



# Surgical Instruments

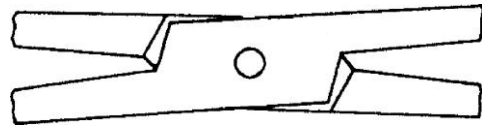
An Introduction to Hospital Instruments

The below brands are Registered under the company's name. Wilmed Instruments are made up of German Stainless Steel which is superior Quality and Meet the International Standards. All our Instruments are highly Standardized to meet the hospital requirements.

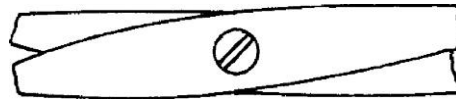
***SURGICAL INSTRUMENTS:  
An Introduction to JMPL Certified Instruments***

Joint Types

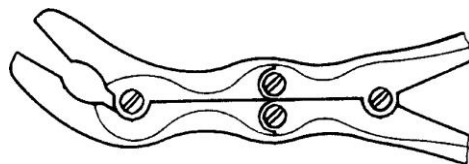
box lock



lap joint



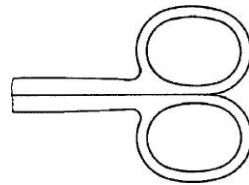
double-action joint



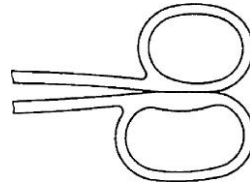
B s

Handle Type

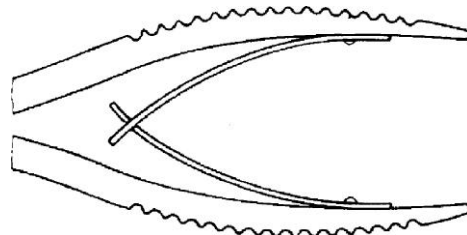
ring handle



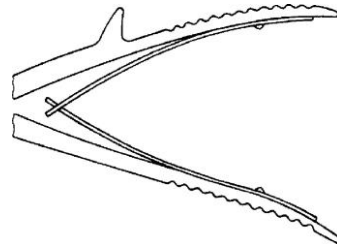
ring handle with one extra- large handle



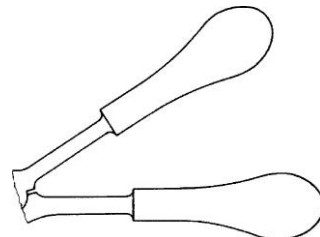
grooved handle



grooved handle with horn



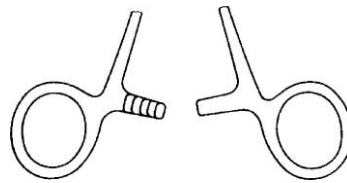
hollow handle



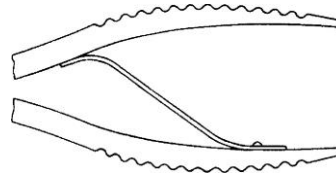
B            s e

Retaining Sy t ms

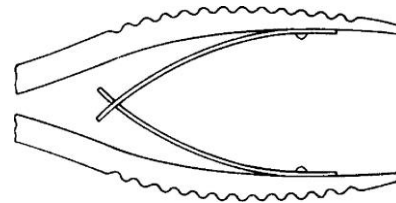
ratchet lock



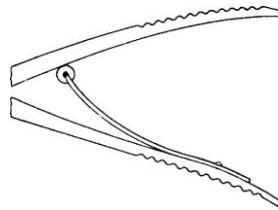
single spring



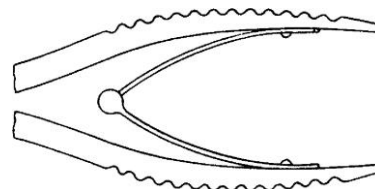
double spring



spring with roller



double spring  
with ball and socket joint



B            s e

Retaining Sy t ms

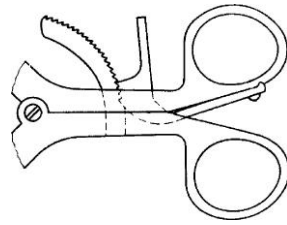
double leaf spring



B se

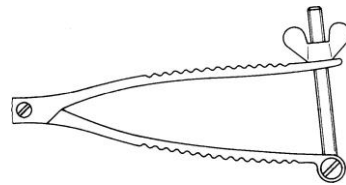
---

cam ratchet



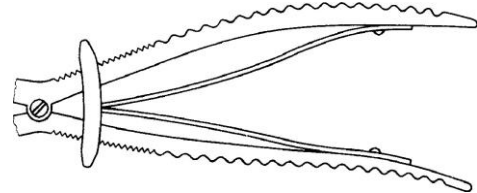
---

bar and wingnut



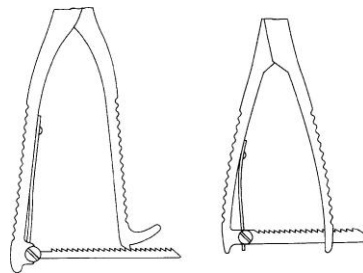
---

sliding ring

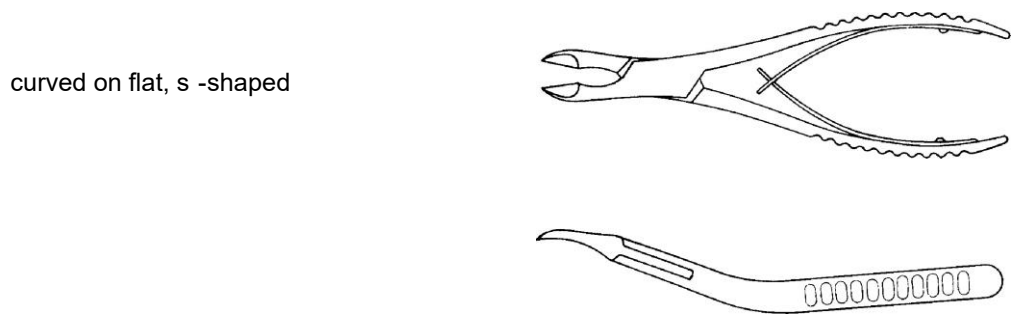
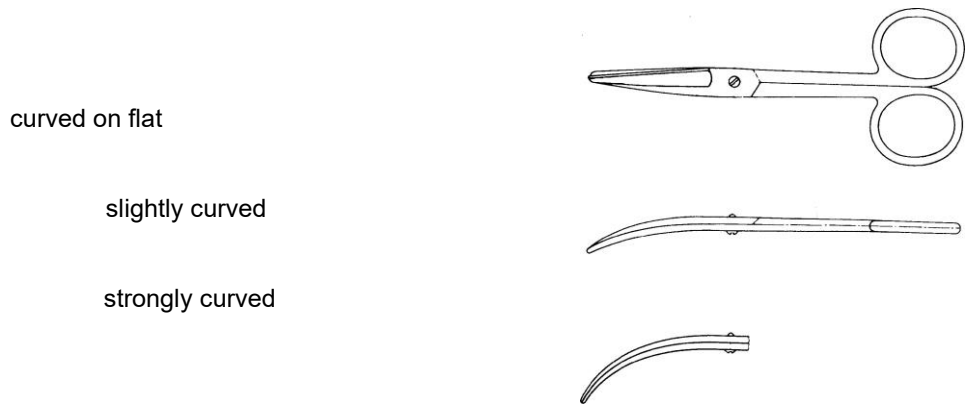
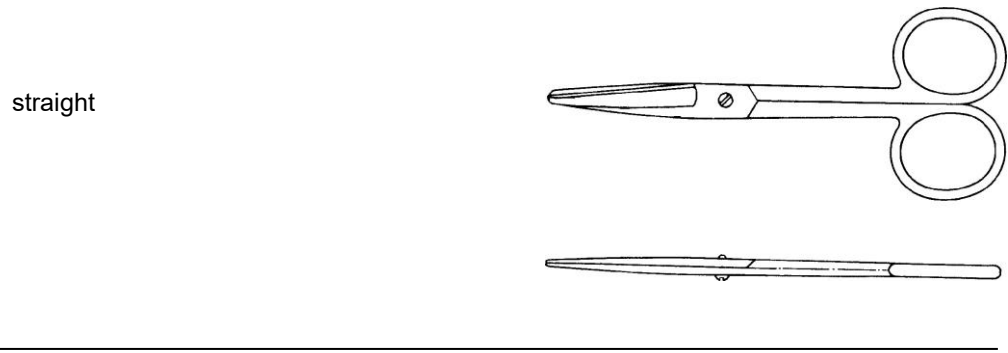


---

bar ratchet

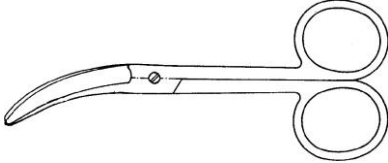


Blade Curvature Types B e

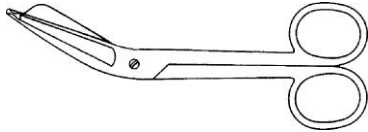


Blade Curvature Types

laterally curved



laterally angled



angled on flat



bayonet-shaped



bayonet tip



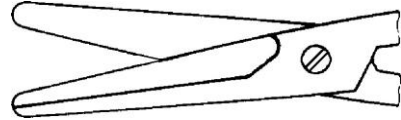


Blade Types

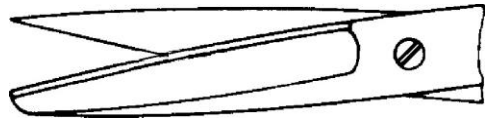
blunt, blunt



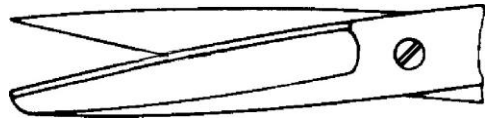
blunt, blunt with bevel



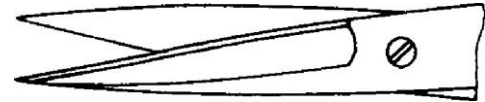
sharp, blunt



angled on flat



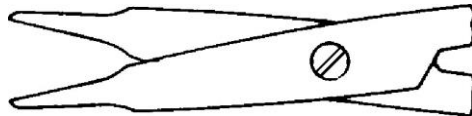
sharp, sharp



fine tip, sharp



fine tip, blunt



sharp with ball end



Blade Types

blunt with round probe end

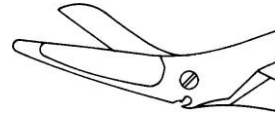


blunt with retaining hook

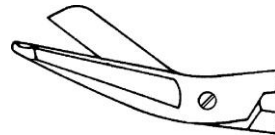


blunt with probe end

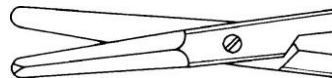
angled on flat



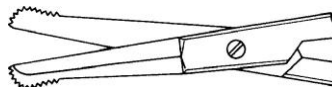
blunt with spade probe end



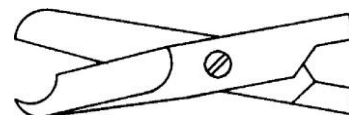
blunt, blunt, triangular section



serrated dissector end

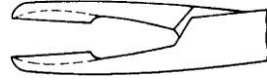


blunt, one hook end

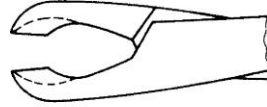


**B**lade Types

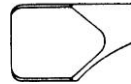
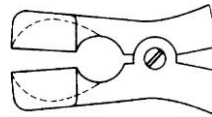
fine, straight jaw



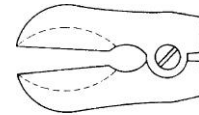
round jaw



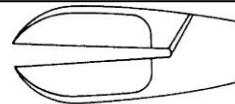
square jaw



curved on flat



straight or angled  
on flat



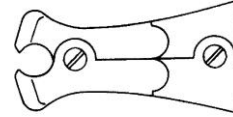
Blade Types

concave cutting jaw



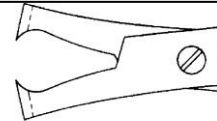
---

end-cutting, straight jaw



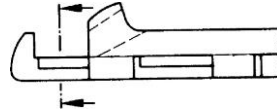
---

end-cutting, concave jaw



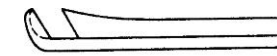
---

punch upward  
through cutting



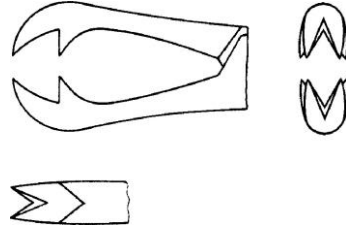
---

punch upward oblique  
not through cutting

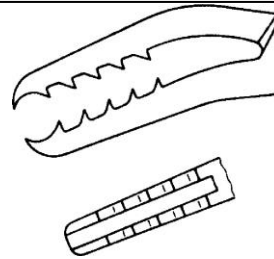


## Bone Holding Jaw Types

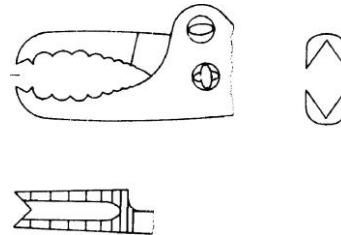
bone holding



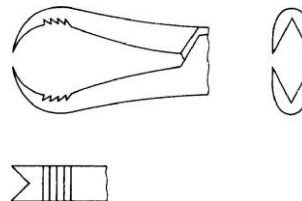
bone holding  
semb



bone holding  
farabeuf

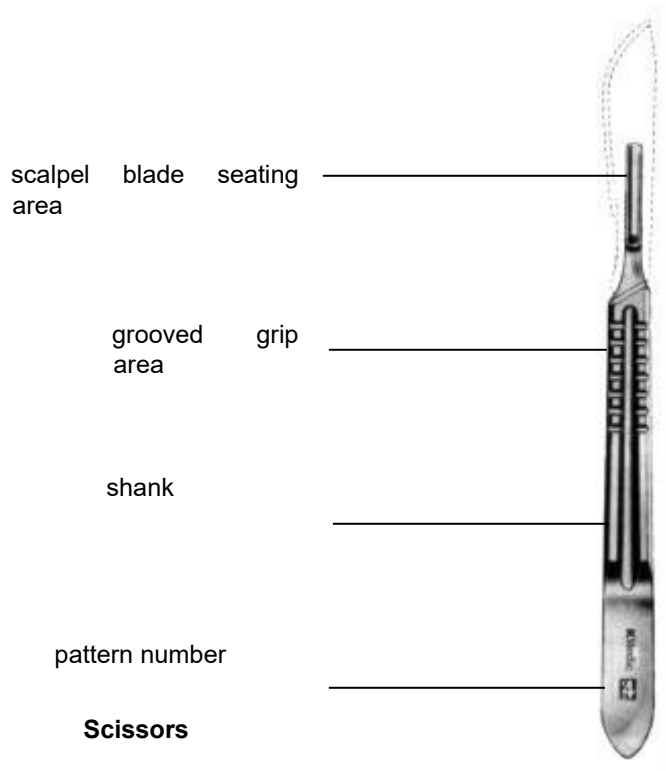


bone holding  
langenbeck



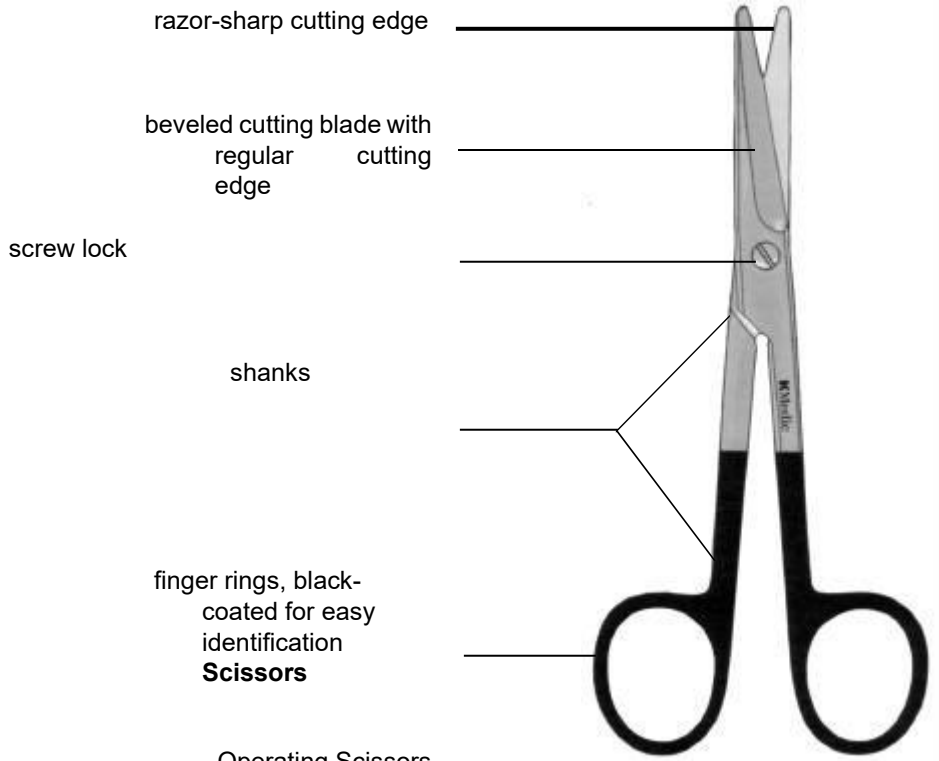
## Soft Tissue Instruments

Scalpel Handle #4  
JEF 29-060



**Scissors**

Super-Cut Mayo Scissors  
JEF 35-280



**Scissors**

Operating Scissors

JEF 33-320

sharp/blunt tips

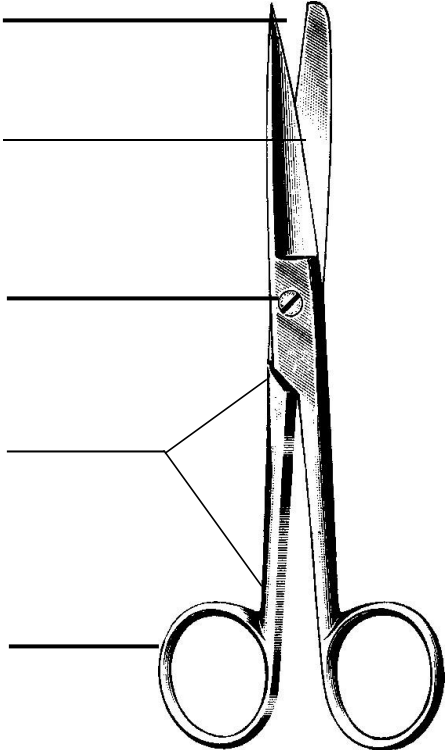
cutting edge

screw lock

shanks

finger rings

**Scissors**



Metzenbaum Scissors  
JEF 34-458



blunt/blunt tips  
regular cutting edge

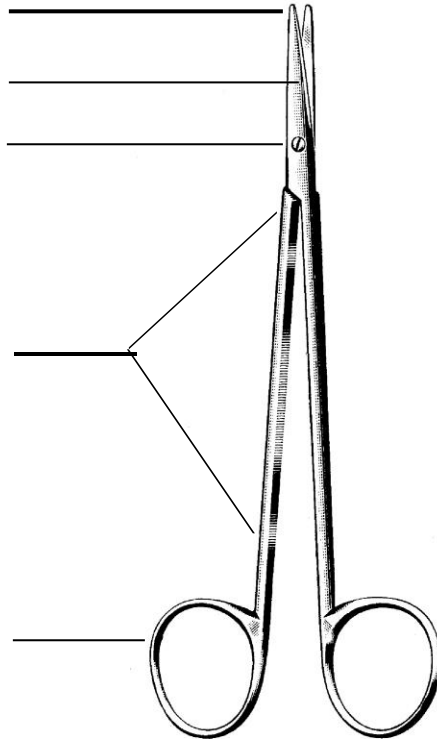
screw lock

shanks

finger rings

TC Mayo Scissors  
JEF 35-620

**Scissors**



blunt/blunt tips

tungsten carbide cutting  
edge

beveled cutting blade

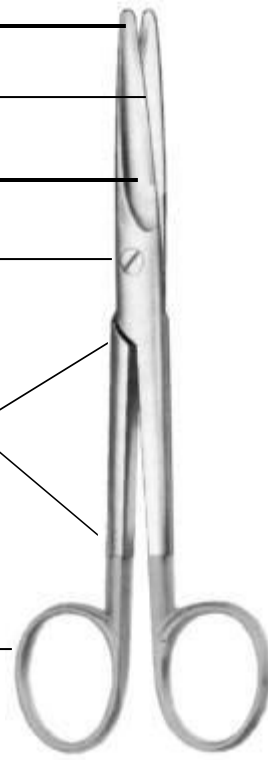
screw lock

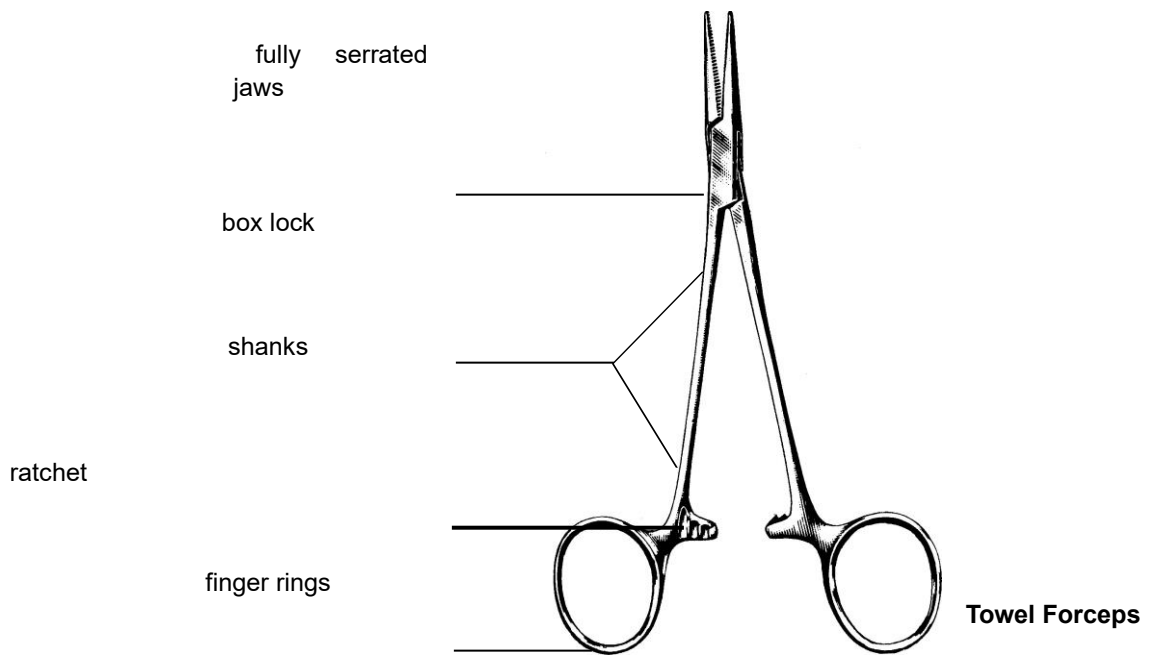
shanks

finger rings, golded for  
easy  
identification of  
TC **Hemostatic  
Forceps**

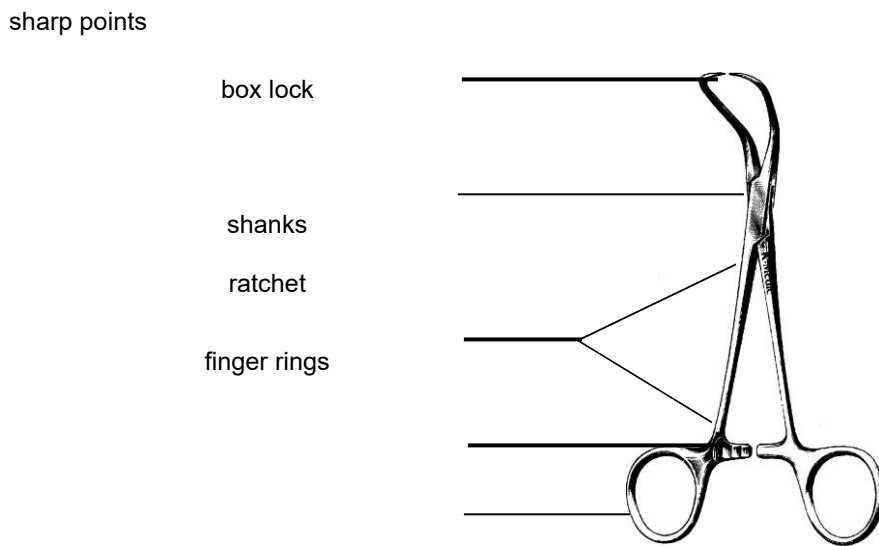
Halsted Mosquito Forceps

JEF 36-156



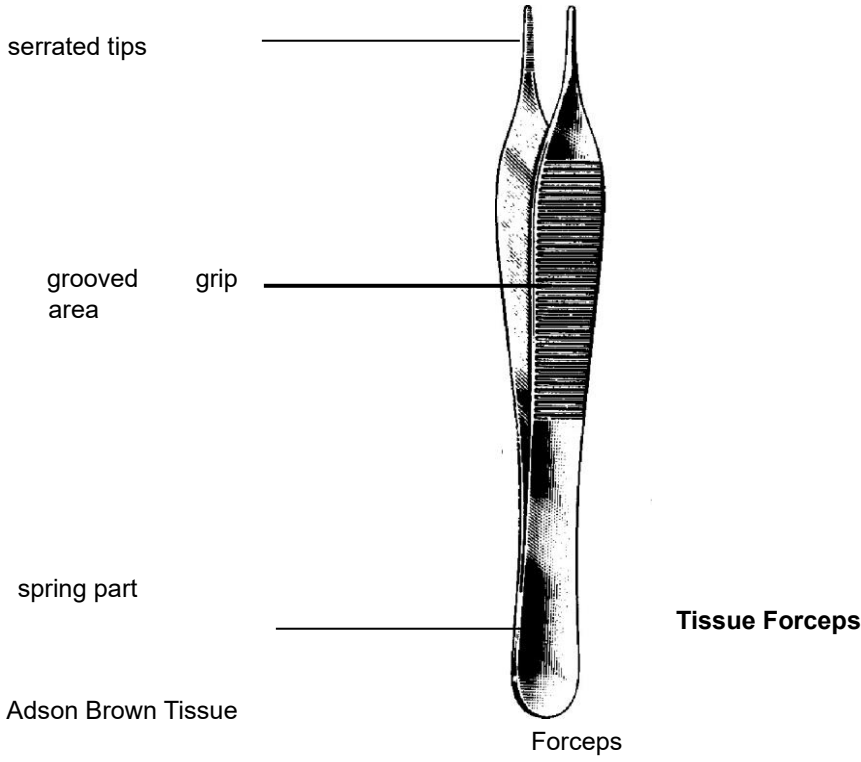


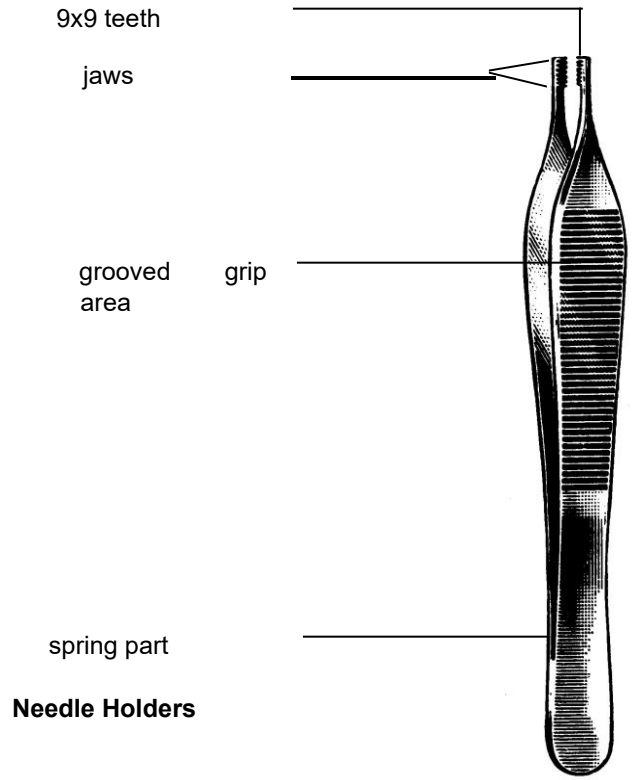
Backhaus Towel Forceps  
JEF 37-462



**Dressing/Thumb Forceps**

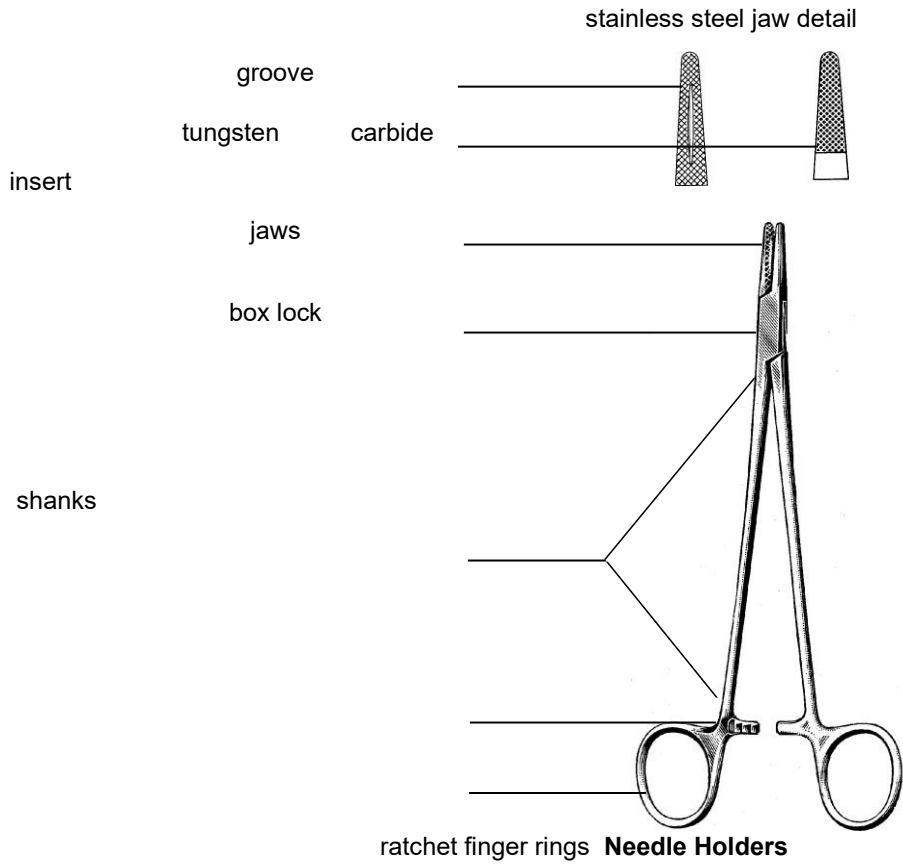
Adson Dressing Forceps  
JEF 39-062





**Needle Holders**

Mayo Hegar Needle Holder, serrated  
JEF 41-270, regular  
JEF 41-302, with TC insert



Olsen-Hegar Needle Holder  
JEF 41-428

tungsten carbide insert  
scissor cutting blades

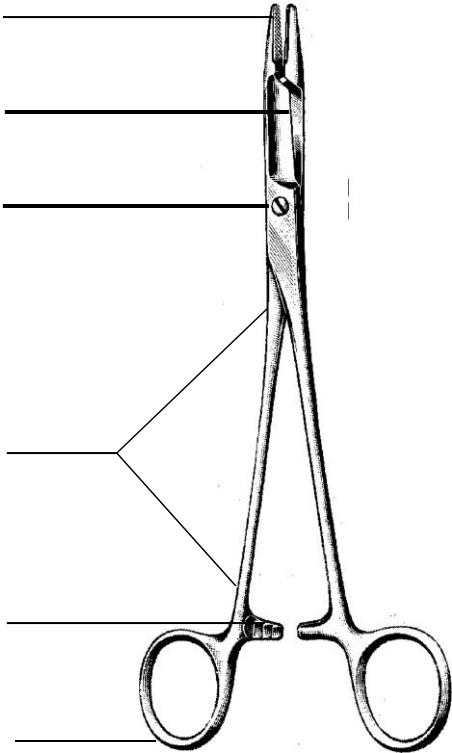
screw lock

shanks

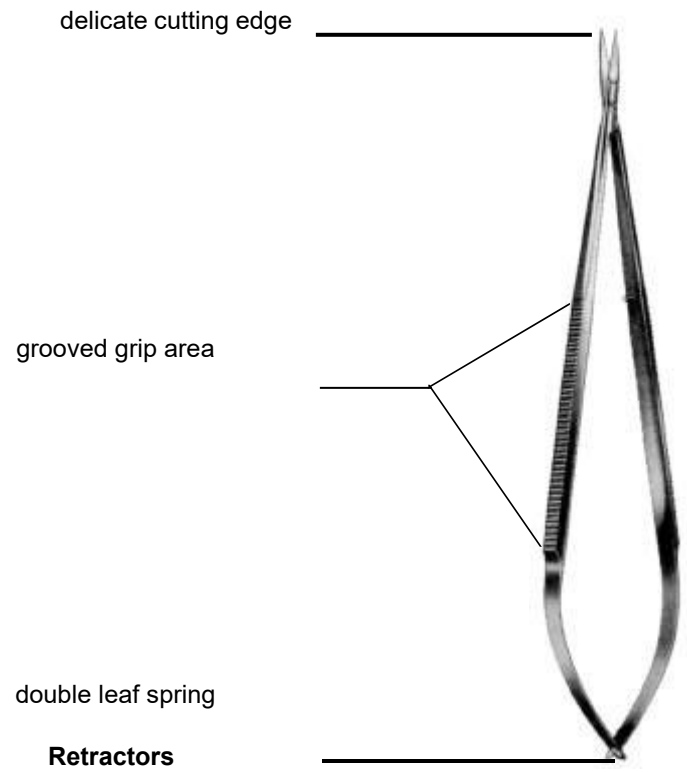
ratchet

finger rings

**Microsurgical Instruments**

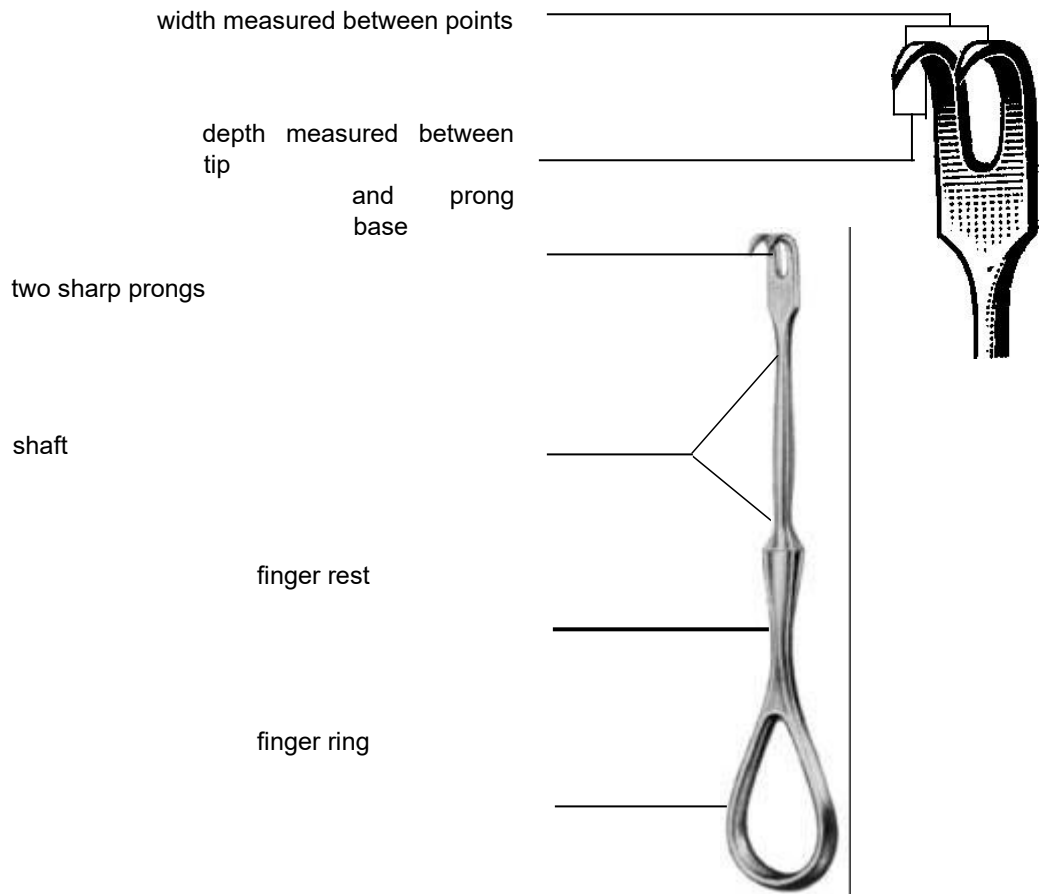


Micro Scissors  
JEF 44-018



Volkman Finger Retractor  
JEF 52-198

tip detail



**Retractors**

Hohmann Retractor  
JEF 46-838

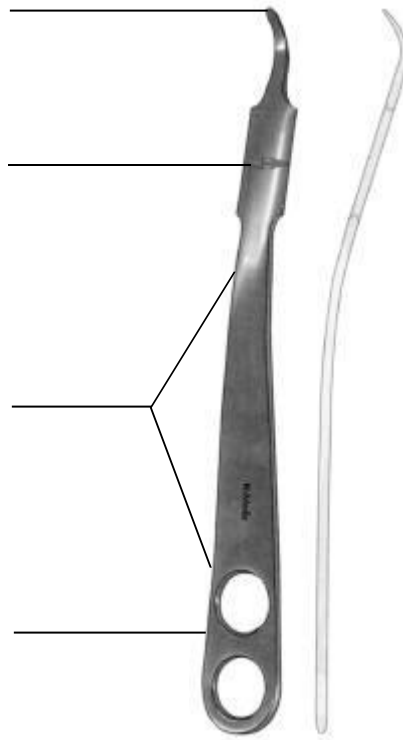


tip

working blade; width is measured here, not at tip

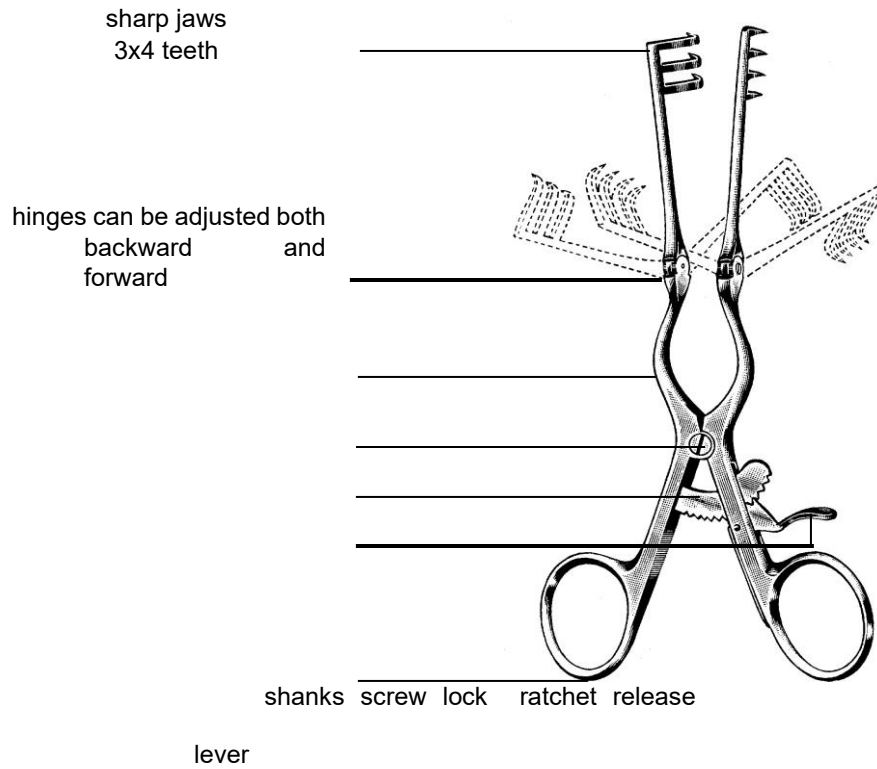
shaft

finger rings



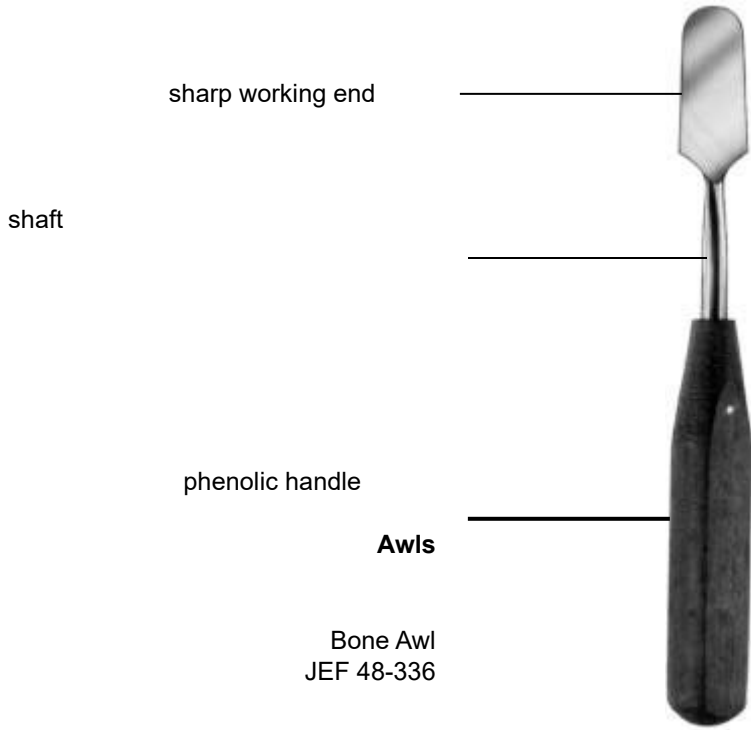
**Self-Retaining Retractor**

Beckmann-Weitlaner Retractor  
JEF 52-530



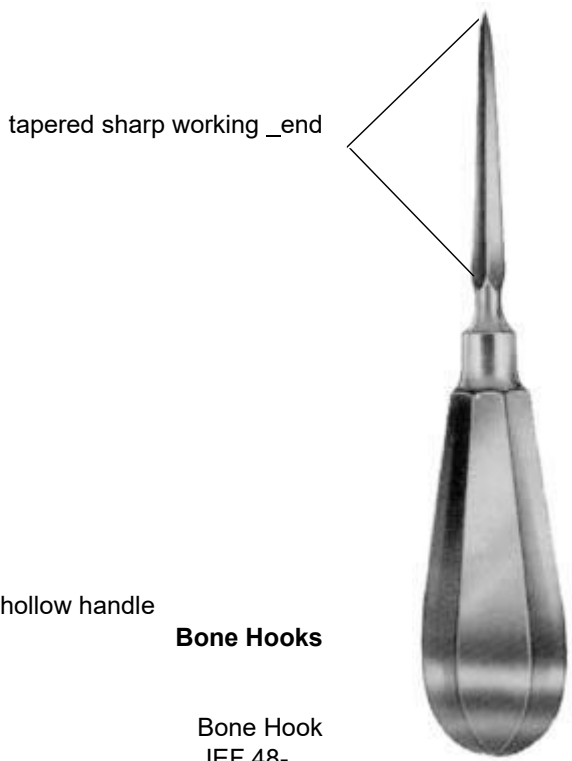
**Elevators**

Periosteal Elevator  
JEF 46-217



**Awls**

Bone Awl  
JEF 48-336



**Bone Hooks**

Bone Hook  
JEF 48-343

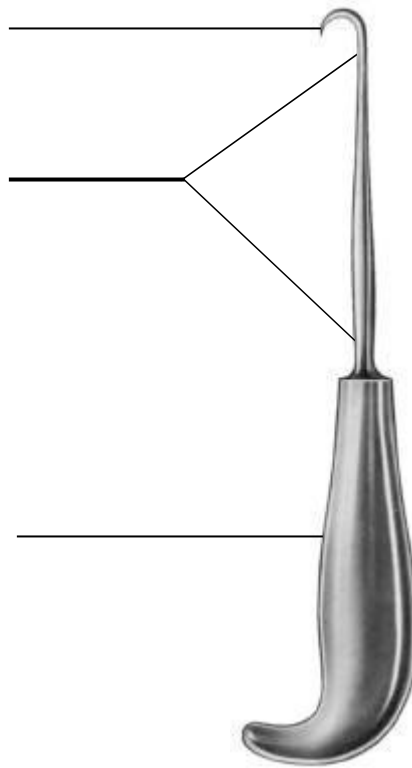
sharp hook end

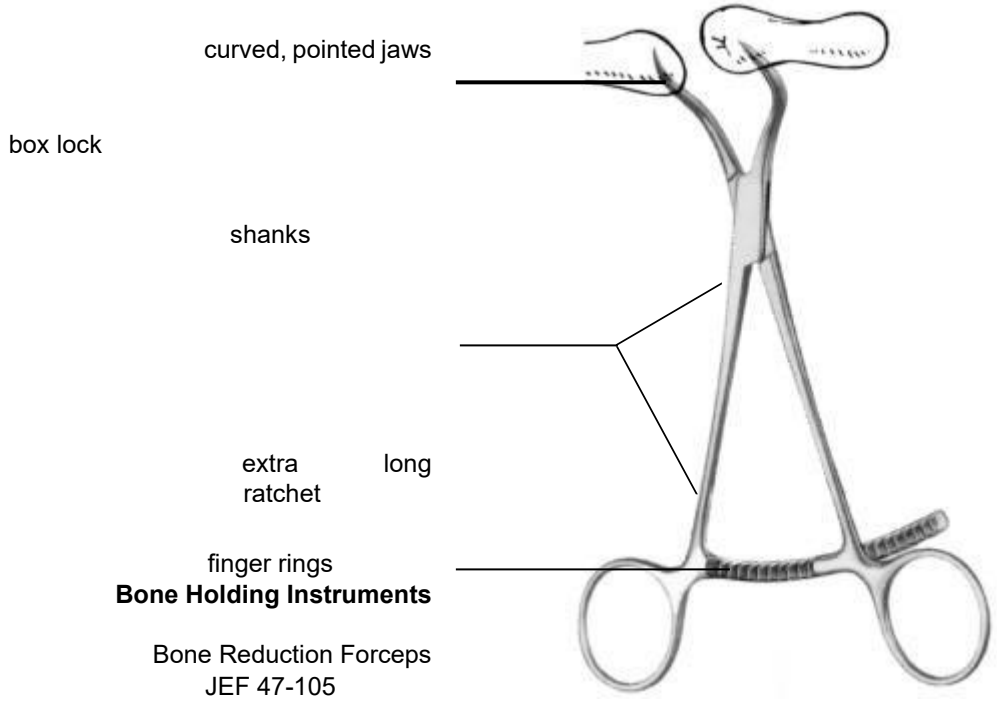
shaft

hollow handle

**Bone Holding Instruments**

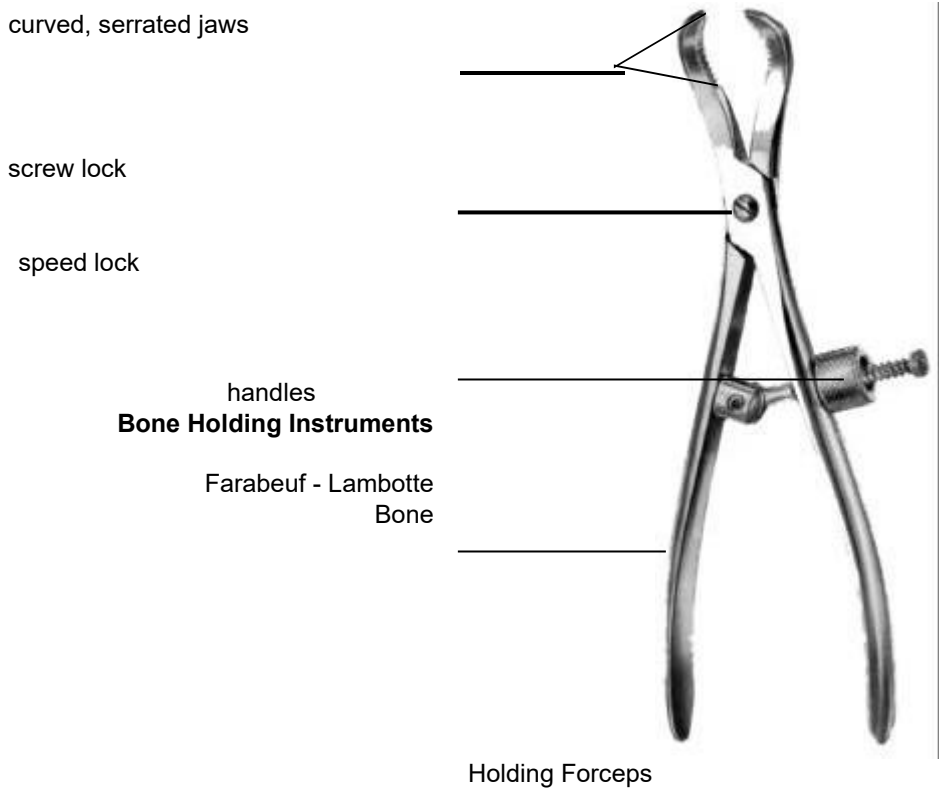
Bone Reduction Forceps  
JEF 45-300





**Bone Holding Instruments**

Bone Reduction Forceps  
JEF 47-105

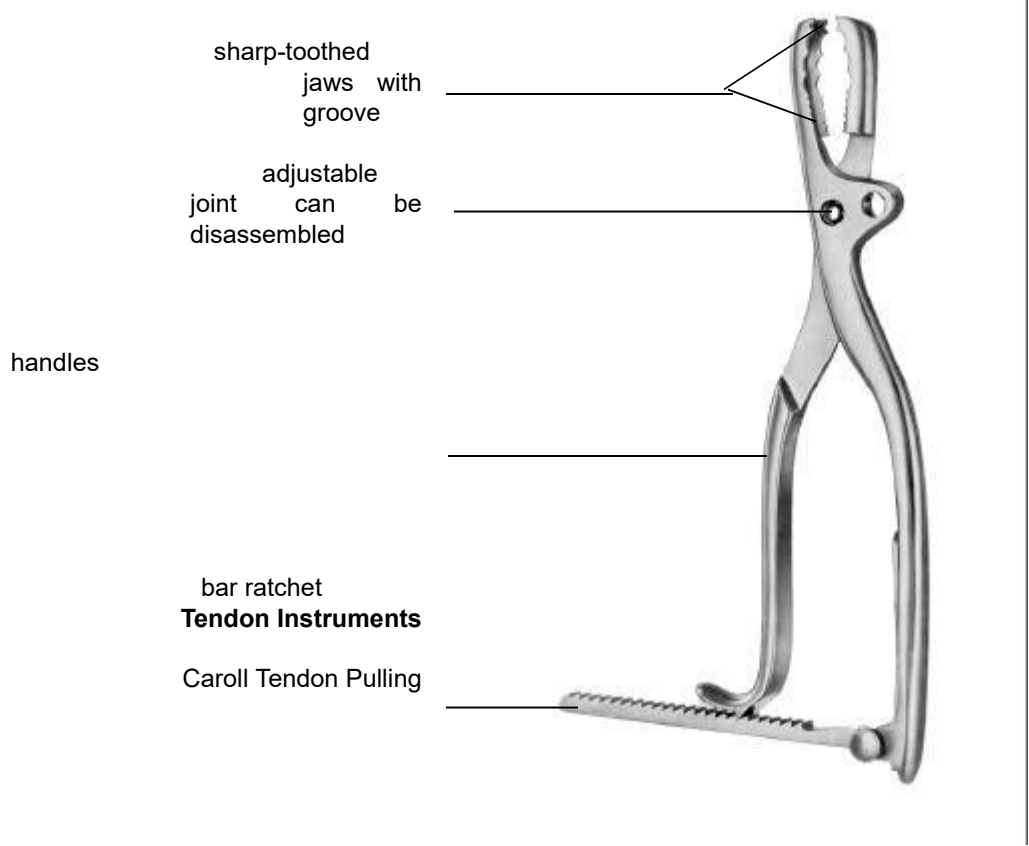


**Bone Holding Instruments**

Farabeuf - Lambotte  
Bone

Holding Forceps

JEF 47-192



sharp-toothed  
jaws with  
groove

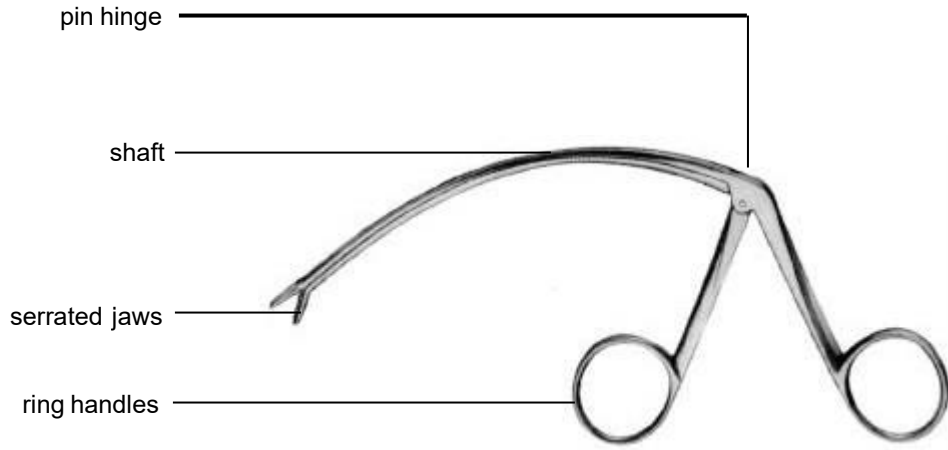
adjustable  
joint can be  
disassembled

handles

bar ratchet  
**Tendon Instruments**

Caroll Tendon Pulling

Forceps  
JEF 46-740



**Curettes**

Brun (Spratt) Curette  
JEF 46-511

sharp oval cup

shaft

thumb rest

hollow handle

**Osteotomes, Chisels and Gouges**

Hibbs Osteotome  
JEF 46-359

tip details:  
chisel

osteotome  
gouge

sharp working end

shaft

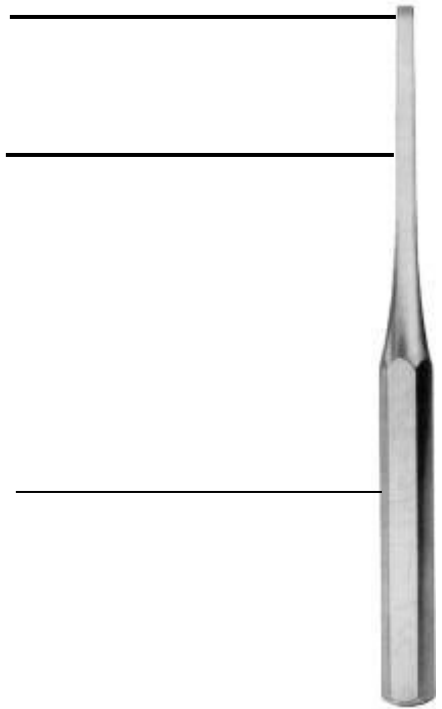


hexagonal  
handle from solid  
stainless steel

NOTE: The primary  
difference between these  
instruments is in the tips—  
see the above tip details to  
distinguish the types.

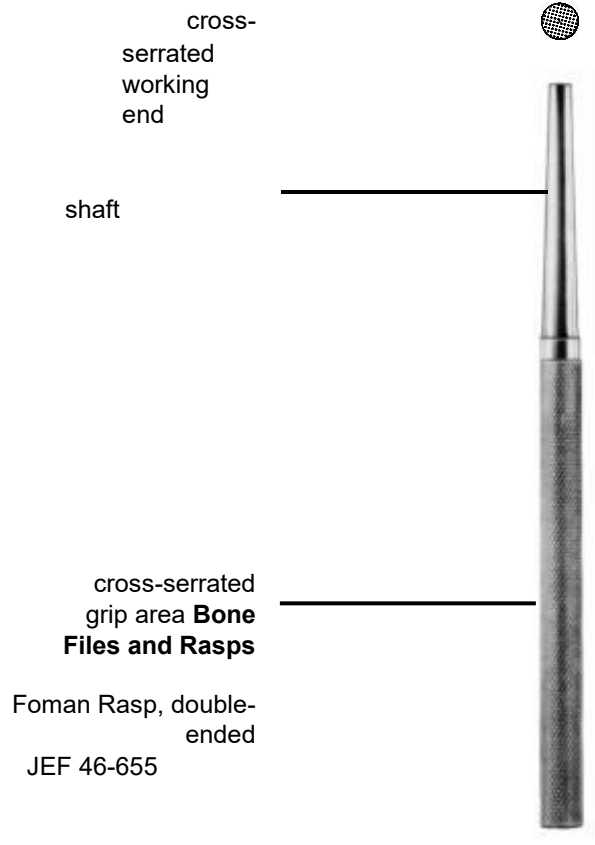
**Mallets**

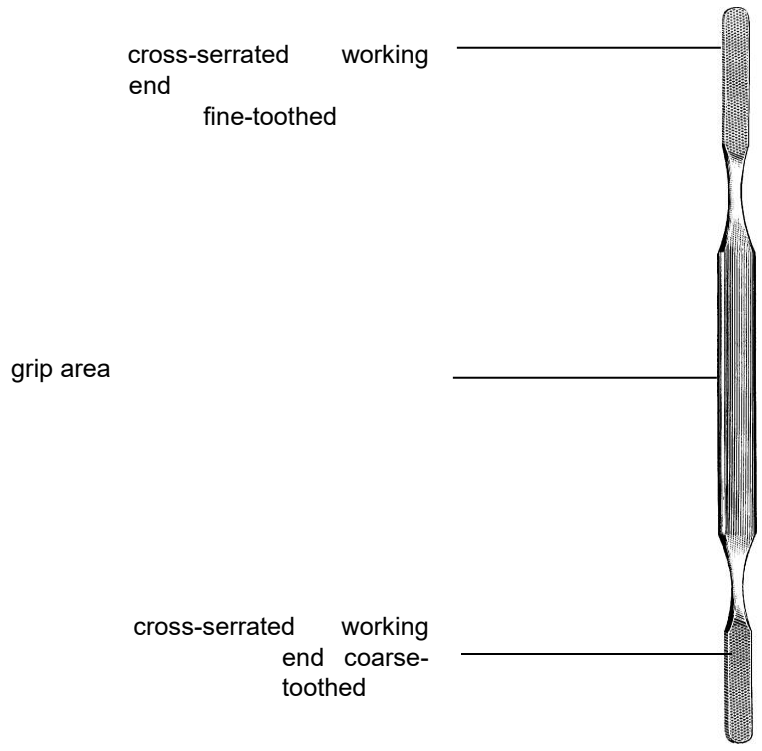
Repercussion Free  
Mallet  
JEF 46-690











**Bone Cutters**

Liston Bone Forceps  
JEF 47-398

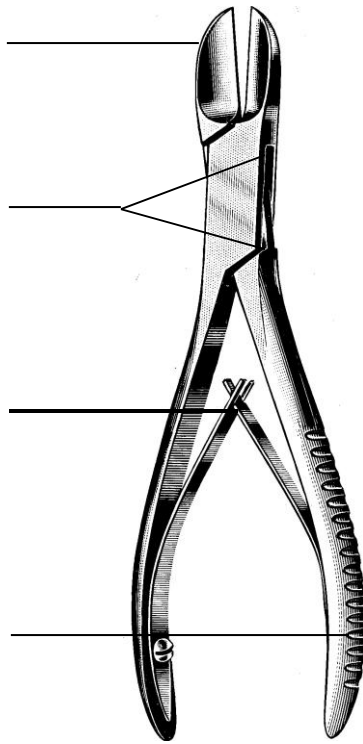
straight, sharp jaws

box lock

double spring

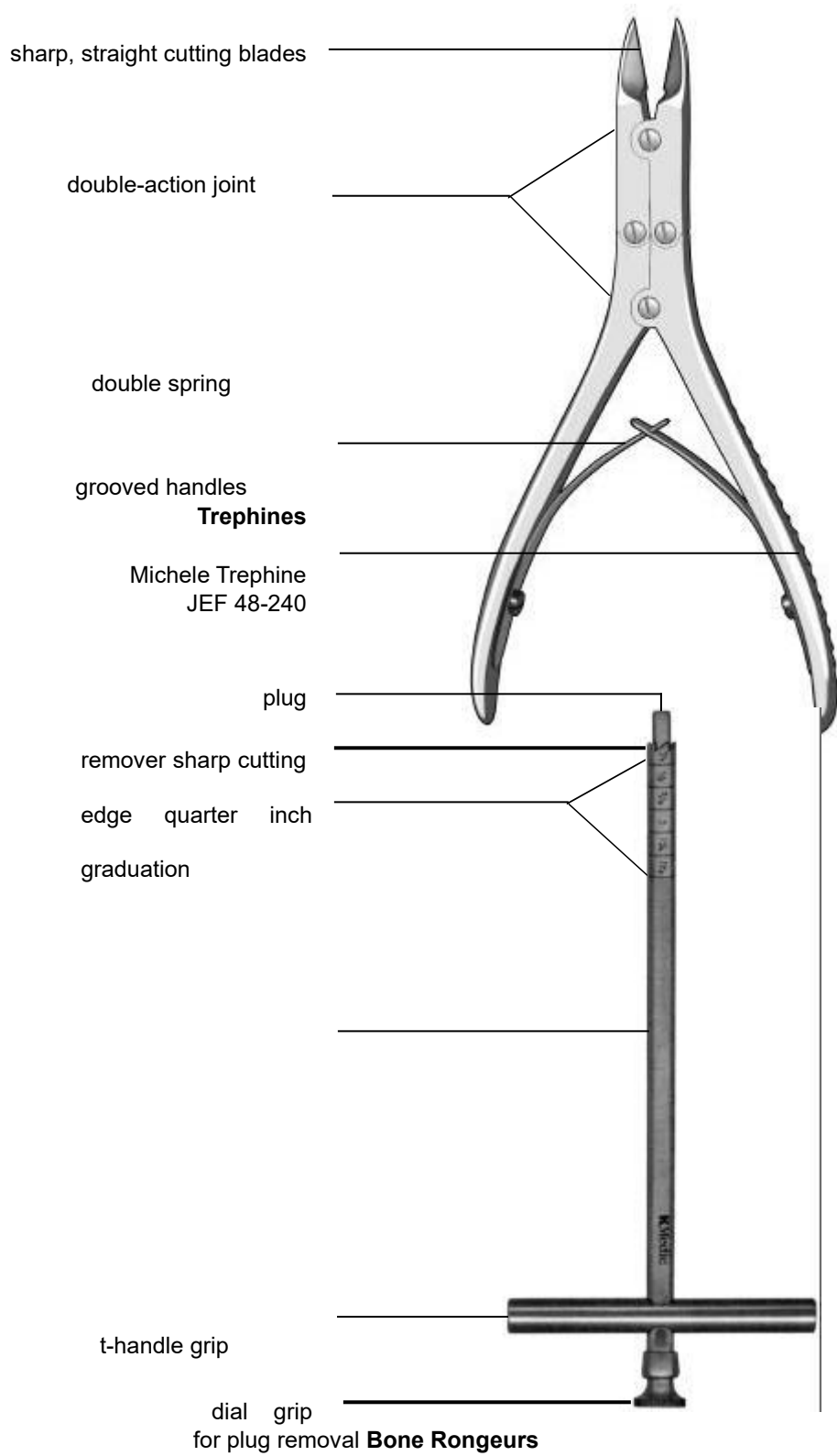
grooved handles

Ruskin-Liston Forceps

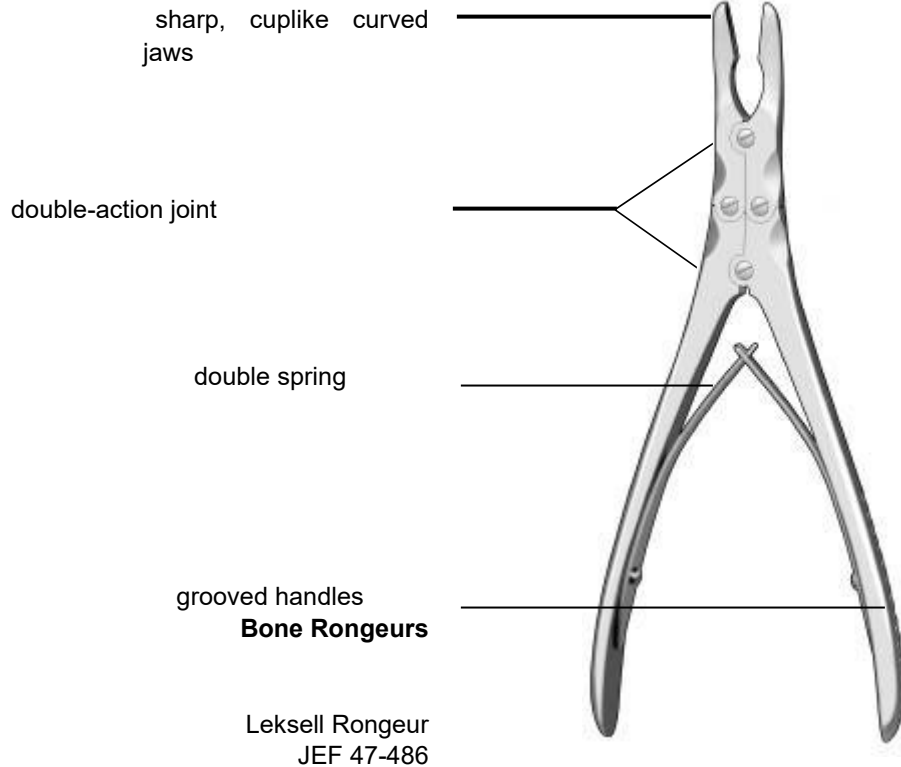


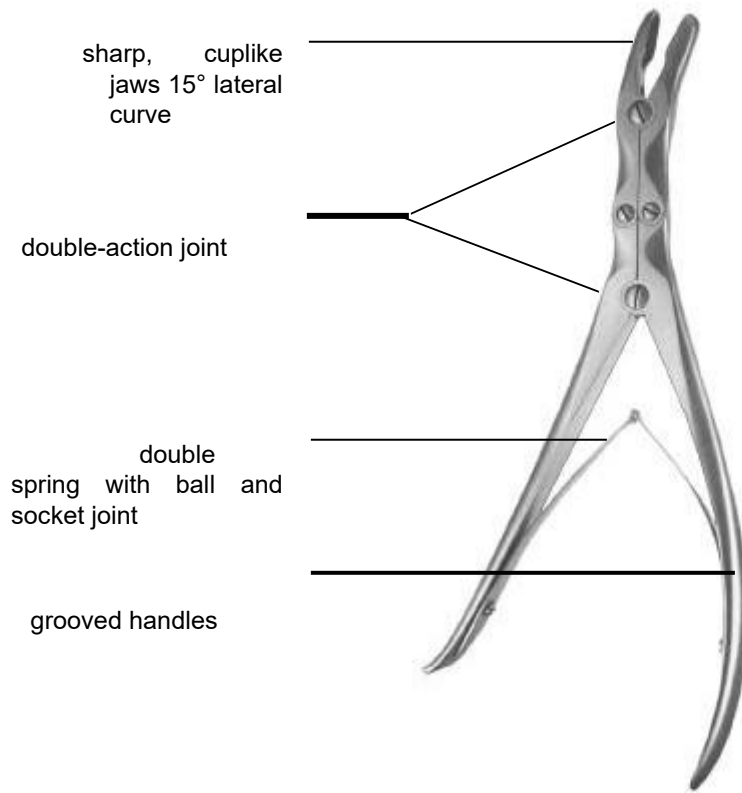
**Bone Cutters**

JEF 47-550



Ruskin Rongeur  
JEF 47-527



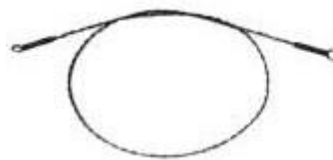


**Bone Saws**

Gigli Saw Handle, loop style  
JEF 46-616

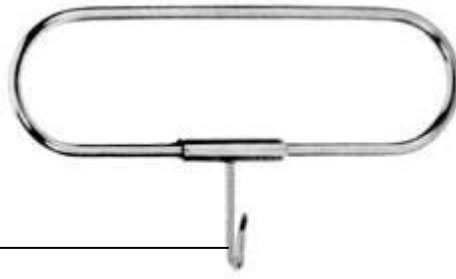
Gigli Saw Blade  
JEF 46-612

Gigli saw blade



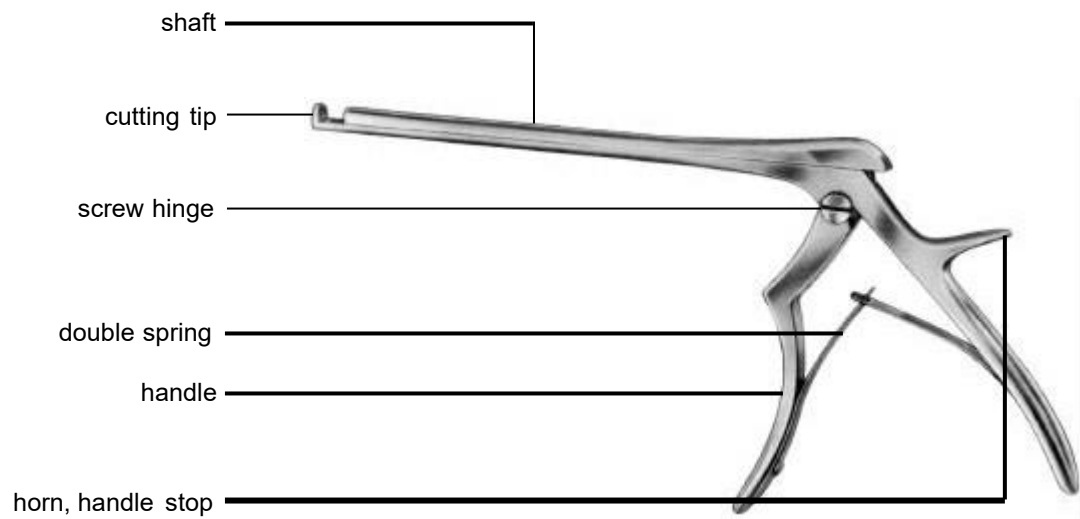
loop-style Gigli saw handle  
used in pairs with a  
Gigli saw blade  
(pictured above)

working end used to hold blade



### Spinal Rongeurs

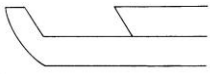
Ferris-Smith-Kerrison  
Laminectomy Rongeur  
JEF 47-990





**Spinal Rongeur Jaw Types**

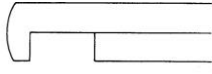
bite styles punch jaws



forward 40°



up 90°



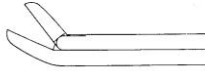
down 90°

---

bite styles cup jaws



straight



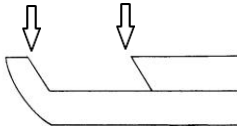
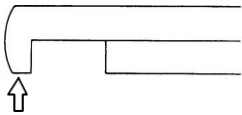
up



down

---

punch jaws



foot plate  
bite opening

bite

### Spinal Rongeur Handles

style I  
ring



style II  
kerrison



---

style III  
love-kerrison



**Spinal Rongeur Handles**

style IV  
improved  
love-kerrison



---

style V  
ferris-smith kerrison



---

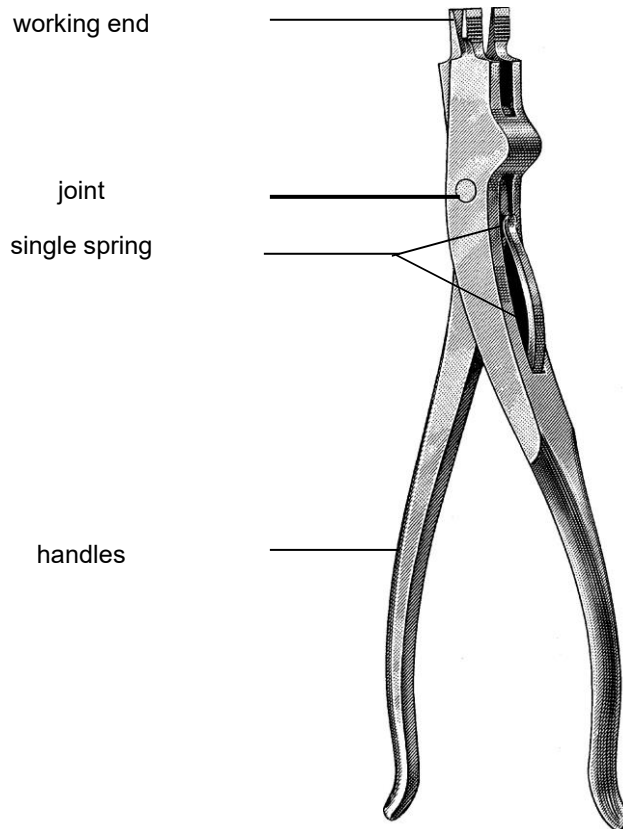
style VI  
ferris-smith  
kerrison ring



**Jmpl Product Information**

**Plaster Cast Instruments**

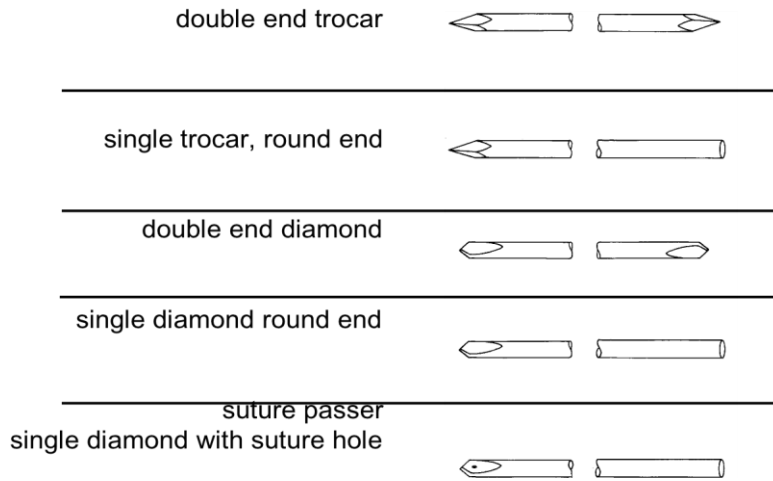
Jmpl Cast Spreader (Walton)  
JEF 46-134



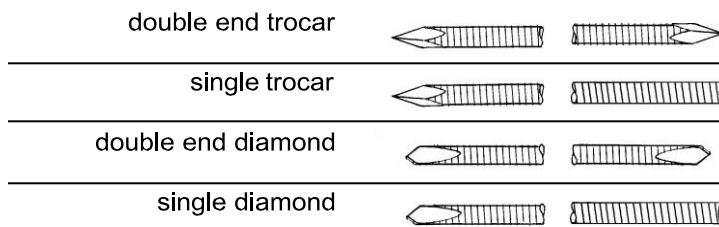
**Wire and Pin Implants**

tip details for  
K-Wire (Kirschner Wire)  
JEF 71-021-JEF 71-  
313

**Kirschner Wires, smooth**



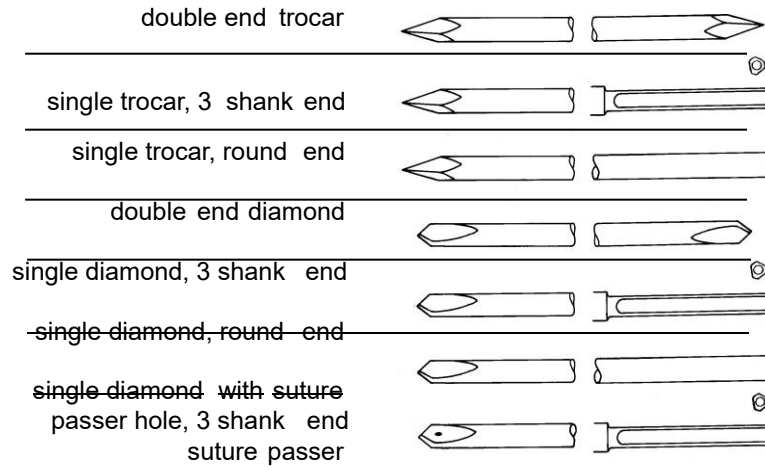
**Kirschner Wire, fully threaded**



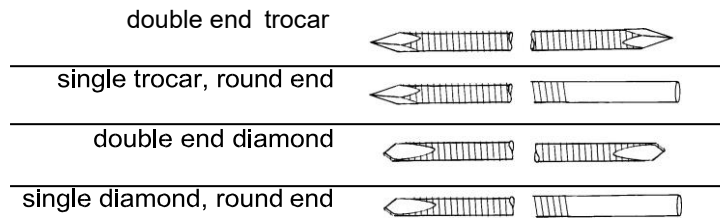
**Wire and Pin Implants**

tip details for  
Steinmann Pins  
JEF 71-450- JEF 71-898

**Steinmann Pins, smooth**

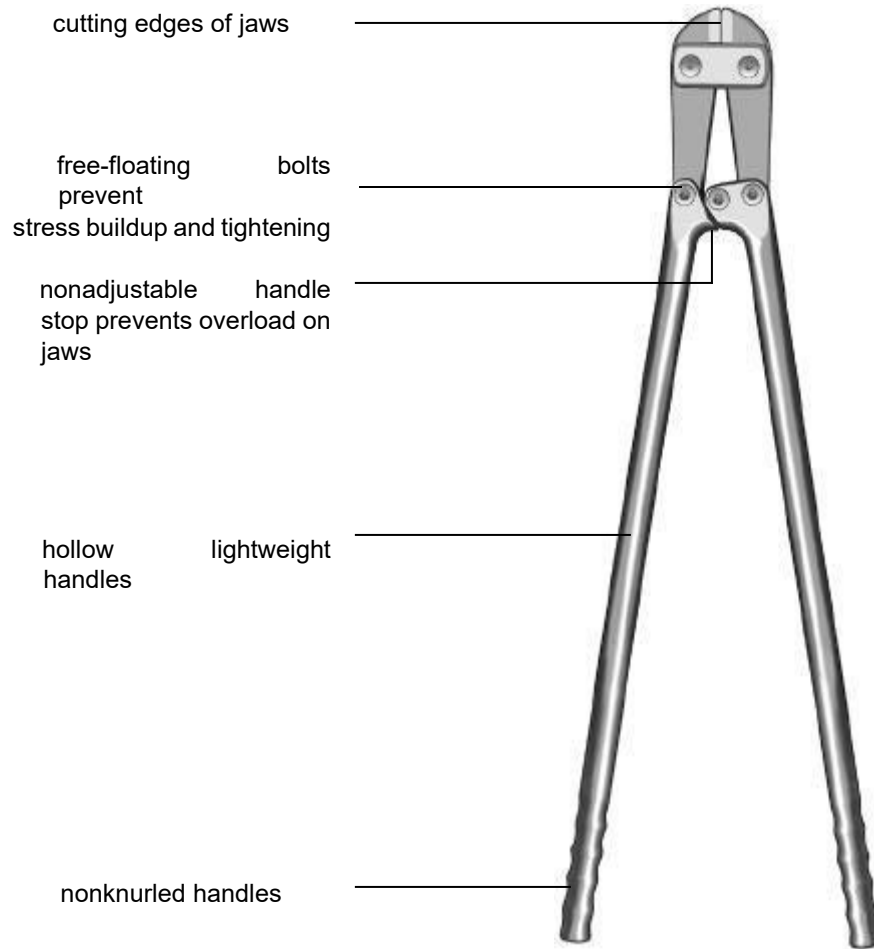


**Steinmann Pins, fully threaded**



**Pin Cutters**

Large Pin Cutter  
JEF 46-626



**Wire and Pin Management Instruments**

Heavy Duty Locking Pliers  
JEF 48-600

serrated jaws

reinforced hinge

spring



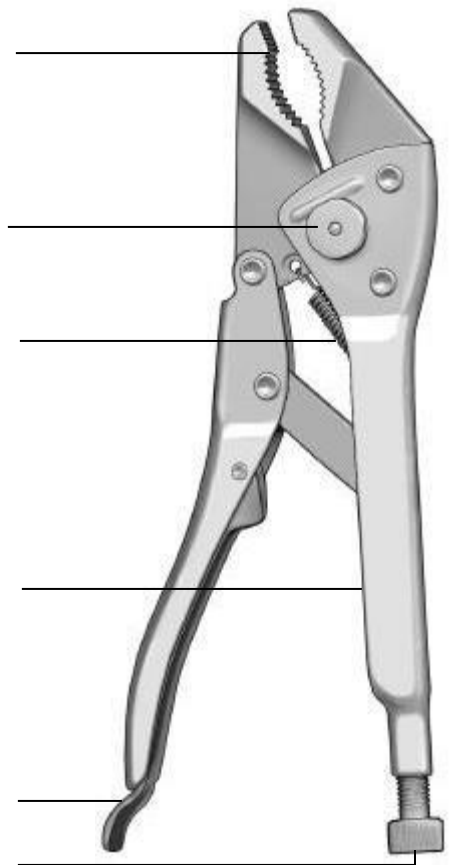
handle

release

lever

adjustment

screw



### Product Information

Instrument type/name:

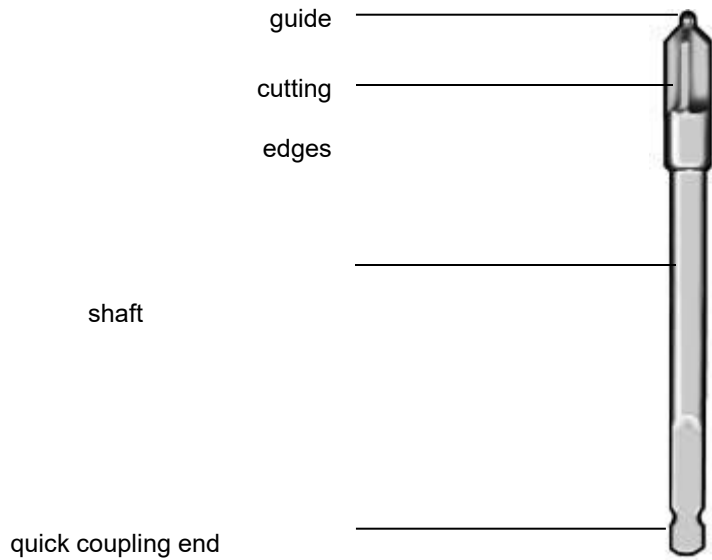
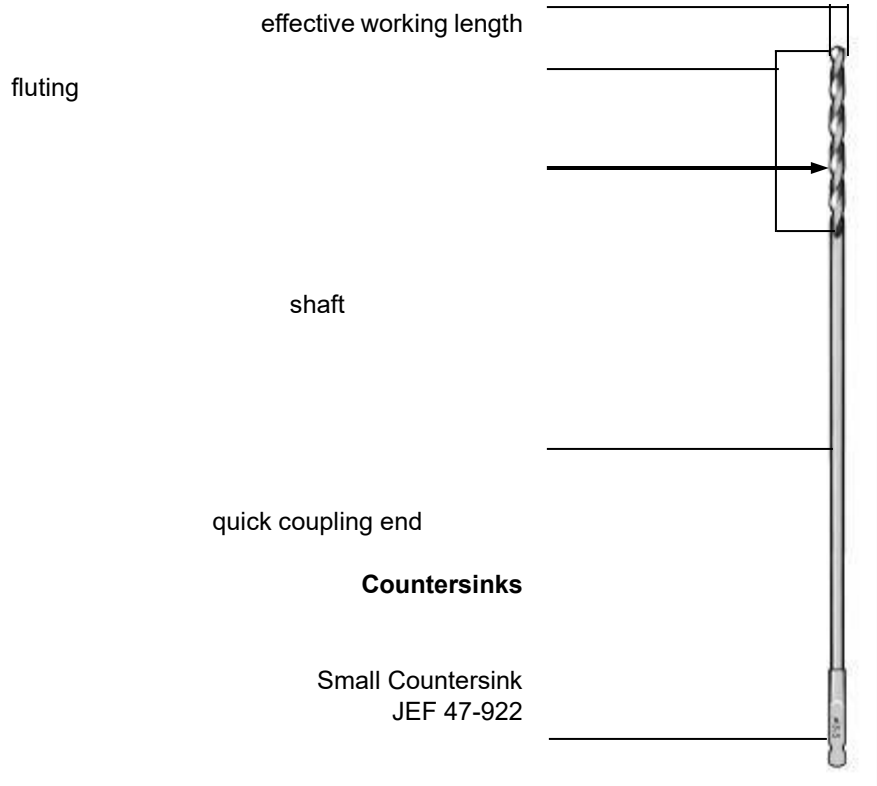
**Hand Drills**

Raw material:	Chuck: stainless steel Body: aluminum or chrome-plated Gear: chrome-plated or stainless steel Handle: stainless steel or aluminum
Surface:	Silk matte satin finish and chrome
Main function:	To insert K-Wires, guide wires, Steinmann pins and rods
Where used mostly:	Orthopedic surgery (fractures), neurosurgery
Important product features:	A variety of styles are available. Some styles have specially designed handles for optimal control.
Useful hints in usage:	They are used as an alternative to power drills.
Special care instructions:	Lubricate moving parts.

### **Drill Bits**

Drill Bit, with quick-coupling end  
JEF 48-051

diameter



**Taps**

Tap for Cortical Screws

JEF 48-112

guiding tip

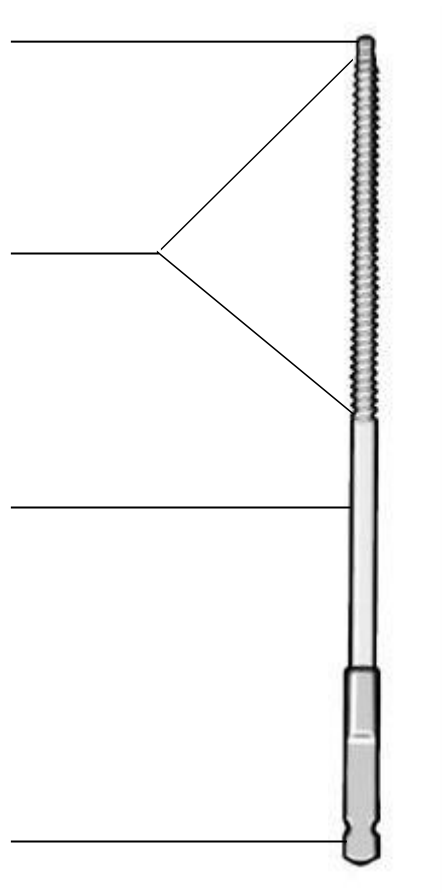
threading

shaft

quick coupling end

**Quick Coupling Handles**

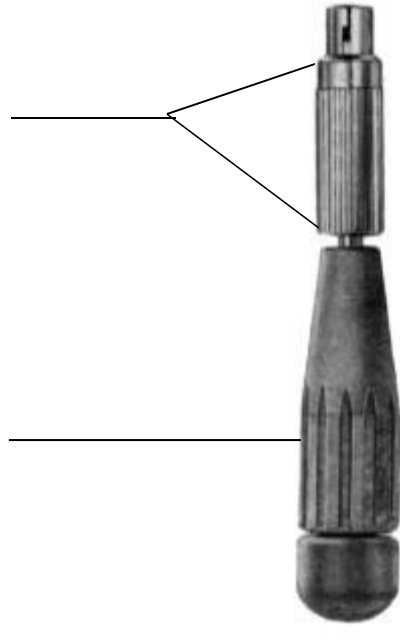
Small Quick Coupling Handle  
JEF 47-904



holding mechanism

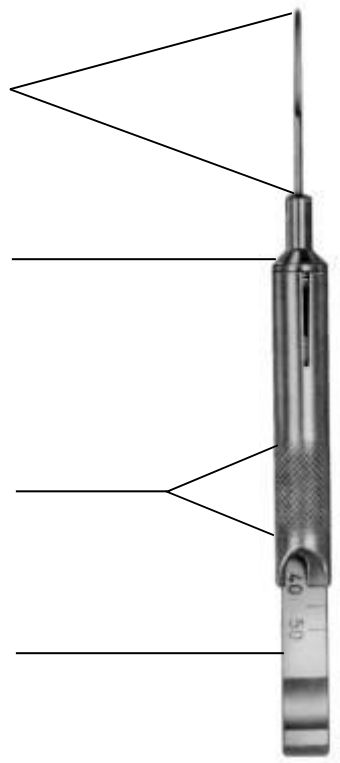
phenolic handle

Small Screw Depth Gauge  
JEF 47-936



**Depth  
Gauges**

working end



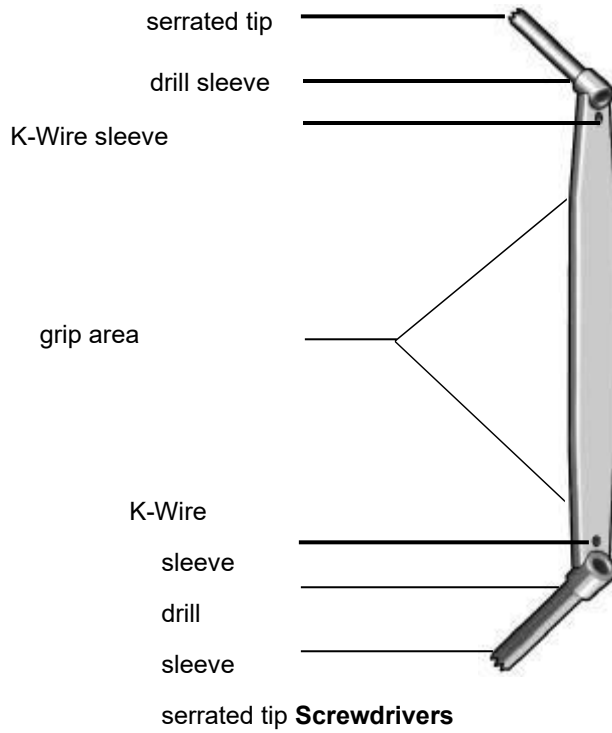
detachable at this point

partially serrated grip handle

scale

### Drill Sleeves

Double Drill Sleeve  
JEF 47-972



### Screwdrivers

Hexagonal Screwdriver  
JEF 48-353

hexagonal tip

shaft

phenolic handle

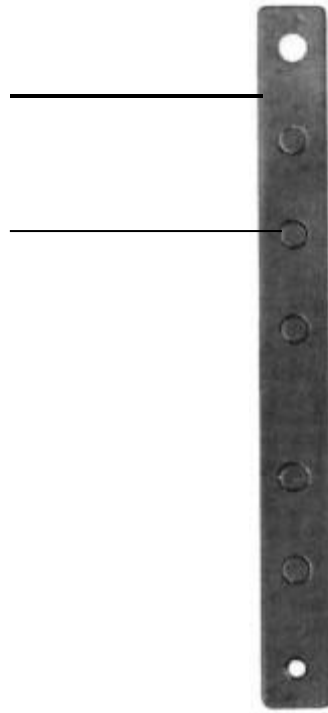
**Bending Templates**



7-Hole Template  
JEF 47-942

made of soft aluminum to  
conform to bone surface

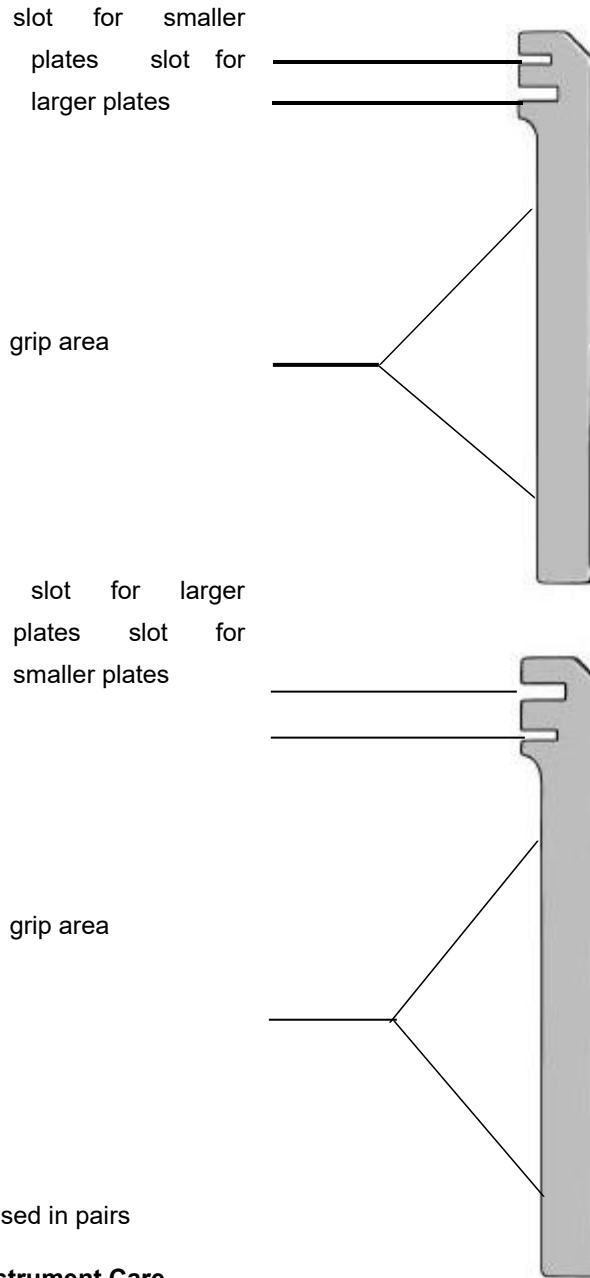
circles match  
screw slots  
on plates





## Plate Bending Instruments

Small Plate Bending Irons  
JEF 47-915, JEF 47-916



### 1. Instrument Care

### Instructions

#### 1.1 Instrument Longevity Through Proper Care

The purchase of Jmpl instruments represents a considerable investment for our customers. By following these guidelines our customers can protect their investment and ensure many years of productive and satisfactory performance.

## **1.2 Maintaining the Surface**

### **New Instruments**

Newly purchased instruments must be cleaned, lubricated and autoclaved immediately before use.

### **Correct Use**

Obvious as it sounds, it bears repeating: instruments are designed for a particular purpose and should be used only for that purpose. Even the strongest instrument can be damaged when used inappropriately, i.e., when a nail splitter is used to cut wire.

### **Water and Stainless Steel**

Ordinary tap water contains minerals that can cause discoloration and staining. Therefore, we recommend the use of distilled water for cleaning, disinfecting, sterilizing and rinsing instruments. To avoid staining, use a cleaning solution with a pH near neutral (7). Instruments should be placed in distilled water immediately after use. They should never be placed in saline solution, as it may cause corrosion and eventually irreversible pitting.

### **Manual Cleaning and Soaking**

When handling instruments, be very careful not to damage their fine tips and mechanisms. If instruments have been exposed to blood, tissue, saline or other foreign matter, they must be rinsed in warm (not hot) water before these substances are allowed to dry. Failure to do so may result in rust. After rinsing, immerse them in a cleaning and disinfecting solution.

Because many compounds, including certain chemicals, are highly corrosive to stainless steel, rinse and dry instruments immediately, in case they have come in contact with any potentially harmful substances.

If no ultrasonic cleaner is available, clean the instrument very carefully. Pay particular attention when cleaning box locks, serrations, hinges and other hard-to-reach areas. What's more, use nylon (not steel) brushes, such as JEF 39684, and warm (not hot) cleaning solutions. Follow the manufacturer's instructions for the preparation of the cleaning solutions. Remember to change these solutions daily.

## **1.3 Ultrasonic Cleaning**

Ultrasonic cleaning is the most effective and efficient way to clean instruments. To maximize its effectiveness, instruments should be cleaned of all visible debris before they are put into an ultrasonic cleaner. Please note that chrome-plated instruments may rust if they are not dried and lubricated immediately after sterilization. In addition, we recommend the following:

- Do not mix dissimilar metals, e.g., chrome and stainless, in the same cycle.
- Use only designated cleaners.

- Open all instruments so ratchets and box locks are accessible.
- When possible, disassemble instruments for optimal cleaning.
- Avoid piling instruments on top of each other when loading and follow the manufacturer's instructions.
- Remove and rinse off instruments immediately after the cycle is finished.
- Allow instruments to air-dry thoroughly.
- Lubricate all moving parts after cleaning and before sterilization.
- Use only surgical lubricants, which can penetrate the instruments during the sterilization process.
- Change the water in the cleaner regularly.

#### **1.4 Instrument Checkup**

The best time to review the condition of instruments is after they have been cleaned and lubricated and have cooled off. Consider the following:

##### **Function:**

"Sharps" must cut cleanly (resharpen if needed) and close properly. Check for burrs along the cutting edges. Needle holders and clamps must engage properly and meet correctly at the tips.

##### **Surface:**

Carefully inspect surfaces for any sign of staining, cracking or other irregularities. Common sources of staining are:

- Inadequate cleaning
- Mixing dissimilar metals
- Impurities in the water
- Unsuitable or improper preparation and usage of cleaning and disinfecting or maintenance agents
- Noncompliance with operating procedures of cleaning and sterilizing equipment

For further information regarding staining, see Section 13, Tips for Troubleshooting.

#### **1.5 Lubrication and Autoclaving**

All instruments must be properly cleaned before autoclaving. Then their moving parts, such as box locks and hinges, should be well lubricated. Be careful to use surgical lubricants and not industrial oils. Always sterilize instruments in the open, unlocked position. We recommend that instruments be wrapped in cloth and then

placed in the container, or that a cloth be put on the bottom of the pan to absorb moisture. The cloth should be pH(7) neutral and have no residue of detergents. Finally, avoid sudden cooling. Instruments should be allowed to air-dry, not rinsed or dried off.

### **1.6 Cold Sterilizing or Disinfecting**

Prolonged immersion in disinfecting or sterilizing solution can damage surgical instruments. Do not soak instruments for longer than 20 minutes. To render the instruments sterile and ready for use, use an autoclave cycle.

#### **Caution:**

Instruments with tungsten carbide inserts, such as wire cutters, needle holders and TC scissors, should never be immersed in sterilizing solutions containing benzyl ammonium chloride (BAC). BAC will soften and dissolve the tungsten carbide. Never use bleach as it will cause severe pitting.

### **1.7 Storage**

Once instruments are thoroughly dry, store them in a clean, dry environment. Never put them in areas where chemicals may emit corrosive vapors or where temperature and moisture variations could cause condensation on the instruments.

### **1.8 Jmpl Quick Instrument Care Checklist**

1. Rinse and soak soiled instruments immediately after use. Thoroughly clean before autoclaving.
2. Clean, autoclave and sterilize instruments in an open position.
3. Do not stack or entangle instruments.
4. Follow the manufacturer's recommendations when using equipment and cleaning solutions.
5. Keep instruments properly lubricated.
6. Inspect instruments regularly.

### **13. Tips for Troubleshooting**

This guide is intended as a quick reference to handle many of the most basic questions and problems regarding surgical instruments.

#### **13.1 Staining**

Staining is most frequently the result of improper or inadequate cleaning.

Stains can be caused by mineral deposits in the water or electrolysis. Instruments should be cleaned in distilled water to avoid this. Staining should not be confused with rusting.

**Blue Stains**

This discoloration is usually caused by cold disinfecting or sterilizing solutions.

Solutions should be changed frequently, as corrosion may otherwise occur. Distilled water will also inhibit discoloration.

**Black Stains**

This discoloration can occur when instruments are exposed to ammonia, which is present in many hospital cleaners, and are not then adequately rinsed.

When possible, avoid using cleaning agents with ammonia, and always rinse instruments thoroughly.

Black stains can sometimes be caused by residues of chemicals used to clean the steam pipes.

**Brown Stains**

Brown stains are probably the result of oxidation and should not be confused with rust (see Rust/Corrosion 13.4). It forms naturally on stainless steel and helps prevent atmospheric corrosion. It should not be a cause of concern.

**13.2 Spotting**

Spotting is usually the result of improper cleaning. It may be caused by the water in which instruments are washed or by detergent residues in the wrapping material.

**Light Spots**

Mineral-rich tap water or detergent residues may leave deposits. Rinsing the instrument in distilled water will generally remove these deposits; if this fails, they can usually be cleaned off using a special, nonabrasive stainless-steel cleaner or stain remover.

To avoid this problem, thoroughly dry instruments in the autoclave and avoid using cloths with detergent residues.

**Dark Spots**

Like light spots, these are usually caused by mineral deposits in the water used to clean, rinse and sterilize instruments. To avoid this problem, always use distilled water.

**Rust like Film**

This film may be caused by residue in steam pipes. Unfortunately, little can be done in this situation.

The film may also be caused by chemical compounds used to treat water. As a result, iron may be deposited on instruments. Take this up with hospital engineering staff. Use distilled water to clean instruments.

**13.3 Miscellaneous Stains and Spots**

Spots and stains may also be caused if too much or the wrong kind of detergent is used to wash the instruments. Use a cleaner formulated specifically for surgical instruments.

### **13.4 Rust/Corrosion**

If treated properly, stainless steel does not usually rust. Brown discoloration, which looks like rust to the ordinary eye, is often mistaken for rust.

#### **Is It Rust?**

A quick test to check whether you are dealing with rust or discoloration is to take an ordinary rubber eraser and try to rub away the imperfection—if you are able to do so, the problem is not with the instrument, and you should look into possible causes in the care and handling of the instrument.

If the instrument is corroding, it can be seen with a magnifying glass, because small pits begin to form in the steel. Such instruments should be removed from circulation and no longer used.

#### **Corrosive Substances**

Rusting may be the result of exposure to salts, saline, blood, iodine, chloride, bleach or other aggressive substances or due to the use of abrasives in the cleaning process, which can wear away the passive layers.

Surgical instruments should only be cleaned with solutions which the manufacturer has specifically stated are safe for such use.

#### **Inadequate Cleaning**

Corrosion can also be the result of inadequate cleaning. If blood or other bodily secretions are allowed to remain on the instruments, corrosion may occur. This is particularly a problem in hard-to-clean areas such as jaw serrations, box locks and ratchets. Instruments should be cleaned in the open position, and whenever possible should be disassembled.

Instruments should also be cleaned in distilled water. Deposits may form on instruments if they are washed in tap water, which may cause spotting and eventually corrosion.

#### **Incomplete Drying**

Incomplete drying may also end in corrosion—instruments should not be removed from the autoclave until they have been thoroughly dried.

#### **Lubrication**

Instruments should always be carefully lubricated. Failure to do so may result in wear, which could lead to corrosion.

#### **Improper Usage**

Improper usage is another common cause of corrosion. When corrosion appears at stress points in an instrument, e.g., at the jaws or box lock, this may be a sign of improper usage.

#### **Improper Marking**

Rust can also be caused by improper marking of the instrument with an engraver. Never mark anything on a box lock since it may weaken it.

#### **Rust Transfer**

Rust transfer can occur when instruments made of dissimilar metals come into contact for an extended period of time—to avoid this, wash and sterilize instruments of different metals separately.

Transfer rust can usually be removed with a rubber eraser. If neglected, however, rust may begin to mar the surface.

### **13.5 Pitting**

Pitting may be caused by the use of improper cleaning agents, such as saline or bleach. Use only cleaners formulated for use with surgical instruments.

It may also be the result of the use of improper concentrations of cleaning agents, or cleaning agents which have a pH level which is too acidic or alkaline. Avoid using these kinds of detergents. The optimal pH for a cleaning fluid is close to neutral, ca. pH(7).

Pitting may also occur in the ultrasonic cleaner if instruments of different metals are cleaned in the same cycle. This can also occur in the autoclaving process.

### **13.6 Broken Instrument**

An instrument should not normally break if it is being used for its intended purpose.

Breakage is likely the result of either an instrument being used for something other than what it was designed for, or being used to perform a task beyond its capacity, e.g., a wire cutter with a maximum cutting capacity of .045" is used to cut a wire of a larger size.

Another cause of breakage comes during the ultrasonic or autoclaving process. Instruments should be cleaned and autoclaved in the open, not locked, position. In the locked position, the heat may make the instrument expand and crack the box lock.

Instruments may also break as the result of careless handling. Some simple guidelines:

- Open all locked instruments
- Don't overload instruments in the ultrasonic cleaner
- Always sort instruments carefully
- Delicate or sharp instruments should be separated—especially microsurgical instruments
- Clean and store delicate or sharp instruments in specialty trays and containers

In the rare case that a flaw in the material or workmanship caused the breakage, Jmpl will replace the item free of charge.





### **13.7 Damaged TC Insert**

Tungsten carbide inserts, while more durable than steel, are not designed to last forever. It is possible that damaged or worn inserts may simply need replacement.

Premature wearing can be avoided by always using the instruments for their intended purpose. Jmpl guarantees against manufacturing and material defects.

Damage may also result from improper cleaning. Instruments with TC inserts should never be cleaned in sterilizing solutions containing benzyl ammonium chloride (BAC). BAC will soften and dissolve the tungsten carbide.

## **Section C**

#### 14. Glossary of Useful Terms

abduction	to draw away from the center line of the body
abrasive	substance which removes or deteriorates a surface by friction
acetabulum	the large, cup-shaped cavity at which the femur, or thigh bone, joins the hip
adduction	to draw toward the center line of the body
angled	bent, not straight
anodized aluminum	aluminum which has been specially treated through an electrochemical process which forms a protective oxide layer, rendering it corrosion resistant; used to make instrument racks; the oxide layer of anodized aluminum may be colored
AO	<i>Arbeitsgemeinschaft fuer Osteosynthesefragen</i> ; an international organization dedicated to research of internal bone fixation (osteosynthesis), as well as instrument design for and documentation of osteosynthesis
approximate tips	instrument tips have proper alignment
arthrodesis	fusion of a joint in a surgical procedure
arthroplasty	surgical reconstruction of a joint
arthroscopy	examination of the inside of a joint with an arthroscope
articular	pertaining to a joint
articulate	divided into or separated by joints
aspirate	to remove fluid or gas from a cavity or joint area using suction
atraumatic	not having a crushing or biting effect on tissue
autoclave	machine for the sterilization of surgical instruments
bayonet	a blade that is offset (bent) from the axis of the handle
biopsy	the removal and examination of tissue from a living body
blank	first stage in the actual manufacture of an instrument; involves the creation of the basic form of the instrument; may be created through hot or cold forging; see: forgings
bone graft	use of bone tissue to reconstruct an area of missing bone
box lock	the area of an instrument at which the male and female parts of the instrument are joined

bunionectomy	the resection of a bunion, an abnormal prominence at the mid-section of the first metatarsal head (below the big toe)
calcaneus	bone of the heel
caliper	a compass with bent or curved jaws used to take measurements
cancellous	spongy and latticelike (soft) bone
cancellous bone	ends of long bones, most of flat and short bones (latticelike bone)
cannula	a tube for insertion into a duct or cavity; used to drain fluids
carpal	pertaining to the group of eight small, short bones which form the wrist
cartilage	white substance covering joint surfaces which can be compressed, allowing for motion without friction
catheter	instrument used to remove fluids from a cavity in the body
cavitation	a process to clean instruments using sound waves in an ultrasonic cleaner
cerclage	wire used in the treatment of long, spiral fractures; it is placed around the bone and tightened; used also in other cases in which temporary fixation is required
cervical	refers to the area at the upper portion of the spine
chisel	wedgelike instrument with a blade, generally used with a mallet to cut and shape bone
chondral	pertaining to cartilage
cleaning agents	detergents designed for the removal of protein soils, a necessary step in cleaning instruments
closed reduction	to set a broken bone by compression
complex fracture	situation in which, after reduction, there is still no contact between the main fragments
compound fracture	an open fracture in which the bone is broken completely across
corrosion	the gradual wearing away of a surface; may be caused chemically
corrosive	causing the gradual dissolving and deterioration of a substance, especially by chemicals
cortex	external layer of cancellous bone or middle layer of long bones

cortical	pertaining to the outer layer of cancellous bone (cortex) or middle layer of long bones (hard bones)
cortical bone	solid portion of a bone; surrounds medullary canal
cranium	the skull or brain pan
critical dimension	area of a surgical instrument which must correspond very closely to product specifications, as in the parts that need to mate with other parts, e.g., QC handle, screwdrivers, etc.
curette	spoon-shaped instrument used to scrape, shape and remove bone
curved	continuously deviating from a straight line, as in a curved blade or handle
debridement	removal of foreign material or contaminated tissue to expose surrounding healthy tissue
decontamination	removal of microbes to make instruments safe for use
dilator	instrument used to stretch or enlarge an opening
dissect	to cut or separate tissue
dissector	instrument used to cut apart or separate tissue
distilled water	purified liquid condensed from boiled water; preferred choice for instrument cleaning
double-action	applies power in two directions, used in instrument mechanism to increase surgeon's power and to control and reduce fatigue
dull	blunted, not sharp
electrolysis	decomposition of a chemical compound into its ions by the passage of an electrical current through a solution of it (electrolyte)
electrolytic	having to do with electrolysis or with an electrolyte
elevator	instrument used for lifting or retaining at a greater height; sharp versions are used to strip the periosteum
etching	process by which instruments are marked to facilitate identification and tracking; an electrochemical process is used in order to preserve the instrument surface; etching should never be performed on an instrument joint
excision	the cutting away or removal of tissue, bone, etc.

fascia	sheet of fibrous tissue encasing the body beneath the skin, enclosing muscles and muscle groups, and separating their layers
fasciotomy	removal of the fascia
femur	bone of the thigh
fenestrated	pierced with one or more openings
fibula	smaller bone of the leg
fine	having thin or slender jaws or tips
finger rings	rings at the handling end of an instrument, used to control the jaws
fixation	to hold, suture or fasten in a fixed position, e.g., fractured bone is stabilized in order for healing to take place; may be temporary or permanent, external or internal; see: osteosynthesis
forging	molded metal, the first step in the actual manufacture of an instrument
fracture	a break in the continuity of bone; see: compound fracture, simple fracture
golding	the marking of instrument with a gold plating usually on the handles for easy identification; indicates the instrument has TC inserted or welded to its tips
goniometer	device used to measure the flexibility and extension of the finger
gouge	instrument used to scoop bone away from an area
hardening	process by which steel is heated to very high temperatures in order to increase the metal's hardness or durability; also known as tempering
head	large, rounded end of a bone
heavy	having broad jaws or tips
hemostat	small surgical clamp used to constrict a blood vessel
hex size	refers to the hexagonal tip of an instrument made to mate precisely, as in screwdrivers
humerus	the upper arm bone
implant steel	special grade of stainless steel used for manufacturing screws and plates for implantation in bone fixation procedures
intervertebral	between the vertebrae

intramedullary	inside the medullary canal
ISO	The International Organization for Standardization; the organization which sets the manufacturing standards for certain surgical instruments, e.g., internal fixation devices
jaws	grasping or cutting tips of a ring-handled instrument
lamina	a thin layer of bone or membrane
laminectomy	excision, or cutting away, of the posterior arch of a vertebrae
lap joint	joint for a two-part instrument fastened in an overlapping fashion; used as an alternative to box locks
ligament	tissue which serves to connect the ends of bones, binding them together or preventing movement
malleable	flexible, able to be bent
mallet	hammerlike instrument used to apply force, e.g., to chisels and osteotomes
mating parts	parts which interlock precisely, as in implant management instruments
medullary canal	bone marrow canal
meniscus	crescent-shaped structure attached to the tibia (knee)
metacarpal	pertaining to the group of five long, thin bones which form the palm area of the hand
metatarsal	pertaining to the group of five rod-shaped bones which form the arch of the foot
micro	small, narrow or delicate
micrometer	device used to take very fine measurements
milling	a stage in the manufacture of an instrument, in which the hot or cold forged blank is shaped, e.g., to create the box lock
mycotic	pertaining to mycosis, any disease caused by a fungus
necrosis	death of areas of tissue or bone surrounded by healthy tissue; can be caused by excessive heating of bone during drilling
neuroma	a tumor or new growth composed largely of nerve cells and fibers; a tumor which grows from a nerve
nonunion	failure of segments of broken bone to reunite
O.R.I.F.	Open Reduction, Internal Fixation

oblique	inclined; sloping
obturator	object which closes an entrance or cavity
occlude	to close or obstruct
olecranon	from the Greek, meaning "elbow"
open reduction	surgical procedure to reduce a fracture; open reduction may include the use of an internal fixation device
orthopedics	area of medicine which deals with the treatment of disorders involving the structures of the body which enable movement, primarily the skeleton, joints, muscles and fascia
ostectomy	the removal of part or the entirety of a bone
osteosynthesis	coined by Dr. Lambotte, refers to the process of surgical joining of bone fragments by internal fixation; now also used to refer to external fixation
osteotome	a chisel-like instrument, often used with a mallet to cut or sculpt bone, particularly cancellous bone
osteotomy	the surgical cutting or shaping of a bone; may include repositioning and/or controlled fracture
passivation	electrochemical treatment of stainless steel to create passive layers
passive layers	protective layers formed on stainless steel, the result of a high chromium content, which inhibit corrosion
patella	the knee cap
pelvis	bony structure which supports lower abdomen
periosteum	connective tissue covering the external surface of a bone
pH	measurement for the acidity or alkalinity of a substance; distilled water has a neutral pH of 7
phalangeal	refers to both the bones which form the toes or the bones which form the fingers and thumb; each group of phalanges includes 14 bones
pitting	indentation on the surface of an instrument, caused by corrosion
QC handle	quick-coupling handle, designed to mate quickly with QC working ends, as in some screwdrivers, taps and drills
radius	the bone of the forearm which rotates
ratchet	locking mechanism located on the shank portion of an instrument

reduction	restoration of a bone to its normal position; see: closed reduction and open reduction
resection	the operation of cutting out or removing a section or segment, e.g., an organ
retractor	instrument used to grasp, retain or hold back tissue, organs or bone for surgical exposure
rongeur	a forcep used to cut or remove small pieces of bone and tissue
saline	solution of sodium chloride and distilled water; saline should not be used to clean instruments, as it may cause corrosion
sand-blasting	a surface treatment process by which tiny glass or sand beads are blasted under high pressure against the surface of a stainless steel instrument to achieve a homogeneous surface; used in cases where hand polishing is not possible or recommended
saw	a notched blade used for cutting
scissors	cutting instrument with two shearing blades
screw lock	a lap joint which is fixed with a screw, as with scissors
self-retaining	capable of being placed in a fixed position, as in a self-retaining clamp
semi-box lock	box lock which may be disassembled for cleaning
serrations	the small grooves seen on the edge or tips of an instrument; can be vertical, horizontal or diamond patterned
sesamoid	small bone of the foot, usually found below the head of the first metatarsal bone (closest to the big toe)
sesamoidectomy	the removal of a sesamoid bone
shanks	midsection of a ring-handled instrument; site of ratchet
sharp	implies a pointed tip, as in a rake retractor; frequent nickname for any sharp instrument, e.g., scissors
simple fracture	a fracture which does not produce an open wound in the skin; also called "closed fracture"
skeleton	the body's framework; in humans, the collective bones of the body
smooth	without teeth; may be serrated, but does not have a projection to penetrate tissue

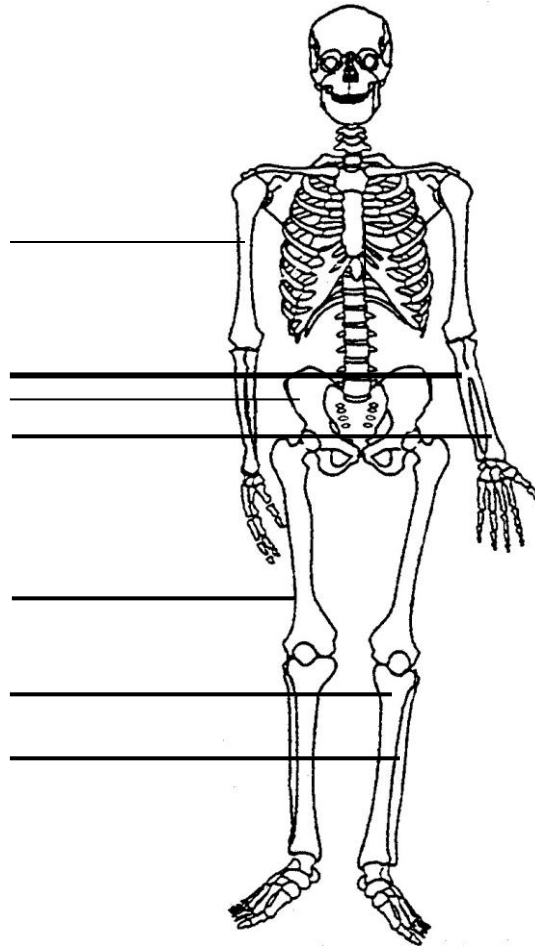


snare	an instrument with a wire loop used to remove a tissue growth by encircling it and removing the growth
soft tissue instruments	basic instruments required for incision, subcutaneous tissue dissection and wound closure
spotting	markings on an instrument caused by nonadhesive surface contaminants
staining	markings on an instrument caused by semiadhesive surface contaminants; difficult to remove
stainless steel	alloy of steels; the main metal is iron alloyed with chromium, carbon, manganese, silicon, etc.; chromium helps the steel to be rust resistant; other elements can be added so it can perform specific functions; used in the manufacture of most surgical instruments
steam sterilization	process for the sterilization of instruments, using saturated steam at a set temperature and for a set time period; see: autoclave
sterilization	process that removes all microbes, including spores, to render instruments safe for use; usually achieved with a steam or gas process; see: autoclave, steam sterilization
sternum	the breast bone
strabismus	deviation of the eye which prevents both eyes from looking at an object at the same time; cross-eye
suction tip	a hollow, tubelike instrument which is attached to a vacuum for suction
synovectomy	removal of a synovial membrane
synovium	membrane which lines the inside of a joint
tarsal	pertaining to the group of seven bones which form the ankle and heel
TC inserts	tungsten carbide inserts, soldered or welded into the jaw of an instrument to provide extra durability; TC inserts may also be replaced, extending the life of an instrument
teeth	small notches or projections used to grasp tissue and prevent the instrument from slipping
tempering	see: hardening
tenaculum	hooklike instrument used to seize and hold tissue
tendon	a cord of tissue which connects muscle to bone

tenotomy	dissection or cutting of tendon or muscle, as in hand, foot and eye surgery
thoracic	pertaining to the chest
tibia	shin bone
tissue	a group of cells which are specialized to perform a particular function
tolerance	the allowable amount of variation in the dimensions of an instrument
tonometer	instrument used to measure the tension or pressure of the eyeball or the blood pressure within blood vessels
tooling	machines, tools, fixtures and other devices which aid in the manufacture of instruments
tool steel	type of steel generally used for machine-shop tools, used in the manufacture of some instruments
toothed	see: teeth
traumatic	having a crushing or biting effect on tissue
traumatize	to wound or damage
trochanter	either of two bony processes, or protuberances, of the upper shaft of the femur which serves in the attachment of muscle
tungsten carbide	alloy used in the manufacture of inserts for instrument tips; harder than stainless steel; tungsten has the highest melting point of all metals
ulna	the inner and larger bone of the forearm
ultrasonic cleaner	mechanical cleaner which makes use of sound waves (known as cavitation) to clean instruments; used before lubrication and sterilization

## Major Bone Anatomy

Major long bones are identified as any elongated bone of the extremities that consists of a diaphyseal shaft and wider epiphyseal articulating ends.



Humerous

Ulna Pelvis  
Radius

Femur

Tibia

Fibula