

Reply to Tomasi *et al.*: The Role of National Institute for Occupational Safety and Health Hazard Evaluations in Reducing Ergonomic Injury among Interventional Pulmonologists

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From the Authors:

We thank Tomasi and colleagues for their comments regarding our article on the need for ergonomics training in interventional pulmonary fellowship (1). We concur with the authors' opinion that the safety needs of the interventional pulmonologist are unique and warrant further exploration. The field of interventional pulmonology and its operators have evolved to meet the demand for more minimally invasive procedures to diagnose and treat a myriad of lung diseases. These advancements offer new challenges for the bronchoscopist who is tasked with performing a higher volume of procedures with added complexity and duration. For example, the diagnostic evaluation of a lung nodule might encompass multiple procedures in one case, including

flexible bronchoscopy, navigational bronchoscopy, and endobronchial ultrasound. Each procedural task may be associated with distinct hazardous exposures—the stressors on the musculoskeletal system during a navigational bronchoscopy that requires multiple ancillary tools, including the use of fluoroscopy, likely differ from those of a basic airway examination. A procedure-level assessment could provide a more detailed understanding of the biomechanical and postural load requirements of each job task on the operator (2).

We agree with the authors that a comprehensive analysis of the work environment is required to fully appreciate the ergonomic needs of the bronchoscopist. We also acknowledge the importance of seeking assistance from local occupational

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safety and health professionals to help operators identify and avoid ergonomic hazards. For example, bronchoscopies performed in an operating theater versus an endoscopy suite may present different risks to the operator. This information is critical to identifying ergonomic solutions at an institution level and more broadly to our understanding of ergonomics in bronchoscopy and designing future curricula. The literature supports incorporating ergonomic education in medical procedural training, including in closely aligned specialties such as gastroenterology. The purported benefits include lowering the risk of work-related injuries and improving trainees' understanding of ergonomic principles (3–5).

The development of an ergonomic curriculum in bronchoscopy will require input from multiple stakeholders, including expert bronchoscopists, academic pulmonologists, and occupational safety and health professionals. Walsh and colleagues proposed a framework for introducing an ergonomic curriculum in endoscopy training that comprises three skill domains: cognitive, technical, and

nontechnical (6). These skills could be acquired through a combination of didactic and simulation-based training. The cognitive domain tasks learners with identifying common work-related musculoskeletal disorders, including their signs and symptoms. The technical aspect requires trainees to demonstrate proper scope handling, body posture, and room setup to minimize musculoskeletal strain. Finally, the nontechnical portion emphasizes the importance of operator recovery time between procedures, physical and mental well-being, and communication with other team members to support an ergonomically friendly environment.

The current training landscape in pulmonary medicine prepares trainees to perform a wide range of bronchoscopic techniques. Integration of ergonomic concepts into the bronchoscopy training curriculum has the potential to mitigate the development of acute as well as long-term injuries while promoting greater well-being and work productivity. The goal should always be to fit the job to the worker and not the worker to the job.

Author disclosures are available with the text of this article at www.atsjournals.org.

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