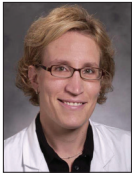


# ADVANCES IN ENDOSCOPY

Current Developments in Diagnostic and Therapeutic Endoscopy

Section Editor: Klaus Mergener, MD, PhD, MBA

## Ergonomic Wellness in Endoscopy: Obstacles and Ways Forward



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**G&H** What are some of the major ergonomic issues in endoscopy?

**MT** The ergonomic issues in endoscopy range widely, especially among providers. The reason for many of these issues is not likely to be remedied easily. Endoscope design, the volume of procedures, the repetitive motions

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and nature of endoscopic procedures, and the resulting musculoskeletal strain on the doctor who is performing them inevitably lead to injury. However, applying ergonomics, which focuses on the environment in which humans perform their work (in this case endoscopy), and altering or optimizing the environment to eliminate or at least mitigate injury could help.

**G&H** What is the burden of musculoskeletal-related injury associated with performing endoscopy?

**MT** There is evidence on musculoskeletal-related injury associated with performing endoscopy, although the data on this are mostly from survey reports and anecdotal experience. Depending on what source one is looking at, the musculoskeletal burden of endoscopy is anywhere from 30% to 90%, and the overall burden may be underreported. Reports include pain in the lower back, thumb, shoulder, elbow, hand, or neck. However, most importantly, pain and the musculoskeletal-related injury or burden of endoscopy can translate into real losses for practices and the health system as a result of missed work or premature retirement from the workplace.

**G&H** Why has there been no substantial development in endoscope redesign, and what accessory devices are in development?

**MT** I should note that I am not consulting with or working for any of the large companies that manufacture endoscopes. However, what I can say after speaking with individuals at these companies is that it is not as simple as it seems. As I mentioned previously, there is a wide range of musculoskeletal issues that arise from performing these high-volume endoscopic procedures. The questions device manufacturers ask me when I bring up ergonomic wellness are: What should we fix? How do we change the endoscope design? What adjustments could we make that would make the majority of endoscopists happy? These are not easy questions to answer. Dr Amandeep K.

Shergill of San Francisco Veterans Affairs Medical Center and University of California has published extensively on investment in endoscopy technology and has accurately stated that the current endoscope design is one size fits all.

Most of the technology advancements in endoscopic design have focused on image quality and image processing. I would like to see the shaft of the scope be lighter, and manufacturers have started producing accessory devices that I think will be helpful. These devices incorporate human factors, such as hand size and strength. Angulation assist dials and antigravity support arms are a start. These types of accessories are important, especially now with more women entering the gastroenterology field than ever before, many of whom have smaller hands.

### **G&H** What are the obstacles to solving ergonomic problems in endoscopy?

**MT** In my opinion, aside from the issues that I already mentioned, a big obstacle is the endoscopist's attention to and, more importantly, proactive approach to their own musculoskeletal awareness. Endoscopy providers are not likely to see a substantial change in the endoscope design; however, there is plenty that the endoscopists themselves can control. For instance, adjustments can be made to the setup of the suite, which includes the position of the patient, the height of the monitor, the height of the stretcher, the endoscopist's posture, the type of flooring or the mat that the endoscopist is standing on, and the scheduling of patients and workflow to allow for breaks (the so-called microbreaks).

Another important obstacle, and one that is easily remedied, is fellowship training that does not include ergonomics. Teaching our gastroenterology fellows about ergonomics and reinforcing ergonomic principles during their training can prevent them from starting off with bad habits. Fortunately, there is much more awareness of ergonomics now. In our fellowship training, for example, a physical therapist works with our attendings and with our third-year fellows. Early on in fellowship is not the time to worry about ergonomics. As fellows progress and are about to graduate, they are given the opportunity to work with a physical therapist to address bad habits (eg, to work on their posture and on how they are setting up the suite for themselves). Therefore, when they are in practice, they have some education and hopefully some better habits.

### **G&H** What are a few obvious or easy adjustments that may address at least some ergonomic issues on a larger scale?

**MT** As I mentioned, the easiest adjustment—and one the endoscopist can completely control—is the setup of

the suite. According to Dr Shergill, the monitor should be located in front of the endoscopist, 15 to 25 degrees below eye level and not too close or too far away to avoid eye strain. The bed height should be high enough

A physical therapist who understands the muscle imbalances that result from habitual posturing away from neutral can help the physician improve these imbalances and execute procedures in more optimal alignment.

so that the endoscopist can hold the insertion tube with the arm bent at a 90-degree angle. The patient should be positioned so that the endoscopist does not have to lean forward to insert the scope. Endoscopists should be standing with their weight distributed between both legs, with their back and neck in a neutral position. They should pay attention to their footwear and make sure it is supportive and cushioned.

### **G&H** How can endoscopists optimize their approach or environment to minimize the risk of endoscopy-related injury?

**MT** What I have learned from ergonomics is that physicians need to have insight into their personal habitual postures. Each endoscopist stands, walks, and moves in unique ways and has different musculoskeletal-injury histories, exercise habits, and hobbies. Different postures and hobbies often lead to muscle length and strength imbalances. A physician with postures or habitual-movement patterns that are away from neutral (out of alignment) are likely to strain the musculoskeletal system during procedures. This is especially true during times of higher concentration, when physicians are most often observed in poor alignment. It is important for endoscopists to distribute weight evenly between both feet, to not lean forward putting strain on the lower back, and to put the working arm in a neutral position. Also, one should not be in a non-neutral position for any extended length of time. A physical therapist who understands the muscle imbalances that result from habitual posturing away from

neutral can help the physician improve these imbalances and execute procedures in more optimal alignment.

### G&H How can working with a physical therapist improve ergonomic wellness in endoscopy?

**MT** At Duke University Medical Center, we have been working with an amazing physical therapist. Her name is Stacy Markwell. She develops a comprehensive, individualized wellness assessment tool for each physician. She reviews the physician's musculoskeletal history, assesses the individual's readiness to change, and performs a pain-fatigue screen. She evaluates the physician's static and dynamic posture. She helps physicians optimize both the setup of their endoscopy suite and their physical execution of procedures to protect their joints and ligaments. This includes identification of unnecessary movements that do not move the procedure forward. She also offers wellness exercises to mitigate symptoms and promote healthy posture. She educates in techniques and supports to reduce normal day-to-day aches and pains that are exacerbated by endoscopic procedures. Every aspect of the wellness plan is customized to that particular physician. Some endoscopists require multiple sessions, which our physical therapist is willing to provide. As I mentioned, all of our third-year fellows are offered this physical therapy intervention prior to graduation.

### G&H What does the ergonomically designed endoscopy unit of the future look like?

**MT** Ideally, a well-designed endoscopy unit would offer flexibility to accommodate a wide variety of body types and sufficient space for all the professionals in the room. The monitor would be a large, clear picture that assists with the identification of pathology. The monitor would be customizable for location, height, and tilt and mounted

on a substantial wheelbase to aid in easy setup. The bed would be automatic instead of a pneumatic foot pump and would accommodate a wider range of physician heights.

In addition, a single, long antifatigue mat spanning nearly the length of the bed would allow the physician, trainees, and support staff to stand and maneuver without needing to stand on edges of the mat. There should be sufficient space available for the monitor to be placed directly in front of the doctor while still allowing the anesthesiologist and the nurse to function optimally, for example, not in their faces. The physician would get to choose an endoscope matched to hand size, which is not currently available. Similarly, the documentation stations would have flexibility in monitor height, mousing capabilities, wrist rests, and ergonomic seating to enjoy optimal alignment for physicians to rest between procedures. In multiple endoscopy rooms our physical therapist has looked at, her favorite room is the one where a standing monitor is used to document, as opposed to trying to document while crammed in a corner, sitting in a rolling chair.

#### Disclosures

*Dr Teitelman has no relevant conflicts of interest to disclose.*

#### Suggested Reading

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