

Voice therapy for children

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Most voice disorders in children are caused by continued abuse and misuse of the voice. The children continue vocal hyperfunction (yelling, speaking and shouting too loudly and at inappropriate pitch levels) day after day. As a result of this continuous abuse/misuse, these children may develop dysphonia. In addition to the dysphonia, prolonged vocal hyperfunction may produce vocal fold thickening, vocal nodules, and vocal polyps. The vocal management of children who abuse their voices will be the focus of this paper.



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Identification of children with dysphonia

Occasional children who demonstrate continued dysphonia are examined by the child's physician and frequently referred for indirect laryngoscopy by an otorhinolaryngologist. Most dysphonic children, however, continue with their "hoarseness, breathiness, harshness" for indefinite periods of time with their parents and teachers incorrectly assuming that "this is the way he talks." Such dysphonic school children should be identified by the speech pathologist in the school and referred for a medical laryngeal evaluation. Persistent dysphonia in a child may well be a presenting voice symptom of a serious laryngeal disease, such as papilloma, and is certainly deserving of a thorough medical examination. A conservative rule for the speech pathologist to follow would be to refer any child (or adult, for that matter) who is dysphonic for more than seven days for a medical diagnostic evaluation of the larynx.

It appears then that the school speech pathologist sees two kinds of

dysphonic children: first, he sees those few children who are referred to him, such as by an otorhinolaryngologist and secondly, he discovers children in his school speech screening program who need laryngoscopy and possible medical treatment for their dysphonias and/or voice therapy. The first kind of problem, the child who is referred to the speech pathologist by the otorhinolaryngologist, usually receives a voice therapy regimen which focuses on identification of vocal abuse/misuse with subsequent voice therapy attempts initiated to reduce this identified abuse/misuse. The great need in most school speech and hearing programs, however, is the initiation of voice screening programs designed to discover the child with a persistent dysphonia (more than seven days) who will then require both laryngoscopy by the physician and possible voice therapy by the speech clinician.

School voice screening programs

Most speech and hearing clinicians in the schools initiate speech screening programs for specified classes at fixed time intervals; for example, many school clinicians do screening in the schools in the fall before beginning their daily therapy schedules. With very little additional testing time per child, a simple voice screening program could be added to the present speech and language screening measures which are employed to screen "normal" school children. The illustration on the following page shows a screening form which can be used for the identification of children with dysphonia. This should be followed with a more thorough diagnostic voice evaluation.

The four variables listed in the form are each rated using a nine point rating scale. Pitch is evaluated relative to the child's fundamental frequency appropriate for his age and sex; a voice pitch compatible with age and sex is rated "1" and a pitch level that is obviously incompatible with "where it ought to be" is rated "9". With the advent of puberty there is considerable lowering of fundamental frequency. By the time a boy has completed his pubertal growth, his pitch level has dropped about one full octave from pre-pubescent levels (C₃ down from C₄) while post-pubescent girls have also experienced a lowering of pitch of three or four musical steps

Résumé en français

La thérapie de voix pour les enfants

La plupart des désordres de la voix des enfants sont occasionnés par le dommage et le mauvais usage soutenu de la voix. Les enfants continuent leur hyperfonction vocale (hurlant, parlant et criant trop fort et aux niveaux non appropriés de la hauteur) de jour en jour. Cette étude examine le traitement des voix de tels enfants. En utilisant de diverses "approches facilitantes," le clinicien peut aider chaque jeune à "trouver" et à développer sa propre meilleure voix.

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(G₃ from C₄). Since pitch levels change dramatically during pubertal changes, it is perhaps not too realistic for the school speech and hearing clinician to make pitch determinations as stable indices of the pubertal child's actual pitch usage; for example, an optimum pitch value obtained in September of a 14-year-old boy may be wholly obsolete for that same boy by December of the same year. Primary level children frequently demonstrate pitch levels which are incompatible with their age and sex. Typical findings would be that boys sometimes demonstrate pitch levels that are too low and girls use pitch levels which are too high. Post-mutational pitch disorders are generally found among boys who demonstrate inappropriately high voices, sometimes using falsetto, long after pubertal changes have been completed.

Phonation quality is rated specific to the presence or absence of hoarseness, harshness, breathiness. Normal quality is rated at the "1" end of the scale with severe quality disorders rated on the "9" end of the scale. Any departure from normal in phonation quality should be noted. A phonation disorder is produced by inappropriate approximation of the vocal folds, with the folds either too laxly adducted or too tightly approximated. This approximation inadequacy could be further categorized using Wilson's (1969) rating system of -3 for complete lack of approximation (as heard in aphonia) to the other

Voice screening

Child.....										Date.....
	Adequate									Poor
<i>Pitch</i>	1	2	3	4	5	6	7	8	9	
<i>Phonation quality</i>	1	2	3	4	5	6	7	8	9	
<i>Loudness</i>	1	2	3	4	5	6	7	8	9	
<i>Resonance quality</i>	1	2	3	4	5	6	7	8	9	

polar extreme of +3 where the folds tightly and excessively approximate (as heard in spastic dysphonia). Deviation from normal is plotted along this rating continuum: -3 -2 -1 0 +1 +2 +3. For whatever phonation departure the clinician detects in his screening, he may wish to make a word or two notation along with his numerical judgments.

All loudness judgments must be made within the context of the screening evaluation. Therefore, the clinician must remember that the artificial situation imposed by the testing environment might well reduce loudness levels in any child who is somewhat frightened by the screening procedure. Nevertheless, as the child repeats the verbal tasks of the speech and language screening, the clinician should rate the child's loudness adequacy on the one to nine scale with "1" ratings depicting normal loudness for the situation and "9" given for too soft or too strong loudness. Perhaps in follow-up observation and evaluation of children who present loudness problems during screening, the clinician will find loudness inadequacy not to be a problem.

Any nasal resonance deviation is also noted during the brief voice screening. No distinction is made during the screening as to whether the child demonstrates hypernasality, denasality, or assimilative nasality, unless the clinician wishes to make a verbal note on the screening form. Normal nasal resonance is rated on the "1" end of the scale and marked resonance departures at the "9" end. Children identified as possibly having a resonance problem would return at a later time for a diagnostic evaluation.

The speech and hearing clinician who employs a voice screening scale as part of his school speech and hearing screening should remember that such a scale helps him systematize his observations about the child. By using such a device he will be sure to apply some observation relative to pitch, phonation quality, loudness, and resonance quality for each child. Criteria for follow-up selection will vary according to the clinician's standards, case load demands, scheduling flexibility, etc. Perhaps a child who obtains a "5" or "6" rating for any one of the four parameters would be recalled for more thorough

observation and testing. Consistency of the problem may be evaluated by observing the child in the classroom or on the playground. If upon further observation, the voice departure is still observed, the child should then be scheduled for diagnostic testing. If further testing finds the child to present a voice problem, he would then be referred for medical evaluation prior to the initiation of any voice therapy program.

Hyperfunctional voice disorders

Misuse and abuse of the voice will produce many varied forms of dysphonia. The child may demonstrate a loss of voice after prolonged use (misuse or normal), he may demonstrate a hoarseness or breathiness; his pitch level might lower after abuse; or he might become aphonic, losing his voice entirely. The result of this prolonged vocal abuse on the vocal folds may lead to swelling, redness, and edema; vocal folds which have been doing a lot of yelling, for example, usually show the increased redness and irritation which the yelling has caused. In many cases, decreasing or desisting the irritating vocal abuse will be all the folds require to return to their normal "pearly white" state. Some children who continue their vocal abuses over time eventually develop vocal fold thickening, sometimes leading to vocal nodules and sometimes to vocal polyps. Nodule and polyp formation, when discovered early in their development, can usually be eliminated by voice therapy. Nodules that are large and hard, similar to large polyps, may require surgical removal followed by voice rest and then by voice therapy.

Some children referred to the laryngologist are found to have medical problems, such as laryngeal web or papilloma, disorders which require close medical supervision and are not the result of vocal hyperfunction. The majority of voice problems in children, however, are highly responsive to voice therapy.

While distinction must be made by the laryngologist between functional voice disorders and organic changes of the vocal mechanism, this dichotomous grouping aids only in ruling out pathology. From a voice therapy point of view, there is little difference in the approach between functional and organic voice problems. That is,

the dysphonia of someone who has nodules, polyps, contact ulcers, cord thickening is not approached differentially from the person who has dysphonia because he over or under adducts his vocal folds. A hyperfunctional voice disorder, regardless of whether or not there have been tissue changes, is the result of too much muscular force or inappropriate force in the wrong places. After identification and elimination of these forceful vocal abuses, the child experiences a better voice. The elimination of excessive force in respiration, phonation, and resonance will reduce most of his voice problem.

There are occasional cases of voice disturbance in which the disorder serves the child and is only a symptom of an underlying neurosis. The reduction of hyperfunctional vocal behavior results in a concomitant reduction of vocal symptoms, regardless of the psychological needs of the person. Voice therapy for years has been frequently avoided by the laryngologist or pathologist because of a prevailing misbelief that most voice problems are merely symptoms of deep and unresolved psychological problems. The clinical evidence seems to say, "We can take the problem out of your voice and you will still have your tensions and personality problems—but your voice will sound like ours." The modification of the voice problem by direct symptomatic voice therapy is possible for most hyperfunctional voice problems after their identification.

A typical hyperfunctional site might be in the area of respiration. Phonation is dependent upon an adequate out-going air stream which produces a sufficient subglottal air pressure to trip the approximated vocal folds into vibration. It appears that the demands of everyday phonation, as well as the added phonatory requirements of the actor, lecturer, or singer require that we develop a sufficiently controlled quantity of air, sustained in a prolonged exhalation. Some patients with hyperfunctional voice problems work much too hard to breathe. Actually, there is no great need for an exceptional vital capacity to be a good speaker. What one needs to develop is control of his expiration. The optimum inhalation for speaking and singing appears to be an only slightly enlarged tidal breath, perhaps like the inhalation required for a sigh of "well being". Shoulder elevation, and other signs of attempting to take a large breath, result only in an exces-

sive outflow of air which in no way produces better phonation.

There are specific hyperfunctional behaviors at the site of the larynx. One of the most damaging vocal behaviors is the hard glottal attack, described by Jackson and Jackson (1959) as the slamming approximation of the vocal processes of the arytenoid cartilages often causing contact ulcers. The formation of other laryngeal pathology, such as cord thickening, nodules, and polyps are often the result of excessive force in vocal cord approximation, as well described by Arnold (1962).

Many people who have dysphonia but no structural change of the laryngeal mechanism overadduct the vocal folds. This practice limits the free vibration of the folds and produces a harsh voice or perhaps the laryngeal "stutter" of spastic dysphonia.

Most clinical voice problems, with or without structural deviation, are characterized by problems of faulty vocal fold approximation. The patient usually is between the extremes of spastic dysphonia and functional aphonia. Inappropriate pitch level frequently contributes to laryngeal hyperfunction. Children may speak either at the extreme bottom or top of their pitch range. An inappropriate pitch level, whether it be too low or too high, requires unnecessary muscle efforts to maintain the needed vocal adjustments of length and mass to produce the artificial voice pitch. Sometimes just by raising or lowering the fundamental frequency slightly, the child will experience a noticeable decrease in dysphonia.

One of the greatest causes of vocal dysfunction is vocal abuse, such as excessive laughing, crying, yelling, or screaming. Coughing and excessive throat clearing frequently contribute to the problem of dysphonia and laryngeal pathology, perhaps adding edema and irritation to other pathology. Once a vocal abuse has been identified, intelligent efforts to reduce such behavior may well result in a lessening of the vocal distress.

In the supraglottal areas, the hypopharynx is a common site of hyperfunction. Contracted pharyngeal constrictors and the tongue posteriorly retracted fill the hypopharyngeal opening. This produces an acoustical problem resulting in a restriction of oral resonance and produces "cul de sac" resonance. Although hyperfunctional carriage

of the tongue, either too far back or too far forward, may create many acoustical variations of the voice, it is often not recognized as a contributing cause of an existing dysphonia.

Another disorder of resonance may be the hyperfunctional use of the soft palate with the velum kept in a fixed or open position. This lack of palatal movement is sometimes directed volitionally by the patient as he attempts to create a "God-like" voice or imitates nasal speech, or attempts to sing like an "Irish" tenor. Prolonged attempts at artificial resonance may create unnecessary constriction and tensions. Eliminating such hyperfunctional behaviors may reduce overall vocal hyperfunction.

One of the most commonly observed hyperfunctional behaviors is speaking with mandibular tension, or talking through one's teeth. Here the child makes most of the muscle adjustments required for continuous speech almost wholly with his tongue with the mandible locked in a passive role. This means that for the various adjustments required for producing vowels the patient changes the size of his oral cavity by flattening or elevating the tongue with no size change contributed by opening of the mandible. The majority of voice patients of all ages with various forms of dysphonia complain of symptoms of vocal fatigue, pain, or fullness in the hyoid area after prolonged speaking or singing. Mandibular restriction is a commonly observed entity in many patients, an observation which was recognized by Froeschels (1955), and which resulted in a subsequent development of his chewing approach in voice therapy. Anything the patient can do to develop a more generalized oral openness usually has a noticeable effect on the sound of his voice.

Voice disorders often begin as a natural sequence of true organic disease. Some children's voice problems seem to have their origin from acute local disease of the respiratory tract, including the larynx and pharynx. The acute problem may force the individual to produce his voice with a surplus of effort, producing hyperfunctional voice behaviors which may well persist after the acute infection is over; or, the child may suffer from allergies which force him to use his vocal apparatus in a strained way. The vocal trauma of a particular event, such as yelling, may produce temporary laryngeal changes which

cause compensatory vocal behaviors which persist and become the individual's "set" of subsequent vocal behavior.

Singing under exceptional conditions (inappropriate pitch range, too loud, too long) may produce temporary phonation changes, requiring the individual to attempt varied effects to overcome a temporary dysphonia. Such vocal compensation may become a permanent part of his vocal repertoire.

Voice therapy for children

It is almost impossible to do voice therapy successfully with pre-school children. Although the symptoms of dysphonia require the attention of the physician to rule out such conditions as papilloma or webbing, it is most difficult for the speech clinician to conduct any kind of remedial voice therapy on a formal basis. The clinician's focus must be in his attempt at isolating particular vocal behaviors which may be abusive to the child's vocal mechanism, for example, identifying an excessive amount of yelling. Efforts are then made to counsel both parents and child about the need to curb vocal abuse. Clinicians occasionally have success with this pre-school counselling and the child experiences improvement in his voice. There are also many failures in counselling attempts at this early age level, and there are many clinicians who prefer to delay such counselling until the child is older—at least until school age. If we have any success at this early level, it results from our occasional success in identifying the child's vocal abuse and our subsequent counselling having the effect of reducing that vocal abuse.

The school age child, six through twelve years, can frequently be helped by voice therapy. The speech and hearing clinician in the schools probably encounters more children with hyperfunctional voice problems than any other voice specialist. Cord thickening and vocal nodules are the most frequently found laryngeal pathologies which produce dysphonia. However, many children, especially boys ages 10 through 13, exhibit severe dysphonia for purely functional reasons and upon indirect laryngoscopy are found to have no laryngeal pathology.

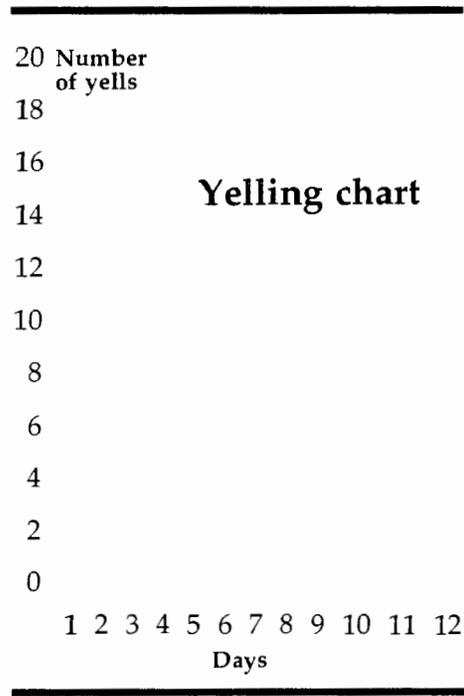
The most effective therapy for school aged children is for the

clinician to isolate for the child those situations in which he is vocally abusive, such as yelling at a ballgame, screaming on the playground, crying, imitating voices much below or above his natural pitch range, and so on. Many children maintain their vocal pathologies simply by engaging in abusive vocal behavior for just a brief period each day.

The old adage, "a little vocal abuse each day will keep a voice problem alive" (Boone, 1971), is particularly relevant to the voice problems of children. It is usually not possible to identify these vocal abuses through interview methods or by observing the child in the therapy room; rather, the child must be observed in various play settings or in the classroom. This need for extensive observation requires that the clinician solicit the help of the child himself to determine where he might be yelling or screaming. The teacher may provide some helpful clues about the child's vocal behavior on the playground and in the classroom. Parents can often reveal further environmental situations where the child is heard to abuse his voice. Parents may be asked to listen for abusive vocal behavior by the child in various family settings. At times, we can utilize the child's siblings or peers to help us in determining what the child may be doing vocally in certain situations.

Once abusive voice behaviors have been identified and isolated, the clinician must obtain baseline measurements of the number of times the vocal abuse is observed in a particular time unit (an hour, a recess period, a day, etc.). A "yelling chart" that a ten year old boy recently returned to this voice clinician is reproduced in the margin.

We can quickly see that over a 12 day period there was a marked decrement in the child's yelling (at least, as counted by the child himself.) On the first day a baseline of 14 yells was observed; by the end of the week, he found himself only yelling three times. Such developing self-awareness of the vocal abuse, as required by keeping a tally count of what one is doing, has proved to be an excellent way of extinguishing an aversive vocal behavior. While some children require some assistance, in maintaining such a tally count from a teacher, parent, or friend, most children can do this task very well by themselves.



It appears that if the child is given a proper orientation to the task and clearly knows why he must cut down his number of vocal abuses, his tally counts are higher, and perhaps more valid, than the counts of the external observers. (Boone, 1971).

All voice therapy with children must be preceded by a proper explanation to the child of what his voice problem is and what can be done for the problem in voice therapy. It is a rare child who feels that he has a voice problem. An explanation about the voice problem is most important for the majority of voice cases we might see in a school setting because these children are not self-referred. Therefore, the clinician who uncovers a voice problem has a selling job to do, not only to the child himself, but often to his parents, his teacher, the school nurse, and often to the speech and hearing supervisor.

Effective voice therapy does not lend itself well for group therapy. Therefore, the speech and hearing clinician whose large case load forces him to work in groups may not be able to work effectively with the child with a voice problem. Since the child's own best voice production is often his primary target therapy goal, grouping of children (each with a different target model) could be very confusing. While different articulation disorders and the children who have them can often be grouped effectively, this lack of homogeneity works against treatment effectiveness in voice therapy. If at all possible, children with voice disorders should be offered individual speech therapy on a twice weekly basis, with each session 20 to 30 minutes long.

Children going through puberty are not good candidates for voice therapy. Their vocal mechanisms at this age are changing so rapidly, with all cartilage and muscles of the larynx increasing in growth so dramatically. For example, the increase of length and thickness of the vocal folds increases quickly in the brief span of less than a year; the boy's voice may drop a full musical octave and the girl's pitch level may drop about three full musical notes. The pitch breaks experienced by many boys changing through puberty are often annoying and embarrassing to the child and sometimes counselling is required for parents, peers, and the boy himself. These pitch

Twenty facilitating approaches in voice therapy

Facilitating approach	Phonatory process affected		Parameter of voice affected		
	Mass/size	Approximation	Loudness	Pitch	Quality
1 Altering tongue position		✓			✓
2 Change of loudness		✓	✓	✓	✓
3 Chewing approach	✓	✓	✓	✓	✓
4 Digital manipulation	✓			✓	
5 Ear training	✓	✓	✓	✓	✓
6 Elimination of abuses	✓	✓		✓	✓
7 Elimination of hard glottal attack		✓	✓		✓
8 Establish new pitch	✓			✓	
9 Explanation of problem	✓	✓	✓	✓	✓
10 Feedback	✓	✓	✓	✓	✓
11 Hierarchy analysis	✓	✓	✓	✓	✓
12 Negative practice	✓	✓	✓	✓	✓
13 Open mouth approach	✓	✓	✓	✓	✓
14 Pitch inflections	✓		✓	✓	✓
15 Pushing approach		✓	✓		✓
16 Relaxation	✓	✓	✓	✓	✓
17 Respiration training		✓		✓	✓
18 Target voice models	✓	✓	✓	✓	✓
19 Voice rest	✓				✓
20 Yawn/sigh approach	✓	✓	✓	✓	✓

breaks experienced during puberty need not be the clinician's therapy concern as they will usually disappear as the youngster experiences continued maturity. Focus on voice during puberty, including attempts at serious singing, should probably be avoided during these times of rapid voice change. I remember vividly my own experience as a boy soprano singing a solo in church the week I was no longer a boy soprano; puberty had struck with a swiftness that drastically changed my voice range, falling from the treble clef to the bass clef in seven days. When the adolescent appears to have achieved some voice stability, voice therapy can begin in a similar pattern to the way one would conduct it with any adult.

Voice therapy for older children and adults

It is necessary to probe continually in voice therapy for the client's best voice productions. The clinician uses a number of voice facilitating techniques in his quest to find the patient's best phonation. Basically, the use of facilitating techniques to produce a good phonation is the core of what we do in symptomatic voice therapy for the reduction of hyperfunctional voice disorders. Such an approach involves the continuous search for "can do" vocal behaviors in each client. What may work well for one patient may not work well for another. The clinician must be familiar with a number of approaches and know when to apply them with individual clients. Each approach must be evaluated in terms of its possible effect on vocal fold mass/size and approximation as observed in changes of voice loudness, pitch, and quality. The chart on the opposite page, taken from my book *The Voice and Voice Therapy* (1971) lists twenty facilitating approaches and the possible use for each.

Termination of voice therapy

It is always difficult to know when to terminate voice therapy with children. Successful voice therapy does not end with the sudden advent of "no more problem." Improvement is generally relative. If the client meets any or all of these criteria, it might be an appropriate time to dismiss him from further voice therapy.

1. *The voice sounds better.* If in the subjective (or objective, if this

were possible) judgment of the clinician or client the client's voice sounds better (less dysphonia, appropriate loudness, normal pitch for age and sex), perhaps further therapy is not needed.

2. *The client reports less vocal symptoms.* If the client reports diminished or absent symptoms of vocal hyperfunction (pain, throat dryness, loss of voice with usage, and so on), therapy can perhaps be terminated. The client's self-report of symptom presence or absence must be a major factor in all aspects of voice therapy.

3. *Reduction of additive tissue along the glottis.* If on indirect laryngoscopy, the original glottal lesion (thickening, nodule, polyp) is reduced in size or totally eliminated, formal voice therapy may be terminated. If it is predicted that further reduction of the lesion can be accomplished by voice therapy, then therapy should be continued.

Summary

Voice therapy for children is usually successful in its attempt to identify abusive vocal behaviors in the child and the subsequent attempt to reduce the occurrence of these voice abuses. By using various facilitating approaches, we can help each youngster "find" and develop his own best voice.

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