


Age of the leftie: the lived experience of left-handed surgeons

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Introduction

It may come as a surprise to some that we live in a world tailored to right-hand dominant people. This right lateral bias exists in everyday life, from can openers to spiral notebooks to desks in the classroom. Many musical instruments are made for right-handers, and the dials on a watch become almost inaccessible if worn on the right-hand by a left-hander. Studies have estimated that 10% of the human population is left-handed (LH).¹ This minority includes prominent historical figures such as Leonardo da Vinci, Albert Einstein, Charlie Chaplin and more recently Rafael Nadal. The French word 'gauche' means left and has extended meanings of 'awkward' or 'clumsy'.² This meaning may have arisen because LH people may appear awkward in

Abstract

Background: Left-handers make up 10%–12% of all surgeons. Surgical education and practice by nature has significant technical demands but there is a paucity of data on left-handers and training in surgery. The surgical curriculum has no specific salutation or recognition of left-handers and the contributions and challenges they represent.

Methods: The purpose of the study was to explore, describe and understand the lived experience of left-handed surgeons in relation to surgical education and training in Australia. Semi-structured interviews were used to gather in-depth information relating to the participants' experiences, viewpoints, beliefs and motivations.

Results: The responses of the participants involved were categorized using the data analysis method described by Colaizzi. Seven themes were identified: left-handed surgeons are universal adapters; left-handed instruments are not necessary for left-handed trainees; most left-handed trainees have experienced discrimination or negativity due to their laterality; ambidexterity is considered an advantage; communicating one's laterality is important; a formal mentoring program is not necessary; and simulation can be a complementary tool for left-handed trainees. Being a left-handed surgical trainee need not be a negative experience.

Conclusion: With appropriate support and teaching, left-handed trainees can develop into excellent surgeons. The themes from this study can be used by trainees, trainers and Colleges of surgical training to build awareness and optimize the training of future left-handed surgeons.

trying to manage in a right-handed (RH) world. Similarly, the term 'sinistral' refers to being LH or inclined to the left and is derived from the Latin meaning 'sinister'. Certain religious, cultural, and environmental beliefs are embedded with the notion that left-handedness is an unfavourable attribute.

In the surgical sphere, the right lateral bias is just as pronounced. Surveys have found that approximately 10% of medical staff are LH, in keeping with the general population.^{3–5} Endoscopes are designed to be held in the non-dominant left-hand with the controls being manipulated by the dominant right-hand. While there is little evidence in the literature regarding hand injuries and colonoscopy, LH surgeons have reported suffering neck, back and hand pain while using RH instruments.⁶ Surgical instruments are designed to be used by the right-hand; theatre scrub staff will load needle

holders for RH surgeons, and pass instruments into the right-hand. Perhaps the only exception in this bias exists at the Mayo Clinic, where surgeons are gloved left-hand first in homage to the LH Mayo brothers.⁷

LH surgeons must reverse the usual motion to utilize instruments such as artery forceps and needle holders. Alternatively, they need to learn to use their right-hands thus cultivating ambidexterity. Both these options are unnatural and fatiguing for the LH surgeon as they are forced to do manoeuvres that challenge their natural actions. This in theory can be dangerous for the surgeon, theatre nurse and patient, particularly when sharp instruments are involved. In some cohorts, up to 38% of LH trainees reported feeling disadvantaged by their laterality and 30% reported that specific procedures are more difficult because of their LH dominance.⁸ A study by Schueneman *et al.* found that LH trainees were consistently being rated lower than their RH counterparts, possibly because RH surgeons find it harder to operate with and assist LH trainees.⁹ In contrast, they also showed that LH trainees were more proficient on neuropsychological testing of tactile-spatial abilities.⁹ These factors may contribute to an environment that elicits anxiety and stress for trainees, surgeons and theatre staff. This situation specific anxiety may even become a deterrent to enter or persist in a surgical speciality.³

The purpose of this study was to explore, describe and understand the lived experience of LH surgeons in relation to surgical education and training in Australia.

Methods

Study design

This was a qualitative study utilizing a phenomenological methodology; an approach to describe the lived experience of the participants in relation to their laterality (left-handedness) in surgery. Semi-structured interviews were conducted with the participants, guided by pre-determined questions but with the opportunity to

diverge and explore new themes as they became apparent. The participants were required to be either surgeons or trainees who are within 5 years of gaining fellowship. They were recruited from a large metropolitan health service in 2017. Recruitment, confidentiality, and privacy contact information for interview participants was obtained from the Eastern Health Department of Surgery. The invitation for the semi-structured interview was sent via email, with an attached information packet. Participants who were willing to take part in the study were then contacted via telephone to arrange a place and time for the interview to be conducted. All the interviews were undertaken in places with minimal distraction.

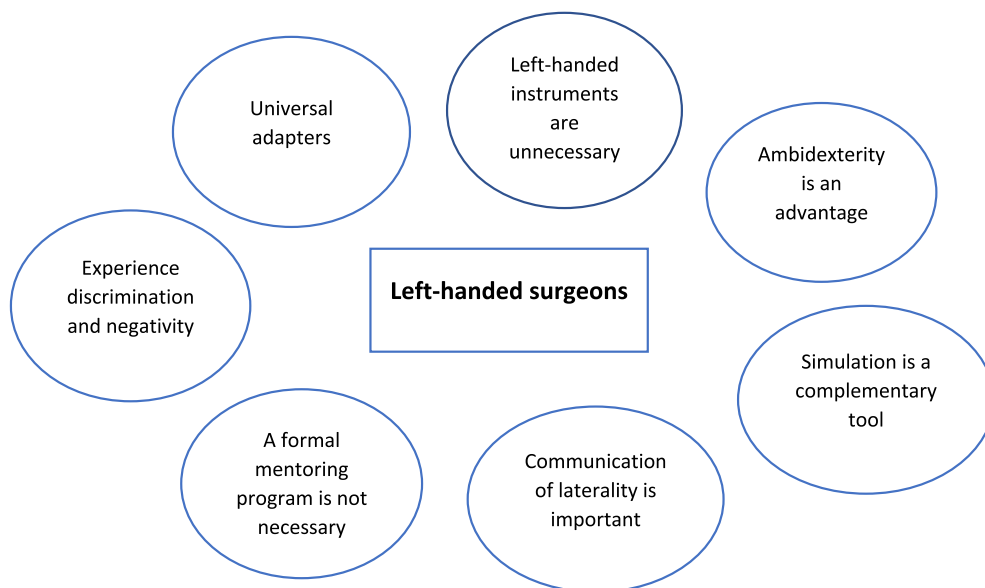
Data collection

An audio-recorded semi-structured interview was designed to explore the lived experience of LH surgeons. Questions were asked regarding their experience as LH trainees and surgeons, specifically relating to their own feelings, biases, or observations thereof, and repression or support of LH trainees, in the context of the training of LH surgeons. The interview duration was 45 min. The audio recordings were de-identified and transcribed prior to analysis. Each interview was listened to several times by the principal researcher (also a LH surgeon) to gain a better understanding of participants' experiences. The audio recordings were checked for accuracy and then destroyed after transcription was complete.

Data analysis

The responses of the participants were categorized using the method described by Colaizzi.¹⁰ In the first instance, the researcher describes their own experience based on the phenomenon in question. This is known as 'bracketing,' and allows the researcher's own beliefs and theories to be separated (or suspended) from those of the subject from the very beginning. Bracketing is largely synonymous with the ancient Greek term 'epoché' which is a point in time when all judgement about the world is suspended, a concept

Fig. 1. The seven themes identified in the lived experience of left-handed surgeons in Australia.



popularized by Husserl.¹¹ The Colaizzi framework to analyse and interpret data consists of a few stages; acquire a sense of each transcript, extract significant statements, formulate meanings from these statements, and organize the formulated meanings into clusters of themes. The resultant data was checked to maximize objectivity and the key components of the participants' experiences were documented. RC analysed all transcripts while BO and DN checked two different transcripts each against the themes.

Reflexivity

The research team comprised a LH surgeon (RC), a second-year surgical fellow (BO) and a surgical education researcher (DN). Each brought different perspectives to the analysis.

Ethics approval

This project received approval from the Eastern Health Human Ethics Committee (granted approval number LR27/2017).

Results

Two Consultant level surgeons, two Colorectal surgery fellows, and one Ear, Nose and Throat (ENT) surgery senior registrar volunteered to take part in the semi-structured interviews. Both Consultant surgeons (Gynaecological Oncologists) had gained their Fellowships from their College of Specialty training within the past 5 years. The Colorectal fellows had gained Fellowship of the Royal Australasian College of Surgeons (FRACS) 2 years prior. The ENT registrar had just passed his Fellowship exit examination and was in his final year of training. The Colorectal fellows and the Gynaecological Oncologists could be considered as one group since

they both perform advanced laparoscopic surgery and operate on pelvic organs. Three of the participants were female while two were male. One gynaecological oncologist and one colorectal fellow undertook medical school training in New Zealand while the remainder took training in Australia.

Analysis identified seven themes (Fig. 1).

Discussion

This study recruited five surgeons of similar vintage, all within 5 years of gaining Fellowship from their respective specialties. Four out of the five participants were laparoscopic surgeons, an area where literature on LH surgeons is lacking. The lived experience of LH surgeons in Australia has identified seven themes, and these are explored below.

Universal adapters

This cohort of surgeons was a group confident with their laterality after having adapted and subsequently became proficient at using both hands during their training. They all agreed that the adaptation process can be difficult or on occasion a 'real struggle', but with time and practise, the right-hand can be trained and used efficiently. This no doubt steepens the learning curve, a hurdle that RH trainees do not have to negotiate. Although previous studies have highlighted significant anxiety among LH trainees,^{3,6,9} this was not apparent within our cohort. This likely relates to the participants being fully qualified or near qualified surgeons and at the upper end of their learning curve.

A participant commented that they 'felt it took them up to one year to master use of the diathermy in their right hand, while they felt their RH counterparts only took three months'. The benefits of

Table 1 The findings from this study and the available literature provide the following recommendations

For trainees

1. Seek out a LH surgeon for advice early in your training. Do not be afraid to ask for assistance.
2. Aim to train your non-dominant hand at every opportunity since ambidexterity affords a significant advantage.
3. Form a group with other LH trainees.
4. Training the non-dominant hand does not always need to be undertaken in the operating theatre. Simple everyday tasks should be practised with the right-hand such as brushing your teeth or eating with chop sticks.
5. Use any form of simulation training for deliberate practice particularly in your early years of training.
6. Inform your trainers of your laterality as well as theatre staff to make your training experience worthwhile.
7. Report any form of discrimination to your supervisors of training or to the College of Surgeons.

For trainers

1. Be aware that LH trainees are different to RH trainees. Therefore, training must be individualized. Some are fast adapters, but others are not. The trainer needs to be flexible in their training approach and exhibit patience.
2. Ask the trainee about their concerns and needs so that their learning can be facilitated.
3. Learn techniques to teach left-handers more efficiently.
4. If you are directly involved in training, no form of discrimination or bullying is acceptable, including negative remarks regarding laterality. All forms of negativity can affect the confidence and development of LH trainees especially in the early years.
5. Be supportive of all trainees and if you are unable to be an adequate teacher (some trainers are unable to teach left-handers certain aspects of procedures) then seek out other surgeons who can help.

For the Colleges of training

1. Recognize that left-handers do exist in surgery and represent a minority group.
2. Acknowledge that left-handers suffer from discrimination and negative remarks based on their laterality.
3. Incorporate greater awareness into existing training programs about LH trainees.
4. Include a small segment on laterality in training courses run by the Colleges. For example, in Australia, courses like the Surgical Teachers Course and the Operating with Respect courses would be ideal to highlight some of the issues mentioned in this study and how to rectify them.
5. Provide contacts of willing LH surgeons who can play a mentoring role.
6. Provide skills centres with the opportunity for simulation training.

ambidexterity were evident in comments regarding suturing or knot tying with either hand, particularly when dealing with bleeding or if operating in the pelvis. Several of the participants commented on the nature of having to learn the RH technique for a procedure because 'that's how their consultants did it' or because the environment was setup for right handers. Overall, there is a spectrum of laterality such that some LH trainees will adapt with ease while others will require time and patience to learn the necessary skills.

Left-handed instruments are unnecessary

Somewhat surprisingly, the study participants had never used LH instruments, nor were given access to them. Yet the group did not feel access to LH instruments was necessary for trainees since they all had learnt to use RH instruments with both hands. Their comments highlighted the initial cumbersome phase of adjusting to RH instruments, but this was overcome with time. In addition, only one participant was aware of their existence. This is contrary to previous reviews and surveys which advocate the need for LH trainees to be given LH instruments.^{3,12,13} Since this study only interviewed senior trainees and surgeons, it would be interesting to perform another study to determine the uptake of LH instruments in junior trainees to see whether this was preferred.

Discrimination and negativity in relation to left laterality

Four of the five surgeons in this study had received negative comments and even discrimination based on their laterality. Ultimately this did not impact the outcome of their surgical training, nor did it deter them. Some participants were forced to change their laterality to RH otherwise the supervising surgeon would not teach them. Another mentioned that one supervisor made them laparoscopically suture RH despite having previously performed LH suturing, and experienced disparaging remarks regarding the quality of their suturing. Multiple studies have found that left-handers are more reactive to situational stress and recorded higher levels of anxiety.^{3,6,9} A hypothesis is that the majority of attending surgeons were RH and found LH trainees 'annoying'. It is these attending surgeons that insist that their trainees learn to operate RH and therefore, may be a source of significant bias. In one study, more than half of the respondents felt they annoyed some of their faculty while assisting during an operation.³

The Royal Australasian College of Surgeons (RACS) has taken great steps to eliminate discrimination of any type including bullying and harassment. An Expert Advisory Group (EAG) report in 2015 found discrimination, bullying and harassment a significant problem for surgical trainees in Australia.¹⁴ While laterality was not specifically mentioned in the report, the accounts from this study clearly identify such practices exist. All the participants acknowledged improved experiences as they progressed through training, with much less negativity towards them in recent times. The EAG report resulted in the 'Operating with Respect' campaign launched in 2016, a mandatory course for all Fellows of the College with the aim of equipping surgeons with the skills and knowledge they need to operate with respect. While this campaign was

relatively new at the time of this study's interviews, and does not specifically include issues of laterality, it may have caused an indirect positive impact.

Ambidexterity is considered an advantage

The surgeons in this study found that being ambidextrous was a significant advantage due to technical and ergonomic reasons. This is particularly true in emergency situations where time is critical and changing positions would be detrimental to the patient, or even trying to swap instruments into their dominant hand. Regarding open operations, the participants highlighted that they could be standing on the patient's left and the surgeon/assistant on the right, with both parties being in a position that suited their laterality. In laparoscopic surgery, the benefits related to being able to use either hand to perform fine dissection or suturing.

The recruitment of four laparoscopic surgeons added strength to the study since this is an area of contention and lack of research. A study by Powers *et al.* showed that LH surgical trainees demonstrated better performance at basic laparoscopic skill tests.¹⁵ This can be explained by the fact that left-handers are more accustomed to using both hands. Alnassar and colleagues from Saudi Arabia found the laparoscopic skills of LH medical students were superior to RH medical students.¹⁶ In particular, the total peg transfer time was shorter and significantly fewer mistakes were made.

A common belief is that laparoscopic surgery eliminates problems related to laterality. Our study and previous other studies^{3,12,17} confirm that this is not realistic. Rather, with experience, exposure and skill acquisition, the inconveniences of laparoscopic surgery for LH surgeons are diminished.

Communicating your laterality is important

Communication, particularly with nursing staff was a common theme. Scrub nurses are trained to hand and load instruments for RH surgeons. All the surgeons in our group reported having to switch the needle themselves to the left. While, this was not a major concern, one surgeon did raise the possibility of needle stick injury; once the nurse realizes they have handed you the needle the wrong way, they reach for it immediately to rectify it. The repeated handling of a needle raises the possibility of inadvertent injury. There is only one study originating in Taiwan showing no evidence of increased needle stick injuries among LH surgeons.¹⁸ Perhaps better education and practice for theatre staff in working with LH trainees and surgeons needs to be fostered. For example, scrub or theatre cards for surgeons should clearly state the laterality of the surgeon so that the scrub nurse is aware before the surgeon scrubs for the case. In addition, the surgeon should make it clear to the theatre staff prior to an operation about their hand preference.

A formal mentoring program is not necessary for left-handed trainees

Our interviewed subjects did not think a formal mentoring program would be crucial but encouraged trainees to seek out other surgeons who are LH within their training disciplines. As a junior trainee, essential skills such as knot tying or ergonomic use of instruments

could be taught more effectively from a LH supervisor or mentor. A few of the participants thought that working with LH surgeons motivated and inspired them to strive towards technical excellence and provided an opportunity to ask for general advice. Laterality specific teaching could be identified and implemented as early as with medical students. A survey of LH surgeons found that only 3% received mentoring specific to their handedness in medical school.³ In addition, they reported that only 10% of surgical training curricula provided mentoring for LH surgeons and only 13% of training institutions offered surgical instruments for left-handers. In another cohort, no LH surgeons were offered mentoring during a survey of 194 surgeons.¹⁷

Simulation can be a complementary tool for left-handed trainees

All the subjects highly recommended simulation training early on in training to allow for deliberate practice in a safe, stress-free environment. Reduced working hours and the COVID-19 pandemic has created a lack of opportunities to practice surgery. Simulation allows maintenance of the Halstedian model of training; an environment to obtain operative exposure in a graduated fashion under supervision.¹⁹ It also helps eliminate medico-legal fears and facilitates deliberate practice and mastery learning. There is now good evidence to support the use of simulation for teaching technical skills. A meta-analysis by McGaghie *et al.* concluded that evidence for deliberate practice within the framework of simulation-based medical education was powerful, consistent, and without exception.²⁰ Two randomized trials on laparoscopic cholecystectomy have demonstrated residents who undertook simulator training made significantly fewer mistakes than those trained in the standard fashion.^{21,22} Similarly, a virtual reality trainer has been developed for training in carotid artery stenting and is now required as part of the certification process for professional practice.²³

In the last two decades, there has been a slow yet steady increase in the literature available on left-handedness in surgery. Some of the subspecialty groups who have reported on LH trainees and surgeons include Plastics, Cardiothoracics and ENT, although there are several publications relating to laparoscopic cholecystectomy and left-handedness. Some of these resources provide tips for operating room set up as well as intraoperative advice. This era of increasing awareness has been accelerated by technological advances and the accessibility of online teaching (e.g., instructional videos on YouTube and simulation training). The advent of robotic surgery is also likely to help minimize some of the barriers that LH surgeons experience.

Limitations

A limitation of this study is the small sample size given only five surgeons were recruited. This could be overcome by extending the study to a nationwide catchment that would capture a greater proportion of LH surgeons. The interviewer was a LH surgeon themselves, which is a potential source of bias. However, the research team offered counterbalance. Utilization of the concept of *epoché* and bracketing attempted to minimize the influencing of subjects with the authors' personal views. A more variable spread in terms of surgical specialty would also add weight to the study.

Conclusion

With appropriate support and teaching, LH trainees can develop into excellent surgeons. LH surgeons in Australia were confident with their laterality once they had adapted to using their right hands and found ambidexterity to be a significant advantage. However, they all experienced some form of discrimination or negativity throughout their training due to their handedness. The themes from this study can be used by trainees, trainers and Colleges of surgical training to build awareness and optimize the training of future LH surgeons.

Recommendations

See Table 1 for recommendations.

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Author contributions

Bushra Othman: Formal analysis; validation; writing – original draft; writing – review and editing. **Raaj Chandra:** Conceptualization; data curation; supervision; writing – review and editing. **Debra Nestel:** Supervision; writing – review and editing.

Conflict of interest

None declared.

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