



PRINCIPLES OF LAPAROSCOPIC SURGERY

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WHAT ARE THE MAIN PILLARS TO
DO/PERFORM LAPAROSCOPIC
PROCEDURE?



ADVANTAGES OF MINIMALLY INVASIVE SURGERY

- Less pain
- Early recovery
- Early return to work
- Better cosmetic
- Can get same outcome of standard approach



SURGICAL TRAUMA **OPEN** VS **LAPAROSCOPIC**

- Both has same surgery stress response
- More wound stress with open
- More respiratory and cardiac with laparscopic



LIMITATIONS OF LAPAROSCOPIC APPROACH

- Loss of tactile sensation
- Need brain training
- Need further training
- Hospital administration and IT support
- Contra-indications:
 - 1- Patient can not get general anesthesia
 - 2- Frozen abdomen,
 - 3- Tumor size limitations
 - 4- Others



MAIN PRINCIPLES OF LS

- Same anatomy and surgical steps as open
- Recognize the content of **Laparoscopic Tower**
- **Up date your self about Laparoscopic Instruments (Disposable vs non-disposable, size and length...)**
- **Standard roles for applying trocars**



FIRST PRINCIPLE OF LS

- Never introduce or violate known anatomy
- Do the scientific approved surgical steps
- Only , difference is **the approach**



MAIN PILLARS OF ANY LAPAROSCOPIC

PROCEDURE: **2 (L T)**

- **Gas :**

to create space (**air**, water, non)

- **Light:**

to illuminate the space

- **Camera :**

to transmit the picture to the screen



LT CONTENT



GAS

- Colorless, odorless,.....(10 features)
- Gases (11) : O, F,N,H,CL,HE,NE,AR,KR,XE,RN
- Air, oxygen, CO₂, nitrous oxide, inert gases
- Insufflator: Flow 40 L/min ,

Set your pressure, mmHg **(15)**

Observe recording pressure

- trouble shooting: no space and high pressure
no space and high flow



INSUFFLATOR



LIGHT SOURCE

- High intensity bulbs, Xenon, mercury, halogen
- 175-300 watt
- Trouble shooting: Dark field
- **Turn on the light before white balance**





IMAGING SYSTEM

- Camera, laparoscope, monitor
- Camera magnifies the endoscopic view 15 fold
- Laparoscope: a rigid rod-lens and light conducting cable, Length (32,42 cm), Diameter (2,5,10 mm), Degree (0, 30, 45)
- Monitor has to be 19 inches or larger , same site of the operated organ
- Trouble shooting: no picture



CAMERA



SCOPES



Laparoscope Endoscope

SD-301.001 0° Φ 10×330
SD-301.003 0° Φ 5×330

SD-301.002 30° Φ 10×330
SD-301.004 30° Φ 10×330



28903



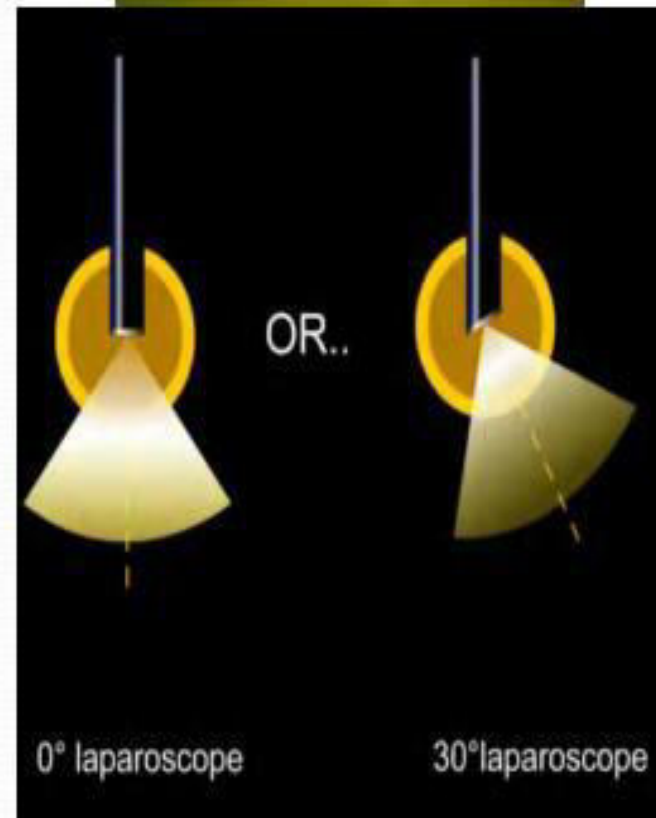
SCOOPS 2



Telescope

- There are three important structural differences in telescope available

1. 6 to 18 rod lens system telescopes are available
2. 0 to 120 degree telescopes are available
3. 1.5 mm to 15 mm of telescopes are available



SCREENS



HOW TO INTRODUCE

PNEUMOPERITONEUM

- Open technique (Hasson)
- Opti-view
- Veress needle

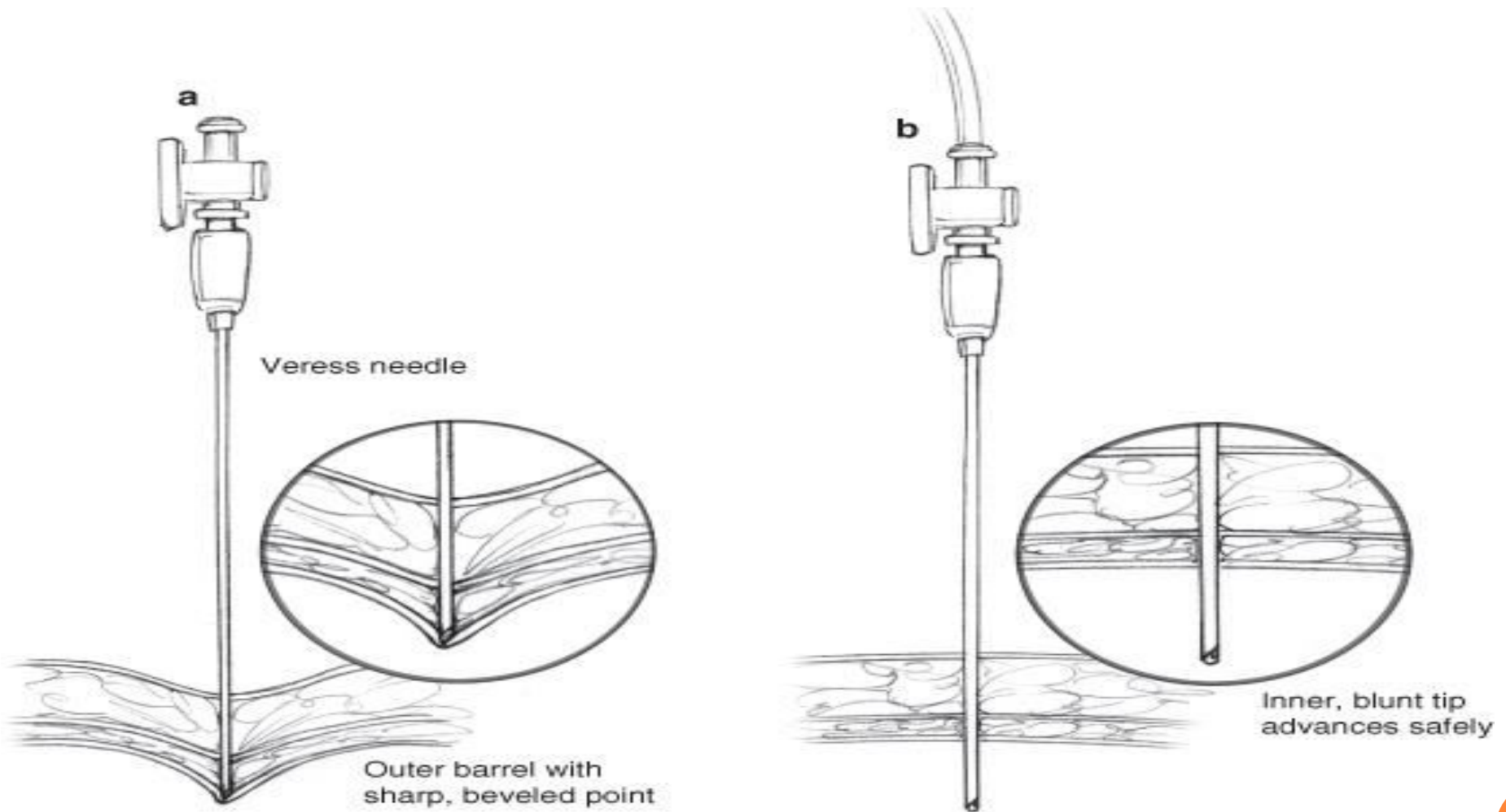


VERESS NEEDLE

- (1938)
- three length 80mm, 100mm, 120mm
- 14-gauge
- Maximum flow rate is 2L/min



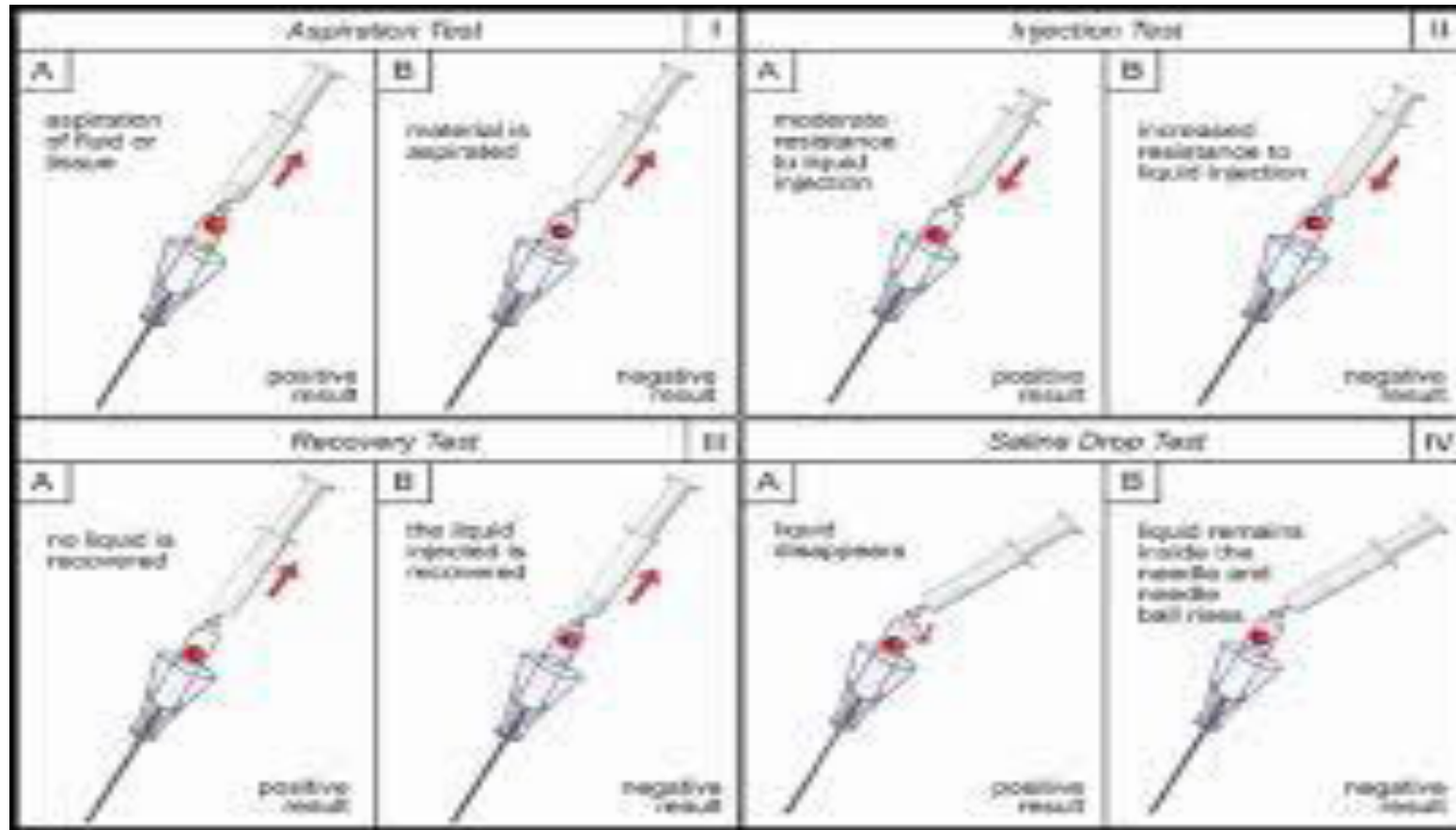
V N



Source: J.G. Hunter, D.H. Spight, C. Sandone, J.E. Fairman: Atlas of Minimally Invasive Surgical Operations: Copyright © McGraw-Hill Education. Illustrations © Johns Hopkins University. All rights reserved.



V N



OPTIVIEW

- A technique which uses cannula and 0 degree telescope to allow direct visualization of the entry tract. Specialist cannula such as Visiport or **Optiview** uses this



OPTI VIEW



TROCARS & INSTRUMENTS

- Trocar:
 - Diameter 2-5-15mm
 - Length 8cm-42cm
 - Bladed, bladeless
 - Disposable vs NON
-
- **How to decide for your trocar?**



TROCARS 1



TROCARS 2



TROCARS 3

Trocars

■ Types:

■ Cutting

- Pyramidal tipped
- Flat blade

■ Noncutting

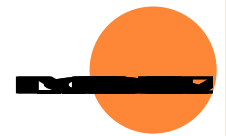
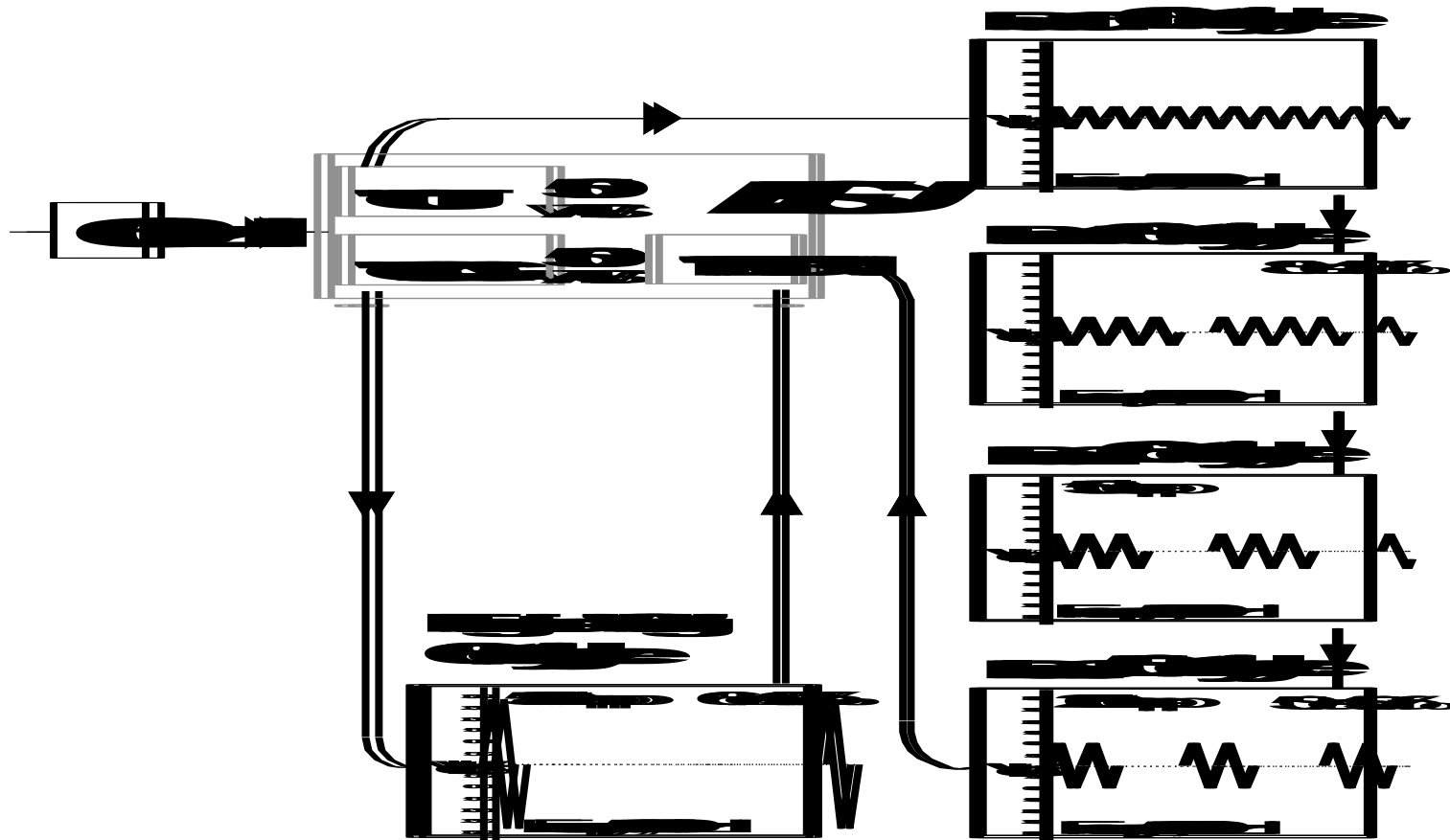
- Pointed conical
- Blunt conical
- Optical



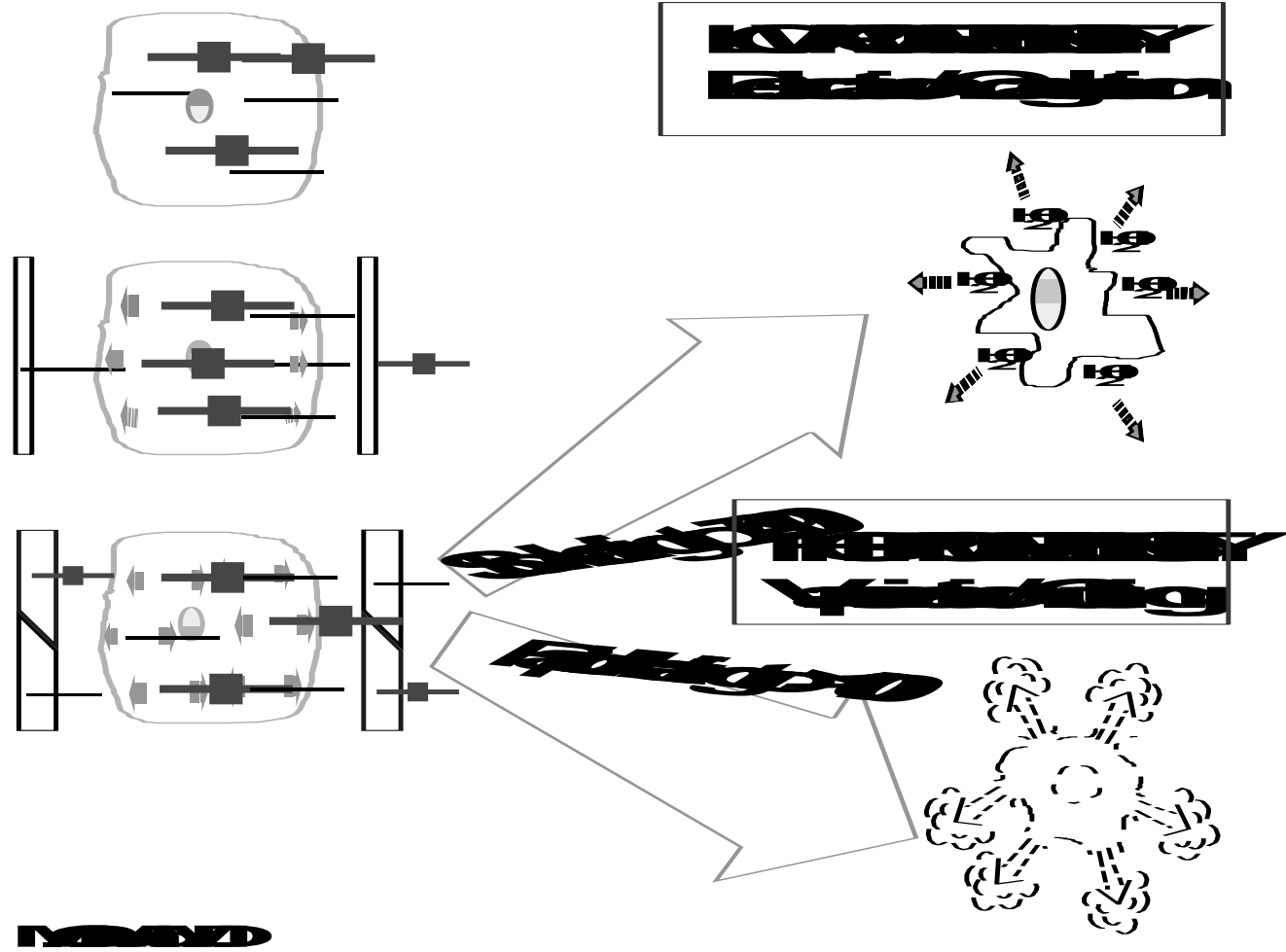
SEALING & **CUTTING & CAUTERY**



CURRENT WAVEFORMS



CELLULAR EFFECTS



ULTRA-CISION/HARMONIC SCALPEL

- Ultrasonically activated device that move at an imperceptible 55,000 cycles/sec, cutting tissue with a cool blade
- The mechanical action denature collagen molecules, forming a coagulant and instantly sealing small vessels with minimal thermal injury



HS



LIGASURE

- electrothermal bipolar tissue sealing system
- In fact, the heat generated from the bipolar energy determines the fusion of collagen and elastin in the walls of the vessel with the creation of a permanent sealed zone. The system detects the thickness of tissue to be coagulated and automatically defines the amount of energy required and the delivering time



LS



LS



LIGASURE



LIGASURE

- The LigaSure Vessel Sealing System allows hemostasis by vessel compression and obliteration through the emission of bipolar energy. It includes
 - 1. An electrosurgical generator able to detect the characteristics of the tissue closed between the instrument jaws; it delivers the exact amount of energy needed to seal it permanently.
 - 2. Several types of instruments that seal and, in some cases, divide the tissue. Those used in thoracic surgery are the following:
 - LigaSure Atlas is a surgical endoscopic device (diameter: 10 mm, length: 37 cm) that seals and divides vessels up to 7 mm in diameter;
 - LigaSure V is a single-use endoscopic instrument (diameter: 5 mm, length: 37 cm) able to seal and divide;
 - LigaSure Lap is a single-use endoscopic instrument (diameter: 5 mm, length: 32 cm);
 - LigaSure Precise is a single-use instrument (length: 16.5 cm) for open procedures specifically designed to provide permanent vessel occlusion to structures that require fine grasping;
 - LigaSure Std is a reusable instrument;

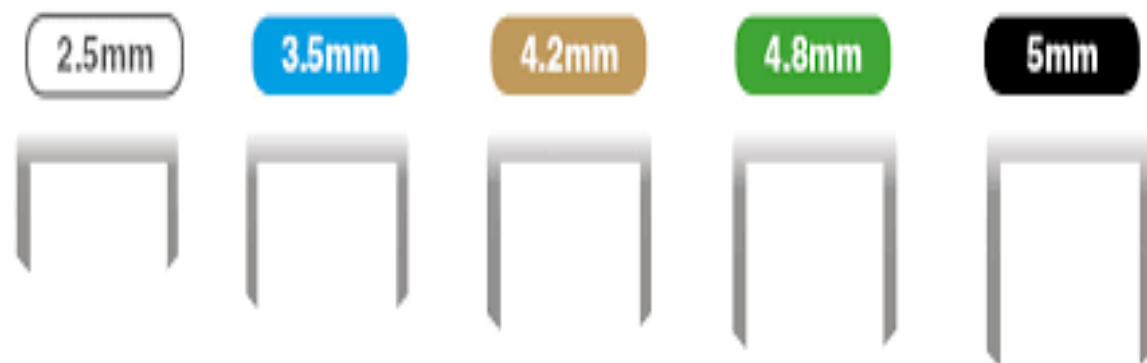


LAPAROSCOPIC STAPLERS







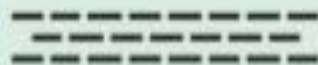


STAPLE CONFIGURATION



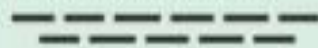
STAPLE LINES

30-mm vascular linear stapler



Three staggered rows of staples

30-mm linear stapler



Two staggered rows of staples



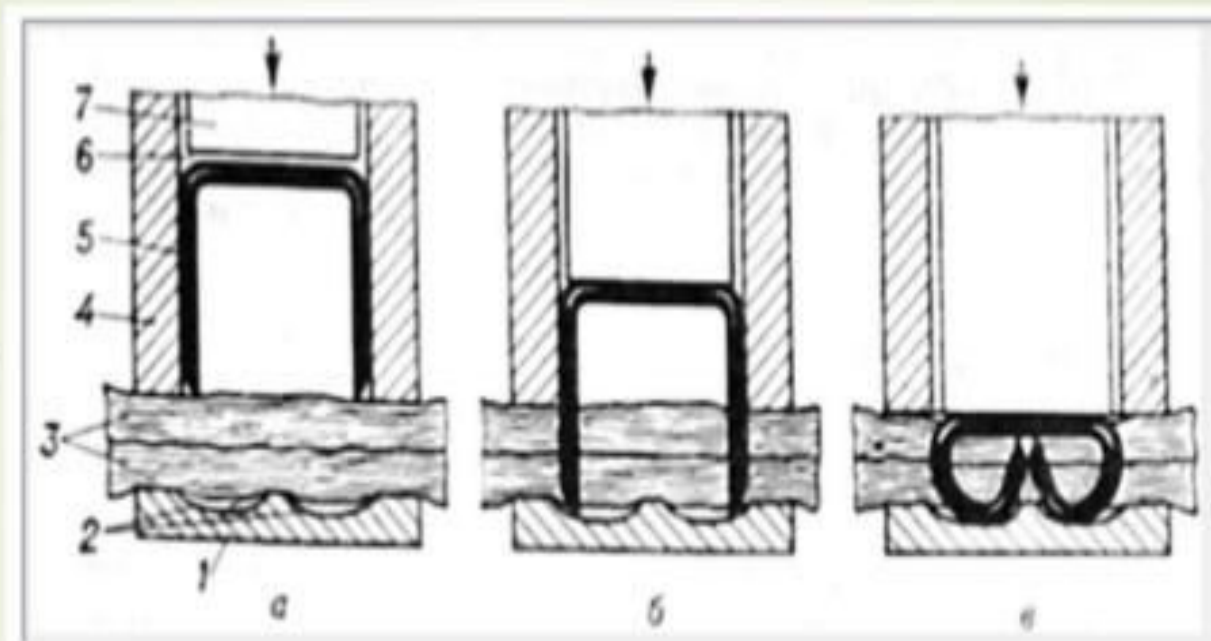


Diagram of stitching being made with metal staples. *Left*, the stitched parts of the soft tissue are compressed between the magazine and matrix; *middle*, the staple is pushed from the magazine by the pusher and pierces the parts of the soft tissue; *right*, the staple stems are inserted inside the craters, get deformed, and stitch the parts of the tissue. 1, matrix; 2, craters; 3, stitched tissue; 4, magazine; 5, staples; 6, slot; 7, pusher. The arrows show the direction of movement.





stapling of
base of appendix



IMPORTANT ROLES IN LAPAROSCOPIC PROCEDURES

- Patient & surgeon position
- Position of the trocar
- Distant between trocar
- Size of trocar
- Examples, fundoplication, APR, Splenectomy, bowel resection, colostomy,



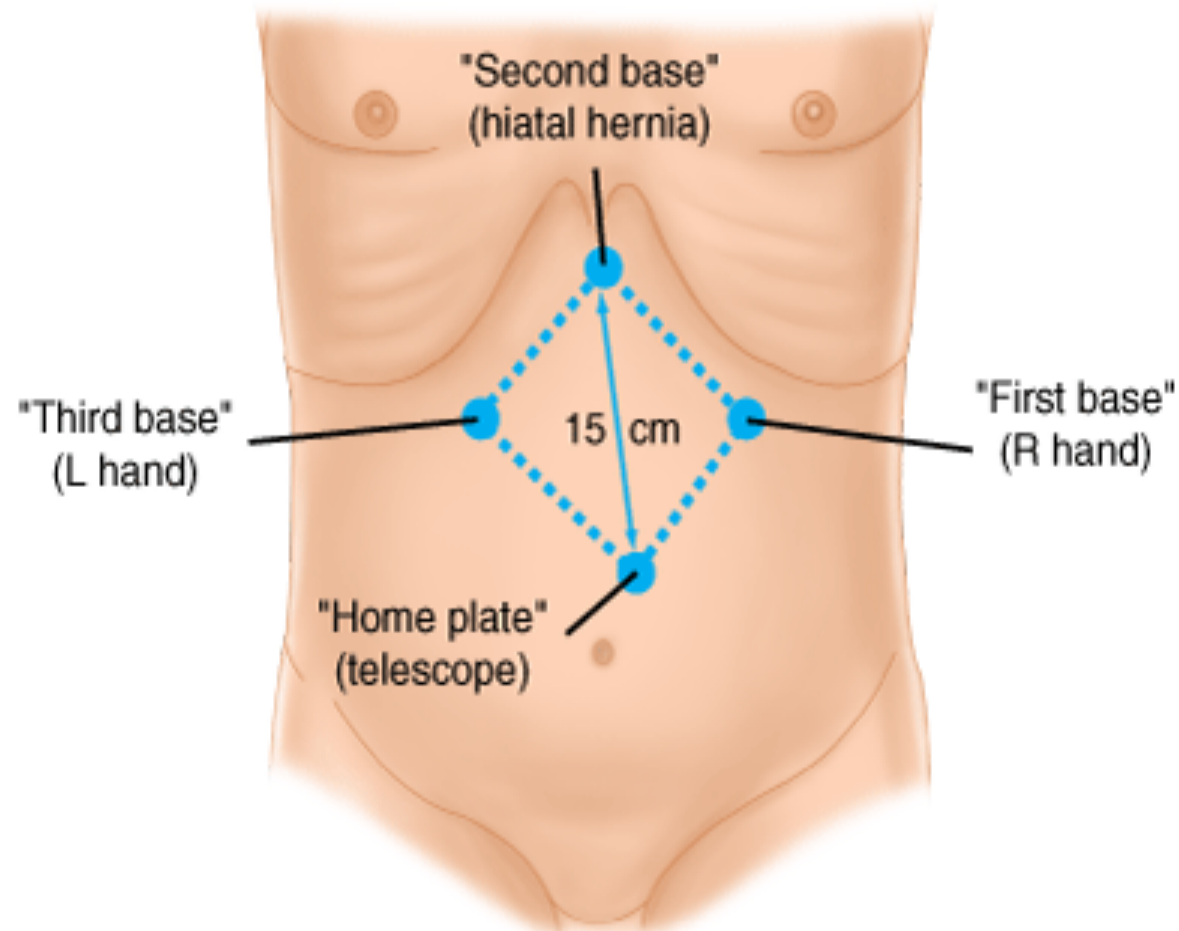
PATIENT POSITION

- Supine
- Prone
- Lithotomy
- Lateral
- Jak-knife
- Modified lithotomy



TROCARS POSITION

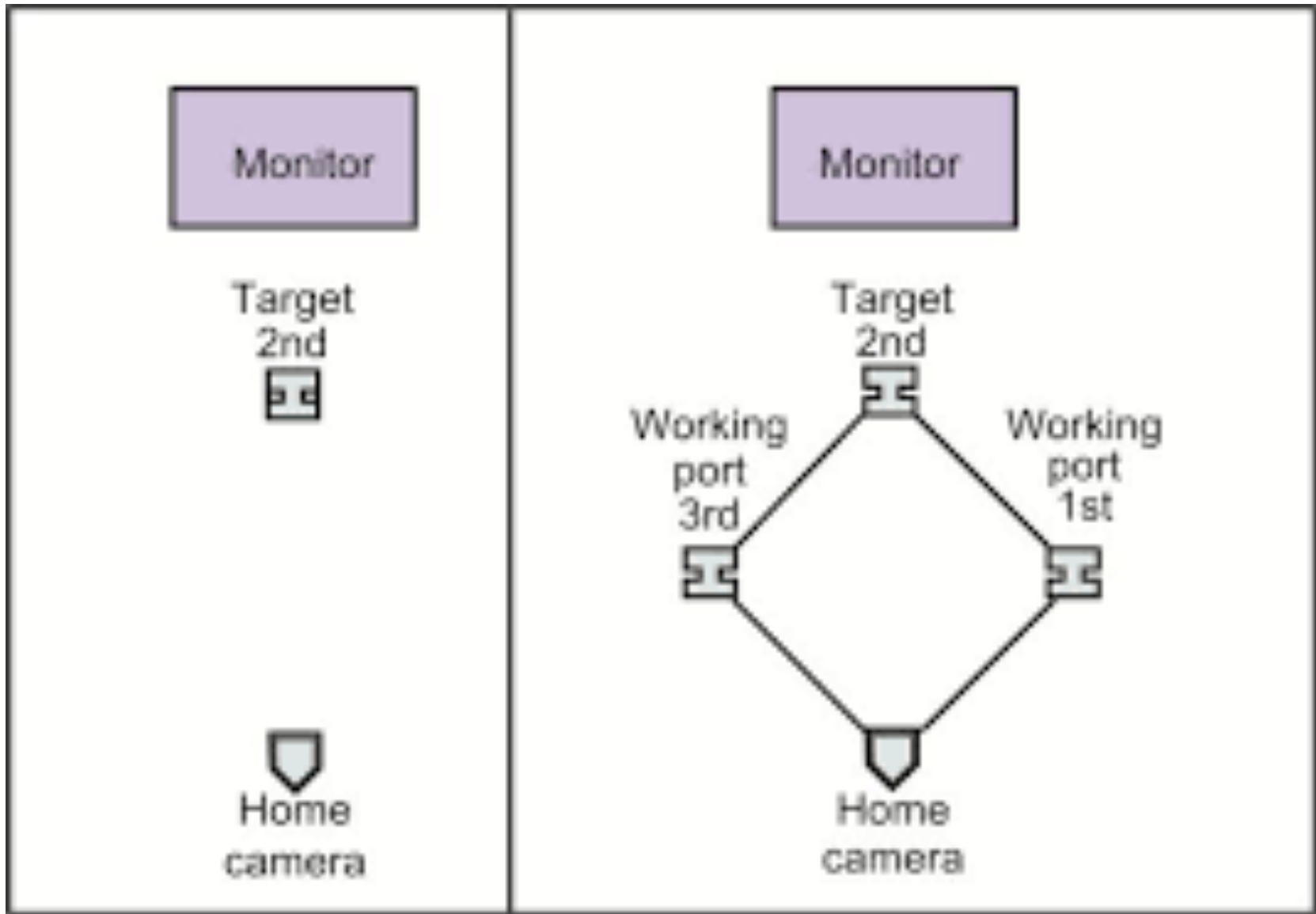
THE DIAMOND OF SUCCESS



Source: Brunicaardi FC, Andersen DK, Billiar TR, Dunn DL, Hunter JG, Matthews JB, Pollock RE: *Schwartz's Principles of Surgery, 9th Edition*: <http://www.accessmedicine.com>

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FUNDOPLICATION, HERNIA, COLON SURGERY

- Patient and surgeon position
- What is the scope (size, degree)?
- How many trocars?
- What is trocar size?
- Where will be the screen?



FUNDOPLICATION



Severe, chronic heartburn can be surgically corrected by Nissen fundoplication — a minimally

HOW TO CONTROL BLEEDER

- DO your best not to have it
- Prepare your self with : strong suction device, other trocars, clip applicator
- Vessels bleeding : Packing, proximal control, electrocautery, clip application, stapler Gray
- Raw service oozing: packing, electrocautery, Argon Beam coagulator, haemostatic agents



OTHERS

- NOTES

- Hand- Assisted laparoscopic surgery

