

An Integrative Approach to Vocal Cord Dysfunction in Young Athletes

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Respiratory symptoms such as dyspnea (air hunger resulting in labored breathing), cough, and hyperventilation may share a complex multifactorial etiology including genetic predisposition and physiological factors as well as psychological factors, particularly stress. One such respiratory condition is termed vocal cord dysfunction (VCD) and is characterized by closure of the vocal cords during inspiration (breathing in), resulting in wheezing, breathing difficulties, dyspnea, and tightening of the throat and/or chest. Historically, other terms used to denote VCD have included paradoxical vocal fold motion, functional stridor, and psychogenic wheezing. VCD is frequently misdiagnosed as asthma and treated with asthma medications with little to no improvement. The condition is commonly seen in adolescents and young adults and is more prevalent among competitive athletes. Although the exact prevalence of VCD is not known, it is not uncommon. The diagnosis of VCD is difficult to make, and all possible causes of wheezing and other VCD symptoms need to be considered. Psychiatric explanations such as anxiety, factitious disorder, and conversion disorder must also be assessed. Without appropriate treatment, VCD symptoms do not resolve and may actually worsen, occasionally leading to hospitalization and invasive medical procedures. In this article, we provide an overview of VCD and describe an integrative approach to the treatment of VCD in young athletes.

Overview of Vocal Cord Dysfunction

Vocal cord dysfunction (VCD) is a condition in which the vocal cords close during inspiration (breathing in), resulting in a wheezing sound due to the glottis narrowing and allowing only a small amount of air to pass. High levels of sympathetic nervous system arousal and associated high levels of muscle tightness in the upper body (neck, shoulders, face, and throat) likely contribute to the involuntary adduction of the vocal cords upon inspiration, along with associated dyspnea. Common symptoms of VCD include wheezing, shortness of breath, tightness of the throat and/or chest, voice changes, and a dry cough. VCD symptoms generally have an abrupt onset

and resolution (i.e., symptoms begin shortly after beginning exercise and subside soon after exercise is ended).

The diagnosis of VCD is definitively established by visualization of the vocal cords, albeit other less invasive testing (e.g., flow volume loop) can also be useful in establishing the diagnosis. These symptoms do not always follow a predictable pattern. Psychosocial factors, such as stress and emotions, and intense exercise may contribute to and/or induce symptoms. For example, one soccer player we treated manifested symptoms almost exclusively during games, not in practices. A similar pattern was seen in a competitive figure skater as well as a track and field athlete. For each of these young women, the stress of competition appeared to play a significant role in their breathing difficulties. Other precipitating factors such as gastroesophageal reflux, sinusitis, post-nasal drip, and environmental irritants have been suggested. VCD is commonly seen in adolescents and young adults and is more prevalent among women than men. Many VCD patients, including the majority of those that we treat, are competitive athletes as well as high academic achievers. They often participate in high-level athletics, such as travel basketball or elite hockey, and/or advanced academic programs.

The diagnosis of VCD is not the same as an asthma diagnosis, but VCD is often misdiagnosed as asthma (i.e., the wheezing sound may be transmitted to the chest and create a perception of asthma). It is important to note that VCD may be present with or without asthma. Children with VCD and asthma present with symptoms that go beyond the typical asthma presentation and do not get total relief from asthma medications. Contrary to common misconception, VCD symptoms are not “all in the head.” The symptoms are very real and are not imagined or voluntarily produced. VCD does not typically require medication or hospitalization, albeit these frequently occur due to misdiagnosis of asthma. A poor response to medication often leads to heightened distress and worry. Without proper treatment, VCD symptoms do not resolve and may actually worsen. Treatment approaches reported in the literature have ranged from

Table 1. Diaphragmatic breathing instructions for children and adolescents

1. Lay on the floor or sit up straight with your feet supported.
2. Put one hand on your chest and the other hand over your belly.
3. Imagine you have a balloon underneath your belly button that inflates as you inhale and deflates as you exhale.
4. Breathe in through your nose (inhale) and pull the air deep into your lungs. Feel your belly expand, like a balloon blowing up.
5. Keep your shoulders as relaxed as possible; they should not raise up while you inhale.
6. Breathe out slowly through your mouth (exhale). Feel your belly go back in, like a balloon deflating.
7. Breathe slowly—inhale to the count of 3 seconds, exhale to the count of 6 seconds. The more you practice, the easier it will be.
8. Practice “belly breathing” as often as you think of it—lying down, sitting, or standing.

education and reassurance to speech therapy to psychotropic medication.

The most common treatment for VCD is diaphragmatic breathing, which relaxes the throat muscles and improves airflow into the lungs. Progressive muscle relaxation with attention to neck, shoulder, and facial muscle groups can also be useful. Patients are instructed to practice basic diaphragmatic breathing techniques while symptom-free prior to using them during VCD episodes. Supportive counseling is another treatment that helps with adjustment to the VCD diagnosis and its treatment. Counseling can also help with the management of stresses associated with VCD symptoms. For many people with VCD, the breathing techniques, relaxation, and counseling provide sufficient treatment. In our work with young athletes, we have found that increased attention to relaxed breathing during practice and game settings is necessary. Athletes do best when they learn how to control and maximize their breathing when engaged in exercise. We have also found that athletes, as well as others with VCD, benefit from direct training in handling the stress and worry related to their symptoms. The better they control their distress, the more effectively they manage their symptoms.

Integrative Approach to Treatment of VCD in Young Athletes

Our biobehavioral approach to VCD in young athletes integrates diaphragmatic breathing with other self-regulation strategies, such as relaxation, imagery, biofeedback, and cognitive coping statements. The primary goal of the approach is to promote relaxed breathing as a means of preventing and managing VCD symptoms. To promote relaxed breathing while active, athletes are trained to breathe diaphragmatically while engaged in physical exercise. Self-talk, coping statements, and positive imagery are taught as strategies to deal with the secondary stress asso-

ciated with VCD symptoms. Training is provided in a systematic fashion, following a discern/control/generalize approach. In the discern phase, clients are taught about body awareness and discriminating dysfunctional breathing patterns, tight muscles, and unhelpful thoughts. In the control phase, they develop voluntary control over breathing and tight muscles while generating positive self-statements. In the generalize phase, they transfer their self-management skills into relevant settings (practice, competitions) and develop greater confidence.

The following is a session-by-session outline of our standard four-session treatment protocol for VCD. General information about VCD (nature, causes, prognosis, treatment) is provided prior to treatment and is deemed essential for enhancing the athlete’s motivation and commitment to the skills training approach.

Session 1 provides an introduction to relaxation and diaphragmatic breathing. Progressive muscle relaxation is introduced, with the explanation that general relaxation and loose muscles are the foundation for “effortless” breathing. Diaphragmatic breathing is presented (see Table 1) with an emphasis on big, full, easy breaths. Daily skills practice and a VCD symptom diary (frequency, severity, cues, and triggers) are assigned for homework.

Session 2 includes practice of diaphragmatic breathing with pneumography (PNG-abdominal) and surface electromyography (SEMG—bi-trapezius) biofeedback and the introduction of relaxation imagery. During breathing practice, abdominal expansion and relaxation of the shoulders during inhalation are emphasized. Suggestions of “easy, open, comfortable vocal cords and air flow” are encouraged and can be combined with visualization techniques. Capnography (measurement of exhaled CO₂) can be added to help athletes avoid “overbreathing” and to provide feedback about desired pace of breathing and ideal end tidal CO₂ levels. Daily skills practice (breathing

Table 2. Other strategies for preventing and managing VCD symptoms

1. Gradually warm up/enter into physical activities and sports.
2. Take small sips of water or dry swallow to help relax the larynx.
3. Use diaphragmatic breathing to prevent breathing difficulties and at any sign of tightness or stridor.
4. Do breathing exercise easily—keep your shoulders and chest relaxed. Concentrate on “letting” air in and out.
5. Establish plans for managing symptoms in each situation that elicits breathing difficulties. Consider how you will manage VCD symptoms as well as associated stress/anxiety.

in different positions—lying down, sitting, standing) and the symptom diary are assigned for homework.

Session 3 emphasizes breathing training during physical activity and management of VCD episodes. Diaphragmatic breathing is practiced while walking and then jogging on a treadmill. When there is control while jogging, we increase the intensity of exercise until symptom severity is much higher (e.g., 8 out of 10) and instruct the athlete to use diaphragmatic breathing to control the symptoms. Daily skills practice (breathing while walking and jogging, use of techniques to control symptoms following intense exercise) and the symptom diary are homework assignments.

Session 4 includes positive self-talk and coping statements and more breathing training during activity. Self-talk and coping statements are also taught as strategies for handling emotionally difficult situations. Diaphragmatic breathing during physical activity is again practiced. Positive visualizations (e.g., throat being as wide open as a baseball during inhalation, breathing comfortably in situations that once triggered symptoms) are promoted. All self-management steps are reviewed, emphasizing self-talk, breathing, and perceptions of control.

Over the course of treatment, situational and cognitive/emotional triggers are reviewed, and problem-solving and coping strategies are generated. Cognitive coping strategies are taught to handle the stress and anxiety associated with VCD symptoms. In addition, peripheral temperature biofeedback and electrodermal biofeedback may be used to support a more general concept of lowered sympathetic nervous system arousal and balance. Heart rate variability (HRV) is an “emotional regulation” tool that may also be helpful. Other strategies for preventing and managing VCD symptoms are also presented, such as gradual warm-up and small sips of water to help relax the larynx (see Table 2).

Over the past 2 years, we have treated approximately 20 young athletes using this integrative approach. Most of these athletes have been high school-age students, but we have also treated older children and young adults. They have included athletes who play team sports, such as soccer,

basketball, and hockey, as well as those who participate in individual sports, like figure skating and gymnastics. Almost all have benefited, showing a decrease in the frequency and severity of VCD episodes. In some, symptoms have been eliminated completely. Those who have been successfully treated report enhanced athletic performance (e.g., less time off the field, more energy) and increased perceptions of control over their breathing. Athletes with a better understanding and acceptance of the VCD diagnosis have responded best, as have those who were motivated and committed to the practice and use of their self-regulation techniques. Individuals with comorbid asthma or emotional problems, such as other anxiety-related symptoms, have been more difficult to treat, often requiring longer treatment and exhibiting less clear outcomes. Problem solving with teenagers and their families about perfectionism, overscheduling, and inappropriate parental/familial expectations can be important. Addressing psychiatric comorbidity, particularly depressive and anxiety-related disorders, with psychopharmacologic agents and psychotherapy may be essential for helping patients achieve more complete symptom resolution.

Summary

VCD is a condition that may mimic asthma and is often seen in young athletes. Athletes appear to do best when provided with direct training in (a) controlling their breathing when engaged in exercise, (b) reducing excessive muscle tightness in the upper body, and (c) handling the stress and worry related to their VCD symptoms. In our clinical experience, a biobehavioral approach integrating diaphragmatic breathing with other self-regulation strategies, practice of these skills during exercise, and stress management effectively reduces and, in some cases, eliminates VCD symptoms.

Suggested Readings

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