Acta Scientific MEDICAL SCIENCES (ISSN: 2582-0931)

Volume 9 Issue 5 May 2025

Short Communication

Improving Ergonomics Education for Medical Students and Doctors

Mina Guirgis[1,2,4]*, Mark Ibraheem[3] and Peter Hewett[4]

[1]*Department of General Surgery, Sir Charles Gairdner Hospital, Western Australia*

[2]*School of Medicine, University of Otago, Canterbury, New Zealand*

[3]*Department of Orthopaedic Surgery, Royal Perth Hospital, Western Australia*

[4]*Faculty of Health and Medical Sciences, University of Adelaide, South Australia*

***Corresponding Author:** Mina Guirgis, Department of General Surgery, Sir Charles Gairdner Hospital, Western Australia.

DOI: 10.31080/ASMS.2025.09.2079

Received: January 20, 2025

Published: April 24, 2025

Abstract

Ergonomics is the discipline of analysing the interactions between humans and elements within their environment. Although educational institutes, workplaces and professions offer ergonomics-specific education and employ occupational health and safety officers to implement and oversee such practices, this important discipline is almost never taught to medical students and junior medical staff. In Australia, almost all medical universities now require undergraduate experience prior to commencing medical school. The youngest age for commencing medical school has now shifted from 17 to 21, with the large proportion of students in their final year ranging between 25-29, at least 2-4 years older than graduates from the 1990s-2000s. In 2021, almost 14% of final year Australian medical students were above 30 with a considerable proportion over 40 years old (Medical, 2022) [3]. Similar trends are being seen in Europe and North America. Such demographical shifts highlight the importance of ergonomics in reducing workplace injuries to enhance career productivity and longevity. Yet there is not nearly enough focus on dedicated and specific ergonomics education and training from medical schools and hospitals. This paper highlights such issues and serves as a guide on ways to implement such change.

Keywords: Ergonomics; Workplace; Doctors

Workplace injury sustained by doctors

Studies surveying practicing medical clinicians reveal the burden of workplace hazards on the profession, affect up to 50% of doctors and 66-100% of surgeons across various subspecialities. This includes a wide array of complaints from musculoskeletal pain, carpal tunnel syndrome, neuropraxia, rotator cuff injury, chronic lumbar and cervical spine disease. The 12-month prevalence of neck pain amongst surgeons and interventionalists from a 2018 systematic search was 65%. Additionally, 12% of clinicians needed sick leave, drastic practice modifications or early retirement (Epstein., *et al*. 2018) [1]. Many studies have revealed that medical students and doctors have a lack of awareness regarding applied ergonomics recommendations and specialities have demanded education during training, including at medical schools (Epstein., *et al*. 2018; Gupta, 2021) [1,2].

Health care environmental factors

Despite the enormous patient benefits from the worldwide uptake of laparoscopic surgery, endoscopy and minimally invasive procedures, this has negatively impacted the health of staff, largely doctors, by increasing workplace strain and injury. Common injuries sustained include (Sharma, 2022) [4]:

- **Musculoskeletal:** Awkward body and arm positioning during surgery/procedures results in poor posture and excessive muscular load, leading to musculoskeletal and nerve strain, fatigue and injury. Neck and back pain are the most common consequences. Incorrectly placed surgical or procedural monitors can cause significant cervical spine strain and misalignment of eye-hand-target axis, limiting movement and adding additional strain. Outside of surgical/procedural settings, doctors are spending more time sitting at desks on computers and so applied office ergonomics to optimise the workspace becomes more crucial.
- **Visual strain:** From laparoscopic, endoscopic or radiological procedures. Such conventional video technology is two-dimensional, lacking stereoscopic vision. Additionally, there is a restricted field of vision and a vast array of clarity, image transmission and focussing settings that can increase the visual workload demand causing significant fatigue.

Solutions

Figure 1 summarises the potential solutions to ensure the ergonomics education is successfully taught and applied at both pre-clinical and clinical setting.

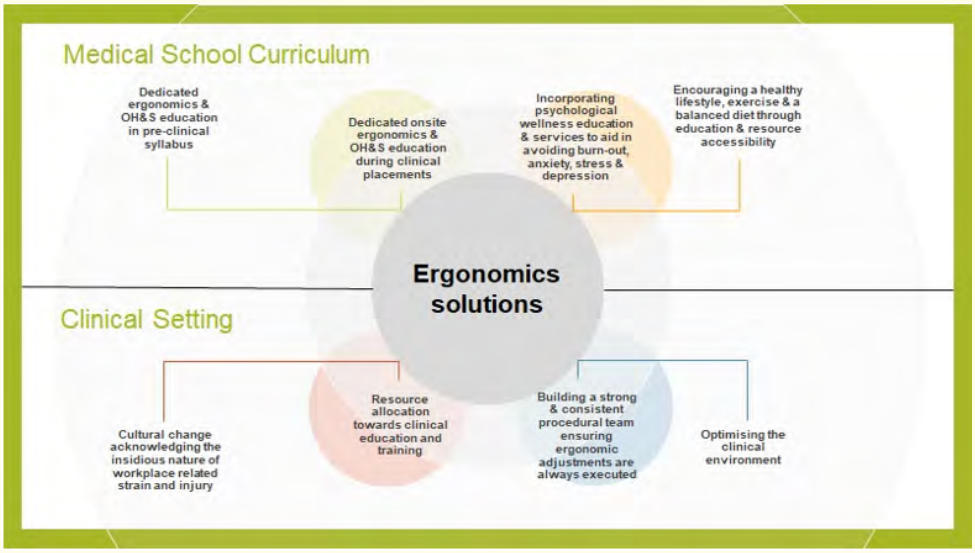

Figure 1: Effective ergonomic solution strategies for incorporation at medical school and clinical settings.

Attention must be paid to optimising the clinical environment. Simple adjustments including using chairs designed for active sitting, allowing for activation of core muscle groups, improving posture, stability and reducing injury. Being mindful to always adjust heights of workstations, monitors and patient beds ensures reduced strain on cervical and lumbar spine.

In surgical or procedural settings, the following measures are examples of interventions that can aid in reduce the burden of performing procedures on the surgeon/proceduralists and their assistant/s (Wong., *et al*. 2010) [5].

Room set up

- Placement of imaging monitors at eye level to avoid cervical spine hyperextension
- Ensuring the coaxial surgical/procedural room set-up involves the procedural field, endoscope and monitor being in the same line (see Figure 2).

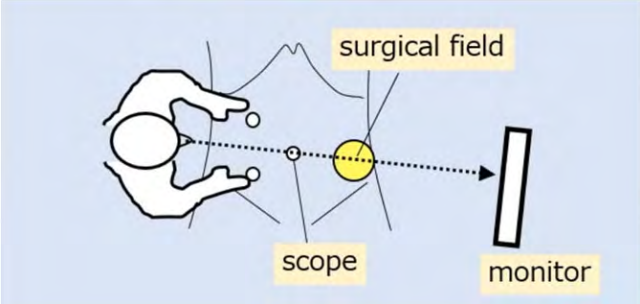

Figure 2: Optimal coaxial procedure set-up.

Building a strong team

- Support staff (surgical, procedural, nursing, anaesthetics) should preferentially work with the same proceduralist routinely to ensure specific equipment and set-up preferences are reproduced, improving ergonomics and efficiency.

Optimising the environment

- Room noise should be at ambient volumes (i.e. 56dB) ensuring verbal communication is uninhibited.
- Room temperature optimisation, balancing between avoiding hypothermia for the patient and overheating for the gowned and gloved staff.

In summary, there is value in educating students, doctors, nurses and support staff in the principles of ergonomics. Such interventions have short term benefit in increasing efficiency in the operating theatre and over the longer term, improving staff health and career longevity. A dedicated specialist who would review operating theatre ergonomics would add value to a surgical department.

The author declares no conflict of interest.

The author declares no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper. There are no sources of funding for this project to declare.

Bibliography

1. Epstein S., et al. "Prevalence of Work-Related Musculoskeletal Disorders Among Surgeons and Interventionalists: A Systematic Review and Meta-analysis". *JAMA Surgery* 153.2 (2018): e174947-e174947.

2. Gupta RG., *et al*. "Medical Students' Wellness from the Perspective of Ergonomics and Occupational Mental Health [Invited Perspective]". *Indian Journal of Social Psychiatry* 37.2 (2021): 143-147.

3. Medical DoAaNZI. "Medical schools outcomes database national data report" (2022).

4. Sharma D H and Priya. "Recent Concepts in Minimal Access Surgery (1 ed., Vol. 1)". Springer (2022).

5. Wong SW., *et al*. "Optimizing the operating theatre environment". *ANZ Journal of Surgery* 80.12 (2010): 917-924.