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# Alleviation of voice difficulties in adults

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# ALLEVIATION OF VOICE DIFFICULTIES IN ADULTS

by

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TABLE OF CONTENTS



APPENDICES

# CHAPTER I

## INTRODUCTION

The voice abnormalities of adults, who have come to the Speech Pathology Department of Central Institute for the Deaf for the alleviation of the voice disorders, have suggested this clinical study.

The writer, a teacher in the Department of Speech Pathology, has had an opportunity to observe and implement a method devised at Central Institute for rehabilitation of the voice and has noted the results of its application. She has further noted that the variable temperaments of the patients govern the length of time the training must be pursued, and also the degree of emphasis and persistence required on certain phases of this method for satisfactory progress.

It has been observed that there is a minimum of emotional upset in the person whose voice disturbance is of pathological origin, and that with improvement of voice, his emotional difficulties become further minimized. The patient whose voice loss or voice abnormality has its origin in emotional disorder, requires in addition to training for voice development, skillful technique in counseling for improved social adjustment. Such judgment and analysis may be guided by a table including the patient's characteristics and experiences which may have had some influence on his voice.

Voice cases, with which the writer has worked, cover a wide range of abnormalities. There have been patients with complete aphonia, laryngectomized patients in whom an esophageal voice has been developed, hemi-laryngectomized patients where the remaining vocal cord is utilized, patients with persistent adolescent voice, those with hoarse voice caused by vocal nodules, some with voice with fluctuating pitch and volume because of nodules or partial paralysis of laryngeal muscles, and cases of strained voice, which is made with fatiguing effort. From this group the writer has selected five typical cases to report in this study.

There is no standard terminology for the description of voice abnormalities because of the varied opinions of listeners. What is considered an unpleasant voice quality by one listener may not be objectionable to another. The terminology used in this study is general and dispenses with the finer discriminations. The voice quality in each patient in this study has deviated from his original voice. The writer has avoided the use of the term "normal voice" because there are no agreed criteria of a normal voice. It is sufficient to say that a voice is abnormal when there is effort on the part of the listener to understand, and fatigue on the part of the speaker to make himself understood. It is with such types that this study is concerned.

When voice abnormality appears in a person in whom no pathology can be found, a psychological or emotional cause is assumed. Sometimes the aftermath of a pathology which

interferes with an acceptable voice also creates an emotional disturbance. There is the dual effect of both psychological and pathological interference. The reaction of the listener to a person having an abnormal voice, and the possibility of being faced with seeking an occupation requiring less use of voice, are also contributing factors to emotional upset.

The therapy used for the rehabilitation of the voice must be geared to the consideration that there can be a combination of pathology and emotional disturbance.

The purpose of this study is to present descriptions of selected cases of adult voice disorders in patients who, having undergone medical treatment, were referred to the Department of Speech Pathology of Central Institute for the Deaf, where they received instruction for the alleviation of the voice disorder. This thesis will include both the clinical findings of the selected cases and the retraining procedure.

## CHAPTER II

## HISTORY

There are many viewpoints among teachers of voice concerning the correct technique of speaking and singing, but there can be no disagreement that respiration, phonation and articulation are necessary for the production of voice. How these faculties are synchronized promotes discussion, especially when regarded from the therapeutic point of view. There are many methods of correcting voice difficulties.

It is known that voice training may be used, 1) to alleviate some functional or slight pathological condition of the vocal cords, and 2) to retrain cases of voice abnormalities following necessary surgery. The value of the otolaryngologist and the speech pathologist co-ordinating their efforts is obvious.

Loré,[1] in his report on hoarseness in children having either multiple papilloma or polypsis, reported that if both cords needed stripping, one cord was stripped first, and the child was allowed to use his voice immediately after the operation. There was definite improvement in the voice the next day. Individual cases varied and improvement in voice was noted the day after the first operation or

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[1] Loré, J. M. Jr. Hoarseness in children. Archives of Otolaryngology, 51: 814-825, 1950.

sometimes as late as two weeks after surgery. The other cord was stripped a month later if the lesion was bilateral. Speech therapy followed the operation to insure the correct use of the voice.

Hodge and Grossman[2] felt that when vocal cords become paralyzed after thyroid surgery, resulting in bilateral abductor paralysis, recovery may occur suddenly, so that operation for correction of the paralysis should be withheld for at least a year. During this time speech therapy helps greatly in rehabilitation.

Misuse or abuse of the vocal cords may produce physical modifications in the vocal cords, such as nodules, that cause either complete loss of voice or some voice alteration. Jackson and Jackson contended that the chief etiological factor causing nodules is vocal abuse.[3] There is no tendency of nodules to reoccur after once removed, but if they do it is because of the original vocal abuse which has persisted.[4] Negus said

> "In every mechanism it is the membranous thyro-arytenoid folds that should vibrate and not the arytenoid cartilages; not only are the latter unsuitable for phonation,

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[2]Hodge, C. E. and Grossman, A. Laryngeal paralysis with a review of its treatment. Canadian Medical Association Journal, LXV (1951), 251, cited in Journal of Laryngology and Otology, LXV (1951), 806.

[3]Jackson, C. and Jackson, C. L. The Larynx and its Diseases. Philadelphia and London: W. B. Saunders Co., 1937, p. 340.

[4]Ibid. p. 341.

> but their prolonged inadvertent vibration leads to pathological changes."[5]

Maramio emphasized muscle tonus and "phoniatric exercises" to improve normal muscular functions or to make new muscular adaptations. Especially is this possible in true functional voice disturbances. He advised, however, vocal exercises only for decreased tonus or hypocontraction, and vocal rest for exaggerated tonus or hypercontraction. Both types receive various systems of therapeutics such as massage, electrical treatment and medicine.

> "Phoniatrics is thus a study to evaluate either hypertonicity or hypotonicity of the various muscles involved in speech production and takes for its role the establishment of an equilibrium between expiration, laryngeal muscular activity and the adaptation of the resonant cavities to pitch and sound."[6]

It is obvious that abnormal strain or abuse may affect the vocal cords and change the voice. One investigator found that such conditions cleared when the subjects phonated in a soft voice.[7] Allen and Peterson found in a specific case of laryngeal inflammation with falsetto voice, that lowering the pitch relieved strain of vocal cords;

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[5] Negus, V. E. The Comparative Anatomy and Physiology of the Larynx. New York: Grune and Stratton, Inc., 1949, p.152.

[6] Maramio, A. Disturbances of phonation of the larynx. Rev. Otorrinolaring., 8: 126, 1948, as cited in Archives of Otolaryngology, 51: 142, 1950.

[7] Pronovost, W. Research contributions to voice improvement. Journal Speech Disorders, 7: 313-318, 1942, citing Brackett.

then they treated any remaining dysphonia and rhinolalia after satisfactory pitch was established.[8] Further reference in recent literature regarding voice strain was reported by Rumsey in which he said,

> "Every case of recurrent laryngitis used a speaking pitch that was much too high and the lowering of the pitch and releasing the tension has solved the problem."[9]

The Bell Telephone Laboratory motion picture of human vocal cords showed poor or little contact of cords on low volume (loudness), and firm contact for an appreciable time on high volume.[10]

There is frequent reference to relaxation of the body and the vocal cords, especially for the correction of hysterical aphonia cases. The importance of proper use of the diaphragm has been stressed. Gray and Wise cite that Huyck and Allen[11] found by Xray technique that the steady action of the diaphragm produced good voices and that jerky action produced poor voices. Gray[12] further mentioned that different methods of breathing may be used for speech with

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[8] Ibid. p. 315.

[9] Rumsey, H. J. Voice strain. Journal of Laryngology and Otology, 64: 708-713, 1950.

[10] Pronovost, W. Research contributions to voice improvement. Journal of Speech Disorders, 7: 313-318, 1942.

[11] Gray, G. W., and Wise, C. M. The Bases of Speech. Revised Edition, 1946. New York: Harper & Brothers, p. 156.

[12] Ibid. p. 157.

good or poor voices and that about sixty-five percent of men and women breath abdominally. The other types of breathing include 1) chest or thoracic, 2) base of sternum or medial, 3) extreme upper chest or clavicular (which should be avoided), or, 4) combinations of abdominal or diaphragmatic, thoracic and medial.

The system used by the writer in voice training depends upon finding the most comfortable and pleasing voice placement, educating the patients to recognize the acceptable quality and then teaching them to reproduce it in practice until they are able to use it easily in conversation.

## CHAPTER III

## PRINCIPLES OF VOICE INSTRUCTION

### A. Anatomy

A brief review of the anatomy of the larynx is helpful in understanding the description of cases and the teaching procedure used in the voice training. Speech involves the combined action of respiration, phonation and articulation.

The larynx, which is the organ of phonation, is composed of cartilages which are moved by muscles. The muscles of the larynx are extrinsic and intrinsic. The extrinsic muscles move the entire larynx upward and downward in such acts as swallowing, breathing, speaking, singing and yawning. The upper part of the larynx is attached to the hyoid bone by ligaments and muscles, and to the hyoid bone is connected the root of the tongue, thereby causing movement of the larynx by any change in tongue position. The tongue exercises as outlined in the teaching procedure make use of these anatomical relationships to produce speech. The intrinsic muscles of the larynx are directly responsible for movement of the vocal cords. The false vocal cords or ventricular folds are above the true vocal cords and are able to take over the function of the true cords if the latter should become impaired.

B. Teaching Procedure*

The method used in alleviating voice discomfort is one in which the organs of speech are utilized with a specific plan for correction. An adult patient should be given an explanation of the function of the vocal organs, and a diagrammatic sketch to show how the muscles work, so that he will realize that there is reason and purpose for the exercises he is to have. The following exercises are given for the development of kinaesiology or muscle feel.

Before any voice is attempted, exercises are given to establish new muscle habits for voice. Since the muscles used to move the vocal cords have limited voluntary action, there are no direct exercises that can be given for the opening and closing of the arytenoids and tensing of the cords.

1) The exercise to create an awareness of the muscles needed to produce voice is the exaggerated protrusion of the tongue given with a wide open mouth. Previous reference has been made to the action of the tongue and its effect on the larynx moving upward and downward. The patient must have a good point at the tip of the tongue, the tongue must be protruded straight out and must not touch the upper or lower teeth and lips. When the tongue is returned to the floor of the mouth, the tip of the tongue must be touching

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*The method described in this teaching procedure is used in the Speech Pathology Department of Central Institute for the Deaf, and was developed by Mildred A. McGinnis, head of that department.

the lower front teeth. This prevents the patient from contracting the base of the tongue.

2) Exercises of the tongue directed to the performance of single elements are given to create an awareness of the feeling of the tongue in producing well articulated words. Sluggish articulation is often the result of the voice disorder and sometimes the cause of it. The patient, not wishing to use a disagreeable voice, acquires the habit of mumbling behind immobile lips. When the pathology is the result of it, the mumbling or immobile lips indicate a tenseness or lack of free functioning of the voice producing muscles. Therefore, the following three exercises are given.

a) The patient should be able to open his mouth, keep his tongue in the normal position on the floor of his mouth, with the tip of the tongue resting lightly behind the lower front teeth, and the lip takes a smiling position and showing six upper front teeth. Then he points the tip of his tongue behind the upper front teeth and down again behind the lower front teeth.

b) With the same position of mouth open and teeth showing, the patient clicks the tip of the tongue behind the upper front teeth. This develops the anterior part of the tongue which must contact the alveolar process for the production of "t," "d," "l," "n."

c) The patient should open his mouth, and have his lips and mouth assume a square shape, then he slowly touches the corners of his mouth with the tip of his tongue, being careful not to touch his teeth or lips with his tongue.

The principle is that sufficient tension in producing good speech concentrates the attention in the muscles that cannot perform in a relaxed position and eases the tension on the muscles not involved in vocalisation. This is opposed to the relaxation theory.

Each of these exercises should be repeated several times in each lesson and practice periods until properly learned, after which they are eliminated.

Attention is then given to posture and sustaining the diaphragm. In order to impress the patient with the voluntary action of the diaphragm he places his hand on his diaphragm or on his stomach region, below the ribs and then expands it. He is able to feel the action by the movement of his hand and also see the action by the outward movement of his hand when placed on the diaphragm. After a few trials, the patient then must be able to expand and sustain his diaphragm without the aid of his hand feeling the action. This exercise is given first with breathing and then without.

The theory behind the emphasis on muscle control rather than on breathing is that there is enough residual air in the lungs for good voice and speech, and that a sufficient

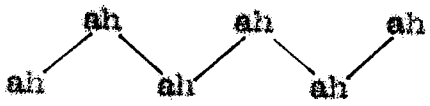
replacement of air by shallow intake, can be made through the mouth at phrase and sentence pauses. If the diaphragm is allowed to collapse between each word or phrase, the result is too great a flow of air producing a breathy voice, and need for frequent intake of breath.

At this point, further emphasis is given to the movement of the lips and tongue for vowels and consonants. With more precise articulation there is a noticeable change in voice quality, indicating a distribution of tension between the vocal cords and the lips and tongue. With better articulated speech, there is better timing in the approximation of the cords for voice production.

For producing voice itself, one of the long vowels such as "o" or "ah" is used and prolonged while the diaphragm is expanded and the lips are in the correct position. A pattern of voice tone is given by the teacher for the patient to imitate. This will be a matter of trial and error until the desired quality is attained. For example, if the voice is hoarse, indicating great strain on the posterior third of the vocal cords, then a high pitch is given for exercise, so that the anterior third of the cords, which has been inert, will begin to function and relieve the tension of the posterior third.

Other trials for a good voice include saying a staccato vowel up one whole tone and back, then increasing the range, one tone at a time until we have reached a change

in pitch used in speech. For example,

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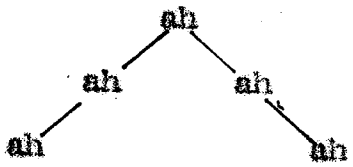


When an acceptable and comfortable voice is attained, it is used on prolonged vowels such as "ō," "ē," and "ah." The prolonged vowels give time for the patient to recognize and establish in his memory, both the tone and the manner in which he produced it. After short rest periods, there should be tests for recall of this tone until the patient can produce it without the aid of the teacher.

When control has been obtained on the prolonged vowels, they are then given in a spoken tone. The next step is to add an initial voiced consonant to each vowel. The consonant and vowel must be spoken separately, so that there can be exact timing with the voice and position. These syllables then are blended, but with emphasis placed on maintaining the voice quality and duration used in the preceding exercise. The final consonant is then added to these combinations and words are made of these combinations.

This voice discipline is carried into practice sentences until there is easy use in conversation.

The following is an outline of the program as described and as it is given to the pupil.

A. Tongue exercises

1) To create an awareness of the muscles needed to produce voice.

2) To create an awareness of the muscles needed to produce good articulation.

B. Diaphragm control

C. Voice

1) Prolonged vowels

2) Spoken vowels

3) Initial consonant with vowel

a) Spoken singly

b) Blended

m { ē, ā, ah, ō }

c) Add final consonant

m { ō, ā, ah, ō } l, t

4) Words made of these combinations with above procedure

5) Sentences

Example. The dog ate a bone.

The patient understands that he must "get set" or assume the correct position of the diaphragm and mouth, and

that he must recall the desired tone before he is to give any voice. He is also reminded of the kinaesiology used in the teaching method and periodically is asked to repeat the following four points which he learned at the start of the lessons.

1. Feel the positions of the mouth.
2. Visualize the positions.
3. Hear what you say.
4. Time the voice with the tongue and mouth movements.

The early lessons should be given seriatim until the patient can produce a voice independently with a minimum of assistance from the teacher. When the patient has learned to practice correctly, the interval of lessons can be extended. The patient should report periodically until he has gained a satisfactory voice and can maintain it without help.

The effectiveness of this method depends upon the success in training the patient's ear to recognize a good tone and the feeling of how to produce it. The lessons should be successive and avoid a long time interval between lessons. Practice should be continued until the patient can converse with complete ease.

## CHAPTER IV

## CLASSIFICATION AND DESCRIPTION OF CASES

The following cases were selected to represent particular kinds of voice disorders of organic and functional origin.

The organic cases are:

1) Two cases of surgical removal of nodules on the vocal cords
2) One case of paralysis of one vocal cord
3) One case of removal of one vocal cord

The functional type of voice disorder is described in one case of functional aphonia.

Reference has been made to the interaction of the physical and emotional characteristics of the patients and will be discussed in the descriptions of the cases and also in the final remarks.

Table 1 contains a digest of the clinical assessment and reaction of each case. (See Appendix.)

The first case is a combination of pathology and emotional difficulty. Miss P. L., who was 69 years old, had a nodule removed from one vocal cord three weeks before her first voice lesson. She was a highly temperamental person and was very concerned with her change in voice which was manifest before and after the operation.

As a young woman, she was a concert pianist, a soprano singer, and a teacher of piano. Her musical training had been supplemented by a study of diction. In recent years, she has worked as a saleswoman in a fashionable dress shop.

Her high speaking voice had become hoarse immediately before the operation and there was no voice after the operation. The patient's anxiety, which caused her to constrict her vocal muscles, prevented or inhibited the initial return of her voice immediately after her operation. Her speech habits were such that she not only spoke excessively but extremely fast, talking with gestures and with dramatic emphasis. She had good articulation.

She learned to perform the tongue exercises satisfactorily without difficulty but, having no diaphragmatic control, learned with considerable effort to use her diaphragm.

The first voice, which was only a whisper, was obtained by saying staccato vowels extremely high in pitch. Gradually the pitch was lowered to a comfortable and pleasing placement of voice. Although there was a background of diction, singing and teaching piano, the patient showed no ability to analyze speech or words phonetically and had only the ability to hear if the sound (vowel tone) was too high for correct placement of voice. She was tone conscious therefore, only in relation to high or low tones. Her ear could not perceive the vowel components of diphthongs.

Her former work in diction varied widely from this teaching program. The beginning lessons also revealed that she was emotionally sensitive and that she lacked mental discipline, that she talked constantly, and that she paid little attention to instructions. Anxiety and constant questioning about "Why does my voice do this?", kept her from concentrating on production of a good tone. Because of those conditions, in the early lessons it was difficult for the patient to master the principles of the method. Consequently, her practice at home was a detriment rather than a help because of lack of understanding of the principles involved.

It w as not until she had constant repetition of controlled voice under strict vigilance and direction, that she became independent in obtaining a good tone. Her practice at home improved when she applied this voice discipline. She learned to reduce the amount of conversation on the advice of her surgeon, and together with the counseling of the speech teacher, she worked toward acquiring the habit of using only necessary sentences in conversation, rather than engaging in continual conversation.

The patient averaged four lessons a week for three weeks. After a week's interval without any lessons, she had a lesson every three days with improved practice between lessons. She returned to her employment after eighteen lessons. In the case of Miss P. L., a longer than average training period was needed because of emotional problems exaggerated by pathology.

Mrs. M. R., 40 years old and the mother of two teenage sons, had two operations for the removal of nodules on the vocal cords, and had no emotional involvement. She was employed full time as a cosmetic saleswoman in a large store.

While her speaking voice was high, she had sung alto for three years in her high school glee club. Fifteen months before an operation for the removal of a nodule on her right vocal cord, her voice became hoarse but it showed intermittent improvement. Hoarseness persisted for the three months prior to the operation. Immediately after the operation, she was advised by her physician to remain on a two week silent period. She slept during the first four days of the period and then broke the silence by whispering for the remainder of the advised silent period. When she attempted to use voice, she found that it was very high pitched and the muscles were constricted. With use her voice improved but did not gain its original quality.

Five weeks later the patient had another operation for the removal of a second nodule. The aftermath of this operation was a hoarse voice which could not be maintained, and when her voice faded out completely, she resorted to the use of a whisper. She began her lessons one week after the second operation.

In this case lessons were not given on consecutive days but every other day. She had good articulation and from the start of the lessons her tongue exercises and control of her diaphragm was good. The voice trials began on

high staccato vowels and then lowered to the proper pitch. She had an excellent ear for voice placement. She was able to retain and recall the proper tone of voice. After three lessons she could use a pleasing voice. Therefore, her lessons were then given every three and then four days until after seven lessons she was able to return to work. The patient continued her instruction on her free day and received a total of ten lessons.

She made rapid progress because she was attentive to instruction and practiced diligently. Her progress was facilitated by her ability to concentrate on tonal discrimination. On the fourth day, the patient consciously tried to use the newly acquired voice in conversation. While she was deeply concerned with her alteration of voice, she controlled her emotions and responded with serious effort to an intelligent application of her instructions.

This patient's emotional stability and auditory discrimination were the contributing factors for successfully regaining her original voice. The patient was observed fifteen months after training, during which period she has maintained a good voice, and should she have further difficulty, she would probably know how to begin practicing and acquire correct discipline.

The next case is one in which the pathology was the paralysis of the left vocal cord together with a complete left side hemiplegia. Mr. S. R. was 34 years old when he

suffered a series of three strokes. The second and third strokes came a day apart and the last two came several months after the first. The patient's face and left arm were paralyzed after the second stroke and the left leg was involved as a result of the third stroke. He did not lose his speech but he had difficulty in swallowing. As a matter of additional interest, this patient was left handed prior to the stroke, and if his speech area had been on the right side of his brain, as has been assumed, there might have been an aphasic condition.

Considerable exercising of the tongue, lips, and facial muscles was required to regain as much normal control as possible. Diaphragmatic control was also emphasized as well as voice development. The patient talked rapidly not making the complete movements for the production of speech elements. This resulted in mumbled and slurred articulation. His voice was hoarse. With persistent practice, the action of the left facial muscles began to improve and some conscious control over the muscles was attained. Besides being able to make normal movement to the right side, the tongue gradually was able to make left lateral movements. With the gradual improvement in those muscles came the ability to assume more normal mouth positions for the vowels and consonants. This is the case where development of muscles for speech helps the voice.

When prolonging the vowels at the beginning of the lessons, he was unable to maintain a tone on one pitch before muscular control was developed. The patient could discriminate between differences in pitch and also tone quality from the teacher's examples but was unable to reproduce it because of the physical disability of the untrained muscles. The patient learned to use good voice and articulation under discipline in the lessons. He averaged two lessons a week for the first two and a half months, the next month six lessons and the final month four lessons, totaling thirty lessons that were given.

The patient was very eager for improvement, even tempered, and cooperative in practicing at home. This type of case takes a long time to retrain because of the spastic muscles.

The next is a case of pathology with emotional involvement. Mrs. S. C., who was 60 years old, worked as an insurance sales executive - a job that required constant talking. Her voice was hoarse for a year before an operation for the removal of one vocal cord. After the operation, her voice was no louder than a whisper, and although her oral communication was limited, she continued to work. The handicap of not being able to use the phone, plus the fatigue caused by effort in making herself understood, caused anxiety. This emotional behavior interfered with mental discipline in applying the teaching methods. She continued to whisper for six months before beginning her voice lessons. Although she

spoke rapidly her articulation was satisfactory. As a young woman, she had a background of studying diction and elocution, but the technique differed from that received in her voice lessons at Central Institute.

Stomach and abdominal operations prior to the surgery on the vocal cord had reduced her vitality and made the diaphragm exercises impossible at the beginning of the series of lessons. After two months she had developed a little control but she could not use this effectively all the time in speaking because of the limited function.

When performing the tongue exercises, the patient would retract the tongue to the throat, when she was to return the tongue to the floor of the mouth, instead of keeping the tip lightly touching the lower front teeth. This was not beneficial in helping to establish the desired kinaesiology of the laryngeal muscles. She learned the correct way with effort.

Because of the feeling of discomfort the patient had to raise the pitch of her voice as a result of the operation. Voice was attained on a high squeak and saying vowels very high, and although there was not much volume, there was a noticeable voice. She worked from the high pitched voice to the lower and on the third lesson she achieved a lower voice. Shortly after the lessons had begun her voice had improved in volume, placement and comfort, and she was able to use the phone in her business.

Mrs. S. O. was emotional, cried during lessons and

would become easily discouraged. Her occupation, physical condition and emotional strain caused her to tire easily. Often lessons were given late in the day on her return from work. She had two lessons a week for the first three weeks, then continued for three months having one lesson a week. The patient developed a voice with enough volume to be understood; in fact, proper names, spoken for the first time were generally understood in direct conversation or over the telephone. She developed some control of the diaphragm and learned to use disciplined speech, realizing its value and necessity. She did not lose her voice over the week-ends and her laughter had begun to have voice in it.

The patient's emotional temperament definitely retarded her from making more rapid progress because the instability influenced the mental discipline required in learning and applying the lessons. It is difficult to judge if she would have been as emotional a person without the operation or at least one less severe. This patient improved in morale as the lessons continued and voice improved. Thus, a long time was required for the combination of pathology and emotion.

Mrs. H. N., age 45 years, is a case of functional aphonia. Her voice began to deviate from acceptability, progressively nine years ago when she found it necessary to suppress her grief in the presence of her invalid husband. Misuse and incorrect muscle control became established. Four years

later after the death of her husband, her voice continued to fade and sound like a groan. There was no pathology, soreness, or discomfort in her throat. The last medical examination was given two years before voice lessons were given.

The patient was not certain of the type of voice she originally had, but thought it to be low and knew it was husky. She used to sing soprano and said she could sing better than talk since having the voice alteration. She claimed that her speaking voice made her nervous.

She could do the tongue and diaphragm exercises well on the first lesson and understood the lesson procedure. Emotional reactions, such as crying or hesitancy in trying many attempts in voice work, affected learning. She was an out-of-town patient and could spend only five days with a lesson each day. On the last lesson she informed the teacher that it was the anniversary of her husband's death. It was apparent that this tragic event intensified her emotional reactions during the lessons.

She had mannerisms of saying "mmmm" before words beginning with vowels and making a growling noise before she could talk with voice. These noises were utilized in vowel prolonging and proved effective. However, the patient could not retain or recall the same tone often enough throughout the lesson. There was no undue bodily tension. There were not enough attempts at practicing between the lessons. She

needed extensive training of the muscles of the larynx for there was an insufficient number of lessons to establish any kinaesiology and thereby attain a controlled voice. Because of the chronic condition of functional aphonia, the patient needed longer and more persistent counseling. Retraining the speech muscles, which have been incorrectly used for nine years, and also correcting the personality disturbance, would require considerable guidance from the teacher with the possibility of additional help from a psychiatrist.

# CHAPTER V

## DISCUSSION OF RESULTS

A teaching method or technique which was developed to alleviate voice disorders and restore voice, used in the Speech Pathology Department of Central Institute for the Deaf, has been presented in this study. It is a method with a specific plan involving certain principles which each patient must develop to the best of his ability to attain success. Since the ultimate voice to be attained is a voice that is pleasant to hear and also comfortable to speak, the following factors which are outlined, must be given the fullest attention by the patient.

1) Ear training. The ear of the patient must be trained to be able to analyze or hear the proper pitch desired when prolonging vowels, saying vowels in a spoken tone, and using them in words. The ear also becomes the monitor for the finer esthetic qualities of voice.

Tone consciousness is more developed in some individuals than in others and often the rate of progress and final voice quality are achieved by the degree of the ability of the ear to be trained.

Thus, the ear is of prime importance in the development of voice, especially in retaining and recalling the memory of the voice quality. However, that would be impossible without the development of the kinaesiology of the

muscles involved in speech which is another basic factor in the technique.

2) Kinesiology. The patient must learn to develop a conscious muscular feel of the action of the muscles involved in voice production. Tongue exercises are used to develop an awareness of the muscles used to produce voice and to produce good articulation. Diaphragmatic control is established for control of the breath stream. This muscular feel is utilized with the addition of voice, and the patient learns the feel in the larynx of producing the proper voice, using the ear as the monitor. In other words, there is proper timing of the voice with the correct tongue and mouth positions.

3) Practice and application into conversation. If the patient does not understand the program, the quality of his practicing is considerably altered. The ability to practice at home, or carry home the lesson procedure, and the amount of time spent in satisfactory practice are factors bearing upon the success of the program. Individuals may need special consideration in certain parts of the lesson technique. For example, one patient may need to spend more time on auditory discrimination than another patient may require.

Another factor contributing to the success of the method is following the recommendation that a number of lessons be given consecutively to help establish the memory

of tone and the accompanying kinaesiology. If a few scattered lessons were to be given, considerable effort on the part of the teacher would have to be used in re-establishing "voice-consciousness" in the patient. It has been found that by the third lesson most patients understand the coordination of the auditory discrimination with the muscular control of the diaphragm and voice mechanism.

It has been found advisable to acquaint the patient with a diagrammatical sketch of the anatomy of the speech mechanism according to his level of understanding and temperament so that the patient can see that there is reason and purpose in the teaching method.

The basis for voice training, and the key to speech production is the patient's <u>conscious control</u> of the above factors, namely, 1) ear training, 2) kinaesiology, 3) practice. Only when this conscious control is definitely established can there be any automatic ability making voice production habitual, or, only after the muscles have been consciously trained to perform a certain way, can we hope for conversation without conscious effort, because it is then that the correct voice and speech patterns have been established.

This teaching technique is adaptable to all voice disorder cases of organic or functional origin. There are, however, no short cuts to the attainment of voice rehabilitation. Enough lessons must be given to enable the patient to be able to learn the technique, the emotionally disturbed

cases requiring more lessons than those with little or no emotional involvement.

It is difficult to tell exactly what occurs in the intrinsic muscles of the larynx during the voice training without inspection by instruments. We know that the arytenoids may overlap to compensate for lack of normal approximation of the vocal cords. It is also believed that the false cords may assume some function in the absence of the true cords.

The writer has observed the importance that individual patients assign to regaining improved voice. She has further noted the personality differences which affect the patient's individual accomplishment and progress. It can therefore be suggested that if a patient conscientiously carries out the program, the system described in this clinical study promises the attainment of a good voice. Some cases may be unable to attain as perfect a voice as desired because of severe pathological limitations. However, a determined individual may produce better results than was theoretically thought possible.

The prognosis for a voice disorder case following this method is good. There has been improvement in all patients that have been taught. The degree of success has been determined by the severity of the pathology, the emotional stability of the patient, and the cooperation of the patient with the teacher.

The writer is aware that the evidence presented for the value of the method described in this study is purely subjective. It is based on clinical observation. In the absence of precise measuring tools and because of the number of variables, this approach appears to be the method of choice. Further research in validating clinical judgments by objective means is desirable.

Table 1. Clinical Assessment of Cases and Results

| CASE | OCCUPATION | FORMER VOCAL HABITS | PATHOLOGICAL CONDITION AND NUMBER OF OPERATIONS |
|---|---|---|---|
| Miss P. L. 69 years of age. | Saleswoman, former concert pianist and singer. Also was a piano teacher. | Soprano singing voice, high speaking voice. Talked excessively and extremely fast. | Removal of nodule from one vocal cord. |
| Mrs. M. R. 40 years of age. | Saleswoman, mother and housewife. | Alto singing voice in high school, high speaking voice. | Removal of nodules from vocal cords. Two operations |
| Mr. S. R. 34 years of age. | Merchant. Former professional football player. | Talked at an average rate. | Left side hemiplegia. |
| Mrs. S. O. 60 years of age. | Sales executive. | Talked extremely fast. | Removal of one vocal cord. |
| Mrs. M. H. 45 years of age. | Secretary. | Sang soprano in church choir. | No pathology, functional aphonia. |

Table 1. Clinical Assessment of Cases and Results (Continued)

| LENGTH OF TIME BETWEEN SURGERY AND FIRST LESSON | PREVIOUS PLACEMENT AND QUALITY | IMMEDIATELY PRIOR TO SURGERY | VOICE AFTER SURGERY AND/OR BETWEEN OPERATIONS |
|---|---|---|---|
| Three weeks | Soprano | Hoarse | No voice after removal of nodule. |
| One week | High speaking | Hoarse 15 months before operation. Twelve months of hoarseness with intermittent improvement. Hoarse final three months. | After first operation voice was hoarse, fluctuating volume. After second operation for removal of nodule her voice was hoarse faded out completely and patient whispered. |
| No surgery Fourteen months since last stroke. | Average male's voice placement | No surgery, left side paralysis. | |
| Six months | Average voice placement. | Hoarse a year before surgery. | Whispered |
| No operation. Nine years of voice alteration. | Patient thought speaking voice was low and rather husky. | No surgery, nine years of voice alteration, last five years voice faded and groaned. Patient growled before talking, saying "nnnn" before words beginning with vowels. She reported that at present she could sing better than speak. | |

Table 1. Clinical Assessment of Cases and Results
(Continued)

| | AFTER VOICE TRAINING | ARTICULATION BEFORE LESSONS | DURING LESSONS | AFTER LESSONS |
|---|---|---|---|---|
| | Pleasing quality, lower pitch, and comfortable placement. | Good, but rapid rate. | Learned a slower rate. | Good, reduced speed |
| | Good. Gives no inconvenience while working. | Excellent | Excellent | Excellent |
| | Good under discipline in lesson and was being transferred into conversation. | Poor after stroke. | Much physical development of speech muscles with improvement in articulation. | Good under discipline, with some application into conversation. |
| | Enough volume to be understood, could use phone, some voice in laughter. | Good, but rapid rate. | Good, learned to reduce speed. | |
| | With the few lessons little improvement in voice. | Poor, growled or said "nnnn" before words. | Poor | Poor |

Table 1. Clinical Assessment of Cases and Results
(Continued)

| TONE CONSCIOUSNESS | | | | |
|---|---|---|---|---|
| ABILITY OF EAR TO ANALYZE TONE | DEVELOPMENT OF PROPER TONE CONTROL, WHEN: | | PHONETIC APPRECIATION | CONTROL OF DIAPHRAGM |
| | Sustaining a vowel | Giving spoken tone | | |
| Only in relation to high or low tones. | Slow to develop because of lack of mental discipline. | Developed better than long vowels, diphthongs slower. | Former work in diction differing greatly from voice lessons at CID. Poor phonetic discrimination. | None, but learned with great effort. |
| Excellent | Excellent, good voice discipline on third lesson. | | Good ability and use. | Fair |
| Very good tone consciousness but physically impossible to produce until better muscle control was established. | | | Excellent | Difficulty in learning proper control. |
| Poor | Poor, but improved. | Poor, but improved. | Former voice and diction work differed from CID method. | Learned, but did not always use diaphragm. Previous stomach and abdominal operations interferred with complete control. |
| Good | Could not retain and recall the same tone often enough. | | Good | Good |

Table 1. Clinical Assessment of Cases and Results
(Continued)

| ABILITY TO LEARN AND PERFORM TONGUE EXERCISES | REACTION TO THERAPY | APPLICATION OF LESSONS INTO CONVERSATION |
|---|---|---|
| Good | Talked constantly, paid little attention to instructions in early lessons. Too emotionally sensitive and anxious. | Slow but was able to return to work after 13 lessons, having attained a good tone in her voice. Reduced amount of conversation rather than continual conversing. |
| Good | Very cooperative, even tempered. | Rapid and well done. |
| Physical improvement of action of speech muscles enabled improved voice and articulation. | Cooperative, eager for improvement, pleasant temperament. | Fair, good during lessons. Improvement of physical condition desired for further progress. |
| Poor | Emotionally sensitive, cried easily. | Used phone after a few lessons, work continued during lessons, and tried to apply lessons. Work required constant talking. |
| Excellent | Emotionally sensitive, tenseness affected learning. | Insufficient number of lessons to establish any kinaesiology and control to attain any desirable voice. |

Table 1. Clinical Assessment of Cases and Results
(Continued)

| PRACTICE | NUMBER OF LESSONS | PREVIOUS VOICE TRAINING FOR THERAPY |
|---|---|---|
| Poor at first because of lack of understanding of principles involved. Practicing improved when she could produce a good tone independently. | Four per week for three weeks, then every three days. Total 18. | None |
| Fluctuated from good to excellent. | One every other day for three times. Four lessons every three or four days. One lesson a week. Total 10. | None |
| Good, faithful work on exercises and voice. Minimum of prepared homework. | Two per week for two and a half months. Six next month. Four last month. Total 30. | None |
| Poor in amount of time and fair in quality. Physical fatigue from working all day prevented patient from practicing. | Two per week for three weeks. Then one per week for three months. Total 18. | None |
| Poor, inadequate. Lack of time to learn technique and train muscles. | One per day for five days. Total 5. | None |

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