Progressive relaxation as a nursing intervention: an analysis

Progressive relaxation is an intervention nurses have used during the past decade. Because nursing practice is seeking a more scientific basis for use of specific interventions, a review of studies that have used relaxation techniques is pertinent. In the 13 studies reviewed, the patient populations, purposes, procedures, measurements, and results are analyzed and compared. Points are provided for nurses to consider when selecting progressive relaxation as an intervention or carrying out research studies.

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MODERN SOCIETY experiences many benefits unknown to past generations. However, the pace and structure of this society has also created numerous problems and considerable stress. Tranquilizers are one of the most commonly prescribed medications, and use of illegal drugs and alcohol has reached alarming heights as society attempts to alleviate stress and stressors. More recently, a variety of stress management techniques have been introduced for assisting persons to handle stress in a more healthy manner. Commonly used techniques include progressive relaxation, self-hypnosis, meditation, autogenics, assertiveness training, biofeedback, breathing techniques, thought stopping, yoga, and imagery.

One of the first techniques developed for reducing stress was progressive relaxation. Since 1908, Jacobson has been a proponent of this stress-reduction technique. In 1938, he published an explanation of the technique and the rationale.[1] Jacobson contends that anxiety and relaxation

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are mutually exclusive because relaxation of muscles spreads to encompass the entire being. Learned relaxation of striated muscles also generalizes to the smooth muscles of the gastrointestinal and cardiovascular systems.

According to Brown,[2] clinical and research evidence suggests that two central nervous mechanisms interact in the control of muscle activity: muscle mechanisms and cerebral mechanisms. The cerebral mechanism is the more dominant of the two. When the brain (conscious or unconscious) perceives a stimulus to be threatening, alerting signals are conveyed to the muscles and they tense. Clarification of the cause of the stimulus could reduce muscle tension. In parallel fashion, reduction of muscle tension reduces stimuli being sent to the cortex, and the cortex subsequently sends fewer impulses to the brain stem and cerebellum, which are involved in maintaining muscle tension. Jacobson[1] contends, therefore, that reduction of impulses to the cerebral association areas diminishes the stimuli to the perceptual-memory association areas, and both mental and muscle tension are lowered.

In progressive relaxation the person tenses and then relaxes successive muscle groups. Attention is focused on discriminating between the feelings experienced when the muscle is relaxed, compared to when it is tensed. Jacobson's procedure entails learning to relax 218 different muscle groups, and it frequently takes more than one year to master this.

Wolpe[3] drew from Jacobson's research in developing his techniques for systematic desensitization. In desensitization training, the person focuses on specific events that precipitate fear or cause extreme stress. Wolpe used muscle relaxation as a counterconditioning response. Jacobson's technique was condensed and taught in six 20-minute sessions, and the person was instructed to practice tensing and relaxing the muscles for 15 minutes twice daily.

Numerous procedural modifications of progressive relaxation have evolved since Wolpe's adaptations. The length of training sessions has been shortened, with some instructors proposing only one teaching session. The number of individual muscle groups "progressed through" also varies. Many of the techniques are based on the procedure developed by Bernstein and Borkovec.[4] The boxed material presents this procedure and shows the sequential order for relaxing the muscles.

The progressive relaxation technique and adaptations of it have been used by

Basic Procedure for Teaching Progressive Muscle Relaxation*

1. Focus attention on muscle group
2. Tense muscle group at predetermined signal from teacher ("When I say, 'Now,' tense")
3. Maintain tension for 5 to 7 s; shorter duration is used for foot muscles
4. Release tension at predetermined signal from teacher ("Relax")
5. Concentrate on relaxed muscles and discriminate differences in sensation from muscle tension (30 to 40 s)
6. Use technique in each muscle group twice

*Bernstein D, Borkovec T: *Progressive Relaxation Training.* Champaign, Ill, Research Press, 1973.

Muscle Groups Relaxed in Sequential Order*

Dominant hand and forearm
Dominant biceps
Nondominant hand and forearm
Nondominant biceps
Forehead
Upper cheeks and nose
Lower cheeks and jaws
Neck and throat
Chest, shoulders, and upper back
Abdominal region
Dominant thigh
Dominant calf
Dominant foot
Nondominant thigh
Nondominant calf
Nondominant foot

*After mastery of the 16 groups, muscle groups are combined into 7 and then into 4 groups.

Bernstein D, Borkovec T: *Progressive Relaxation Training*. Champaign, Ill, Research Press, 1973.

nurses for diverse patient populations: patients who have cancer; those receiving preoperative and postoperative care; and patients with psychiatric conditions, anxiety, epilepsy, and chronic obstructive pulmonary disease (COPD). Many of its uses by persons other than nurses are within the domain of nursing. This technique has been used for health promotion, reducing blood pressure, improving insomnia, treating tension headaches, and alleviating gastrointestinal problems. Progressive relaxation is also an integral component of many other relaxation techniques, such as biofeedback, autogenics, and imagery.

Since nurses can readily use progressive relaxation as an intervention, a review of its usage and effectiveness may guide them in determining its appropriateness for specific situations and suggesting areas for further investigation. A synopsis of 13 studies that have used progressive relaxation or a technique labeled "relaxation" are presented in Table 1. Several of these studies were conducted by non-nurses but address conditions that are within the purview of nursing. Bernstein and Borkovec[4] stated that it is important to document claims made for the success of relaxation and to closely evaluate studies that have used relaxation, in order to assess implications for future areas of research and innovation.

PROCEDURE

The technique used for teaching relaxation, the number of sessions used in training, the environment, and the mode of instruction are procedural variables that may affect the degree of success achieved. Careful attention to these variables in both planning and reporting studies is needed before comparisons and generalizations can be made.

Jacobson[1] did a thorough assessment of the client's ability to relax a muscle group before focusing on the next muscle group. Bernstein and Borkovec[4] stated that there has frequently been a proliferation of procedures without careful attention to assessment of their effectiveness. In addition, progressive relaxation has been used to treat a variety of clinical disorders in a variety of settings, but the appropriateness and adequacy of the technique has not always been assessed.

The majority of the techniques shown in Table 1 are based on several well-known sources: Paul and Trimble,[5] Bernstein and Borkovec,[4] Luthe,[6] or Jacobson.[1] One format would not be appropriate for all

Table 1. Comparison of purpose, technique, population, measurement, and results of studies using relaxation*

Author	Purpose, technique	Subjects	Measurement	Results
Morris (1979)[1]	Reduce stress in patients in medical clinic Paul and Trimble[2] (adaptation); 7-muscle group with tensing and relaxing Taped instructions	Case study after myocardial infarction Patient modified diet	Vital signs at 1 yr	BP ↓ 190/100 to 154/84 mm Hg Cholesterol ↓ 34.4 to 24 mg/100 mh Triglycerides ↓ 302 to 118 mg/100 mh Uric acid ↓ 10 to 8.4 mg/100 mL Reported ↓ in angina
Broussard (1979)[3]	Improve health status of COPD patients Not stated, but appeared to follow Bernstein and Borkovec sequence[4]; contract muscles with breathing in and out; rest 30 to 60 s; repeat	Case study of emphysema	Vital signs 22 days before treatment and 14 days after treatment (average)	HR, $p = .01$ R, $p = .05$ BP, NS
Moore and Altmaier (1981)[5]	Assess effectiveness in anxiety associated with clinic visits and chemotherapy 6 sessions: (1) education (2, 3) cognitive (4, 5) physical (16-muscle group of Bernstein and Borkovec,[4] Michenbaum[6] modification) (6) Rehearsal	9 cancer patients receiving chemotherapy; 2 dropped out	Adjustment measured by ACL Interview Sleep and appetite patterns Participation in decision making Correspondence between patient and physician description of prognosis	4 adjusted according to AACL and self-statements 3 unadjusted but stated reduced anxiety
Greziak (1977)[7]	Decreased pain in patients with spinal cord injury French and Tupin[8] adaptation: (1) Muscle relaxation; follow Bernstein and Borkovec sequence[4] (2) Let mind drift to pleasant image (3) Concentrate on image	4 case studies of quadriplegics and paraplegics	Subjective reports; observation	Some relief reported Altered attitudes toward and experience of pain Staff noted better mood

Table 1. *(continued)*

Author	Purpose, technique	Subjects	Measurement	Results
Shapiro and Lehrer (1980)[9]	Compare results of biofeedback and self-regulation (progressive relaxation) to aversive stimuli Abbreviated Jacobson method[1] with Luthe[10] adaptation	32 adults in good health	Skin conductance HR SCL-90 STAI Subjective Rating Scale	Both groups ↑ SCL-90 ($p < .05$) Anxiety state and subjective ratings unchanged HR and skin conductance, NS
Garrison (1978)[11]	Teach handicapped to relax 7 sessions and follow-up: (1) Introduction (2, 3) Tension-relaxation (4, 5) Meditation (6) Differential and rapid relaxation (7) Transfer to life situations	4 persons with aparalysis	Rating scale (0 to 100); patient control	4 ranked it very helpful; could relax faster and deeper than before
Steger and Harper (1980)[12]	Determine if biofeedback or progressive relaxation is most effective in tension headaches Bernstein and Borkovec[4]; 1 session, told to practice 2 × daily	20 adults with tension headaches	MMPI SCL-90 Headache activity calendar Frontalis EMG	Frontalis muscle Bio, $p = .001$ PR, $p = .05$ HA frequency—Bio, $p = .025$ HA intensity—Bio, $p = .05$
Green et al (1981)[13]	Compare SRT and PR Bernstein and Borkovec[4]; Two 1½-hr sessions, practice 2 × daily	48 students with high anxiety to trauma	Skin resistance level Skin resistance response HR	Both PR and SRT superior to control ($p = .0001$.) PR reduced tonic sympathetic response prior to introduction of stressful stimuli; after exposure to stressful stimuli, difference NS
Tamez et al (1978)[14]	Determine effectiveness of relaxation training on mild tranquilizer given as needed or on sedative demands; effectiveness of taped vs live instructions	60 open-unit psychiatric patients; 3 groups	Frequency of medication BP R HR TMAS MMPI	Change in medication requirements NS Diastolic BP, HR, and R: significant differences between treated and control subjects ($p \leq .05$)

Table 1. *(continued)*

Author	Purpose, technique	Subjects	Measurement	Results
	Bernstein and Borkovec[4]: (1) 16 muscles (2, 3) 7 muscles (4) 4 muscles and recall (5) 4 muscles, recall, and counting (6) Counting			Live instructions showed greater changes than taped on VS and some of MMPI scales
Sheer (1980)[15]	Effect of relaxation on anxiety Bernstein and Borkovec[4]; alternated teaching to groups 2 × weekly for 4 weeks	12 psychiatric patients	AACL daily	No significant difference in scores whether or not relaxation was taught
Aiken and Henrichs (1971)[16]	Effect on postoperative complications Modification of Wolpe[3]; (1) Relaxation 1st step in desensitization (2) Counterposing relaxation to fear-producing stimuli (3) Use tape 4 × a day	15 patients for open heart surgery; matched with similar group	MMPI Postoperative complications	Expected complication rate of 40%; 8% found ($p < .05$); comparison with control, $.10 > p > .05$ Significant differences in anesthesia time, bypass time, units of blood, degree of hypothermia in treated patients Duration of hypothermia and multivalve replacement NS
Flaherty and Fitzpatrick (1978)[17]	Effect on comfort getting out of bed 1st time after surgery Rathbone technique[18]; lower jaw dropped slightly, tongue quiet, lips soft, breathing slowly (3 ×)	42 general surgery patients; GB, hernia, and hemorrhoids	BP HR R SRS Analgesics first 24 hr	Significant differences in narcotic dose, $p < .05$ Incisional pain, $p < .01$ Body distress, $p < .001$ R, $p < .05$ Differences in BP and HR, NS Patient as own control for changes in Diastolic BP, $p < .05$ HR, $p < .001$

Table 1. *(continued)*

Author	Purpose, technique	Subjects	Measurement	Results
Bowles et al (1978)[19]	Compare PR and biofeedback Taped instructions Ten 1-hr sessions, Bernstein and Borkovec[4]; practice Biofeedback group received relaxation and audiofeedback	18 healthy women	Frontalis and trapezius muscles EMG STAI Subjective rating scale	Variance in groups too great for comparison PR-EMG changes NS PR and Bio, significant EMG changes STAI changes NS for both groups

HR = heart rate; R = respiration; NS = not significant; Bio = biofeedback; HA = headache; SRT = self-induced relaxation; VS = vital signs; GB = gallbladder; PR = progressive relaxation; BP = blood pressure.

[1]Morris C: Relaxation therapy in a clinic. *Am J Nurs* 1979;79:1958-1959.

[2]Paul G, Trimble R: Recorded vs live relaxation training and hypnotic suggestion: comparative effectiveness for reducing arousal and inhibiting stress response. *Behav Ther* 1970;1(3):285-302.

[3]Broussard R: Using relaxation for COPD. *Am J Nurs* 1979;79:1962-1963.

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[16]Aiken L, Henrichs T: Systematic relaxation as a nursing intervention technique with open heart surgery patients. *Nurs Res* 1971;20(2):212-217.

[17]Flaherty G, Fitzpatrick J: Relaxation technique to increase comfort level of postoperative patients: a preliminary study. *Nurs Res* 1978;27(6):352-355.

[18]Rathbone J: *Relaxation*. Philadelphia, Lea & Febiger, 1969.

[19]Bowles C, Smith J, Parker K: EMG biofeedback and progressive relaxation training: a comparative study of two groups of normal subjects. *West J Nurs Res* 1979;1(3):179-189.

patient populations because specific conditions or situations may warrant specific approaches; for example, Broussard[7] had the patient's head elevated. However, the adaptations made or the precise technique used in a study was not always evident. Such details are important to other investigators who want to use the technique with similar patient populations.

Teaching sessions varied both in length of session and number of sessions. In preoperative instruction, several investigators taught relaxation skills in one session but most of the investigators in these studies had six training sessions. Bernstein and Borkovec[4] suggested ten sessions, but stated that individual differences may necessitate increasing or decreasing this number.

Perhaps the length or number of sessions is not as important as confirming that the person being taught has mastered the muscle relaxation technique. The number of sessions needed for mastery may vary considerably. Mastery can be measured in several ways: electromyogram (EMG), breathing pattern, demeanor, body positioning, and subjective reports.

Although the generalization of a relaxed frontalis muscle to relaxation in other body areas has been questioned,[8] EMG recordings of this muscle group have been used to indicate the degree of relaxation throughout the body. In persons who are relaxed, the breathing rate slows and breathing is more quiet. Generalized relaxation is also manifested by a slack jaw, positioning of feet at 45° angles to each other, and the resemblance of peaceful sleeping.[4] Requesting clients to signal with a finger when a muscle is relaxed is another method that has been used; this, however, demands that the client is able to discern between tension and relaxation. Obtaining the patient's verbal indication of relaxation is another subjective assessment mode for evaluating mastery. Unless the person being taught has mastered the technique, subjective interpretation of relaxation may not be accurate.

Practice sessions are an integral component of learning relaxation. Some studies did not mention practice by the patient, whereas others noted as many as four practice sessions a day. Patients must understand the importance of daily or twice daily practices; muscle relaxation is an acquired skill that becomes a habit. Garrison[9] believes that a follow-up teaching session held several months after the formal sessions have ended is essential to the success of the technique. He scheduled a session 2 months after the last class.

If generalized relaxation is desired, training sessions need to include instructions that assist in the transference to life situations. In the concluding sessions of their technique, Bernstein and Borkovec[4] teach the patient to achieve rapid relaxation by counting. This is applicable in real-life situations. Others have the patient imagine a stressful situation and how he or she could prepare for the situation by reducing tension via muscle relaxation.

Environmental variables such as teaching site, patient position during the training, and time of day may also affect the outcome. The investigator needs to be cognizant of these factors in planning sessions, and information on these variables should be included in the study report. Some advocate a recumbent position for the client, but others prefer a comfortable chair; they find that the client

is less likely to fall asleep in an upright position.

Concentration on relaxing muscles requires a room where outside activity does not intrude. Background music is viewed by some as beneficial in achieving an atmosphere conducive to relaxation; it also may help dampen outside noise. A relaxed setting, by itself, may decrease tension. Tamez et al[10] hypothesized that the hospital atmosphere may have decreased anxiety in their sample.

Instructor qualifications were not described in all studies. The technique is not difficult to learn and teach, but knowledge of the rationale for its use, the procedure, assessment of the level of relaxation, and common problems is required. If there are two or more instructors, inter-rater reliability for teaching and assessing should be ascertained. Prior interactions between the teacher and the patient, such as in primary nursing, may affect the measurement of the effectiveness of the technique.

Persons receiving live instructions showed greater changes in vital signs and on some scales of the MMPI than persons receiving taped instructions.

The merit of live versus taped instruction is debated. Tamez et al[10] found that persons receiving live instruction showed greater changes in vital signs and on some scales of the Minnesota Multiphasic Personality Inventory (MMPI) than did persons receiving taped instruction. Paul and Trimble[5] also found live instruction to be superior. Taped instructions are commonly provided to patients for use during practice.

MEASUREMENT

The stress response is characterized by both physiological and psychological changes. Measuring the success of progressive relaxation, therefore, includes indexes for both components. A wide variety of measurements were used in the studies reviewed. The purpose for the use of the technique dictates the parameters chosen. A number of the studies used only physiological indexes, and others used only psychological indexes. Studies using both physiological and psychological measurements did not address the relationship of the magnitude of the changes in the two areas.

A variety of standardized tests were used to measure reduction of anxiety: Affect Adjective Checklist (AACL) developed by Zuckerman and Lubin;[11] State-Trait Anxiety Inventory (STAI) developed by Spielberger;[12] the SCL-90 of Derogatis, Lipman, and Covi;[13] MMPI; Taylor Manifest Anxiety Scale (TMAS);[14] and the Subjective Rating Scale (SRS) for pain developed by Johnson.[15] The validity and reliability of these tests were provided. In selecting tests, the investigator should be aware of the intended use of the test and its specified limitations. Sheer[16] noted that the AACL could be administered frequently and retain its reliability but said that other tests are not reliable if administered within close time frames. In addition to these standardized tests, several investigators developed subjective rating scales or forms. Subjective responses are important, particularly in determining if the person will continue to use the technique.

Vital signs were the most widely used measurement index. Since the autonomic

nervous system is intimately involved in the stress response, alteration of the response should result in changes in vital signs. When progressive relaxation is used for patients with known pathology, the effect of the pathology on vital signs needs to be ascertained before selecting measurement indexes. Broussard[7] noted that the blood pressure did not decrease in a patient with COPD, but significant changes in heart rate and respiration occurred; right cardiac hypertrophy was cited as a possible reason. According to Shapiro and Lehrer,[17] significant changes in vital signs do not occur in "normal" persons taught relaxation. Therefore, in teaching relaxation as part of health promotion, significant changes in vital signs are not expected to occur.

Galvanic skin resistance (GSR) and frontalis EMG are other commonly used physiological measurements. Use of the GSR is based on the premise that increased perspiration during stress responses alters the resistance of the skin. These measurements are vulnerable to many sources of error and are being used less frequently.[18] The use of the frontalis EMG in the study of relief of tension headaches is appropriate; tense cranial muscles are often associated with headaches.[19]

Multiple measurements over time may be indicated. One criticism of relaxation is that measurements are usually taken immediately following the training session. If the intent is lowered blood pressure, the training session may achieve this, but does the lower pressure continue? A persistent relaxed state is desired. Is this achievable, and if so, what duration of time is needed to achieve it?

The studies reviewed did not use criterion measures in evaluating the effectiveness of progressive relaxation as an intervention. The limited studies on the use of the technique with various populations preclude the establishment of criteria. Analysis of studies may suggest realistic criteria, which can be further tested.

Selection of appropriate measurement instruments requires careful study. Because purposes of studies vary, methods of measurement differ. Clinical investigations often require adaptation of measurement used in laboratory studies. It would be helpful to future investigations if an assessment of the adequacy of the measurement instruments were included in the discussion section of studies, especially clinical investigations.

METHODOLOGY

Study designs varied from a single case study to matched-pair experimental studies. Findings from studies assist clinicians in determining the potential uses of progressive relaxation for patients. Matched groups assist the investigator to determine the effect of multiple variables. Whenever possible, this design is desirable; it allows more accurate decisions about the main effect versus interaction effects.

A number of the studies taught the relaxation technique for a specific, time-limited activity such as decreasing pain when getting out of bed,[20] diminishing postoperative complications,[21] or reducing anxiety on a daily basis.[16] Jacobson's aim was for the person to achieve a relaxed state that would be used daily;[1] results indicate that the relaxation technique is also effective in achieving short-term

effects. Sheer[16] alternated teaching of relaxation to the two groups on a daily basis but found no significant differences in scores whether or not relaxation was taught. Incorporation of information from previous sessions may have influenced the patients on the days they were not taught relaxation.

RESULTS

Findings from the studies reviewed revealed that progressive relaxation produced positive outcomes in all but one study. In a number of the studies, significant differences were not found between pretreatment and post-treatment in one or more of the several measurement parameters. The positive results in diverse patient populations indicate that the technique could have wide application as a nursing intervention.

IMPLICATIONS

Although numerous nursing texts and articles include progressive relaxation as a nursing intervention, there are few systematic studies. More data are needed from populations that can benefit from the technique. Measurement instruments that are accurate and feasible to use in the clinical setting for assessing both the degree of relaxation and the effectiveness of the intervention need to be specified. It would be helpful if investigators would follow several guidelines:

- identify clearly the characteristics of the sample;
- specify the exact teaching technique used, including the environmental variables;
- provide precise information about the measurement instruments and their timing;
- indicate main effects and interaction effects; and
- evaluate the success or lack of success of the technique and the factors that may have contributed to the results obtained.

Progressive relaxation has often been viewed as a benign technique; only recently have some precautions for its use been noted.

- In persons who are depressed, relaxation may precipitate further withdrawal.
- In persons experiencing hallucinations and delusions, loss-of-reality-contact reactions may occur.
- The trophotropic state created by relaxation can intensify the toxic effects of medications; an excessive trophotropic response can result in temporary hypotensive or hypoglycemic states.
- Cardiac patients should receive special instructions not to tightly tense muscles.
- For some patients in pain, focusing attention on body functions increases awareness of the body and heightens the pain experience.

These cautions indicate the need for nurses to have a thorough knowledge of the patient's history before instituting progressive relaxation.

Progressive relaxation should not be viewed as a panacea for all persons and all conditions. Davidson and Schwartz[22] suggest thorough assessment of a person

before a specific stress management technique is prescribed. Both the cause of the stress and patient characteristics should be considered. Patients also need to understand that progressive relaxation is not magical; it requires effort to be effective. Nurses have a unique opportunity, however, to investigate the applicability of progressive relaxation for diverse patient populations.

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