

# WATCH YOUR BACK (AND NECK AND WRISTS)



Work-related musculoskeletal disorders can shorten your career.

BY TIMOTHY RATZLAFF, MD; AND ASHLEY BRISSETTE, MD, MSc

**E**rgonomics, the study of how individuals interact with their environment, is an important area of focus because it centers on human well-being and is essential to maintaining vocational productivity and longevity.

The particular physical demands of performing surgery put surgeons at risk for work-related musculoskeletal disorders (MSDs) due to poor ergonomics,<sup>1</sup> and ophthalmologists are at particular risk due to their unique work environment. They operate at a microscope, use lasers that sometimes require awkward positions, and spend hours during clinic assessing patients at the slit lamp. Positions involving

stooping, sitting, and flexing the back and neck are maintained for long periods of time. All of the above factors can lead to work-related MSDs.<sup>2-5</sup> The pain experienced may compound into long-term injury and limit the ophthalmologist's future ability to work.

Over the past decade, a high prevalence of work-related MSDs has been increasingly recognized within the field of ophthalmology. Up to 80% of ophthalmologists surveyed across the globe have reported work-related MSDs due to poor ergonomic practices.<sup>6-11</sup>

### EDUCATIONAL NEED

We first became interested in the study of ergonomics in

ophthalmology when we realized that there was no formal teaching component during residency training that focused on proper positioning in the clinical setting. Research groups at Queen's University in Kingston, Ontario, and at the University of Ottawa conducted a systematic review of the literature.<sup>12</sup> Investigation revealed three predominant risk factors for work-related MSDs in ophthalmic practice:<sup>1-3,5,12,13</sup>

- sustained working postures;
- forced manipulation of surgical instruments; and
- the repetitive nature of these movements.

High-volume clinics, psychosocial stress, and the practicalities of examination equipment are also contributing factors. As might be expected, the majority of reported symptoms occur in the back, neck, and upper extremities.<sup>11</sup> Without proper risk-factor management, decreased clinical productivity and even complete withdrawal from the workforce can become a reality.

Educating ophthalmologists about long-term work-related MSD prevention is essential, as it may limit any future productivity loss due to work-related pain. The ideal intervention should include a complete ergonomic assessment of the clinician's positioning and behavioral habits as well as careful redesign of the clinical setting to optimize

## IN THE LITERATURE

up to **8%** --> of ophthalmologists required surgical intervention to treat work-related MSDs

and **9%** --> were forced to give up operating prematurely due to chronic pain

Chatterjee A, Ryan WG, Rosen ES. Back pain in ophthalmologists. *Eye*. 1994;8(4):473-474.

efficiency and promote neutral postures.

However, for some, a clinical redesign may be impractical or prohibitively expensive. A simpler but effective endeavor is to intervene with self-directed education, allowing the ophthalmologist to identify risk factors within his or her own environment and learn ways to modify his or her positioning.

Evidence suggests that ergonomics education should be implemented within surgical training programs to have the greatest impact on physicians' well-being.<sup>14-15</sup>

### ERGONOMICS MODULE

All of the published studies on ergonomics in ophthalmology that we identified found high rates of self-reported work-related MSDs, but little attention is devoted to the topic of ergonomics within the formal ophthalmology residency curricula. Based on the results of the systematic review, our research group created an online educational module on proper ergonomic practices in ophthalmology, targeted toward resident ophthalmologists. Our development team is in the process of making the module available

online to maximize accessibility for interested eye health specialists, and it should be complete by the end of the year.

Our group collaborated with specialists in education, kinesiology, occupational therapy, and biomechanics to create a robust educational module designed to improve ergonomic knowledge and behavior. The resulting module highlights important facts about the prevalence of MSDs within ophthalmology, describes proper ergonomic technique for various examination modalities and settings, and educates physicians on how to mitigate risk factors. Before-and-after photographs delineate ideal neutral postures—comfortable working positions in which joints are naturally aligned. Adopting these postures can help minimize stress and strain on the musculoskeletal system and reduces the risk of chronic injury.

In collaboration with a biomechanics laboratory, we performed a prospective interventional pilot study to evaluate the efficacy of our educational module in improving ergonomic behaviors. In simulated clinical encounters, 10 ophthalmology residents

performed slit-lamp examinations on standardized patients before and after exposure to the module. Results showed a statistically significant change in ergonomic behaviors, including a decrease in average lifetime injury risk scores from moderate to low risk. Surveyed participants reported that they considered the 30-minute module to be a practical, useful learning tool. Other feedback has been reintegrated into the module in hopes of further improving its readability and efficacy in improving ergonomic posturing.

Based on the encouraging findings of our pilot study, a multicenter validation study is under way. The results of this study are expected to provide a strong evidence-based case to formally adopt ergonomics education into the ophthalmological academic curricula.

Implications extend well beyond ophthalmologists to include optometrists, orthoptists, ophthalmic technicians, and others.

### PAIN REDUCTION

Recognizing that many practicing ophthalmologists already experience high rates of MSDs, we then directed our attention to pain-reduction strategies. Our research group at Weill Cornell Medicine began a collaboration with Cornell Tech School of Graduate Studies and physicians in the Department of Rehabilitation Medicine. Our goal was to develop a directed exercise regimen that could improve work-related musculoskeletal pain scores among microscope-bound physicians.

Rehabilitation and sports medicine studies show that performing simple targeted exercises can improve pain scores for other types of MSDs, and we believe this strategy may also help combat injury due to microscope positioning among ophthalmologists. Results of this pilot study are scheduled to be presented at the 2018 ASCRS meeting in May.

## AT A GLANCE

- ▶ Up to 80% of surveyed ophthalmologists have reported work-related musculoskeletal disorders (MSDs) due to poor ergonomic practices.
- ▶ Ergonomics education should be implemented within surgical training programs to have the greatest impact on physicians' well-being.
- ▶ Rehabilitation and sports medicine studies show that performing simple targeted exercises improves pain scores for other types of MSDs. The authors believe this strategy may also help combat injury due to microscope positioning among ophthalmologists.



## CONCLUSIONS

Proper positioning is essential to the prevention of long-term injury and the preservation of longevity of careers in ophthalmology. Many ophthalmologists, however, do not receive formal education about risk factors for work-related musculoskeletal pain and MSDs. Surveys examining the rates of work-related MSDs among ophthalmologists determined that high numbers of respondents experienced pain. Some respondents even reported loss of work performance and income due to chronic injury.

The high rate of work-related MSDs in ophthalmology leads us to conclude that ergonomic practices should be emphasized in this discipline. Once implemented and practiced, proper positioning should not take much time away from the patient encounter. Work-related injury prevention programs should start early in residency training, and proper habits of positioning should

be a component of formal teaching. These measures will help ophthalmologists maintain years of productive work. Ideally, we hope these interventions may decrease lifetime risk of developing work-related MSDs, protect the longevity of our colleagues' careers, and help to maintain excellent ophthalmic care standards for our patients. ■

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