

ENERGY USE IN MIS TRICKS AND TIPS

ESTHER OKELLO
EBD- EAC



Medtronic
Further, Together

PROGRAM CONTENT - BREAK THINGS INTO SECTIONS

1. BASIC PRINCIPLES OF ELECTRICITY AND ELECTRO SURGERY GENERIC
1. INNOVATIONS IN TECHNOLOGY AND WHY THEY WERE DEVELOPED
1. BEST PRACTICES FOR PATIENT SAFETY

KEY OBJECTIVE OF ANY SURGERY IS TO CONTROL BLOOD LOSS

INTRODUCTION

- One of the biggest enemies of minimally invasive surgery is bleeding.
- The ongoing desire to improve hemostasis and thus its efficacy has led to the rapid evolution of electro-surgical technology.
- For the optimal use of available tools, it is of utmost importance for the laparoscopic surgeon to understand that different electro-surgical instruments have different properties and thus their use has to be tailored.
- It is essential to understand the principles of using appropriate electric currents and techniques to achieve the desired tissue effect and avoid complications and proceed to discuss the modern tools



BASIC PRINCIPLES OF ELECTRICITY- POWER IS NOTHING WITHOUT CONTROL”

ELECTRICITY ALWAYS . . .

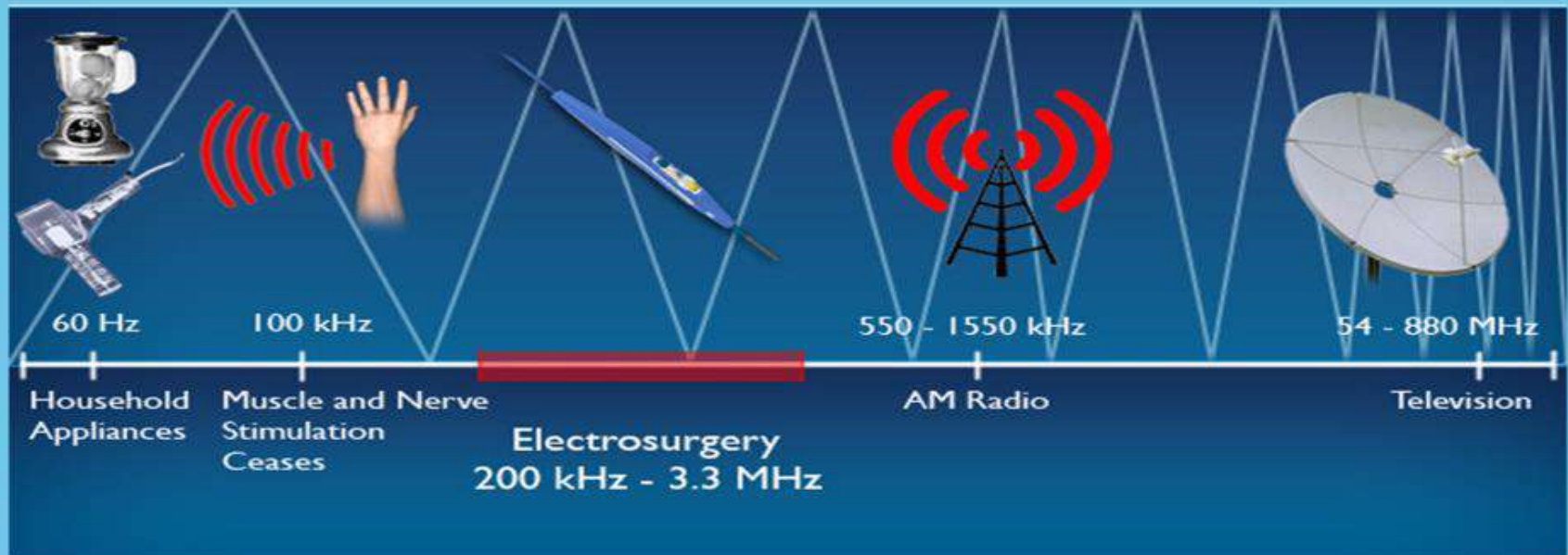
SEEKS GROUND (ITS SOURCE)

SEEKS THE PATH OF LEAST RESISTANCE

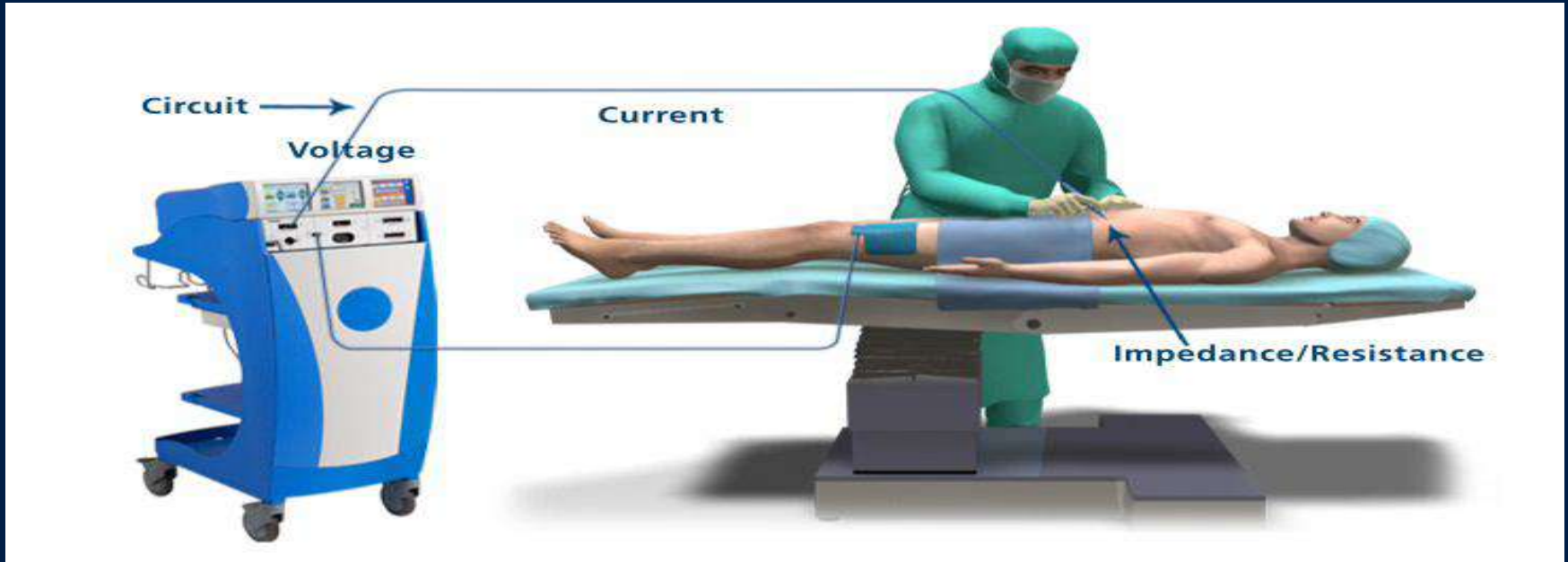


HOW SAFE IS SHOCK OR BURN? ELECTROSURGERY

ELECTROSURGERY FREQUENCY



CURRENT PATHWAY- DEFINITIONS



- Current
- Circuit
- Impedance/Resistance
- Voltage

- **BURNS = CURRENT X TIME/
AREA**

ELECTROSURGERY

Bipolar

Monopolar

Coag

Cut & Coag

Small vessels
Delicate Tissues

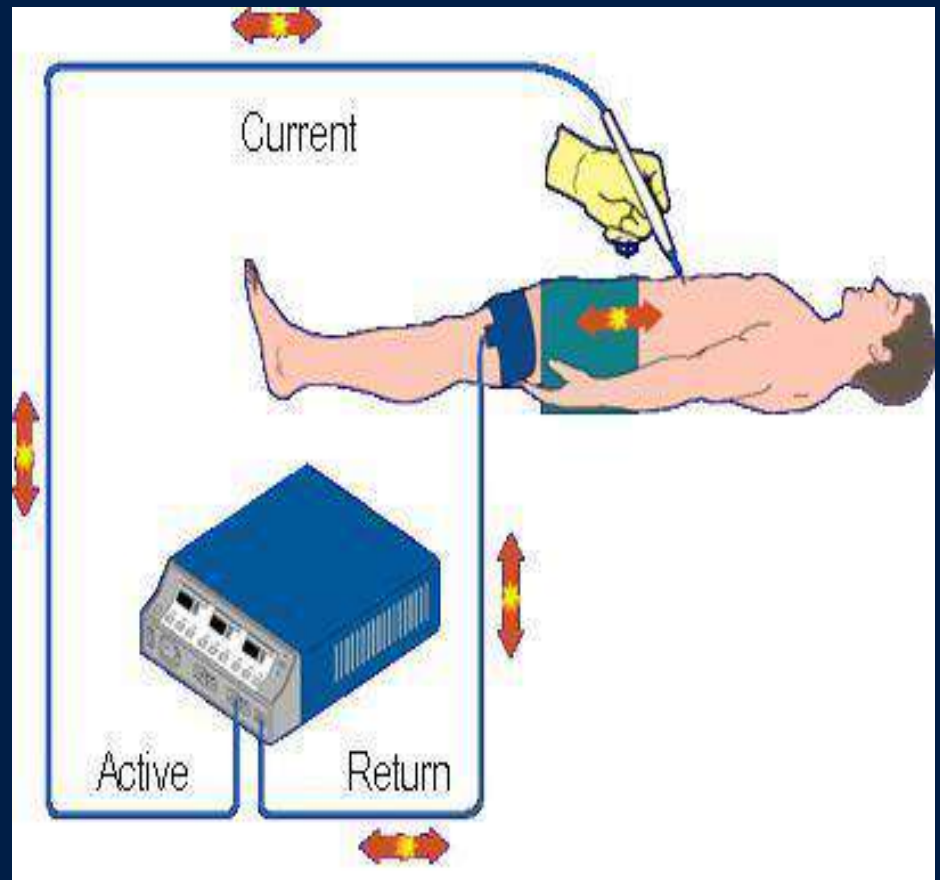
General Application

Between the jaws

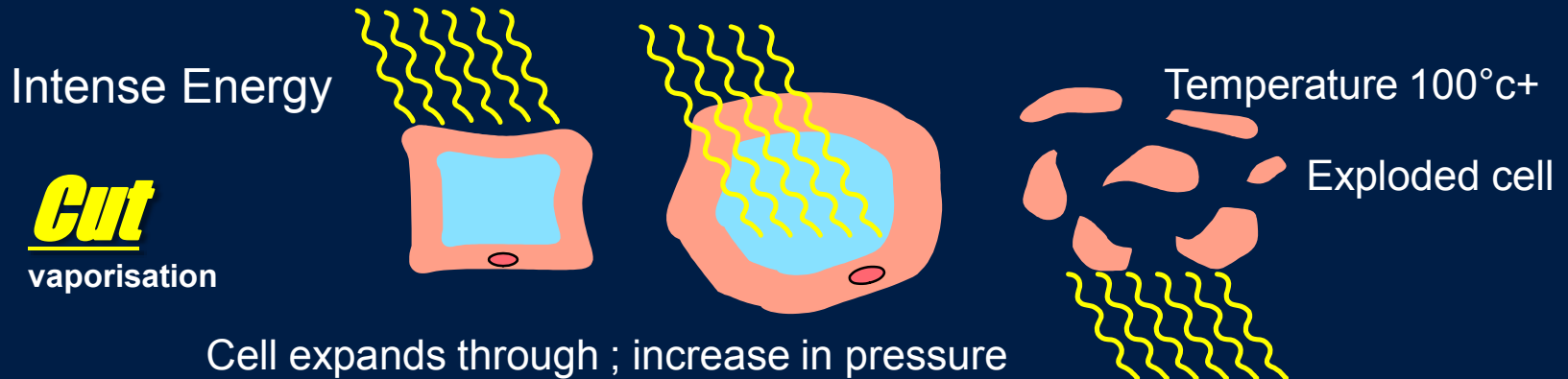
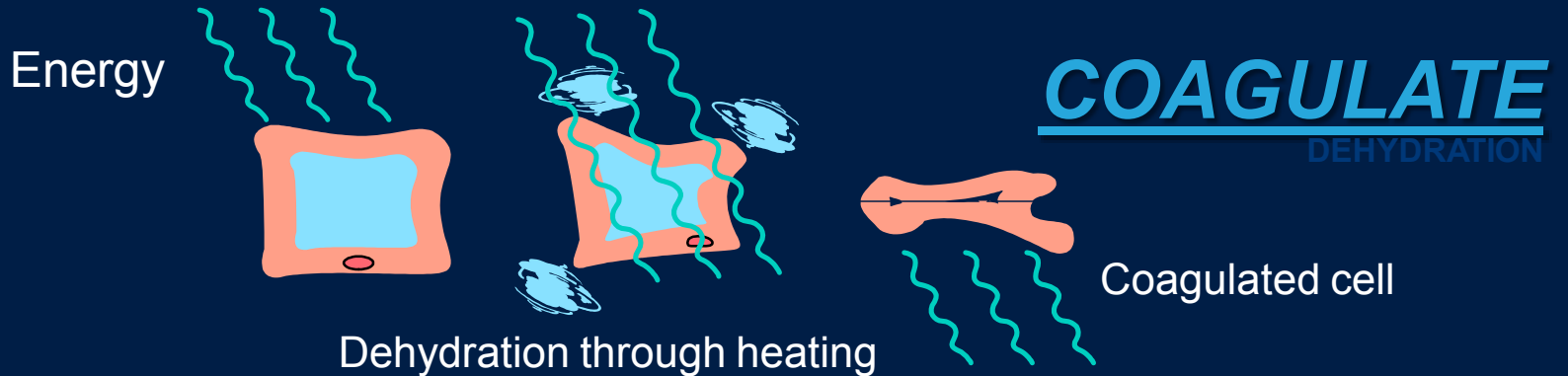
Active and Return Electrode

MONOPOLAR

- Active electrode at surgical site
- Return electrode at another site
- Current flows through the body between the electrodes
- High voltage
 - Coag – 3000 – 9000
 - Cut – 1350 - 4000

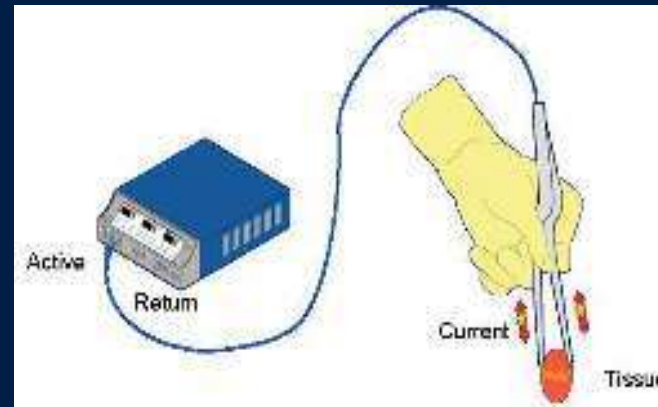


Cut and coagulate:



BIPOLAR

- Active and return electrodes in the instrument
- Current flow confined to tissue between electrodes
- Low Voltage (320 - 1200 volts)

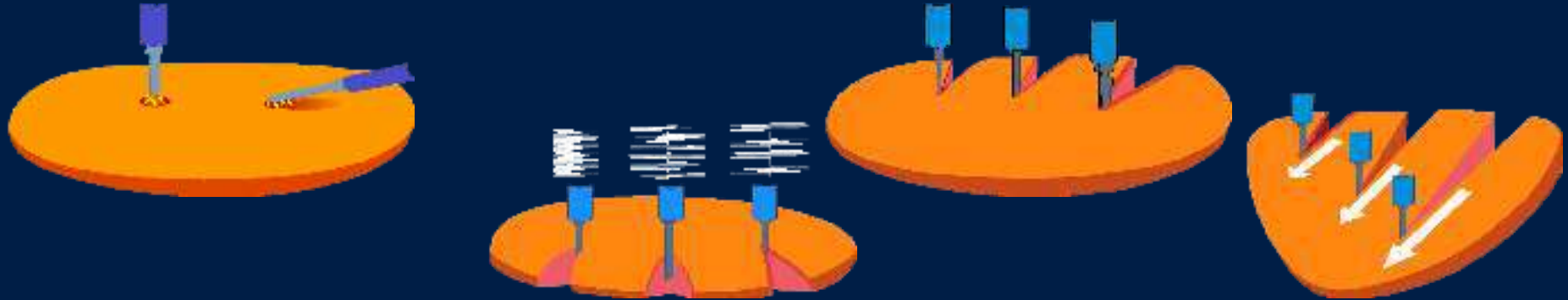


CONTROL BLEEDING USING MONOPOLAR AND BIPOLAR ES

- Vessel size must be small (< 2 mm)
- Low burst pressure
- Sufficient coagulation dependent on technique and application time
- Lateral thermal spread can be large
- Small vessels can be transected unintentionally



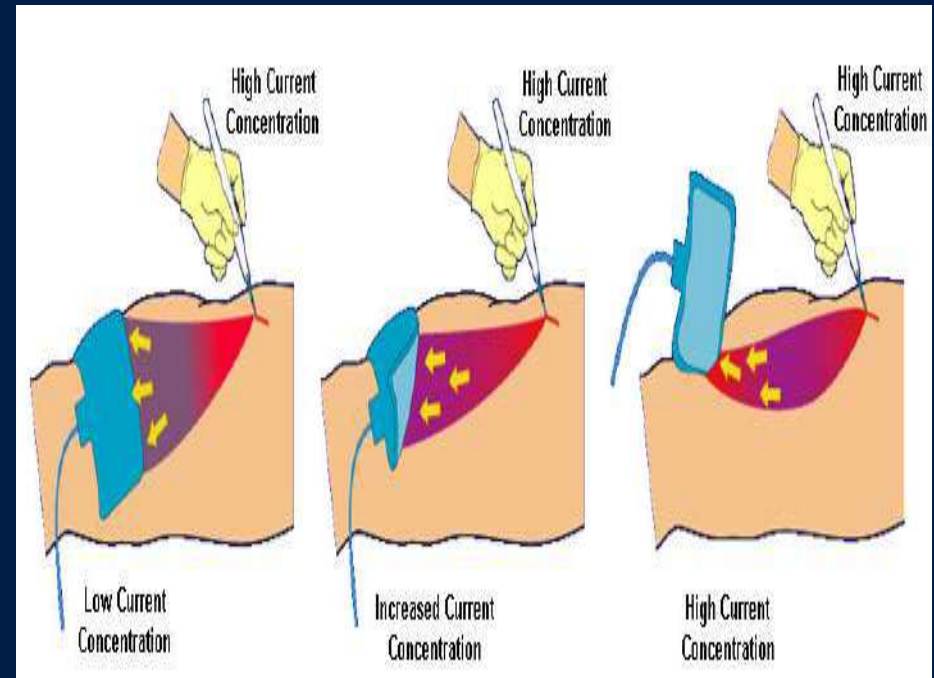
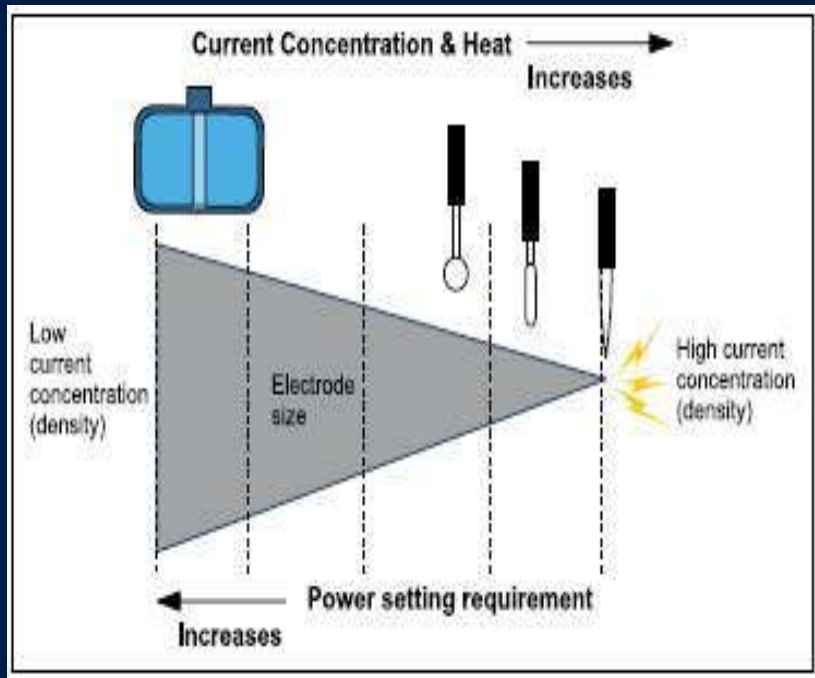
THE ELECTROSURGICAL EFFECT IS INFLUENCED BY VARIABLES:



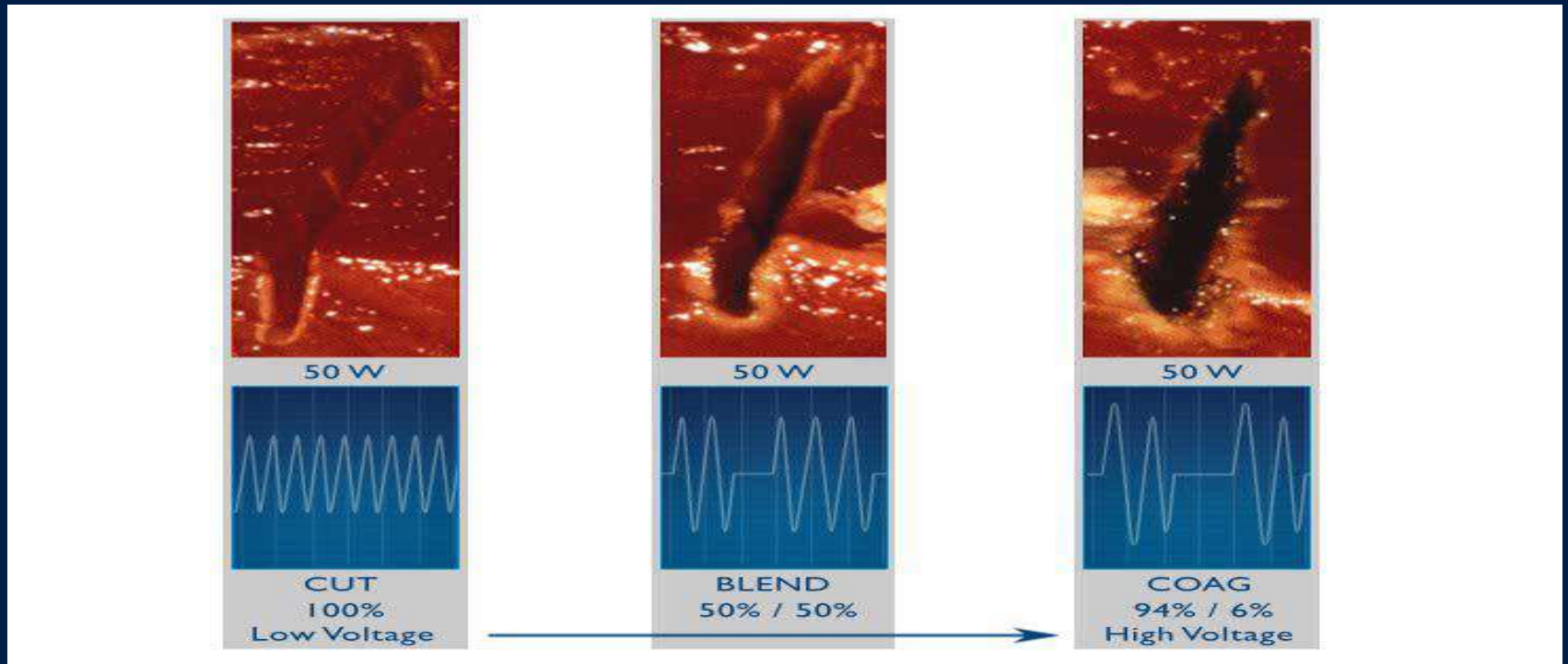
1. Contact Time/Speed of movement
2. Power Settings of Generator
3. Type of electrode used (Current Density)
4. Generator Mode Cut/Coag
5. Tissue Impedance (inc Distance from Active to Return)

|

ELECTRODE SIZE AND CURRENT CONCENTRATION

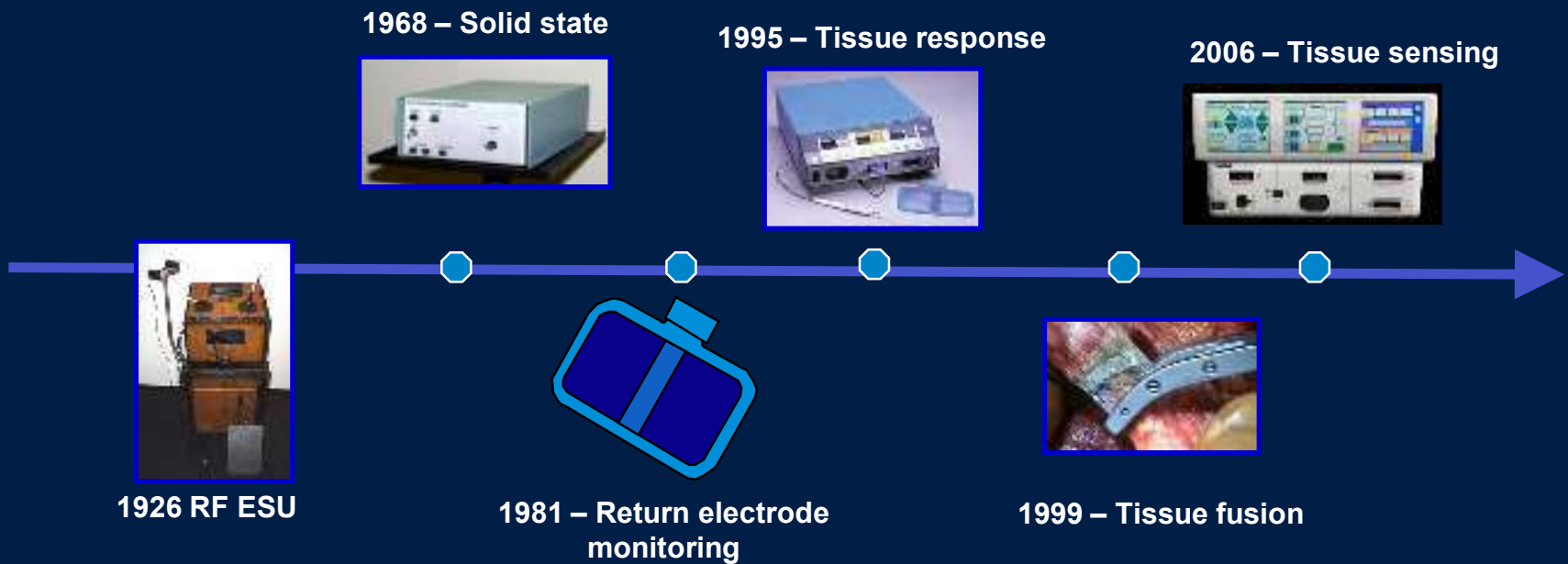


GENERATOR MODE OR WAVEFORM



15

SAFETY INNOVATIONS THROUGH THE YEARS



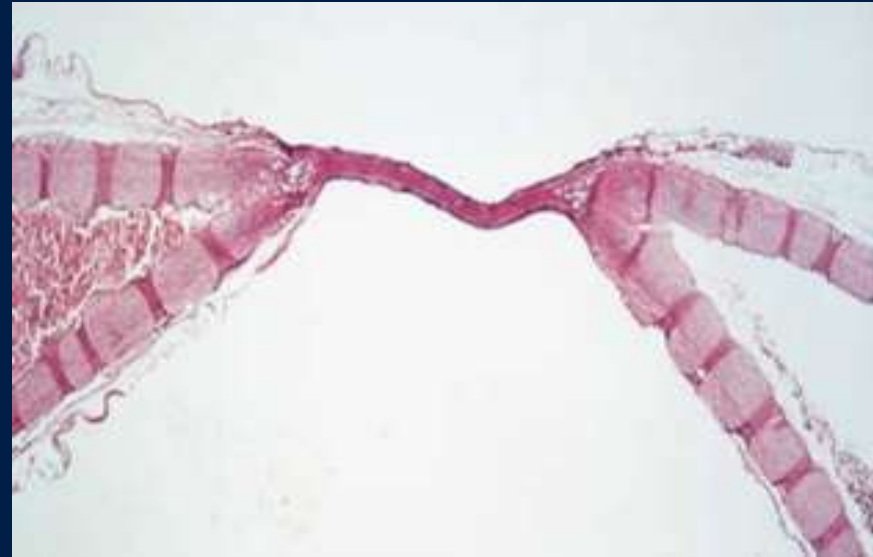
BRINGING POWER UNDER CONTROL

USING ELECTROSURGICAL GENERATORS



ADVANCED ENERGY

Ligasure™ - Tissue Fusion



LIGASURE TISSUE SEALING/FUSION TECHNOLOGY

- Controlled combination of pressure and radiofrequency bipolar energy
 - Low voltage
 - High current
- Fuses tissue bundles, lymphatics and vessels up to 7 mm in diameter
- Clips, sutures, mechanical ligation devices NOT required
- Superior clinical performance when compared to ultrasonic scalpel, plasma bipolar coagulator, and nano ES device

Lamberton et al, 2008



Microscopic stain of artery

Benefits of LigaSure™

Benefits to the Surgeon and the Patient

- Significant reductions in postoperative pain
- No foreign tissue left behind (reduction in adhesion formation)
- Minimal thermal spread
- Have the highest burst pressure, fastest sealing time and were highest rated overall compared to Gyrus PK™*, Harmonic ACE™* and ENSEAL™*¹ Lambertson et al. (2008)
- Significantly reducing operative blood loss in colorectal and gynecologic surgery compared to other energy based devices
- Significantly reduce procedure time in colorectal and gynecologic surgery
- Reduce patient length of stay compared to sutures



2 LS10 generator at KES 1,000,000

Medtronic

BEST PRACTICES: SELECT ESU AND ACCESSORIES TO MINIMIZE PATIENT RISK

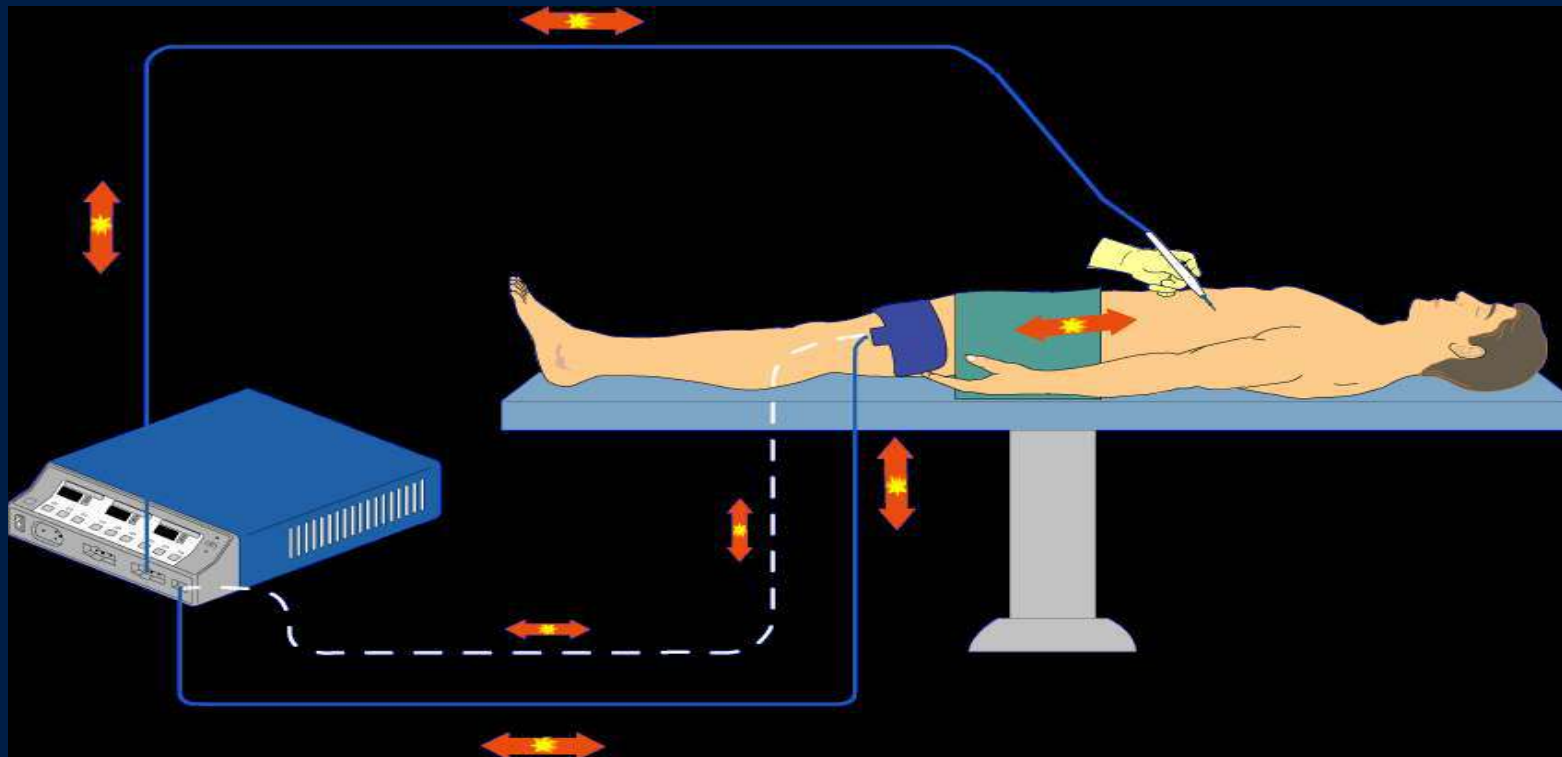
- Dual-contact dispersive electrodes with nondrying hydrophilic gel
- Return electrode contact quality monitoring



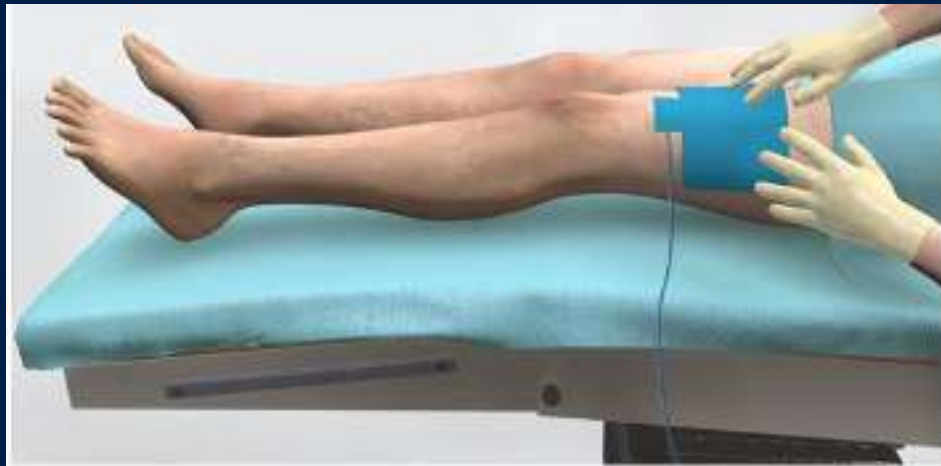


SAFETY PRACTICES IN ES

1. CONTACT QUALITY MONITORING



PATIENT RETURN ELECTRODE SITE SELECTION



- Follow manufacturer's written instructions
- Well vascularized muscle mass
- Convex area
- Close to surgical site

Hotline News, 2000

PATIENT RETURN ELECTRODES SITE SELECTION



Prostheses



Bony prominences



Scar tissue

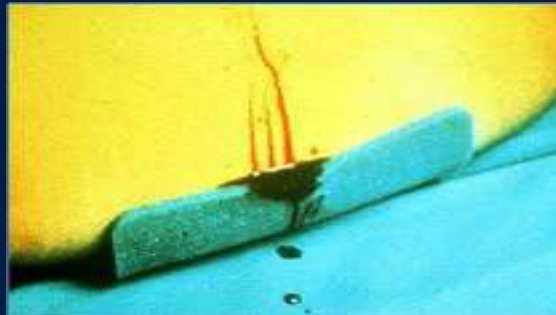


Hair

PATIENT RETURN ELECTRODE SITE PREPARATION



Follow manufacturer's instructions for hair removal, cleaning, and drying site



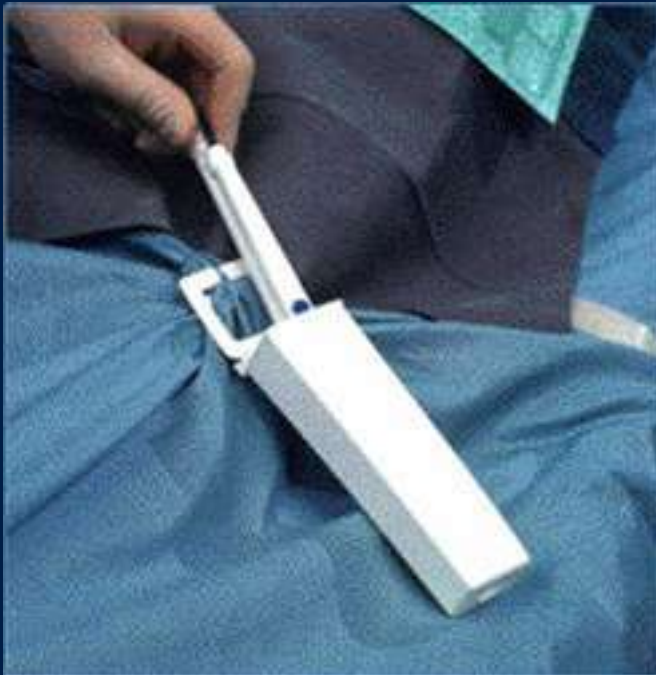
Protect return electrode from fluid invasion



Do not use flammable agents for PRE site preparation

AORN Recommended Practices 2008

ACTIVE ELECTRODE



Active electrode **MUST** be in a non-conductive holster when not in use

Electrode that does not fit holster should be placed in a designated site with tip away from flammable material

Active electrode tips should be securely seated into the hand piece

AORN Recommended Practices 2008

RADIOFREQUENCY CURRENT LEAKAGE

- Active electrode cords should not be wrapped around metal instruments
- Active electrode and other electrical cords should not be bundled together



ELECTROSURGERY DURING PREGNANCY

- No evidence to contraindicate use
- Dispersive amniotic fluid protects fetus from concentration of electrical current
- No neuromuscular stimulation above 100 kHz — radiofrequency range

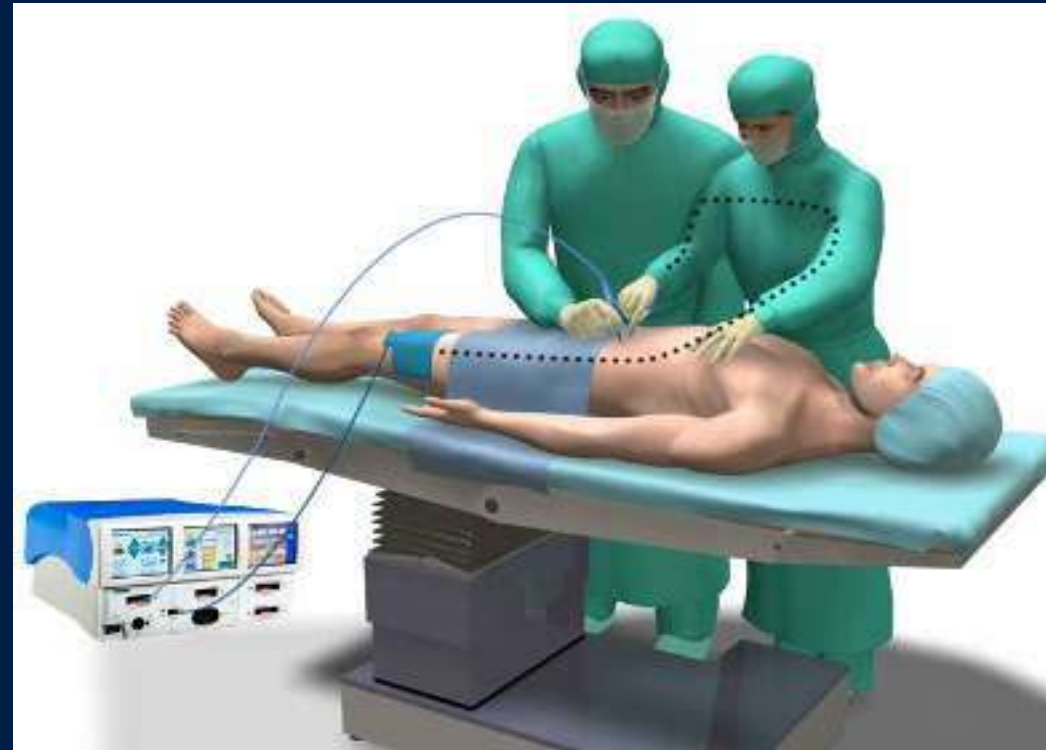


Leonardo da Vinci
c. 1510 - 1512

Te Linde's Operative Gynecology Text, 8th Edition

AVOID HEMOSTAT BURNS

- Use lowest power setting
- Activate low voltage (cut)
- Avoid touching patient
- Hold hemostat with full grip
- Do not open circuit activate
- Avoid metal to metal arcing



Note: Surgical gloves do not insulate against RF current

JEWELRY



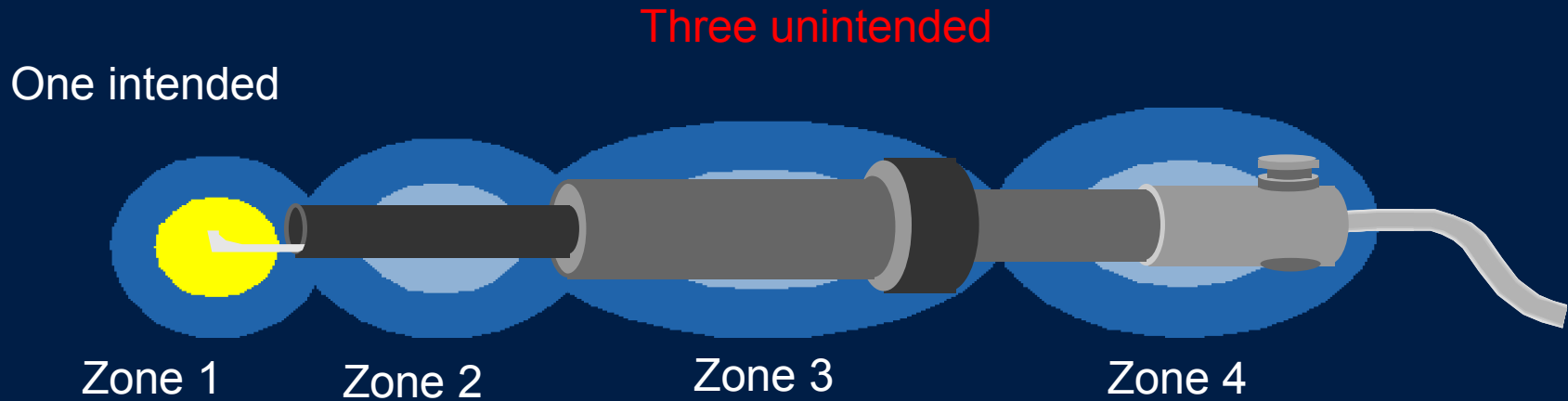
- Jewelry should be removed if it is within the activation range of the active electrode
- When using a reusable, capacitive-coupled return electrode, all of the patient's metal jewelry should be removed

AORN Recommended Practices 2008

ELECTROSURGERY SAFETY CONCERNS DURING MIS

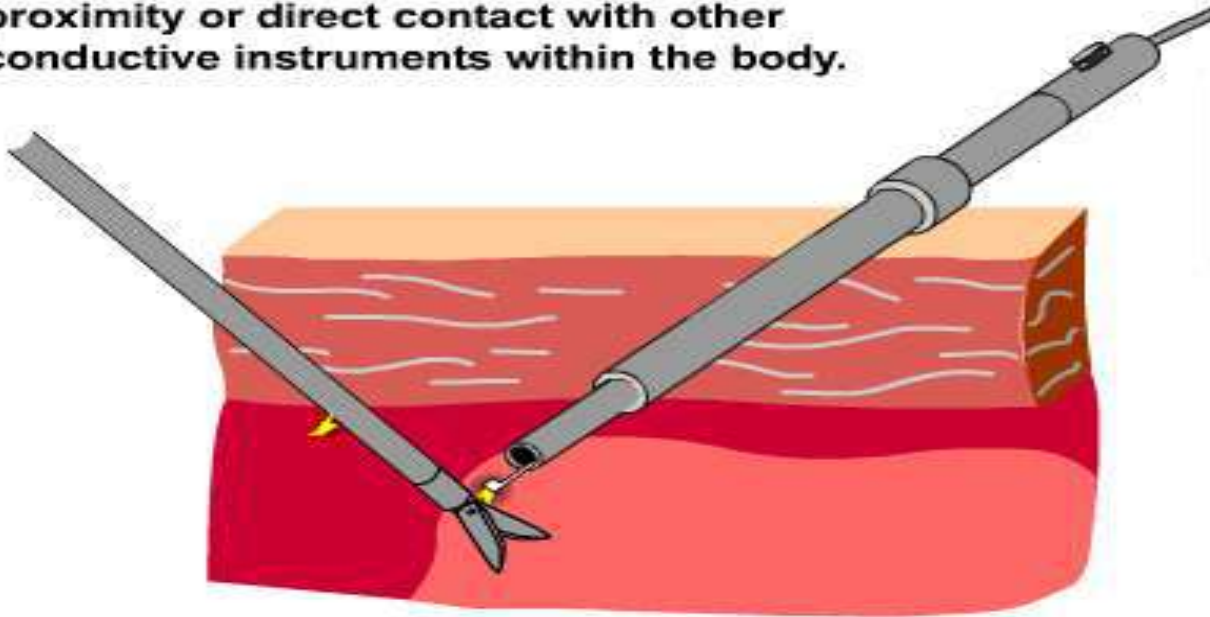
- Direct coupling
- Insulation failure
- Capacitive coupling
- Residual Heat

FOUR ZONES OF ES EFFECT

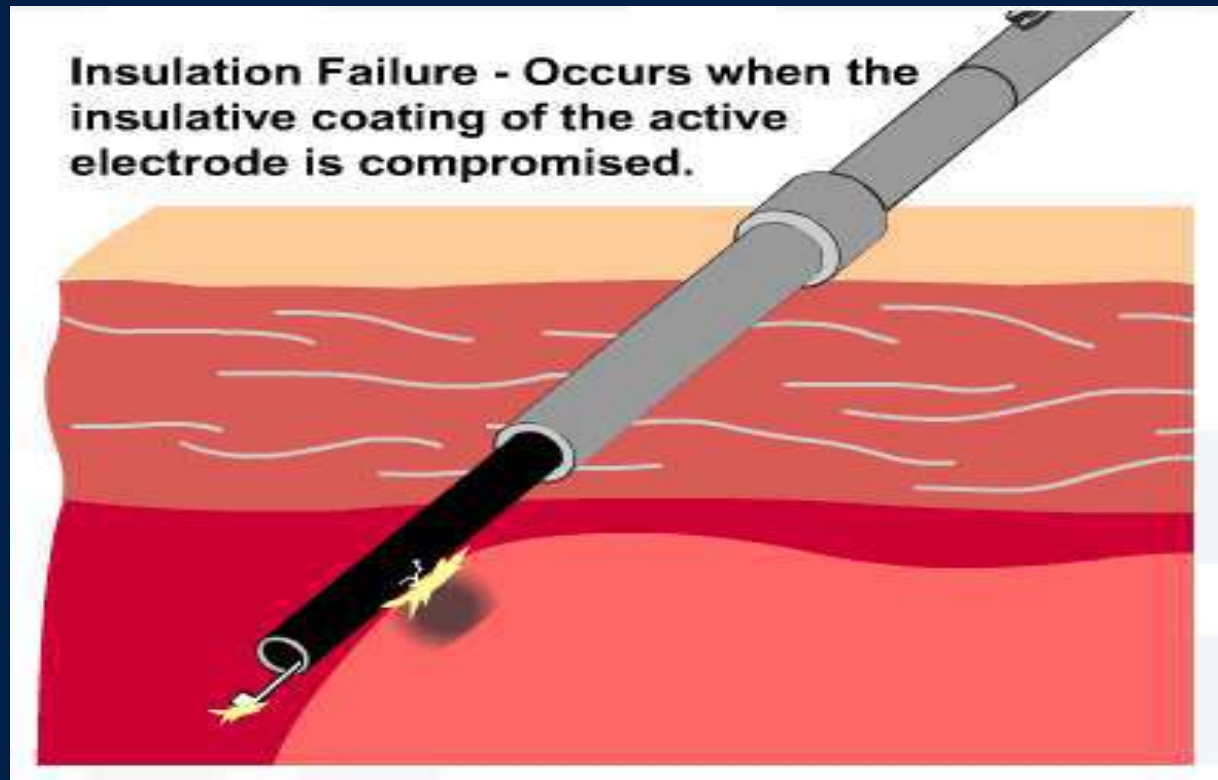


DIRECT COUPLING

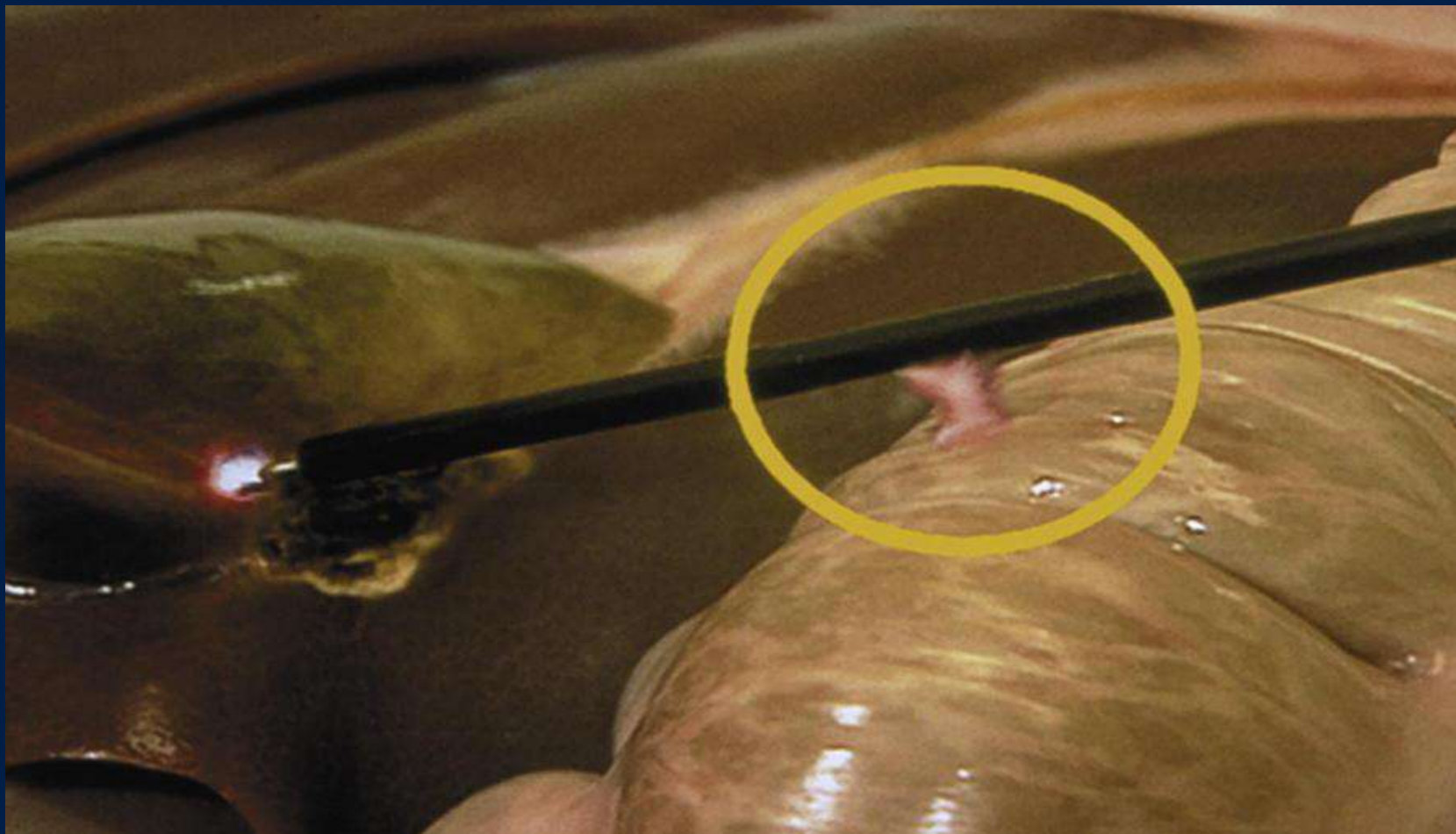
Direct Coupling - Occurs when the active electrode is activated in close proximity or direct contact with other conductive instruments within the body.



INSULATION FAILURE

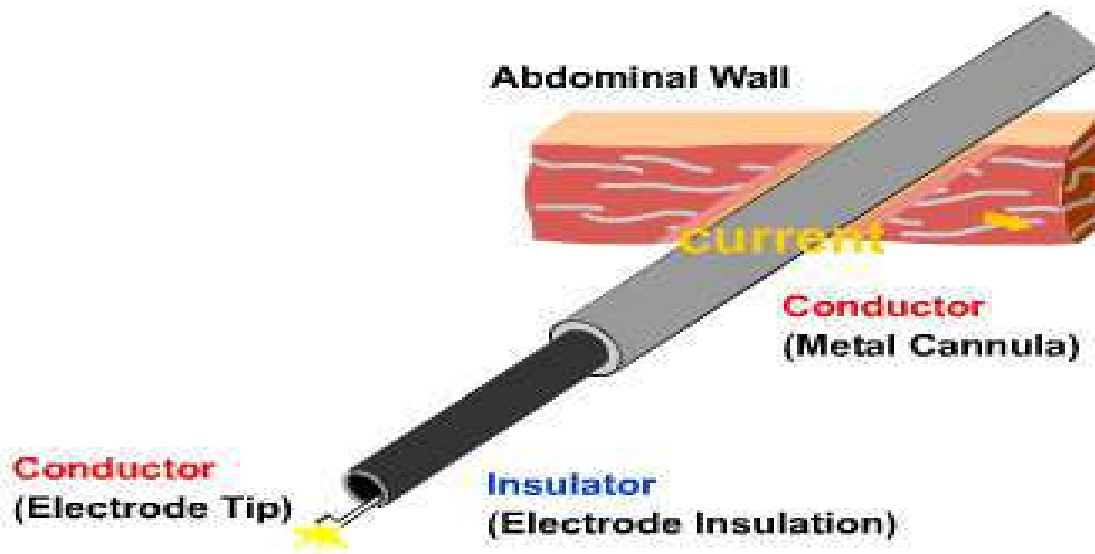


INSULATION FAILURE



CAPACITIVE COUPLING

Capacitive Coupling - Occurs when two **conductors** separated by an **insulator** discharges current into other surrounding conductive material (tissue, trocar, etc.)



CAPACITATIVE



REFERENCES

- Delayed manifestations of laparoscopic bowel injury ; Cassaro S. American Surgeon 2015 81:5 (478-482)
- Complications of electrosurgery in laparoscopy ; Huang H.-Y., Yen C.-F., Wu M.-P. Gynecology and Minimally Invasive Therapy 2014 3:2 (39-42)
- Surgical Complications Specific to Monopolar Electrosurgical Energy: Engineering Changes That Have Made Electrosurgery Safer ; Odell R.C. Journal of Minimally Invasive Gynecology 2013 20:3 (288-298)
- Electrosurgical Generators and Monopolar and Bipolar Electrosurgery ; Vilos G.A., Rajakumar C. Journal of Minimally Invasive Gynecology 2013 20:3 (279-287)
- Indirect electrical injuries from capacitive coupling: A rarely mentioned electrosurgical complication in monopolar laparoscopy .Liu Q., Sun X.

QUIZ

- STATE WHETHER THE STATEMENTS BELOW ARE TRUE OR FALSE
- The parallel orientation of active electrode cords and laparoscopic camera cords cause transfer of energy to the camera cord resulting in cutaneous burns at the camera trocar incision.
- Electrosurgery is used extensively in laparoscopic surgery and can cause thermal injuries that are harder to detect than mechanical injuries and may evolve over time
- It is essential to understand the principles of using appropriate electric currents and techniques to achieve the desired tissue effect and avoid complications

VALLEYLAB™ FT10 ENERGY PLATFORM

VLFT10GEN



- Automatic instrument recognition
- Utilizes most current and all new LigaSure™ instruments
- Single, simplified touch screen
- Exclusive Valleylab™ exchange software update system
- Unique Valleylab™ mode for enhanced dissection with hemostasis
- Adaptive REM™ system
- Automatic power settings require minimal setup and minimize need for further handling during surgery
- Bipolar cable compensation reads cable length and width for consistent electrosurgical output
- Autobipolar capability ,Soft coag settings

VALLEYLAB FORCE FX8 ENERGY PLATFORM

VLFX8GEN



- Automatic instrument recognition
- Single, simplified touch screen
- Exclusive Valleylab™ exchange software update system
- Unique Valleylab™ mode for enhanced dissection with hemostasis
- Adaptive REM™ system
- Automatic power settings require minimal setup and minimize need for further handling during surgery
- Bipolar cable compensation reads cable length and width for consistent electrosurgical output
- Autobipolar capability
- Soft coag settings

VLLS10GEN VALLEYLAB™ LS10 VESSEL SEALING GENERATOR



- A simple, portable, ‘plug and play’ generator, designed to give you control, confidence and consistency in the OR
- Single power on/off button
- Single instrument plug in port, compatible with all LigaSure™ devices
- RFID (radio frequency identification) technology for automatic software upgrades
- Improved and enhanced LigaSure™ vessel sealing performance

VLFTCRT VALLEYLAB™ FT10 CART

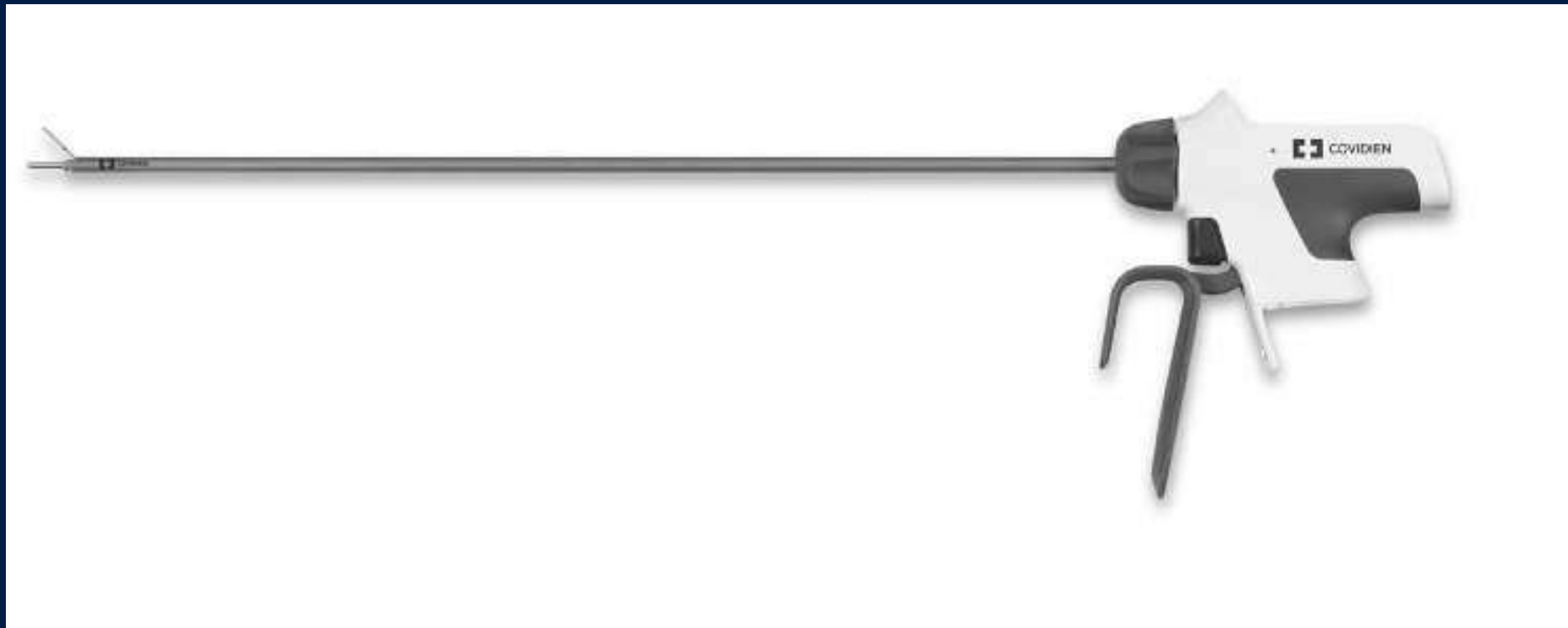


- The Valleylab™ FT10 cart is compatible with the Valleylab™ FT10 and FX8 energy platforms and the LS10 generator
- Cord management system
- One storage drawer
- Rust resistant
- Conductive casters (2 locking, 2 non-locking)
- Multiple shelves

SE3695 RAPIDVAC™ SMOKE EVACUATOR



- **Requires SEA3700 RapidVac™ smoke evacuator filter**
- **For use with any electrosurgical generator**
- **Evacuates electrosurgical smoke and laser plume**
- **Synchronizes with electrosurgical units for auto activation using SEA3730**
- **Five power levels plus turbo mode**
- **Maximum flow rate of 44 cfm**
- **Needs no prefilters or adapters**



Sonicision Ultrasonic dissector





14/06/18

LAPAROSCOPY IN LOW RESOURCE SETTING

MITG

PRESENTED BY
CHARLES AWITI
BDM

Medtronic
Further, Together

INTEGRITY, HONESTY, SAFETY AND QUALITY



We will conduct business with integrity and honesty in compliance with all laws and Company policy.

We are committed to produce products that are safe and of the highest quality for our customers.



OUR NAMES:

1. COVIDIEN.



2. TYCO HEALTHCARE.



3. AUTO SUTURE.



4. USSC = UNITED STATES SURGICAL COMPANY.



5. MEDTRONIC

ACCESS AND TROCAR SYSTEMS:

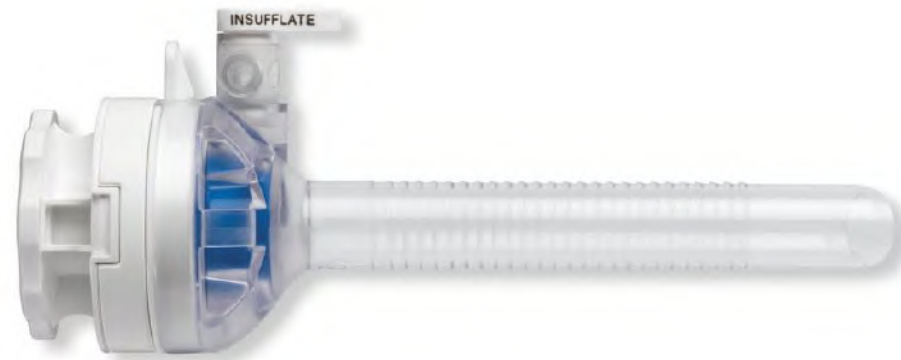


V2 Trocars (Bladed)



Bladeless trocars

12 MM OPTICAL TROCAR



LAPAROSCOPIC GRASPING HAND INSTRUMENTS:



Endo Clinch

Endo Grasp



Endo Babcock



LAPAROSCOPIC HAND INSTRUMENTS: WITH MONOPOLAR ELECTROCAUTERY COMPATIBILITY



Endo dissect



Endo Shears

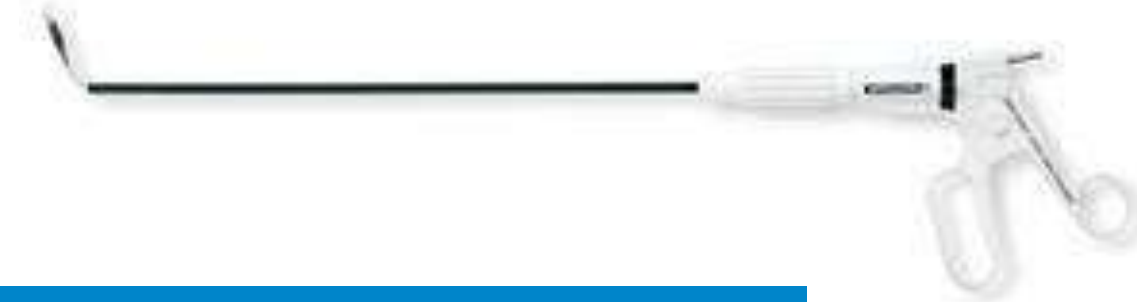
ARTICULATING HAND INSTRUMENTS:



Roticulator Endo Grasp



Roticulator Endo dissect



Roticulator Endo mini-shears

SPECIMEN RETRIEVAL POUCHES:



Endo Catch Gold 10 mm can be used for the extraction of the gall bladder



Endo Catch 15 mm can be used for the extraction of the spleen

LIGATION PRODUCTS:



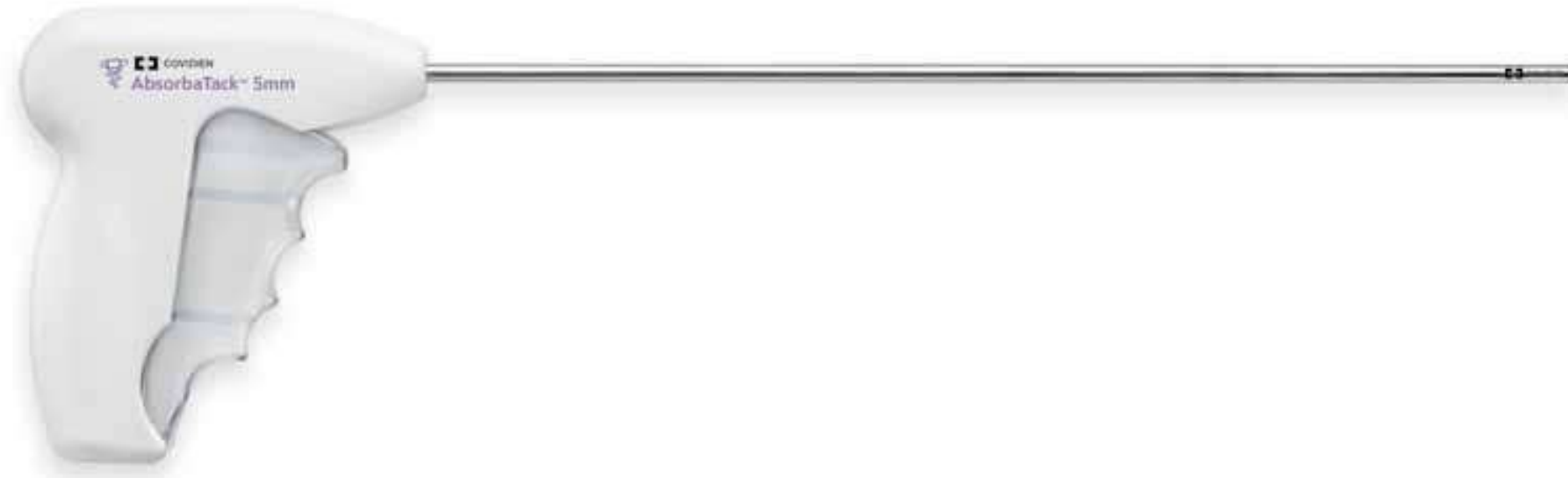
The Endo Clip™ 10 mm applicator contains 20 titanium clips in the ML and M sizes, and 15 titanium clips in the L size.



The Endo Clip™ III 5 mm clip applicator

NEW INNOVATIONS:

AbsorbaTack™ 5mm Fixation Device



The AbsorbaTack™ 5mm fixation device is a sterile, single use device for fixation of prosthetic material, such as hernia mesh, to soft tissue. The tack is constructed of an absorbable synthetic polyester copolymer derived from lactic and glycolic acid.

IMAGINE A SURGERY WITHOUT SCARS

SILS Port (Single incision laparoscopic surgery)



The SILS™ Port is a flexible laparoscopic port that can accommodate up to three instruments through a single incision-offering surgeons an immediate advancement in patient care.

LAPAROSCOPIC STAPLERS:

ENDO GIA UNIVERSAL:
THE STAPLER PLACES TWO TRIPLE, STAGGERED ROWS OF TITANIUM STAPLES AND SIMULTANEOUSLY THE KNIFE DIVIDES THE TISSUE IN BETWEEN. THE INSTRUMENT IS DESIGNED FOR MULTIPLE USE DURING A SINGLE SURGICAL PROCEDURE, IT CAN BE RELOADED UP TO A TOTAL OF 25 APPLICATIONS ON THE SAME PATIENT. THE DISPOSABLE LOADING UNIT CAN ARTICULATE AT 22° AND 45° IN BOTH DIRECTIONS BY MOVING THE PROXIMAL KNOB ON THE STAPLER.



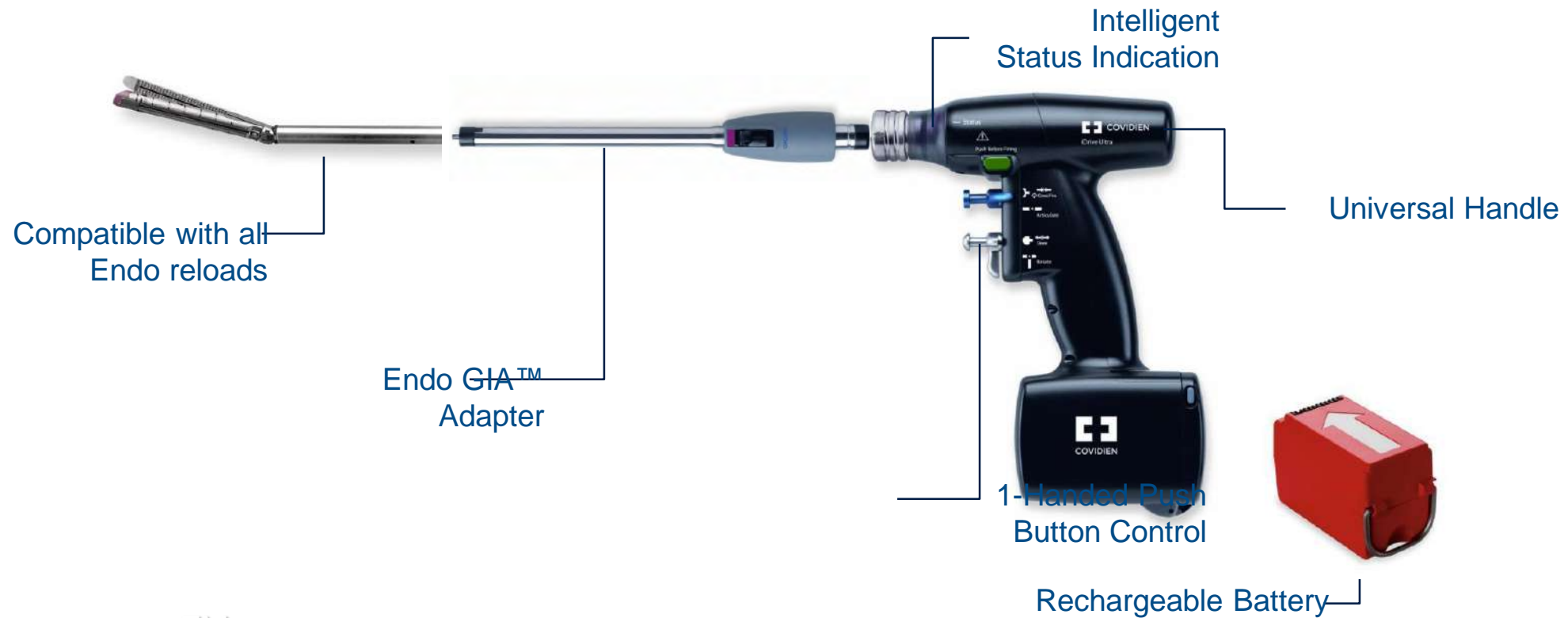
ENDO GIA – ULTRA



I-DRIVE (POWER STAPLING)



iDrive™ Ultra Powered Stapling System



iDrive™ Ultra Powered Handle	Endo GIA™ Adapter	Battery and Accessories
<ul style="list-style-type: none"> • Multi-patient reusable handle • 50 procedures//300 firings (6:1 ratio) • Push button operation of all functions <ul style="list-style-type: none"> - Articulate, rotate - Clamp / Open - Fire / Retract • Smart LED communication 	<ul style="list-style-type: none"> • Multi-patient reusable adapter • 50 procedures//300 firings (6:1 ratio) • Universal Compatibility with all Endo GIA™ reloads <ul style="list-style-type: none"> - Endo GIA™ with Tri-Staple™ technology - Legacy products • Specialty (curved tip, radial, etc) 	<ul style="list-style-type: none"> • Battery and Charger compatible with both iDrive™ and iDrive™ Ultra Stapling systems • Rechargeable 16.8 volt lithium ion <ul style="list-style-type: none"> - Capable of 300 procedures

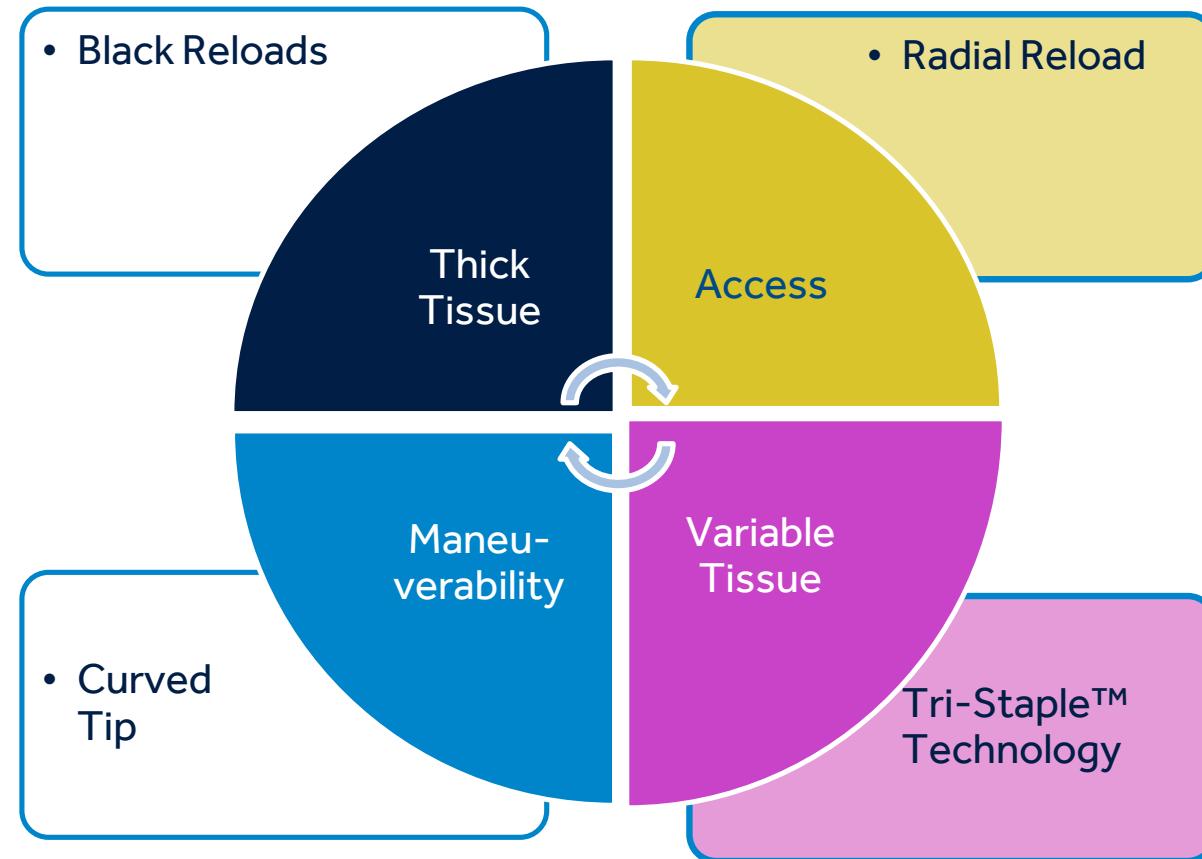
The iDrive™ Ultra Is The Only Fully Powered Endostapling Platform

RELOADS



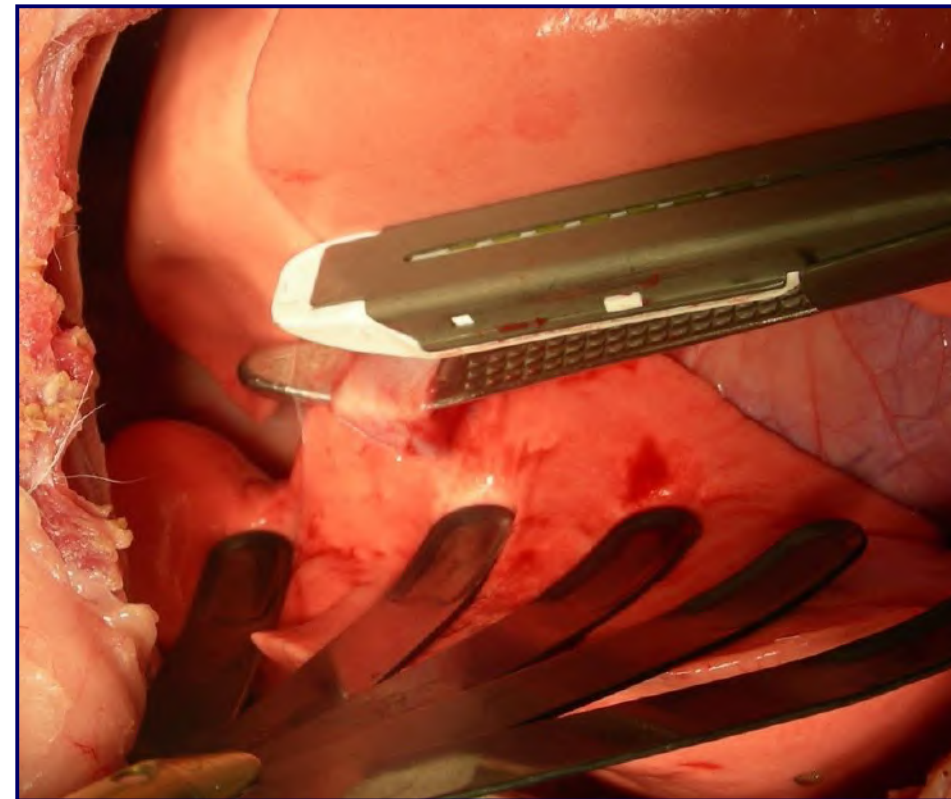
Comprehensive Tissue Solutions

Minimizing The Challenges Associated With Extra-Thick, Hard to Reach and High Risk Tissues



STAPLING MADE SMARTER

Curved Tip Reload for Thoracic and HPB Surgery



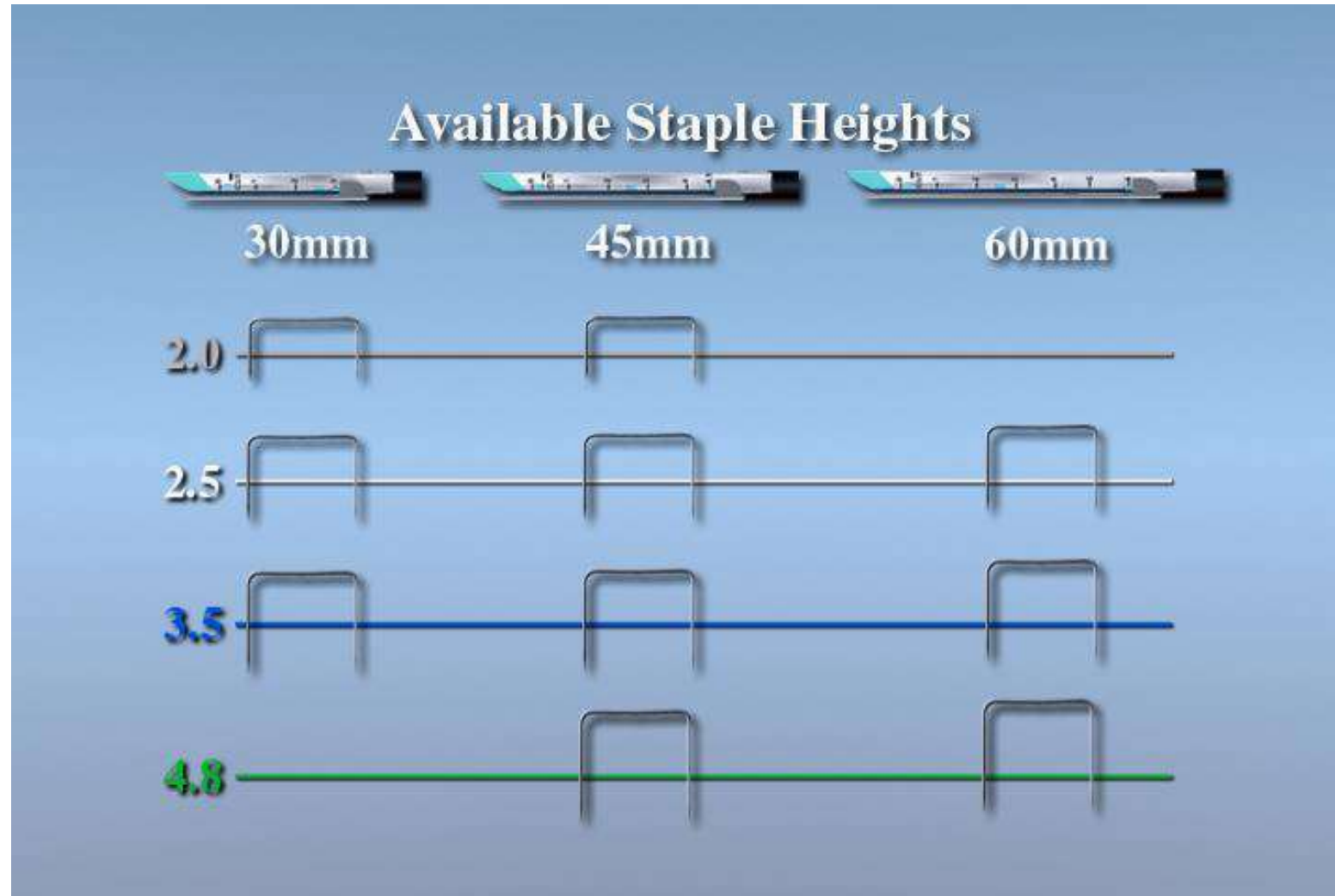
Improved tissue manipulation, ➤
maneuverability & visualization

Curved tip for blunt tip dissection of tissue ➤

REINFORCED RELOAD



RELOADS IN DIFFERENT SIZES

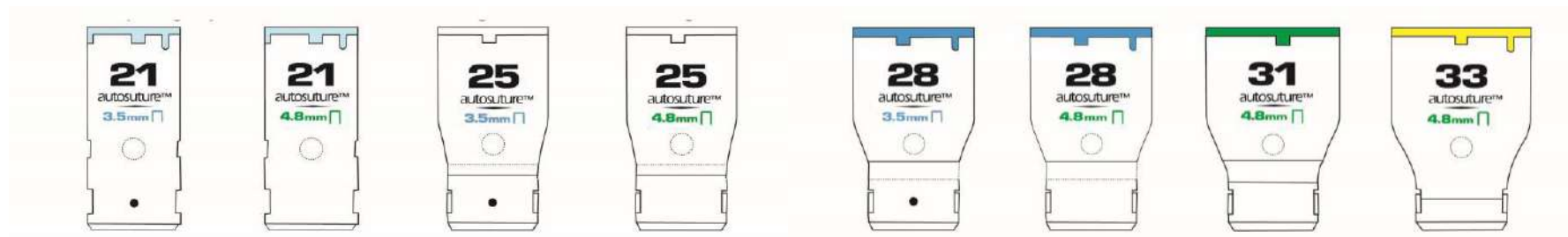


EEA DST LINE:

THE EEA DST CIRCULAR DISPOSABLE STAPLER, FORMS 2 CIRCULAR ROWS OF TITANIUM STAPLES AND A KNIFE IS CUTTING ON THE INNER DIAMETER OF THE STAPLES.



DST
series™



PARIETEX PROGRIP MESH

- Self Fixing Mesh for
 - Open Inguinal Hernia Repair
 - Laparoscopic Inguinal Hernia repair

PARIETEX COMPOSITE MESH

- Open Skirt for Intraperitoneal placement
- Open Ventral Hernia Repair

V-LOC SUTURE

- Knotless wound Closure Device
- Monofilament
- Essential for laparoscopic surgeries

COVIDIEN LAPAROSCOPIC TOWER



NATIVE FULL HD 1080P LAPAROSCOPIC CAMERA SYSTEM



WHAT MAKES AN HD IMAGE? THE WEAKEST COMPONENT OF THE SYSTEM DETERMINES WHAT YOU SEE



**LAPAROSCOPES:
5 & 10MM DIAMETERS WITH 0& 30 DEGREES DIRECTION OF VIEW AND A 10MM, 45
DEGREE ENDOSCOPE, EACH FEATURING PRECISE HD-OPTICS**



**LED LIGHT SOURCE:
TRUE WHITE LIGHT – 20,000 HR LIFESPAN**



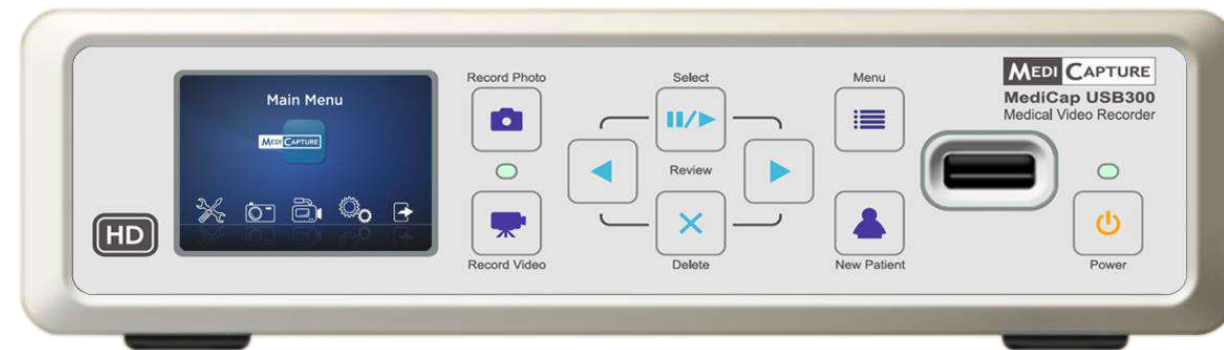
40L INSUFFLATOR: THERMOREGULATION & PRESSURE REGULATION



SUCTION AND IRRIGATION PUMP SYSTEM



MEDICAPTURE USB300: HD MEDICAL-GRADE VIDEO RECORDER



REUSABLE HAND INSTRUMENTS

WIDE RANGE OF SOLUTIONS

- Access Trocars and accessories
 - Reusable
 - Disposable
- Laparoscopic Needle holders
- Ligation for Laparoscopic and Open procedures
 - Reusable
 - Disposable
- Suction/Irrigation

ACCESS TROCARS

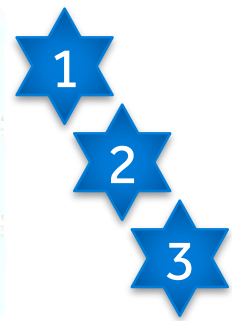


© 2011 Medtronic

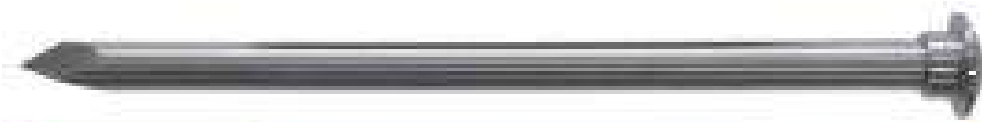
REUSABLE TROCARS



10-1115THC	Trocar with silicone valve, dismantable, threaded carbon cannula 5.5mm	QTY: 1 per box
10-1116THC	Trocar with silicone valve, dismantable, threaded carbon cannula 11mm	QTY: 1 per box
10-1117THC	Trocar with silicone valve, dismantable, threaded carbon cannula 12.5mm	QTY: 1 per box



REUSABLE OBTURATORS

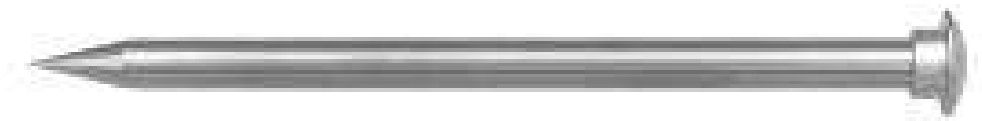


10-1034	Triangular Obturator 5.5mm	QTY: 1 per box
10-1044	Triangular Obturator 11mm	QTY: 1 per box
10-1049	Triangular Obturator 12.5mm	QTY: 1 per box

1
2



10-1034BL	Blunt Obturator 5.5mm	QTY: 1 per box
10-1044BL	Blunt Obturator 11mm	QTY: 1 per box
10-1049BL	Blunt Obturator 12.5mm	QTY: 1 per box



10-1035	Conical Obturator 5.5mm	QTY: 1 per box
10-1045	Conical Obturator 11mm	QTY: 1 per box
10-1050	Conical Obturator 12.5mm	QTY: 1 per box



10-1068	Safety Obturator 5.5mm	QTY: 1 per box
10-1069	Safety Obturator 11mm	QTY: 1 per box
10-1069-12.5	Safety Obturator 12.5mm	QTY: 1 per box

3

ACCESSORIES



VALVE REPLACEMENTS

10-1008-100	Trocar Silicone Valve Replacement 5.5mm, recommended number of uses 20	QTY: 50 per box
10-1013-100	Trocar Silicone Valve Replacement 11mm, recommended number of uses 20	QTY: 50 per box
10-1052-100	Trocar Silicone Valve Replacement 12.5mm, recommended number of uses 20	QTY: 50 per box



SEALING CAPS

10-1029	Sealing Cap 5.5mm, recommended number of uses 20	QTY: 10 per bag
10-1030	Sealing Cap 11mm, recommended number of uses 20	QTY: 10 per bag
10-1030-12.5	Sealing Cap 12.5mm, recommended number of uses 20	QTY: 10 per bag



FLIP-ON TROCAR REDUCERS

10-1021-101	Flip-On Trocar Reducer 11-5.5mm, recommended number of uses 50	QTY: 1 per box
10-1021-102	Flip-On Trocar Reducer 12.5-5.5mm, recommended number of uses 50	QTY: 1 per box



SLIDE-ON TROCAR REDUCERS

10-1021-200	Slide-On Trocar Reducer 11-5.5mm, recommended number of uses 50	QTY: 1 per box
10-1021-201	Slide-On Trocar Reducer 12.5-5.5mm, recommended number of uses 50	QTY: 1 per box

REUSABLE NEEDLE HOLDERS



13-1590ETSFU	ETH-Needle Holder, 5mm self upright, 330mm length	QTY: 1 per box
13-1590ETSFU-45	ETH-Needle Holder, 5mm self upright, 450mm length	QTY: 1 per box

2

13-1593ET	ETH-Needle Holder, right angled, 330mm length	QTY: 1 per box
13-1593ET-45	ETH-Needle Holder, right angled, 450mm length	QTY: 1 per box

4



13-1591ET	ETH-Needle Holder, short straight, 330mm length	QTY: 1 per box
13-1591ET-45	ETH-Needle Holder, short straight, 450mm length	QTY: 1 per box

1

13-1594ET	ETH-Needle Holder, left angled, 330mm length	QTY: 1 per box
13-1594ET-45	ETH-Needle Holder, left angled, 450mm length	QTY: 1 per box

3

LIGATION FOR LAPAROSCOPIC AND OPEN PROCEDURES



LIGATING CLIPS



1

SMALL

AI74CS6	6 small titanium clips per cartridge	QTY: 20 cartridges per box
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3

MEDIUM

AI74CM6	6 medium titanium clips per cartridge	QTY: 20 cartridges per box
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2

MEDIUM/LARGE

AI74CML6	6 medium/large titanium clips per cartridge	QTY: 20 cartridges per box
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4

LARGE

AI74CL6	6 large titanium clips per cartridge	QTY: 20 cartridges per box
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SUCTION/IRRIGATION



11-1276	Suction/Irrigation Pistol Handle with 2-way valve	QTY: 1 per box
11-1277	Tube 10mm for 11-1276	QTY: 1 per box
11-1278	Tube 5mm for 11-1276	QTY: 1 per box
11-1279	Electrode Adaptor for 11-1276	QTY: 1 per box

2
1



THANK YOU

