

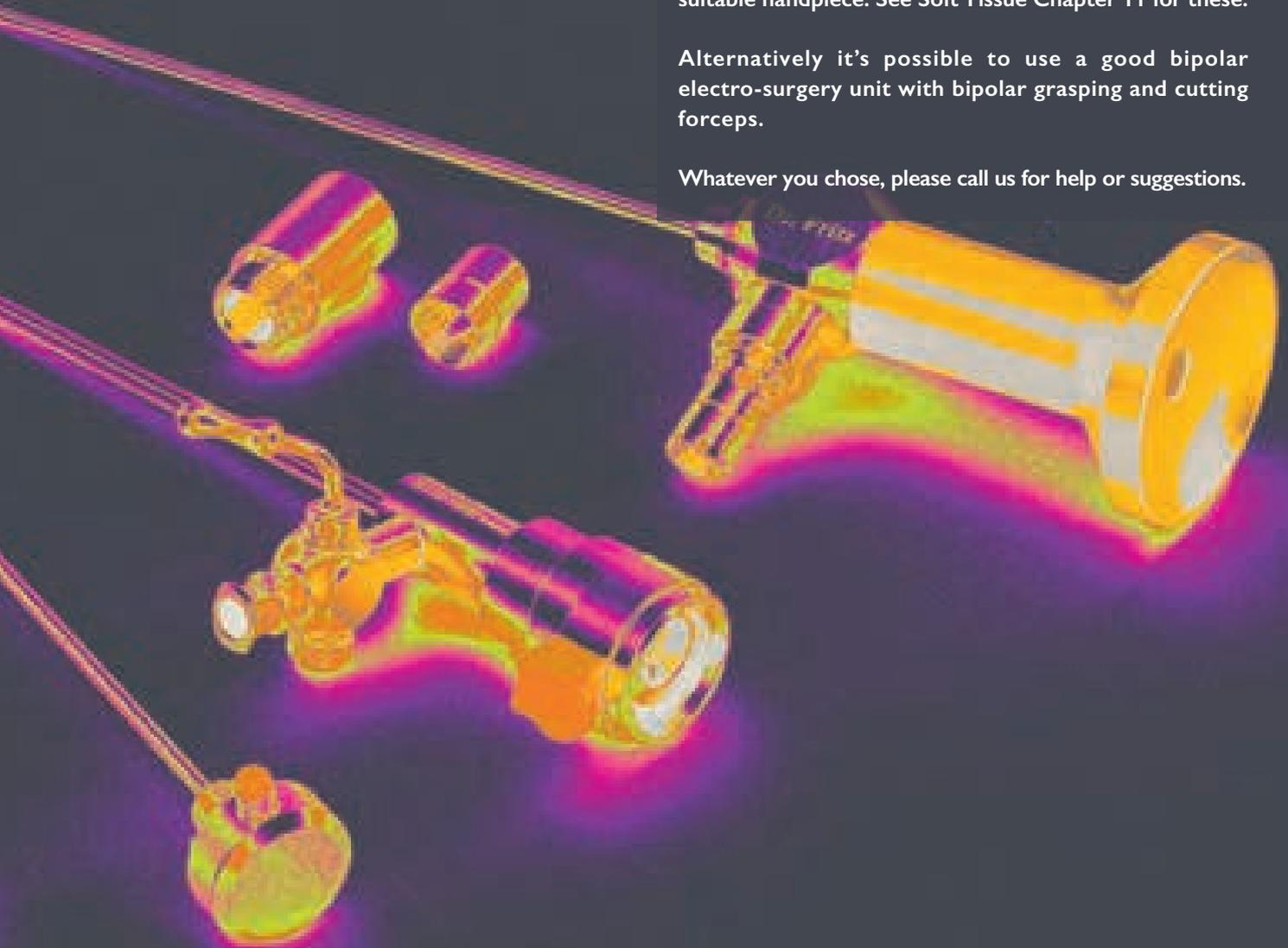
An emerging surgical modality, less invasive laparoscopic spays are growing in popularity. More and more owners are looking for lap spays despite the higher cost of the procedure versus a traditional spay.

As for arthroscopy, set-up costs are high. But if you already have a light source and camera for arthroscopy or endoscopy these are usually fine for laparoscopy as well.

In addition you will need scopes, trochars, hand instruments and a ligating device such as the Ligamax 5 clip applier or a power system such as the Gen II with a suitable handpiece. See Soft Tissue Chapter 11 for these.

Alternatively it's possible to use a good bipolar electro-surgery unit with bipolar grasping and cutting forceps.

Whatever you chose, please call us for help or suggestions.



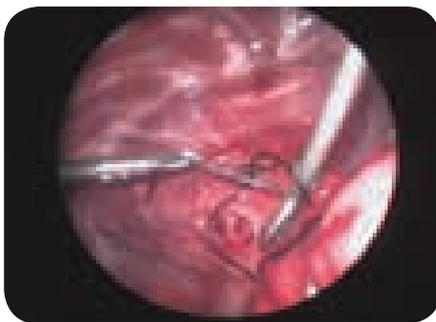
Canine Laparoscopy and Thoracoscopy

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FRES FRGS MRCVS

The first canine laparoscopy was performed over 100 years ago by George Kelling in Dresden. He used a cystoscope and inflated the abdomen with filtered air, and termed the procedure 'Celioscopy' (Lhermette and Sorbel, 1998). While advances such as the use of carbon dioxide for insufflation, the rod lens "Hopkins" endoscope design, and glass fiber light transmission all improved the image quality and illumination, laparoscopy did not gain widespread medical acceptance, until after the development of the charged couple device and the first video-assisted laparoscopic cholecystectomy was performed by Mouret in 1987. The fact the operator no longer had to use their eye to look down the endoscope, and could instead use a video camera, led to a rapid and widespread acceptance of laparoscopy, to the stage that it is the recognised standard for many human surgical procedures in developed countries we see today.

While veterinary laparoscopic work was already active before the advent of the video camera and its widespread human acceptance (Harrison and Wildt, 1980), currently endosurgery techniques are still limited to referral centres and a minority of veterinary first-opinion practices in the UK. Laparoscopy is more widespread in first opinion practice in North America, and some European countries, such as Italy. Limited uptake appears mainly due to the initial equipment costs, but also in part to the learning curve needed by the operator. A recent study (Pope et al, 2014) suggests that as many as 80 laparoscopic ovariectomies are needed for a new operator to be judged safe and competent with even this relatively simple laparoscopic technique. There is a recent increase in practices taking up laparoscopy in the UK, and this appears to be partly as a method of client retention, in the increasingly competitive veterinary marketplace, aiming to act as an indicator of the quality of services and level of skills offered by a particular veterinary practice.

Minimally invasive surgery (MIS) techniques such as laparoscopy and



*PRAA lig art ligation
Intracorporeal ligation
of the ligamentum
arteriosum during
a thoracoscopic
procedure for a
vascular ring anomaly
(persistent right aortic
arch)*

thoracoscopy hold numerous advantages for veterinary patients such as reduced morbidity, reduced post-operative pain, shorter hospitalisation, reduced risk of wound infections or dehiscence (Freeman, 1998; van Goethem et al, 2006; Culp et al, 2009; Hodgson-Moore and Ragni, 2012; Mayhew et al, 2012), but also have the advantages for the surgeon of providing an illuminated and magnified view, via the endoscope, of areas more difficult to visualise during open surgery, such as the chest, diaphragm, and pelvis.

The economic justification for initiating MIS in practices differs dependant on case load. In a very busy first opinion practice, the time taken to reprocess laparoscopic instruments may negate the increased fees charged for a laparoscopic ovariectomy. The benefit of these procedures may be more in building surgeon experience with MIS, to allow other procedures with a higher cost premium to be undertaken.



*Cryptorchidectomy
Laparoscopic
cryptorchidectomy is one of
the simplest laparoscopic
procedures, with clear
benefits to the patient, and
advantages to the surgeon.*

Laparoscopic-assisted cryptorchidectomy is an excellent addition to a practices repertoire, being a relatively simple procedure, with clear benefits to the patient, that is often much faster than an open procedure and allows a practice to charge a premium for this. Similarly laparoscopic organ biopsies, such as liver and kidney, hold similar clear advantages for both patient and practice. Thoracoscopy can result in excellent visualisation of the chest, particularly regions not easily examined in open surgery, but needs a 30degree endoscope, and should only be undertaken by surgeons already comfortable with open thoracic surgery, in case of the need for emergency conversion (Pizzi, 2012).

In contrast to human MIS, veterinary techniques are still less standardised, with differing opinions as to some techniques, as an evidence base continues to be developed. Even laparoscopic neutering is not standardised (Mayhew et al, 2007; Case et al, 2011). While the two port laparoscopic ovariectomy is the most commonly employed technique (Dupre et al, 2009), this is in part due to this procedure only needing a single sterile operator, rather than it holding significant benefits over the 3 port technique, which can be easier when initially learning laparoscopy. Others instead prefer a single port technique, using a larger diameter "operating laparoscope" with an instrument channel. While single port surgery may be undertaken in humans for the benefits in post-operative cosmesis (as it is done through the navel and is hence invisible), it is unclear if a single larger incision holds any significant advantage in canine ovariectomies, and does limit visualisation during the procedure.

Equally contentious, just as in human surgery, are the different types of access to the abdomen undertaken in laparoscopic surgery (Varma et al, 2008). Blind access with a sharp trocar after insufflation with a veress needle has largely fallen from favour in human general surgery (due to the risks of serious vascular injury on entry), and is not permitted in the USA, and no longer taught to human surgery trainees in the UK, but still popular with gynaecologists and veterinarians in the UK. Open access, sometimes referred to as "Hasson technique" has become the standard in human general surgery in the USA and UK, as it is perceived as safer. It is the author's preferred technique (Pizzi et al, 2011) (and successfully used in obese bears up to 360kg in weight), and more commonly used by veterinarians in the USA, Spain, and Italy. A variety of disposable and re-usable optical trocars are also popular with individual surgeons. Despite strong opinions, a Cochrane review of the subject in humans was unable to yield a definitive demonstration that one technique was safer than the other (Ahmad et al, 2008). Either technique can be safe in an experienced practitioner's hands, and is largely down to personal preference.

For all its benefits, laparoscopic surgery does carry some specific risks that surgeons need to be aware of. Initial entry into the abdomen, and blind entry of instruments (under visualisation) can risk trauma, particularly to the spleen, particularly during the initial learning curve (Pope et al, 2014). Loss of tactile feedback means operators need to take care which instruments are used to grasp sensitive tissues, such as bowel, if not to cause crushing and post-operative necrosis. Electrosurgical instruments (both monopolar and bipolar), as well as harmonic scalpels (Ethicon) and tissue feedback bipolar instruments (Enseal, Ethicon; Ligasure, Covidien) all generate heat at their tips and care must be taken never to inadvertently rest these on non-target tissues such as bowel between use, with the risk of thermal necrosis resulting in perforation 2-3 days after surgery. Unrecognised bowel perforation carries a poorer prognosis if incurred during laparoscopy than in open surgery (van der Voort, 2004). As MIS is more physiological surgery, with less tissue damage and hence a much reduced post-operative inflammatory response, post-operative bowel perforations take longer to manifest clinical signs and typically present 2-3 days later to the veterinarian than would typically be the case with open surgery cases, and hence carry a poor prognosis.



T lung biopsy

Taking a thoracoscopic lung biopsy by means of an extracorporeally tied loop ligature (Meltzer knot). Note the use of soft thoracoports (Ethicon), which don't risk damage to ribs or the intercostal neurovascular bundle, from leveraging MIS instruments through the metal cannulas commonly used for veterinary laparoscopy.

Laparoscopy and thoracoscopy carry the advantages, not just of smaller less painful incisions and faster post-operative recovery, but also of enhanced visualisation, which combined with the more physiological nature of the surgery, allows the conscientious and careful surgeon to perform safer surgery (Pizzi, 2012).

For those interested www.veterinarylaparoscopy.com has videos of some common veterinary procedures, and the human MIS website www.websurg.com is also useful. While the standard human laparoscopic procedures (cholecystectomies, appendectomies, and colorectal neoplasia resection) are not really applicable to veterinary patients, much can be learned about safe MIS surgical techniques and approaches from watching human MIS, and systems such as the WHO safe surgery initiative www.who.int/patientsafety (Haynes et al, 2009).



Thorac pericardiectomy I

Thoracoscopic sub-total pericardiectomy. Note the visualisation of the phrenic nerve, which should not be incised.



Thorac restrictive pericard

Thoracoscopic pericardiectomy in a case of restrictive (fibrotic) pericarditis. A sub-total pericardiectomy is ideally needed in these cases, as a simple window will not resolve clinical signs as in pericardial effusion. If this is not possible due to large epicardial adhesions, then the window should be fenestrated to resolve the restriction.

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Ethicon Laparoscopy Trocars

Flexipath Trocars & Endopath Trocar



FLEXIPATH Trocars are sterile single-patient-use instruments that consist of a mechanical obturator and a flexible sleeve. When activated, the mechanical obturator expands the flexible sleeve, which becomes secured to the mechanical obturator for placement. The flexible sleeve incorporates holes (for sutures or skin staples) to secure it to the skin.



ENDOPATH Surgical Thoracic Trocar Sleeve with Rounded Tip Obturator
Features
•Thoracic trocar sleeve.

- Rounded tip obturator.
- Designed to prevent puncture or laceration to internal structures once the cavity has been entered.
- Incorporates stability threads on the sleeve which enhance security as instruments are inserted and withdrawn.

The Thoracic Trocar Sleeve consists of a rounded tip obturator which is designed to prevent puncture or laceration to internal structures once the cavity has been entered. The device incorporates stability threads on the sleeve which enhance security as instruments are inserted and withdrawn. This can be used in patients for Thoracoscopic or minimally invasive procedures to establish a port access to internal organs where insufflation is not required. It is a sterile single-use instrument.

- JJFP007** Flexipath Trocar 7mm Diameter 80mm Long Flexible - Box of 6
- JJFP015** Flexipath Trocar 15mm Diameter 80mm Long Flexible - Box of 6
- JJFP020** Flexipath Trocar 20mm Diameter 80mm Long Flexible - Box of 6
- JJTT012** Endopath Trocar 10/12mm Diameter 80mm Long Rigid - Box of 6

Ethicon Trocar Pack

- JJFPK02** Trocar Pack 15mm Obturator 3 x 15mm Flexible Sleeves

Laparoscopes for Minimally Invasive Surgery

Standard Laparoscopes



Good optics are a pre-requisite for successful laparoscopy. The more you see the easier it becomes. Fritz 'scopes have a patented large image optical system taking in a wide field of vision producing a full screen, very high definition image.

All the laparoscopes are autoclavable and have standard eyepiece and light cable connectors.

LAPAROSCOPES - STANDARD

T281-5000	Wide Angle Telescope, 0° OD: 5mm WL: 29cm Standard Light Cable Connectors Autoclavable
T281-5030	Wide Angle Telescope 30° OD: 5mm WL: 29cm Standard Light Cable Connectors Autoclavable
T141-2430	Wide Angle Telescope 30° OD: 2.4mm WL: 14cm Large Image Technology
S140-2433	Examination Sheath OD: 3.2mm WL: 12cm Compatible with T140-2430 and T141-2430
T181-4030	Wide Angle Telescope 30° Large Image Technology OD: 4mm WL: 18cm Autoclavable
S180-4033	Examination Sheath OD: 5.5mm WL: 17cm compatible to T181-4030 Stopcock inc. Blunt Trochar

Electrocautery & Suction



Laparoscopy will require a bipolar electrocautery generator to power the handpieces. The GIMA unit is very effective and reasonably priced.

See Chapter 20 page 432.



Adequate suction is also a pre-requisite for Laparoscopy. Our new HospiVac unit with 2 x 2litre bottle capacity and foot control is a high capacity suction unit for many hospital procedures.

See Chapter 20 page 430.

ELECTROSURGERY & SUCTION

HF122	GIMA 122 Bipolar Electrosurgery Kit
I85H350	HospiVac 350 Suction Unit*

Laparoscopy Start Up Kit - Scope & Hand Instruments

Instrument choice is determined by personal choice and patient selection. However, a starter kit is a useful starting point and offers a discounted approach to setting up.

The Laparoscopy kit described is discounted by 10% compared to buying the individual components.

In addition to laparoscopic hand instrumentation a suitable camera, light source, CO₂ insufflator and electrosurgery generator will be required. Several options, including pre-owned units, are available please telephone or e-mail to discuss options.

Code Description

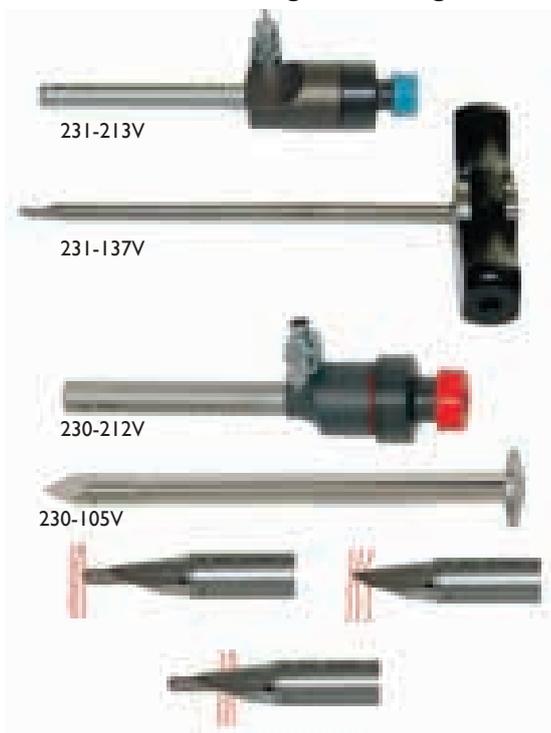
T281-5030	Wide Angle Telescope, 30° OD: 5mm, WL: 29cm, Standard Light Cable Connectors, Autoclavable
DE4680-52	Sterilizing & Storing Tray, 460 x 80 x 52mm Perforated Stainless Steel with Silicon Bars
230-212V	Cannula only with Magnetic Valve ID: 10mm, WL: 7cm, Inflation Stopcock, 55g
230-213V	Cannula only with Magnetic Valve ID: 10 mm WL: 7cm, 45g
230-137V	Safety Trochar only compatible to Cannulas with ID: 10mm, WL: 7cm, fully dismantable, Cork Screw Handle
231-213V	Cannula only, Magnetic Valve ID: 5.5mm, WL: 7cm, Inflation Stopcock
231-212V	Cannula only, Magnetic Valve ID: 5.5mm, WL: 7cm, 30g
231-137V	Safety Trochar only compatible to Cannulas ID: 5.5mm, WL: 7cm, fully dismantable, Cork Screw Handle
230-505	Reducer Adapter for Trocar Cannulas with ID: 10 to 5.5mm
L-19-120	Veress Needle, D: 2mm, 12cm, LL(f)
531.23H1 IV	Atraumatic Grasper, curved, 5mm 33cm insulated, rotatable, dismantable, inside ratchet, HF Connector
531.02H05V	Mini - Metzenbaum Scissors 5mm 33cm insulated, rotatable, dismantable
531.40H1 IV	Dissecting Forceps, (Maryland) 5mm, 31cm, insulated, dismantable, Silicon Handle, inside ratchet
X-300-26	Silicon Tube, ID: 5mm, 3m, LLm both ends
BP-05-32I	Bipolar Grasping & Cutting Forceps 5mm, WL: 320mm, disposable, Universal Connector
BP2-533-10	Bipolar Grasping Forceps with std. handle 5mm, WL: 34cm, jaws: 13 4.5mm with hook totally dismantable
BP-500-11	Bipolar Cable, 5m, comp.to Martin Unit to Martin/ Berchtold Instrument

LAPAROSCOPY STARTER KIT

LAPROKIT	Laparoscopy Starter Kit
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Trochars and Cannulae

Trochar Cannulas with Magnetic Valving



Safety trochar tissue pressure exposes the sharp tip

Trochar Cannulas are designed with different types of valves to reduce or to avoid CO₂ loss when changing instruments and telescope during laparoscopy and thoracoscopy. Our reusable and patented magnetic valve trochar system has several advantages compared to other valve types. They are lightweight and because of the valve construction, the insertion of instruments and scopes will pass smoothly through without scratching or touching the front lens like in a so called automatic valve system. In addition there is nearly no gas loss even when changing instruments. There are no mechanical parts to clean inside except the magnetic flap itself which is a great help to your staff.

5.5MM INNER DIAMETER CANNULAE FOR 5MM 'SCOPES

- 231-213V** Cannula only, Magnetic Valve, ID: 5.5mm, WL: 7cm, Inflation Stopcock
- 231-212V** Cannula only, Magnetic Valve, ID: 5.5mm, WL: 7cm, 30g
- 231-137V** Safety Trochar only, comp. to cannulas ID: 5.5mm, WL: 7cm, fully dismantable
- 231-105V** Trochar only, with Sharp Tip compatible to ID: 5.5mm, WL: 7cm

10MM INNER DIAMETER TROCHARS & CANNULAE FOR 10MM 'SCOPES

- 230-212V** Cannula only, Magnetic Valve, ID: 10mm, WL: 7cm, Inflation Stopcock, 55g
- 230-213V** Cannula only, Magnetic Valve, ID: 10mm, WL: 7cm, 45g
- 230-137V** Safety Trochar only, compatible to Cannulas with ID: 10mm, WL: 7cm, fully dismantable, cork screw handles
- 230-105V** Trochar only with Pyramidal Tip for Trochars Cannulas ID: 10mm, WL: 7cm

ACCESSORIES

- 230-505** Reducer Adapter for Trochar Cannulas with ID: 10 to 5.5mm
- 231-211** Sealing Caps, for Trochar Cannula 5.5mm 10 pcs
- 230-211** Sealing Caps for Trochars and Reducer Adapters
- 231-215** Magnetic Valve Flap 5.5mm, 2 pcs.
- 230-215** Magnetic Valve Flap 8/ 10mm, 2 pcs.

Palpation, Dissection and Puncture Instruments

Laparoscopy First Puncture Needle, Veress



LAPAROSCOPY NEEDLE VERESS

- L-19-100** Veress Needle 2mm x 100mm Luer Lock

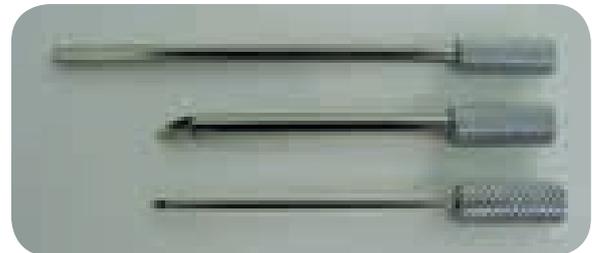
Thoracoscopy First Puncture Needle, Long Version



THORACOSCOPY NEEDLE

- TR-03-201** Thoracoscopy Needle 3mm x 200mm includes Sharp Trochar

Palpation Probe and Puncture Cannula



5mm diameter, 330mm long protected interchangeable needle with outer tube. Consists of:

- L-33 Inside tube Luer lock Connector
- L-33-2 Outside Tube/ Probe
- L-210 Needle 1 x 26mm

PALPATION PROBE & PUNCTURE CANNULA

- L-33-210** Palpation Probe/ Cannula
- L-210** Injection Cannula 1 x 26mm compatible to L-33/47
- L-218** Injection Cannula 1.9 x 26mm compatible to L-33/47
- L-218R** Injection Cannula 2 x 28mm Blunt compatible to L-33/47

Hand Instruments

Fritz hand instruments have a modular construction. The handles, the connecting tubes and the working jaw tips are interchangeable. Easily stripped down for cleaning, compatible to 5mm and 10mm trochar cannulas. All handles have a High Frequency connector.

Handles



The handles may have plastic coated or stainless handles. They may or may not have a ratchet. The ratchet may be external or enclosed. See individual instruments for exact construction.

Tubular sheaths



5mm or 10mm diameter options. Different working lengths which may be rotated through 360 degrees. Insulated or stainless steel.

5mm Instruments Complete

Scissors



Mini-Metzenbaum Scissors 531.02H05V



Hook Scissors 531.04H05V

SCISSORS

531.02H05V Mini-Metzenbaum Scissors
531.04H05V Hook Scissors

Biopsy Forceps



Biopsy Forceps 531.60H01V



Biopsy Forceps 531.61H01V

BIOPSY FORCEPS

531.60H01V Biopsy Forceps
531.61H01V Biopsy Forceps - Double Action Jaw

5mm Instruments Complete



531.40H1 IV Dissecting Forceps, 5mm, 31cm, insulated, dismantlable, rotatable, consisting of: jaws insert (53 M 40), sheath (53 R 1) handle (H 01) colour code: black



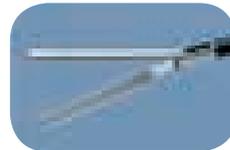
531.23H1 IV Atraumatic Grasper; curved 5mm, 33cm insulated, rotatable, dismantlable, inside ratchet, consisting of: jaws insert (53 M 23), sheath (53 R 1) handle (H 11, HF-connector), colour code: black



531.22H2 IV Grasping Forceps, universal use, 5mm, 33cm, insulated, dismantlable, rotatable, outside ratchet, consisting of: jaws insert (53 M 22), sheath (53 R 1) handle (H 21, HF-connector), colour code: black



531.27H1 IV Babcock Grasping Forceps, 5 mm, 33 cm, insulated, dismantlable, rotatable, inside ratchet, consisting of: jaws insert (53 M 27), sheath (53 R 1) handle (H 11, HF-connector), colour code: black



531.35H2 IV DeBakey Grasping Forceps, 5mm, 33cm, insulated, dismantlable, rotatable, HF-connector consisting of: jaws insert (53 M 35) sheath (53 R 1) handle (H 21, HF-connector) colour code: black



531.36H2 IV Bowel Grasping Forceps, 5mm, 33cm, insulated, dismantlable, rotatable, outside ratchet, consisting of: jaws insert (53 M 36), sheath (53 R 1) handle (H 21), colour code: black



536.30H52V Claw Grasping Forceps, 5mm, 33cm, metal, fixed tube, outside ratchet, consisting of: jaws insert (53 M 36), sheath (53 R 6) handle (H 52), metal *Only available with Axial handles (the frog)

5MM HAND INSTRUMENTS

- 531.40H1 IV** Dissecting Forceps
- 531.23H1 IV** Atraumatic Grasper
- 531.22H2 IV** Grasping Forceps
- 531.27H1 IV** Babcock Grasping Forceps
- 531.35H2 IV** DeBakey Grasping Forceps
- 531.36H2 IV** Bowel Grasping Forceps
- 536.30H52V** Claw Grasping Forceps

BIPOLAR FORCEPS

BP-05-321 Bipolar Grasping & Cutting Forceps 5mm, WL: 320mm, disposable, Universal Connector

Laparoscope Instrument Cleaning Kit

Laparoscope Instrument Cleaning Kit consists of:

- 3 x General Brush Nylon Bristles
- 3 x Laparoscopic Trumpet Valve Brush
- 3 x Nylon Twisted Wire Brush 3mm diameter
- 3 x Nylon Twisted Wire Brush 5mm diameter
- 3 x Nylon Twisted Wire Brush 10mm diameter

LAPAROSCOPE INSTRUMENT CLEANING KIT

LAPROCLEAN Laparoscope Instrument Cleaning Kit