Programmed Voice Therapy for the Beginning Vocal Fold Pathology Patient

1976

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PROGRAMMED VOICE THERAPY FOR THE BEGINNING VOCAL FOLD PATHOLOGY PATIENT

BY

ANN ELIZABETH CATON
B.A., Florida Technological University, 1975

THESIS

Submitted in partial fulfillment of the requirements for the degree of Master of Arts: Communication in the Graduate Studies Program of the College of Social Sciences Florida Technological University

Orlando, Florida
1976
ACKNOWLEDGEMENTS

Throughout the course of this research several people have given of themselves in order that I accomplish this study.

I would especially like to thank Dr. David B. Ingram, my thesis advisor, for his professionalism and the numerous hours he has spent with the material. Without his help and patience this thesis could never have been completed.

I would especially like to thank Dr. Thomas A. Mullin for his assistance throughout this research as well as my entire college career. Also, I would like to thank the other members of my committee Dr. Gladys Bennett and Dr. Albert Pryor. I would also like to thank the following physicians for their help in the completion of this thesis: Dr. Stephen Howery, Dr. Barry Kronman, Dr. Hobson Wilson, Dr. Colin Freeman, Dr. John Mahan, Dr. John Coleman, Dr. John Taggart, Dr. John Webb Jr., Dr. Merrill Wattles, Dr. Rufus Holloway Jr., and Dr. Richard Goldcamp.

A very special thanks to Maggie Richardson for her time, guidance and patience in preparing this manuscript.

And finally I wish to thank my family for their eternal faith, support and encouragement.
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1. Analysis of Variance of Method of Presentation
2. Summary of Group Means and Differences
INTRODUCTION AND RATIONALE

The interest of the medical profession, coupled with the efforts of speech therapists and the awareness of the problem by certain voice teachers, has led, in recent years, to the formation of a steadily enlarging group of persons whose chief concern has been with the functioning of the larynx and the curing of vocal disorders resulting from the abuse of its proper functions (McCloskey, 1959).

Milisen (1957) reported that voice disorders existed in about 1% of our population.

The treatment of patients with voice disorders has undergone an interesting change recently. In the past, therapy approaches have been somewhat individually exclusive of each other, however, recently there has been an attempt to assimilate and coordinate these techniques. Boone (1971) and Moncur and Brackett (1974) suggest similar therapy techniques throughout vocal rehabilitation. This has been desirable because as the various techniques and philosophies are combined, a more viable treatment procedure emerges (Cooper, 1963). Continuing in this direction, an attempt will be made in this thesis to unify and program rehabilitation approaches in the specific area of vocal fold pathology.

Types of Pathologies and Nature of Vocal Abuse

The typical vocal fold abuse pathologies as described by Boone (1971) include:
1) Cord thickening - the free glottal edges of the folds become granular and somewhat rounded, with occasional blood vessels seen on their superior surfaces. The normal pearly-white surface of the fold becomes inflamed in its entire length with increased redness often observed in the middle of the true vibrating fold.

2) Vocal nodules - when the vibrating vocal folds approximate one another with excessive force, their approximating inner margins begin to show irritation at the midpoint (the anterior, middle one-third junction, as in the vocal fold thickening). With this irritation repeated day after day, increased callous-like layers of epithelium begin to cover the irritated site.

3) Vocal polyps - usually occur at the same site as vocal nodules. The early thickening of the fold becomes irritated, resulting in hemorrhages. As the hemorrhage is absorbed the tissue at the site may become swollen and somewhat distended.

4) Contact ulcers - usually located bilaterally on the free, approximating margins of the vocal processes. These posterior ulcerations rarely produce any hoarseness, (Boone, 1971).

Organic changes in the vocal folds may occur as a result of some types of vocal abuse. Van Riper (1958) states, "Tension in any area of the body tends to flow toward and focus in the larynx." Brodnitz (1959) also believes many voice disorders result from too much muscular force or hyperfunction. Hyperfunction of the vocal folds sometimes results in pathologies of the larynx which can cause the voice to sound breathy, hoarse or a combination of the two. (Wilson, 1972).

In 1955, Ferguson conducted a study to determine if vocal misuse could cause organic pathologies of the larynx. Organic
lesions of the larynx can be caused by vocal misuse and few laryngologists are trained to recognize vocal misuse. He concluded that knowledge of methods of voice production, together with an understanding of the patient's emotional problems was required for the proper treatment of such laryngeal lesions.

The vocally abusive behaviors which may cause these pathologies are: excessive loud talking, shouting, screaming, coughing and throat clearing (Boone, 1971; Wilson, 1972). Cooper and Nahum (1967) cite examples of vocal abuse as: talking above mechanical noises, air conditioning and office equipment, also shouting at public events. Personality characteristics can sometimes cause such vocal fold pathologies, as in the case of the patient with contact ulcers who tends to be a hard-driving person whose pitch is usually too low (Boone, 1971). Contributing factors include smoking, allergies and upper respiratory conditions (Wilson, 1972).

Types and Sources of Treatment

Although there are different patterns or sequences for rehabilitation of vocal fold patients because of patient or therapist differences, the following individual treatment phases seem to be common to most treatment plans.

1. An indirect laryngoscopy by a laryngologist as a diagnostic procedure (Boone, 1971; Wilson, 1972; Moncur and Brackett, 1974).
2. Pre-surgery counseling which may include:
   a. Description of the normal process of phonation
      (Moore, 1957; Murphy, 1964; Wilson, 1972; Moncur and Brackett, 1974).
   b. A discussion of the nature and effects of vocal abuse and resulting vocal fold pathology
      (Brodnitz, 1959; Arnold, 1963; Boone, 1971; Greene, 1972).
   c. The need for and description of voice rest (Moore, 1957; Von Lidden, 1958; Kleinsasser, 1968; Boone, 1971; Rothenburg, 1974).

3. Voice therapy which may include:
   a. Diagnostic and case history information along with the isolation of vocal abuse hyperfunction (Boone, 1971; Moore, 1971; Fox, 1975).
   b. Ear training so that the patient can learn to discriminate between clear and dysphonic voices when they are produced by the clinician (Brodnitz, 1961; Boone, 1971; Moncur and Brackett, 1974).
   c. Feedback or confrontation experiences so that the patient may perceive his error behavior (Brodnitz, 1961; Boone, 1971; Wilson, 1972).
d. Searching for a clear tone at the vowel and word level (Moore, 1957; West and Ansberry, 1968; Boone, 1971; Greene, 1972).

e. Stabilization of the clear tone at the vowel and word levels and the construction of a hierarchy to accommodate generalization for carry-over to the conversational level (Barry, Eisenson, 1956; Boone, 1971; Wilson, 1972; Moncur and Brackett, 1974).

Various combinations or sequences of the above phases are usually constructed for specific patients. For example, a patient with fibrous bilateral vocal nodules or contact ulcers might require all phases. On the other hand, a patient with laryngitis or a beginning nodule might only require a laryngology examination, description of normal phonation, discussion of vocal abuse, need for voice rest and voice therapy. Or a patient with functional dysphonia and no vocal fold pathology might only require a laryngology examination and voice therapy. Other combinations might also be constructed for other patients.

The Rehabilitation Team

Specialists from several areas, including speech pathology, audiology, laryngology, pediatrics and others, work with children who have voice problems (Wilson, 1972).

More and more laryngologists have begun to realize that voice therapy by a well-trained clinician should form an integral part of the overall plan of treatment of these
patients (Brodnitz, 1966).

Therefore, clinicians and laryngologists agree that a team approach for the rehabilitation program for voice patients is necessary (Wilson, 1972). The first step is the examination by the laryngologist.

**Laryngologist**

"The laryngologist is responsible for the diagnosis and the medical and surgical treatment of the patient" (Greene, 1972). The laryngologist makes the diagnosis of the problem and what may be causing it.

Patients should not receive voice therapy without a diagnosis from a laryngologist, otherwise voice therapy may be inappropriate as in the case of papilloma or carcinoma. The decision as to whether or not voice therapy would be beneficial is made by the laryngologist who may in turn confer with the speech pathologist (Boone, 1971).

Similarly, Greene (1972) states:

No case of hoarseness should ever be accepted for treatment by a speech pathologist without first having obtained a report from a laryngologist. It is imperative that malignancy should be excluded.

Diagnosis of laryngeal disorders and diseases should be the responsibility of the laryngologist, indicating that the laryngologist is a necessity in the management of voice disorders (Moore, 1957; DeWeese and Saunders, 1960; Cooper, 1971).
Boone (1971) discussed the laryngeal examination as including an assessment of the larynx and related structures.

The vocal folds are assessed, usually by indirect mirror laryngoscopy, and their color, configuration, and position noted. During the patient's quiet respiration, the laryngologist looks for the normal inverted-V position of the cords. For phonation, the patient is often asked to phonate a relatively high pitch, perhaps by extending the e-e-e for several seconds. The higher the pitch, the further the epiglottis is extended upward, permitting a relatively unobstructed view of the vocal folds. A judgement is made on the adequacy of fold approximation during phonation. Other structures examined may include the ventricular folds, laryngeal ventricle, pharynx, tonsils-glands and muscles of the neck etc. The laryngologist's examination is directed at finding the cause of the patient's presenting problem and evaluating the overall status of the larynx and related mechanisms (Boone, 1971).

It is a necessity that the laryngologist perform indirect laryngoscopy so the condition of the folds can be determined in order to plan the direction of therapy.

Pre-Surgery Counseling

This part of the sequence consists of preparing the patient for surgery and voice rest.

Description of the Normal Process of Phonation - It is important that the patient have a clear understanding of what his problem is. Some advice and education about vocal functioning will prove helpful in vocal re-education, the more involved the patient becomes in the therapy process, the better the likelihood of his continuing. The patient should be given an explanation of the elements of voice and the physiological processes involved in
phonation (Murphy, 1964; West and Ansberry, 1968).

Wilson (1972) continues in this direction by suggesting that the child be taught how voice is produced and facts about his voice problem. Having a basic understanding of the vocal processes help the child to understand therapy procedures and helps to motivate him to improve his voice. A young child can be given a simple explanation of the larynx and its functions. The child usually responds well to drawings and comparisons. These are especially useful when the child must be given reasons for eliminating the voice abuse.

It is important, as an early therapy procedure to explain the process of phonation to the patient. The procedure should be a simple clear-cut presentation and the discussion should focus on the nature of the folds and how they function in normal speech (Moncur and Brackett, 1974). Later, the discussion should focus on how the client is producing his voice. During the explanation of the processes, the clinician can use models, diagrams, charts, etc. (Moncur and Brackett, 1974).

Discussion of the Nature and Effects of Vocal Abuse - It is important to discuss vocally abusive behaviors with those patients displaying such problems and determine how these abusive behaviors can be eliminated. It is important that the clinician give his explanations in the language the patient can understand and that it
be brief (Boone, 1971; Greene, 1972).

Arnold (1963) similarly believes that nodules in children are mainly the result of vocal abuse, therefore the elimination of the underlying causes requires: parent counseling, psychotherapeutic rehabilitation and vocal re-education.

Brodnitz (1959) stated that the goal of voice therapy for patients with contact ulcers is to make the patient aware of his faulty habits and to eliminate the hyperfunction.

Many patients should be educated about new vocal habits before surgery is performed (Fox, 1975).

Clinicians agree then, that it is important to discuss the nature and effects of vocal abuse, to provide insight and motivation to the problem.

Description of Voice Rest - Voice rest may be used 1) following surgery, (Moore, 1957; Wilson, 1972) 2) to restore weak vocal folds (Kleinsasser, 1968) and 3) to restore damaged folds (Arnold, 1963).

Healing must occur after surgery and the first step of therapy is usually complete silence (Moore, 1957). All communication must be by pencil and paper, usually for a period of a few days to a week or two. Silence does not improve the voicing habits but merely gives the vocal folds a chance to heal (Moore, 1957; Wilson, 1972). Brodnitz and Froeschels (1967) however, are opposed to voice rest after nodule surgery because they feel there may be
muscular atrophy. Peacher (1947) also indicated voice rest is not necessary after nodule surgery but voice therapy is appropriate. In the early stages of contact ulcers, voice rest may promote regression and healing whereas surgical removal may result in recurrence. Surgery is indicated when granulomas are mature, however, patients should be on complete voice rest before and after surgery.

Kleinsasser (1968) suggested medical personnel often prescribe voice rest because 1) the folds tire from natural use and 2) voice rest will revitalize the cords so that a clear voice can be produced. Voice rest should follow surgery for about one week. Also, in a few instances, voice rest is recommended prior to therapy if the voice is extremely hoarse.

Voice rest is used in cases of acute laryngitis (Boone, 1971). This prevents further irritation and promotes healing. It is essential at this point that the folds refrain from any vibration (Boone, 1971).

Arnold (1963) states that acute nodes in singers are best treated by voice rest, also that voice rest should be stressed after the removal of a polyp because most patients have considerable irritation. He also stresses the fact that contact ulcers begin with an extended period of voice rest and limited voice use.

Myerson (1964) suggests as in the case of contact ulcers that if the pathology is inactive and healing, the patient should speak without
exertion.

The length of the voice rest varies according to the pathology. It is determined by the surgeon and ranges anywhere from three to seven days to two to three weeks (Boone, 1971).

As in the case of well-developed vocal nodules, voice rest is usually maintained for one week (Von Lidden, 1958; Brodnitz, 1959; Jackson and Jackson, 1959; Rothenburg, 1974), whereas voice rest for polyps should be approximately two weeks (Von Lidden, 1958; Brodnitz, 1959).

Lore (1950) stated that after cord stripping, the patient should talk immediately but not excessively and should not whisper, shout or sing from about three to five weeks.

Voice rest then is used in many ways and the length of voice rest depends on the type of pathology (Brodnitz, 1959; Rothenburg, 1974). However, it is almost always used in vocal fold abuse pathology cases. After this procedure has been explained to the patient in order that he understand the need for a healing period, he then is ready for surgery.

**Surgery Information**

Surgery is sometimes needed to provide a more normal structure for proper phonation (Moore, 1957).

Surgery is often necessary for such disorders as nodules, polyps, granulomas and contact ulcers, however, the speech clinician
should explain to the patient what happens to his voice as a result of surgery (Fox, 1975).

Surgery procedures vary according to the pathology. If there is granulation tissue formed over a contact ulcer, it should be removed with small biting forceps introduced through a laryngoscope (Saunders, 1964). Clipping or nipping of the granulomas, or trimming of the edges tend to prolong the existence of the ulcer. "Such procedures as the use of chemicals, cauterization, curettage, or nipping with cupped forceps serve only to interfere with healing and prolong the condition" (Myerson, 1964).

Although treatment of vocal nodules has been the subject of controversy recently, (Jackson and Jackson, 1959) in most cases the careful removal of nodules under direct laryngoscopy, using cupped forceps is necessary (Jackson and Jackson, 1959; Saunders, 1964; Ballenger, 1969).

Surgery of vocal polyps consists of stripping of the mucous membrane by a direct laryngoscopy. After healing, the mucosa looks relatively normal (Saunders, 1964; Ballenger, 1969).

In summation, various vocally abusive behaviors can sometimes cause vocal fold pathologies. These in turn may create the need for surgery. After and occasionally before surgery, voice rest is needed so that the vocal folds can properly heal. In any instance voice rest is explained before surgery so that the patient understands the sequence of treatment.
Voice Therapy

Voice re-education for vocal fold pathology patients has the following purposes: 1) to teach the patient adequate use of his voice following surgery 2) to teach the correct use of his voice prior to surgery 3) to try to alleviate vocal pathology by vocal rehabilitation in lieu of surgery and 4) to use vocal re-education when surgery is not necessary (Wilson, 1972). The goal of vocal rehabilitation is to restore the normal voice in all conditions or to prevent vocal hyperfunction (Brodnitz, 1961).

"With acceptance of vocal abuse as the cause and the therapeutic approach of nonsurgical intervention, the speech clinician inherited a prominent role in the treatment of children with vocal nodules" (Toohill, 1975).

Strong and Vaughn (1971) suggested that in the early stages of vocal fold pathology, counseling will resolve the problem without surgery. For adults whose voice quality is not important to them, counseling is indicated, however, for patients who use their voices professionally, voice therapy is indicated (Brodnitz, 1961).

Voice therapy should begin before surgery so that the patient can have several sessions of voice therapy to introduce him to the principles of using a good voice (Wilson, 1972). This also opens the door for the continuation of therapy after the operation (Wilson, 1972). Voice therapy following surgery is necessary to restore the normal voice by eliminating vocal abuse and avoiding recurrance
Arnold (1963) stated that nodules will return after surgery if the voice abuse continues. Voice therapy should also follow surgery after removal of thickening, polyps and polypoid thickening (Moore, 1957).

Environmental therapy lessening environmental initiants or allergens, can help decrease shouting or other abuses which can lead to the reduction or elimination of vocal nodules, chronic laryngitis, contact ulcers and others related to vocal abuse (Moore, 1971).

Speech therapy is indicated after nodule or contact ulcer surgery and sometimes after removal of polyps and papiloma (Kleinsasser, 1968). Speech therapy is also necessary if the patient uses a pitch that is too low or too high, or if he phonates with the false cords (Kleinsasser, 1968).

Cooper (1963) divided vocal rehabilitation into traditional and modern procedures. Traditional methods were concerned with pitch, tone, focus, quality, volume, breath support and rate; treating the variables first in isolation and then in combination. Modern vocal rehabilitation includes psychotherapy, plus illustrative therapy and utilizes extensive tape replays of the patient's old and new voices.

**Diagnostic** - The first stage in voice therapy is the diagnostic session in which information is collected about the patient.

The diagnosis begins with an interview with the patient.
consisting of the following steps: a statement about the problem as perceived by the patient and development and history of the problem. During the entire interview, the clinician is continuously evaluating the patient's voice (Boone, 1971; Moore, 1971; Wilson, 1972; Fox, 1975).

The purpose of the diagnosis then is to isolate those variables which are contributing to the vocal pathology. Typically, the diagnostic sequence consists of interviewing, observing and occasionally some formal testing (Boone, 1971; Moore, 1971; Wilson, 1972).

**Ear Training** - The first step in therapy following the diagnosis is ear training (Moncur and Brackett, 1974). It is the purpose of this stage of therapy to teach the patient to discriminate auditorily between clear and dysphonic voice qualities at the vowel or word levels when the therapist produces the various voices.

Wilson (1972) suggested that the key to the goal of voice therapy is a program of listening training procedures. The patient must learn to discriminate between a good and poor voice. His training program consists of a) awareness of deviation in others, b) gross discrimination of differences in others and, c) fine discrimination of differences in others. Listening stimuli is presented via tape recorders, or live. The clinician presents the patient with various models; the first being relatively easy and others becoming progressively more difficult (Eisenson and
Ear training helps direct the patient toward discriminating his own correct and incorrect voice (Boone, 1971; Moncur and Brackett, 1974).

Confrontation - Accurate auditory discrimination on the part of the patient while the therapist produces various voices does not insure that the patient has insight into his own problem. Therefore, it is necessary for the patient to perceive his voice the way others do (i.e. via tape recordings).

Brodnitz (1961) uses auditory training equipment during confrontation; the patient speaks into a microphone and listens to his voice through a head set.

Audio tape recorders are the most direct approach when training the patient to listen to his own voice (Moore, 1957; West and Ansberry, 1968; Boone, 1971).

At this point it is anticipated that the patient knows the actual nature of his deviant voice and is motivated to search for a more effective or different voice.

Searching - The purpose of searching is to help the patient experience a more acceptable voice. This is usually done with vowels using numerous techniques (Boone, 1971).

Boone (1971) uses 12 techniques for finding the "target voice." For example, the pushing approach is used with patients who have problems abducting the folds, on the other hand relaxation techniques
are used to help patients with hypertension, etc.

Other searching techniques include pitch training, loudness resonance training, easing of cord adductions, and relaxation exercises (Peacher and Hollinger, 1947; Moore, 1957; Eisenson, 1958).

Similarly West and Ansberry (1968) suggested the use of masking noise with a majority of patients with voice defects. Their plan suggested bombarding the patient's ears with constant noise so that he cannot hear his own voice until after he has produced it correctly.

By the end of this stage the patient should be able to produce a clear voice for vowels and maybe words and is now ready to expand the use of his new voice (Boone, 1971).

Stabilization and Construction of a Hierarchy - The clear phonation acquired in searching as the patient produces vowels or words is often unstable in sentences, reading and conversational voicing. For this reason, a hierarchy beginning with easy voicing situations and ending with demanding situations is often constructed and implemented. The hierarchy is usually different for each patient.

Boone (1971) suggests a hierarchy analysis in which the patient constructs different situations ranging sequentially from little anxiety provoking to the most anxiety provoking. He begins by creating an awareness of the hierarchy, gradually introducing home assignments and then field assignments.

Wilson's (1972) voice therapy hierarchy consists of two steps:
1) limited habituation - the child uses the new voice for short periods of time and 2) overall habituation - patient uses the new voice outside of the formal therapy environment varying from short to continuous conversation.

After the patient reaches the end of the hierarchy, he is dismissed (Boone, 1971; Moncur and Brackett, 1974).

**Bibliotherapy**

Currently clinicians are emphasizing efficiency and accountability, it would seem desirable to synthesize and program as much of the therapy sequence as possible without disturbing the creative and spontaneous elements of therapy.

Discrimination training, confrontation and searching steps do not lend themselves to the use of programmed materials because of variances from patient to patient and certain spontaneous and creative aspects of therapy (Boone, 1971). However, the early stages of therapy, such as descriptions of normal phonation, vocal abuse and voice rest do lend themselves to programmed materials.

As we begin to understand more about the different disorders and their treatments, aspects of treatments which have previously been creatively said are now being written (Johnson, 1948). This saves the patient both time and money. For example, Johnson's pamphlet (1948). "An Open Letter to the Mother of a Stuttering Child," to the parents, provides parents with information
concerning the nature of beginning stuttering and suggestions about what to do. Also, Miller's (1960) pamphlet "Is Your Child Beginning to Stutter?" provides parents with specific suggestions for the disorder.

In the area of language, pamphlets are also being used, for example, Penington and James (1965) "For the Parents of a Child To Listen and Talk" provides suggestions for both the parents and teachers.
STATEMENT OF THE PROBLEM

It is an accepted idea that vocal fold pathology patients require information related to normal phonation, voice rest and vocal abuse (Boone, 1971; Wilson, 1972; Moncur and Brackett, 1974). This is usually accomplished on a one-to-one basis between the therapist and the patient. This is time consuming and represents considerable expense for the patient.

This information has been prepared in pamphlet form. It is the purpose of this study to determine the comprehension abilities of those subjects reading the pamphlet and those listening to an examiner read it to them.
METHODOLOGY

Test Site

All testing was conducted in two otolaryngology (ENT) offices in central Florida.

Subjects

Forty-five subjects were patients of two ENT offices in central Florida. These patients ranged from 20 to 60 years of age. It was necessary for all individuals to have the ability to read and understand English prior to being randomly selected.

Stimulus Material

The independent variable stimulus material for Group I (experimental) subjects consisted of a voice therapy pamphlet (Appendix A) which was divided into three sections. The first section provided a description of normal voicing and included aspects of inhalation, exhalation and phonation with an emphasis on vocal fold activity during voicing. As can be seen in Appendix A, the pamphlet contained written material as well as illustrations.
Section two was concerned with various types of vocal abuse and physiological effects on the vocal mechanism. The final section contained information on the need for and suggestions for voice rest.

The stimulus material for Group II (experimental, verbal) consisted of the voice pamphlet which was read to them verbatim.

The questionnaire for Group III, Appendix B, which was administered to all three groups consisted of ten questions designed to evaluate the subject's knowledge of key aspects of vocal fold pathology information presented in the pamphlet.

Procedure

Group I subjects (experimental, those who read the pamphlet) were randomly selected from patients in the ENT offices. Subjects were requested to imagine that they had a voice problem and this was a pamphlet that the physician had given to help them understand their condition, (Appendix A). After reading the pamphlet, (10-12 minutes) subjects were given the questionnaire (Appendix B).

Group II subjects (experimental, those who listened to the examiner read the pamphlet) were selected and instructed in the same manner as those in Group I (Appendix C). The experimenter read the voice pamphlet verbatim to each subject in this group. They were then asked to complete the dependent variable questions.
Group III subjects (control) were also randomly selected from those in the waiting room in the ENT offices and instructed to answer the dependent variable questions to the best of their ability (Appendix B).

**Data Analysis**

A one-way analysis of variance and two-tailed $t$ test were planned to analyze the data.
RESULTS AND DISCUSSION

Due to the difficulty of obtaining a large sample of vocal fold pathology patients, it was decided to use a sample of patients from ENT offices. To insure validity of generalizing results from non-vocal fold pathology patients to those with vocal fold pathologies, an initial comparison between the two groups was necessary. The scores of six vocal fold pathology subjects were compared with six normals in an ENT office with a t-test. The results indicated that the two groups did not differ significantly ($t = -0.36$). Therefore, the author believes that the use of the normals as subjects is justifiable.

Table 1
Analysis of Variance of Method of Presentation

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<th>df</th>
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<td>Treatments (presentation)</td>
<td>24.5776</td>
<td>2</td>
<td>12.2888</td>
<td>7.5460**</td>
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<td>Experimental Error</td>
<td>68.4002</td>
<td>42</td>
<td>1.6285</td>
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<tr>
<td>Total</td>
<td>92.9778</td>
<td>44</td>
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**$F_{0.99} (2,42) = 5.26$**
A one-way analysis of variance (ANOVA) was performed. The results of the ANOVA are summarized in Table 1. The significant $F$ ratio conclusively indicates that differences between the groups did exist.

Subsequently, Sheffe multiple $t$ tests were performed between the groups (Sheffe, 1953). The results are summarized in Table 2.

Table 2
Summary of Group Means and Differences

<table>
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<td>7.467</td>
<td>I X II, I X III*</td>
</tr>
<tr>
<td>II (verbal)</td>
<td>7.53</td>
<td>II X III**</td>
</tr>
<tr>
<td>III (control)</td>
<td>5.93</td>
<td></td>
</tr>
</tbody>
</table>

*2 tailed, $p < .05$
**2 tailed, $p < .02$

The data in Table 2 illustrates there was a nonsignificant $t$ ($t = .14$) between the two experimental groups. Each experimental group however differed significantly from the control group. For Groups I X II, $t = 3.185$, df = 14, $p < .05$; for Groups II and III, $t = 3.636$, df = 14, $p < .02$.

In summation, Group I, or those reading the pamphlet did not differ significantly from Group II, those who listened
to the examiner read the pamphlet. Both groups however, differed significantly from the control Group III, those not receiving any written or verbal information.

Results obtained from Group III indicates that patients who come to ENT offices have little information concerning vocal fold pathologies. Group II (experimental, verbal) results suggest that it is possible to teach this information by counseling. Group I (experimental), results suggest that it is possible to teach this information with a pamphlet.

The two experimental groups (I and II) performed similarly, thereby suggesting that the method of presenting this material made no difference. Patients who listened to the examiner reading the material understood the ideas as well as patients who read the material themselves. This finding has critical implications for therapy.

First, the amount of therapy contact time and subsequent cost is reduced for the patient. When this routine counseling is performed in a programmed fashion, therapists may focus on the more subtle aspects of counseling. Second, the patients may take the pamphlet home with them and re-read it, look at the diagrams; thereby, reinforcing their original learning.

It is important to realize that this pamphlet can be used in other therapy situations. For example, the pamphlet can be used with vocal fold pathology patients in private practice, university
clinics and institutions.

Additional research should be directed toward the idea that further redundancies and areas of agreement may lend themselves to similar programmed material. When this is possible, we will increase our sophistication levels in understanding the therapy model, thus programming the routine aspects of therapy and allowing more time for the creative and spontaneous elements of therapy.

The author feels that these results indicate applicability to other pathology populations because the study was an after-only design, therefore decreasing those factors which jeopardize internal and external validity.
A review of the literature revealed that it is an accepted idea that vocal fold pathology patients require information related to normal phonation, voice rest and vocal abuse early in therapy. Because this is usually accomplished on a one to one counseling basis between therapist and patient, it is time consuming as well as expensive for the patient. It was decided to investigate the possibility of "programming" this information in pamphlet form and comparing the comprehension levels of subjects who listened to an examiner read the same information with subjects who read the pamphlets.

Forty-five patients from two ENT offices in central Florida were randomly assigned to three groups. Group I subjects read a pamphlet containing information related to normal phonation, voice rest and vocal abuse. Subjects then answered ten questions designed to evaluate their knowledge of the key aspects of the information. Group II subjects listened to the experimenter read the voice pamphlet verbatim and were then asked to complete the dependent variable questions. Group III subjects were instructed to answer the questions to the best of their ability without receiving any information on vocal pathology.
Sheffe multiple $t$ tests were performed on the dependent variable test scores of the groups. Results demonstrated that there was no significant difference between those subjects reading the pamphlet (Group I) and subjects listening to the examiner read the pamphlet to them (Group II). However, there were significant differences between Group III, those not receiving information, and the two experimental groups.

The method of presenting this information did not make a difference in comprehension; therefore the pamphlet may be used to save the therapist time and the patient time and money.

Further research might be directed towards clinicians looking for other aspects of the therapy sequence which may be programmed.
APPENDIX A

Voice Pamphlet and Instructions Read to Each Subject Prior to Reading the Pamphlet

"Imagine that you have a voice problem. After your doctor has diagnosed you, he would give you this pamphlet which contains information so that you can begin to help yourself. When you are through you will be given some questions to answer so that the doctor will know you have the key ideas."
HELPING YOUR VOICE TO GET BETTER

By

David B. Ingram, Ph.D.
Speech Pathologist
INTRODUCTION

Your doctor has diagnosed you as having a voice problem. There are many causes of voice problems, but several changes in your talking habits may improve your voice. Perhaps your physician will decide that a voice therapist may help you, or you require surgery, or voice rest, or that you have a voicing habit that needs to be changed. You may need 'some' or 'all' of the above.

What's important FIRST is that you need some information about your voice because YOU will be helping to make it better. We would like to put you to work right away as a member of your own rehabilitation team.

There are several things that you can do to help your voice. If you will do them, you can save yourself both time and money. In fact, it would be difficult to improve your voice without your help.

Your voice belongs to you, and you will be in charge of most of the changes; however, you will need some information or training first. That's what this pamphlet is all about.

There are three parts to the pamphlet.
(1) How normal voices are made,
(2) How people hurt or 'abuse' their voices,
(3) Getting your voice back to normal.

After you have studied this pamphlet, the receptionist will give you a short written test so that we can make sure you got all the important ideas.
HOW NORMAL VOICES ARE MADE

At least part of your voice problem is caused by vocal abuse. This means that you have been 'misusing' your voice. The first step in learning to use your voice without hurting it is to learn how normal voicing is done.

Before you make a voice, you must take air in, then as it comes out, it will pass over the vocal cords or folds and vibrate them. Now you are making a voice. This basic sound may be changed into different vowels in your mouth and nasal cavities. Now let's look more carefully at these steps.

Taking Air In - "Inhalation"

When you make sounds for talking like "aah" or "ooo", you begin by taking air in:

(1) Through your nose
(2) and mouth
(3) then the air goes down through the top part of your air tube (voice box)
(4) down through the lower part of the air tube (trachea)
(5) and finally to your lungs.
Getting The Air Out - "Exhalation"

If you look at the drawing on the previous page, you will see that the air in the lungs may go back up and out through the same tubes and areas it came in through. As the air leaves the lungs it is under pressure and flows up the air tube (4) through the larynx, (3) and out through your mouth, (2) or nose, (1) (see picture).

Making A Voice - "Phonation"

The air goes in - the air goes out. That's breathing or respiration. Your VOICE happens when the air comes up through the larynx and vibrates the vocal folds.

Now here's the important part. Put your finger on the small bump at the top of your larynx (sometimes called the adam's apple). Your finger is near the top of the air tube and the vocal folds.

If we could look down the throat to see the top of the tube behind your finger, we would see two small pieces of skin stretched across the tube. Air may pass through the opening. Remember, we're looking down the air tube.

The vocal folds move back and forth - they open and close. When they move together, the air tube is closed.

When the folds move apart, they open wide and lots of air may go in or out.

The folds open and close rapidly many times while you say "aaaaaaaaaaah".
Making Pitch Changes - The vocal folds may stretch out from front to back so they become long and thin. (Which makes the pitch of your voice raise.)

When muscles in the vocal folds relax, the folds get loose and thicker, and when they vibrate this makes the pitch lower.

There is a BEST pitch range for everyone. It is determined mostly by the size of your vocal folds.

Your vocal folds make many complicated changes as you talk; (a) the pitch goes up and down and the vocal folds 'stretch out' or 'relax', (b) the folds vibrate and, (c) the folds open and close.
HOW PEOPLE HURT OR 'ABUSE' THEIR VOICES

It is hoped you have enough ideas now so you may begin to understand what may have caused your voice problem. Any time there is too much or too little tension in the muscles in the breathing or phonation areas we have talked about, there may be vocal abuse. The vocal folds and the muscles which control them may also tighten and the vocal folds may become reddened, swollen or develop callous-like bumps.

When the vocal folds come together and close, they actually touch all along the middle edges. If you are making a voice normally, the vocal folds come together gently. If you are 'hurting' the vocal folds, you are probably making your voice so the vocal folds go together too hard. And this is what vocal abuse is all about; voicing habits that hurt the vocal folds.

Consider this example. Imagine you did not rake leaves very often. Suddenly you found that you had to rake leaves for an entire day. At the end of the day you would probably have sore hands with redness, swelling and blisters. This would happen because the skin was abused; it was rubbed and scraped. If you kept on raking for a few days, hard callouses would develop as protection against the rubbing.
The skin on your vocal folds is the same as the skin on your hands. If vocal fold skin is rubbed, bumped or abused, it will redden, thicken and "blisters" will form. The "blister" will be soft at first and then get hard if the abuse of the vocal folds continues. So your job is to find out how you have been hurting your voice and then eliminate the abuse. Then the problem won't happen again. Here are some examples of some types of problems and their causes.

(1) Thickening and Reddening of the Vocal Folds and Vocal Nodules

If you (a) yell, (b) talk often in a loud voice, (c) cough or clear your throat often and hard, (d) use 'unusual' or tense voices during play or anger, or (e) use a pitch that is too high or too low, you are hurting your vocal folds. Also, if you are a very tense, nervous person under pressure, the tension may focus in the neck, shoulder or laryngeal area. In most of these situations the vocal folds slam together during voicing.

These problems begin with one of the above vocal abuses and result in thickening and redness. If the vocal abuse continues, the thickening near the middle of the fold may develop into a blister or nodule. In severe conditions a nodule may be present on both folds.
(2) Contact Ulcers

Contact ulcers are similar to vocal nodules in that they are both "between the vocal folds". Contact ulcers, however, are small growths at the back of the vocal folds. There may be only one or one on each vocal fold.

The causes are also different; (a) this problem is connected with loud or hard voicing when the voicing starts, (b) frequent lifting or straining during voicing, (c) 'authoritative voicing'. Occasionally, medical problems cause contact ulcers.

(3) Laryngitis

Laryngitis may result from infection from a cold or flu, vocal abuse such as yelling at a football game, or both. The vocal folds become thickened and red. As the laryngitis gets worse, it becomes harder and harder to voice. If you insist on 'speaking over' the laryngitis and not resting your voice, it will get worse. You should also consider coughing and throat clearing as vocal abuse.

If appropriate, your physician or speech pathologist will discuss other pathologies with you. However, at this point it is important for you to understand that many types of vocally abusive behavior can cause vocal fold problems. If you are really going to solve the problem, you will want to eliminate these causes. Your physician and speech pathologist will help.
GETTING YOUR VOICE BACK TO NORMAL

What will you need to do to get the vocal folds back to normal?

(1) If you have not seriously damaged your vocal folds, your physician or speech pathologist may help you eliminate the vocal abuse. Treatment usually consists of finding out what vocally abusive behavior you may be using, and then helping you to replace this behavior with normal voicing.

(2) If the condition is slightly more serious, you may be advised to have a week or two of complete voice rest. This means NO voicing at all, limit any coughing, throat clearing, and no whispering. If your doctor recommends complete voice rest, plan ahead for that week so you are not in situations which 'demand' speech. You may have to change your lifestyle somewhat for a week, so prepare yourself.

Complete voice rest is inconvenient, but it is prescribed for a good reason.

You will recall that during voicing, your vocal folds come together and touch many, many times. The skin on the area that touches is injured and needs to heal. If you had a cut on the palm of your hand, you would probably not 'rake' for a week, but instead would let the skin heal. Your vocal folds are the same. They need rest and no rubbing so they can heal.
Good voice rest for two days followed by five minutes of voicing won't work. You are making an investment in something very important—your voice. Go 'first class'.

(3) In more serious cases the physician may choose surgery followed by voice rest. The surgery consists of gently scraping the added tissue or thickening from the fold or removing the nodule or growth from the vocal fold.

Many surgeons prefer to have their patients follow surgery with a week or two of complete voice rest. If your doctor tells you to follow this procedure, he wants to make sure the folds heal properly; so follow the previous directions for complete voice rest.

(4) Occasionally, a week of 'modified voice rest' is suggested. This plan allows for a minimum of talking and reduced or eliminated coughing or throat clearing. Talk only when absolutely necessary and only for short periods such as 30 - 60 seconds.

This technique is used when the condition of the vocal folds is fairly good at the beginning of treatment, or the folds may have improved as a result of complete voice rest.

Your doctor will choose the right treatment sequence for you. You may need only modified voice rest for a week or combinations of the other treatment techniques.

Now, review this pamphlet and you are ready for the quiz.
Dependent Variable Questions

CIRCLE THE CORRECT ANSWER

T F 1. The vocal folds are open during inhalation.

T F 2. The pitch of our voice is dependent upon how much air we force up from our lungs.

T F 3. Nodules are primarily caused by hard glottal attacks or authoritative voicing.

T F 4. During inhalation we take air first through the nose and mouth; it then goes down through the voice box and lower air tube and finally down to the lungs.

T F 5. During modified vocal rest patients are allowed to talk freely most of the day however, they must not yell or talk loudly.

T F 6. The major differences between normal voicing and vocal abuse is related to the force of the vocal folds coming together.

T F 7. Yelling and loud talking are considered examples of vocal abuse, however throat clearing and coughing are not.

T F 8. Voicing happens as air goes down through the larynx which makes the vocal folds vibrate.

T F 9. Contact ulcers are caused by a lack of tension as the vocal folds come together.

T F 10. Complete voice rest may be used with a beginning vocal abuse problem or following surgery so that the vocal folds can heal.
APPENDIX C

Instructions Read to Each Subject Prior to the Reading (verbally) of the Pamphlet

"Imagine that you have voice problem. After your doctor had diagnosed you, he would give you this pamphlet which contains information so that you can begin to help yourself. Today, however, I will read it to you. When we are through, you will be given some questions to answer so that the doctor will know that you have the key ideas."
LIST OF REFERENCES


