The Future of Exertional Respiratory Problems

What Do We Know About the Total Airway Approach and What Do We Need to Know?

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KEYWORDS

- Exertional dyspnea • Exercise-induced laryngeal obstruction
- Excessive dynamic airway collapse • Exercise-induced bronchoconstriction

KEY POINTS

- Exercise is increasingly viewed as a preventative and therapeutic modality for a variety of medical and behavioral health disorders; therefore, it is imperative to minimize barriers that discourage exercise.
- This issue of *Immunology and Allergy Clinics of North America* details a "total airway approach" to the evaluation of exertional respiratory problems.
- This issue focuses on basic elements of 2 of sinonasal disease and excessive dynamic airway collapse; more complicated considerations are discussed with respect to exercise-induced laryngeal obstruction.
- A rigorous discussion of the mechanisms, diagnostics, and therapeutics for exercise-induced bronchoconstriction follows, reflective of more than 5 decades of research in the area.
- There is much room for growth in research in these areas, and in common inflammatory pathways and neurophysiologic coupling across all airway segments.

THE IMPORTANCE OF A TOTAL AIRWAY APPROACH TO EXERTIONAL DYSPNEA

In an age when exercise is viewed as a preventative or therapeutic modality for a variety of medical and behavioral health conditions, it is imperative that the medical, surgical, and behavioral health communities minimize barriers that discourage patients from exercising.[1] Exertional respiratory symptoms such as dyspnea, cough, and wheeze represent some of the most important problems acting as such a barrier faced by patients of general practitioners, allergists/immunologists, pulmonologists,

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otolaryngologists, and cardiologists. This collection of reviews has highlighted the history and recent improvements in our understanding of exertional symptoms attributable to the airway. The primary goal of this edition was to introduce a conceptual framework for clinicians to use in the approach to exertional respiratory problems, championing a "total airway" approach.

A secondary goal of this issue is to identify areas for growth in our scientific understanding of specific causes of exertional dyspnea attributable to the airway. Clearly, the medical and research communities have appreciated the impact of asthma during exercise for decades.[2] We propose the total airway approach as a conceptual framework for contextualizing asthma research as well as research devoted to sinonasal disease, the larynx, and the central airways.[3–5] Using this framework, gaps in scientific knowledge become more apparent.

TOTAL AIRWAY APPROACH: WHAT DO WE KNOW?

From a clinical perspective, the collective expertise of the immunology/allergy, pulmonology, otolaryngology, speech-language pathology, and psychology communities featured in this edition can be pooled to develop diagnostic and treatment suggestions for providers of patients with exertional dyspnea. Although formal multidisciplinary teams are sparse, an appreciation of the multidisciplinary nature of exertional respiratory problems may lead to a more thoughtful approach by all providers.

In this issue, we began by discussing interactions between exercise and sinonasal disease (see Brecht Steelant and colleagues' article, "Exercise and Sino-Nasal Disease," in this issue). This is a field in its infancy and rarely discussed in the literature despite the very high prevalence of sinonasal disease in the general population and increased prevalence among elite athletes.[6] Seys and colleagues highlight some of the cellular mechanisms and physiologic consequences known to be involved in disease as well as the diagnostic and therapeutic options available to clinicians.

This issue of the *Immunology and Allergy Clinics of North America* is replete with a number of reviews (articles 2 through 6) devoted to exercise-induced laryngeal obstruction (EILO), which, since its initial recognition as a cause of exertional dyspnea in the 1980s, is increasingly recognized as an important cause of exertional dyspnea in specific populations.[7] In the second article, Walsted and colleagues (see Leif Nordang and colleagues' article, "Exercise Induced Laryngeal Obstruction – An Overview," in this issue) taught us that that its prevalence lies in the 5% to 10% range in select demographic groups and societies, which is a prevalence comparable with that of asthma in the general population, and yet it remains almost completely unrecognized and certainly misdiagnosed in clinical practice.[8,9] It may be completely distinct from inducible laryngeal obstruction caused by other triggers at rest, the condition described by Dunglison, Patterson, and Christopher, which has been described with many names including vocal cord dysfunction and paradoxic vocal fold motion.[10–12] Halvorsen and colleagues (see Ola Drange Røksund and colleagues' article, "Working Towards a Common Transatlantic Approach for Evaluation of Exercise Induced Laryngeal Obstruction," in this issue) described a variety of invasive and noninvasive diagnostic techniques that have been used in the past few decades, and noted that continuous laryngoscopy during exercise is emerging as the preferred diagnostic method for its ability to contextualize partial airway obstruction in relation to symptoms of interest, exercise intensity, and recovery.[13,14] A variety of medical, behavioral, and surgical approaches to treatment have been proposed, each with potential benefits and shortcomings. Bergevin and colleagues (see Monica Shaffer and colleagues' article, "Speech-Language Pathology as a Primary Treatment for

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