CHAPTER III
THE PRESENT STUDY
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The main objective of the present study was to evaluate the combined effect of EMG feedback assisted relaxation and SIT as a therapeutic strategy in the management of anxiety neurosis.

PROBLEMS TO BE INVESTIGATED:
1. To find out the effect of EMG feedback assisted relaxation in anxiety neurotics on the psychological and physiological measures.
2. To find out the additive effect of SIT with EMG feedback assisted relaxation in anxiety neurotics on the psychological and physiological measures.

The subsidiary objective of the present study was to find out the relationship of certain sociodemographic parameters and some of the clinical characteristics of the clients with therapeutic outcome.

EXPERIMENTAL DESIGN:

The design selected was the single group outcome study with multiple assessments. The combined effect of EMG feedback assisted relaxation and SIT was evaluated as a therapeutic programme in a sample of clients with anxiety neurosis. The assessment done prior to the therapeutic intervention (pre-therapy assessment) was repeated after the
initial 10 therapy sessions (mid-therapy assessment) and after the subsequent 10 therapy sessions (post-therapy assessment). It was repeated on follow-up a month after termination of therapy (First follow-up assessment).

The experimental design is illustrated in the flow chart (Fig.3).

Previous research work done in this area shows that there is only minimal change in frontalis muscle tension after 10 sessions of EMG feedback assisted relaxation (Lavellee et al. 1977; Sargunaraj, 1988). Hence if there is evidence of significant change after the mid-therapy assessment, it should be attributed to the additive effect of SIT with EMG feedback assisted relaxation.

METHOD:

SAMPLE:

A sample of 22 clients was studied. The clients for the study were selected from those referred to the Behaviour Therapy and Biofeedback Unit, National Institute of Mental Health and Neuro Sciences (NIMHANS), from the Psychiatry Out-Patient Centre of NIMHANS.

The criteria for inclusion were as follows:

1. A diagnosis of anxiety state (300.0), i.e., various combinations of physical and mental manifestations of anxiety not attributable to real danger and occurring either in attacks or as a persisting state. The anxiety
**FIG. 3 EXPERIMENTAL DESIGN**

INTAKE INTERVIEW

SUITABLE

NO

YES

PRE-THERAPY ASSESSMENT

ADMINISTRATION OF TOOLS 2-9

EMG FEEDBACK ASSISTED RELAXATION

PHASE I THERAPY

10 SESSIONS OVER 10 DAYS

MID-THERAPY ASSESSMENT

ADMINISTRATION OF TOOLS 2-10

EMG FEEDBACK ASSISTED RELAXATION - SIT

PHASE II THERAPY

10 SESSIONS OVER 20 DAYS

POST-THERAPY ASSESSMENT

RE-ADMINISTRATION OF TOOLS 2-10

FIRST FOLLOW-UP ASSESSMENT

AFTER 1 MONTH OF TERMINATION OF THERAPY

RE-ADMINISTRATION OF TOOLS 2-9
is usually diffuse and may extend to panic. Other neurotic features such as obsessional or hysterical symptoms may be present but do not dominate the clinical picture (ICD-9) (WHO, 1978).

2. Literacy in either English, Kannada or Tamil languages.
3. Age between 20 and 45 years.

The exclusion criteria were as follows:
1. Presence of an additional psychiatric diagnosis.
2. Presence of any medical illness.
3. Presence of anxiety symptoms during marked physical exertion or life threatening situations.
4. Duration of anxiety neurosis of more than 10 years.

TOOLS:
1. Personal Data Sheet (PDS) (Appendix A): This data sheet (Sargunaraj, 1988) was used to obtain information during the initial interview regarding the sociodemographic parameters and clinical characteristics of the clients.

2. Symptom Rating Scale (SRS) (Appendix B): The Symptom Rating Scale (Sargunaraj, 1988) was used to obtain quantitative ratings of anxiety symptoms. This was derived from the Patient Record Form (Lader and Wing, 1966). The client is asked to describe in his own words all the symptoms that have troubled him and these are listed along the left hand column. Beside each symptom description, there is a 100
millimeter line whose left anchor point is labelled as 'absent', the middle point as 'moderate' and the extreme right as 'very severe'. The client indicates how much each symptom has troubled him over the preceding 10 days by making a cross somewhere along this line. The distance is measured to the nearest millimeter and the score for each symptom totalled to give an overall rating of the severity of the listed symptoms.


The 14 items in this questionnaire are randomly ordered into cognitive and somatic subscales. The client is asked to rate each item on a 5 point scale from 'not at all' to 'very much so' as to the degree to which he generally or typically experiences the symptoms when he feels anxious. Emphasis is given to the preceding 10 days. The sum of the ratings on each subscale provides a measure of cognitive and somatic anxiety. The CSAQ provides a useful measure of these two anxiety components (Steptoe and Kearsley, 1990).

The questionnaire has adequate reliability as the cronbach alpha coefficient is 0.85 for the cognitive and 0.81 for the somatic subscales (Delmonte and Ryan, 1983).

Schwartz et al. (1978) report preliminary data on validity, that the correlation coefficients obtained between the CSAQ and the State Trait Anxiety Inventory (Spielberger,
Gorsuch, Lushene, Vagg and Jacobs, 1983) are 0.67 (cognitive) and 0.40 (somatic). The correlation between the cognitive and somatic subscales of the CSAQ is 0.42. Though scores on the questionnaire can be influenced by the gender of the subject (Edwards, Zeichner and Greene, 1984), it has been found to have adequate discriminant and convergent validity (Tamarin, Carney and Allen, 1985), as well as construct and concurrent validity (Degood and Tait, 1987).

The Kannada and Tamil versions of the CSAQ (Sargunaraj, 1988) (Appendix D and Appendix E) were also used. Sargunaraj and Kumaraiah (1991b) report that the vernacular translations are reliable measures of anxiety.

4. State Trait Anxiety Inventory (STAI-Form Y1) (Spielberger et al. 1983) (Appendix F):

The measure of state anxiety consists of 20 statements that evaluate how respondents feel 'right now', or 'at the moment'. Clients responding to this scale circle the number of the data sheet to the right of each item statement that best describes the intensity of their feelings, either (1) not at all, (2) somewhat, (3) moderately so, or (4) very much so.

Each item has a weighted score of 1-4. A rating of 4 indicates the presence of a high level of anxiety for 10 of the items and the absence of anxiety for the remaining 10
Items. The scoring weights for the anxiety present items are 1, 2, 3 and 4 and the scoring weights for the anxiety absent items are reversed, i.e., responses marked as 1, 2, 3 and 4 are scored as 4, 3, 2 and 1 respectively. To obtain total scores, the weighted scores for each of the 20 items is added. The total score can range from 20 to a maximum of 80. Failure to respond to some items, necessitates the calculation of a prorated full scale score. To obtain this, a mean weighted score for the items responded to is calculated, the value multiplied by 20 and the resulting answer rounded off to the next highest whole number.

The normative data reported for a sample of clients with anxiety reaction is 49.02 ± 11.62. The overall median alpha coefficient is 0.92. The scale has adequate concurrent, convergent, divergent and construct validity.

The Kannada and Tamil versions of STAI-Form Y1 (Sargunaraj, 1988) (Appendix G and Appendix H) were also used. Sargunaraj et al. (1991b) reported that the vernacular translations are reliable measures of anxiety.

5. State Trait Anxiety Inventory (STAI-Form Y2) (Spielberger et al. 1983) (Appendix I):

The trait anxiety scale consists of 20 statements that assess how respondents generally feel. In responding to the items, clients rate the frequency of their feelings of anxiety on the following 4 point scale: (1) almost never,
(2) sometimes, (3) often, (4) almost always. Emphasis is given to the preceding 10 days.

The scoring procedure is similar to that used for STAI-Form Y1.

The normative data reported for a sample of clients with anxiety reaction is 48.08 ± 10.65. The overall median alpha coefficient is 0.90. The scale has adequate concurrent, convergent, divergent and construct validity.

The Kannada and Tamil versions of STAI-Form Y2 (Sargunaraj, 1988) (Appendix J and Appendix K) were also used. Sargunaraj et al. (1991b) reported that the vernacular translations are reliable measures of anxiety.


It consists of 13 variables each defined in a series of brief statements. The therapist's ratings are based on the clients' report of the presence/absence and the severity of the symptoms defining a particular variable. Emphasis is given to the preceding 10 days.

The rating is done on a 5 point scale (0-4)-none, mild, moderate, severe and very severe/grossly disabling. A sum of the ratings on all the 13 variables provides the anxiety score.

The feedback dermograph was used to measure the Galvanic Skin Reflex (GSR) or skin conductance, i.e., skin conductance level and skin conductance response in micromhos. Since the discovery of the GSR in the late nineteenth century, the electrical properties of the skin have been studied extensively as indices of human psychophysiological processes.

GSR or skin conductance is defined as the electrical conductivity of the skin with respect to a constant voltage applied to its surface.

Skin conductance level denotes the absolute level of electrical conductance detected across a given area of the skin and skin conductance response refers to momentary, relatively rapid fluctuations in skin conductance level as a result of situational psychophysiological responses to discrete stimuli.

The autogen 3400 consists of a main unit and 3 finger electrodes with velcrobands-2 active electrodes and 1 ground electrode.


The feedback myograph was used to obtain electrical activity which accompanied frontalis muscle action, i.e.,
the frontalis EMG in microvolts. Since muscular tension is proportional to the degree of electrical discharge stimulating the muscles, the EMG is a direct physiological index of muscular contraction or relaxation (the lower the microvolt level of EMG activity, the more relaxed the monitored muscle).

The autogen 1700 consists of a main unit, 3 silver chloride electrodes embedded in plastic insulator discs and a high efficiency external speaker. The electrode discs are colour coded with the yellow and red discs identifying the active electrodes and the dark blue disc identifying the ground electrode.


It is designed to obtain a profile of a client's reactivity to a cognitive stressor—whether the client can relax on his own given the opportunity to do so, during the relaxation phase; whether any bodily system (GSR and/or EMG) is hyperactive during the stress phase, and whether the systems return to relaxed baseline levels during the recovery phase.

Guck, Kreuch and Franzen (1985) reported adequate test-retest reliability on the physiological stress procedure, for the variable of muscle tension.
10. Mid-,Post-Therapy Clinical Interview (Appendix N):

It was prepared by the therapist to evaluate the clients' perception of change in therapy soon after the first phase and soon after the completion of the second phase of therapy.

It has sections for recording the clients' report of the percentage and nature of improvement, the percentage and nature of remaining problems, the attribution for the perceived improvement, the strategies adopted to reduce frontalis muscle tension during the sessions of the first phase of therapy, and the strategies adopted to cope with daily stressors during the sessions of the second phase of therapy.

These clinical interviews that were conducted after the first and second phases of therapy provided only qualitative data and served as an appropriate index of clinical improvement and were not retrieved for statistical analysis.

PROCEDURE:

The data for the present study were collected over 2 years and 6 months from March 1989 to August 1991. The initial 11 months constituted the pilot phase of the study.

The objectives of the pilot study were as follows:
1. To assess from the rate of referral of clients with anxiety neurosis the possible size of the sample for the main study.
2. To assess the adequacy and appropriateness of the inclusion and exclusion criteria.

3. To finalise the choice of tools to be used for the study.

4. To formulate the therapeutic programme.

5. To gain familiarity with EMG feedback assisted relaxation, SIT, and the assessment tools.

During the pilot phase the total number of referrals of clients with anxiety neurosis was 43 -

- 18 did not fulfill criteria of the study.
- 6 did not report after the first contact.
- 3 reported practical difficulties and that they would be unable to come for therapy.
- 4 dropped out of therapy.

A sample of only 5 clients could be studied.

Taking into consideration the difficulties in the availability of clients who will fulfill the inclusion and exclusion criteria, and the possibility of some discontinuing therapy, it was decided that the sample size for the main study could be 20.

It was thought desirable to exclude clients who were on medication. Considering the practical difficulties in getting drug-free clients, it was decided to include clients on medication but to monitor carefully the type and amount of medication used by them so that the data can be included in the final analysis.
The main study was begun in February 1990. The total number of referrals of clients with anxiety neurosis till August 1991 was 90 -

54 did not fulfill criteria of the study.
7 did not report after the first contact.
4 expressed practical difficulties and that they will not be able to come for therapy.
2 dropped out of therapy and in 1 client, therapy was prematurely terminated.

A dropout in the present study was any client who dropped out of the treatment programme after therapy had begun with no prior intimation.

Premature termination of therapy in the present study occurred when any client requested for a termination of therapy due to unavoidable circumstances related to his personal life.

For the main study, a sample of 22 clients was studied. The following procedure was adopted for each of the 22 clients.

Each client was seen individually in a pleasant, comfortable room where the biofeedback equipment was placed. There was soft, dim lighting. The chair meant for use during EMG feedback assisted relaxation was a low lying, reclining
cane chair, with a comfortable headrest. The noise level from the surrounding environment was kept to a minimum. SIT was also carried out in the same room.

Each client had about 30 sessions in the clinic which extended over a period of one and a half months, each session lasting for about 1 to one and a quarter hours. Out of this, 20 were therapy sessions.

Intake Interview:

The purpose of this interview was to establish rapport with the client as well as to assess the suitability for inclusion in the study. During the course of the interview, the therapist obtained enough information to complete the PDS. A client who was unsuitable for the study was either re-referred to the concerned psychiatrist or to another behaviour therapist for further management. A client considered suitable for the study was told that the entire programme involved 20 sessions of therapy with assessment sessions before, during, and after therapy to monitor progress, and further, that a follow-up assessment would be made a month after termination of therapy. The client was told that the first 10 sessions would be spaced over 10 days and that this would constitute the first phase of therapy and that the next 10 sessions would be spaced over 20 days and that this would constitute the second phase of therapy. The clients were told that the entire programme would last for
about 1 and a half months and that their co-operation and active participation in the programme would be important.

Following this, Schachter's two factor theory of anxiety (Schachter, 1966) was explained, i.e., anxiety consists of physiological and cognitive arousal. The concepts of stress, reactivity to stress, arousal, and the consequences of chronic increased arousal were also explained to each client. The clients were told that the first phase of therapy would focus on decreasing physiological arousal. The rationale for using EMG feedback assisted relaxation to learn to decrease physiological arousal and as an alternative to the use of medication was discussed. The therapist explained that the frontalis muscle was chosen as the site for training in relaxation as the tension level in these muscles served as an indicator of residual muscular tension throughout the head, neck and shoulder regions. They were then told that in the second phase of therapy, the focus will be on decreasing cognitive arousal and that they would be taught cognitive coping skills to overcome situational anxiety. The need for home practice of relaxation in this phase was emphasized. The clients' active participation in making attempts at applying the relaxation skill and the cognitive coping skill in order to overcome daily stressful situations was ensured.
After giving all the details of the study, consent to participate in the programme was obtained (Appendix 0). Each client was given an option to continue or to stop medication during the course of the study. If clients wished to continue medication, details of the name, dosage and type of the drug were noted down (Appendix P) and they were asked to keep the dosage constant as far as possible throughout the study. An approach to control for the effects of medication has been recently developed by researchers investigating the effects of psychological intervention. Craske and Barlow (1986) required that individuals receiving medication in the treatment study be stabilized on the medication and that they agree to continue taking it. In this way, further improvements could be reasonably attributed to the psychological intervention and not the pharmacological agent.

Pre-Therapy Assessment:

Each client was required to complete the SRS, the CSAQ and the STAI-forms Y1 and Y2. The therapist rated the clients on the HARS.

The clients' baseline level of skin conductance level, skin conductance response and frontalis muscle tension were recorded at rest during a single half hour session either the same day or another day.
For a recording of electrodermal activity at rest, the client was seated comfortably and instructed to avoid all unnecessary movements. The 3 electrodes were attached to the palmar surface of the fingers by velcro bands (P₁). The ground electrode was placed on the middle finger, and the 2 active electrodes on the second and fourth fingers of the dominant hand. The meter scale selector for the skin conductance level meter was adjusted to an appropriate scale of sensitivity. The skin conductance response meter function selector was set at R5 (50 seconds) and the response scale selector was set at X1 for all the clients. Following a 5 minute adaptation period, the therapist depressed the automatic baseline switch so as to reset the response meter at 0. The skin conductance level (SCL) and skin conductance response (SCR) values in micromhos (µmhos) were recorded at 1 minute intervals for 30 minutes (Appendix M).

For a recording of muscle tension at rest, the client was seated comfortably on the reclined chair. The skin surface of the forehead was gently abraded with a piece of cotton wool soaked in alcohol. The 3 electrodes were then filled with the electrode contact medium and attached to the skin surface by a velcro band. The red and yellow active electrodes were placed 5 centimeters apart on either side of the blue ground electrode which was placed in the middle of the forehead along an imaginary line from the nasion (P₂).
P1 ELECTRODE PLACEMENT FOR THE RECORDING OF GSR AT REST AND DURING THE PHYSIOLOGICAL STRESS PROCEDURE.

P2 ELECTRODE PLACEMENT FOR THE RECORDING OF EMG AT REST, DURING THE PHYSIOLOGICAL STRESS PROCEDURE AND EMG FEEDBACK ASSISTED RELAXATION.
The input termination plug of the shielded attachment cable for all 3 electrodes was plugged into the main unit front panel connector marked as 'input A'. A dummy input termination plug was inserted into 'input B'. The main unit was set with the input weighting control at A and the bandpass selector at 100-200 hertz. It was ensured that the electrode impedance from each of the 2 active electrodes was 20,000 ohms or lower. An appropriate scale of sensitivity for the response meter was chosen for each client. Following a 5 minute adaptation period (Meyers and Craighead, 1978; Sallis and Lichstein, 1979), the therapist recorded the level of frontalis muscle tension in microvolts (μV) at rest at 1 minute intervals for 30 minutes (Appendix M).

The physiological stress procedure was carried out during another half hour session on the same day or another day. A 5 minute adaptation period was followed by 15 minutes of relaxation, 6 minutes of stress (subtracting serial sevens from 700 mentally) and a 9 minute recovery period. During all 3 phases there was a recording of SCL, SCR, and frontalis muscle tension every minute for 30 minutes (Appendix M). The procedures adopted were similar to those adopted in measuring electrodermal activity and muscle tension of the frontalis at rest.

EMG Feedback Assisted Relaxation (Therapy Phase I):

The treatment protocol for the EMG feedback assisted
relaxation was evolved from the guidelines provided in the instruction manual for the Autogen 1700 and that provided by Sargunaraj (1988) as well as from the therapist's clinical experience with clients during the pilot phase. The therapy programme was designed to teach the clients awareness and control of frontalis muscle tension and generalization of tension reduction. The programme was flexible enough to allow for individual differences in learning.

The client was informed that the biofeedback instrument was a passive learning device and that its function was to continuously monitor and display muscle tension levels. On the meter, readings of 5 µv or more indicated the presence of excessive tension and that between 2 to 5 µv the presence of moderate tension. The occurrence of relaxation was indicated by readings below 1 µv and deep relaxation by readings below 0.5 µv. The audio and visual displays on the instrument provided additional information as to the presence or absence of tension.

The purpose of the first therapy session was to acquaint the client with the capabilities of the EMG feedback instrument. The instructions given to the client were: "Sit comfortably in the chair with your eyes open and experiment with the machine and observe what causes the change in the audio and visual signals. We will discuss it after the session".
An electrode attachment procedure similar to the one for the recording of frontalis muscle tension at rest was adopted. The additional adjustments to the main unit were meter averaging time selector at 50 seconds, audio feedback mode selector at AN2 (continuous analog tone), and feedback response control at 1 second. At the end of a 5 minute adaptation period, the therapist allowed another 5 minutes to lapse and obtained a pre-session mean baseline value of frontalis muscle tension over the last 50 seconds of this 5 minute period by depressing the 'average' button. The button was then released, the audio and visual feedback signals were activated and the therapist recorded muscle tension values at 1 minute intervals (Appendix Q). At the end of 30 minutes, the feedback signals were deactivated and there was a 5 minute period of rest after which a post-session baseline of average muscle tension was recorded for the last 50 seconds of this 5 minute period by depressing the 'average' button. Following this, the button was released and the machine was switched off.

A post-session interview was conducted where the therapist enquired about the nature of the clients' observations. Most often, clients reported that the physical movements of the upper body musculature (swallowing; movements of the eyebrows, lips and tongue; clenching of teeth) caused a change in the signals while movements of the
limbs produced no change. Increased pitch of the audio signal along with the green visual signal indicated a high level of muscle tension and decreased pitch of the audio signal along with the red visual signal indicated a low level of muscle tension as seen on the meter scale—higher readings indicating higher tension and lower readings indicating lower tension. They also reported that the absence of physical movements; the presence of slow, regular breathing; and emptying one's mind of thoughts favoured lower levels of muscle tension. The therapist reinforced clients' attempts at observing and understanding the working of the machine and asked them to make further efforts over the subsequent sessions to sit as comfortably as possible and maintain still lower levels of tension. This remained the instructions for the subsequent sessions. For those clients who had difficulty in identifying cues signalling tension or its absence, the therapist provided prompts. They were encouraged to observe the effects of physical movements of the upper body musculature; hurried, effortful breathing; and intrusive thoughts on the signals. Clients learned awareness of the presence of tension and relaxation during the initial 2 or 3 sessions.

Over the remaining sessions, each client learnt to control the level of muscle tension by utilising the threshold function of the instrument. The threshold was always set at the microvolt reading obtained at the pre-
session baseline. The visual feedback was present both above and below the threshold while the audio feedback function was activated only if the muscle tension level exceeded the threshold. The absence of audio feedback below the threshold was assumed to act as a positive reinforcer facilitating the learning process. The therapist after every session acquainted the clients with their performance during the training phase and the muscle tension levels obtained at the pre-, and post-session phases. In this manner, the clients were given training in EMG feedback assisted relaxation ($P_3$).
P3 EMG FEEDBACK ASSISTED RELAXATION IN PROGRESS
Mid-Therapy Assessment:

Each client was re-assessed after the tenth session to evaluate the progress made in therapy (phase 1).

The client was asked to rate the symptoms on the SRS as to the degree to which they had been problematic over the preceding 10 days. The CSAQ, the STAI-Forms Y1 and Y2 were administered with no change in the instructions. The therapist rated each client's level of anxiety on the HARS.

The recordings of SCL, SCR and frontalis muscle tension were obtained at rest during a half hour session either the same day or another day. The procedures used for the pre-therapy assessment were repeated.

The repeated physiological measurements are considered fairly reliable as available literature suggests that SCL and SCR (Waters, Willamson, Bernard, Blouin and Faulstich, 1987) and frontalis EMG (Arena, Blanchard, Andrasik, Cotch and Myers, 1983) have modest test-retest correlations if sessions are repeated within a 2 week interval.

The physiological stress procedure was also carried out to evaluate the progress in therapy.

A mid-therapy clinical interview was also carried out to evaluate the progress in therapy.
Irrespective of the degree of improvement reported, every client was advised to attend 10 further sessions of therapy.

**EMG Feedback Assisted Relaxation And SIT (Therapy Phase II):**

The first phase of the therapeutic protocol consisted of EMG feedback assisted relaxation. The second phase of the protocol consisted of EMG feedback assisted relaxation and SIT.

The treatment protocol for SIT was evolved from the guidelines provided by Meichenbaum, 1985; 1988 and from the therapist's clinical experience with the clients during the pilot phase.

As soon as the mid-therapy assessment was over, each client was given a stress diary to maintain every day (Appendix R). It was derived from the Daily Record of Dysfunctional Thoughts (Clark, 1989) and Daily Stress Diary (Keable, 1989). Clients had to submit each day's diary to the therapist as and when he came for the therapeutic session. Clients had to systematically record the following variables: a) stressful situation, b) percentage of distress, c) details of distress, d) thoughts/images pertaining to the stressful situation, e) what the client did in the stressful situation. The duration of EMG feedback assisted relaxation during this phase of therapy was reduced to 15 minutes considering the fact that clients had already
learned to relax fairly well at this juncture. This was seen
by the plateauing of the frontalis muscle tension level after
the sixth or seventh session. This has also been
substantiated by research workers like Lavelle et al. (1977);
Sargunaraj, et al. (1990) based on the work of Sargunaraj,
(1988) who have shown that there is very minimal change in
muscle tension level after 10 sessions of EMG feedback
assisted relaxation. The procedure of EMG feedback assisted
relaxation remained the same as in the first phase. In
addition to 15 minutes of EMG feedback assisted relaxation,
each client was told to practise the relaxation technique
once every day for about 15 minutes in the home with special
emphasis to the control of breathing. The instructions given
were as follows: "Sit comfortably, preferably in a reclining
chair with eyes closed and relax as much as possible just as
you would relax in the Unit in front of the machine".

Ten sessions of the second phase of therapy were spaced
over 20 days. The first 3 treatment sessions which
constituted the educational or conceptualization phase of SIT
were carried out on 3 consecutive days. The therapist worked
collaboratively with the client to develop a new, shared
working definition of anxiety. The situational cues
eliciting anxiety and the affective-physiological
characteristics of his anxiety reaction became clearer.
After 15 minutes of EMG feedback assisted relaxation, the data from the diaries were orally verified and discussed. The clients were made to understand that their anxiety is a reaction to stress and that their cognitions mediate their anxieties; that it is their worrying, anxious thoughts and unpleasant images that make them feel anxious and disable them from facing stressful situations well and that there is a need to change their way of thinking and looking at these situations in order to be able to cope with them well. It was also pointed out that some of life's stressful situations will be anticipated ones while others will not be and that they would have to learn to face both kinds of situations. Clients were also made aware of the fact that a stressful situation can be broken down into smaller units, i.e., 1) preparing to meet the stressful situation, 2) confronting and coping with the stressful situation especially if anxiety is seen as building up in the situation, and 3) rewarding oneself for the efforts taken at facing the stressful situation.

After this reconceptualization was ensured, the clients were taken through the skill acquisition or rehearsal phase of SIT.

During the next 3 sessions which were spaced over 5 days, the clients, in addition, acquired cognitive coping skills. The somatic coping skill of relaxation which is also
included in the repertoire of skills taught in this phase of SIT by now was almost perfected by the clients. Hence importance was placed on identifying negative self-statements, re-evaluating them objectively and changing them to positive self-statements.

The positive self-statements could be of the following types (Meichenbaum, 1985; 1988):

1) Cool relaxed thoughts

2) Cognitive restructuring of maladaptive thoughts

3) Task oriented problem solving self-instruction (seeing the anxiety arousing situation as a problem, orienting to the anxiety arousing situation as a problem, breaking it down into smaller units, problem solving, terminating problem solving when no solution is available and ultimate control and escape routes).

4) Self-reward/self-efficacy thoughts.

Positive self-statements in preparing oneself to face a stressor, in confronting and coping with the stressor especially if the anxiety experienced is overwhelming, and in rewarding oneself for the efforts taken to face the stressor were generated through discussions.

Clients were required within each session to analyse situations from their diary. The therapist played an active role in modelling these self-statements for the clients and
in reinforcing the clients' attempts in this regard. The clients' had to write the positive self-statements on paper after the discussion ended. They were encouraged to practise this procedure at home, taking situations from their stress diary or analysing past or hypothetical situations. These were discussed with the therapist on subsequent sessions for further clarification and re-evaluation. Reinforcement was given to the client for his attempt. Some typical examples are given in the Appendix (Appendix S).

The next 4 sessions which constituted the application phase of SIT were spaced over 12 days. During these sessions, the clients, in addition, learned to apply the coping skills of relaxation and adaptive cognitive self-dialogue (positive self-statements). The situations from the stress diary were enlisted and arranged in a hierarchical order by the client on the basis of his subjective feeling of distress, in an ascending manner. During each therapeutic session imagery of a stressful situation from the lower end of the hierarchy was used. The client had to sit in a chair (the reclining chair used during EMG feedback assisted relaxation), close his eyes and vividly imagine and visualize the situation given and use the skills of relaxation as well as adaptive cognitive self-dialogue to face the situation. The therapist played an active role in modelling the positive self-statements for the client, i.e., in preparing him to
face the situation, in confronting and coping with the situation and in rewarding self for efforts taken at facing the situation. The client had to mentally rehearse these statements and was even free to supplement them with others. The client was told that if at any point the situation became very stressful and highly anxiety arousing, he could open his eyes and the session would be terminated for that day.

After every therapeutic session, the client was also told that he must actively apply the coping skills in real life situations and that his co-operation is necessary for this. Information from such an assignment was subsequently discussed and application of coping skills further modified. He was also made aware of the fact that anxiety is a normal phenomenon and that what is important is to keep it at a manageable level. He was also made to understand that he may meet with failures, setbacks and backsliding and that he must consider them as learning trials instead of occasions to catastrophize. He was told that if he does think of them as catastrophies and as evidence of his inadequacy, it will only undermine his subsequent efforts at coping. It was highlighted that the goal is not to eliminate anxiety but to teach him to respond adaptively in anxiety arousing situations and to be resilient in the face of fear. High risk situations were identified in which lapses may occur and coping skills to handle them were developed and rehearsed. The client was told that he may re-experience anxiety and
that it is expected but that he must use these as opportunities to continue to manage anxiety without giving up. The client was made aware of the fact that whatever change has happened is to be attributed to his effort rather than external factors.

Post-Therapy Assessment:

Each client was assessed again after the therapy was completed in order to evaluate the overall progress made in therapy (Phases I and II).

The client was asked to rate the symptoms on the SRS as to the degree to which they have troubled him over the preceding 10 days. The CSAQ, the STAI-Forms Y1 and Y2 were administered with no change in the instructions. The therapist rated each client's level of anxiety on the HARS.

The recording of SCL, SCR and frontalis muscle tension were obtained at rest during a single half hour session. The procedures adopted were the same.

The physiological stress procedure was also carried out as before with no change.

A post-therapy clinical interview was also conducted.

The clients were then explained the need to continue 30 minutes of relaxation at home daily and to apply the coping
strategies of relaxation and adaptive cognitive self-dialogue especially in anxiety arousing situations despite setbacks.

The clients were given an appointment for follow-up one month later. If any of the clients said that he would not be able to come in person and see the therapist after one month, he was told to drop a letter to state how he is and describe in detail his progress in applying the coping strategies. For such clients, a letter was sent in reply emphasizing the need to continue home relaxation and to apply the skills of relaxation and adaptive cognitive self-dialogue especially in anxiety arousing situations, despite setbacks.

If the client did come for follow-up the first time after termination of therapy, an assessment was done which was similar to the preceding assessment procedures. Emphasis was also made on continuing home relaxation and the need to rehearse and apply the coping skills especially in anxiety arousing situations despite setbacks.

Follow-ups subsequent to the first follow-up were in the form of clinical interviews which were conducted either in person or through a letter on a monthly basis. Clients were also given a session of relaxation preferably without feedback whenever possible.

ANALYSIS OF DATA:

For each of the 22 clients, raw scores on the
psychological measures were obtained at the pre-, mid-, post-therapy and first follow-up assessments. Means of these raw scores for the group of 22 clients were computed. During the 30 minute pre-, mid-, post-therapy and first follow-up assessments, 30 GSR and EMG values were obtained at 1 minute intervals. Means of these raw values were computed for each of the 22 clients. Means of these values were then computed for the group of 22 clients. Mean GSR and EMG values for each of the 22 clients across the 3 segments of relaxation, stress and recovery phases of the physiological stress procedure during the 30 minute pre-, mid-, post-therapy and first follow-up assessments were also computed. Means of these values were then computed for the group of 22 clients.

During each half hour therapy session of the initial 10 EMG feedback assisted relaxation sessions for each client, EMG values were recorded at 1 minute intervals. These 30 values were used to calculate a mean value for each session. An average of these values was obtained for the first, fifth and tenth therapy sessions for the group of 22 clients. An average of the first 15 values was also obtained for the first, fifth and tenth therapy sessions. Means of these values were then computed for the group of 22 clients across these 3 occasions. During each 15 minute therapy session of the subsequent 10 EMG feedback assisted relaxation sessions, for each client, EMG values were recorded at 1 minute intervals. These 15 values were used to calculate a mean
value for each session. An average of these values was obtained for the eleventh, fifteenth and twentieth therapy sessions for the group of 22 clients. For every therapy session, for each client, an average EMG value was recorded both before and after the session. The values were then averaged for the group of 22 clients to obtain pre-, and post-session mean baseline values for the first, fifth, tenth, eleventh, fifteenth and twentieth therapy sessions.

Homogeneity of the Sample

Out of the 22 clients studied, 10 were on medication. As a preliminary step in the analysis, the homogeneity of the sample was established. Student's t statistic for independent means (Sundar Rao, Jesudian and Richard, 1983) was computed to find out if the group on medicines was significantly different from the group off medicines on the psychological and physiological measures at all the 4 assessments (Pre-, mid-, post-therapy and first follow-up).

First Problem

To answer the first problem laid down by the study, student's t statistic (Sundar Rao et al. 1983) was computed to find out if there was a significant difference between the 2 means obtained from correlated groups, i.e., to find out if there was a significant mean change from pre-therapy assessment to mid-therapy assessment on the psychological and
physiological measures as a consequence of EMG feedback assisted relaxation only.

A repeated measures analysis of variance (ANOVA - R) (Garrett, 1981) across the first, fifth and tenth therapy sessions was also computed to find out if there was a significant difference between the means of the EMG levels across these occasions for the group as a consequence of EMG feedback assisted relaxation only, when feedback was given to the clients. In addition, pre-, and post - session mean EMG baselines across the first, fifth and tenth therapy sessions were compared using a repeated measures analysis of variance (ANOVA - R) (Garrett, 1981) to find out if there was a significant difference between the means of the EMG levels across these occasions for the group as a consequence of EMG feedback assisted relaxation only, when feedback was not given to the clients.

Second Problem

To answer the second problem laid down by the study, student's t statistic (Sundar Rao et al. 1983) was computed to find out if there was a significant difference between the 2 means obtained from correlated groups, i.e., to find out if there was a significant mean change from mid - therapy assessment to post - therapy assessment on the psychological and physiological measures as a consequence of the additive effect of SIT with EMG feedback assisted relaxation.
A repeated measures analysis of variance (ANOVA - R) (Garrett, 1981) across the eleventh, fifteenth and twentieth therapy sessions was also computed to find out if there was a significant difference between the means of the EMG levels across these occasions for the group as a consequence of the additive effect of SIT with EMG feedback assisted relaxation when feedback was given to the clients. In addition, pre-, and post-session mean EMG baselines across the eleventh, fifteenth and twentieth therapy sessions were compared using a repeated measures analysis of variance (ANOVA - R) (Garrett, 1981) to find out if there was a significant difference between the means of the EMG levels across these occasions for the group as a consequence of the additive effect of SIT with EMG feedback assisted relaxation when feedback was not given to the clients.

Main Objective

To fulfill the main objective of the study, a repeated measures analysis of variance (ANOVA - R) (Garrett, 1981) across the pre-, mid- and post-therapy assessments was computed to find out if there was a significant difference between the means obtained from correlated groups/repeated measures (from pre-therapy assessment to the post-therapy assessment through the mid-therapy assessment) on the psychological and physiological measures as a consequence of the combined effect of EMG feedback assisted relaxation and SIT.
A repeated measures analysis of variance (ANOVA -R) (Garrett, 1981) across the first, fifth, tenth, fifteenth and twentieth therapy sessions was also computed to find out if there was a significant difference between the means of the EMG levels across these occasions for the group as a consequence of the combined effect of EMG feedback assisted relaxation and SIT when feedback was given to the clients.

Physiological Stress Procedure

Regarding the physiological stress procedure, a graphical representation of the physiological stress profile depicting the mean GSR and EMG values for the group of 22 clients across the 3 segments of relaxation, stress and recovery phases of the physiological stress procedure at the pre-, mid-, post-therapy and first follow-up assessments was provided in order to study the effect of EMG feedback assisted relaxation and the additive effect of SIT with EMG feedback assisted relaxation on the group's reactivity to a cognitive stressor.

Subsidiary Objective

To fulfill the subsidiary objective of the study, a criterion for improvement was selected in order to find out the number of adequate and inadequate responders to therapy. The post-therapy scores of the 22 clients on the SKS (Sargunaraj, 1988) was chosen as an index of improvement, based on the empirical evidence that the scores on the scale reflected clients' perception of the degree of distress.
caused by the anxiety symptoms. The group was divided according to whether each client's score fell above or below the median score. Those clients with scores below the median were designated as 'adequate responders' to therapy and those with scores above the median as 'inadequate responders' to therapy. These 2 groups were compared to identify the characteristics of clients who responded adequately to the therapy. The socio demographic variable of marital status for the 2 groups was compared using Fisher's exact probability test (Siegel, 1956) as the Chi-square ($X^2$) test (Garrett, 1981) was not applicable. For the variables of age and education, an average was calculated for each of the groups. The mean values of each variable were compared using student's $t$ test for independent means (Sundar Rao et al. 1983). For the clinical variable of duration of anxiety symptoms, an average was calculated for each group. The mean value was compared using student's 't' test for independent means (Sundar Rao et al. 1983). Other clinical variables such as number of symptoms reported at pre-therapy assessment, associated psychiatric features, precipitating factors and prior treatment experience for the two groups were compared using Fisher's exact probability test (Siegel, 1956) as the Chi-Square ($X^2$) test (Garrett, 1981) was not applicable. A prior treatment experience implied that a client had treatment for anxiety prior to commencing EMG feedback assisted relaxation and SIT.
Follow-up

The first follow-up assessment resembled the pre-, mid-, and post-therapy assessments but only 18 out of the 22 clients studied returned to the unit for the assessment and therefore the data obtained could not be compared with the pre-, mid-, and post-therapy assessment data. Hence, the 18 clients who returned for the assessment and who were classified as either an 'adequate responder' or an 'inadequate responder' to therapy at the post-therapy assessment were compared on the psychological and physiological measures obtained at the post-therapy and follow-up assessments using student's t test for independent means (Sundar Rao et al. 1983) in order to isolate differences between them and understand the trends seen at both the assessments. Follow-up assessments subsequent to the first follow-up assessment were in the form of clinical interviews. Clients were also given a session of relaxation, preferably without feedback, whenever possible. Hence only a qualitative analysis was done in order to examine whether clients were able to maintain or further the improvement gained by the intervention strategies.

Dropout

There were only 2 dropouts from the study and in another client, therapy was prematurely terminated. Hence only a qualitative analysis of the available data was done.