



ENDOSCOPY STAFF INJURY: A SERIOUS PROBLEM HIDING IN PLAIN SIGHT

LARISSA BIGGERS, BA, MA

It is common knowledge that nursing can be a physically demanding and even dangerous profession. What is not highly publicized is the degree and severity of musculoskeletal disorders (MSDs) suffered by endoscopy nurses and technicians as a result of patient handling duties. MSDs in an endoscopy unit affect more than just staff; they compromise patient care and have a financial impact on healthcare facilities. Safe patient handling and mobility (SPHM) programs provide a high return on investment by allowing facilities to be proactive in identifying and addressing costly patient handling problems. This article explores the extent, nature, and root causes of endoscopy staff MSDs as well as potential solutions to the problem, including ergonomic training and medical devices. It is intended as a primer for SPHM professionals (and others) interested in learning more about patient handling issues in gastroenterology/endoscopy.

Keywords: Safe Patient Handling, Endoscopy

THE PREVALENCE OF NURSING INJURIES

Nurses are more likely to suffer a job-related injury than any other profession in the United States.¹ According to the US Bureau of Labor Statistics, on an annual basis, 35,000 nurses and nurses' aides are forced to miss work due to job-related MSDs, including back and other injuries. This puts an enormous burden on our healthcare system, and, unfortunately, the problem is getting worse; MSDs are on the rise among healthcare workers.²

These injuries not only leave nurses in pain, they also generate huge costs for hospitals and healthcare systems. The Occupational Safety and Health Administration (OSHA) estimates that the direct costs of 1 nurse suffering a patient handling-related MSD average \$15,600 and that the indirect costs (productivity loss, hiring replacement personnel, training, etc.) can be 4 to 10 times higher.³

MSDs IN ENDOSCOPY

Endoscopy refers to nonsurgical procedures that enable the examination of the digestive tract. In these procedures, a flexible tube with a light and camera attached (an endoscope) is inserted into the mouth or the rectum, allowing physicians to take pictures and perform therapeutic operations like removing polyps and taking biopsies. The 2 most common endoscopic procedures are (1) upper endoscopy, which examines the throat, esophagus, and stomach and (2) colonoscopy, which examines the lower intestine (colon).

Nurses working in endoscopy are typically responsible for initiating sedation, monitoring patients during the procedure, and providing post-procedure care and instructions. In units without endoscopy technicians, nurses might also prepare and maintain endoscopy equipment, assist the physician with specimen collection, and clean and reprocess scopes. Both nurses and technicians perform patient handling duties as a routine part of assisting with colonoscopy.

Endoscopy nurses and technicians suffer work-related MSDs at a rate comparable to or greater than nurses in other subspecialties.^{4,7} Several published studies have examined these injuries and related problems among endoscopy nurses. The first, a small, cross-sectional study of 38 Canadian endoscopy nurses, found that because of upper extremity injuries sustained on the job, 47% of respondents had missed work, 45% had visited a doctor, and 92% used analgesics for pain relief at least 1-3 times per week.⁶

The same author subsequently conducted 2 larger studies—1 in Canada and 1 in the United States—and reported similar findings. Specifically, among the Canadian (n = 147) and US (n = 215) cohorts, 32% and 21% of participants missed work due to MSD symptoms, 60% and 45% visited a doctor, and 42% and 32% used NSAIDs at least 1-3 times per week, respectively.^{4,5} In addition, in the US cohort, 14% of respondents had undergone surgery, and 8% occasionally used painkillers (in addition to NSAIDs) to manage pain.⁵ (Figure 1)

Figure 1: Survey results on impacts of injury⁴⁻⁶

Finally, the largest study of the group ($n = 428$), found that at least 52% of endoscopy nurses had experienced MSD problems within the last 12 months and that at least 19% had been unable to perform normal work as a result.⁷ This study also shed light on the types of MSDs sustained by endoscopy nurses; 44.9% indicated suffering neck problems, 19.2% reported shoulder problems, 29.7% reported upper back problems, and more than 50% reported lower back problems.⁷

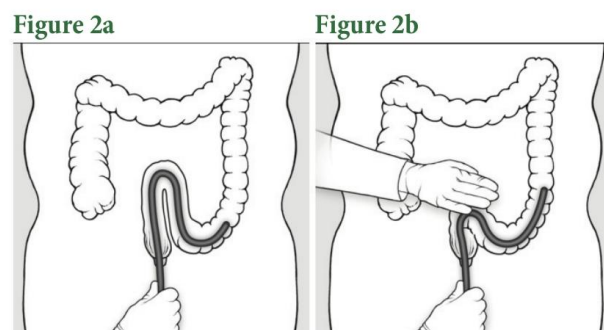
THE ROOT OF THE PROBLEM

As with other high-risk specialties, MSDs among endoscopy nurses and technicians can often be traced back to patient handling. However, endoscopy patient handling responsibilities are unique; they are a standard (and, many believe, necessary) component of the most common endoscopic procedure, colonoscopy.

During colonoscopy, a long, flexible tube (a colonoscope) is inserted into the patient's rectum and advanced all the way to the cecum. A tiny camera at the tip of the tube allows the physician to inspect the entire large intestine (colon) and remove any abnormal growths (polyps). Colonoscopy is considered the gold-standard tool for preventing colorectal cancer because it is the only screening test that enables the detection and removal of precancerous polyps, thus preventing cancer before it develops. More than 15 million colonoscopies are performed each year in the US.⁸

Despite its protective benefits for patients, performing colonoscopy can be challenging for both physicians and staff because parts of the colon—mainly the sigmoid and transverse colon—are attached to tissue called the mobile mesentery, which allows the colon to move. As a result, when the endoscopist pushes the scope forward, the tip doesn't always advance. Instead, it can stretch and distend the colon outward. (Figure 2a) This problem is known as looping because sometimes the colon distends and stretches so far that it actually forms a loop. Looping is the primary cause of patient pain, complications, and failed procedures and increases the overall risk and cost of colonoscopy.⁹ Therefore, there is a strong incentive to mitigate looping as much as possible.

**Figure 2: Looping in the sigmoid colon, (2a)
Looping mitigated with abdominal pressure (2b).**



Along with physician scoping techniques, the best way to address looping is to apply manual (ie, via a hand, forearm, or elbow) counterpressure to the patient's lower abdomen. Manual pressure works because it helps immobilize (or splint) the mobile parts of the colon. When the colon is held in place, the force pushing the scope advances the tip forward, instead of pushing the colon outward. (Figure 2b)

If manual pressure fails to prevent looping, the patient is typically rolled from his or her side to the back, or vice versa. As with pressure, changing the position of the patient often changes the position of the colon to permit passage beyond an otherwise challenging angle. Before a colonoscopy is aborted, it is common to do a full turn of the patient from left lateral, to back, to right lateral, to prone.¹⁰

Almost universally, the responsibility for providing counterpressure and repositioning patients lies with endoscopy nurses and technicians supporting the procedure. (Figure 3) These maneuvers are commonplace, and endoscopy experts have even incorporated them into best practices guidelines for performing colonoscopy.¹¹ Although widely accepted as a routine part of the procedure, these practices can place

significant physical stress on staff, especially when performed on obese patients or patients for whom sustained pressure is required.

Figure 3: Common methods of applying counter pressure.



Numerous safe patient handling guidelines, including those developed by the Veterans Health Administration, identify lifting and repositioning more than 35 pounds of patient body weight as a high-risk activity for sustaining injury, even when performed from an optimal position.¹² Published studies estimate that manual abdominal pressure and patient repositioning are required in more than half of all colonoscopies.¹³⁻¹⁹ Nurses indicated that, when required, they spent an average of 6.3 minutes applying pressure per colonoscopy.⁵ Although no data could be found approximating the weight of the human abdomen, it is reasonable to assume the weight being manipulated by staff when applying manual pressure often exceeds 35 pounds. Furthermore, the body positions and angles from which staff apply pressure are typically anything but optimal. For example, bed height is generally set to accommodate the physician, which can make it particularly challenging for shorter (or taller) staff.

Moreover, it is not just staff who can suffer harm as a result of manual pressure and repositioning during colonoscopy. A recent study examining causes of post-colonoscopy patient pain found that 2 of the strongest predictors of post-procedure pain were (1) if manual abdominal compression was used and (2) if the patient was repositioned.²⁰ In the study, patients who received manual abdominal pressure were more than twice as likely to report moderate-to-severe pain, and those who were repositioned reported moderate-to-severe pain 8 times more often than patients who were not.²¹ Lastly, patients returning to the emergency room after colonoscopy cite abdominal pain as their chief complaint 3 times more frequently than any other issue.²²

REPERCUSSIONS OF INJURY

Patients are also affected by MSDs suffered by staff. According to 1 study, 22% of nurses reported being less friendly or not engaging with their patients due to physical discomfort,

and 22% also modified or limited their activity level on the job.²³ OSHA posits that risks to staff and patients are intermingled, noting that caregivers and patients face many related hazards. For instance, manual lifting can injure nurses, limiting their physical mobility and strength. These problems subsequently put patients at risk for falls, fractures, bruises, and skin tears.¹

Maintaining quality and enhancing patient and staff satisfaction are all paramount for a healthcare facility's success in the current climate of financial pressure and declining reimbursement. The lifetime value of a patient is approximately \$1.4 million.²⁴ When patients have a bad experience at 1 hospital and go elsewhere for care, that money travels with them, along with any prospective patients who read their negative online reviews. Colonoscopies alone are a significant source of new patients and procedural revenue for hospitals and other healthcare facilities. As a result, solutions that make colonoscopy safer and more efficient are worthwhile investments.

Options for addressing risks posed by patient handling duties associated with colonoscopy aim to either (1) make it safer for staff to apply pressure and reposition patients or (2) minimize the need for patient handling all together.

SOLUTIONS FOR REDUCING RISK

Ergonomic Training

There are several educational resources designed to help endoscopy staff minimize risks while applying manual pressure. Examples of written materials include two Gastroenterology Nursing articles: "Looping and Abdominal Pressure: A Visual Guide to a Successful Colonoscopy"²⁵ and "Safe and Effective Abdominal Pressure During Colonoscopy: Forearm Versus Open Hand Technique."²⁶ Additionally, the Society for Gastrointestinal Nurses and Associates (SGNA) typically offers courses on applying abdominal pressure once per year during their national conference.

Slide Sheets

Slide sheets are designed to make repositioning patients easier by reducing the friction between the patient and the bed. (Figure 4) In colonoscopy, placing a slide sheet under the patient could potentially reduce the physical strain associated with repositioning a sedated and/or obese patient. However, the extent to which these products are routinely used in endoscopy is unknown. Given that slide sheets used during colonoscopy are likely to be exposed to bodily fluids, single-patient use (disposable) options are preferable to reduce the risk of cross-contamination and infection.

Figure 4: Patient repositioning using a slide sheet.

SOLUTIONS FOR MINIMIZING APPLICATION OF MANUAL PRESSURE

While the approaches described previously can reduce the risk of MSDs, sometimes there is just no safe way to apply manual pressure and reposition patients (Table 1). As a result, without additional intervention, strains and injuries will still occur among endoscopy nurses and staff.⁴⁻⁷ Thus, solutions designed to eliminate or greatly reduce the need for patient handling can offer an increased level of risk mitigation.

TABLE 1

HIGH-RISK CIRCUMSTANCES FOR INJURIES ASSOCIATED WITH COLONOSCOPY
Colonoscopies performed in understaffed endoscopy units
Colonoscopies performed on obese patients
Difficult colonoscopies requiring sustained, long-duration abdominal pressure

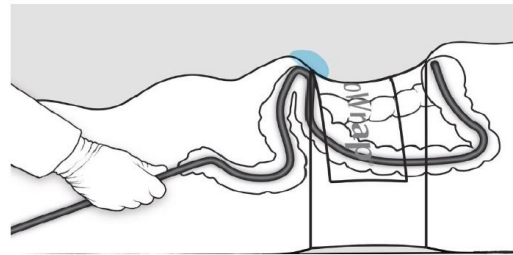
Endoscopy positioning pillow

An endoscopy pillow is a reusable positioning pillow developed specifically for colonoscopy. The product is placed under the patient's abdomen during the procedure and is intended to take the place of a staff member's hand during colonoscopy. When the patient is rolled into the left lateral decubitus position, his or her body weight compresses the pillow into the abdomen to apply abdominal pressure. With the pillow in place, staff can roll the patient forward (or backward) to apply more (or less) pressure. The pillow can be moved to target different areas of the colon.

Colonoscopy compression device

Another solution is a colonoscopy compression device that can be worn by patients during colonoscopy and provides external abdominal compression. (Figure 5) Unlike traditional binders that simply provide abdominal support, the colonoscopy compression device is specifically de-

signed to splint (immobilize) the sigmoid and transverse colon to prevent looping during colonoscopy. By preventing looping, the device minimizes the need for manual abdominal compression and patient repositioning. The device features a primary band that provides sustained compression across the abdomen and a secondary strap that can be employed during colonoscopy to provide additional, location-specific compression, if needed. (Figure 6) The colonoscopy compression device is a single-patient-use item and can be purchased in a variety of sizes.

Figure 5: Compression device splinting the sigmoid colon (side view)**Figure 6: Colonoscopy compression device on patient**

Numerous published studies have evaluated the effectiveness of the colonoscopy compression device. The findings from these studies suggest that use of the device is associated with a 40-90% reduction in the need for manual abdominal pressure and a 50-100% reduction in the need for patient repositioning.^{15,16,18}

CONCLUSION

The prevalence of work-related MSDs among endoscopy professionals is alarming, and the status quo approach to addressing looping during colonoscopy is a major driver of these injuries. Accordingly, additional research on how

alternative patient handling methods may reduce MSDs is warranted. Furthermore, considering the impact that staff MSDs have on the patient experience and outcomes, healthcare facilities should allocate adequate attention and funding to remedy the situation. The most promising mechanism for doing so continues to be SPHM programs that enable facilities to be proactive in identifying and solving problems, educating staff, and training them on best practices and the use of SPHM equipment.

REFERENCES

1. *Worker Safety in Your Hospital*. OSHA. 2013.
2. Goma AE, Tapp LC, Luckhaupt SE, et al. Occupational Traumatic Injuries Among Workers in Health Care Facilities — United States, 2012–2014. In *Prevention CfDca*, ed. Vol 64. Washington, DC; 2015:405-410.
3. *Safe Patient Handling Programs: Effectiveness and Cost Savings*. OSHA. 2011.
4. Drysdale S. The incidence of upper extremity injuries in Canadian endoscopy nurses. *Gastroenterol Nurs*. 2011;34(1):26-33.
5. Drysdale SA. The incidence of upper extremity injuries in endoscopy nurses working in the United States. *Gastroenterol Nurs*. 2013;36(5):329-338.
6. Drysdale SA. The incidence of upper extremity injuries in endoscopy nurses. *Gastroenterol Nurs*. 2007;30(3):187-192.
7. Darby B, Gallo AM, Fields W. Physical attributes of endoscopy nurses related to musculoskeletal problems. *Gastroenterol Nurs*. 2013;36(3):202-208.
8. Seeff LC, Richards TB, Shapiro JA, et al. How many endoscopies are performed for colorectal cancer screening? Results from CDC's survey of endoscopic capacity. *Gastroenterology*. 2004;127(6):1670-1677.
9. Choi J, Drozek D. Detection of looping during colonoscopy using bending sensors. *The Open Medical Devices Journal*. 2012;5:1-7.
10. Witte TN, Enns R. The difficult colonoscopy. *Canadian Journal of Gastroenterology = Journal Canadien de Gastroenterologie*. 2007;21(8):487-490.
11. Waye JD. Difficult colonoscopy. *Gastroenterol Hepatol (N Y)*. 2013;9(10):676-678.
12. Clancy C. VHA DIRECTIVE 1611. In *Safe Patient Handling and Mobility Program*; 2018.
13. Church JM. Ancillary colonoscope insertion techniques: an evaluation. *Surg Endosc*. 1993;7(3):191-193.
14. Hansel SL, Prechel JA, Horn B, Crowell MD, DiBaise JK. Observational study of the frequency of use and perceived usefulness of ancillary manoeuvres to facilitate colonoscopy completion. *Dig Liver Dis*. 2009;41(11):812-816.
15. Crockett S, et al. Use of ColoWrap reduces cecal intubation time during colonoscopy. *Gastrointestinal Endoscopy*. 2013;77(5):AB501.
16. Crockett SD, Cirri HO, Kelapure R, Galanko JA, Martin CF, Dellon ES. Use of an abdominal compression device in colonoscopy: a randomized, sham-controlled trial. *Clin Gastroenterol Hepatol*. 2016.
17. Khaja X, Church J. The use of ancillary techniques to aid colonoscope insertion. *Surg Endosc*. 2014;28(6):1936-1939.
18. Spanarkel M, et al. Use of ColoWrap Binder Reduces Insertion Time, Use of Ancillary Maneuvers, and Frequency of Prolonged Insertions During Colonoscopy. In SAGES 2014 Abstract Archive: Society of American Gastrointestinal and Endoscopic Surgeons; 2014.
19. Kravochuck S, Gao R, Church J. Differences in colonoscopy technique impact quality. *Surg Endosc*. 2014;28(5):1588-1593.
20. Park SW, Jeon WJ, Kim JD, Lee SJ, Choi AR, Lee BS. Total colonic decompression after colonoscopy decreases postcolonoscopy abdominal pain: a randomized double-blind controlled trial. *J Clin Gastroenterol*. 2016;50(1):59-65.
21. Park DI, Kim HJ, Park JH, et al. Factors affecting abdominal pain during colonoscopy. *Eur J Gastroenterol Hepatol*. 2007;19(8):695-699.
22. Leffler DA, Kheraj R, Garud S, et al. The incidence and cost of unexpected hospital use after scheduled outpatient endoscopy. *Arch Intern Med*. 2010;170(19):1752-1757.
23. Wood, D. Nurses worry about injuries, and it may affect patient care. *Travel Nursing*. 2014. Published 2014.
24. Morrissey, GD. *The True Costs of Alienating Patients*. Published Aug 23, 2012.
25. Prechel JA, Sedlack RE, Harreld FA, Sederquest MM. Looping and abdominal pressure: a visual guide to a successful colonoscopy. *Gastroenterology Nursing*. 2015;38(4):289-294.
26. Prechel JA, Huckle R. Safe and effective abdominal pressure during colonoscopy: forearm versus open hand technique. *Gastroenterol Nurs*. 2009;32(1):27-30; quiz 31-22.

LARISSA BIGGERS, BA, MA, is the Director of Learning at ColoWrap in Durham, NC. She has over 20 years of experience as a medical writer and editor. Larissa has also worked as an instructional designer for corporations and universities, a technical trainer, and a middle school English teacher.

The author declares no conflicts of interest.