

**Teaching the Tube: Using VMT with Children Experiencing Language  
Delays.**

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# TEACHING THE TUBE:

## Using VMT with Children Experiencing Language Delays

by Anne Brownell

### Introduction

“Music is the language from the place before the word is born.” (Knill, 1988) In human development, vocalization precedes speech, and the work of VMT begins not with the spoken word, its cognitive content or articulation, but with the affective expression of voiced sound as recognized and worked with through the application of ten vocal components within a context of creative exploration and play.

The capacity to vocalize is dependent on the individual’s ability to take in and generate air. Through the action of the diaphragm and intercostal muscles, sufficient quantities of air pass up from the lungs through the bronchial tubes and trachea, or windpipe, to vibrate the vocal cords in different pitches and volume according to the speed at which they open and close and the degree of pressure applied beneath them to resonate the sound by means of the vocal cavities in the head. The sound then passes out through the mouth and lips which, in conjunction with the tongue, shape vocalization.

Often with children experiencing developmental and language delays, restrictions which may be neurological, muscular and/or emotional in origin occur in a particular part or parts of the body, rendering the ability to produce sustained and varied vocal sound partially or almost wholly ineffective.

For example, for a child with cerebral palsy or any condition in which he has to struggle against hypertonic or overly tense musculature, it is difficult both to generate sound and to release it. Often, in cases of children with Down’s syndrome or other conditions in which the muscles are hypotonic or flaccid, it is difficult to generate and propel the sound out because it is not sufficiently supported by the breathing or the shaping mechanisms. People with such conditions may also encounter a combination of high and low tonicity in different parts of the body at the same time. Sometimes a person may experience compromised function limited to certain body parts such as the tongue, vocal cords, diaphragm or the lungs themselves, so that he\* must learn to enable other parts of the body to compensate, insofar as that is possible, to vocalize effectively. In some children, muscle movement may be habitually held and speech suppressed due to early emotional trauma such as lack of bonding, neglect, accident or abuse.

In my experience, most of the above conditions can be investigated and to some degree ameliorated through working with the notion in VMT of the continuous and expandable vocal tube, in conjunction with the vocal components, convex and concave movement, and a form of compression, manipulation and massage particular to our work.

Anyone familiar with the functioning of the respiratory system knows that in the act of speaking, and even more in the production of loud noise or the sustainment of tone required to sing, air is taken in through the mouth and to a lesser extent through the nose, passes through the front of the mouth (the oropharynx), meets the internal opening of the nasal passages in the back of the

In this paper, for purposes of clarity, the client will be referred to as “he” and the therapist as “she.”

throat (the nasopharynx) and travels down the trachea through the vocal cords which open and close rhythmically to allow the breath to pass in and out of the body. The trachea then branches out into two large bronchial tubes and then through the smaller and more numerous bronchioles and capillaries to enter the lungs. The diaphragm inverts on the in-breath, becoming concave like a bowl to make room for the lungs to fill, and reverts to convex on the out-breath to help push the air up and out of the body.

In the work of VMT, we imaginatively extend the vocal tract, which resides in the throat and can change length and width, into the metaphor of a continuous vocal tube which begins at the lips and mouth, curves down the back of the throat, and then passes not only through the neck but down the entire length of the torso. This image is made possible by the fact that, while we do not extend our actual breath into the abdomen, our viscera, in order to accommodate the filling of the lower lungs with air, move further down into the abdominal cavity, causing it, according to the natural action of the body, to distend or expand on a full in-breath and contract on the out-breath, thereby creating the sensation of breathing with the whole body. If one watches babies when they are sleeping, one can observe this wavelike motion of the unhampered breath.

When we consider that the human voice is the only instrument wherein both player and played upon are contained within the same organic structure composed of living tissue, we understand how it can change shape to an extent not possible for any non-living acoustic instrument which has an essentially fixed form.

Everything we do and are affects the voice, and this metaphor of the continuous expandable vocal tube enables us to address vocal function and production more holistically, for we seek nothing less than the embodiment of the voice in each individual to the fullest extent possible. In children experiencing vocal and language delays, playing with them in movement and sound according to VMT principles and practices and through a form of therapeutic play based in part on the work of Dance-Movement Therapist Norma Canner and Physical Therapist Nancy Helm-Estabrooks, can not only improve breathing and vocalization and provide a melodic and rhythmic non-cognitive foundation for the pursuit of meaningful speech, but can increase a child’s ability to express feelings and needs and improve communication and socialization with others, as well.

### **Sources for This Way of Work**

My own work with people experiencing developmental and language delays is based on what I formulated in Early Intervention Programs in Massachusetts in the 1980’s by drawing on the following sources which I have set within the framework of VMT:

- 1. The creative and sensory-based methods of Dance Therapy pioneer Norma Canner** (Canner, 1968, 1972) who, “rather than working on skills development from a primarily functional perspective, which traditionally had been the case in the hospitals and other institutional and rehabilitative settings in which she worked, facilitated movement-based experiences that motivated children to be active through the medium of play. Canner engaged with children by meeting and supporting them at their levels of ability and by offering them opportunities to learn about

themselves and others within the context of creative movement groups. She used simple sound-making instruments - stretch-band material, props and found objects - to assist children in exploring and discovering movement as avenues for increasing sensory and kinesthetic awareness, giving them the opportunity to transform things into meaningful objects which allowed for the capacity for interaction. Through this sensory movement-based approach, she facilitated nonverbal and verbal interactive communication between these children and their peers and adults. Canner's methods are well-documented in the film, *A Time to Dance: The Life and Work of Norma Canner* (BTI Films, 1998) which includes historical footage of her work from the 1960's to the 1990's." (Brownell and Freeman, unpublished article; and *Canner*, 1998). This imaginative, in-the-moment approach to furthering communication was always accompanied by Canner with sung vocalization to encourage both vocal expression and speech, and combines well with the dual functional and creative practices of VMT;

2. **The vocalization profile developed by Dr. Penny Lewis and myself** (Brownell and Lewis, 1990) from the body movement assessment profile of child psychiatrist Dr. Judith Kestenberg (Kestenberg 1967, 1975) in which the amount and types of efforts (considered to be the dynamics of movement) illustrates the individual's adaptation to his environment; the element of shape (the placement of the body in space) illumines his relations to others; and shape-flow (which is determined by the breath) indicates the kind and degree of internalization of a sense of Self and Other. In our study, we applied these movement concepts of effort, shape and shape-flow to free vocalizing, speaking, the act of singing itself and various singing styles, and they continue to inform my work in VMT;
3. **The work of Speech/Language Pathologist Nancy Helm-Estabrooks** (Helm- Estabrooks, 1983) at the Veteran's Administration Hospital in Boston where she developed a technique called Melodic Intonation Therapy which uses vocal intervals and a tapped rhythm to provide an alternative basis for language in patients who have incurred damage to linear left-brain speech centers through stroke. I use the vocal components and other VMT techniques as a way of extending this work and making it more spontaneous.

It has been for some time a truism in speaking of the brain that the left hemisphere controls the right hand, spoken and written language, numerical skills, and reasoning; and the right hemisphere controls the left hand, space and pattern perception, and the generation of mental images of sight, sound, touch, taste and smell in order to compare relationships (Tortura, 1981, p. 329). Note also in the same text an observation of results from Positron Emission Tomography scans of designated language and music centers in the neo-cortex: "When stimulation consists of both language and music, the auditory cortex on both sides of the brain is active; when stimulation consists of language only, there is predominantly left-sided activation of the auditory cortex; when stimulation consist of music only, there is predominantly right-sided stimulation of the auditory cortex" (1981, 328).

In a situation where the auditory stimulus is provided by a single human voice singing a simple wordless melody in which rhythm is minimized, the progression, or flow, and intervals of tone are what carry the tune or musical line. In this respect, melody is linear, sequential, and composed of individual parts, note following note and phrase following phrase, with the function of repetition being to fix it in the memory. But melody is also unifying, creates a vibrational pattern, and travels three-dimensionally by activating the

space through which it moves. Having discovered that “some aphasic patients make no mistakes in pronunciation of words that are embedded in song, although they are unable to pronounce the same words under other circumstances,” Helm-Estabrooks developed a method for using this surviving ability to promote and reinforce speech:

“We have good evidence that the right hemisphere may be dominant for perception, discrimination, and production of melodic and intonational contours. In view of this evidence, there is reason to believe that melodic intonation therapy may call upon intact right hemisphere processes in rehabilitating language in aphasia” (Helm-Estabrooks, 1983, p. 232).

Helm-Estabrooks also demonstrated - much as Canner did from an intuitive, creative and improvisational perspective - that this type of therapy could be used to improve auditory comprehension and that linguistic input could be processed first by the right hemisphere in a slower manner before transmission to the left. As the patient recovered, his right hemisphere alone could process verbal material but only if presented slowly because the right is not so good as the left at temporal resolution. Slowing down speech and inter-phrase pause time, with lots of repetitions (as in song) were found to be helpful, and it was demonstrated that not only did the right hemisphere have the ability to aid in language recovery but that it had considerable capacity on its own, even in adults, to organize language. Furthermore, if left-brain damage occurred in childhood, it was quite possible that recovery could be total. When Penfield and Roberts, in experiments in the 1950’s, applied electrical current to the cortical area of either hemisphere, vocalization could be stimulated. This meant, as Helm-Estabrooks knew, that language capacity existed in both hemispheres. The difference was in kind and quality as well as method and ease of access. In my work, encouraging the sounding voice by eliciting spontaneous vocalization while applying the vocal components, the animal images and postures, convex/concave and VMT massage, manipulation and compression, opens up the possibilities for increased breath and more varied and sustained sound and engages both sides of the brain.

When I work with developmentally and specifically language-delayed children, my goal is to stimulate communication and socialization through body movement, rhythm and melody within a context of creative play. Within each human being, no matter how handicapped, there is movement and it is rhythmical. If a person is alive, he is breathing which means that he has a heartbeat, pulse, circadian rhythms of sleep and wakefulness, a respiration rate, and his own sequence and stages of development which are reflected in his outward expression. No matter how much his external voluntary movement is limited, he is moving internally in his own innate rhythms, and that movement can be viewed on a spectrum of convex and concave with the intention of making all the tubes in the body, most especially the vocal tube, more flexible and functional.

One of the first tasks of a Voice Movement Therapy practitioner is to find ways to identify these preferred rhythms and sounds and to help externalize them by making them more expressive. This can be done by using facilitating objects, many of them inherently or specifically musical, and by movement and massage work based on amplifying and extending instinctive, affective expression.

Where movement and voice meet, the source from which each originates, is the breath. Gestural and vocal language are not only related, but develop from the same neural systems (Tortura and Anagnostakos, 1984, p. 330). To be heard and reflected in movement and sound is crucial to the development of speech. As

every good grandmother knows, and as put into theoretical language by Hans Bleuler in his theory of fascination, “A child will imitate what is perceived in an attempt to master intense stimuli,” (Moses, p. 11). Spread your arms wide, open your mouth and say “ah” and the baby will shape his mouth, open his arms and make the sound, not all at once but eventually, and over time, all together. Once you have gained the child’s attention, if you make amazing faces and exciting sounds, he almost has to respond, like a reflex. It is part of his learning process.

Whatever neurophysical occurrences have caused a child to experience language delays, he will most likely require specifically focused sensory-based stimulation to extend and direct whatever vocalization exists. Since English is an inflected language which has as part of its underpinnings a reliance on melody and rhythm, the purpose of VMT in this instance is to work to connect the voice to the body, to the feeling self, with sound coming out of movement -- “the kinesthetic made audible,” as Canner says -- so that the individual may achieve an affective form of vocal communication as a beginning and basis for cognitive language, insofar as that is possible.

Basically, the aim of my work is to facilitate sound out of movement and language out of sound primarily through:

1. Body movement, breathwork and specific VMT massage, manipulation and compression to stimulate vocalization;
2. Use of specific facial gestures and body postures, combined with the use of simple wind, stringed and percussive instruments, to facilitate increased malleability and refined function of the vocal tract, along with more effective diaphragmatic movement; and
3. Observation and use of an individual’s own innate sound and movement patterns to create a functional sense of melody and rhythm, two not specifically cognitive but physiologically and sensory-based structures which can support and carry an inflected language such as English.

## **I. OBSERVATION AND SENSORY-BASED PLAY: THE TOOLS FOR AUDITORY OBSERVATION**

Before outlining the kind of approach I am proposing to stimulate vocalization and language in children with developmental delays, I need first to set forth the basic vocal components as they are taught in Voice Movement Therapy and as I have combined them with my own work. As Newham says, “At the end of the day, all voices play the same.” Even though every voice that exists is as individual and distinct as a fingerprint or a snowflake, there are certain vocal parameters or components which are common to all voices and which may be identified and worked with to make each one as flexible and malleable, and in this instance as functional as possible. They are as follows (all material in this section in italics is from Newham, *Therapeutic Voicework*, 1999, p. 62, after which, in each category, are my applications):

1. **Pitch:** *Each vocalized sound is perceived to have a certain pitch, note or fundamental tone determined by the frequency of the vocal vibration or phonation. This is perceived within the metaphor of high to low, though it does not, in fact, relate to spatial dimensions but to the speed of vibration in time.* Children with developmental delays often tend to have just a few sounds: monotones or tones that may cover a wide pitch range but are basically uncontrolled or unmodified. A Voice Movement therapist working with an individual in the realm of language delay generally works to find the natural or existing voice's widest expressive range and then to refine it to the purpose at hand, in this case, affective expression and, eventually if possible, speech.

2. **Pitch Fluctuation:** *This pitch sustains more or less constancy or fluctuation in a given time across a range of tones, often called vibrato and sometimes perceived as an inability to remain attuned. This is determined by the shifting frequencies of vocal fold vibration and phonation.* Sometimes pitch fluctuation is so wide as to make what the person is saying unintelligible and needs, through specific types of exercises and practice, to be brought within a smaller range.

3. **Loudness or dynamics:** *The sound of the voice is perceived on a spectrum from loud to quiet determined, in the main, by the pressure of breath released from the lungs.* I believe that learning to express oneself with affect, with or without words, is the surest way of beginning the process of sensorily and eventually consciously varying vocal dynamics.

4. **Glottal attack:** *The voice is perceived as having greater or lesser attack determined by the force under which the vocal folds come together during phonation.* Often children with either low tonus or extremely high tonus in their facial muscles don't know how or are unable to get sounds to the front of their mouths and so rely on a kind of vocalization characterized by increased pressure or force under the vocal folds, often produced by spasmodic diaphragmatic movement. Working with the timbres (see #9) in combination with facial and full or partial body movements and gestures can help to change or mitigate this pattern.

5. **Disruption:** *The human voice may or may not be to some degree disrupted, that is, broken or sporadically interrupted by noise or air which appears to interfere with the continuity of the tone. This can be caused by friction or uneven contact between the vocal folds.* Insufficient force or volume of breath, sounds that are pushed out against tight laryngeal muscles, or actual physical impediments such as nodes or polyps, are some of the things that can cause this effect; it also can be used as a style of expression. In VMT, this is known as "disruption" rather than "dysphonia", a diagnostic term in Speech and Language Pathology, because such sounds can be produced without causing vocal damage. If the space around the vocal box is sufficiently wide or "open," the vocal folds can be forcibly brought together with great consistency in a manner that does not do serious injury because they have sufficient room to vibrate. One has only to think of the disrupted or dysphonic (depending on your point of view) sounds of Louis Armstrong, Tom Waits or many male and female gospel and country singers who have achieved long vocal careers, to know that this type of voice production can be used successfully as a singing style. It can also be learned, without precluding other methods of vocal production, in VMT which presupposes that there are no "bad" sounds, just bad or damaging ways of producing them. Disrupted sounds, at all kinds of pitches, are unusual and interesting and often can be used to attract and engage people of all ages experiencing language delays or dysfunctions, just as they have been used to engage audiences.

**6. Free Air:** *The quality of the voice is perceived as being more or less breathy or airy, determined by the volume or quantity of transglottal airflow.* Children who have restricted movement or limited strength in their intercostal muscles and the muscles surrounding the diaphragm, or who are shy or hesitant about being heard, often have a whispery, indistinct tone which can be worked with through body and voice to relax or strengthen muscle tonus to release and/or project the voice. Likewise, those with extremely tight, hoarse or damaged voices can be shown how to use free air to loosen up and sometimes to help heal their voices.

**7. Register:** *The voice is produced within what is perceived as a certain register, either modal, falsetto, whistle or vocal fry. The voice can also be perceived as being composed of a blended combination of modal and falsetto. When the vocal folds are phonating using the majority of their length and when most of the energy is at the fundamental resonant frequency, the voice register produced is usually considered to be modal. When the vibrating length of the vocal folds decreases so that most of the energy is in the first overtone or second harmonic, it is usually falsetto. When only a minimal portion of the folds is vibrating, forming a very small glottis, very high sounds are produced in what is known as the whistle register, like a cry or screech or piercing call, as, for example, in the type of sound known as “cri du chat” which is sometimes found in children with severe developmental delays.” Very low sounds, in which the focal folds are extremely lax and vibrating along their entire length with either very little or a great deal of air pressure behind them, often fall into the category of vocal fry or vocal creak, a mélange of low tones which are unclear in terms of pitch.* Often, for neurophysical reasons, these very high or low sounds are what children with major developmental delays habitually make, and it is useful to begin to engage a child in soundmaking in these less common registers by reflecting back the child’s sounds rather than trying to suppress or eliminate them. Reflecting them, particularly in exaggerated or amplified tones, will often attract the child’s attention and stimulate participation and, over time, they can be encouraged to pursue tones in more usual registers.

**8. Violin, nasality or forward pharyngeal resonance:** The focused production of vocal resonance in the nasal cavities as opposed to its absence as in the sound produced when these resonating chambers are blocked by a cold or infection. *The human voice may be heard as possessing a spectral degree of nasal resonance. When nasal resonance is radically increased, the sound may metaphorically be described as possessing a high degree of violin; when nasal resonance is minimal, the voice may be heard as lacking in violin.* Violin is often found in early baby sounds, crying and whining, so-called witchy sounds, and in the voices of very old people. To engage a child in soundmaking, the more a Voice Movement Therapist can both reflect back a child’s own sounds and attract a child with greatly contrasting ones, the more she will be able to stimulate that child’s ability to vocalize, a necessary precursor to speech. Being able to place the sound in the front of the face will also help with the process of learning to articulate.

**9. Timbre or harmonic resonance:** *The most dominant component of the voice which gives it its particular character arises from the configuration of the vocal tract. Harmonic resonance may be arbitrarily divided into three categories arising from a short, narrow tract; a medium length and diameter tract; and a fully lengthened and dilated tract. These are given the names flute, clarinet and saxophone respectively.* Taking the time to match the preferred or possible timbre in which a



child speaks or vocalizes gives that child an experience of being met and a feeling of satisfaction for making the effort.

**10. Articulation or vowel:** *The human voice may be perceived as producing sounds which appear close to a sound usable in a spoken language of a particular culture and which are produced by the shapes of the vocal tract in combination with the movement of the tongue and lips.* Making sounds in flute, clarinet or saxophone are akin to making vowels because, harmonically, timbre and vowel are the same; so actual language-making can start here. (1998, 61)

Proceeding from observation and use of an individual's own patterns of breathing, moving and vocalizing, VMT seeks, through focused creative play as well as specific sound and movement structures, to increase communication skills and social interaction. Using the non-cognitive bases of melody and rhythm, Voice Movement Therapy identifies and strengthens components common to all voices through movement, massage, breathwork and vocalization to help individuals develop more flexible and functional voices for forming relationships and communicating.

The purpose of using VMT with individuals with developmental, and especially language delays, is twofold:

1. To help persons with little or no verbal language to increase and focus their ability to vocalize: as a means of forming relationships, expressing their wants and needs non-verbally and, if possible, as a precursor to speech, preliminary to or in conjunction with the work of a speech/language pathologist;
2. To assist persons whose social development is affected by limited language, physical/neurological conditions, behavioral disorder and/or emotional trauma, to find the voice to express what they mean and what they need.

## **II. OBSERVATION AND SENSORY-BASED PLAY: PRACTICE**

Assuming, for the purposes of this paper, that we are beginning with children with little or no appreciable language, some methods for proceeding would be as follows:

1. Identify preferred body rhythms and vocal sounds and help the child make them extrinsic or expressed, i.e., look for the smallest signs of voluntary movement and listen for breathing patterns and sounds as beginning places for encouraging vocalization. One can discern individual sound preferences by making and playing different kinds of music. For example:
  - A.) Use straight vocal sounds which one can make oneself, such as hissing, blowing, whistling, buzzing; squeaking, growling, whispering, humming; loud./soft, high/low, vibrato/no vibrato, free air/no free air, disrupted/not disrupted, glottal stops/no glottal stops, vowels/consonants, etc. Set the exploration within the framework of the core ingredients of vocal sound as understood in VMT and described above.
  - B.) Use live or recorded music such as Country-Western, Pop, Rock, Easy Listening, Jazz,

Folk, Classical, Latin, Blues, Gospel, Hymns, Spirituals; acoustic versus electric, wind, strings, reeds, or drums; whatever comes to mind that you think might appeal to a particular child from what you know about him and have observed in terms of sound and movement preferences. You can move with the child to discover rhythmic preferences or, if the child has paralysis or seems physically or neurologically delayed, move him to music and note responses, even the tiniest, particularly what parts of the body may have a tendency to continue to try to move even after you have stopped. This will also help to determine tension-flow rhythms: id-based unconscious movements indicating early childhood needs and impulses (see Kestenberg 1967 for further details).

2. Introduce simple sound-making instruments - objects that can be blown, plucked, or hit - in a considered developmental progression. For example, with regard to:

### **A. Wind instruments**

a.) One might begin by blowing through a tube. I would suggest empty toilet paper, paper towel rolls or available plastic tubing, ranging in size from straws to tubes of larger diameter, depending on whether the child tends to open his mouth just a little bit or widely, and blow air on his cheeks, chin, forehead, neck, and especially around the mouth and lips. Encourage the child to blow or make sounds back at you, or even to look at you through the other end of the tube so that he may become aware that something is happening in and through this tubular space.

b.) Begin to make sounds through the tube, using opposite extremes, as outlined above (loud/soft, high/low, squeaky/growly, etc.). If he makes any sound at all, try to reflect it back in an approximation of what you heard. If he seems to be stuck on only one sound, listen carefully and amplify the slightest variation which he may make as a way of eventually approaching and adding a new sound. I found this very useful when working with a child who had had approximately one quarter of his brain removed in order to close his skull which was open where the spinal chord joined, due to spina bifida. All he would do is roll around on the floor and make one sound -- "eh, eh." My first job as an Expressive Therapist was to see if I could get him to vary this sound. So, twice a week, for an hour, I rolled around on the floor with him making the "eh" sound and, every time he would vary it to even the slightest degree, I would repeat and amplify the variation. After working with me for ten weeks, he could make five separate and distinct sounds, three of which he would imitate back to me when cued. When he had attained a few more sounds, this child went on to work with a Speech and Language Pathologist, and eventually achieved a substantial degree of meaningful language with which he could communicate.

c.) Blow on simple soundmaking objects or instruments which require breath but not vocalization to make sound, for example, pennywhistles as opposed to kazoos. I would suggest chromatic pitchpipes which are circular and do not have sharp edges (they cost about \$12. and can be obtained at most music stores). Pitchpipes with four to six blowholes (those used to tune violins, banjos and guitars, for example) are another possibility. Slide whistles are good if the child can make a small enough aperture with his mouth. Once the

child can make an instrument “sound” by blowing into or through it, harmonicas are a next possible step, as they make sound on both the inbreath and the outbreath and can be used both to strengthen the muscles and coordinate breath patterns in children with tight or loose musculature.

d.) Blowing on a kazoo is a great intermediate step to a non-amplified speech sound. The lowly kazoo amplifies the voice which must be used to make it work. Once a child has achieved this, he has a wonderfully versatile instrument with which to communicate and begin to have nonverbal conversations with another human being. Kazoos can be made to sound louder/softer, rhythmic/arrhythmic, higher/lower, etc, and can begin to convey feelings through use of the child’s own voice (Brownell 1992, 8, “Scott”).

Where one starts in this progression with any given child depends on where we find him in relation to using the breath and making sounds, but the basic principle which guides this exploration is twofold: 1.) using the breath and sound to evoke a response and 2.) using various kinds of tubes of different widths, depending on whether the child begins with a small opening of the mouth which needs to grow bigger to achieve adequate freedom of expression or a mouth opening which will need to become smaller to produce the articulation necessary to speak. With a grown person or child not experiencing a delay, the vocal tube itself can be made more malleable through postures and movements without the need of an intermediary tube, and this is the way VMT is usually employed. In children and other people with language difficulties caused by delays, malformation, other neurophysical problems or injury, use of the external tubes can help them develop or loosen tonus in the facial and other muscles and learn to expand and contract, lengthen and shorten their own vocal tube. As explained in #9 of the components of the voice according to VMT, saxophone configuration represents the greatest expansion which makes articulation the most difficult; flute is the most narrow, least expansive configuration of the tube but the one most necessary for speech; and clarinet is in the middle. I would add that I only use the above and other sound-making objects or instruments during my play together with a child in such a way that they will become, and remain, special and connected to the communication that is growing between us. Like words, phrases or melodies, they can become transitional as well as facilitating objects, and my work with children is based on a relationship as much as a method (Brownell, 1986, 98-116, “Language as Transitional Object”). When these methods are used only as techniques without establishing the relationship that is the prime motivator for change, they lose their effectiveness.

## **B. Stringed instruments**

With regard to using objects that are plucked or strummed, I have found it useful to develop voice and movement play around instruments such as a classical guitar with nylon strings (because they are soft) and which has a sound hole. Until I studied VMT, I never realized that what I had been doing and enticing the child to do by plucking or strumming the strings which vibrate over the sound hole and cause the body of the instrument to resonate, by blowing and calling through the strings down the sound hole which amplified our voices, by lengthening and shortening the strings to lower and raise pitch, by sliding our hands up and down the strings to get strange effects; or by buzzing and disrupting the strings by bending them and causing them to hit together in unusual ways, was, in a crude way, something akin to giving the child an external model of his own vocal

mechanism and some of its possibilities. This is a particularly wonderful form of sound and movement play for children with autism because the guitar becomes the third or facilitating object, the medium (in both senses of that word) or “go-between” between us, and often such a child will begin to make eye contact during this play and, over time, to make sounds or, if he is able, to direct words specifically toward me (Brownell, 1988, 72-74, “Sam”).

I have also used small lap harps, wonderful because the sounding box is held next to the heart and the strings are plucked or strummed in toward the body as well as away from it, so the sound is entering the heart physically as well as metaphorically. Pioneer Dance Therapist Norma Canner-- who has always used sound as the fourth component of movement, adding it to space, force and time--would, in her early work with children with disabilities, have someone make small chest harps out of flat wooden boxes with a sound hole and rubber bands for strings, which partially paralyzed children could hold against their chests and strum. Alternatively, the therapist could hold the harp for a child and strum or pluck it for him so that he could feel the vibrations and then, with or without help, place his hand on the therapist’s throat and upper chest and feel the vibrations her voice made which often motivated him to put his hands on his own neck and chest to see if he could make a sound and feel the vibrations in his own body (Canner, 1968).

The principle here, as with the objects that are blown, is to give the child a direct sensory experience of sound-making which helps him locate that facility in his own body as well as in the external world because he feels something on his skin, his hands, or his face. He blows or plucks or strums an object and it resounds or vibrates against some part of his body and he can also use his own body for making non-vocal percussive sounds, a good precursor to consonant-making. Which brings us to objects one can tap or beat:

### **C. The role of rhythm and percussive instruments**

Of the non-cognitive, intrinsic structures of the English language, one is melody, which is both linear and spatial, and another is rhythm. My proposition is that if a child can sustain a melody *and* keep a beat, he has the structural underpinnings for language. As discovered by Helm-Estabrooks and put to work in Melodic Intonation Therapy, a person who has experienced a cerebral accident and lost the power cognitively to sequence words can in fact learn to speak again by using the natural inflections of the English language, the melody contained in the words themselves, to carry or impel the words forward in the event that the linear cognitive speech centers have been damaged. This is made possible because there are speech centers in the right brain as well as the left, only they are more spatially oriented. Melody is both linear, in that it travels forward through time, and spatial, in that it is vibratory, i.e, moves space by making the air vibrate in front of us and sometimes around us, depending on how it is projected and reflected. It seems to me that one can also experience the sensation of sound, to some extent, around the body as well as directly in front, since it sets the air molecules moving, and these vibrations are picked up by receptors in the body, such as the Pacinian corpuscles, which make us feel that we have been literally touched:

“The versatility of the skin is such that it is capable of responding to sound waves just as it is to those of pressure. A.S. Mirkin of the Pavlov Institute of Physiology at Leningrad has

shown that the sensory receptors for pressure (deep touch), which are present around muscles, joints, ligaments and tendons, the Pacinian corpuscles, possess very definite resonance properties. Mirkin subjected Pacinian corpuscles, in mesenteric tissue adjacent to the intestines, to acoustic stimulation in a uniform acoustic field, and found that these receptors possess resonance properties, and that a conditioned connection is obtainable between an optimal frequency of stimulation and bioelectric activity, thus strongly suggesting a biochemical resonance in Pacinian corpuscles.... Madson and Mears, using deaf subjects, found that sound vibrations have a significant effect upon the tactile threshold, that a fifty cycles per second tone at both high and low pressure desensitizes the skin and raises the threshold, while a 5,000 cycles per second tone at both high and low pressure levels sensitized the skin....Gescheider has shown that the skin is able to localize sound waves of different intensities with remarkable accuracy” (Montague, 1971, 246).

Thus, it seems that not only is sound spatial as well as linear, but also that when we say that the quality of a person’s voice has touched us, we are not just speaking metaphorically; and that vocal “touch” has the capacity to sooth or stimulate, depending on the rate of vibration.

While my knowledge of both physics and neurology is extremely limited, what I *do* know is that the scientific principles Helm-Estabrooks used to formulate Melodic Intonation Therapy and the instinctive sense which caused Canner to sing her directions to the developmentally delayed children with whom she worked and have them sing back to her because she knew that they would be able to remember and to communicate more readily in song, are both based on the fact that sound is linear *and* spatial, or pattern-creating, *and* three-dimensional, and that melody, combined with the element of time as represented in the repetition of a pulse or rhythm, can carry cognition.

For example, ask a child with a language delay to speak his name and maybe he can and maybe he can’t, and maybe he will and maybe he won’t. But say his name-- Eric, for example (as in the section on the child with autism in the film *A Time To Dance*, Canner, 1968) --and say it accented-- “E(h)” accented and “ric” unaccented-- and accompany it with a beat for each syllable on a drum held out in front of the child, and chances are that he will be intrigued. Do this each time you see him, either alone or in the company of others, and he will probably start to reach for the drum and want to tap out his own name. Most children who can hold a spoon at a particular stage of their development are impelled to bang it on the dinner table and often accompany it with some kind of vocal sound. People who are in prison waiting for “chow” or at a concert where the main attraction is late in appearing, will bang with their spoons or rhythmically clap or stamp their feet and call out in rhythm to express or discharge their impatience. This is a very fundamental human response which may be used to harness and direct a child’s interest and energy, as well as transform his frustration.

Doing a body tap-out is another way of enlivening the skin and muscles of the body and stirring up a person’s internal rhythms. Dance movement therapists are excellent at helping people develop creative ways of moving their body rhythmically, and I have learned from them. They need only remember, as Norma Canner does, that the fourth component of dance is sound, and especially vocal sound which can be accessed, stimulated and encouraged simultaneously with and through body movement.

## V. CONCLUSION

I would like to close with a few words about the power of creative play - about dancing, song-making, and the role of the Creative or Expressive Arts Therapies in general and VMT in particular - with children experiencing developmental and language delays. It is a well-known fact among neurologists that the brain, especially in a young child where neural pathways are still actively forming, can make new connections. In the same way that a person with cerebral palsy can sometimes still his shaking body to focus intently on something he really wants to do, so a child with a developmental language delay and/or some kind of cognitive dysfunction can experience a breakthrough in his ability to round his mouth, raise his voice, use his lips, and say "O" (videotape of "Michael," author's personal collection) and to do other kinds of things that were perhaps not thought possible, when confronted with someone seeking to engage him through his creative self, through play which is "educated" on the part of the therapist and spontaneous on the part of the child, and first initiated on a body or sensory-based level.

In our present technological age when there is so much emphasis on using written or visual symbols, mechanical or electronic devices and assisted technologies, many of which may be useful and perhaps essential to help many children with various kinds of disabilities to communicate, often what I consider to be the two most essential ingredients for progress lose their priority. These are, in my opinion, the ***power of a human relationship to motivate a child to expend effort in his own behalf*** and ***the presence of his own innate creative ability to alter or learn to compensate for his circumstances***. For a child, even a disabled child, can be his own best source, possessing untapped abilities to relate, to express, and to grow - emotionally, psychologically and neurologically - by finding new pathways for learning and for change through creative play. Facilitating this ability through informed and often improvisational creative play on the part of the therapist, through a collaboration between scientific knowledge and artistic and therapeutic process can, I believe, lead both to greater communication and more independent functioning on the part of the child. Working in this way coupled with the concept of the expandable vocal tube and its relation to the whole body and using the vocal components as a way both to increase existing sounds and add others, makes VMT a natural therapeutic modality for this kind of work.

According to Piaget, learning on a body level is where we begin. If our minds and/or bodies are damaged, we need this body connection even more. We need ways to experience real objects concretely before we can abstract, so why not present a child with a real drum making a real sound to try to reach for, instead of a visual symbol of a drum with, perhaps an accompanying recorded sound? Why not a primary source instead of a more removed or secondary one? It doesn't take much more time, but it might take more engagement of the whole self, of the whole sensorium, on the part of the therapist. The reward might be more engagement of the whole self, the sum of whatever parts are currently able to engage, on the part of the child. It is with this in mind that I have tried to begin to outline here a method of work which provides a framework for both the functional and the creative investigation of vocalization and language stimulation with children experiencing language delays.

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