III			
Word repetition	I		I			
Phrase repetition						
Total No. of dysfluencies	13	8	19	3	0	
Total no. of words	230	150	213	231	65	
% of dysfluencies.	5.65 %	5.33 %	8.92 %	1.29 %	0 %	

Table 6(b): Results of the perceptual evaluation done by the 2nd Judge for subject-2.

Provisional diagnosis: Mild stuttering

| | 25.9.90 Pretherapy dysf. | | | 1.10.90 3rd Sessn | 10.10.90 5th Sessn | Remarks |
| | Spont. Speech | Reading in | | Reading in Hindi | Spont. Speech | |
		Hindi	English			
Misarticulation						
Voiced/voiceless						
Nonnasals/nasals						
Omission of sounds/words						
Metathesis						
Inversion						
Post position						
Interjections						
Drawlers						
Broken words						
Incomplete phrase						
Articulatory release on inspiration						
Articulatory fixation	‖‖ I	I	‖‖			
Prolongation	I	I	I			
Hesitation	‖I	I	I			
Filled pauses		I	‖			
Unfilled pauses	I					
Paranthetical remarks			I			
False start		I	I			
Phoneme repetition						
Syllable repetition	I	I				
Part word repetition	‖	I	‖‖	I		
Word repetition	I		I	I		
Phrase repetition				‖		
Total No.of dysfluencies	15	7	16	4	0	
Total no.of words	265	205	151	489	147	
% of dysfluencies.	3.41 %	3.41 %	10.59 %	0.81 %	0 %	

Table 6(c): Results of the perceptual evaluation done by the 3rd Judge
for subject—2

In reading English, the subject had high percentage of repetition followed by filled pauses, hesitation, paranthetical remarks and interjection. However, one of the judges reported of high percentage of repetition followed by articulatory fixation, filled pauses, and hesitation, prolongation, false start and parenthetical remarks (all three having the same percentage of dys-fluency).

After two sessions of therapy Hindi reading was elicited and it was observed that all other dysfluencies except unfilled pauses, hesitation, and prolongation were minimized. However, false start, repetition and unfilled pauses seemed to increase.

In the post therapy speech sample two of the judges reported of 0% dysfluency and one reported 4.44% dys-fluency with unfilled pauses, hesitation, articulatory fixation and false start as features present after therapy. Figure-4 shows the different types of dysfluencies present before and after therapy and table-7 depicts the percentage of dysfluencies in all the sessions as evaluated by the three judges.

| Judges | Dysfluencies | Pretherapy percentage of dysfluency | | | Percentage of dysfluency after two sessions | Post therapy percentage of dysfluency |
		Spont. speech	Reading in Hindi	Reading in English	Reading in Hindi	Spont. Speech
Judge-1	Repetition	2.26	1.08	4.19	2.60	0
	Filled pauses	1.34	1.08	1.9	0	0
	Unfilled pauses	1.34	0.54	0	1.30	2.22
	Hesitation	1.34	0.54	0.38	0	0.74
	Parenthetical remarks	1.34	0	0.38	0	0
	Prolongation	0.45	0.54	0	0	0
	Articulatory fixation	0	0.54	0	0	0.74
	Interjection	0	0	0.38	0	0
	False start	0	0	0	0.86	0.74
	Total % of dysfluency	7.69	4.34	7.25	4.78	4.44
Judge-2	Repetitions	1.73	0	2.81	0.43	0
	Articulatory fixation	1.30	2.00	0.93	0	0
	Unfilled pauses	1.30	1.33	2.34	0.43	0
	Filled pauses	0.43	0	0.93	0	0
	Hesitation	0.43	0.66	0	0.43	0
	Interjection	0.43	0	1.87	0	0
	Prolongation	0	1.33	0	0	0
	Total % of dysfluency	5.62	5.33	8.92	1.29	0
Judge-3	Articulatory fixation	2.36	0.48	2.64	0	0
	Repetition	1.50	0.97	3.97	0.81	0
	Hesitation	1.13	0.48	0.66	0	0
	Prolongation	0.37	0.48	0.66	0	0
	Unfilled pauses	0.37	0	0	0	0
	Filled pauses	0	0.48	1.32	0	0
	False start	0	0.48	0.66	0	0
	Parenthetical remarks	0	0	0.66	0	0
	Total % of dysfluency	5.66	3.41	10.59	0.81	0
J1, J2, J3 & J3	Misarticulation; voiced/ voiceless;Non.nasals/ nasals;Omission of sounds/ words; Metathesis; Inversions; Post-position;Drawlers; Broken words; Incomplete phrase; Articulatory release on inspiration	0	0	0	0	0

Table-7: Results of perceptual evaluation (Subject-2)
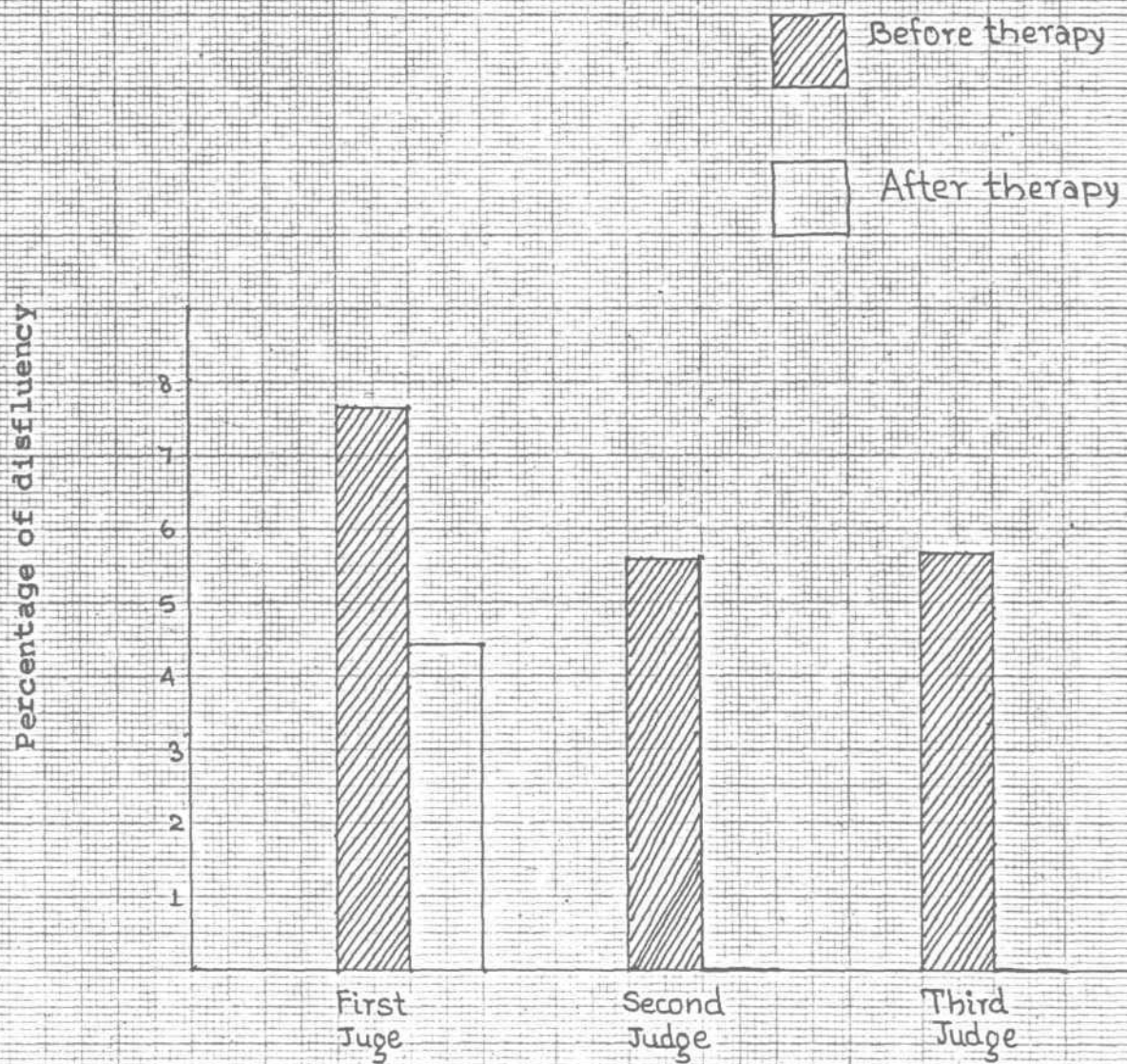
Fig-2   Total percentage of dysfluency in spontaneous speech
before and after therapy(Subject-2)
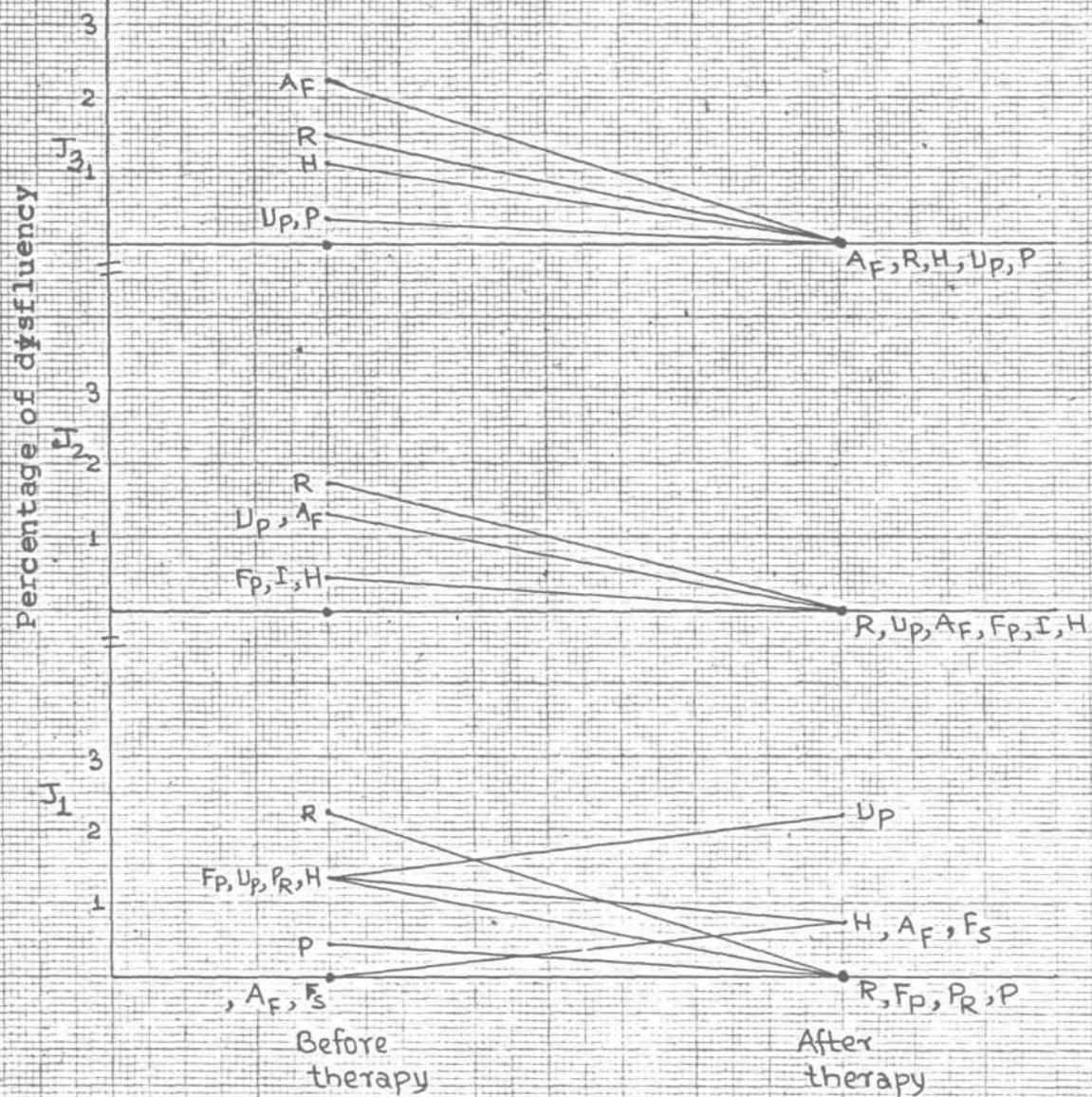
Fig 4 : Percentage of different dysfluencies in spontaneous speech before and after therapy (Subject-2)

In summary, there was a significant difference in the percentage of dysfluency before and after therapy, in that the percentage of dysfluency reduced after therapy and a high correlation of .60 to 1 was observed between judges. Of the several dysfluencies, prolongation, hesitation, filled pauses and articulatory fixation were eliminated first followed by repetition. However, J1 reported the presence of one articulatory fixation in 135 words even after therapy.

Subject-3: In subject 3, it was observed that the total percentage of dysfluency significantly reduced after therapy. Of the three judges, two judges reported of 0% (dysfluency in reading in Kannada) to 0.6% dysfluency (in spontaneous speech), and one of the judge (Jl) reported 4.16% dysfluency in spontaneous speech. Figure-5 illustrates the percentage of dysfluency in spontaneous speech before and after therapy.

On the Spearman's rank correlation test it was noticed that high degree of correlation existed between the judges (in terms of their perceptual evaluation| indicating agreement between the judges with respect to the number of percentage of dysfluency. Table-4 represents the results of rank correlation test.

Provisional diagnosis: Moderate severe stuttering with secondaries.

1.	22.9.90 pre-therapy recording		24.9.90 Reading in Kannada	25.9.90 6th session		8.10.90		10.10.90 12th Session			Re marks
	Spont. Speech	Read ing		Read- ing	Spont. speech	Spont. speech	Read- ing	Spont. speech	Reading in English	Reading in Kannada	
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.
Misarticulation											
Voiced/voiceless	||	—|									
Nonnasal/nasals											
Omission of sounds/words											
Metathesis											
Inversion											
Post-position											
Interjections	|||	|									
Drawler											
Broken words											
Incomplete phrases											
Articulatory release on inspiration	||	||									
Articulatory fixation	|||	|									
Prolongation	||	||||		|	|	|	|			|	
Hesitation	||||	||	|	|||	|	||	|||	||	|	||	
Filled pauses	卌 |	||||	|			卌 |	|	|||		|	
Unfilled pauses	卌	||	||||	||||	|||	|||	||||	|	|		
Paranthetical remarks	|||	|||	|								
False start											
Phoneme repetition	卌 |	卌 卌 ||	卌 ||	||||	|||	|||	|	|		||	
Syllable repetition		|				|					
Part word repetition		卌					|				
Word repetition	|||	卌 |							||	|	
Phrase repetition						||	|	·			
Total no.of dysfluencies	39	44	14	12	8	18		7	4	7	
Total no.of words	342	263	70	43	111	119		168	281	187	
% of dysfluency	11.4 %	16.73%	20 %	27.9 %	7.2 %	15.12 %		4.16 %	1.42 %	3.74 %	

Table 8(a): Result of perceptual evaluation done by the Ist judge for subject - 3.

Provisional diagnosis: Moderate severe stuttering with secondaries.

1.	22.9.90 pre-therapy recording		24.9.90 Reading in Kannada	25.9.90 6th session		8.10.90		10.10.90 12th Session			Remarks
	Spont. Speech 2.	Read ing 3.	4.	Read-ing 5.	Spont. speech 6.	Spont. speech 7.	Read-ing 8.	Spont. speech 9.	Reading in English 10.	Reading in Kannada 11.	12.
Misarticulation											
Voiced/voiceless											
Nonnasal/nasals											
Omission of sounds/words											
Metathesis											
Inversion											
Post-position											
Interjections	I	I									
Drawler											
Broken words											
Incomplete phrases											
Articulatory release on inspiration											
Articulatory fixation	卌 I	卌 卌	III	III	I						
Prolongation	III	III									
Hesitation	卌	卌	II	II	I						
Filled pauses	III										
Unfilled pauses	卌	卌 卌 卌 卌 卌 II	卌 I	III	II	III			III		
Paranthetical remarks											
False start											
Phoneme repetition	卌 III	卌 卌 卌 IIII		I		I					
Syllable repetition									I		
Part word repetition											
Word repetition	II	卌									
Phrase repetition	II										
Total no.of dysfluencies	35	70	11	9	5	4	0	0	4	0	
Total no.of words	145	295	98	107	37	120	181	30	163	82	
% of dysfluency	24.13%	23.72%	11.95	8.41%	13.51%	3.33	0 %	0 %	2.45 %	0 %	

Table 8(b): Results of the perceptual evaluation done by the 2nd judge for subject - 3.

Provisional diagnosis: Moderate severe stuttering with secondaries.

1.	22.9.90 pre-therapy recording — Spont. Speech 2.	Reading 3.	24.9.90 Reading in Kannada 4.	25.9.90 6th session Reading 5.	Spont. speech 6.	8.10.90 Spont. speech 7.	Reading 8.	10.10.90 12th Session Spont. speech 9.	Reading in English 10.	Reading in Kannada 11.	Remarks 12.
Misarticulation											
Voiced/voiceless											
Nonnasal/nasals											
Omission of sounds/words	|	|		|							
Metathesis											
Inversion											
Post-position											
Interjections											
Drawler		||									
Broken words		|									
Incomplete phrases											
Articulatory release on inspiration	|	|||	|								
Articulatory fixation	卌 |||	卌卌卌 卌 卌 ||||	||||	|||		|	||		|	|	
Prolongation		|		|					|		
Hesitation	||										
Filled pauses	|										
Unfilled pauses											
Paranthetical remarks	|	卌									
False start		|					|	|			
Phoneme repetition	|	卌				|		|			
Syllable repetition	卌 |||	卌 |	|			|					
Part word repetition	|||	||||	|					|	|	|	
Word repetition	||	||									
Phrase repetition		|	||								
Total no.of dysfluencies	28	56	9	5	0	3	3	3	3	2	
Total no.of words	205	305	105	155	39	148	179	164	226	143	
% of dysfluency	13.65 %	18.36 %	8.57%	3.22%	0 %	2.02%	1.67 %	1.82%	1.32 %	1.39 %	

Table 8(c): Result of the perceptual evaluation done by the third judge for subject-3.

Among the different dysfluencies, subject-3 had high percentage of repetition followed by articulatory fixation, filled pauses, unfilled pauses, hesitation, prolongation, parenthetical remarks, interjection, articulatory release on inspiration and voiced/voiceless in spontaneous speech. In reading Kannada, subject-2 had high percentage of repetition followed by unfilled pauses, articulatory fixation, hesitation, filled pauses, parenthetical remarks and articulatory release on inspiration. In reading English the subject had high percentage of repetition (according to two judges) and articulatory fixation (according to J3) followed by unfilled pauses, filled pauses, prolongation, hesitation, paranthetical remarks, articulatory release on inspiration, interjections, drawler, broken words, false start and omission of sounds/words.

After five sessions of therapy reading in Kannada and spontaneous speech was elicited. In spontaneous speech, it was observed that the repetition had reduced to 0% according to J2 and J3. But J1 reported of reduction percentage of repetition which is followed by unfilled pauses, prolongation and hesitation. Similarly, in reading Kannada, it was observed that the percentage of dysfluency had significantly reduced. However, the subject exhibited high

Judges	Dysfluencies	Pretherapy percentage of dysfluency			After 5 sessions of therapy		After 10 sessions of therapy.		Post therapy after 12 sessions.		
		Spont. speech	Reading in English	Reading in Kannada	Reading in Kannada	Spont. speech	Spont. speech	Reading in Kannada	Spont. speech	Reading in English	Reading in Kannada
Judge-1	Repetitions	2.63	9.12	10.00	9.30	2.70	5.04	1.63	0.59	0.71	1.60
	Filled pauses	1.75	1.52	1.42	0	0	5.04	0.54	1.78	0	0.53
	Unfilled pauses	1.46	0.76	5.71	9.30	2.70	2.52	2.18	0.59	0.35	0
	Hesitation	1.16	0.76	1.42	6.97	0.90	1.68	1.63	1.19	0.35	1.06
	Articulatory fixation	0.87	0.38	0	0	0	0	0	0	0	0
	Parenthetical remarks	0.87	1.14	1.42	0	0	0	0	0	0	0
	Interjections	0.87	0.38	0	0	0	0	0	0	0	0
	Articulatory release on inspiration	0.58	0.76	0	0	0	0	0	0	0	0
	Voiced/voiceless	0.58	0.38	0	0	0	0	0	0	0	0
	Prolongation	0.58	1.52	0	2.32	0.90	0.84	0.54	0	0	0.53
	Total % of dysfluency	11.40	16.73	20.00	27.9	7.20	15.12	6.55	4.16	1.42	3.74
Judge-2	Repetition	8.27	8.13	0	0.93	0	0.83	0	0	0.61	0
	Articulatory fixation	4.13	3.38	3.06	2.80	2.7	0	0	0	0	0
	Hesitation	3.44	1.69	2.04	1.86	2.7	0	0	0	0	0
	Unfilled pauses	3.44	9.15	6.12	2.80	8.1	2.50	0	0	1.84	0
	Filled pauses	2.06	0	0	0	0	0	0	0	0	0
	Prolongation	2.06	1.01	0	0	0	0	0	0	0	0
	Interjection	0.68	0.33	0	0	0	0	0	0	0	0
	Total % of dysfluency	24.13	23.72	11.95	8.41	13.51	3.33	0	0	2.45	0
Judge-3	Repetition	6.82	5.9	3.8	0	0	1.35	0	1.12	0.44	0.69
	Articulatory fixation	3.90	7.86	3.8	1.93	0	0.67	1.11	0	0.44	0.69
	Hesitation	0.97	0	0	0	0	0	0	0	0	0
	Parenthetical remarks	0.48	1.63	0	0	0	0	0	0	0	0
	Filled pauses	0.48	0	0	0	0	0	0.	0	0	0
	Omission of sounds/words	0.48	0.32	0	0.64	0	0	0	0	0	0
	Articulatory release on inspiration	0.48	0.98	0.95	0	0	0	0	0	0	0
	Drawler	0	0.65	0	0	0	0	0	0	0	0
	Broken words	0	0.32	0	0	0	0	0	0	0	0
	Prolongation	0	0.32	0	0.64	0	0	0	0	0.44	0
	False start	0	0.32	0	0	0	0	0.55	0.6	0	0
	Total % of dysfluency	13.65	18.36	8.57	3.22	0.00	2.02	1.67	1.82	1.32	1.39
J1,J2,J3	Misarticulation; Nonnasals/ nasals; Metathesis; Post-positive; Incomplete phrase.	0	0	0	0	0	0	0	0	0	0

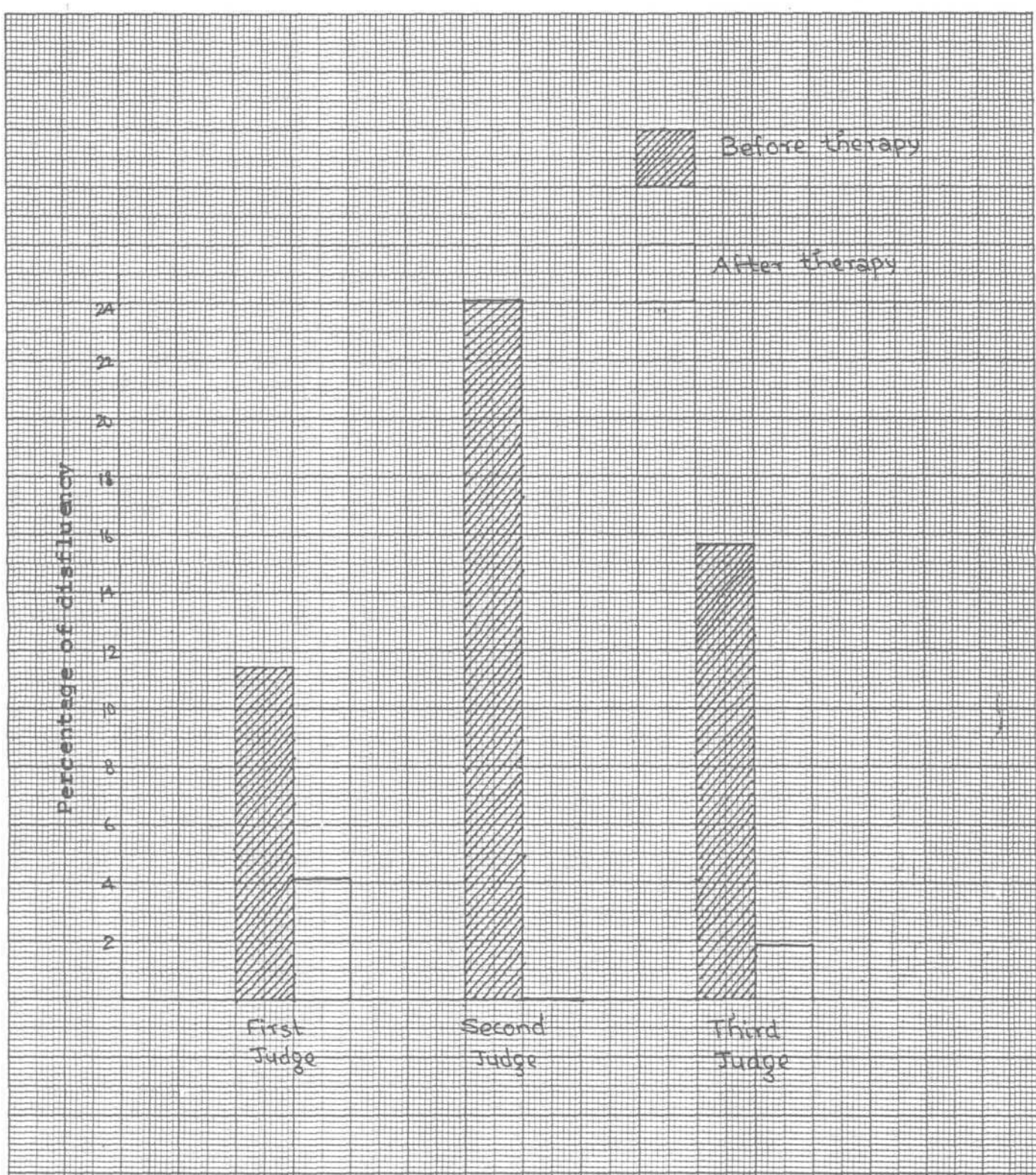Table-9:Results of the perceptual evaluation (Subject-3)

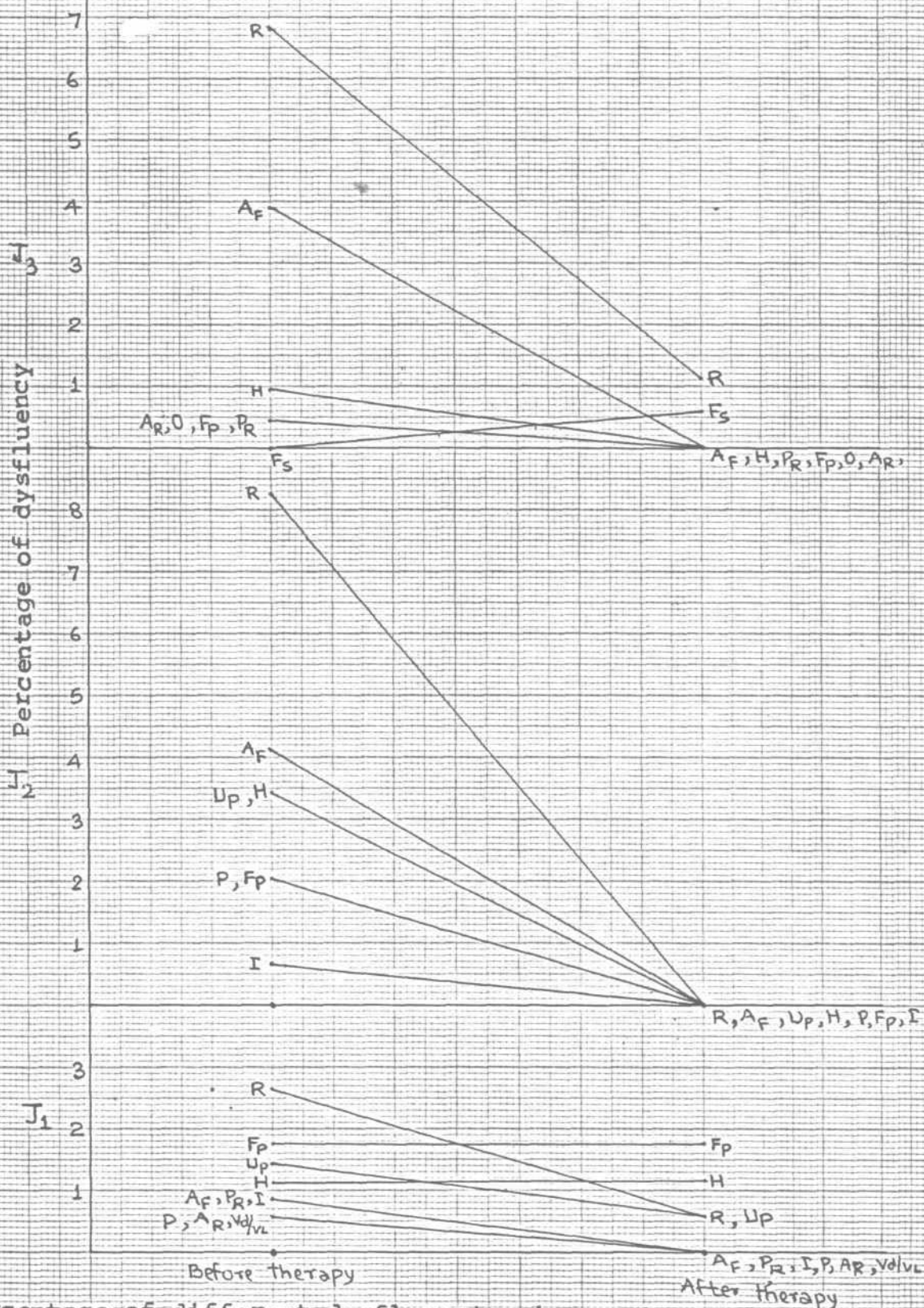Fig 5:   Total percentage of dysfluency in spontaneous speech before and after therapy (Subject-3)

Fig-6: Percentage of different dysfluencies in spontaneous speech before and after therapy (Subject-3)

percentage of repetition followed by articulatory fixation, unfilled pauses, hesitation, prolongation, and omission of sounds/words.

In the post therapy speech sample, two of the Judges (J2 and J3) reported of 0 percentage dysfluency in reading Kannada whereas Jl reported of 0.53% of dysfluency in reading Kannada. In spontaneous speech Jl reported of reduced percentage of dysfluency and filled pauses, hesitation and repetition were the features present. Other dysfluencies has reduced to 0%. J3 reported the presence of false start which was not present in pretherapy spontaneous speech sample. Other dysfluencies reduced to 0%. Figure-6 shows the different types of dysfluencies present before and after therapy. Table-9 depicts the percentage of dysfluency in all the sessions as evaluated all the three judges.

Thus, the percentage of dysfluency significantly reduced after therapy and there was a high correlation between judges. Of the varies dysfluencies, filled pauses, paranthetical remarks, interjection, articulatory fixation, hesitation, voiced/voiceless and articulatory release on inspiration were the first to be eliminated and repetition was the last. Though reduced, repetition still persisted in the post therapy speech sample.

Subject-4: In subject-4 the pretherapy speech samples in reading Kannada and spontaneous speech were recorded and the perceptual evaluation was done by the investigator. On perceptually analyzing the speech sample the investigator observed 24.43% of dysfluency having a high percentage of articulatory fixation, followed by repetitions, unfilled pauses, filled pauses, hesitation, articulatory release on inspiration, prolongation, and paranthetical remarks in spontaneous speech. In reading Kannada, the subject had 19.8% of dysfluency characterized by a high percentage of repetition followed by articulatory fixation, unfilled pauses, filled pauses, hesitation, prolongation,paranthetical remarks, and false start. However, accidentaly the audio-cassette was damaged and the pretherapy speech sample could not be evaluated by the other two judges (J1 and J2). On perceptually analyzing the speech sample during and after therapy, it was observed that the total percentage of dys-fluency significantly reduced after therapy. Figure-7 illustrates the percentage of dysfluency during and after therapy.

The results of the Spearman's rank correlation indicated that there was a very high degree of correlation between the

judges (in terms of their perceptual evaluation) indicating agreement between judges with respect to number and percentage of dysflnency. Table-4 represents the results of rank correlation test.

After 12 sessions of therapy, reading and spontaneous speech was elicited and it was observed that subject-4 had a high percentage of articulatory fixation followed by repetitions, unfilled pauses, prolongations, hesitation and paranthetical remarks (in spontaneous speech). Other dysfluencies had reduced to 0% in spontaneous speech. In reading Kannada, it was observed that the subject had high percentage of articulatory fixation followed by unfilled pauses, repetitions, prolongation, hesitation, articulatory release on inspiration, misarticulation and broken words.

In the post therapy speech sample, the total percentage of dysfluency had reduced and minimized but not to 0%. In Kannada reading, it was observed that most of the dysfluencies except repetition, articulatory fixation, unfilled pauses, paranthetical remarks and false Start had reduced to 0%. According to J2, total percentage of dysfluency in reading Kannada reduced to 0.62% but J1 and J3 reported a dysfluency of 1.76% and 4.34% respectively. In spontaneous speech

Provisional diagnosis: Moderate severe stuttering with secondaries

	1.10.90		7.10.90		Re marks
	Reading in Kannada	Spont. speech	Spont. Speech	Reading	
Misarticulation					
Voiced/voiceless					
Nonnasals/nasals					
Omission of sounds/words					
Metathesis					
Inversion					
Post position					
Interjections					
Drawlers					
Broken words					
Incomplete phrase					
Articulatory release on inspiration		ll	l		
Articulatory fixation	ll	ʰʰ	\	l	
Prolongation	l	l			
Hesitation	lll	ll	ll		
Filled pauses					
Unfilled pauses	l		l		
Paranthetical remarks	·	l			
False start			l	l	
Phoneme repetition	ll	llll	l		
Syllable repetition					
Part word repetition	l		l		
Word repetition				ʰʰ	
Phrase repetition			l		
Total No.of dysfluencies	10	15	9	7	
Total no.of words	157	143	237	161	
% of dysfluencies.	6·36 %	10·48%	3·79 %	4·34 %	

Table 10(a): Results of the perceptual evaluation done by the Ist Judge
for subject-4

Provisional diagnosis: Moderate severe stuttering with secondaries

	1.10.90		7.10.90		Re marks
	Reading in Kannada	Spont. speech	Spont. Speech	Reading	
Misarticulation					
Voiced/voiceless					
Nonnasals/nasals					
Omission of sounds/words					
Metathesis					
Inversion					
Post position					
Interjections					
Drawlers					
Broken words					
Incomplete phrase					
Articulatory release on inspiration					
Articulatory fixation	ℍℍ I	ℍℍ			
Prolongation	I	I			
Hesitation	I	I			
Filled pauses					
Unfilled pauses	ℍℍ	IIII	II	I	
Paranthetical remarks			I		
False start					
Phoneme repetition	I	II			
Syllable repetition					
Part word repetition					
Word repetition					
Phrase repetition					
Total No.of dysfluencies	14	13	3	1	
Total no.of words	165	174	190	160	
% of dysfluencies.	8.48 %	7.47 %	1.57.	0.62 %	

Table 10(b): Results of the perceptual evaluation done by the 2nd Judge for Subject-4

Provisional diagnosis: Moderate severe stut—erate severe stuttering with secondaries

	Pretherapy % of dysflu-ency		1.10.90		7.10.90		Re marks
	Reading in Kannada	Spont. speech	Reading in Kannada	Spont. speech	Spont. Speech	Reading	
Misarticulation			l				
Voiced/voiceless			l				
Nonnasals/nasals							
Omission of sounds/words			— l				
Metathesis							
Inversion							
Post position							
Interjections							
Drawlers							
Broken words			l				
Incomplete phrase							
Articulatory release on inspiration	—	lll	l	lll			
Articulatory fixation	ℸℸℸℸ ℸℸℸℸ l	ℸℸℸℸ ℸℸℸℸ ll	ℸℸℸℸ ℸℸℸℸ l	ℸℸℸℸ ℸℸℸℸ ℸℸℸℸ llll	ℸℸℸℸ ll	ll	
Prolongation	ℸℸℸℸ	ll	— l	l llll	ll	l	
Hesitation	ℸℸℸℸ l	llll	l	ll			
Filled pauses	ℸℸℸℸ lll	ℸℸℸℸ l	l				
Unfilled pauses	ℸℸℸℸ llll	ℸℸℸℸ lll		l			
Paranthetical remarks	lll	l					
False start	l				l		
Phoneme repstition	llll	lll					
Syllable repetition	ll	lll	l				
Part word repetition	llll	ll	l		l		
Word repetition	lll	l		l	l	l	
Phrase repetition	l				l		
Total No.of dysfluencies	57	45	21	27	13	4	
Total no.of words	287	184	210	229	275	227	
% of dysfluencies.	19.8 %	24.43%	10 %	11.79 %	4.72	1.76 %	

Table 10(C) : Result of perceptual evaluation done by the third judge for subject-4

Judges	Types of dysfluencies	Pretherapy % of dysfluency		% of dysfluency after 5 sessions		After 22 session of therapy	
		Spont. speech	Reading in Kannada	Reading in Kannada	Spont. speech	Spont. speech	Reading in Kannada
Judge-1	Repetitions	Not available	Not available	1.91	2.79	1.26	3.10
	Hesitation			1.91	1.43	0.84	0
	Articulatory fixation			1.27	3.49	0.42	0.62
	Prolongation			0.63	0.69	0	0
	Unfilled pauses			0.63	0	0.42	0
	Articulatory release on inspiration			0	1.43	0.42	0
	Parenthetical remarks			0	0.69	0	0
	False start			0	0	0.42	0.62
	Filled pauses			0	0	0	0
	Total % of dysfluency			6.36	10.48	3.79	4.34
Judge-2	Articulatory fixation	"	"	3.63	2.87	0	0
	Unfilled pauses			3.05	2.29	1.05	0.62
	Repetition			0.60	1.14	0	0
	Prolongation			0.60	0.54	0	0
	Hesitation			0.60	0.54	0	0
	Parenthetical remarks			0	0	0.52	0
	Total % of dysfluency			8.48	7.47	1.57	0.62
Judge-3	Articulatory fixation	6.52	3.83	5.23	8.29	2.54	0.88
	Repetitions	4.83	4.87	0.95	0.43	1.09	0.44
	Articulatory release on inspiration	1.63	0	0.47	1.31	0	0
	Hesitation	2.17	2.09	0.47	0.87	0	0
	Prolongation	1.08	1.74	0.47	0.43	0.75	0.44
	Filled pauses	3.26	2.78	0.47	0	0	0
	Unfilled pauses	4.34	3.13	0	0.43	0	0
	Misarticulation	0	0	0.47	0	0	0
	Voiced/voiceless	0	0	0.47	0	0	0
	Omission of sounds/words	0	0	0.47	0	0	0
	Broken words	0	0	0.47	0	0	0
	False start	0	0.34	0	0	0.37	0
	Parenthetical remarks	0.54	1.04	0	0	0	0
	Total % of dysfluency	24.43	19.8	10.0	11.79	4.72	1.76
J1, J2 & J3	Metathesis; Inversion; post-position; Interjection; Drawlers; Incomplete phrase	0	0	0	0	0	0

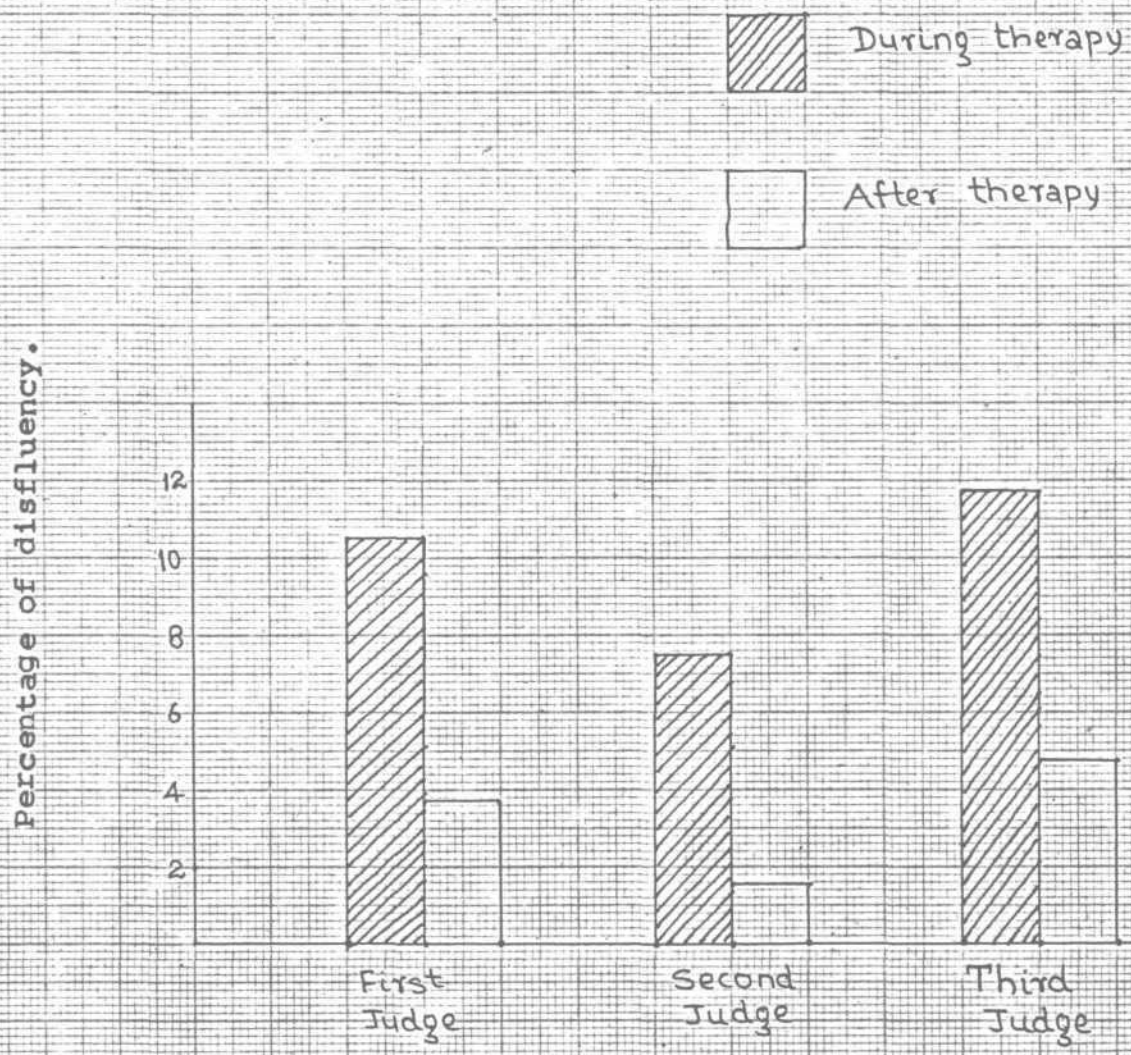Table-11: Results of perceptual evaluation (Subject-4)

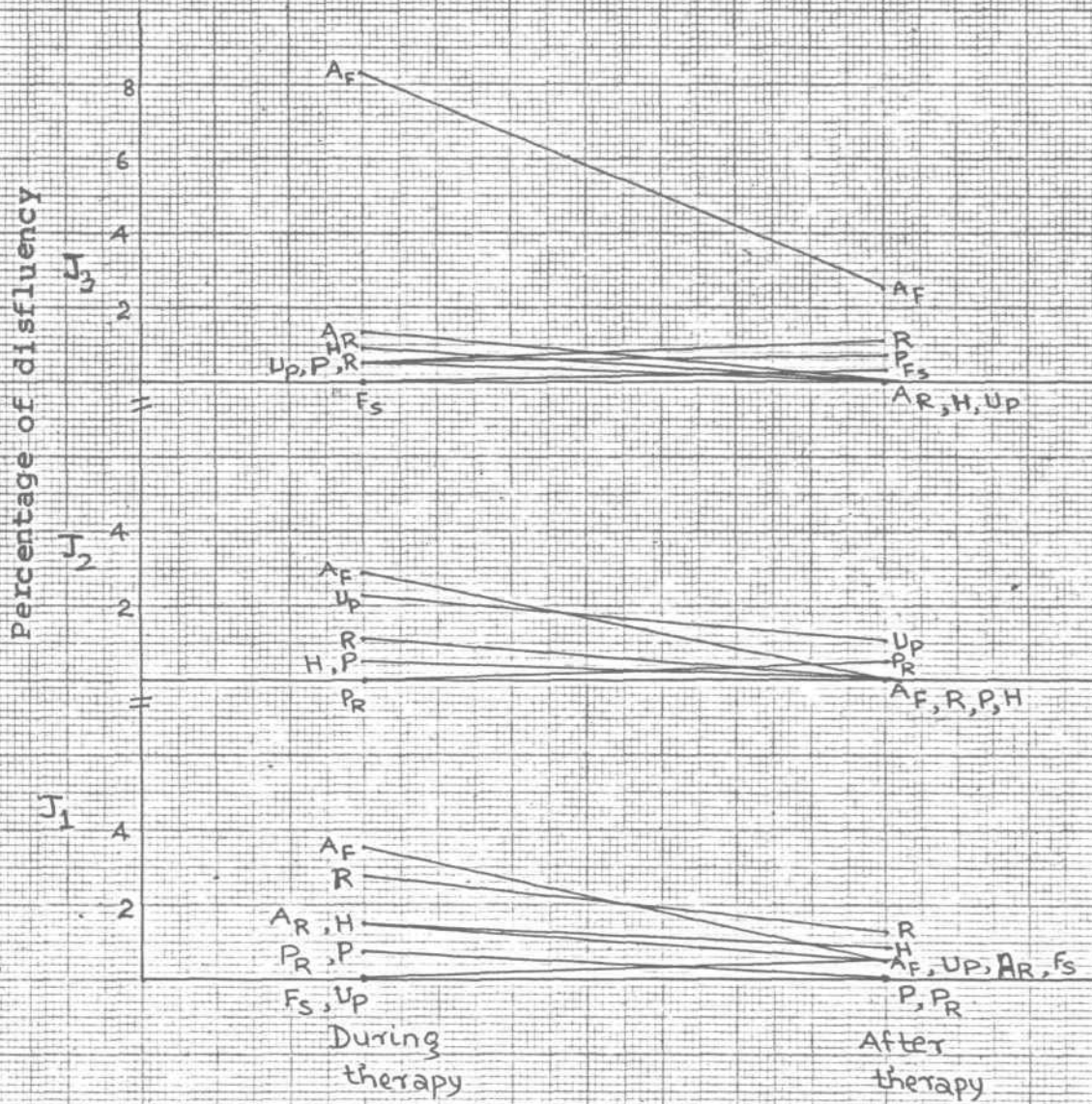Fig 7 Total percentage of dysfluency in spontaneous speech during and after therapy (Subject-4)

Fig. 8: Percentage of different dysfluencies in spontaneous
         speech before and after therapy (Subject-4)

evaluation, it was observed that the total percentage
of dysfluency varied between 1.57% to 4.72%. The
subject's speech was characterized by a high percentage
of articulatory fixation and repetition followed by
hesitation, unfilled pauses, prolongation and false
start. Figure-8 shows different types of dysfluencies
present during and after therapy. Table-11 depicts
the percentage of dysfluency in all the sessions as
evaluated by all the judges.

To summarize, the percentage of dysfluency signi-
ficantly decreased after therapy and a high correla-
tion was observed between the evaluation of judges.
The dysfluencies which were controlled first were
prolongation, hesitation, articulatory release on
inspiration. However, repetitions and articulatory
fixations persisted.

<u>Discussion:</u>

The results of the present study suggest that the methods used in the study were effective and significant fluency was achieved after a few sessions of therapy in all the cases.

These findings correlate with the findings of different studies by Curlee and Perkins (1969, 1973); Andrew and Ingham (1970, 1973), Andrews and Craig (1982); Andrews et al. (1983); Azrin and Nunn (1974); Schwartz (1976); and Lee (1976); Azrin, Nunn and Frantz (1979) in that they also have reported improvement in the fluency after using prolongation and airflow therapies.

In general, the dysfluencies noticed in these four subjects were repetitions, articulatory fixations, voiced/voiceless, unfilled pauses, filled pauses, prolongation, hesitation, parenthetical remarks, interjections, articulatory release on inspiration, broken words, false start and omission of sounds/words. It seems that during the therapy* filled pauses were the first to be eliminated and articulatory release on inspiration,

omission of sounds/words, prolongation, hesitations, inter-
jections, broken words, false start and articulatory fixa-
tion were the next followed by repetitions. According to
the perceptual evaluation it seems that articulatory fixa-
tion and repetition persists inspite of therapy while other
types of dysfluencies were not observed. Table-12 repre-
sents a comparison between the dysfluencies of subjects
between and after therapy.

The features predominantly persisting after therapy
were repetitions and articulatory fixations. According
to Van Riper (1982) repetitions in stuttering usually
involve a single consonant or consonant cluster and only
occasionally a syllable or monosyllabic words. Van Riper
defined stuttering as a disruption of the simultaneous
and successive programing of muscular movements required
to produce a speech sound or its link to the next sound
in a word. The primary difficulty lies in the programing
of sequence and timing.

MacKay and MacDonald (1985) in their metatheory
on stuttering as a sequencing and timing disorder opine
that the 'nodes (neural) once activated have a tendency
to be reactivated resulting in repetition. They explain

	S$_1$		S$_2$		S$_3$		S$_4$	
	pretherapy dysfluency	post thera-py dis fluency	Pre-therapy	post the-rapy	Pre therapy	post the-rapy	During therapy	After the-rapy
Fea-tures	Articulatory fixation Repetition Articulatory release on inspiration Prolongation Hesitation Filled pause Unfilled pause False start Parenthetical remarks Drawler.	Articulary Repetition	Articulatory fixation Repetition Unfilled pause Filled pause Hesitation Prolongation Interjection False start Parenthetical remarks.	Nil	Repetitions Articulation fixation Filled pause Hesitation Interjection Articulatory release on inspiration Voiced/voice less Prolongation Parenthetical remarks Drawler Broken words False start	Repetition	Articulatory fixation Repetition Unfilled pause Filled pause Hesitation Articulatory release on inspiration Prolongation Omission Parenthetical remarks Voiced/voice less.	Articulatory fixation Repeti-tion

Table-12: Dysfluencies before and after therapy.

that "the nodes of stutterers may manifest as abnormal
priming and recovery cycle. Priming summates abnormally
slowly in stutterers and rebounds abnormally sharply
following self inhibition. As a consequence, a just
activated sequence node would have a high probability
of being the most primed node in its domain, so that it
becomes reactivated with the next pulse from the timing
node. The result is, of course, a repetition such as
'p-practice' and the nodes can undergo this cycle again
resulting in a third 'P'. However, the cycle cannot
go on indefinitely, because reactivated nodes become
fatigued and cannot rise to such high levels of priming
on rebound from inhibition. Consequently they no longer
achieve more priming than the next-to-be-activated node.
Another reason why repetitions eventually stop is that
priming for the next-to-be-activated nodes continues to
summate during the time that malfunctioning nodes are
to be reactivated. Thus, the longer the period of
stuttering, the more likely that the correct node will
be activated with the next pulse from the triggering
mechanism. Major disfluencies occur under this account
when several modes malfunctions as a group" (MacKay and
MacDonald, 1985).

Further, the physiological block, or the articulatory fixation, is the most severe problem of stuttering. As Van Riper (1982) pointed out, blocks can be viewed as a special type of prolongation, where one or more articulators (the velum, lips or glottis) are "locked" in an obstructed position, virtually prohibiting airflow and preventing speech. Zimmerman while trying to identify the physiological conditions that are associated with the breakdown in fluent speech and conditions among diagnosed stutterers which make them more susceptable to breakdowns in speech fluency opined that a model of behaviour breakdown and explanation for the diagnosis of stuttering should emerge from an account of regularities and deviations from regularity of speech production system and from an account of the perceptual consequences of those deviations. His study, which focussed on parameter such as velocity, displacement, duration of movement and the coordination of timing between articulated event and the perceptually fluent events reveals difference in the movement patterns in perceptually fluent utterances of stutterers and non-stutterers (Zimmerman, 1980a). He suggests that lower velocities and displacements and longer durations in the movements of stutterers are associated

with process that keeps activation of brainstem pathways below 'threshold' level during perceptually fluent speech. The aberrant position of articulators preceding oscilla- tory or tonic activity of the articulator (Zimmerman, 1980b) indicate that the period before speech may be a time in which aberrant inputs are likely to occur in stutterers.

Considering these observations and suggestions, it appears that repetitions and articulatory fixations are the most severe problems in a stutterers. This involving a higher centre, one can presume that -

1) The methods used in this study were not efficient in excluding these features, or

2) As suggested in the literature, if these therapy methods are establishing a new memory for fluent utterances in the nervous system of the stutterers, it was not yet established in these cases studied.

However, as significant reduction in repetition and articulatory fixations were noticed, continuation of therapy would provide better results.

Thus the fluency achieved after therapy suggests that these individualized therapy techniques based on stuttering

features were effective. To quote Cooper and Allen (1977) and Zimmerman (1985) "The temporal coordination of voice, respiration and articulation is apparently disrupted during fluent as well as nonfluent utterances of stutterers" and "A model of behaviour breakdown and explanation for the diagnosis of stuttering should emerge from an account of the regularities and deviations from the speech production system and from and account of the perceptual consequences of these deviations".

An attempt in this direction is made in the present study and the results are encouraging. However, it is suggested that the diagnosis in future could include the diviations in the speech production system which should be possible by laryngography and spectrography.

This would be justified at the moment as no access to the higher centres are possible. However, the efficacy of the new therapy techniques suggested in this study which are based on the deviations in the speech production system needs to be tested on stutterers who show these symptoms and also long term effect of this has to be established.

SUMMARY AND CONCLUSIONS

It is well known fact that stuttering is a disorder of several theories. As such it is a disorder of several therapies also. For a very long time stuttering treatment has come into picture. In recent times, the researcher have more insight into it and several therapy techniques have been developed. In earlier times, a single therapy technique for stuttering was used based on a rationale. In the present state of art, more knowledge has been gained about the stuttering phenomenon. Hence there is a new way of considering stuttering as a disorder involving many systems underlying speech production. Disruption in any or many of these would result in speech characteristics termed as stuttering. Several therapy packages have been used till date to overcome stuttering. The present study was aimed at using different therapy techniques in combination which are suitable and appropriate for the different types of dysfluencies exhibited by the stutter. Therefore evaluation of different types of dysfluencies and selection of the appropriate technique for these dysfluencies and their usefulness were the major aims of the present study.

Four stutters varying in degree of severity from mild to severe formed the subjects of the study. Among the four

only one had mild stuttering and the others had severe stuttering. Twenty-five features were considered for evaluations which were grouped under features reflecting miscoordination of the articulatory system, laryngeal system and respiratory system. Further the features were grouped under rhythm and secondaries observed. Their speech and reading samples were audio-recorded before, during and after therapy. Different reading samples were used to avoid adaptation. The percent of occurrance of each dysfluency before therapy were computed and depending on the percentage of dysfluency, whichever feature had highest percentage was treated first by using an appropriate type of therapy technique. The different therapy techniques used in this study were (1) airflow technique; (2) airflow exercises (3) soft contacts (4) exercise for articulatory coordinations (5) exercise for laryngeal coordination and (6) generalization.

(1) Airflow technique - in this technique, initially the patient was trained to say /h/ sonorously and then the word with initial syllable prolongation. After the subject had acquired this, /h/ was made silent. This technique was used especially in those subjects who exhibited repetitions of initial syllables. By this technique the subjects were taught to maintain a smooth   airflow.

(2) Airflow exercise - This technique was used in those subjects who exhibited a sudden inspiratory air intake especially in plosive release which suggests that the air pressure behind the articulator is inadequate to release the highly tensed articulators. For this, initially the subject was trained to take a deep breath and expire gently through the oral cavity. Once this was achieved, the subject was asked to prolong vowels on expiration and later this was generalized to speech.

(3) soft contact - In this technique the subject(s) was/ were trained to articulate the sounds using less pressure than he uses during stuttering itself. The subject(s) was/ were asked to move the articulators with minimum (or no ten- sion) in the lips, tongue and vocal folds. This technique was used when the patient showed hard contacts.

(4) Exercise for articulatory coordination - This exercise was given when the subject showed miscoordination in the articulatory system,- nasals for non nasals, non- nasals for nasals or prolonged nasals, especially for the velopharyngeal port, a voluntary control of the velopharyngeal port movements were tried with. In this technique initially the subject(s) was/were taught to feel the nasal air escape for nasal continuants like /m/ and /n/; and the oral escape

for oral sounds like /a/ and /i/. When they were able to differentiate this nasal and oral sounds by airflow they were taught to alternate /m/ and /a/ or /i/. By this a voluntary control on velopharyngeal port movement was achieved which was further transferred to other speech sounds in speaking as well as in reading.

(5) Exercise for laryngeal coordination - This exercise was given when miscoordination of laryngeal system was indicated by the use of voicing for voiceless or voiceless/voiced. To correct this miscoordination the subject(s) was/were made to feel tactually the vibration of the vocal folds during the prolongation of vowels. After that they were taught to feel the absence of vibration of vocal folds during the production of unvoiced sound such as /s/. Later on the subject(s) was/were trained to utter /a/ and /s/ alternately ie. alternating the movements of the vocal folds from vibratory position to the open position. In this way subjects could acquire voluntary control over the glottal gestures which was later transferred to speak and reading.

(6) Generalization - When the subject's speech became fluent in the clinical situation, he was introduced to strangers one at a time and he was engaged in a dialogue. After that he was exposed to a group of individuals and deliver speech in front of them.

All the audio-recorded speech samples were given to three judges for their perceptual evaluation. The judges were provided with the measurement criteria and after the perceptual evaluation, Spearman's rank correlation test was administered which showed a very high degree of correlation between the judges and Walsh test was used to find out the significant difference before and after therapy. On perceptually analyzing the speech samples of the cases, it was observed that there was a drastic reduction in the percentage of dysfluency in post therapy speech sample in reading as well as in spontaneous speech. Some of the judges reported of 0% dysfluency in two subjects (after therapy). Also, if any dysfluencies were persisting they were repetitions and articulatory fixations.

The results of the present study are encouraging and they suggest that therapy programmes utilizing specific feature elimination might serve as a useful approach. However, in this study only four stutterers were considered and it would be essential to try these individualized therapy techniques with many more stutterers to come to a conclusion. Also, the long term effect of these kinds of programs are to be evaluated.

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हमारा राष्ट्र-ध्वज

हर एक राष्ट्र का अपना एक ध्वज होता है, जो उस राष्ट्र के जीवन का संकेत है। राष्ट्र की जनता उसे देखकर फूली नहीं समाती। समय पड़ने पर अपने राष्ट्र-ध्वज की रक्षा के लिए जनता अपना सब कुछ बलिदान करने को तैयार होती है। अपने प्राण जोखिम में डालकर भी उसकी रक्षा करती है। राष्ट्र-ध्वज कपड़े का एक टुकड़ा मात्र नहीं, बल्कि बहुत ही मुल्यवान वस्तु है जिसके मूल्य का कोई अंदाजा नहीं लगाया जा सकता। कोई भी मूल्यवान वस्तु उसकी बराबरी नहीं कर सकती।

राष्ट्र-ध्वज राष्ट्र की स्वतंत्रता तथा गौरव का प्रतीक है। गौरव केवल ध्वज के कपड़े के प्रति नहीं, बल्कि उसमें छिपी राष्ट्रीय भावनाओं तथा सिद्धान्तों के प्रति है। इसलिए हम उसे श्रद्धा की दृष्टि से देखते हैं, नतमस्तक होकर उसकी वंदना करते हैं; और भक्ति-भाव से उसकी महिमा का गुणगान करते हैं।

सदियों से हमारे देश पर अंग्रेजों का अधिकार था। देश को स्वतंत्र बनाने के लिए हमारे राष्ट्र-पिता महात्मा गांधीजी अहिंसा-त्मक आन्दोलन छेड़ा। इसके फलस्वरूप हमारा देश पन्द्रह अगस्त उन्नीस सौ सैंतालीस को स्वतंत्र हुआ। उस समय राष्ट्र-नायकों ने मिलकर स्वतंत्र भारत के लिए जो ध्वज बनाया, वही हमारा राष्ट्र-ध्वज है। इसी की छाया में हम एकत्र होकर फल-फूल रहे हैं।

हमारा राष्ट्र-ध्वज तीन रंगों का बना है। हर रंग का अपना महत्व है। ध्वज में सबसे ऊपर केसरिया रंग है, बीच में श्वेत और नीचे हरा रंग। केसरिया रंग धर्म और त्याग का प्रतीक है। श्वेत सत्य और शान्ति का द्योतक है और हरा रंग हमारी श्रद्धा और शक्ति का संकेत है। बीच में शोभायमान अशोक-चक्र धर्म-चक्र कहलाता है जो संसार को अहिंसा का संदेश सुनाता है।

राष्ट्रीय त्योहारों के अवसर पर स्कूलों, कॉलेजों और कार्यालयों पर राष्ट्र-ध्वज फहराया जाता है। विद्यार्थी अपने-अपने स्कूल-कॉलेज के प्रांगण में एकत्र होकर ध्वज की वन्दना करते हैं, राष्ट्र-गीत गाते हैं और बड़ी धूमधाम से उत्सव मनाते हैं। साथ ही मनाये जानेवाले राष्ट्रीय त्योहार के महत्व पर व्याख्यान देते हैं।

राष्ट्रपति-भवन, संसद-भवन, राज-भवनों, विधान-सभाओं तथा सचिवालयों पर राष्ट्र-ध्वज सदा फहराया रहता है। राष्ट्र-नायकों के निधन पर शोकसूचना के लिए राष्ट्र-ध्वज का अर्धावरोहण होता है। उस समय देश भर में शोक मनाया जाता है।

राष्ट्र-ध्वज की अवहेलना नहीं की जा सकती और नाहि उसके प्रति कभी अगौरव दिखाया जा सकता। इसकी अवहेलना या इसके प्रति अगौरव राष्ट्रीय अपराध माना जाता है और ऐसे अपराधी को कड़ी सजा दी जाती है।

हमारा राष्ट्र-ध्वज सदा शान से फहराता रहे और विश्व को अहिंसा, शान्ति, सहयोग और विश्व-बन्धुत्व का संदेश देता रहे।

"विजयी विश्व तिरंगा प्यारा
झंडा ऊँचा रहे हमारा॥"

ಮೃಗರಾಜ

ನಿಮ್ಮಲ್ಲ ಬಹಳ ಮಂದಿ ಪ್ರಾಣಿಪ್ರಿಯ, ಪ್ರೇಮಿಗಳಿರಿ. ಇವರ
ಚಿತ್ರಪಟಗಳನ್ನು, ಮೃಗಾಲಯಗಳನ್ನು ಮತ್ತು ನಿಮಿಷಗಳನ್ನು ಸ್ಪ್ರೀಟಿಸಿ ಬರುವ,
ಅಸ್ಟೇ.

ನಿಮ್ಮಲ್ಲ ಸಂಭ್ರಮವಾದ ನಡಿಗೆಯಲ್ಲ, ಶ್ರೀ. ಇದು ತನ್ನ ಮುತ್ತ ಮುತ್ತಿನ
ಪ್ರೀತಿಗಳ ಎದ ಕೆಯ್ದೃಸಿ ಸಂತ ಕಿಜಿನೆ ಎಣುಸ್ತದೆ. ಇದು ಮೃಗಗಳಜವಂತ
ಬಜ್ಜಿಗೆ ಮಾತ್ರಣಾಗಿ. ಮ್ಯಾಂಸ್ಣಾಂ ಪ್ರಾಣಿಗಳಾದ ಚೆಕ್ತಂ, ಸೂ ಮುಂಗಿಷ
-ಪ್ರಗಳ ಜಾತಿ ಇದು ಸ್ಪ್ರಿದ್ದು.

ಹಿಂದೆ ಕೈ‍ದು ಪ್ರಳ‍ಣಾಗಿ. ಇವರ ಹ‍ಯಾಯಿಗೆ ವಿಕ್ತಿ ಪ್ರಾಣೆಗಳು
ಬ್ಬ‍ವಿಷಾಂದುಬಂಡ ಒಬ್ಜಹುತ್ತಿರುಸ್ಗೆ, ತನ್ನ ಕಳ್ಳುಗಳಿಂದ ಬಲ‍ಣಗ ಈ‍ಸಿಂಯುತ್ತದೆ.
ಐವರ ಪ್ರ‍ಿಂತಿಂಯಂದು ಶಿವಸಿಂಯ‍ಯ್ಯಂಯ‍ಂಯ‍ ಭ‍ಗ‍ರೆಸನ್ನ ಮೀಳ‍ಲು ಭ‍ಮ‍ರೆ‍ಗ‍ ‍ಣಿಸುವಂತೆ
ಮೀರ‍ಳಿಸಿದ ಶ‍ೇ‍ಲೆಯಲ್ಲ‍ಗ‍ಳ‍ು. ಇವರ ಕ‍ತ್ತಿ‍ಗ ಸುಂಬ ಉದ್ದ‍ಣಾದ ಕೇ‍ಸರಿಗಳ‍ವ;
ಭ‍ದು ಬ‍ಂ‍ದ‍ಲ‍ ಇ‍ದ‍ನ್ನ ಕೈ‍ಸ‍ನ‍ ಎ‍ದು ಕ‍ರೆ‍ಯ‍ುತ್ತಿ‍. ಹ‍ಣ್ಣ ಸಿಂಹ‍ತ್ತಿ ಈ‍
ಕೇ‍ಸ‍ರಗ‍ಳ‍ರು ‍ಷ‍ಪ‍ಷ‍. ಇ‍ವ‍ರ ‍ಳ‍ಗ‍ಿಂಯ‍ು ಉದ್ದ‍ಾಕ‍ಯ‍ಲ‍ು, ಚ‍ಳ‍ಸ‍ಿಕ‍ಂ‍ತ‍ ಆ‍ದ‍ಷ
ಇ‍ಷ್ಣ, ಭ‍ಷ‍ರ ಮ‍ು‍ಷ‍ಬ‍ಂದ‍ಸ‍‍, ಕ‍ನ್ನ‍ ಷ‍ನ್ನ‍ ಮ‍ುಕ್ತ‍ುಗ‍ಳ‍ು ‍ಕ‍ುಂಬ‍ಿ‍ೆ. ‍ಹ‍ುಷ್ಟ
ಸಿಂಹ‍ಷ‍ನ್ನ‍ು ಸುಮ‍ಗ‍ರ‍ು ಬ‍ಂ‍ಬ‍ತ್ತ‍ ‍ಈ‍ ‍ ‍ಎ‍ಷ್ಟ‍ಾಗ‍ಿ‍ ‍ತ್ತ‍ದೆ. ‍ಇ‍ವ‍ರ ‍ ‍ಥ‍ಣ‍ಸ್ಣ‍
ಸುಮ‍ಗ‍ರ‍ು ‍ ‍ ‍ ‍ಣ‍ಾಲ‍ ‍ ‍ ‍ ‍ ‍ಎ‍ಷ್ಟ‍ೆ‍ಷ್ಟ‍ ‍ ‍ತ‍ುಬ‍ಿ‍ಂ‍ಯ‍ಾ, ‍ಕ‍ುಷ್ಟ‍ಷ‍ಂ‍ತ್ತ‍ದೆ. ‍ಇ‍ಷ‍ರ
‍ಬ‍ಷ್ಟ‍ ‍ಕ‍ಂ‍ದ‍ು ‍ಮ‍ುತ್ತ‍ ‍ಮ‍ಳ‍್ಳ‍ನ‍ ‍ ‍ಎ‍ಲ‍್ಳ‍ ‍ ‍ಮ‍ೃ‍ಗ‍ಾ‍ದ‍ು‍ಗ‍ು.

‍ಥ‍ನ‍ ‍ಮ‍ುಂ‍ದ‍ಣ‍ ‍ ‍ಪ್ರ‍ಾ‍ಣೆ‍ಗ‍ಳ‍ನ‍್ನ‍ ‍ಇ‍ದ‍ು ‍ಲ‍ಿಂ‍ದ‍ಿ‍ಸ‍ು‍ಪ‍ದ‍ಣ‍ಾ‍ಗ‍ಿ ‍ಸ‍ಿಂ‍ಹ‍ಪ‍ಿ‍ದ‍ು,
‍ಬ‍ಗ‍ಲ‍ಣ‍ಾ‍ಗ‍ದ‍ ‍ಮ‍ುಷ‍ು‍ಬ‍ಿ‍ರ‍ು‍ವ‍ದ‍ರಿಂ‍ಡ ‍ ‍ಮ‍ುಷ‍್ಬ‍ಿ‍ನ‍್ನ‍ಯ‍ಂ‍ಯ‍ು. ‍ಕ‍ಂ‍ದ‍ರ‍ಲ‍ೂ ‍ ‍ಸ‍ೊ‍ಷ್ಟ
‍ಷ‍್ಣ‍ಸ‍ಂ‍ಯ‍ಲ‍್ಳ‍ದ‍ಿ‍ರ‍ದ‍ ‍ ‍ಕ‍ಂ‍ಡ‍ೇ‍ರ‍ಷ‍ ‍ಎ‍ದ‍ು, ‍ ‍ಮ‍ೃ‍ಗ‍ಗ‍ಳ‍ಿ‍ಗೆ ‍ ‍ಣ‍ಜ‍ವ‍ಾ‍ದ‍ ‍ ‍ದ‍ಂ‍ತ
‍ಮ‍ೃ‍ಗ‍ಗ‍ಳ‍ಜ‍ಂ‍ಯ‍ು ‍ ‍ಇ‍ದ‍ನ‍್ನ‍ ‍ಕ‍ರೆ‍ಯ‍ುವ‍ು.

. . . . .

ಪ್ರಾಚೀನಕಾಲದನ್ನು ವಿಂಚುಗಳು ವಿಶ್ವದಾದ್ಯಂತ ಇವೆ ... ...

ವಿಂಚು ... ...

ವಿಂಚು ... ...

ನೋವಾಗದ ... ...

ವ್ಯವಸಾಯವನ್ನೂ, ಇತರ ಜೀವಿಗಳು ಸಾಮಾನ್ಯವಾಗಿ ಮುಚ್ಚುಮರು
ವಸ್ತುಗಳು ಹಲ ಬಂದಿರುತ್ತವೆ. ಕೆಲವು ಸಂಕಗಳು ಇಷ್ಟಕ್ಕೆ ಈ
ವಿರುಗಳು ಹೊಂದಿದ ಗುಣಗಳೂ ಇವೆ. ಇವ್ವ ಜೀಯಲ್ಲಿರುವ
ವಸ್ತುವೆಂದು ಇಲ್ಲ ಮರಿ ಕಾರಣ. ಗೀತೆ ಅಡಿಸೂ, ಸ್ವತಂತ್ರವಾಗಿ
ಜೀವಿವ ವೀಚಿಗಳು ಇತರ ವಸ್ತುಗಳನ್ನೆಲ್ಲ ಮರಿ
ಆಗುತ್ತವೆಂಬ ಸಂಗ ಜೀವಿಗೆ ಬಂದಿದೆ. ಹೆಸ್ಸ ಪೀಚುಪ್ಪ
ಗಿಷ್ಕ ಸ್ಥಳಿಸೆ ಸುಪಾರು ಮಗುವಿ ಇಂಗಳಿ ಇಸ್ತ
ಹೆಸುತ್ತವೆ. ಒಂದು ನಲ್ಲೆ ಇಂದಲಿ ವಾಲ್ ಮಂಗಳು
ಜೀವಸುತ್ತವೆ. ಮುಚ್ಚಿಗೆ ಈ ಮಂಗಳ ವೃಚಿಲ ಚರಿತೆ
— ಗೀತಾರುವಂತೆ ಮಂಚೆಗಳಾಗುತ್ತವೆ. ಒಂದು ವಸ್ತುವಿ
ಸಂಕಟ ಈ ಮಚ್ಚೆಗಳು ಎಳಯಾ ಆಗುತ್ತವೆ. ಮುಚ್ಚುವಸಿ
ಮಂಗಳು ಕಣ್ಣ ಮುಚ್ಚಿರುತ್ತವೆ. ಇಂದು ಎಡಿ ಸಂಕಟ
ಹೆಚ್ಚ ಕಣ್ಣ ಜೀಯುತ್ತವೆ. ಮುಚ್ಚಿ ಇಂದು ವಸ್ತುವವಿಸೆ
ಹೆಚ್ಚ ಪ್ರಾಂತಿಹಾರಿಗಳಾಗುವ ಸಸ್ಕಹಾರಗ್ಳಾಗುತ್ತವೆ.
ಗಂಟು ಮಂಗೆ ಮಾಡು ವಸ್ತುಗಳು ಹೊಂಡ ಕಷ್ಟ ಸುತ್ತ
ಗೆಚಿರಗಳು ಜೀಲಂಲಂಗಿ ಮುತ್ತವೆ.

    ನಿಂದುಪ್ಪ ವಿಷ್ಟ ಹ್ಞಿರಪ್ಪುಭಾವವನ್ನೂ ಹಂಬುರುತ್ತೆಡಿಮೀ
ಹಿಷ್ಟೆ ಬಿನಯ ಗುಣವಸ್ಸೂ ಹೊಂದಿರುತ್ತಿ. ಇಎನ್ನು
ಪಿಲಭಸ್ವಾಗ ಬೆಲಗಿಸುಮ್ರುಟು.