



# Introduction to the use of a laparoscope for medical students

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## Introduction

Handling the laparoscope during a laparoscopic case is an ideal way for medical students to be involved in the operating room. However, it takes practice to learn how to use laparoscopic equipment safely and effectively. This is a brief introduction to the components and proper handling of a laparoscope for medical students, so that they can learn how to best aid their surgical teams and patients during laparoscopic cases.

## Components of the laparoscope

We first discuss the components of the laparoscope. As shown in the video (*Figure 1*), the scope itself is a narrow cylinder containing various lenses. It has a beveled edge called the “angle of view”. Laparoscopes may have 0°, 30°, or 45° angles of view, depending on the operation. Understanding this bevel becomes important for the person navigating the scope, as it influences the direction of the camera.

Second, we discuss the camera, which produces the image and provides zooming and focusing capabilities. These parameters will most likely be determined by the resident or attending prior to the start of a case. The camera also functions as the handle.

On top of the handle, there are a series of buttons that control the laparoscopic equipment. As previously mentioned, the attending or resident will likely use these to influence the zoom and focus parameters of the camera. The most important thing for medical students to keep in mind with regard to these buttons is ensuring that they stay “face up”, as this determines one’s horizon. If one rotates the handle of the scope such that the buttons are no longer

facing the ceiling, the horizon is lost, and staying oriented in the relevant body cavity becomes difficult.

Lastly, we discuss the light source. The cord moves in the opposite direction to the “angle of view”. If the light cord is turned clockwise, the angle of view turns clockwise facing the opposite direction. This is more clearly demonstrated in the accompanying video (*Figure 1*).

## Maneuvering the laparoscope

The remainder of the video (*Figure 1*) focuses on handling the scope and includes tips on optimizing visibility, preparing for cases, and working as part of the surgical team.

Ideally, if a student’s only responsibility is navigating the scope, the use of his or her dominant hand is preferred. There will be times, of course, when positioning relative to others and the table makes this impossible or when the dominant hand simply becomes fatigued. If that is the case, switch hands during a time when the scope is being cleaned, prior to re-insertion, or do so very gently, so as not to shift the image on the screen. If done well, no one watching the monitor should know that the person holding the scope switched hands. Of course, it is crucial to maintain one’s horizon during and after switching hands by keeping the buttons on the handle facing up toward the ceiling.

In terms of navigation, the most difficult task is maneuvering the laparoscope when using an angled scope because one’s movements are a mirror image of the result on the screen. When the handle of the laparoscope is moved to the left, the right side of the body cavity is shown on the screen and vice versa. The one dimension that isn’t



**Figure 1** Introduction to the use of a laparoscope for medical students (1).

Available online: <http://aos.amegroups.com/post/view/1550050620>

flipped is depth; when the scope is pushed deeper into the body cavity, one essentially zooms in on the area of interest. Students are urged to be careful while doing this, given that the laparoscope can become hot and injure organs if one is not careful. Please refer to the accompanying video (*Figure 1*) for a demonstration.

### Other considerations

We conclude this introduction with a few additional points medical students should consider when using the laparoscope:

- (I) Students should strive to keep the “active” part of the operation in the center of the screen. For example, if a student is participating in a laparoscopic cholecystectomy, they must keep the image focused on where the cautery, graspers, and other tools are or will be. The assistant retracting will request help throughout the operation, particularly with repositioning instruments. Aside from that, the scope should focus on the active part of the operation. One good rule of thumb is to follow instruments in the body cavity. If an instrument is being inserted, point the scope toward that port. If an instrument is being used, position it in the center of the screen.
- (II) One of the reasons the camera can become foggy is due to the temperature difference between the cool laparoscope and the body. This may lead to condensation, which impairs visibility. If and when this happens, students may be asked to remove the

scope and use FRED anti-fog solution or warm the scope in hot water to address the issue.

- (III) If smoke from the cautery is making it difficult to see, students may also be asked to turn the stopcock on a trocar to the “open” position to allow smoke to escape.
- (IV) Sometimes, things like blood, fat, and tissue obscure the lens. If these are smudging the view, students should ask the resident or attending if they would like the camera cleaned. Students may be asked to clean the scope on the liver or omentum by gently pressing against them. This prevents having to exit the body cavity. Other times, students will have to remove the scope to clean it. Being vigilant and bringing details like this to the surgical team’s attention are valued skills in the operating room.
- (V) Always review the relevant anatomy prior to starting a case. Students will likely be asked to focus on a particular structure or group of structures at a time. Know the key organs the surgery involves as well as the nearby structures that could be accidentally injured throughout the case. Students are not expected to know a surgery step-by-step, but they are expected to know the general anatomy of the area they will be working in.
- (VI) Lastly, students are encouraged to ask for clarification when questions or doubts arise. The surgical team would rather have students be honest about their limitations and attempt to learn than pretend that they know things that they do not. It is best for patient safety if questions are asked and answered rather than not asked at all. Part of being a good physician is knowing one’s limitations are and working to address them.

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### Footnote

*Conflicts of Interest:* The authors have no conflicts of interest to declare.

## References

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