

# Enhancing Graduate Medical Education for Left-Handed Learners

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Approximately 12% of the population of North American and Western European countries, and 10% of the global population, is left-handed (LH).<sup>1</sup> Because most of the population is right-handed (RH), LH people may find it challenging to navigate a RH-dominant society. The medical profession is no exception to this challenge. For centuries, medical trainees have been taught to examine their patients from the patient's right side. Procedural skills (such as lumbar puncture, intubation, suturing, cardiopulmonary resuscitation, etc) are an integral part of medical education that may pose dexterity-related challenges. Educational materials on performing clinical, procedural, or surgical skills, to the best of our knowledge, rarely if ever describe the approach best suited for a LH learner (LHL). To be successful in performing any skill, LHLs must either adapt to performing the skill with their left hand from the right side, using right-handed instruments, which may lead to apprehensiveness,<sup>2,3</sup> awkward learning, perplexity, fear of misconstrued innate inefficiency, or unsuccessful attempts; or else resort to ambidexterity.<sup>4</sup> LHLs have reported greater difficulty in attaining procedural proficiency in performing lumbar puncture, intubation, and suturing.<sup>4</sup> Anxiety related to laterality has also been reported in medical education.<sup>2,3</sup> In a survey of 68 LH surgeons, nearly 50% of participants reported anxiety about their laterality during their residency training, and about 25% of surgeons admitted to anticipating difficulties due to their laterality even before joining surgical specialties.<sup>3</sup> There is also lack of adequate mentoring for LHLs during residency. In a survey of 194 surgeons that included both RH and LH surgeons, none of the LH surgeons (n = 18, 9.3%) received mentorship regarding their laterality during their surgical residency.<sup>5</sup>

Based on persistent challenges in LHL graduate medical education, the authors share valuable strategies to effectively support and accommodate LHLs in medical education. These strategies are based on available relevant evidence from the literature and the authors' experiences in teaching clinical and

procedural skills to LHLs for several years. One author (S.C.) additionally serves in several leadership roles in medical education and engages in curricular design and delivery of various clinical courses involving clinical and procedural skills. These strategies for LHLs are grouped into 4 main categories: (1) cognitive support, (2) psychomotor support, (3) mentorship, and (4) faculty development for mentors supervising LHLs. The TABLE summarizes these strategies with expected outcomes in LHL education.

## Cognitive Support for LHLs

Asking about dexterity should occur early in residency. This signals that LH residents can approach the program about needs related to handedness and that needs can be accommodated. Asking at the time of orientation ensures the question is not perceived as discriminatory in the selection process. Programs should not recommend or support becoming ambidextrous or changing laterality, as it can lead to harmful health outcomes in the long run. One study demonstrated that 28% of LH surgeons were forced to change their laterality during their residency training.<sup>5</sup> Individuals who lack laterality are at increased risk of certain disorders and brain abnormalities including cognitive decline, and in fact, ambidexterity fares worse than left-handedness.<sup>6</sup>

## Psychomotor Support for LHLs

When possible, LHLs should be supervised by LH educators to increase their efficiency and foster confidence. Understandably, most of the educators for LHLs will be RH educators, given their predominance. Increasing faculty awareness of LHL challenges and encouraging inclusion of alternative methods to perform RH-dominated procedures best-suited for LHLs will best support the LH resident's training needs. Discussing the steps of the clinical, procedural, or surgical skill with a LH resident prior to performing it on the patient will help address some of the anticipated technical issues. According to a survey of LH surgeons (n = 68), only 13% of surgical training programs provided LH instruments. They also reported challenges in the operating room and

TABLE

Helpful Strategies to Enhance Medical Education With Expected Outcomes for Left-Handed Learners (LHLs)

| Strategy No. | Helpful Strategies to Support LHLs                                                                                                                              | Expected Outcomes for LHLs                                                                                                       |
|--------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|
|              | <b>Cognitive Support</b>                                                                                                                                        |                                                                                                                                  |
| 1.           | Know the dexterity of your learner                                                                                                                              | Help plan and accommodate the curricular needs of LHLs; satisfaction and validation of dexterity challenges of LHLs              |
| 2.           | Refrain from enforcing change in dexterity or embracing ambidexterity                                                                                           | Prevent cognitive decline and harmful health outcomes related to ambidexterity in the long run                                   |
| 3.           | Highlight availability of LH mentors and/or faculty cognizant in LHL education in the program description                                                       | Reassurance for LHLs, promoting LHLs to consider joining programs with LH mentors and trained RH mentors                         |
| 4.           | Contemplate having a strong consideration for LHLs in training programs with availability of LH mentors (especially in a procedure-intensive or surgical field) | Promote conducive mentorship for LHLs; LH mentor can act as a role model and be an inspiration to LHLs                           |
|              | <b>Psychomotor Support</b>                                                                                                                                      |                                                                                                                                  |
| 5.           | Match LHLs with a LH educator if feasible                                                                                                                       | Increase LHL efficiency and confidence; avoid unnecessary learner-educator interpersonal conflicts due to laterality preferences |
| 6.           | Offer alternative strategies on performing RH-dominated clinical skills and surgical procedures better suited for LH residents                                  | Help improve academic environment for LH residents and their educators                                                           |
| 7.           | Perform trial drills with the LH residents prior to performing the clinical skill or procedure on the patient                                                   | Help address anticipated technical difficulties and avoid confusion; promote better learning                                     |
| 8.           | Provide easy availability of LH instruments during surgical procedures                                                                                          | Avoid the challenge of handling RH-dominant instruments; facilitate LHL learning by decreasing cognitive load                    |
| 9.           | Rearrange clinic rooms and operating rooms based on dexterity                                                                                                   | Help alleviate stress associated with access to patients                                                                         |
|              | <b>Mentorship</b>                                                                                                                                               |                                                                                                                                  |
| 10.          | Engage in frequent “check-ins” with LHLs                                                                                                                        | Help facilitate open dialogue and opportunity for LHLs to share their dexterity challenges; inclusive curriculum                 |
| 11.          | Maintain a national LH mentor directory                                                                                                                         | Easy and early access to LH mentors                                                                                              |
|              | <b>Faculty Development for Mentors Supervising LHLs</b>                                                                                                         |                                                                                                                                  |
| 12.          | Provide formal training to RH medical educators in teaching LHLs                                                                                                | Help alleviate the strain on educators; well-rounded feedback to LHLs                                                            |

handling the surgical instruments.<sup>3</sup> In another report surveying LH surgeons ( $n = 18$ ), only 11% were provided with LH instruments by their surgical training programs.<sup>5</sup> Easy availability of LH surgical instruments will facilitate their learning by decreasing cognitive load. Modifications to the clinic and operating rooms to facilitate LHL performance, such as moving examination tables away from the wall to provide easy access to the patient from both sides, will help as well.

### Mentorship for LHLs

Frequent dialogue between medical educators and LHLs provide LHLs an opportunity to share their

dexterity challenges and thus help alter the curriculum and workplace. There is a lack of adequate mentorship for LHLs as reported by a study wherein all LH surgeons ( $n = 18$ ) from the participating surgeons ( $n = 194$ ) revealed that none of them had received any mentorship regarding their laterality during residency.<sup>5</sup> In another study surveying solely LH surgeons, of the 68 respondents, only 3% received laterality-related mentoring in medical school, and only 1 in 10 respondents were offered laterality-related mentoring during residency.<sup>3</sup> Availability of LH mentors and/or faculty cognizant of LHL education should be highlighted in the program description. LHLs should strongly consider applying to training programs with LH mentors. Conversely,

training programs with availability of LH mentors and presence of robust RH faculty development programs on how to support LHL education should extend their support to LH applicants by ranking them high, especially in procedure-intensive and surgical disciplines. We recommend LHLs be matched with a LH mentor/skills supervisor who can act as a role model and can closely demonstrate the rationale for the choice of a specific approach that may be best suited for LHLs.

National mentoring efforts could include specialty-specific lists of LH mentors based on their location maintained by national specialty organizations and shared with LHLs upon request.

### Faculty Development for Supervising LHLs

LHLs will frequently be supervised and taught by RH faculty. Compared to LH surgeons, RH surgeons reported more difficulty and less comfort teaching LHLs and were also more likely to report that LHLs have less technical ability.<sup>7</sup> Providing formal training to RH educators in teaching and assessing LHLs will help alleviate this tension. Institutions can train their educators by discussing LHL challenges and by sharing the above-mentioned cognitive, psychomotor, and mentoring strategies that may help in enhancing LHL education. Additionally, the resident-educator pair can practice on virtual reality simulators to assess their interpersonal communication and feedback during a procedure. This will uncover unanticipated challenges in a virtual setting, thus improving the real-time environment and potentially reducing bias in feedback and assessment. Allowing each member of the pair to perform a simulation or game using the other's dexterity preferences could also help build rapport and understanding.

The challenges in the graduate medical education of LHLs can be lessened by removing barriers to training. It is vital for us to understand these challenges and offer guidance and solutions to help LHLs become successful and confident future physicians.

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