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# Weight Lifting, Singing, and Adolescent Boys

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# **WEIGHT LIFTING, SINGING, AND ADOLESCENT BOYS**

**Patrick K. Freer**

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It's not fun anymore.

You used to be a good singer, and you liked being in chorus. But, now your voice is changing. You have no idea why, other than you know it's going to happen during puberty. You sing, but you have little control over what comes out. Sometimes, notes are comfortable, sometimes not. Often singing is smooth and effortless, at other times it's effortful, with notes being sounded that certainly were not your intention. Your choral conductor says that it will get better eventually, and that the best thing you can do is just sing through the voice change.

At the same time, you have started weight training in the gym under the supervision of a physical education teacher. The teacher explains the mechanics of lifting and leads you through a series of steps to prepare your growing musculature to lift heavy

weights—eventually. For now, the emphasis is on form and technique, and you know that learning these skills will assist you in getting stronger and developing muscle mass. Most important, you can name the muscles involved, identify the different technical skills, and you see the results in your reflection in the mirror.

These two scenarios represent daily experiences of many boys in our choirs. There has been a marked increase in the number of children and adolescents—male and female—who lift weights. Success in weight rooms and on athletic fields has long held allure for high school students, and recent advances in understanding the developing physiology of young people has led to the expansion of strength training in high schools and its incorporation into elementary and middle schools. And these



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students are taking what they learn in school and adding to it in their basement home gyms and sharing it with friends.<sup>1</sup>

The problem is simple: the physical developments that lead to voice change are responsible for the characteristic strength gains during adolescence. Without purposeful instruction, adolescents who experience frustration in singing may gravitate instead to athletic activities, where that physical development is celebrated, particularly during the early high school years. The fact that there are strong similarities in the physical foundations of singing and weight lifting affords choral conductors a unique opportunity to reframe singing during the period of pubertal voice change as an athletic endeavor. To embrace this change requires choral conductors to reinforce what students already know from their experience in athletics and weight rooms with analogies and descriptions of parallel and related singing activities. Weight training is a wholly individualized activity with attention focused entirely on the lifter and his body. If we can frame the skills of singing toward the same level of focus and individualization, we will simultaneously take advantage of the archetypical need of adolescents for autonomy and personal satisfaction.

Weight lifting is increasingly common throughout the lifespan without restrictions

regarding age, gender, ethnicity, race, or socio-economic background. This article uses the phrase "weight lifting" to reference the activity of lifting weights for physical benefit rather than the competitive sport known as "weightlifting." In this article, "strength training" refers to a program designed by a physical education teacher or athletic coach. This article is focused on the experience of adolescent boys in middle and high schools because of the long-established problem of male adolescent attrition from choral music. The intent is to provide a rationale for drawing parallels between weight training and singing, present examples and descriptions of those parallels, and suggest ways in which choral conductors might begin conversations about these topics with their male singers.

Indeed, middle school and high school boys involved in both athletics and choral music urge that choral conductors function as coaches who convey specific information about physical functions and technical skill.<sup>2</sup> However, very few resources describe parallels between exercise training and non-sports activities. One of these is a book chapter titled "Exercise Physiology: Perspective for Vocal Training."<sup>3</sup> The chapter authors regard singing as an athletic endeavor and present foundational information about the physical processes involved in any kind

of movement activity. The present article extends that theoretical framework through the consideration of a specific set of propositions: (1) weight lifting is common among adolescent boys; (2) weight lifting and singing share mutual principles; (3) many adolescent boys respond favorably to discussion of muscular growth and function; and (4) choral conductors may be able to engage adolescent boys through authentic analogies between strength training and singing.

## MASCULINITY, MUSIC, AND MUSCLE

Various concepts of identity permeate discussions of schooling and enculturation. Current theories of how individuals develop, maintain, and transform their identities are based in William James's references to self-concepts that evolve from past experiences and toward desired future characteristics.<sup>4</sup> The topic of identity development has been recently explored broadly within music education in schools alongside more specific investigations of how adolescent boys view issues of masculinity in choral music settings.<sup>5</sup> Findings from other studies indicate that pathways toward identity construction begin at an early age. Young children construct their identities as athletes and/or musicians based upon their elementary school activities, and once made, these decisions are unlikely to be altered.<sup>6</sup>

The activity of weight lifting becomes attractive to adolescent boys due to rapid gains in strength and size that are uniquely possible as physiological byproducts of puberty.<sup>7</sup> These gains correlate with characteristic increases in the physical height of adolescent boys, much as the peak stage of male voice change correlates with changes in physical height.<sup>8</sup> It should be noted that the peak of pubertal development has an opposite effect in females, who temporarily experience decreases in joint and muscular stability.<sup>9</sup> Just as adolescence presents great variety in the vocal development of young singers, diversity in the overall physical development of adolescent boys requires personalized and differentiated training approaches in the weight room.<sup>10</sup>

Boys' singing during the period of adolescent voice change has a storied and con-

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trouversial past, with current practice favoring the singing activity of all boys at all stages of vocal development.<sup>11</sup> Weight training has a similar history, with physical education programs embracing youth weight lifting only within the past few decades. In response, there have been numerous published sets of recommendations for strength training practices appropriate for preadolescents in upper elementary schools,<sup>12</sup> young adolescents in middle schools,<sup>13</sup> and post-pubertal adolescents in high schools.<sup>14</sup> Many of these recommendations are conceptually aligned with current approaches to vocal pedagogy with children and adolescents.

Male singers who have largely progressed through the voice change are proud of their new vocal capabilities and the commensurate sense of having achieved a level of masculinity. Maturing adolescent boys are similarly proud of their newly muscular bodies. But, boys' increased access to weight lifting opportunities have been accompanied by emphases on muscularity and hyper-masculinity, promoted by trends and stereotypes illustrated in print and visual media. This phenomenon can be seen most readily when comparing the physique of a typical male model in a current issue of *Men's Health* or *Muscle and Fitness* with that of a professional athlete from an earlier era. The idealized image of masculinity presented by the media has changed toward one of abnormal muscularity, prompting boys to begin lifting weights for any number of positive and negative reasons.<sup>15</sup> The drive to increase muscular mass and physical strength is correlated with several factors, including parental comments, the desire for romantic involvement, responses to teasing and bullying, and ideals of masculinity portrayed in media and video games.<sup>16</sup>

The development of masculinity is an area of increasing sociological interest, with focus on how males internalize and perform their conceptions of maleness.<sup>17</sup> Recent studies confirm that throughout adolescence, boys are concerned about their physical appearance and what it indicates about masculinity.<sup>18</sup> Middle school and high school boys frequently cite failure to succeed at sports and self-perceptions of inadequate physique as causes for personal

humiliation.<sup>19</sup> In general, boys report their highest levels of bodily dissatisfaction at the peak of pubertal development and, concurrently, the peak of vocal change.<sup>20</sup> There may be differences relative to race and ethnicity, but research has produced mixed results in this area.<sup>21</sup>

Some adolescent boys turn to illicit drugs to enhance their muscularity and improve strength. Recent studies have documented the increasing use of anabolic steroids and Human Growth Hormone (HGH) among male weightlifters of all ages.<sup>22</sup> Steroid use among middle school students, although not common, is a growing concern and is higher among boys than girls. And more middle school boys use steroids than high school boys, probably because the effects of steroid use are not commonly discussed in schools prior to high school health and sex education courses.<sup>23</sup>

Young and post-pubescent adolescent boys compare their bodies to future, idealized selves more than to the bodies of their peers.<sup>24</sup> They develop these conceptions through the media and by watching older males around them. The positive role models of conductors serve to ameliorate the negative self-perceptions of boys.<sup>25</sup> Because adolescent boys tend to base decisions about their possible future selves on the older boys and adults they admire, there is opportunity for conductors to provide these role models as part of the schooling process. Indeed, the positive influence of older male role models has been found to be as true in choral music and singing as it is regarding physique.<sup>26</sup>

## CORRELATED ELEMENTS AND PROCESSES

Music teachers, choral conductors and otolaryngologists have long noted the potential for vocal stress and dysfunction in adolescent boys due to overly vigorous singing and/or weight lifting.<sup>27</sup> The main areas of concern are the vocal mechanism comprising the larynx, the vocal folds, the inter-laryngeal musculature, and the muscles that position the laryngeal structure within the trachea. For both singers and lifters,

the main prophylactic techniques involve breathing (particularly exhalation), physical alignment, and attention to the body during the movement activities of either lifting or singing.

## PROPER FORM AND TECHNIQUE

Adolescents are learning how to work with the possibilities afforded by their changing bodies whether in the weight room or in choral rehearsals. We will notice that a boy has a newly acquired ability to sing low pitches, but it is unwise to suddenly assign him to sing repertoire where those pitches alone are represented in the piece's limited tessitura. Rather, it is incumbent upon choral conductors to guide the boy toward using his vocal musculature in a healthy manner with exercises and vocal lines that approach and move away from the newly acquired pitches. Just as weight lifters would risk injury if they were to lift only their maximum poundage, young singers risk vocal injury (or, at least, discomfort) if they only sing pitches in any extreme of the range. Do boys desire to lift the most weight possible in the gym, often avoiding those exercises at lower resistance levels that contribute to stability and flexibility? Yes. Do boys desire to sing their lowest pitches in the choral rehearsal room, often avoiding other pitches and vocal activities that contribute to stability and flexibility? Yes.

An analogy we might make is: novice weight lifters often train the "mirror muscles," or the ones on the front of the body visible when looking in the mirror (chest, biceps, shoulders, quadriceps), but often neglect the ones not as easily seen (upper back, lower back, hamstrings, etc.). A vocal workout is similarly off-balance if we only sing the "mirror pitches," or the lowest pitches of which we are most proud and that garner the most attention. We need to train the entirety of the vocal apparatus in order to maximize the development of the low part of the singing range.

Programs of music education and physical education for adolescents share the common goal of laying foundations for lifelong participation in physical activities. Many choral conductors may not have previously

## SUGGESTED WARM-UP EXERCISES

### Relaxation

**quadriceps extension:** while seated, raise feet so that legs are straight, then lower;

**calf raise:** while seated or standing, raise heels so that only toes are in contact with the ground;

**oblique twist:** while standing, place hands on hips and, leading from the elbows, rotate at waist in alternating directions.

### Alignment

**single leg lunge:** place hands on hips and place one foot in front of the other by about 1.5 feet, lower knee of the rear leg toward the ground and then return to upright by pushing through the heel of the forward foot; maintain an erect posture from waist upward, exhaling on the ascent and inhaling on the descent;

**shoulder shrug:** sit with back flush to back of chair, extend arms downward at sides, slowly lift imaginary dumbbells using only the trapezius muscles along the tops of the shoulders; this is a movement of only an inch or two; arms remain straight, eyes forward with chin slightly down so the movement's upward direction parallels the spine; exhale on the ascent and inhale on the descent;

**bicep curl:** stand with feet shoulder width and one slightly forward for balance; grasp imaginary dumbbells and raise them upward toward the shoulder joint by pivoting at the elbow joints; elbows remain at side and do not rotate forward during the lift; maintain a firm yet relaxed and unlocked body position (especially at knees) while facing forward with a sense that the spine is lengthened upward; exhale on the ascent and inhale on the descent.

### Breathing

**lateral shoulder raise:** while standing or seated, grasp imaginary dumbbells in hands and let hang at side; raise the dumbbells outward until arms are extended at sides and parallel to ground; maintain a slight bend in the elbow; exhale by contracting abdominal muscles on the ascent and inhale by relaxing abdominal muscles on the descent;

**lat (upper back) pull-down:** while seating or standing, extend arms overhead to widely grasp an imaginary bar at a pulley machine; pull the bar downward in front of head to just above the sternum; exhale on the descent and inhale on the ascent;

**cable row:** while seated or standing, extend arms forward to narrowly grasp imaginary handles connected to a pulley machine; pull the handles toward the lower abdominals or navel; exhale on the pulling motion and inhale on the return motion.



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considered the choral art as a physical activity, nor may they be aware that the topic of sport as an aesthetic endeavor has, for many decades, drawn upon the same philosophical underpinnings as music education.<sup>28</sup> The adolescent boy, looking in the mirror for the effects of weight training, may be employing aesthetic criteria to evaluate proportion, symmetry, definition, shape, and size. A powerful analogy here is that no muscle works or can be trained independently; all muscles operate in groups of primary and secondary (supporting) functions no matter the exercise of the moment. Similarly, all singing endeavors involve a host of muscular functions that work to support the musical goal of the moment such as singing a particular pitch or working to negotiate a register transition. Whether it occurs in the gym or the choral rehearsal room, all movement education for adolescents should result in awareness of whole-body function, systems, and kinesthesia.

### The Warm-Up Process

The warm-up process for any type of physical activity follows similar principles: begin with relaxation and focus on the body's alignment, draw attention to exhalation and inhalation as controlled by the core abdominal muscles, and then gradually add muscular movements (including laryngeal muscles for singing) in progression from large to small coordinations. Many authors have suggested that choral conductors draw upon metaphor and analogy when constructing warm-ups so that the sequence relates to daily experience.<sup>29</sup> Listed in the accompanying sidebar are three simple warm-up movements that evoke weight lifting and their attendant purposes for each of the initial phases of the warm-up procedure: relaxation, alignment, and breathing. As with any pedagogical technique, it is important that procedures lead toward the desired outcome. Though no weight-lifting background is necessary to apply these movements, choral conductors who are unsure about how to properly model them might enlist the support of students who have some experience as lifters.

### BREATHING

Normal breathing patterns should continue throughout a lift, whether lifting a box in the basement or weights in a gym. It is physiologically advantageous to inhale a greater than normal volume of air just prior to a lift because this expands the lungs and increases thoracic stability. The problem occurs when the vocal folds are then forced together to prevent the air from escaping during the positive phase of the lift (as opposed to the negative phase when the weight is returned to the resting position).<sup>30</sup> Though lifters may sense that holding the breath assists in stability during the lift, the assistance is only actualized during inhalation as the body prepares for the lift.<sup>31</sup> Rather, a slow, controlled exhalation is necessary during the positive phase of the lift.

The holding of breath during a lift is known as a modified Valsalva maneuver, named after physician Antonio Maria Valsalva (1666-1723), who was partly focused on how human internal

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breath pressure affects the inner ear. A characteristic effect of the Valsalva maneuver during weight lifting is an audible rapid expelling of air, often accompanied by a verbal grunt at the conclusion of a lift. Sometimes lifters do this unconsciously, but they often imitate peers who use the technique to intimidate or impress onlookers. Despite the frequent use of the Valsalva maneuver in gyms and weight rooms, it is nearly impossible to find a reputable resource that advocates holding the breath during lifts. It should be emphasized to lifters that, as in breathing for singing, the greater benefit comes with control of the exhalation through purposeful contraction of the core abdominal muscles.<sup>32</sup>

## LARYNGEAL POSITION

As is optimal for singing, a low and comfortable position of the larynx is most advantageous for lifting. The larynx is suspended from the hyoid bone by a group of muscles that permit the larynx to be raised or to be lowered within the vertical space of the trachea. Artificial manipulation of laryngeal position can be detrimental, and unfortunately this can unconsciously result from neck tension and muscle strain when performing movement activities. The frequent effect is a rising of the larynx into an uncomfortably high position with an accompanying forward placement of the chin. Choral conductors may often observe this phenomenon in young tenors who strain

to sing upper pitches. The same physical response (forward chin and strained neck muscles) can be commonly observed in weight rooms as novice lifters perform exercises designed to strengthen the upper torso and shoulder areas. Though conductors may advise boys to "lower the chin," that advice will only provide a momentary solution. On a broader scale the remedy is entirely postural: to attentively relax the musculature of the shoulders and neck. This approach will cause the larynx, chin, and shoulders to return to comfortable and relatively low positions. Though the remedy is simple, the phenomenon may have become habitual and its correction will take both time and many good-natured reminders from the

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choral conductor:

On a related matter, this author has interviewed a number of adolescent boys who lift weights and sing in their school choirs. Several of these boys have noted that they grunt audibly on low pitches while lifting because of a myth that doing so will result in the boy emerging from the voice change as a bass or baritone rather than a tenor. Choral conductors may debunk this myth by citing a study that indicated grunting while lifting weights does not result in the ability to sing lower pitches.<sup>33</sup> It does, however, create other forms of vocal dysfunction that are discussed in the sidebar “Lifting Problems and Singing.”

## HYDRATION

The benefits of hydration for singing are well known and do not need to be restated here. Of interest to adolescent boys, though, is that a lack of adequate hydration has been shown to result in decreased muscular mass, strength, and endurance.<sup>34</sup> None of these is likely to be seen as a positive attribute by

adolescent boys. Hydration that is good for singing is also good for muscles.

## NOTICING AND AVOIDING DISCOMFORT

Much of the mechanism for singing occurs out of sight—we simply cannot regularly peer into the body and observe the vocal mechanism at work. Choral conductors need to gain the trust of boys so the boys will proactively report anything that causes vocal discomfort. To do so, boys need to know enough about the anatomy and processes of vocal production that they can offer descriptions with any degree of specificity. Experienced lifters know to notice changes in physical sensation during and after lifting and to seek assistance at the first sign of problems. Ignoring discomfort or pain could result in a significant injury. The same is true in choral music, except that without specific knowledge of what they are to physically perceive, boys may report “difference” as “discomfort,” especially when singing vocal lines that transition to and from

newly acquired pitches. Boys need to know the mechanics of vocal production so they can effectively speak about their experiences and sensations during vocalization.

## PRINCIPLES OF STRENGTH TRAINING

There are basic principles of strength training that should be applied in any systematic program designed for building strength. These principles share similarities with the fundamental principles of singing, offering occasions for choral conductors to use the terminologies when enacting them during rehearsals. As when training singers about the fundamentals of vocal production, the fundamental principles of strength training apply across differing populations although the applications need to be adjusted to meet the specific needs of adolescent youths and adult singers.<sup>35</sup> Strength training for maturing adolescents should be conceptualized as “fitness integration,” with a combination of performance-enhancing and injury-reducing components.<sup>36</sup> This conceptualization is analogous to a program of vocal education within a choral rehearsal where emphasis on performance repertoire is but one component of the curriculum. The basic components of strength training can be generally identified and stated as principles:

**Overload.** Increases in muscular strength and mass are achieved as the body responds to the breakdown of muscle fibers as they contract to move heavy weights. This breakdown of muscle fibers results in (1) fatigue that prevents the ability to lift the maximum amount for many consecutive repetitions and (2) the process of repair that results in increased strength after a period of recovery. Overload in singing occurs when we ask more of the vocal mechanism than we have previously, including by singing longer, louder, more frequently, or at higher and lower pitches.<sup>37</sup> Tasks that represent overloads are necessary for vocal skill development through time, and the careful attention of choral conductors is imperative if the appropriate overload is to be asked of singers at exactly the right moment.

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**Progression.** The overload principle of strength training is effected through a progressive sequence where the amount to be lifted is incrementally increased across successive workouts. The progression principle relates to vocal stamina. Choral conductors often see the results of this when they return to daily rehearsals after a lengthy break or vacation. Without attention to progressively preparing for those first days, a result can be their personal vocal fatigue and/or injury. The same is true of our singers. We can speak about the principle of progression as we lead students through vocalises and exercises in preparation for specific vocal tasks necessitated by repertoire that may not be introduced for several weeks.<sup>38</sup>

**Specificity.** This principle refers to the requirement that specific muscle groups need specific exercises in order to gain strength and mass. For instance, back exercises may secondarily involve the biceps in the pulling motion, but the biceps will respond quicker with movements specifically targeted toward their growth. This principle can be seen in choral warm-up sessions in which vocalises are designed specifically to address problems presented in the repertoire to be encountered in that day's rehearsal. A general process may warm up the voice, but the addition of specifically chosen exercises will result in a more facile application of the skills to meet the challenges of repertoire.<sup>39</sup>

**Rest and Recovery.** We design our rehearsals for rest intervals between the vocal tasks embedded in repertoire, and we plan for recovery periods when we develop long-term plans for multiple rehearsals across periods of weeks or months. Failure to do so would result in vocal fatigue and, potentially, dysfunction. The same concerns are true in strength training programs, with additional provision for two distinctive characteristics of pubescent adolescents: their growing cartilages, ligaments and joints require purposeful periods of rest and recovery, and the duration of rest needed between sets of lifts is less than that required for adults.<sup>40</sup> An extension of this principle in strength-training programs is that the amount of rest needed between sets of lifts varies according

## LIFTING PROBLEMS AND SINGING

The following are several common problems of weight lifters, particularly for novice lifters such as those in the middle school and early high school years. These problem areas are suggested as possible conversational starting points for choral conductors and student singers because of the straightforward remedies and resultant positive effects on the singing voice.

### Holding the Breath: Lifting

Weightlifters are often told to hold their breath when lifting heavy weights to increase the abdominal support and decrease the possibility of muscular problems in the lower back. Unfortunately, that is only half of the story. Successful lifters exhale the breath through the "explosive" (or positive) phase of the lift and inhale during the "return" (or negative) phase. Inexperienced lifters will instead hold the breath much too long, increasing the amount of time that the amplified pressure remains. Conductors can make analogies to singing where failure to exhale results in failure to phonate.

A related moment in singing may occur just after inhalation in the transition to exhalation. Novice singers frequently inhale, and then hold the breath prior to singing (often with elevated upper chest and shoulder musculatures). Choral conductors can encourage singers to think of breathing as a seamless process of exhalation and inhalation without the interruption created by holding the breath.

### Holding the Breath: Abdominal Exercises

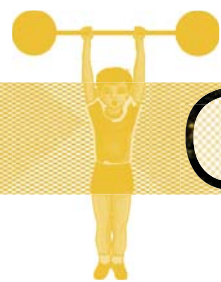
When doing abdominal exercises, many people unconsciously hold their breath rather than exhaling through the contraction. Coupled with the forces of gravity that come into play with the supine body positioning called for by many abdominal exercises, this places the larynx and related musculature under a great deal of stress. A question to ask young singers is, "Is there a difference in how your voice feels on days you do abdominal exercises?" The response might give you a starting point for a conversation about the interactions between technique similarities in singing and lifting.

### Holding the Breath: Shrug Exercises

A shrug exercise is a lift, and as stated, all lifts require exhalation. Incorrect breathing during shrug exercises is so frequent that it deserves additional mention because of the movement's proximity to the laryngeal structure. Make certain that the shrug movements for the trapezius muscles are accompanied by a smooth breathing pattern. Since the shoulders are raised upward in these exercises, it is common for lifters to unconsciously elevate the laryngeal position as well, resulting in vocal fatigue through the remainder of the day. Regular attention to exhalation during the lift will help ease this.

### Grunting

Ask your singer to notice what vocal utterances are made while lifting. If the lifter is grunting, he is not keeping the airway open to facilitate the



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to the goal, whether muscular size, strength, or endurance.<sup>41</sup> In choral rehearsals, we similarly need to vary periods of rest and recovery to match the vocal demands of the literature being studied, and we can speak to the principle of rest and recovery as concert season approaches—especially if it coincides with a student’s athletic endeavors.

## CONCLUSION

Choral conductors may find that addressing the functions and processes of vocal production helps singers transfer any experiences of attending to the nuanced muscular movements of weight lifting to the physiological aspects of singing. As alluded to earlier, this transfer is reciprocal. Weight lifting and athletic activity can be as reflective of aesthetic qualities as is choral music, and a choral conductor’s guidance can assist students to see authentic parallels between the two pursuits from both biomechanical and artistic perspectives.

## NOTES

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<sup>2</sup> Patrick K. Freer, “I’ll Sing with My Buddies—Fostering the Possible Selves of Male Choral Singers,” *International Journal of Music Education*, 27, no. 4 (2009): 341–55.

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<sup>7</sup> Michael Behringer, et al., “Effects of Resistance Training in Children and Adolescents: A Meta-analysis,” *Pediatrics* 126, no. 5 (2010): e1199–e1210.

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<sup>9</sup> Gamble, “Approaching Physical Preparation,” 32; Avery D. Faigenbaum and Gregory D. Myer, “Pediatric Resistance Training: Benefits, Concerns, and Program Design Considerations,” *Current Sports Medicine Reports* 9, no. 3 (2010): 163.

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<sup>11</sup> Patrick K. Freer, “Boys’ Changing Voices in the First Century of MENC Journals,” *Music Educators Journal* 95, no. 1 (2008): 41–47.

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<sup>15</sup> Harrison G. Pope, Katharine A. Phillips, and

Roberto Olivardia, *The Adonis Complex: The Secret Crisis of Male Body Obsession* (New York: Free Press, 2000).

<sup>16</sup> Nicole Martins, et al., “Virtual Muscularity: A Content Analysis of Male Video Game Characters,” *Body Image* 8, no. 1 (2011): 43–51; Lauren B. Shomaker and Wyndol Furman, “A Prospective Investigation of Interpersonal Influences on the Pursuit of Muscularity in Late Adolescent Boys and Girls,” *Journal of Health Psychology* 15, no. 3 (2010): 391–404; Linda Smolak, Sarah K. Murnen, and J. Kevin Thompson, “Sociocultural Influences and Muscle Building in Adolescent Boys,” *Psychology of Men and Masculinity* 6, no. 4 (2005): 227–39; Linda Smolak and Jonathan A. Stein, “The Relationship of Drive for Muscularity to Sociocultural Factors, Self-Esteem, Physical Attributes, Gender Role, and Social Comparison in Middle School Boys,” *Body Image* 3, no. 2 (2006): 121–29.

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<sup>19</sup> Karen R. Zittleman, “Gender Perceptions of Middle Schoolers: The Good and the Bad,” *Middle Grades Research Journal* 2, no. 2 (2007): 89.

<sup>20</sup> Marla E. Eisenberg, Dianne Neumark-Sztainer, and Susan J. Paxton, “Five-year Change in Body Satisfaction Among Adolescents,” *Journal of Psychosomatic Research* 61 (2006): 521–27; Patrick K. Freer, “Between Research and Practice: How Choral Music Loses Boys In the ‘Middle,’” *Music Educators Journal* 94, no. 2 (2007): 28–34.

<sup>21</sup> Gretta D. McCall, et al., “American Boys and Body Image,” *Topics in Clinical Nutrition* 25, no. 4 (2010): 351–61.

<sup>22</sup> Brian P. Brennan, et al., “Human Growth Hormone Abuse in Male Weightlifters,” *The American Journal on Addictions* 20 (2010): 9–13.

<sup>23</sup> Patricia vandenBerg, et al., “Steroid Use Among Adolescents: Longitudinal Findings from Project EAT,” *Pediatrics* 119, no. 3 (2007): 476–86.

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release of breath pressure during the lift. Beyond a few involuntary grunts here and there, grunting in the gym is mostly a social part of gym culture, an unnecessary byproduct of lifting that only does damage to the voice. When the lifter releases breath pressure by exhaling through the lift, that release should be sustained and quiet. Grunting is a sure indication that the release is not as efficient as it could be, and it may put undue stress on the vocal apparatus if done repeatedly. A parallel effect may be noted when singers begin phonation with an abrupt glottal stroke that results in a popping sound. The technique for eliminating unwanted glottal strokes is the same as for reducing grunting: begin the airflow by contracting the abdominal musculature prior to phonation (or the muscular movement of lifting) so that the tone might be perceived as “melting” into the airstream.

### Wearing Weight Belts While Lifting

If lifters use a weight belt, that is a sign that they may be receiving poor advice when in the gym. Except for occasions when maximum weight is being used (not recommended for young adolescents, in any event), weightlifting belts worn just above the waist are usually counterproductive. The belts artificially create the abdominal pressure that would optimally be provided by proper breath support through an expansive inhalation just prior to the lift. Young lifters often tighten the belt so much that their breathing is inhibited, compounding all of the problems noted above. The latest advice from several national training associations is to steer away from the use of belts, relying instead on slightly lighter weights while focusing on strengthening the stabilizing musculature of the abdominals and lower back. Weightlifting belts have a place, but usually for only one or two sets per workout, if that, and only for mature adolescents who can safely lift maximum amounts of weight during those sets. All the attendant negative influences on vocal production and health follow from the improper or unwise use of weightlifting belts. Again, lifters are most likely trying to do the right thing by using a belt, and conductors should frame their well-intentioned comments to avoid perceptions of criticism.

### Weight Belts and Shoulder Exercises

Some young lifters will also wear a lifting belt while working on the shoulder or trapezius musculature. Doing so is problematic because the belt creates a sensation that the lifter can use much more weight than is appropriate, particularly for the shoulders. One of the most important issues when pressing any weight over the head or doing shoulder “shrugs” with arms in a downward position is to keep the spine in proper alignment throughout the exercise. Those who wear lifting belts during shoulder workouts often arch their lower backs during lifts, whether lifting from seated or standing positions. If so, they are lifting too much weight, and the result will often be excessive neck tension with accompanying tension in the laryngeal area.

### Locking the Knees

Finally, many lifters who experience hoarseness while singing can trace their difficulties to locking their knees while lifting. When the knees are in a locked position, an involuntary sympathetic response will be to tighten, or lock, the laryngeal musculature. This is true no matter what muscle group is the focus during a lift or workout.

- <sup>25</sup> Smolak and Stein, “Drive for Muscularity.”
- <sup>26</sup> Freer, “Buddies.”
- <sup>27</sup> Robert C. Peppard, “Management of Functional Voice Disorders in Adolescents,” *Language, Speech, and Hearing Services in Schools*, 27 (1996): 257–70.
- <sup>28</sup> David Best, *Expression in Movement and The Arts: A Philosophic Enquiry* (London, UK: Lepus Books, 1976); M. Andrew Holowchak, ed., *Philosophy of Sport: Critical Readings, Crucial Issues* (Upper Saddle River, NJ: Prentice-Hall, 2002); R. Scott Kretchmar, *Practical Philosophy of Sport and Physical Activity* (Champaign, IL: Human Kinetics, 2005); William J. Morgan and Klaus V. Meier, eds., *Philosophic Inquiry in Sport* (Champaign, IL: Human Kinetics, 1995).
- <sup>29</sup> Patrick K. Freer, “Choral Warm-Ups for Changing Adolescent Voices,” *Music Educators Journal* 95, no. 3: 55–60.
- <sup>30</sup> Vishal Goyal and Malathi Srinivasan, “Don’t Hold Your Breath,” *Journal of General Internal Medicine* 26, no. 3 (2011): 345.
- <sup>31</sup> Marshall Hagins and Eric M. Lamberg, “Natural Breath Control During Lifting Tasks: Effect of Load,” *European Journal of Applied Physiology* 96 (2006): 457.
- <sup>32</sup> Robert F. Orlikoff, “Voice Production During a Weightlifting and Support Task,” *Folia Phoniatrica et Logopaedica* 60 (2008): 188–94.
- <sup>33</sup> *Ibid.*, 192.
- <sup>34</sup> Daniel A. Judelson, et al., “Hydration and Muscular Performance: Does Fluid Balance Affect Strength, Power and High-Intensity Endurance?,” *Sports Medicine* 37, no. 10 (2007): 907–21.
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- <sup>36</sup> Faigenbaum and Myer, “Pediatric Resistance Training,” 165.
- <sup>37</sup> See Schneider, Saxon and Dennehy, “Exercise Physiology,” 302.
- <sup>38</sup> *Ibid.*, 304.
- <sup>39</sup> *Ibid.*, 302–03.
- <sup>40</sup> Gamble, “Approaching Physical Preparation,” 38; Faigenbaum and Myer, “Pediatric Resistance Training,” 166.
- <sup>41</sup> Jeffrey M. Willardson, “A Brief Review: How Much Rest Between Sets?,” *Strength and Conditioning Journal* 30, no. 3 (2008): 44–50.

