

# Exercise Science Principles and the Vocal Warm-up: Implications for Singing Voice Pedagogy

\*Matthew Hoch and †Mary J. Sandage, \*†Auburn, Alabama

**Summary: Objectives/Hypotheses.** Principles from exercise science literature were applied to singing warm-up pedagogy as a method for examining parallels between athletic and voice training. Analysis of the use of exercise principles in vocal warm-up should illuminate aspects of voice training that may be further developed in the future.

**Methods/Design.** A selected canon of standard voice pedagogy texts and well-regarded warm-up methods were evaluated for use of exercise science principles for skill acquisition and fatigue resistance. Exercises were then categorized according to whether they were used for the purpose of skill acquisition (specificity), training up to tasks (overload), or detraining (reversibility).

**Results.** A preliminary review of well-established voice pedagogy programs reveals a strong bias toward the skill acquisition aspects of vocal warm-up, with little commentary on the fatigue management aspects. Further, the small number of vocalises examined that are not skill-acquisition oriented fall into a third “habilitative” category that likewise does not relate to overload but may play a role in offsetting reversibility.

**Conclusions.** Although a systematic pedagogy for skill acquisition has emerged in the literature and practice of voice pedagogy, a parallel pedagogy for fatigue management has yet to be established. Identification of a systematic pedagogy for training up to specific singing genres and development of a singing maintenance program to avoid detraining may help the singer avoid injury.

**Key Words:** Pedagogy–Exercise–Warm-up–Skill acquisition–Fatigue resistance.

## INTRODUCTION

Throughout most of its history, singing voice pedagogy has focused on the vocal warm-up as having essentially one purpose: acquisition of a specific set of skills necessary to sing a specific genre of classical repertoire. An examination of the classic methods of Vaccai,<sup>1</sup> Concone,<sup>2</sup> Panofka,<sup>3</sup> and Marchesi,<sup>4</sup> four of the most popular and still-used methodologies, reveals that these pedagogical staples are organized almost entirely by vocalises geared toward various facets of skill acquisition. Concepts such as breath management and resonance (vocal tract tuning)—quintessentially important to the classical singer—are largely ignored in these publications. Although it is safe to assume that these aspects of classical singing were highly valued and thus addressed by the singing teacher, there was not an extensive discourse about these topics in pedagogical works.

In 1967, two seminal voice pedagogy works, William Vennard's *Singing: The Mechanism and the Technic*<sup>5</sup> and D. Ralph Appelman's *The Science of Vocal Pedagogy: Theory and Application*,<sup>6</sup> paved the way for a new era of voice pedagogy that revolutionized undergraduate and graduate curricula throughout the United States. The master-apprentice method of teaching, although still alive and well, was now blended with one that was more scientific and fact-based in nature. Then, in 1986, Richard Miller published *The Structure of Singing: System and Art in Vocal Technique*.<sup>7</sup> This book advocated for a systematic method for training singers, one that blended goal-oriented vocalises with explanations that were firmly grounded in practical voice science.

Despite a long-held belief that vocal warm-up is essential for singers, the physiological mechanisms for its benefits are not well understood. Warm-up in athletics has been regarded as theoretically beneficial for physiological, psychological, and injury-prevention reasons. Physiological benefits of warm-up include, but are not limited to, faster enzyme catalysis at muscle temperature changes above 0.05°C and faster propagation of the neural impulse.<sup>8,9</sup> Psychologically, pre-performance arousal and re-establishment of muscle activation patterns (a component of motor planning) are attributed to improved performance.<sup>10</sup> Injury prevention is described as a combination of skill acquisition and the development of fatigue-resistance,<sup>11</sup> the latter of which is a little-considered aspect of singing training. Given that the muscle engagement for warm-up before performance adds to the cumulative use of the target muscle group(s), warm-up activity may also be considered a component of fatigue-resistance training. Bioenergetically, muscle fibers that are being employed for physical activity are using up energy reserves and enzymes that are available for muscle metabolism, regardless of whether it is for warm-up or performance.<sup>8</sup> From this perspective, warm-up should not be separated from performance as a distinct muscle endeavor.<sup>12</sup>

The evidence to support the performance advantages of warm-up is controversial and requires a more nuanced evaluation of the level of training, the duration and intensity of the warm-up, and the performance variables required for the target activity.<sup>13</sup> Exercise training principles, such as specificity, overload, and reversibility, can be used to pursue this more nuanced assessment of well-regarded and published warm-up regimes. The specificity principle states that changes in muscle function are very specific to the type of exercise, even when the same muscle groups are used. This is because specific muscle groups are recruited for specific tasks. For example, if an athlete wants to improve his leg presses, he must practice leg presses. Practicing squats will not help to improve his leg presses, even though squats employ the same muscles as leg presses,<sup>1</sup> hence the

Accepted for publication March 28, 2017.

This work is novel and solely the responsibility of the authors.

From the \*Department of Music Auburn University Auburn, Alabama; and the †Department of Communication Disorders, Auburn University, Auburn, Alabama.

Address correspondence and reprint requests to Matthew Hoch, Department of Music, Auburn University, Auburn, AL 36849. E-mail: [mhoch@auburn.edu](mailto:mhoch@auburn.edu)

Journal of Voice, Vol. ■■■, No. ■■■, pp. ■■■-■■■

0892-1997

© 2017 The Voice Foundation. Published by Elsevier Inc. All rights reserved.

<http://dx.doi.org/10.1016/j.jvoice.2017.03.018>

specificity principle. By extension of this principle, skill acquisition exercises must be thoroughly grounded in the specific repertoire that the singer is being trained to perform. For example, classical Italian *fioratura* vocalises will do little to help train the Broadway belter in her upper chest-mix. Rather, these exercises will only help the classical singer improve her flexibility in selected passages of Italian *bel canto* repertoire. For the Broadway belter to improve her upper chest-mix, she must be assigned an exercise that directly addresses the upper chest-mix.

The overload principle describes the requirement to work muscle tissue at an intensity or frequency above which it is used to working to achieve morphologic, metabolic, and neurologic changes to the tissue.<sup>11</sup> Muscles need to be worked beyond what they are used to for them to continue to develop. The principle of reversibility indicates that the level of exercise intensity and frequency needs to be sufficient enough to prevent loss of these mechanisms that were upregulated with training.<sup>14</sup> Should the frequency and intensity of muscle function (and cardiorespiratory function for that matter) decline, then all of those mechanisms (morphologic, metabolic, and neurologic) that were upregulated during training will downregulate to a new level of homeostasis. As the old adage goes, it is easier to stay in shape than to get in shape.

Questions remain about length and intensity of warm-up relative to the singing performance expectations. Research needs to be done to quantify the length and intensity of singing performance endeavors so that we can better understand how the warm-up process should be designed to enhance and not detract from optimal performance.

Although there is a large body of literature that applies exercise principles to athletic goals (running marathons, training specific skill acquisitions, etc), there is little research currently being done that applies these same principles to singing endeavors. Therefore, the goals of this research were to examine a standard body of writings and methods relating to vocal technique and warm-up—both historical and modern—and examine them through the lens of well-established exercise science principles: skill acquisition and fatigue resistance in particular.

## METHODS/DESIGN

In this study, the authors examined a selection of standard voice pedagogy method books from the 19th century *bel canto* era to the present day for evidence of use of the exercise training principles of specificity, overload, reversibility, and fatigue management. Operational definitions for these concepts are described in the Introduction section. A preliminary review of the large body of singing pedagogy literature was chosen for this investigation in lieu of a systematic review for the purpose of identifying a need for a more thorough systematic review. For example, although there are dozens (if not hundreds) of early Italian methodologies, many of their structures and goals are quite similar in nature, and Vaccai, Concone, Panofka, and Marchesi are four of the methods that are most widely used in contemporary practice. Likewise, standard pedagogy textbooks before Miller's *The Structure of Singing*—such as those by Vennard and Appelman—clearly have historical importance, but these

pre-Miller resources were avoided in an effort to make sure that scientific data were more current.

The works of three “generations” of methodologists were studied, all of which are still used regularly in the 21st century voice studio: selected early Italian methodologists (Vaccai, Concone, Panofka, and Marchesi), Richard Miller's *The Structure of Singing* (1986), and Ingo Titze's “Vocal Warm-ups: What Do They Accomplish?” (2000).<sup>15</sup> The exercise regimens presented in these standard treatises were examined according to organization (content and sequence) and categorization of specific technical skill addressed in each exercise. In addition, a core list of standard voice pedagogy textbooks was consulted and examined for content relating to singing voice warm-up. Using search engines available in Google Scholar, Academic Search Premier, and EBSCO, a search of literature published after Titze's seminal 2000 article was conducted. The following search terms were used: singing, solo singing warm-up, singing warm-up length, and routine singing warm-up. The review targeted individual singing warm-up publications that included information regarding length of warm-up, specific vocalises, and physiological goals of warm-up. Studies that addressed choral warm-up were not included. These data were then examined for evidence of the exercise warm-up and training principles of reversibility and fatigue resistance as operationally defined above. Reversibility was coded if the resource being evaluated described any pedagogical considerations for loss of trained skill secondary to extended vocal rest or hiatus from singing exercise. Fatigue resistance was coded if the resource being evaluated addressed pedagogical aspects of systematically training the voice to be able to perform longer or recover faster. Absence of these physiological aspects of fatigue resistance training, which are commonly accounted for in exercise science, served as indicator that fatigue resistance training was not considered.

## RESULTS

A review of these resources suggests that historical singing pedagogy resources do not address singing warm-up specifically, at least in the modern muscle physiological sense. An examination of these resources indicated that voice pedagogy has historically been oriented toward skill acquisition while ignoring other aspects of muscle training and tissue upregulation, on which current paradigms for performance warm-up are based. [Table 1](#) summarizes the analyses of historical singing voice pedagogy according to skill acquisition parameters that were well-recognized for singing voice training before the modern evidence-based era. [Table 2](#) summarizes the findings from the more contemporary body of literature.

## DISCUSSION

The goal of this preliminary pedagogical analysis was to identify inclusion of exercise training principles in singing warm-up regimes. The findings indicate that skill acquisition has been a focus of singing warm-up approaches for some time, with attention toward other principles of muscle training (specificity, overload, reversibility, and fatigue management) as a more recent development. Principles of reversibility and fatigue resistance were not present in any of the singing warm-up programs reviewed.

Download English Version:

<https://daneshyari.com/en/article/7533317>

Download Persian Version:

<https://daneshyari.com/article/7533317>

[Daneshyari.com](https://daneshyari.com)