BASIC SURGICAL INSTRUMENTS

- Assoc. Prof. Dr. Murat ÇALIŞKAN

- There are many specialized instruments for specific procedures, but there are certain basic instruments that are common to nearly all surgical procedures
- These basic instruments are designed to secure surgical drapes; to cut, manipulate, and retract tissues; to suction surgical fields for maintaining visualization; to provide hemostasis; and to achieve wound closure

- Surgical drapes are secured to each other and to the patient's skin with towel forceps (also referred to as towel clamps or towel clips).
- The Backhaus towel forceps are the most common instrument used to secure sterile surgical drapes

- Basic surgical instruments for cutting are scalpels and scissors.
- The most common scalpel blade sizes used in small animal surgery are 10, 11, 12, and 15 and the most common handle to accommodate these blade sizes is the number 3 Bard-Parker scalpel handle.

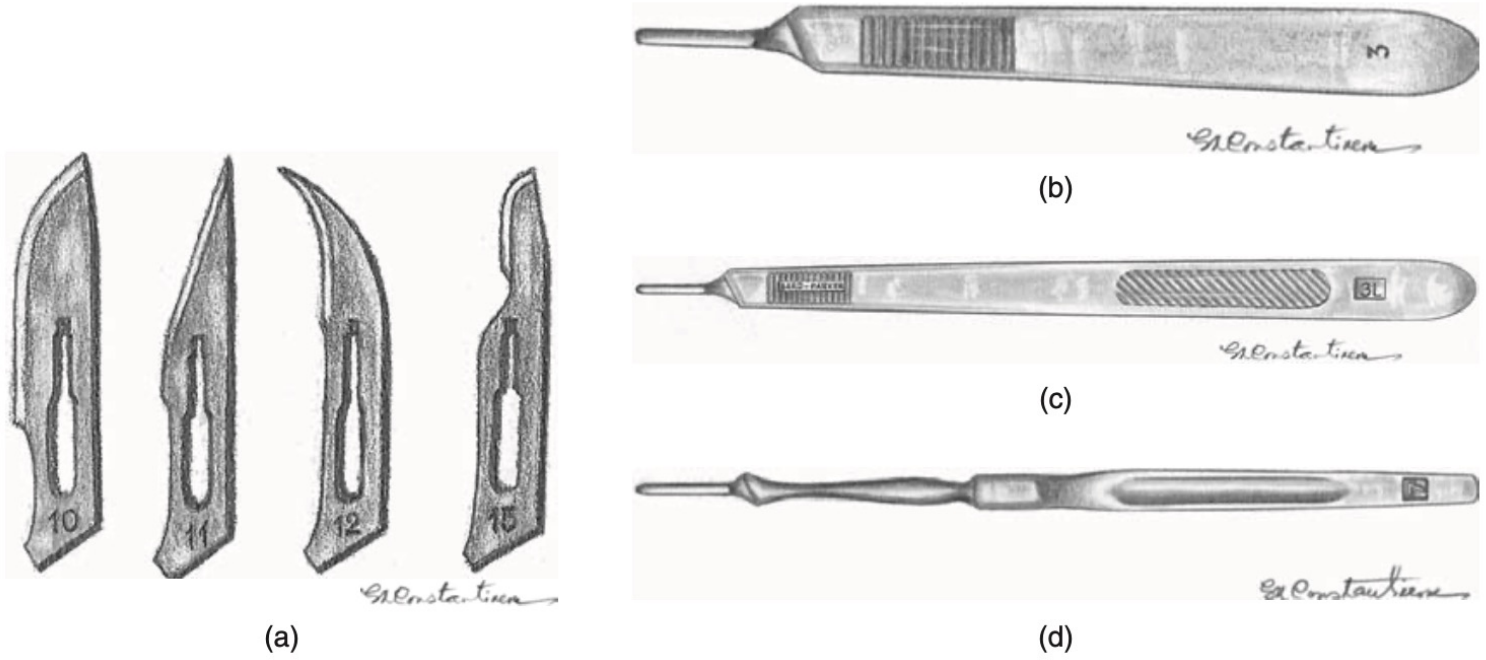
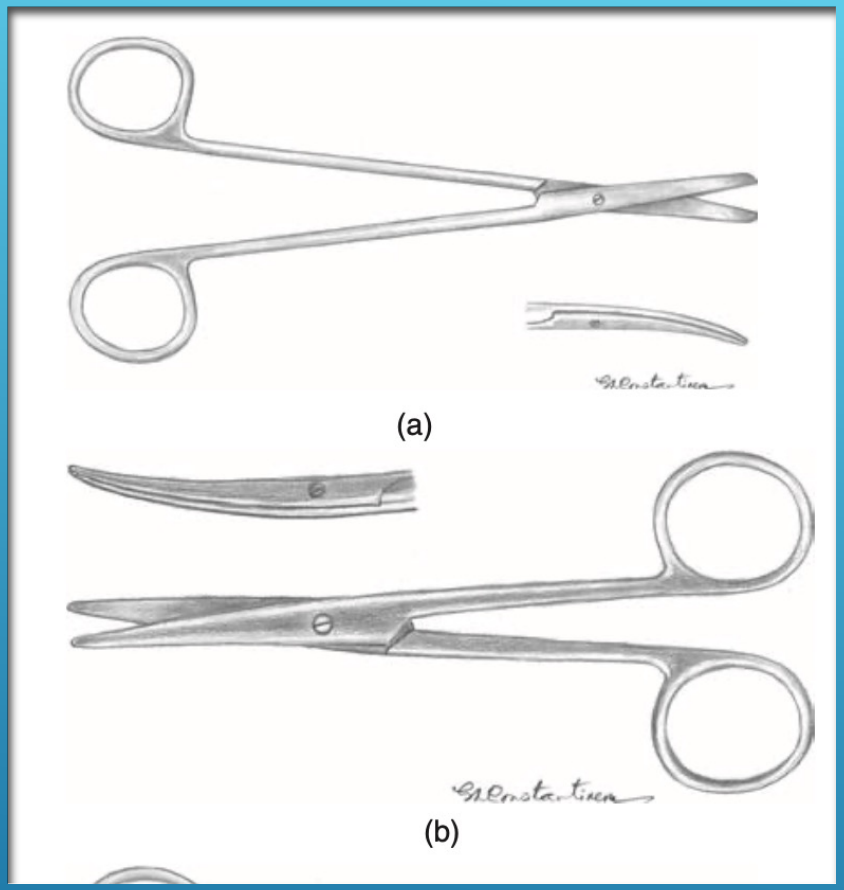


Figure 5.2 Common surgical scalpel blades and handles to accommodate them: (a) scalpel blade sizes 10, 11, 12, and 15, (b) number 3 Bard-Parker scalpel handle, (c) number 3L Bard-Parker scalpel handle, and (d) number 7 Bard-Parker scalpel handle.

- The main use of the scalpel is for cutting skin, but it can be used for cutting other tissues.
- Scissors are cutting instruments for tissues other than skin.
- Subcutaneous tissues, fasciae, tendons, and other structures beyond the skin are often cut with scissors.
- Curved tissue scissors are more versatile and nearly always preferred over straight scissors when available.
- There are numerous scissor types for specified procedures, but the three basic types are those for cutting delicate tissues (Metzenbaum scissors), muscle fasciae and other tough tissues (Mayo scissors), and sutures.



- Common scissors used by surgeons:
- (a) Metzenbaum scissors,
- (b) Mayo scissors,

Metzenbaum and Mayo scissors should not be used for cutting sutures because such will shorten the sharpness life of these expensive instruments

- Instruments for manipulation of tissue are designed to allow the surgeon to precisely handle tissue without direct digital contact.
- The most commonly used tissue forceps are thumb forceps.
- Thumb forceps are held with the thumb and index finger in chop- stick fashion to minimize tissue trauma.

- Thumb forceps are also used for handling needles during suturing.
- Needle grasping should be done delicately so as to preserve the tips of the thumb forceps.
- Damaged/dulled tips will add to tissue trauma when the forceps are used again to manipulate tissue

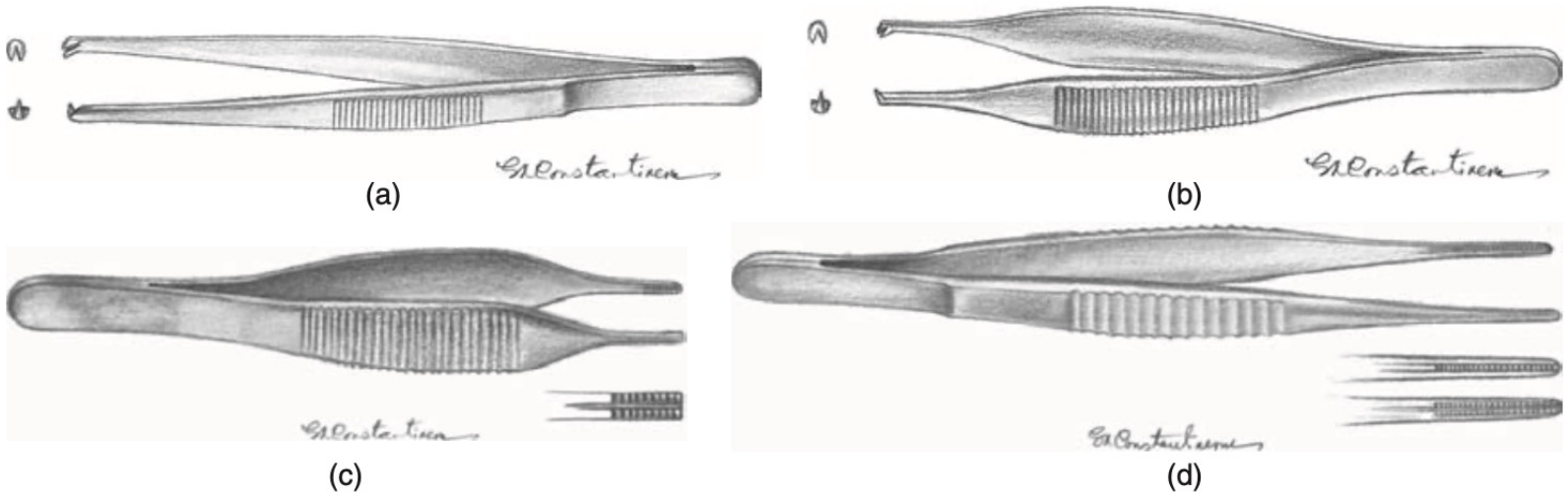


Figure 5.4 Common thumb forceps: (a) rat-toothed thumb forceps with narrow thumb and finger blades, (b) rat-toothed thumb forceps with wide thumb and finger blades, (c) Brown-Adson thumb forceps, and (d) DeBakey tissue forceps.

Ratcheted tissue forceps allow manipulation of tissues without repeated grasping,

Examples of such forceps are the Allis tissue forceps and the Babcock tissue forceps. For ideally minimizing tissue trauma, these forceps are avoided altogether.

If ratcheted tissue forceps are necessary, the Babcock tissue forceps are preferred because it is less traumatic than the Allis tissue forceps.

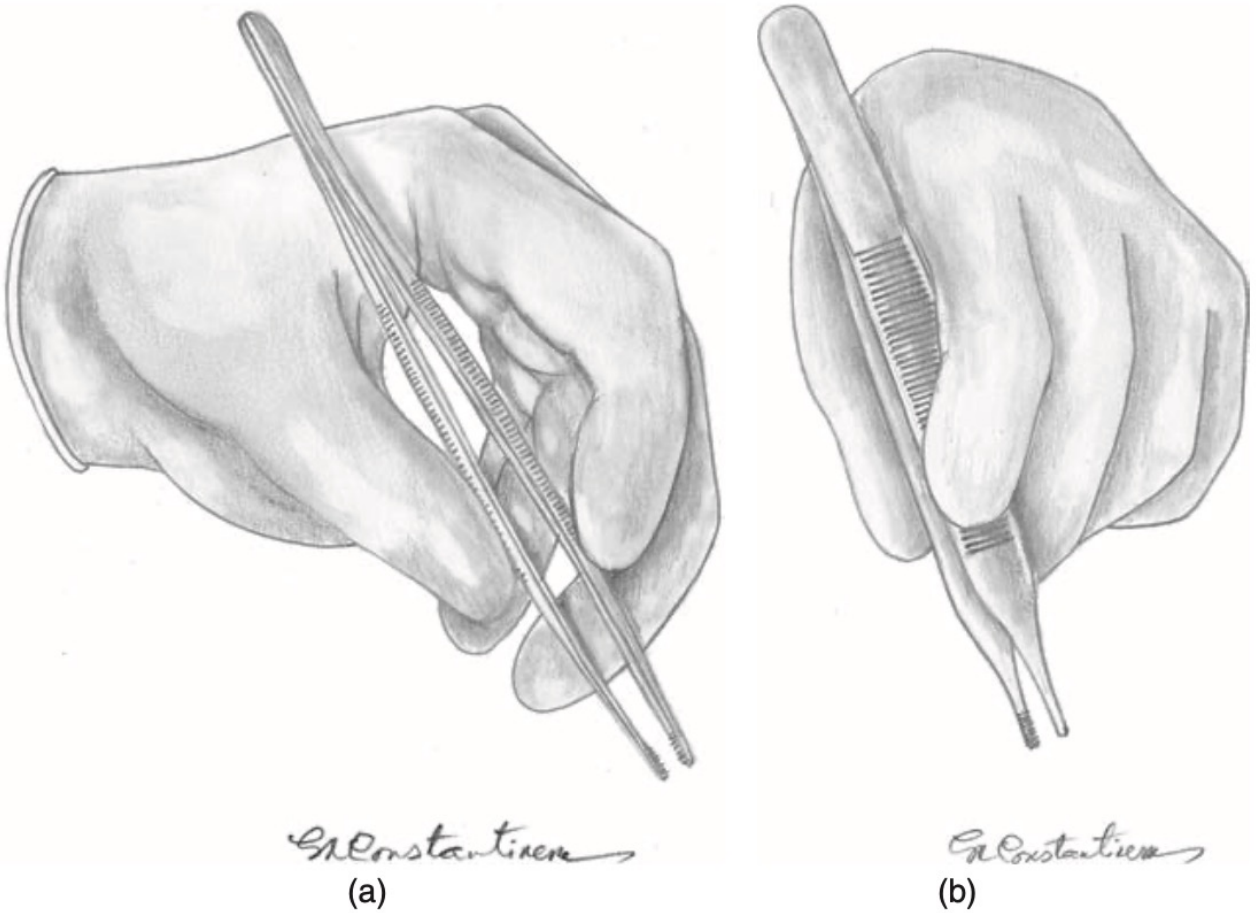
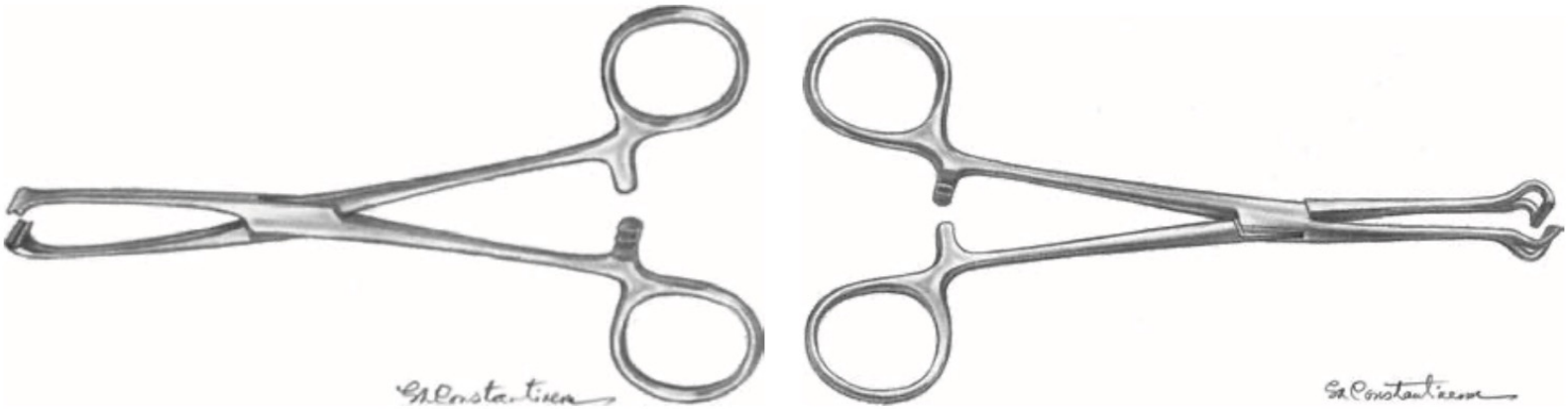


Figure 5.5 Proper method of holding thumb forceps: (a) thumb view and (b) index finger view.



(a) (b)

Figure 5.6 Ratcheted tissue forceps: (a) Allis tissue forceps and (b) Babcock tissue forceps.

- Retraction of tissues is necessary for visualization of the targeted area of the surgery.
- Various retractors are available to achieve this objective.
- Retractors are classified into two major categories: handheld retractors and self- retaining retractors.

Common handheld retractors include the:

-Senn retractor
-Volkmann retractor,
-Army- Navy retractor
-Meyerding retractor , and
-Hohmann retractor

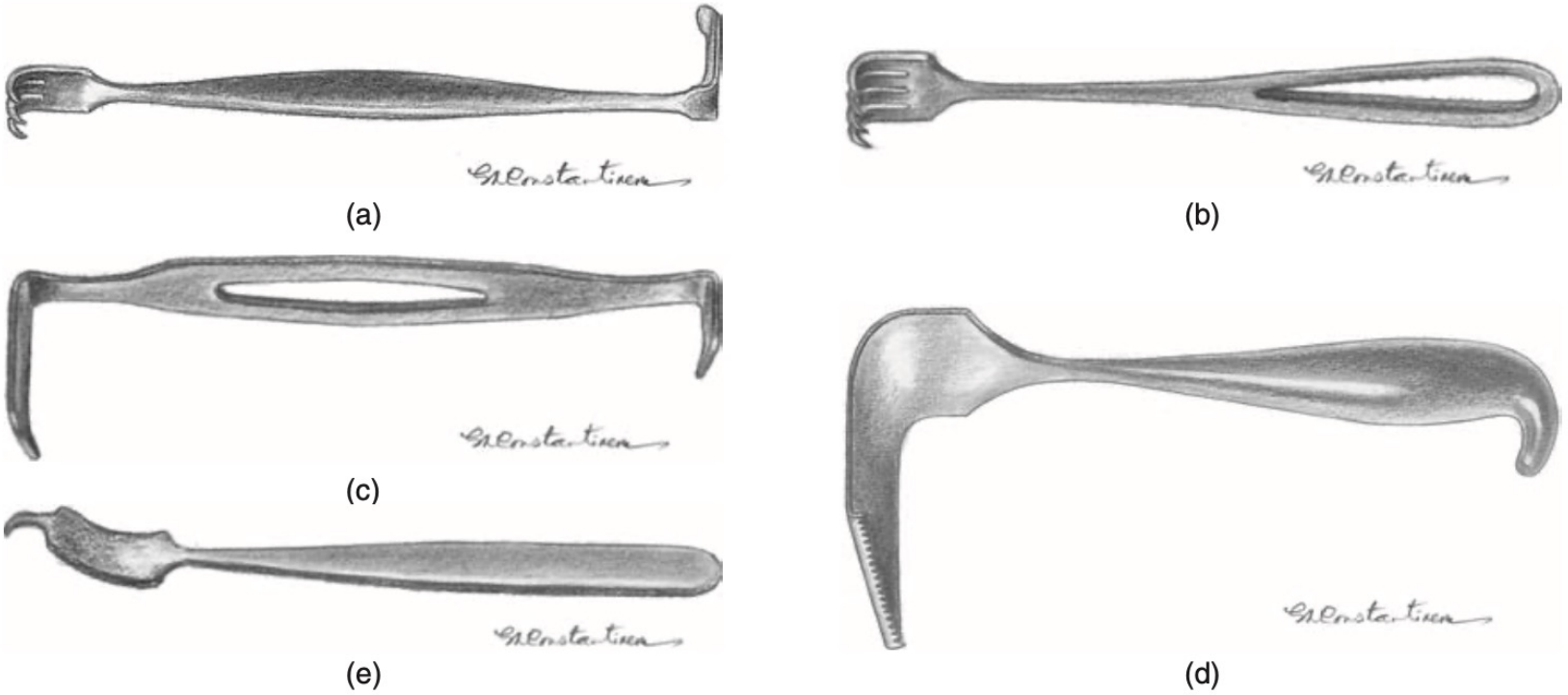


Figure 5.7 Common handheld retractors: (a) Senn retractor, (b) Volkmann retractor, (c) Army-Navy retractor, (d) Meyerding retractor, and (e) Hohmann retractor.

The rake portions of the Senn and Volkman retractors are available in sharp and blunt varieties.

The Meyerding's tiny teeth help keep the retracted tissue confined behind the retractor and less likely to slip out compared to the smooth blades of the Army-Navy retractor.

The Hohmann retractor is available in standard size and a small variety referred to as baby Hohmann retractors.

Hohmann retractors are used most commonly in orthopedic procedures by hooking and levering tissue over a bony area

- Self-retaining retractors are handy when there is not enough intraoperative assistance or room for handheld retraction.

- Common selfretaining retractors include:

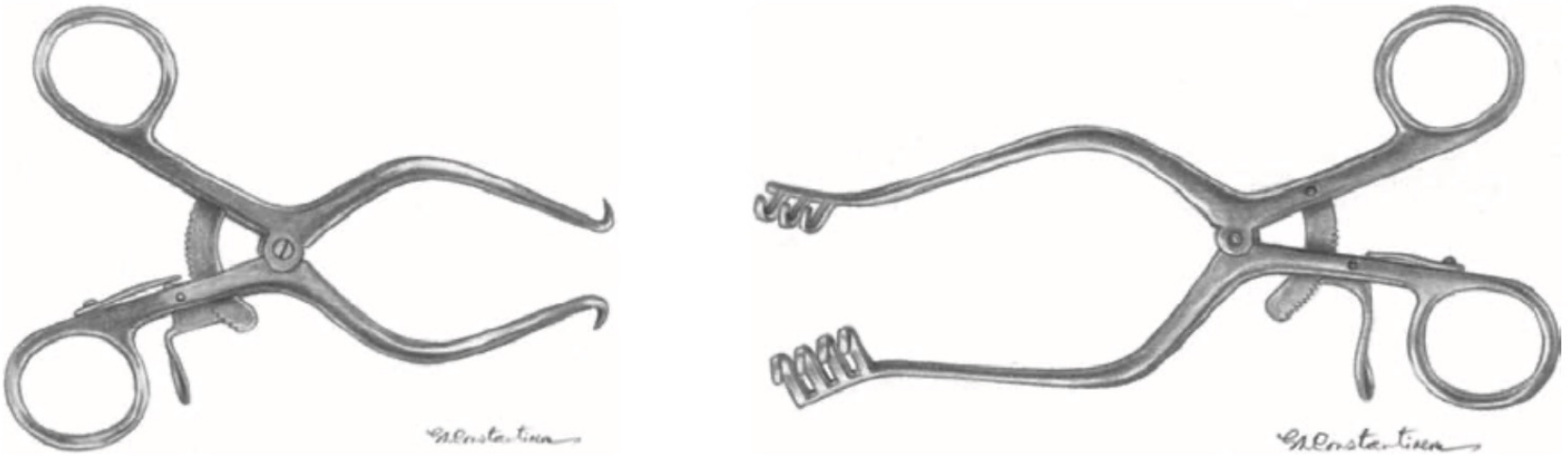
- Gelpi perineal retractor,

-Weitlaner retractor,

-Balfour retractor ,

-Finochietto rib retractor, and

-Frazier laminectomy retractor



(a) (b)

Figure 5.8 Common self-retaining retractors: (a) Gelpi perineal retractor, (b) Weitlaner retractor.

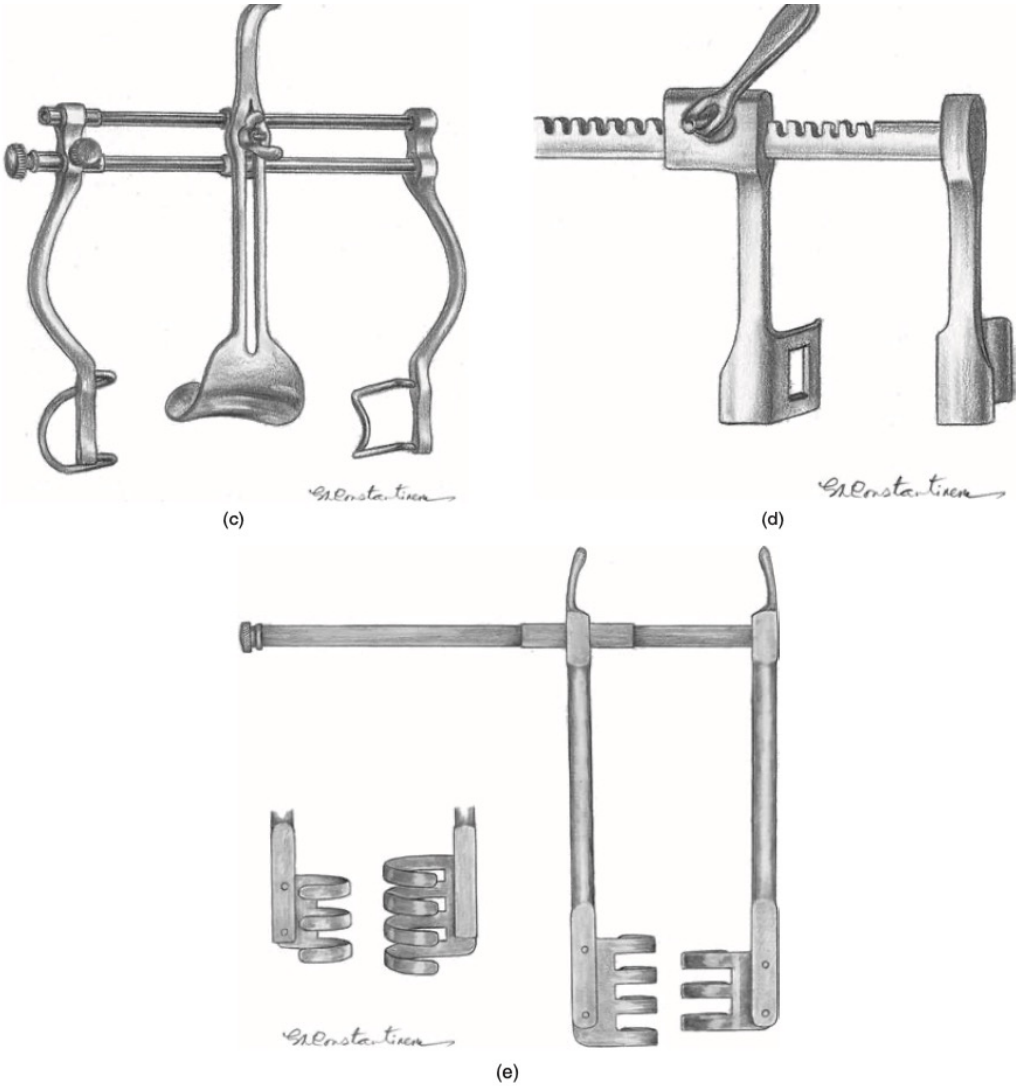


Figure 5.8 (*Continued*) (c) Balfour retractor, (d) Finochietto rib retractor, and (e) Frazier laminectomy retractor.

- The Gelpi and Weitlaner retractors are used to retract skin and superficial tissues. They can be used for deeper tissues as long as vital structures are not put at risk by the sharp points.
- The Weitlaner retractor is available with sharp or blunt tips.
- Balfour and Finochietto retractors are designed to hold body cavities open.
- The Balfour retractor is meant for keeping open celiotomy incisions, but can be used as a rib retractor.
- The Finochietto rib retractor is a specific rib spreader to keep open a thoracotomy incision.

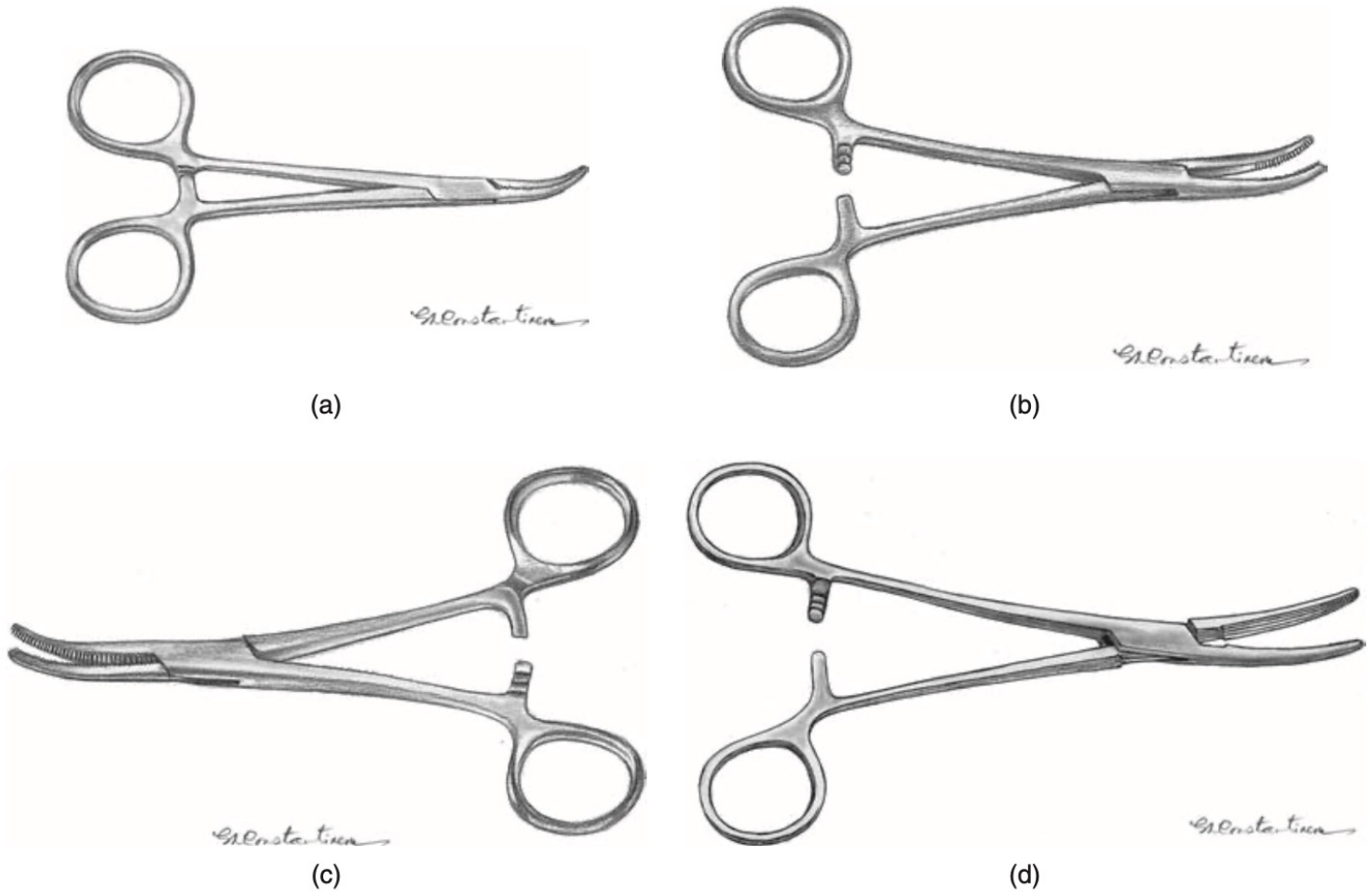


Figure 5.9 Common hemostatic forceps: (a) mosquito hemostatic forceps, (b) Kelly hemostatic forceps, (c) Rochester-Péan hemostatic forceps, and (d) Rochester-Carmalt forceps.

- Maintenance of good visualization requires proper hemostasis and clearing the surgical field of blood and effusions.

- Four common hemostatic forceps are

- mosquito hemostatic forceps,
- Kelly hemostatic forceps,
- Rochester- Pe´an hemostatic forceps,,
- the Rochester-Carmalt forceps.

The curved varieties of these forceps are more useful than the straight versions.

Mosquito forceps are used to clamp small (approximately 1 mm diameter) vessels to prevent bleeding or to stop bleeding if the vessel is cut before forceps application.

Kelly and Rochester-Pe´an forceps are designed for similar hemostasis of larger vessels.

Mosquito, Kelly, and Rochester-Pe´ an hemostatic forceps have serrations that are perpendicular to the jaws so that the vessel is less likely to slip when the hemostat is properly applied, that is, with the forceps' tip on the end of the vessel and the jaws oriented parallel to the vessel

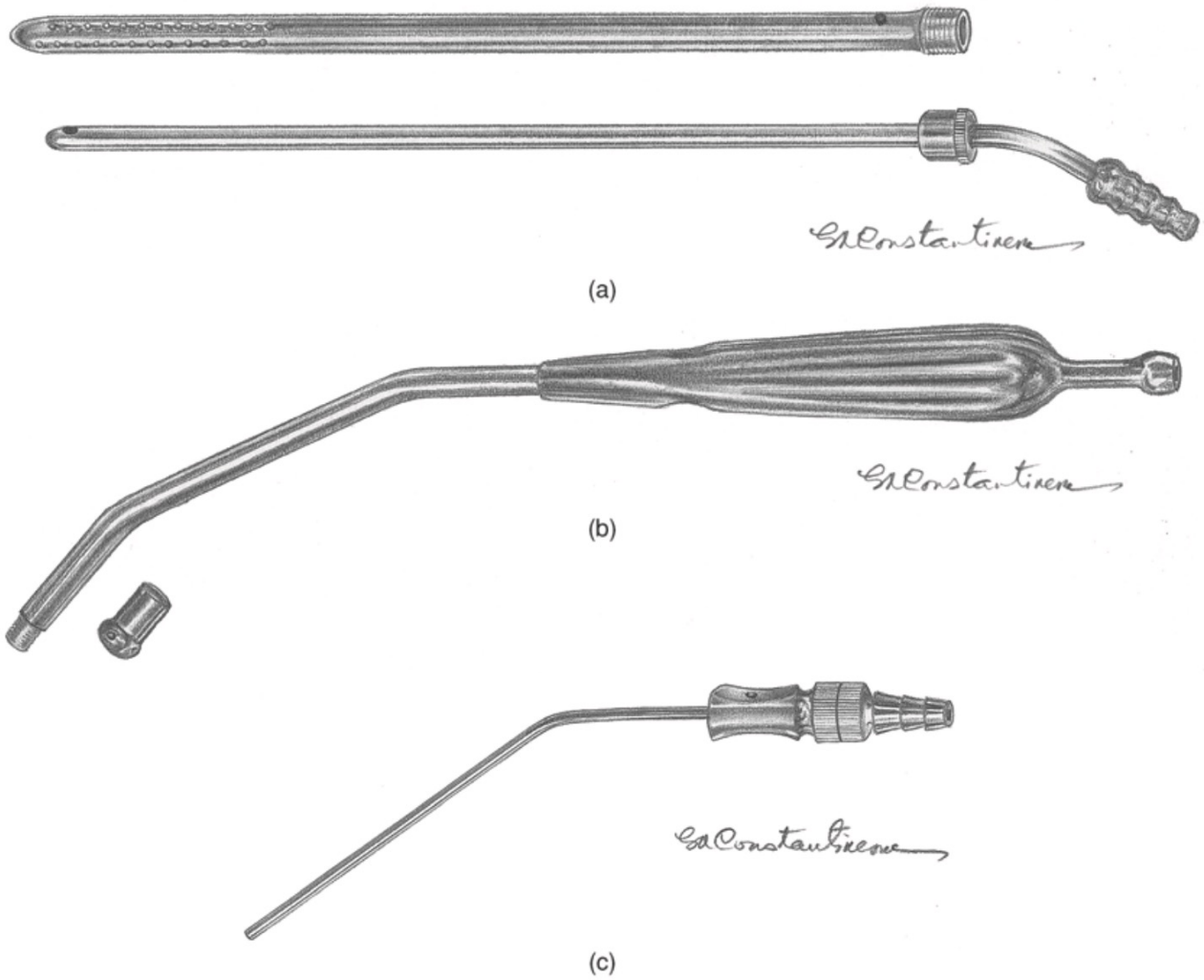


Figure 5.10 Common suction tips: (a) Poole suction tip, (b) Yankauer suction tip, and (c) Frazier suction tip.

- Three common suction tips that are attached to suction tubing and vacuum source for aspirating blood and fluid from surgical fields are the Poole suction tip, Yankauer suction tip, and Frazier suction tip.
- **The Poole suction** tip usually has a detachable guard with many tiny fenes- trations to allow suction of the abdominal cavity without plugging by tissues such as omentum. The guard can be removed when more precise suctioning is desired in areas where tissues are less likely to plug the suction tip.

- The Yankauer suction tip is used commonly in the thoracic cavity where plugging with tissues is not likely.
- The Frazier suction tip is smaller than Poole and Yankauer tips and is used in small areas of fluid accumulation such as orthopedic and neurologic surgical approaches.
- The Frazier suction tip has a hole where the surgeon's thumb holds the instrument.
- Covering this hole provides high-pressure suction; leaving the hole uncovered provides low-pressure suction, which is less likely to suck tissues into the tip, thereby preventing unnecessary tissue trauma.

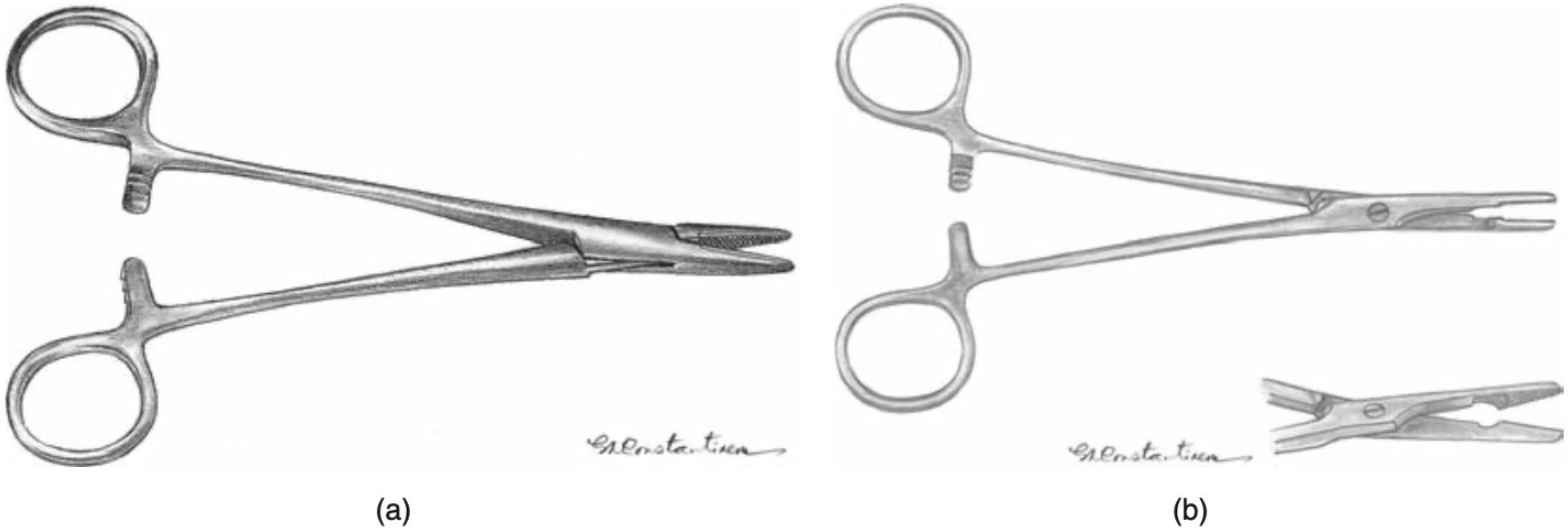


Figure 5.11 Common needle holders: (a) Mayo-Hegar needle holder and (b) Olsen-Hegar needle holder.

- Closure of the surgical wound with suture requires needle holders (also referred to as needle drivers), thumb forceps, and suture scissors.
- A variety of sizes and styles of needle holders are available. The size and type chosen depend on the surgical procedure and sizes of suture and suture needle.
- A very commonly used needle holder is the Mayo-Hegar nee- dle holder.
- Another popular needle holder that incorporates suture scissors in the jaws is the Olsen-Hegar needle holder.
- Caution must be exercised when using the latter needle holder to prevent premature cutting of suture.

OPERATING ROOM PROTOCOL

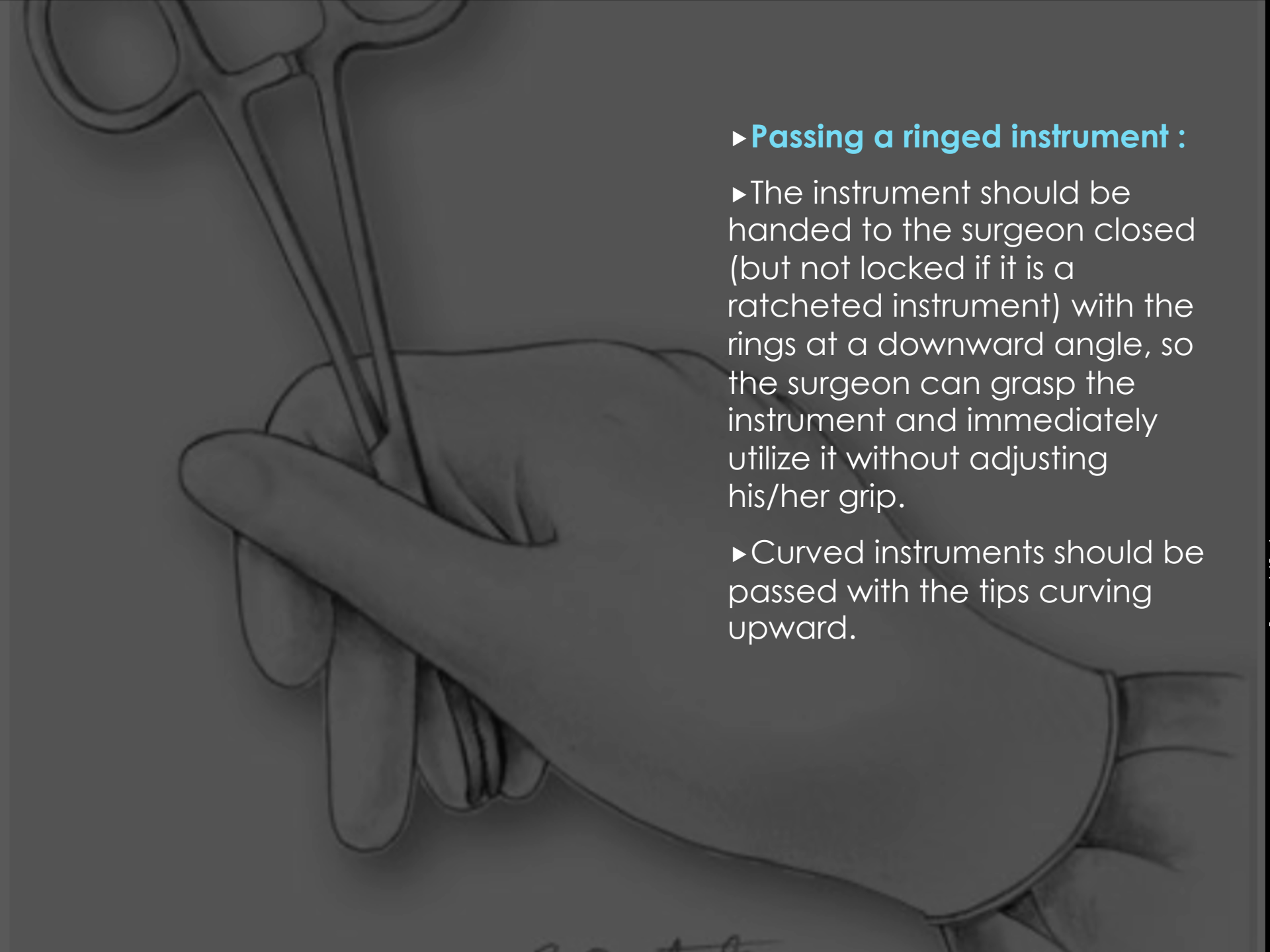
- Individuals that may be present during a sur- gical procedure include the surgeon, assistant surgeon, circulating nurse, and anesthetist.
- Certainly, in academic institutions, residents, in- terns, veterinary students, other trainees, and observers may also be present.
- All personnel, **regardless of their role**, should have a surgical cap (+/− beard cover), a surgical mask covering their nose and mouth, and a clean pair of surgical scrubs

- These scrubs should only be worn within the surgical suite and are not considered appropriate “street clothes.”
- Ideally, footwear should be dedicated for use in the surgical suite, or protective shoe covers (“booties”) should be donned over the individual’s shoes
- A laboratory coat should never be worn into the surgical süite.
- Physical movements made during a surgery by scrubbed personnel should be aimed at improving the overall efficiency of the procedure.
- An assistant surgeon’s responsibility is to maintain a clean and tidy instrument table.
- Used gauze sponges should be discarded onto a water-impermeable drape on the floor in order to easily account for them

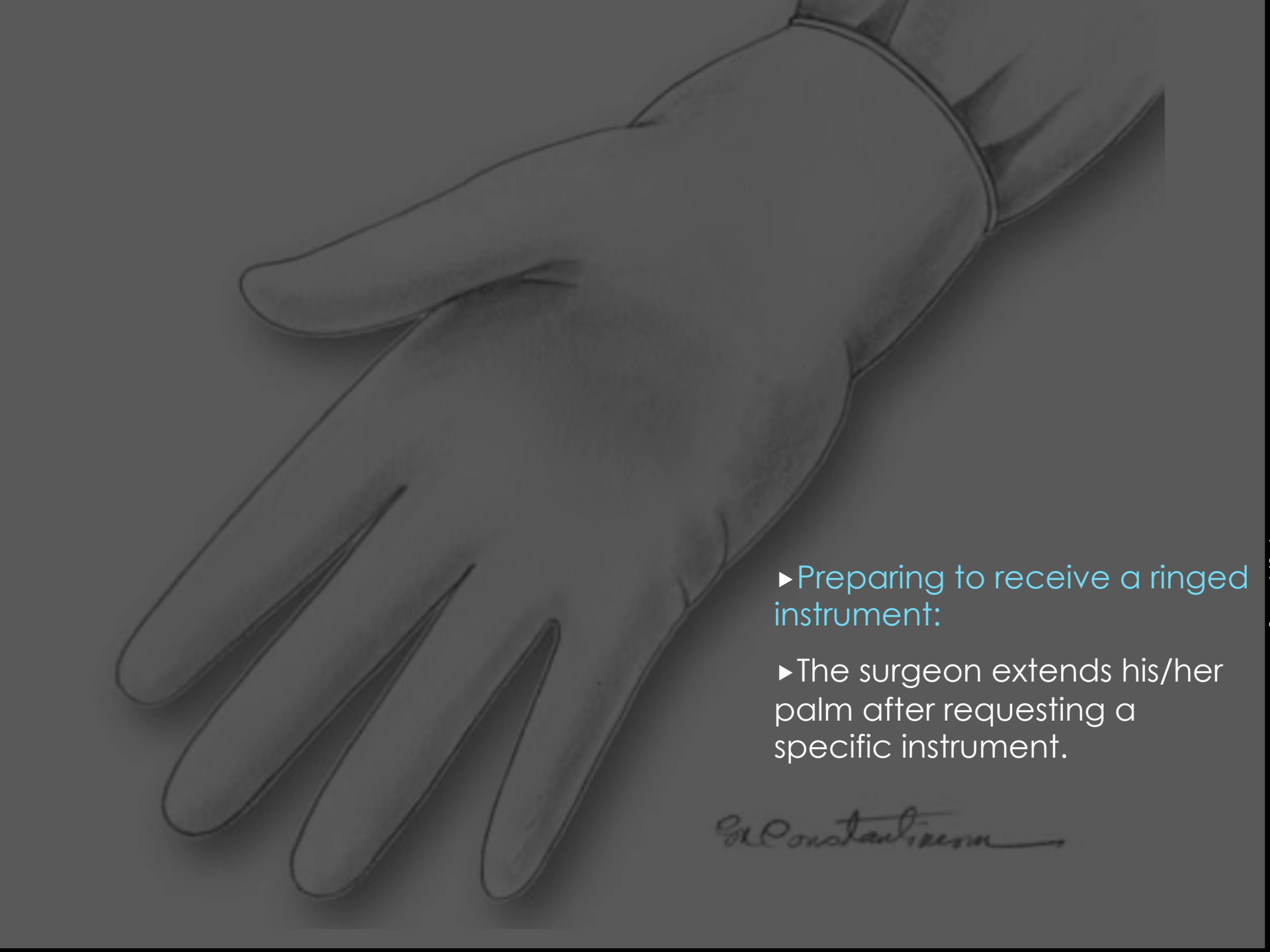
It is always advisable to minimize the number of people in the surgical suite.

This will decrease the amount of talking and moving within the room and will directly decrease the proba- bility that the patient will be exposed to potential pathogens.

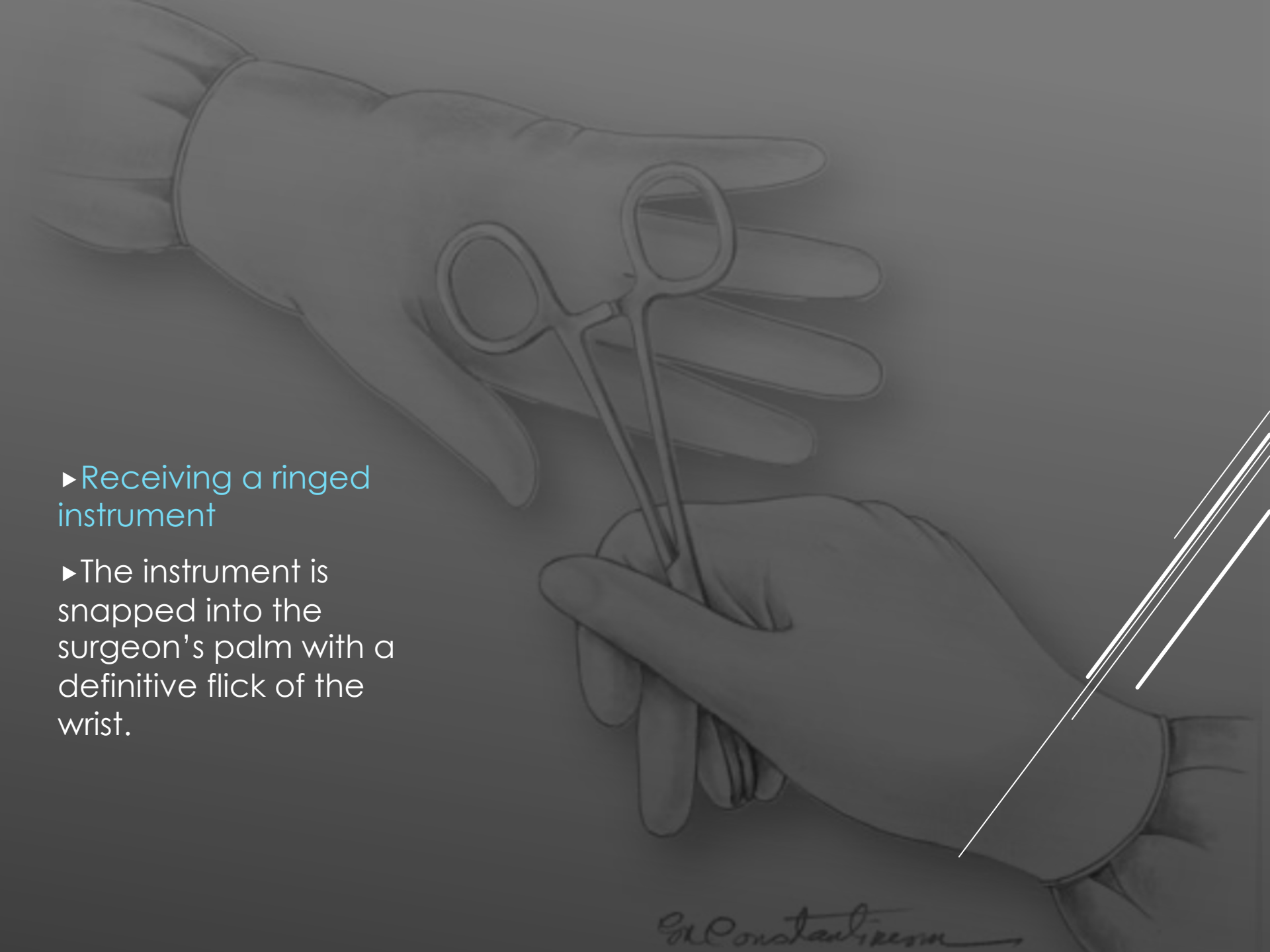
- It is the assistant surgeon's responsibility to anticipate the surgeon's next move.
- Always think about the next step of the procedure and have the proposed implement ready to hand to the surgeon.
- Anticipation may be as simple as having a dry gauze sponge ready to blot away extraneous blood or fluid, or as complex as assembling a saw to create an osteotomy.
- When passing a ringed instrument, hold the instrument with the rings pointing downward.
- The surgeon will ask for the instrument by name and will extend his/her palm to receive the instrument



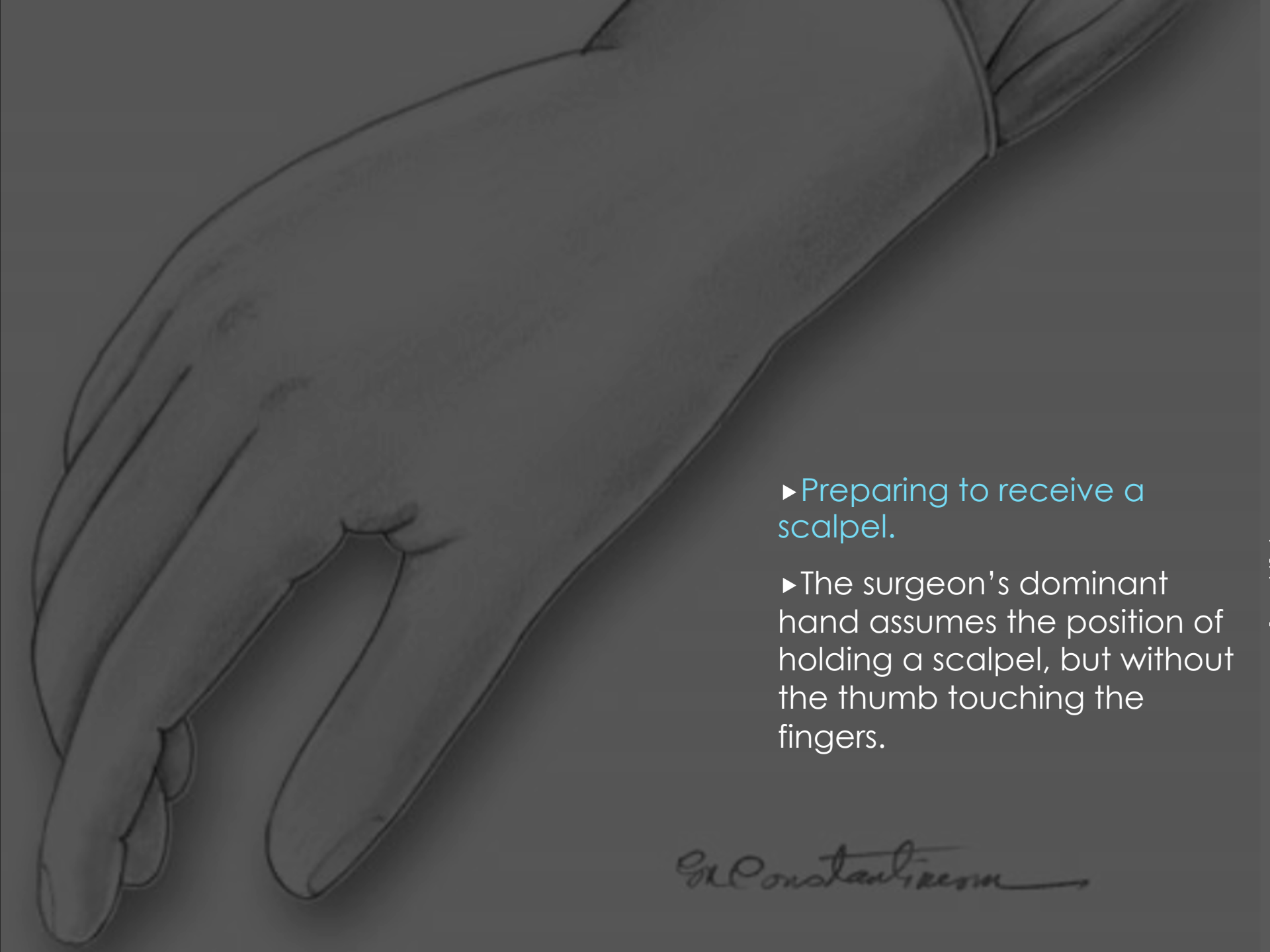
- **Passing a ringed instrument :**
- The instrument should be handed to the surgeon closed (but not locked if it is a ratcheted instrument) with the rings at a downward angle, so the surgeon can grasp the instrument and immediately utilize it without adjusting his/her grip.
- Curved instruments should be passed with the tips curving upward.



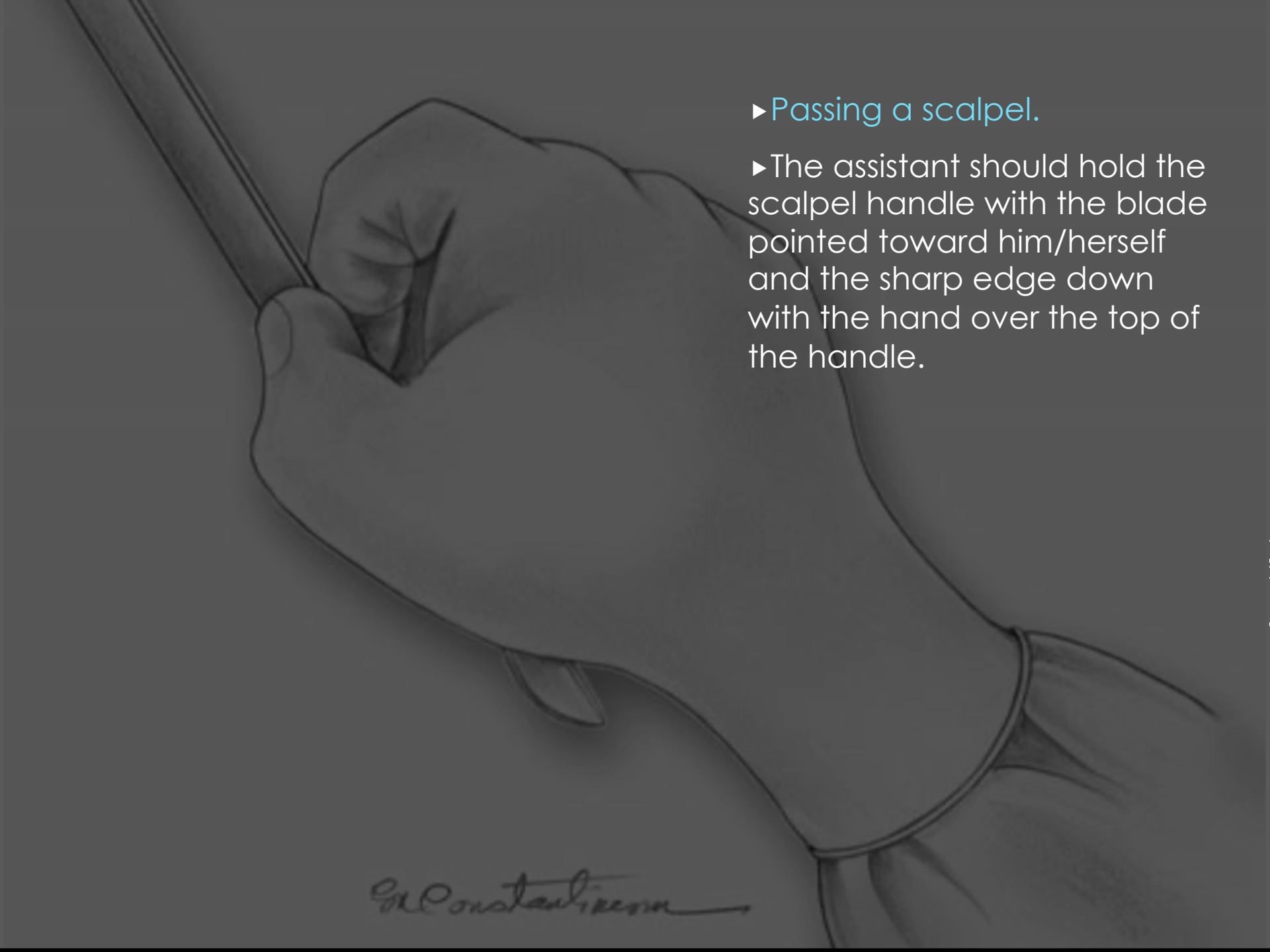
- Preparing to receive a ringed instrument:
- The surgeon extends his/her palm after requesting a specific instrument.



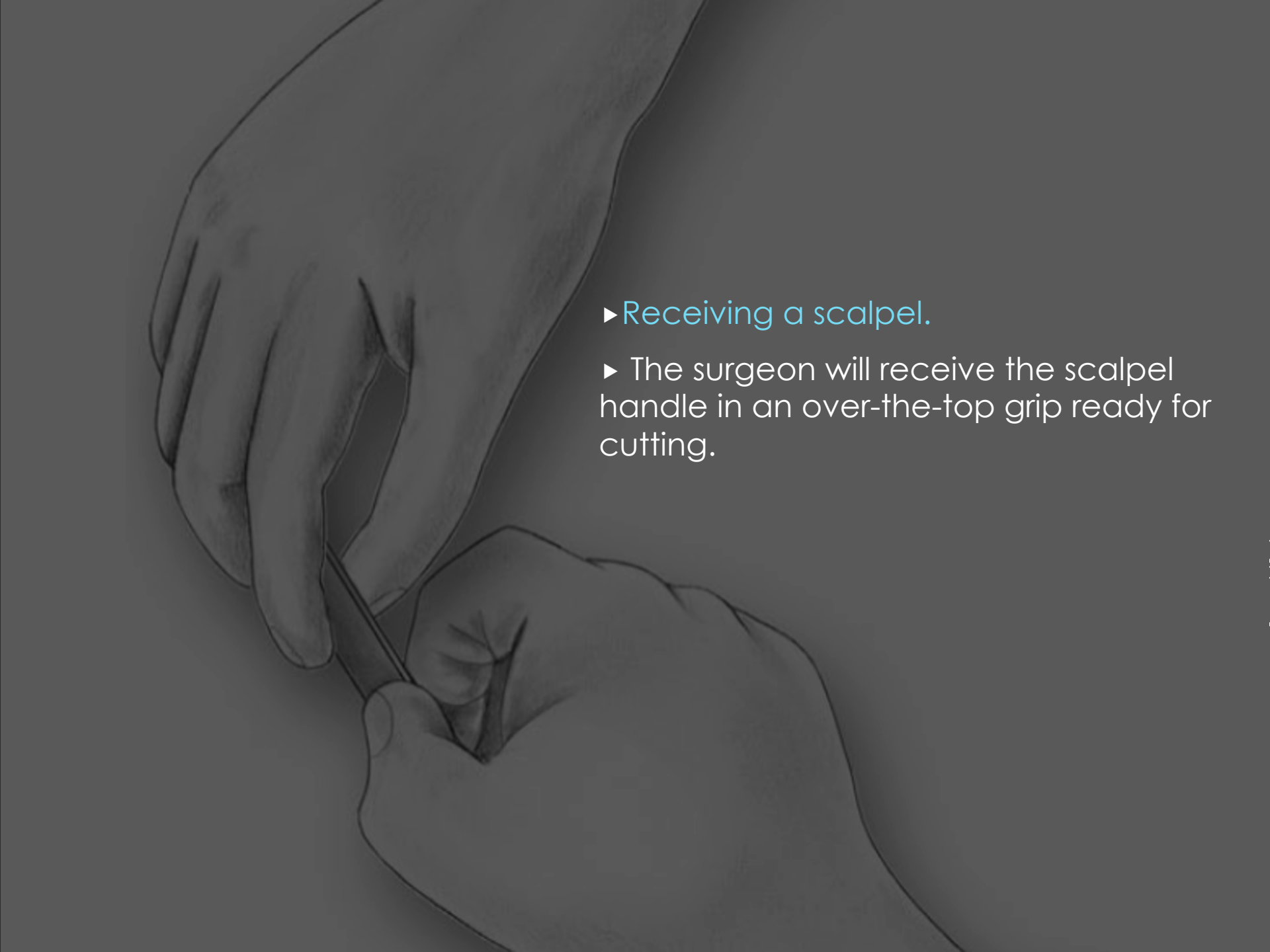
- Receiving a ringed instrument
- The instrument is snapped into the surgeon's palm with a definitive flick of the wrist.



- Preparing to receive a scalpel.
- The surgeon's dominant hand assumes the position of holding a scalpel, but without the thumb touching the fingers.



- Passing a scalpel.
- The assistant should hold the scalpel handle with the blade pointed toward him/herself and the sharp edge down with the hand over the top of the handle.



- Receiving a scalpel.
- The surgeon will receive the scalpel handle in an over-the-top grip ready for cutting.

- Hand signal to request a scalpel.
- The surgeon makes a cutting motion as if holding a scalpel and then opens the fingers to accept the handle.

Figure 7.9 Hand signal to request scissors. The surgeon opens and closes the second and third fingers (pointer and middle fingers) as if scissors were opening and closing and then extends an open palm.

Figure 7.10 Hand signal to request thumb forceps. The surgeon taps the thumb and first (pointer) finger together like pinchers and then extends the open palm. If the dominant hand is already occupied by needle holders, the surgeon will signal for and receive the thumb forceps with the nondominant hand.

Figure 7.11 Hand signal to request hemostatic forceps. The surgeon snaps his/her fingers and extends an open palm.

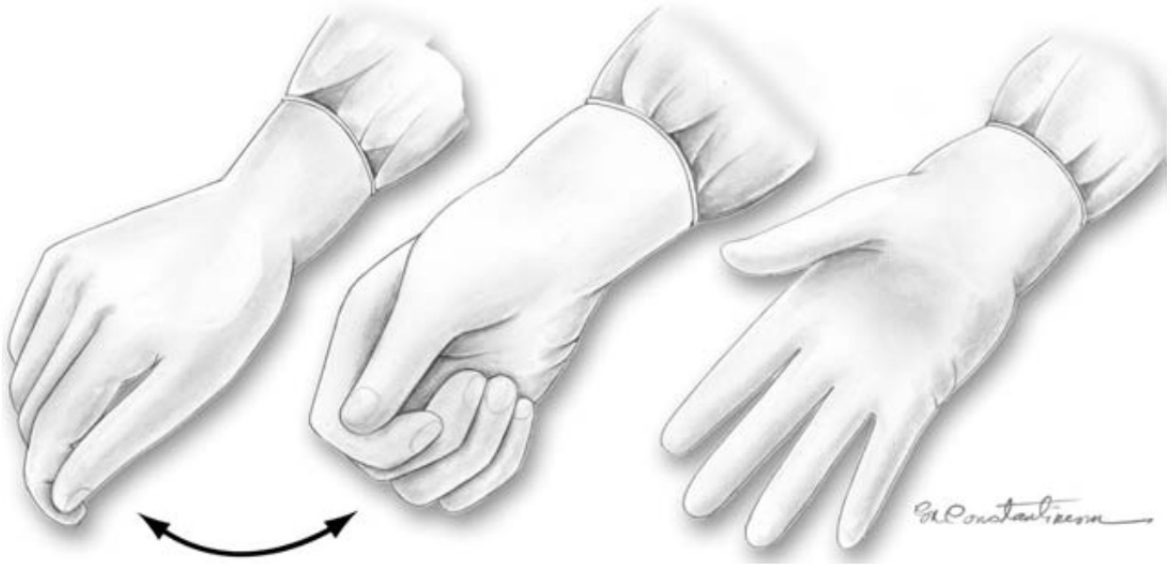
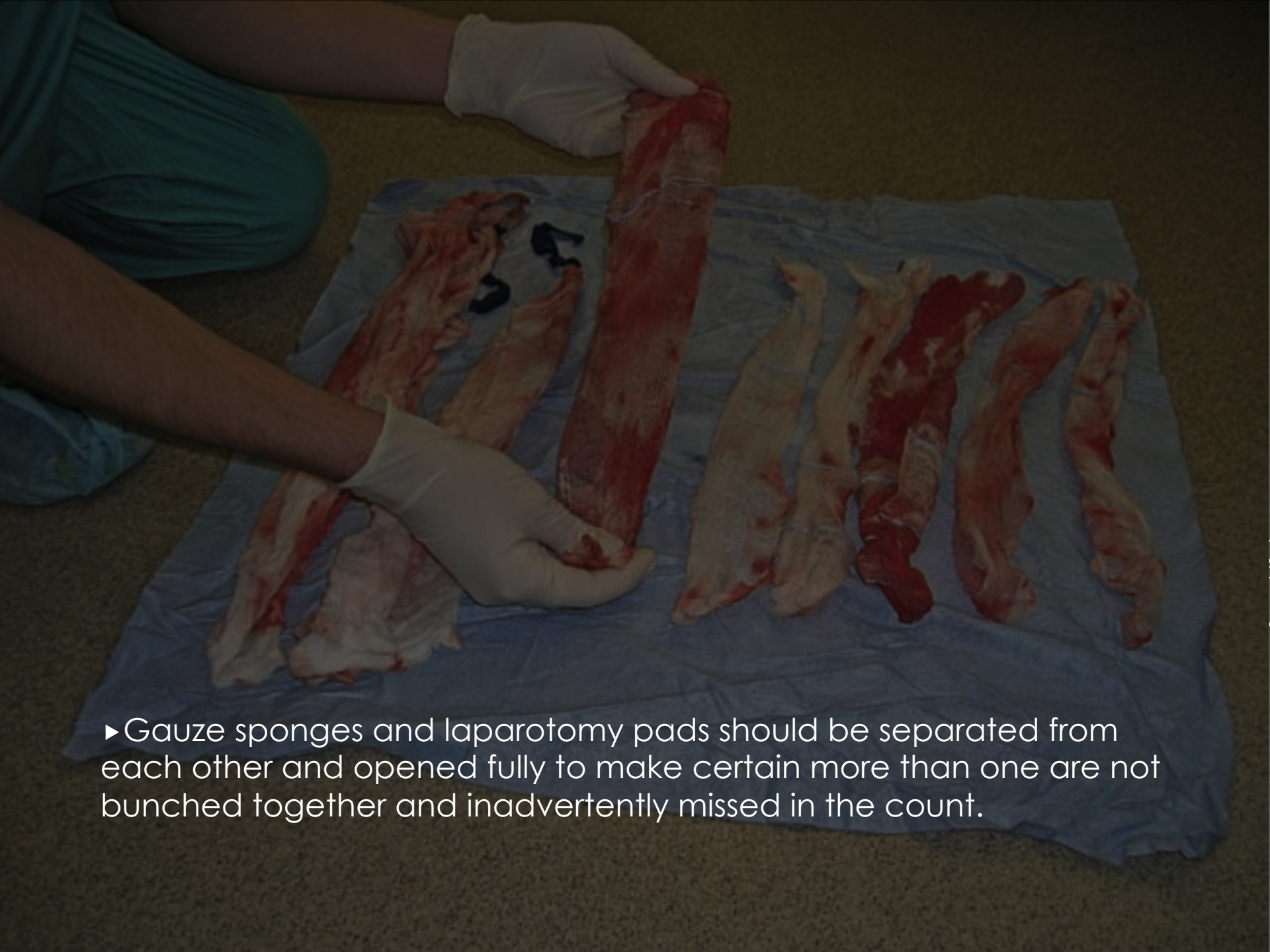
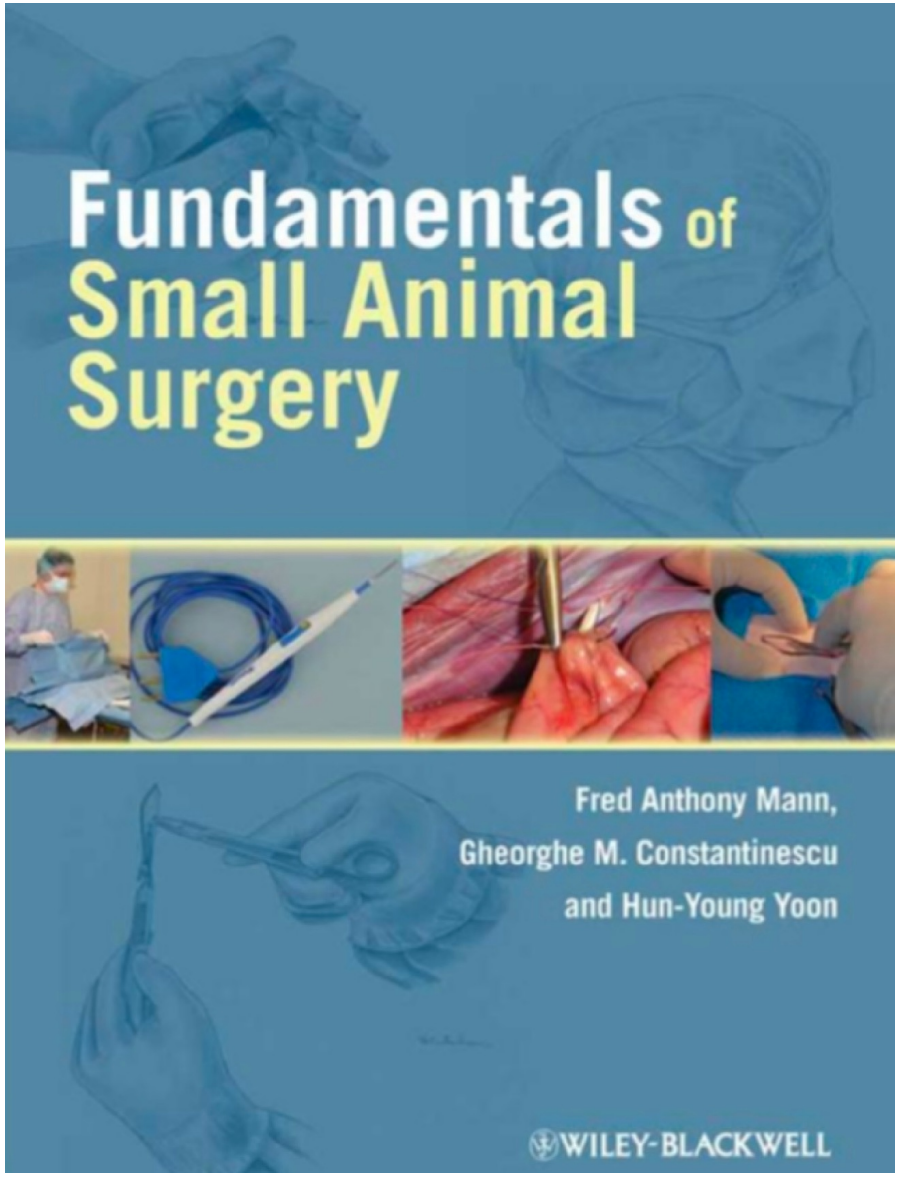


Figure 7.12 Hand signal to request a needle holder. The surgeon pantomimes a suturing motion and then extends the open palm.

- Performing a sponge count on a water-impermeable drape placed on the floor near the surgeon or assistant surgeon.
- A circulating assistant dons nonsterile examination gloves to count the sponges and laparotomy pads on the floor target, while the gowned assistant counts the sponges and laparotomy pads that remain on the sterile field.



▸Gauze sponges and laparotomy pads should be separated from each other and opened fully to make certain more than one are not bunched together and inadvertently missed in the count.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