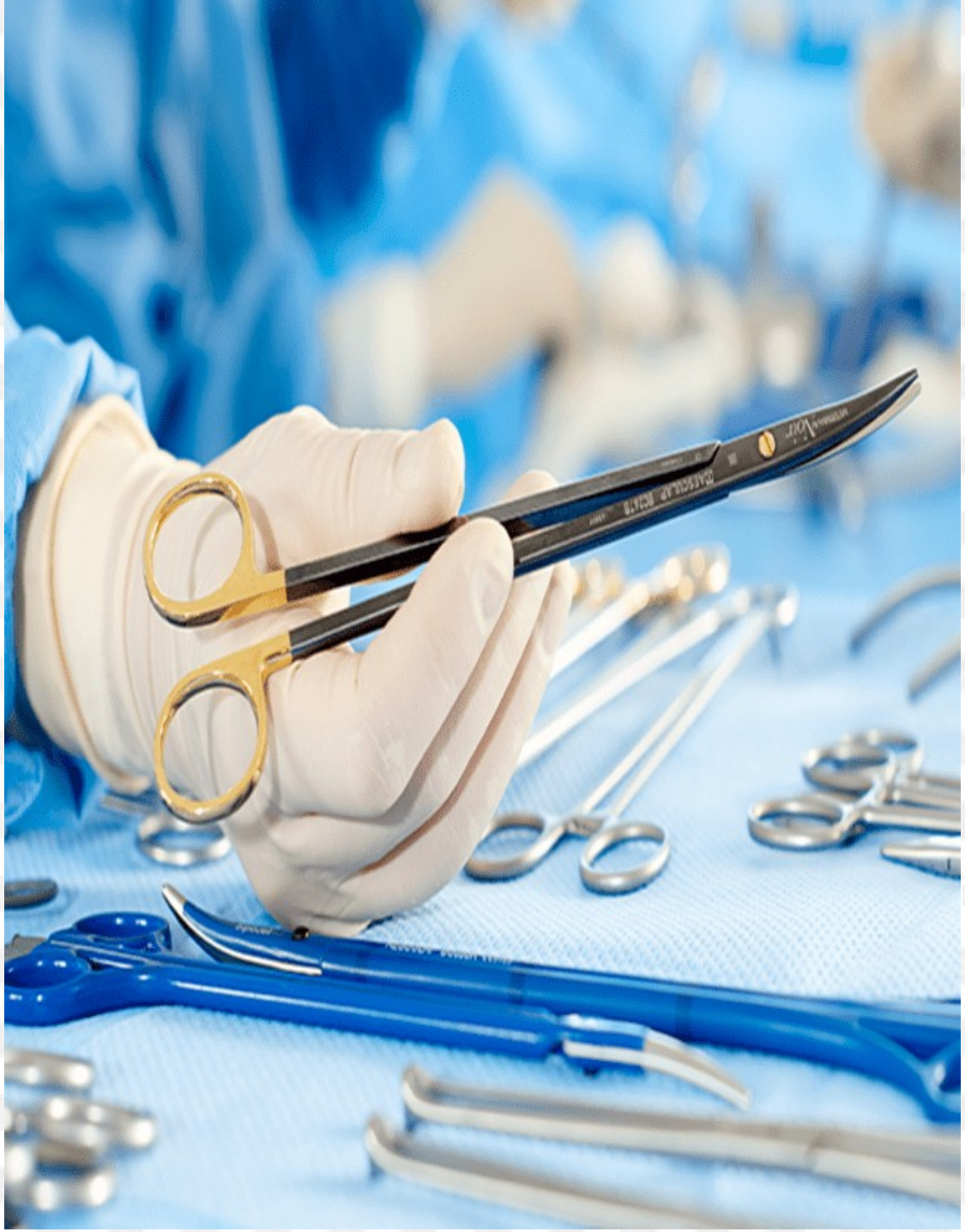

MINISTRY OF HEALTH OF UKRAINE
ODESSA NATIONAL MEDICAL UNIVERSITY
Department of Pharmacy Organization and Economics
with post -diploma specialization

PHARMACEUTICAL AND MEDICAL COMMODITY SCIENCE

Atlas of General Surgical Instruments

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The publication provides information on the range of general surgical instruments. It is recommended for use in the training of specialists of the master's degree in specialty 226 "Pharmacy. Industrial Pharmacy".

AGENDA

01 HISTORICAL BACKGROUND

02 CUTTING & DISSECTING INSTRUMENTS

03 GRASPING & HOLDING INSTRUMENTS

04 HEMOSTATIC INSTRUMENTS

05 TISSUE UNIFYING INSTRUMENTS FOR PUTTING TISSUE BACK TOGETHER.

BRIEF HISTORY OF SURGICAL INSTRUMENTS

Surgical instruments go as far back as 10,000 BC. Archaeological discoveries have unveiled cutting tools like a sharp flint used to sharpen animal teeth, grasping tools to extract arrows, saws, forceps and other ancient surgical instruments. Rubble amidst the volcanic ashes of the old Roman city of Pompeii unveiled an entire well-preserved arsenal of surgical instruments. The find is known as the House of the Surgeon, because of the nature of the collection found in the home.

Claude Moore Health Sciences Library by the University of Virginia received a reproduction of the Pompeii instruments in 1947. This library is one of the best preserved collections of this nature. Few changes have been made to surgical instruments' design and functionality since Hippocrates (5th century BC), who is called the father of medicine, and Galen (2nd century). Here are a few examples along with short description of how the instruments were used. The descriptions of the usage were provided by the medical writers of antiquity.

BRIEF HISTORY OF SURGICAL INSTRUMENTS

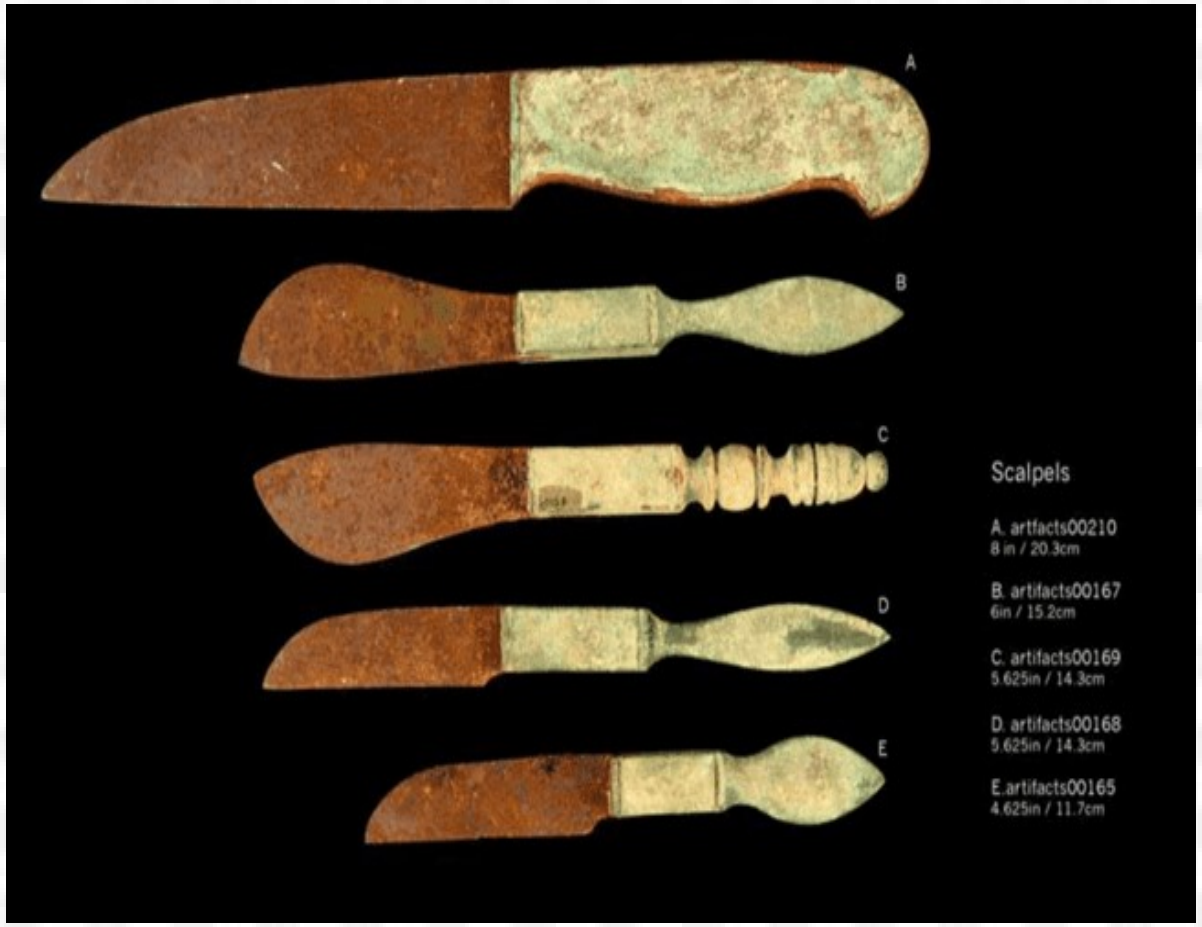
Scissors

Forceps

Image courtesy of Historical Collections & Services, Claude Moore Health Sciences Library, University of Virginia.

BRIEF HISTORY OF SURGICAL INSTRUMENTS

Scalpels



Bone Forceps

Image courtesy of Historical Collections & Services, Claude Moore Health Sciences Library, University of Virginia.

Classification of general surgical instruments

- Cutting & Dissecting Instruments
- Grasping & Holding Instruments
- Hemostatic Instruments
- Retractors
- Tissue Unifying Instruments for putting tissue back together

Cutting & Dissecting Instruments

Cutting instruments include:

- Scalpels and surgical blades
- Scissors
- Rongeurs and Bone Cutters
- Saws
- Elevators
- Curette

Cutting & Dissecting Instruments

Scalpels

Scalpel is a knife with a short blade (about 1 to 3 cm) that makes cuts in the skin or other tissues. The blade is very small and this helps make clean cuts. Surgical scalpels are available in either single-use or reusable versions. Reusable blades are permanently attached to the handle and must be sharpened consistently. Single-use blades are designed to lock onto a scalpel handle and are easily removable.

Scalpels: consist of a handle and a blade; the handle is made of metal (reusable) or plastic (disposable); blades are disposable, of various shapes and sizes. The top of the scalpel handle has a special part, with a groove that allows its sliding into the blade slot and securing of the blade in position.

The scalpel blade has a slot - larger at its base and narrower at its top. The larger part is fitted to the groove of the handle, and the narrower part secures the blade into the groove.

Surgical Blade Materials: surgical scalpel blades are usually made from stainless steel, tempered steel or high carbon steel. Ceramic, titanium, diamond, sapphire, and obsidian are other less common options.

Cutting & Dissecting Instruments

Scalpels

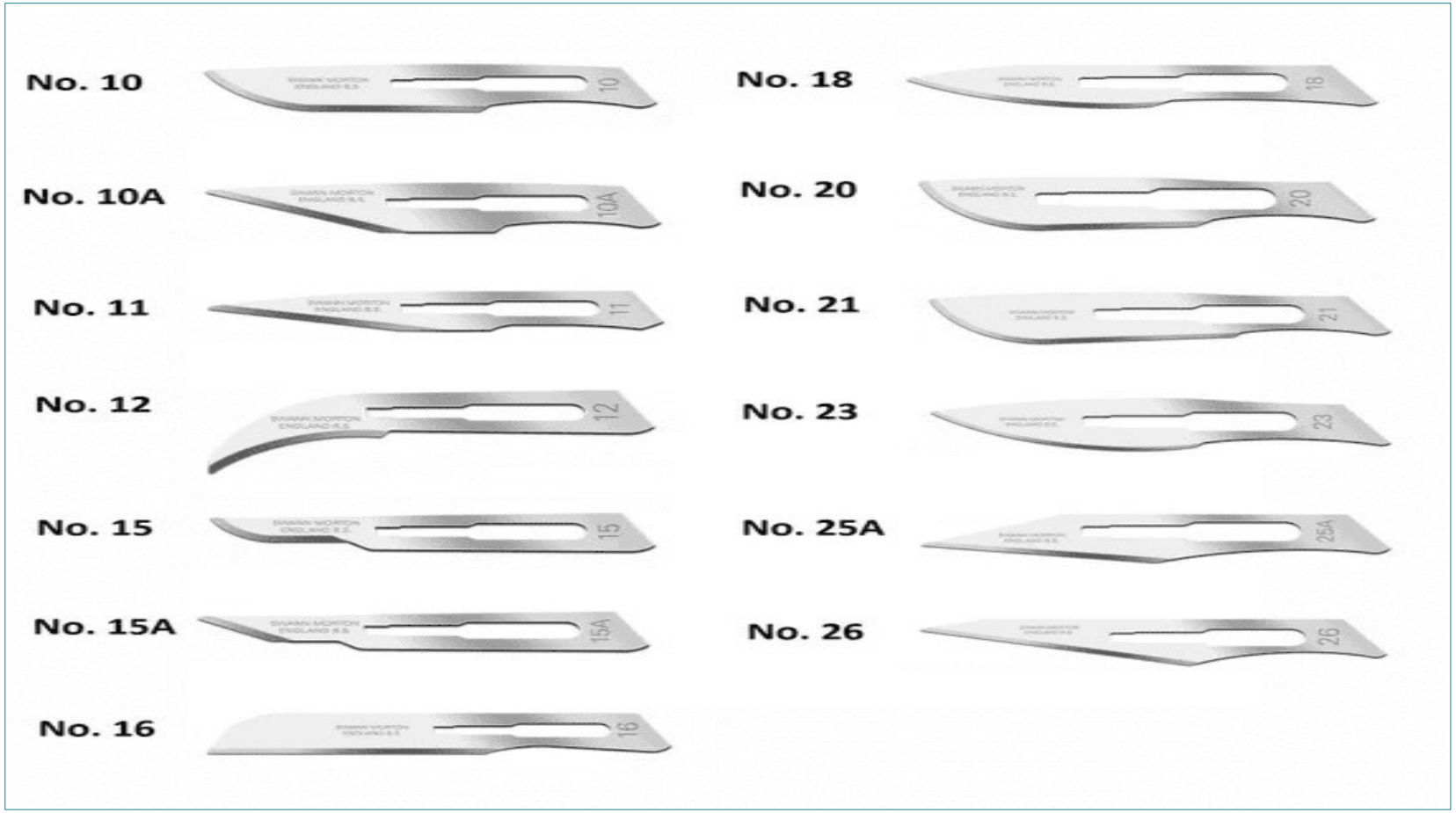
Surgical blade handles

Surgical blade handles vary in size, weight, and length to provide the surgeon with the optimal precision, balance and visibility.

Cutting & Dissecting Instruments

Scalpels Surgical Blades

Surgical blades come in sterile packaging and the number on a surgical blade communicates both its size and its shape.



Cutting & Dissecting Instruments

Surgical Blades

The №10 – A large curved cutting edge, which represents a more traditional blade shape. It is used for cutting soft tissue, typically with large incisions.

The №11 – A long, triangular blade with the hypotenuse as its sharpest edge. Because of its pointed tip, it is typically used for stabbing incisions and/or short, precise cuts that are shallow.

The №12 – A small, pointed, crescent-shaped blade used typically as a suture cutter. It is most sharp on the inside edge of its curve.

The №15 – Ideal for making short, precise incisions because of its small, curved cutting edge.

Cutting & Dissecting Instruments

Surgical Blades

The № 20 - A large curved blade commonly used for cutting tissue and other procedures that require a puncture or cut.

The № 21 –Similar to the № 20, it features a large curved blade commonly used for cutting tissue and other procedures that require a puncture or cut.

The № 22 – Essentially a larger version of the №10, it has a flat, unsharpened back edge and a short, curved cutting edge. These blades are best for creating large incisions, often through thick skin.

The №23 – A large blade that is slightly narrower than the №21 and № 21. It also has a pointier tip.

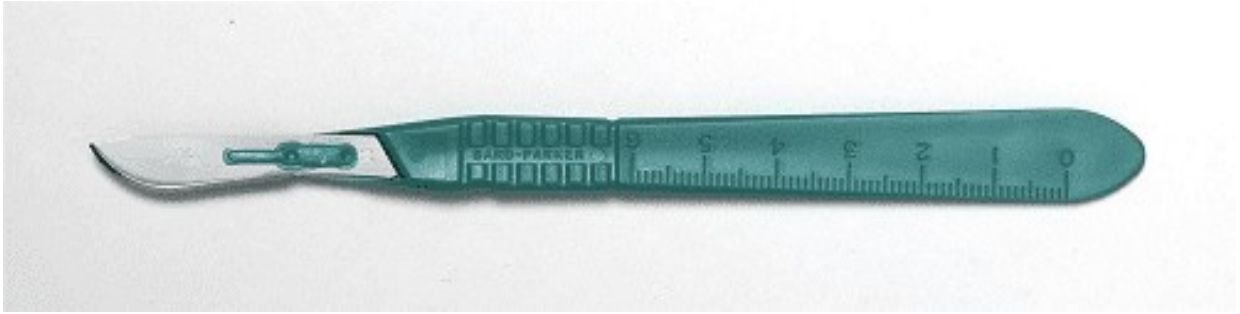
Cutting & Dissecting Instruments

Scalpels

Single-Use or Reusable Blades

Surgical scalpels are available in either single-use or reusable versions. Reusable blades are permanently attached to the handle and must be sharpened consistently. Single-use blades are designed to lock onto a scalpel handle and are easily removable. There are also **disposable surgical scalpels** which typically have plastic handles and an extensible blade. These can be used only once before the entire instrument is discarded.

Safety scalpels, which come with a special covering around the surgical blade that protects it until it's used. The use of safety scalpels has been shown to help prevent accidental injuries caused by inadvertent contact with the blade.



Disposable surgical scalpels

Disposable safety surgical scalpels

Cutting & Dissecting Instruments

Scalpels

The basic position of the scalpel in the hand is the "table knife", "writing pen" and "violin bow" positions.

Cutting & Dissecting Instruments

Scissors

Scissors are used to cut tissues, suture threads, dressings, as well as for blunt dissection (the closed scissors are introduced between the planes to be separated, and are opened before they are extracted scissors. Scissors exist in a variety of sizes and shapes. They can be straight, curved or angular. They can have a sharp or blunt tip. The smaller sized blades are used at the surface for small incisions and the longer blades go deeper into cavities. Curved blades provide a better visual of the working area and straight blades can be used for any type of incision

Depending on the intended use, scissors may have the following blade shapes:

Straight.

Curved along the plane.

Curved along the edge.

Cutting & Dissecting Instruments

Scissors

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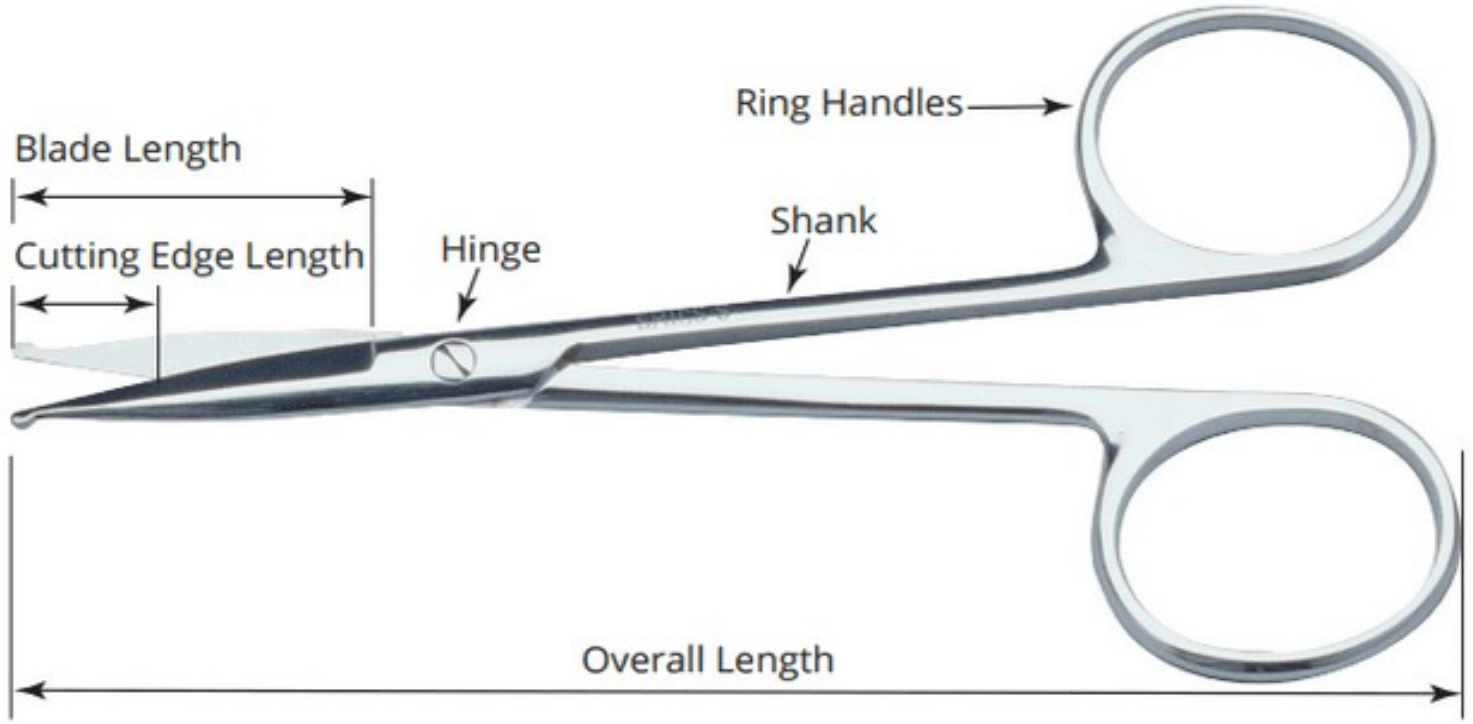
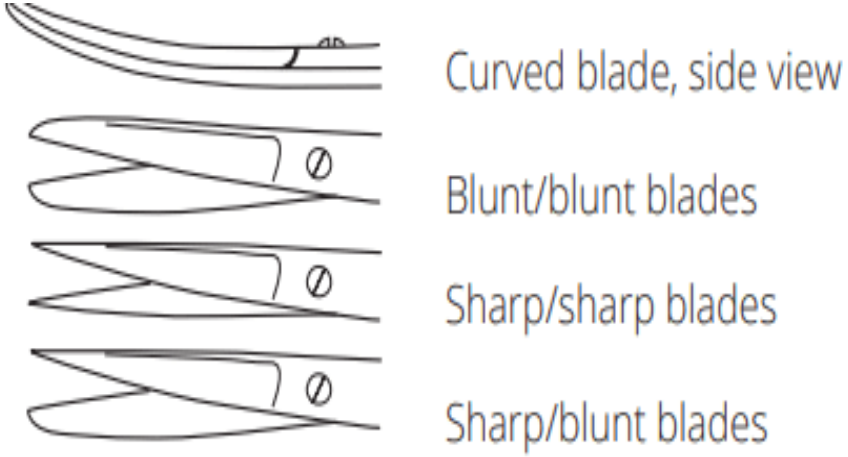


Cutting & Dissecting Instruments

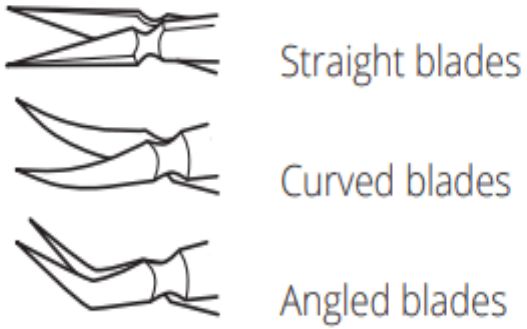
Scissors

Standard scissors are available in a variety of lengths and patterns with straight, curved or angled blades. Heavy duty patterns are for blunt dissection. Fine, thin blades are used for delicate cutting

Micro scissors are often called Vannas or spring scissors. They are excellent for left hand users.



Standard Scissor Tips



Micro Scissor Tips

Cutting & Dissecting Instruments

Scissors

Mayo scissorss , straight	Scissors straight, blunt/blunt
	
Mayo scissors have semi-blunt ends, a feature that distinguishes them from most other surgical scissors.	Straight-bladed scissors for extracorporeal manipulation or for tissue dissection in shallow wounds

Cutting & Dissecting Instruments

Scissors

Metzenbaum scissors	Metzenbaum scissors - curved, blunt/blunt
	
A surgical scissors designed for cutting delicate tissue and blunt dissection.	Extra thin surgical scissors. Durable and suitable for tissue dissection.

Cutting & Dissecting Instruments

Scissors

Scissors Straight - Sharp/Blunt	Cooper scissors, curved, pointed/blunt
	
These scissors have a straight design that is used in multiple delicate surgeries. It has sharp/blunt blades for quick and easy cutting.	Cooper scissors are curved flat, they do not damage tissues when advanced forward, and can be used for blunt dissection by spreading the blades apart.

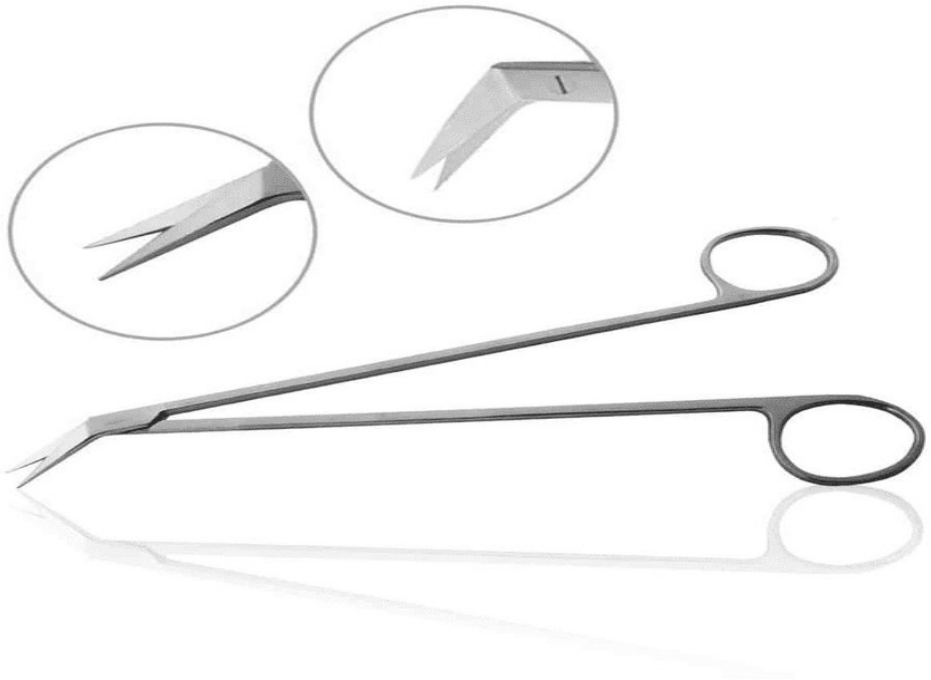
Cutting & Dissecting Instruments

Scissors

Lister Bandage Scissors

Multifunctional bandage scissors, suitable for removing bandages, dressings, hard materials/tissue during surgery, angled blades which improve visibility, angled blade for better access to tissue.

Potts scissors



Potts scissors used in biliary and vascular surgery

Cutting & Dissecting Instruments

Scissors

Correct way to hold scissors

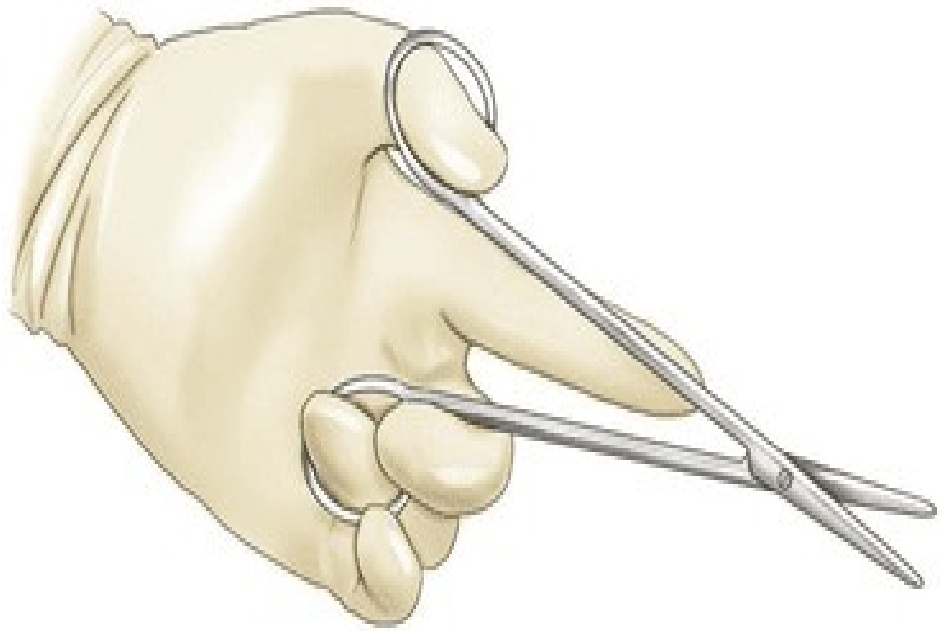
· The fourth finger is inserted through the ring of the lower arm of the scissors

→ The third finger supports the lower arm of the scissors

↓

The second finger is extended along the arms of the scissors, ensuring the precision of movement

→ ·The thumb (about half of the first phalanx) is inserted through the ring of the upper arm of the scissors



Cutting & Dissecting Instruments

Scissors

Scissors should be handed from one person to another as follows:

The first person holds the tip of the scissors

→ The second person opens Handing over scissors

→ The first person places the handle of the scissors in the palm of the recipient

→ Palm of the hand to receive the instrument

Grasping & Holding Instruments

Grasping Instruments

Surgical Grasping Instruments can be broadly divided into two categories:

Ring Forceps

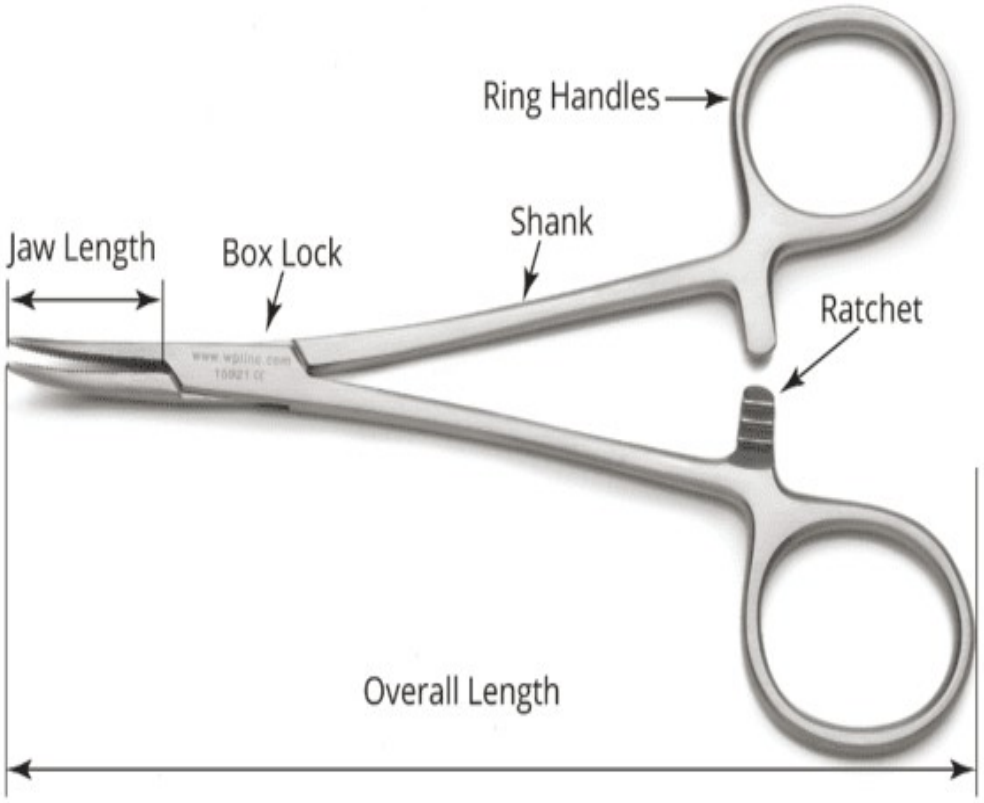
Thumb Forceps

Grasping Instruments

Ring Forceps also called hemostat clamp, arterial forceps, hemostatic forceps and locking forceps).

Hemostatic forceps have a locking mechanism called a ratchet, which is used for clamping. The jaws of the locking forceps gradually come together as each increment of the ratchet is employed.
Ring forceps are used for grasping, holding firmly or exerting traction upon objects. For especially delicate operations, generally ring handles with a locking ratchet are preferred over thumb forceps.

Locking hemostatic forceps may be called clamps and are used to securely hold tissue. When they are used to control blood flow, they are called hemostats. Hemostats are typically used to compress blood vessels or other tubular structures to obstruct the flow of blood or fluids.



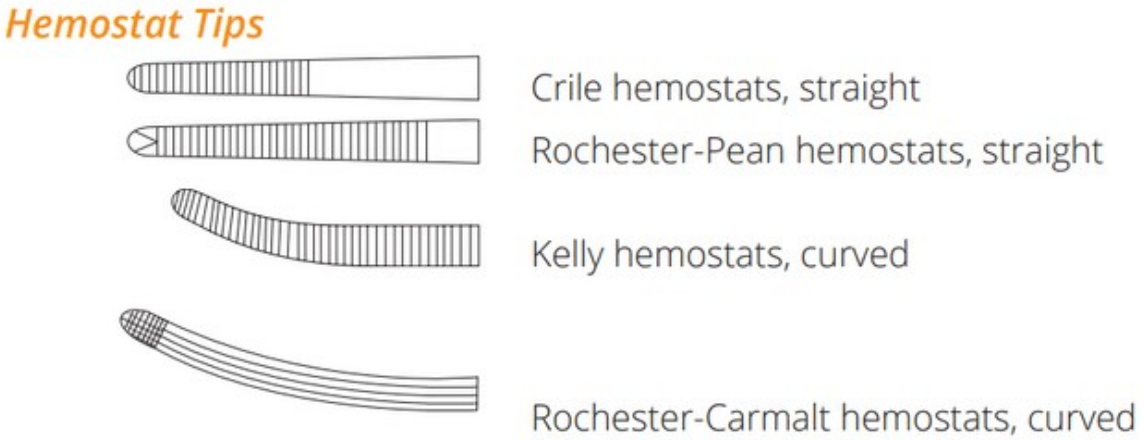
Grasping & Holding Instruments

Grasping Instruments

Hemostatic Forceps

The jaws of hemostatic forceps are often serrated, featuring fine teeth or grooves. These serrations help to grip tissues securely without causing excessive damage. The design of the serrations can vary.

Hemostats come in various tip configurations, such as curved, straight, or angled. The choice of tip design depends on the specific procedure and the anatomy of the subject area.

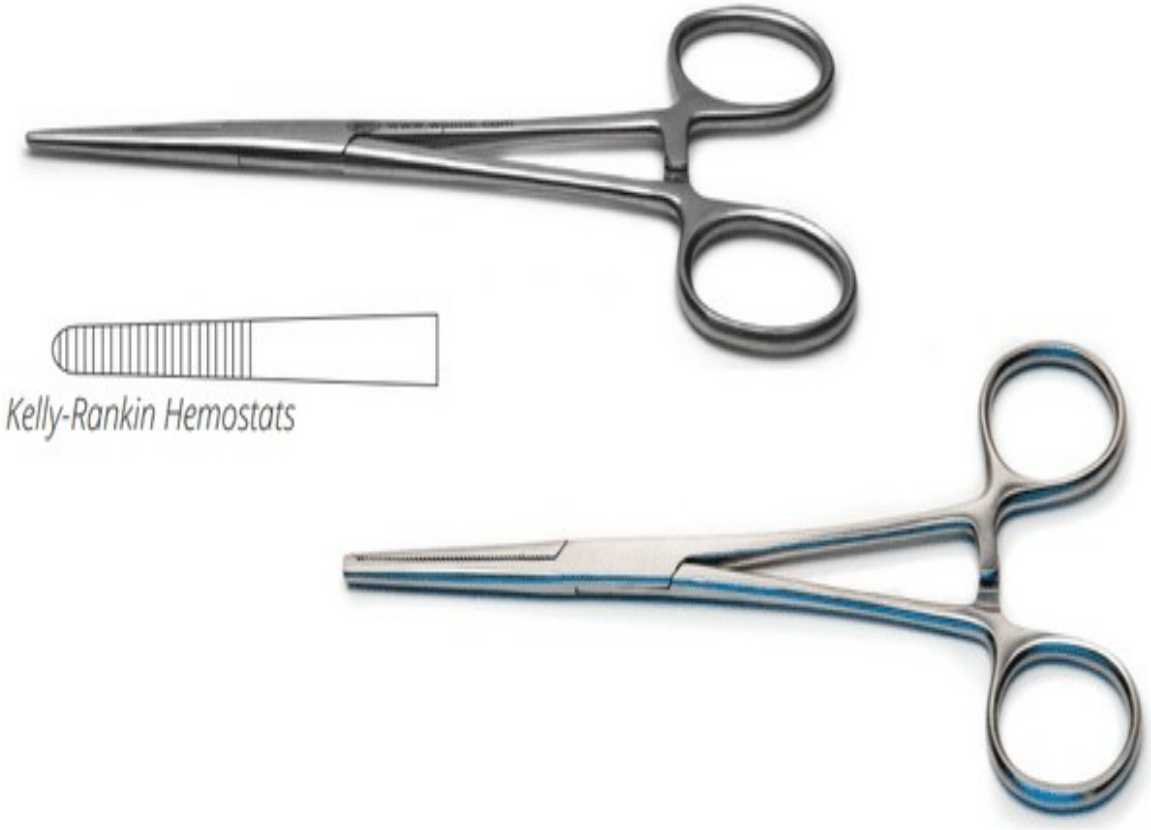


Grasping & Holding Instruments

Ring (Hemostatic) Forceps

Kelly Hemostatic Forceps

can be used to clamp larger vessels or grasp tissue



Grasping & Holding Instruments

Ring (Hemostatic) **Forceps**

Halsted Mosquito Forceps (Mosquito Forceps)

are used for delicate procedures in areas with limited space. They have small, serrated jaws with straight or curved tips.

Grasping & Holding Instruments

Ring (Hemostatic) Forceps

Crile Hemostatic Forceps

with transverse serrations along the entire length of the jaw. These are used for clamping medium to large blood vessels and tissues.

Grasping & Holding Instruments

Ring (Hemostatic) Forceps

Rochester-Oschner Hemostatic forceps are heavy hemostats designed for clamping large vessels or grasping dense tissue. They are serrated for grasping and often have teeth at the tip, too

Grasping & Holding Instruments

Ring (Hemostatic) Forceps

Rochester-Péan Hemostatic Forceps are designed with full horizontal serrations for clamping larger tissue and vessels.

Grasping & Holding Instruments

Ring (Hemostatic) Forceps

Rochester-Carmalt Hemostatic Forceps

(nicknamed the "stars and stripes hemostat,") are similar to Rochester-Péan Forceps are characterized by the longitudinal serrations that run the length of the blade with cross-hatching at the tip. These large, crushing hemostatic forceps are a choice instrument for clamping blood vessels and large tissues or ligating pedicles.

Grasping & Holding Instruments

Ring Forceps

Allis tissue forceps have sharp teeth for gripping heavy tissue. Because they can cause damage, they typically hold tissue that is to be removed.

Grasping & Holding Instruments

Handling of Ring Forceps

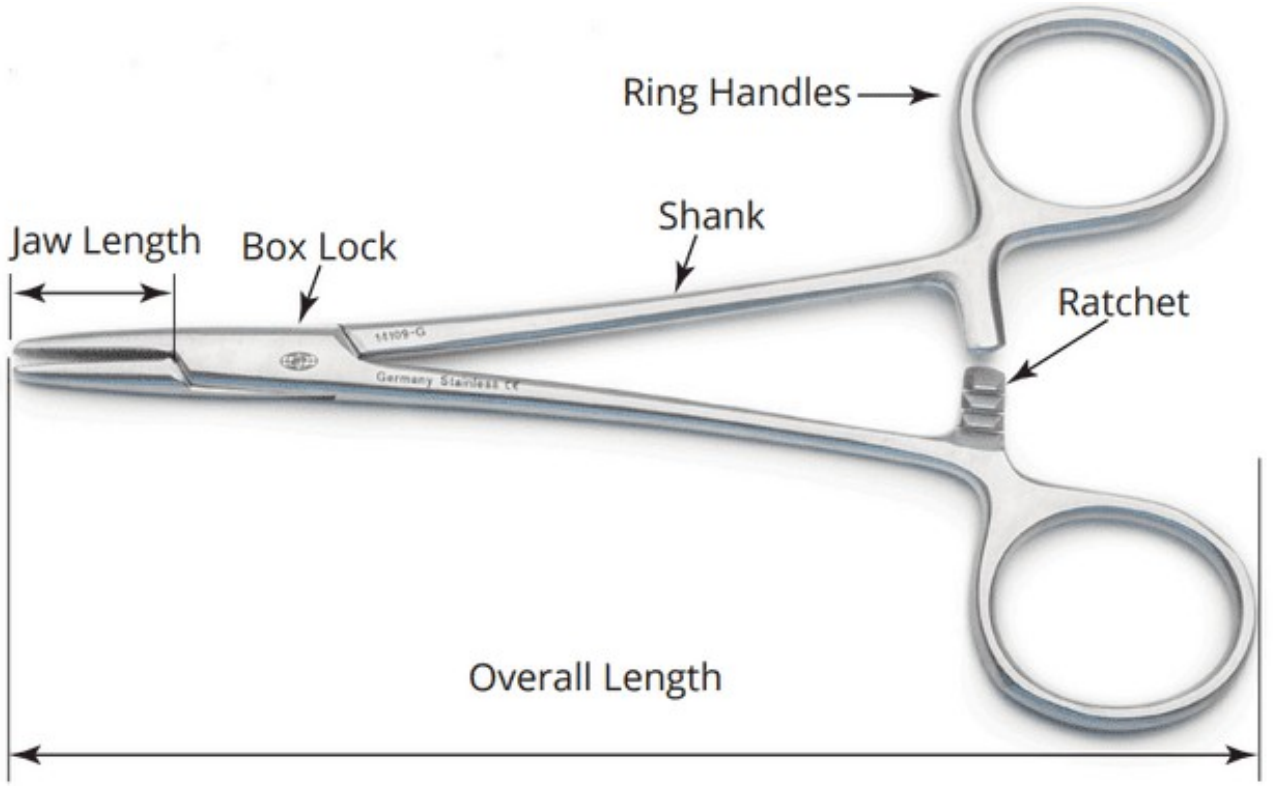
Forceps should be held similarly to scissors: the fourth finger is inserted through the lower ring, the middle finger supports the forceps The index finger is extended along the arms of the forceps to ensure precision of movement, and the thumb (the proximal half of the first phalanx) is inserted through the upper ring.

Grasping & Holding Instruments

Needle Holders

Needle Holders are used during surgical operations to hold suture needles. The clamping mechanism provides a firm grip over the needle and locks it in place. They are similar in structure to a hemostat.

Needle holders, also known as needle forceps or needle drivers, are used in suturing during a surgical procedure. Needle holders typically have a textured tip for a secure hold. Often they have a ratchet (or other mechanism for locking).



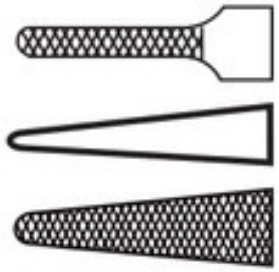
Grasping & Holding Instruments

Needle Holders

Needle Holders are used during surgical operations to hold suture needles. The clamping mechanism provides a firm grip over the needle and locks it in place. They are similar in structure to a hemostat.

Standard Needle Holder Tips

The ratchet locks the tips on the needle of standard needle holders. The tips can be straight or curved. Serrated tips work better for holding larger needles. Smooth tips are designed for the smallest needles. Some needle holders have built-in suture scissors



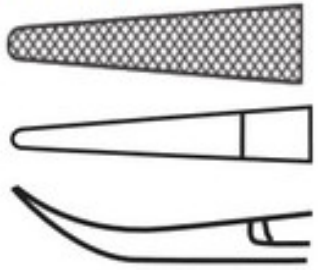
Ryder, serrated jaw

Smooth jaw

Standard, serrated jaw

Micro Needle Holder Tips

Micro needle holders have the spring (squeeze) handles for ambidextrous use. They come with or without a lock, smooth or serrated, and straight or curved.



Serrated jaw

Smooth jaw

Curved jaw

Grasping & Holding Instruments

Needle Holders

Mayo Hegar Needle

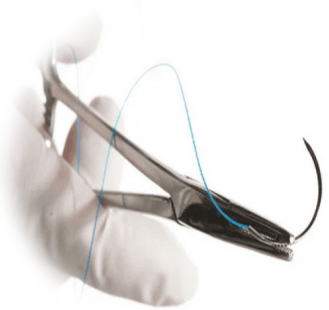
used to drive curved needles during surgeries. It has a broader jaw with a rounded tip. These needle holders have straight and cross-serrated inserts which provide greater precision during the suturing process. These needle holders are available in different sizes and variations.

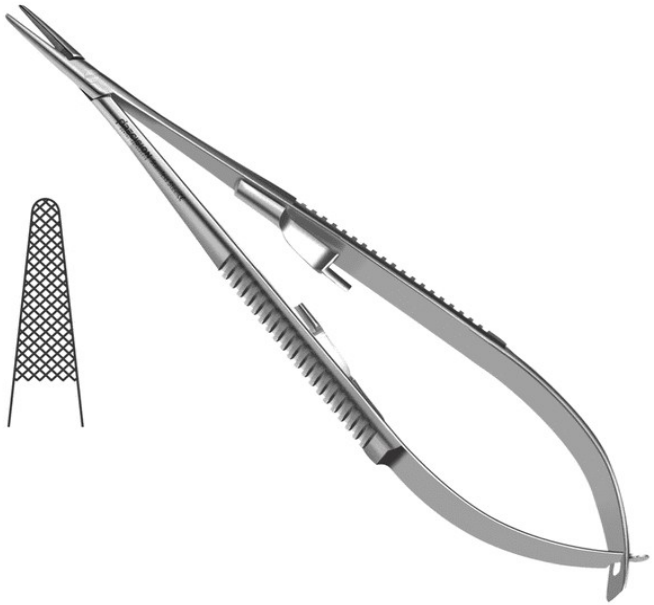
Grasping & Holding Instruments

Needle Holders

Mathieu Needle Holders
features a handle with an internal locking system designed to prevent the pinching and breaking of latex gloves.

Castroviejo needle holders
used by ophthalmologists, plastic surgeons, and other surgeons to hold and manipulate small needles during various surgical procedures.





Grasping & Holding Instruments

Needle Holders

DeBakey Needle Holder

Lighter than the mayo needle holder, useful for deeper surgical procedures or surgeries where there is restricted space such as chest surgery.

Derf Needle Holders

are surgical instruments designed for holding needles during suturing. The tip has fine serrations and a groove in the center. The groove helps to securely hold thicker surgical needle.

Grasping & Holding Instruments

Needle Holders

Halsey needle holders
have a scissor-like jaw design with a flat, blunt tip. They have a locking mechanism to secure the jaws as they grasp the needle firmly.

Heaney Needle Holder
used for light to medium weight suturing. Its common use is in gynecological procedures

Grasping & Holding Instruments

Needle Holders

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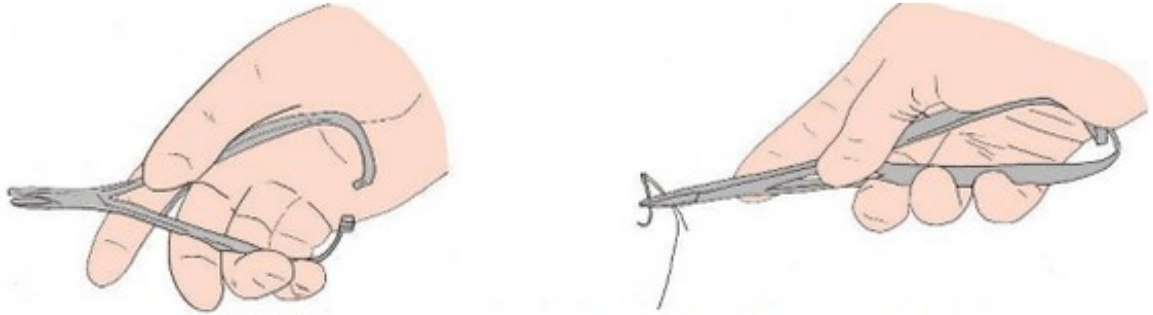
Heaney Needle Holder
used for light to medium weight suturing. Its common use is in gynecological procedures

Grasping & Holding Instruments

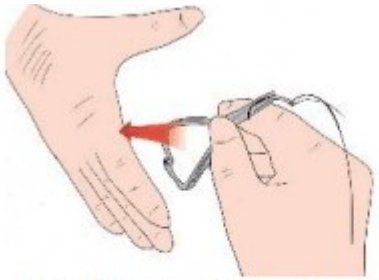
Handling of Needle Holders

The Mathieu needle holder is held in the palm of the hand;
it is closed and opened by pushing the rack and pinion mechanism situated at the end of the arms.



How to correctly hold the Mathieu needle holder

The Mathieu needle holder is passed from one person to another by placing the handle in the recipient's palm.



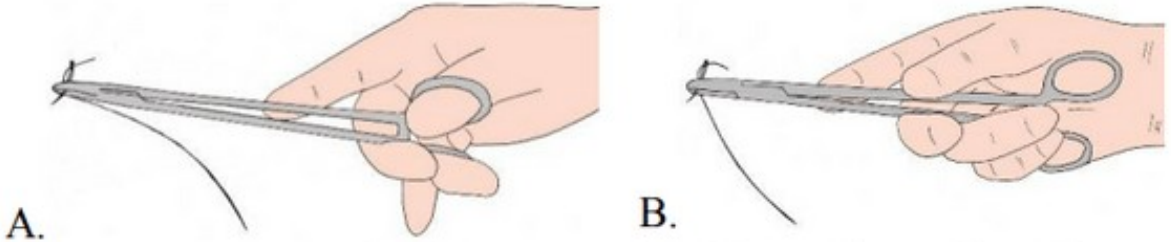
Handing over the Mathieu needle holder

Grasping & Holding Instruments

Handling of Needle Holders

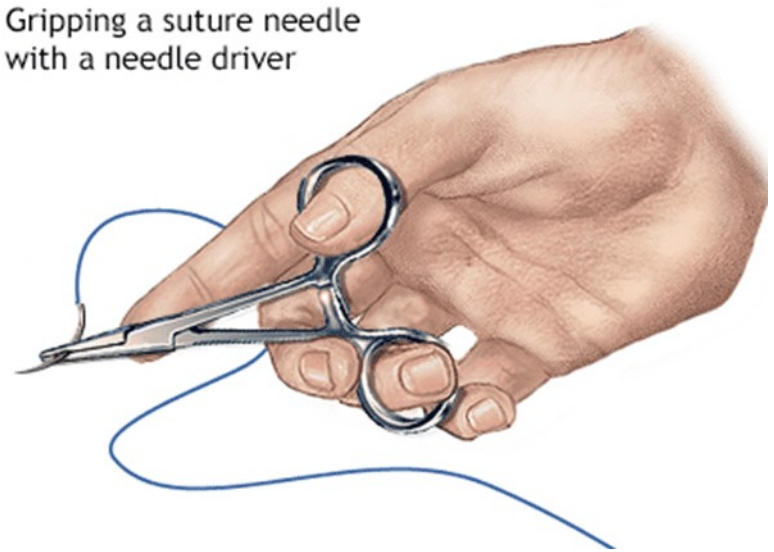
The Hegar needle holder can be held:

- With the thumb and the second-fourth fingers
- In the palm

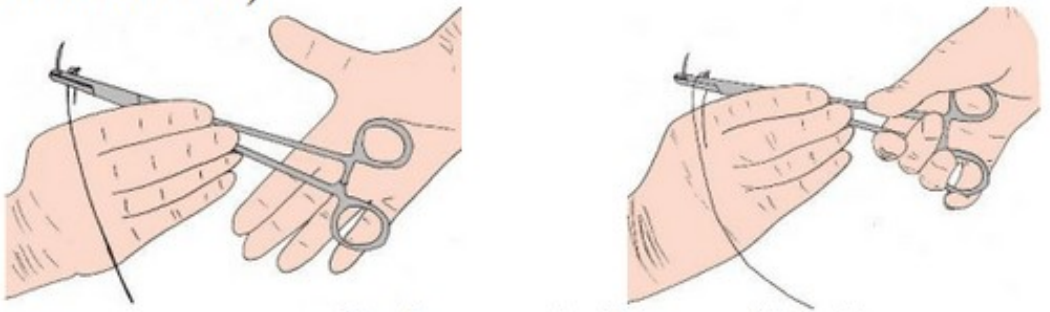


Maneuvering the Hegar needle holder: A. Like a self-retaining forceps; B. Held in the palm

Gripping a suture needle with a needle driver



The Hegar needle holder should be handed over similarly to a self-retaining forceps; in addition, care should be taken to correctly orient the needle and keep the thread free (out of the palm of the hand).



Handing over the Hegar needle holder

Grasping & Holding Instruments

Thumb Forceps

Thumb forceps are spring forceps used by compression between your thumb and forefinger and are used for grasping, holding or manipulating body tissue. They have no ratchet in the handle. Two broad categories of thumb forceps are:

dressing forceps

Dressing forceps are used when dressing wounds and removing dressings. Very fine dressing forceps are also used in eye surgery. Dressing forceps have serrated tips for grasping delicate tissue and dressings.

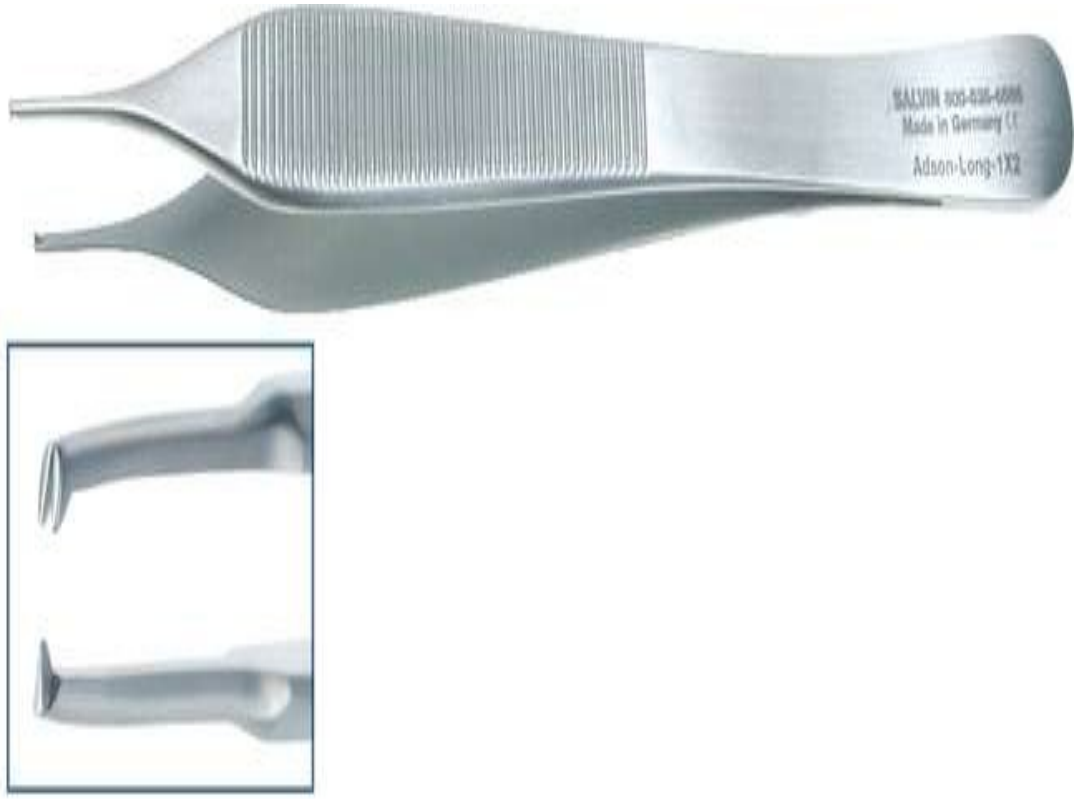
tissue forceps.

Tissue forceps generally have teeth, which offer a better grip on tissues while minimizing tissue damage

Grasping & Holding Instruments

Thumb Forceps

Adson tissue forceps	Adson-Brown Forceps
are designed for grasping delicate tissues, and they have 1x2 teeth.	is a specialized instrument used for grasping thick and rough tissues for manipulation.



Grasping & Holding Instruments

Thumb Forceps

Bonn tissue forceps

are designed for delicate work, and they include a tying platform to assist when you are tying sutures

Grasping & Holding Instruments

Thumb Forceps

Foerster tissue forceps

work well when handling delicate tissue. These serrated forceps have the unique octagonal keyhole in the handle, giving you tactile feedback and control

Grasping & Holding Instruments

Thumb Forceps

Iris forceps

are designed for use in ophthalmologic work. Iris forceps are a small pair of forceps with a fine pointed tip for grasping delicate tissue with minimal trauma.

Grasping & Holding Instruments

Thumb Forceps

Graefe forceps

have a horizontal row of 6 (or 8) small teeth for grasping tissue. They are most commonly use in ophthalmologic applications.

Grasping & Holding Instruments

Thumb Forceps

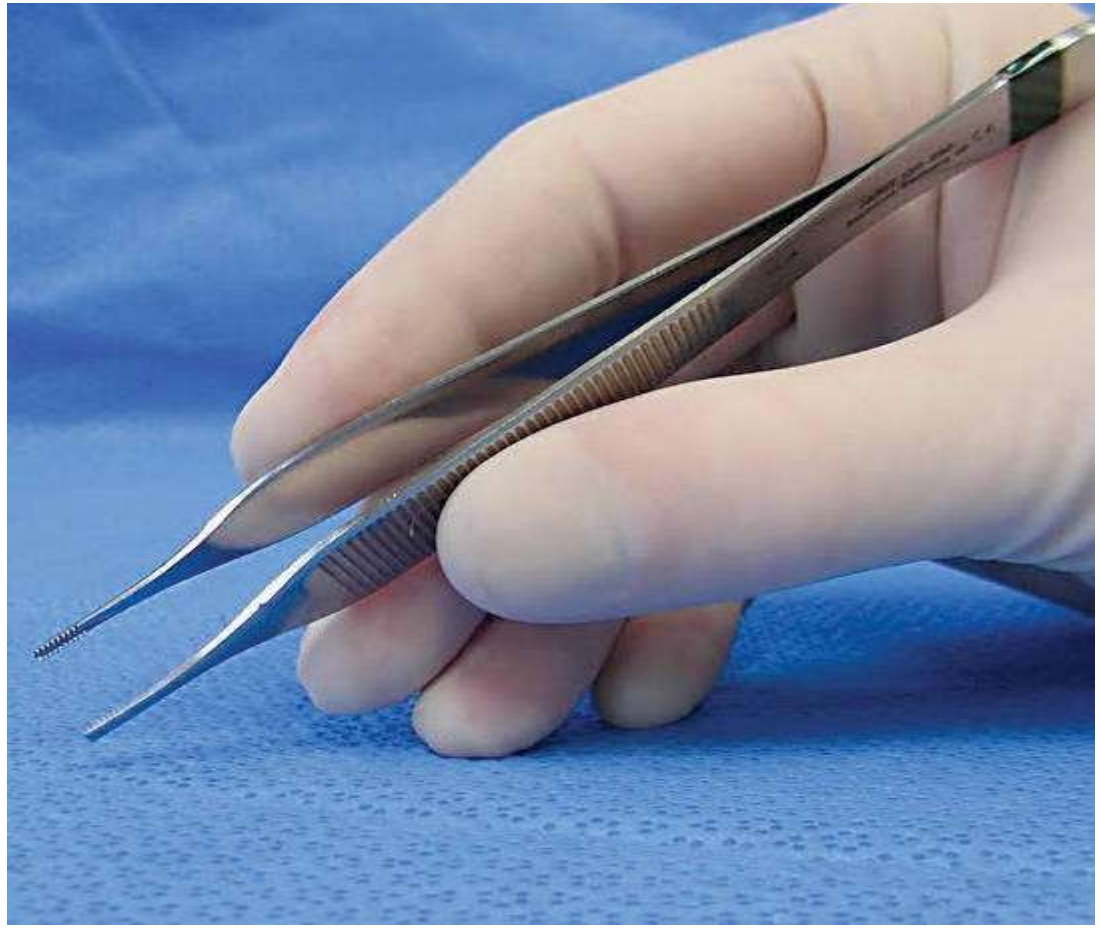
Dressing Forceps

can use to grasp and manipulate different types of wound dressings, in order to perform wound debridement and remove necrotic tissue from the wound's surface.

Grasping & Holding Instruments

Handling of Thumb forceps

Thumb forceps should be held between the thumb and index finger with a pencil grip when in use, and in the palmed position when not in use.

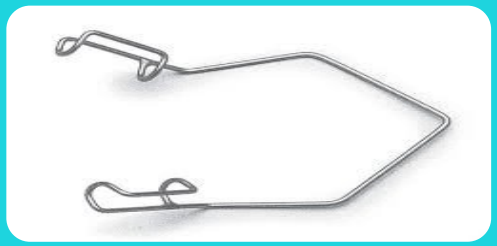


Retractors

Retractors are used to hold an incision or a wound open, to hold an organ or tissue out of the way to expose what's underneath. Three broad categories of retractors include:

Hand Retractors must be held by an assistant, a robot or the surgeon during a procedure.

Self-Retaining Retractors have a mechanical device for holding tissue during surgery, allowing hands free operations. Self-retaining retractors have a screw, ratchet or some type of clamp to hold the tissue. These allow the surgeon to operate with two free hands.



Wire Retractors are the simplest style of retractor. Usually the wire has some spring so that the surgeon can pinch it together, position it and release it. These also free up the surgeon's hands.

Retractors

Hand Retractors

Farabeuf Retractor

is one of the most popular hand-held retractors across the world, and it allows surgeons to grasp, retract and statically hold multiple types of tissues during procedures in a broad range of surgical specialties.

Double Ended Design With L-Shaped Blades For Reliable Retractions.
Atraumatic Blunted Blade Edges For Avoiding Local Injury.
Ergonomic Solid Handle For Superior Surgical Control.

Retractors

Hand Retractors

Richardson Retractor

is a 9-1/2" long retractor that can be used during procedures, such as chest or abdominal, to grasp soft tissue using the curved blade. Several widths and depths of the blade are available in order to suit the different surgical needs.

Hand Retractors

The Deaver Retractor

is a large, handheld retractor commonly used to hold back the abdominal wall during abdominal or thoracic procedures. It may also be used to move or hold organs away from the surgical site.

Retractors

Hand Retractors

The Army-Navy Retractor and U.S. Army Retractor

are set of surgical instruments designed for use in surgical procedures where the need arises for retracting soft tissue or organs. These army retractors are named after the military, as they are designed to be tough and durable, just like the soldiers who use them.