UNIVERSITY OF DEBRECEN
FACULTY OF MEDICINE
DEPARTMENT OF OPERATIVE TECHNIQUES
AND SURGICAL RESEARCH

BASIC SURGICAL TECHNIQUES

for students of Dentistry Program



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THE ROLE OF OPERATIVE PROFESSIONS IN MEDICINE.

SURGICAL DEONTOLOGY. SURGICAL ARMAMENTARIUM.

1.

SURGICAL TECHNIQUES

The science of interventions' methodology.

ESSENTIAL
USEFUL
ORIENTATION

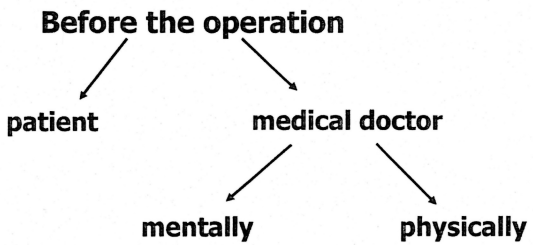
} **KNOWLEDGE**

DEONTOLOGY

the science
of professional duties
and etiquette

Gr. deonta - things that ought to be done
Gr. logos (logy) - the science of something

SURGICAL DEONTOLOGY

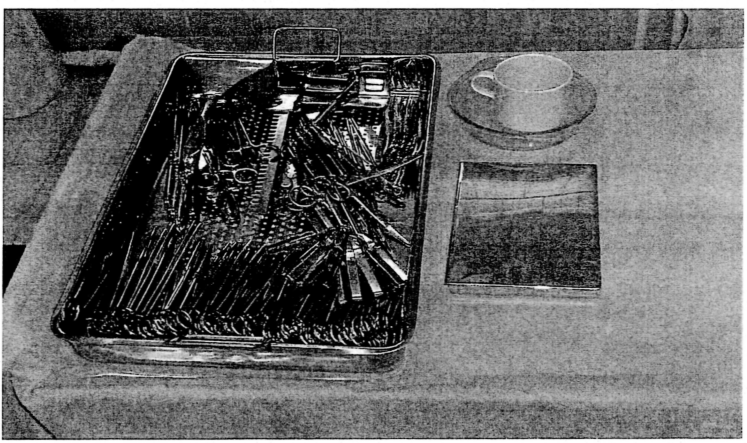


During the operation

After the operation

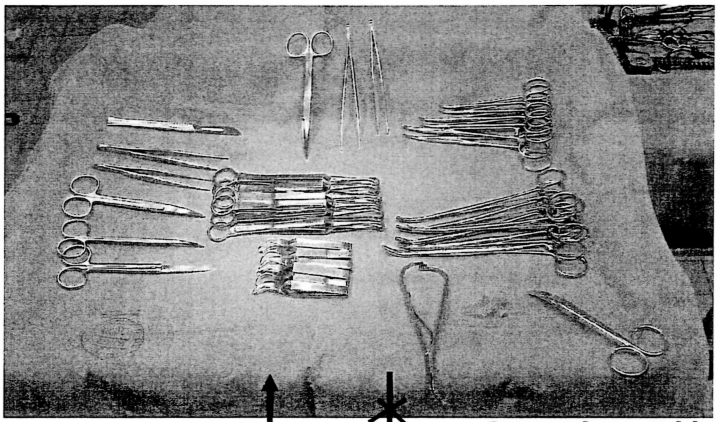
SURGICAL INSTRUMENTS

I. Cutting instruments
II. Hemostatic instruments
III. Grasping and Retracting instruments
IV. Special instruments
V. Suturing instruments

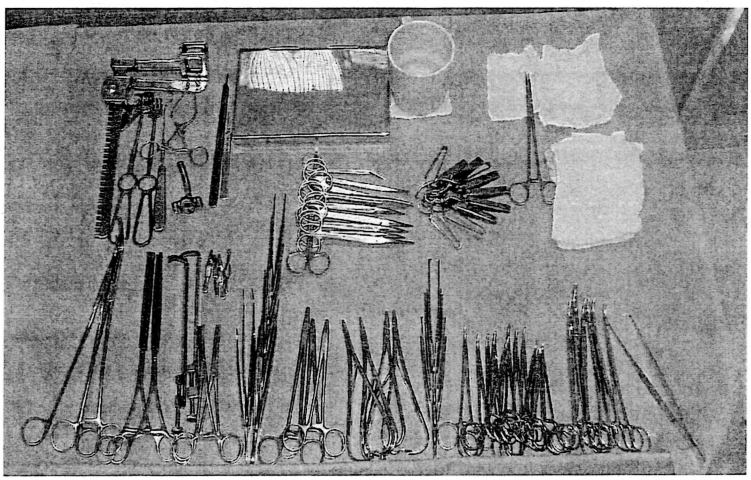


big table

SURGICAL INSTRUMENTS



Sonnenburg table



big table

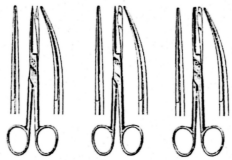
CUTTING INSTRUMENTS

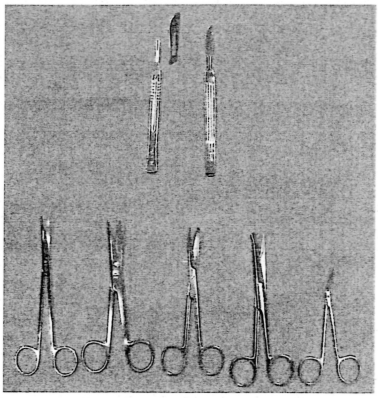
scalpels

conventional
changeable blade

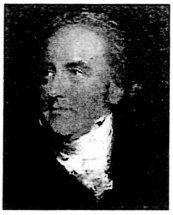
scissors

straight - curved
sharp - blunt
Cooper, Mayo scissors
knee-, peritoneal scissors





Cooper scissors



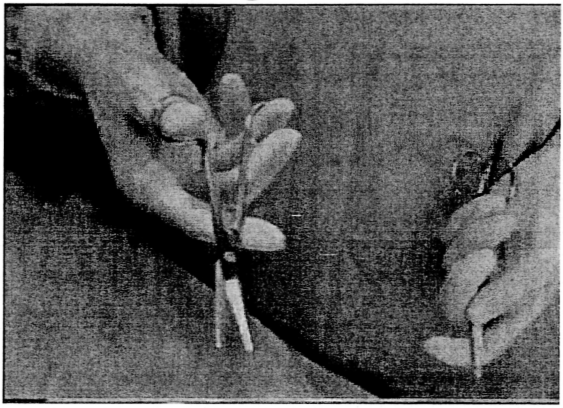
Sir Astley Cooper
1768-1841

Mayo scissors

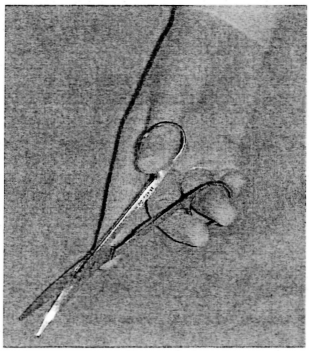


Charles Horace Mayo
1865-1939

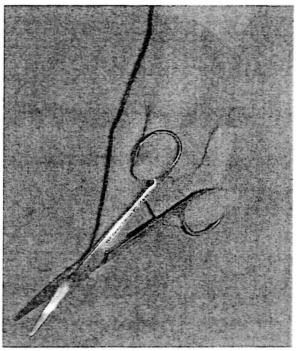
Handling of scissors



thumb – ring-finger



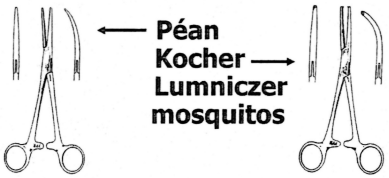
thumb – ring-finger



thumb – middle-finger

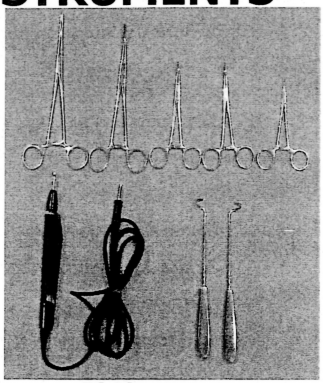
HEMOSTATIC INSTRUMENTS

Hemostatic clamps



← Péan
Kocher →
Lumniczer
mosquitos





Diathermy
(cutting and coagulation function)
Deschamps needle

Péan **Kocher** **Lumniczer**



Émile-Jules Péan
1830-1898

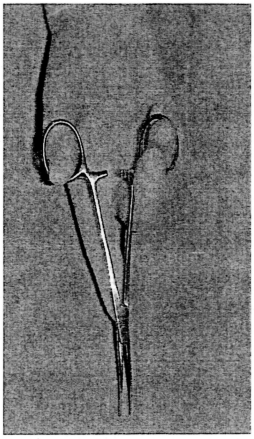


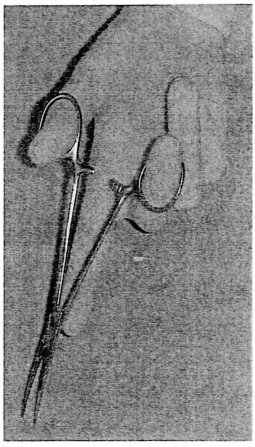
Theodor Kocher
1841-1917
Nobel - Prise

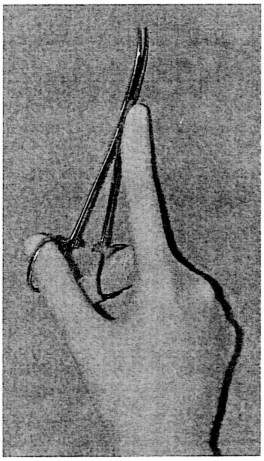


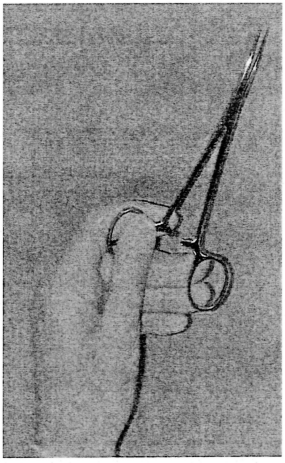
Lumniczer Sándor
1821-1892

Handling of hemostatic clamps







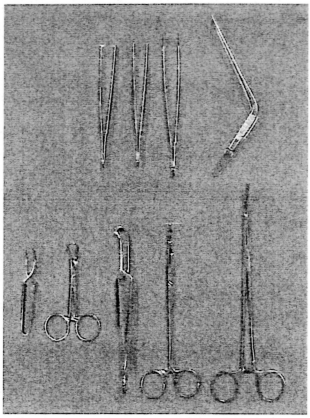


GRASPING AND RETRACTING INSTRUMENTS I.

Grasping instruments

anatomical forceps
surgical forceps
special forceps
(dental, bayonett-shape)

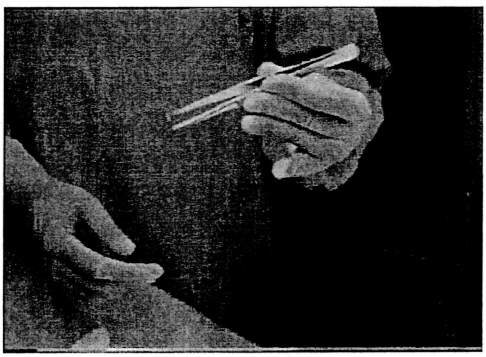
towel clamp, Backhaus
Doyen
peritoneal clamp
Lumniczer



Handling of forceps







„pencil grip"

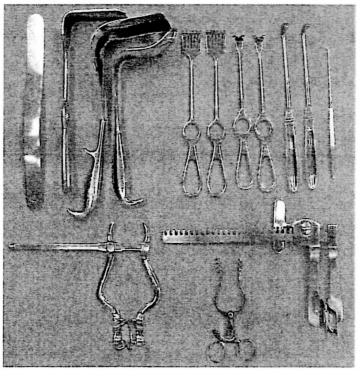
GRASPING AND RETRACTING INSTRUMENTS II.

Retracting instruments

manual-retractors
Langenbeck (1 prong)
2 to 8 prongs
retractors for deep surgery
skin retractor

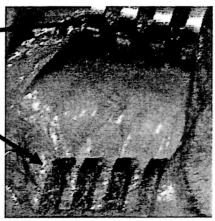
spatulas

auto-retractors
mastoid retractor

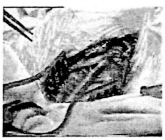


manual retractors

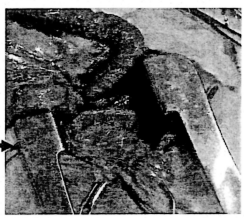
self retaining retractors (auto-retractors)



mastoid retractor



abdominal retractor

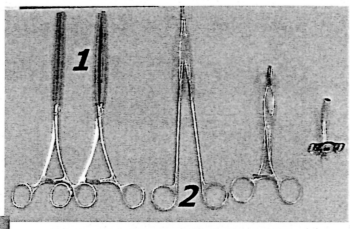


SPECIAL INSTRUMENTS

intestinal clamps (1)

dissector (2)

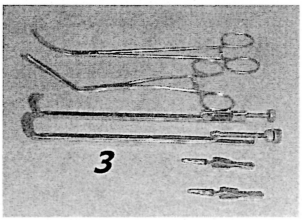
vascular clamps (3)



Satinsky
De Bakey
Bialock
bulldog

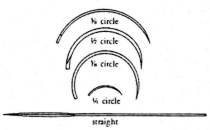


Alfred Blalock
1899-1964

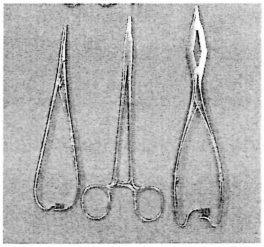


tissue and organ forceps

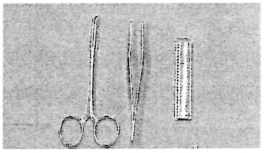
SUTURING INSTRUMENTS





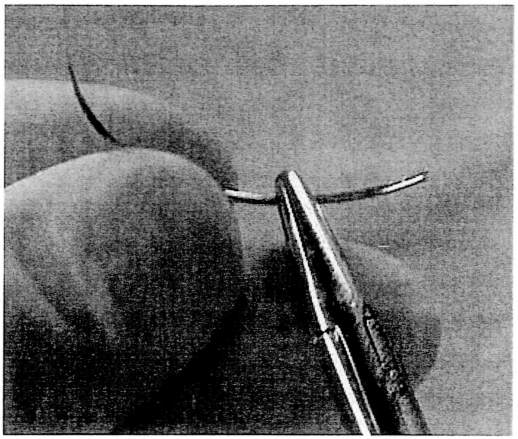


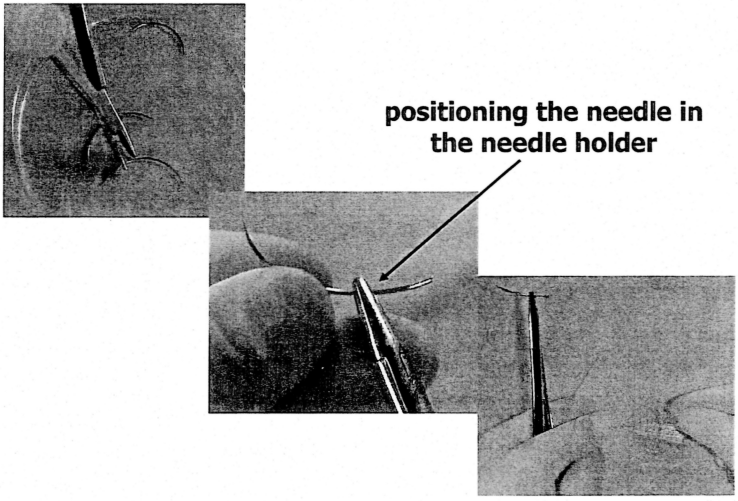
needle holders
Mathieu
Hegar (atraumatic)
needles
suture materials



clips
clip applying forceps
clip removing forceps

Correct fixation of needle





SURGICAL SUTURES.

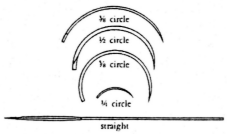
SURGICAL SUTURE MATERIALS.

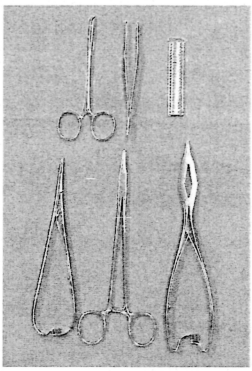
2.

DYNAMIC UNIT









surgeon

needle holders

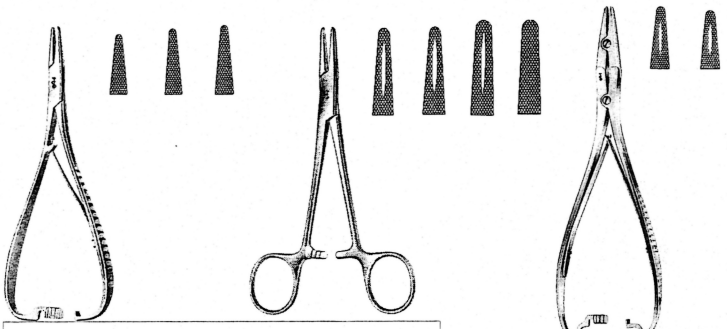
surgical needles

surgical suture materials

****

(clips, tissue adhesives)

Different types of needle holders

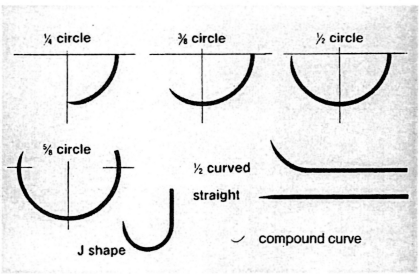


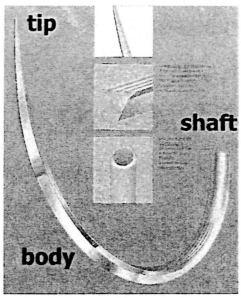
Mathieu **Hegar** **Zweifel**

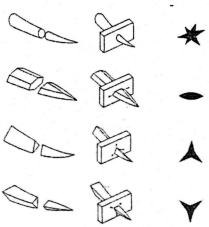
SURGICAL NEEDLES

Shape

straight - curved

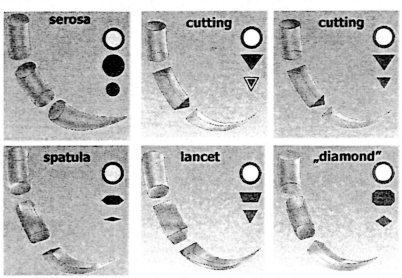






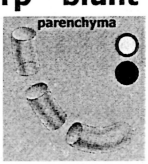
Body cross-section

round bodied (serosa)
triangular (cutting)
spatula, lancet, diamond...



Tip

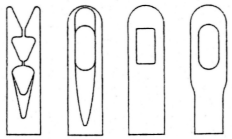
sharp - blunt

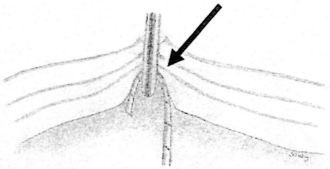


SURGICAL NEEDLES

Shaf

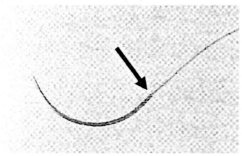
conventional

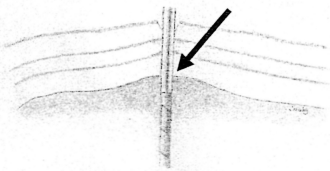




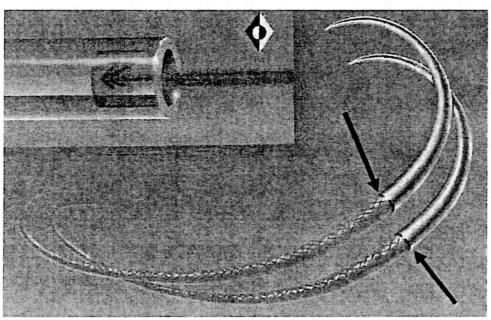
tissue damage

atraumatic

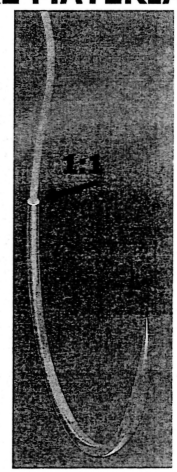




ATRAUMATIC NEEDLE – SUTURE MATERIAL



„double armamentarium"
(vascular surgery)



SURGICAL BIOMATERIALS

Absorbable or non-absorbable materials that contribute wound healing and improve function failure. Implanting into the organism they create favourable situation without tissue damage. They are not medicines.

surgical suture materials

surgical clips

surgical mesh

bioplasts

tissue adhesives

SURGICAL SUTURE MATERIALS

Natural or synthetic materials.

They keep wound edges together during the early wound healing.

The wound healing depends on the regenerative capacity of the organism.

„IDEAL" SUTURE MATERIAL

Physical properties

- high tensile strength
- high breaking strength
- good tying capacity
- good knot holding security
- high flexibility
- monofil
- surface smoothness
- no cutting or serrating effect
- easy to sterilize

Biological properties

no: edema, allergic, toxic, carcinogenic effect, drainage effect

minimal tissue reaction

Chemical properties

Resistance to: acids, alkalis, bacteria, enzymes

minimal adhesive effect

NONABSORBABLE SUTURE MATERIALS

NATURAL **SYNTHETIC**

ORIGIN

Animal origin

Silk

Silk, Silkam,
Mersilk, Sofsilk

Plant origin

Linen

Linen, Linatrix

Mineral origin

Steel

Steel Stainless,
Surgisteel
Flexon, Steelex

Polyamid

Nylon, Supramid, Dermalon,
Ethilon, Perlon, Surgilon,
Dafilon, Bralon, Monosof,
Nurolon

Polyester

Dacron, Ethibond, Mersilene
Tevdek, Ti-cron, Mirafil,
Synthofil, Miralene, Dagrofil,
Surgidac, Securex

Polypropylene

Prolene, Premilene, Surgipro,
Surgilene

Polytetrafluoroethylen

Gore-Tex

Polybuteser

Novafil

ABSORBABLE SUTURE MATERIALS

NATURAL **SYNTHETIC**

ORIGIN

Animal origin

Cat gut

Soft cat, Plain gut,
Surgigut (plain, chromic)
Chromic cat gut

Collagen

Plain collagen,
Collagen chromic



Polyglycolic Acid

Dexon Plus, Dexon II, Safil

Polyglactin 910

Coated Vicryl, Vicryl rapide

Polydioxanone

PDS II

Polyglyconate

Maxon

Lactomer 9-1

Polysorb

Glycomer 631

Biosyn

Glyconate

Monosyn

Polyglecaprone 25

Monocryl

Polyglytone 6211

Caprosyn

L-lactid/glycolid

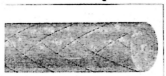
Panacryl

FIBER CHARACTERISTIC

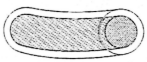
monofilament

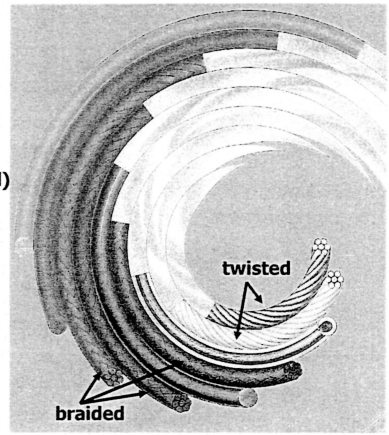


polyfilament (twisted, braided)

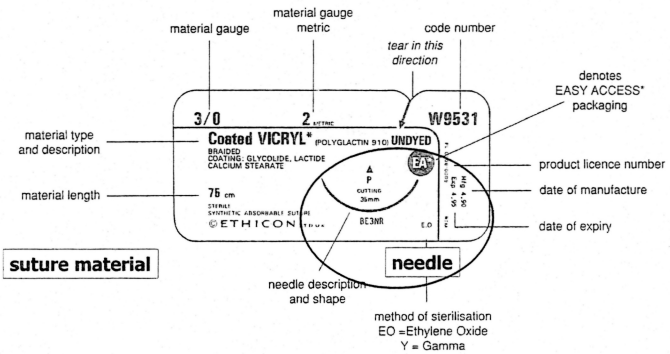


pseudo-monofilament

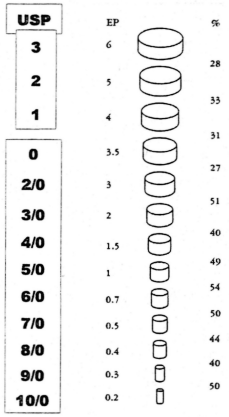




EXPLANATION OF LABELLING SUTURE MATERIALS



SIZE OF SUTURE MATERIALS



Metric size

(European Pharmacopeia)

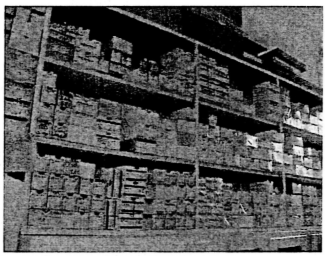
from 0.1 metric (0.010-0.019 mm)
to 10 metric (1.00-1.09 mm)

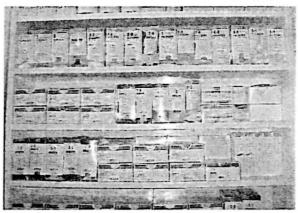
USP size

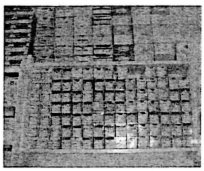
(American Pharmacopeia)

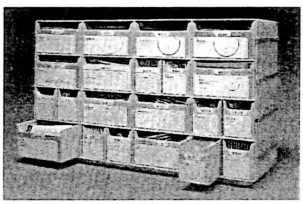
from 11/0 size (0.010-0.019 mm)
to 6 size (1.00-1.09 mm)

STORAGE OF SUTURE MATERIALS









EXAMINATION OF SUTURE MATERIALS

Intraoperative

handling

flexibility

knotting ability

knot holding security

cutting or serrating effect

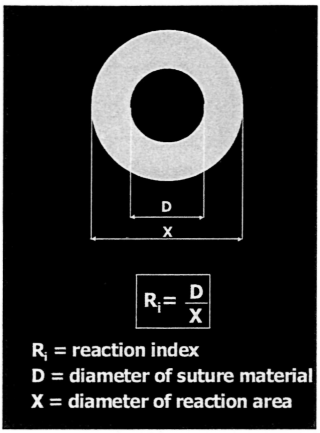
Postoperative

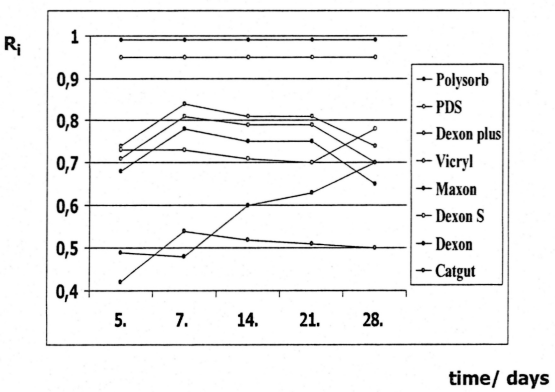
adhesions

reaction index

histological examinations

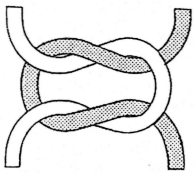
REACTION INDEX (R_i)



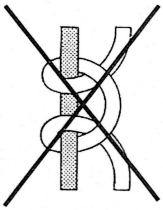


KNOTTING TECHNIQUES

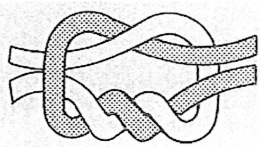
mariner knot (square knot)



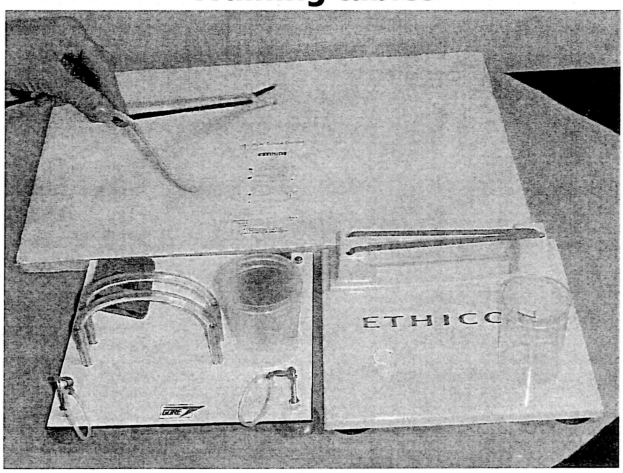
"lady's" or "granny's" knot



surgical knot



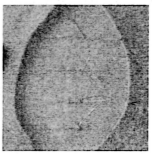
Training tables



SUTURING TECHNIQUES I.

Interrupted sutures

simple
special
„mattress" sutures:
vertical - Donáti
horizontal
parenchymal sutures (U, X, Z, 8)



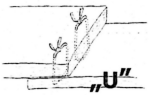
simple



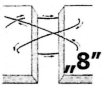
horizontal „mattress"



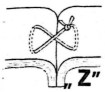
Donáti (vertical „mattress")



„U"



„8"



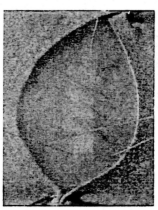
„Z" parenchymal

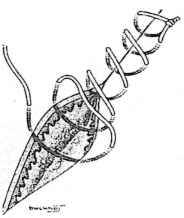


„X"

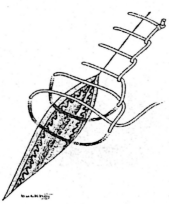
SUTURING TECHNIQUES II.

Continuous sutures





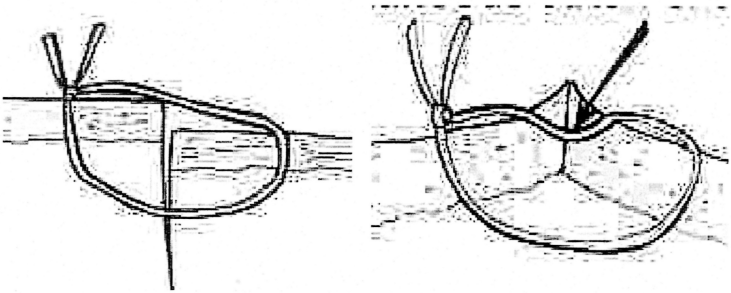
simple



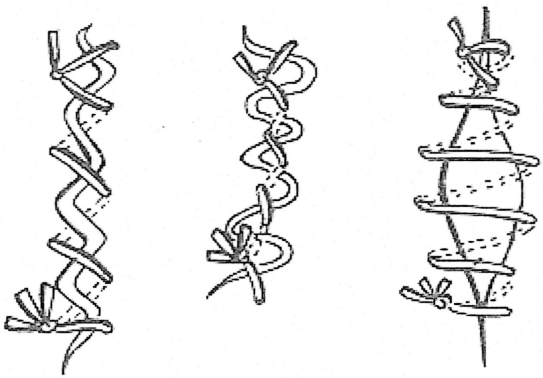
special
„locked"

POSSIBLE MISTAKES

Interrupted suture



Continuous suture



REASONS FOR COMPLICATIONS

choice of wrong suture material
(cutting or serrating effect
in parenchymal organs)

wrong localisation
of suture material
(submucosa-muscle)

faulty knot-tying technique
(3 parallel knots
for monofil suture material)

faulty handling
(damage to the coat of
pseudomonofil threads
or damage to monofil thread
with an instrument)

using threads made
not for surgery
(fishing-line)

„tight" knots
microcirculatory damage
(role of the assistant!)

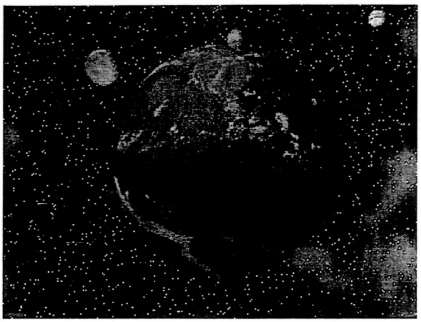
SURGICAL STAPLERS



Petz, Aladár
1888-1956



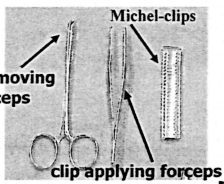


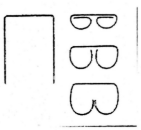


The creator of the principle of surgical staplers

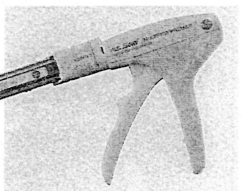
SURGICAL CLIPS

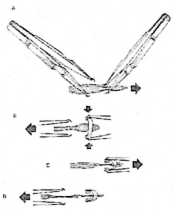
conventional ***staplers***

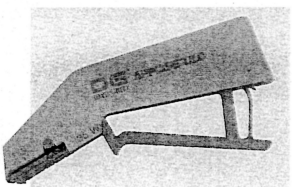




paperclip-theory









clip removing tools

SURGICAL CLIPS

absorbable **non-absorbable**

clips for ligation

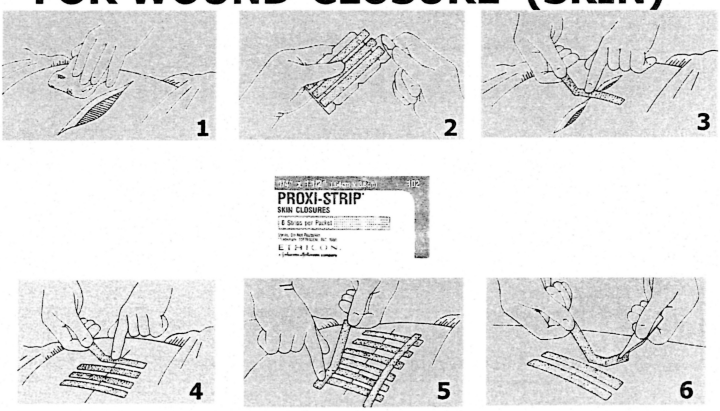
lactomer 9-1
(Poly Surgiclip)
polydioxanone
(Absolok pius)

stainless steel
(Ligaclip Extra)
titanium
(Multifire Endo Hernia Stapler
Ligaclip Extra)

clips for surgical staplers

Polysorb stapler, Roticulator 55 Poly Surgiclip

OTHER POSSIBILITIES FOR WOUND-CLOSURE (SKIN)



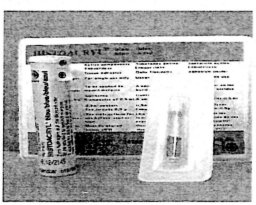
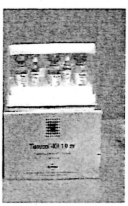
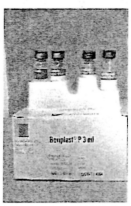
SURGICAL TISSUE ADHESIVES

Materials that make
„immediate" and permanent connection
between the wound edges
(time of polymerisation!)

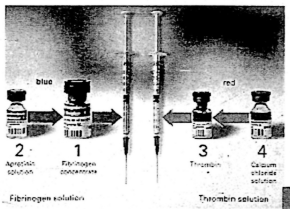
gelatine-resorcine-formaldehyde (GRF)
cyanoacrylate (Histoacryl Blue)
fibrin (Tissucol, Beriplast P)

ADVANTAGES OF SURGICAL TISSUE ADHESIVES

secure joint of wound edges application
good conditions for wound healing
good hemostatic effect
absorbable
minimal tissue reaction
minimal functional parenchymal loss

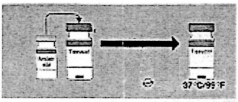




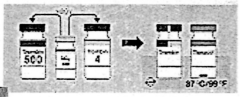
COMPONENTS OF SURGICAL TISSUE ADHESIVES

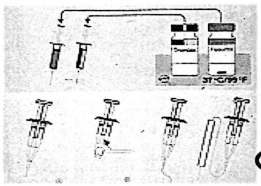


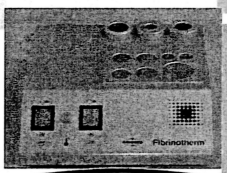
Tissucol

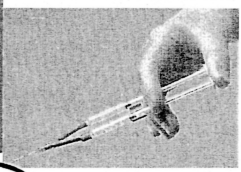
37⁰C





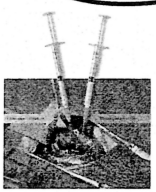






Body temperature

Beriplast

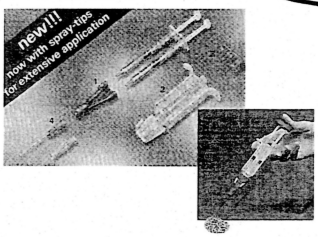


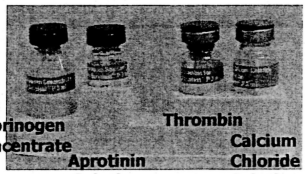
Komponente 1 Composant 1	Component 1 Componente 1	Komponente 2 Composant 2	Component 2 Componente 2





Room temperature





Fibrinogen Concentrate

Aprotinin Solution

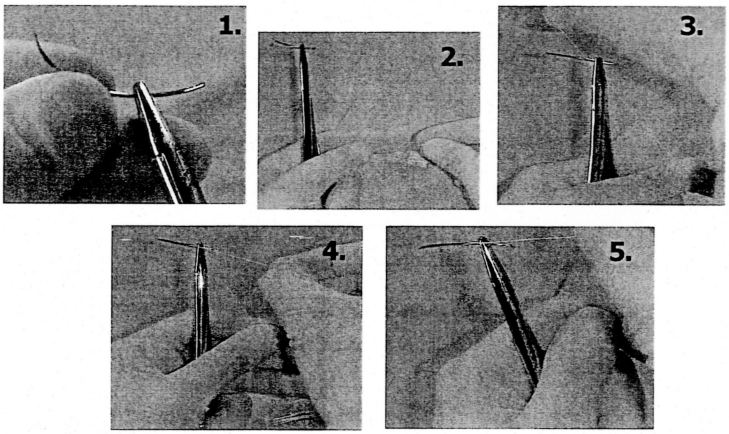
Thrombin

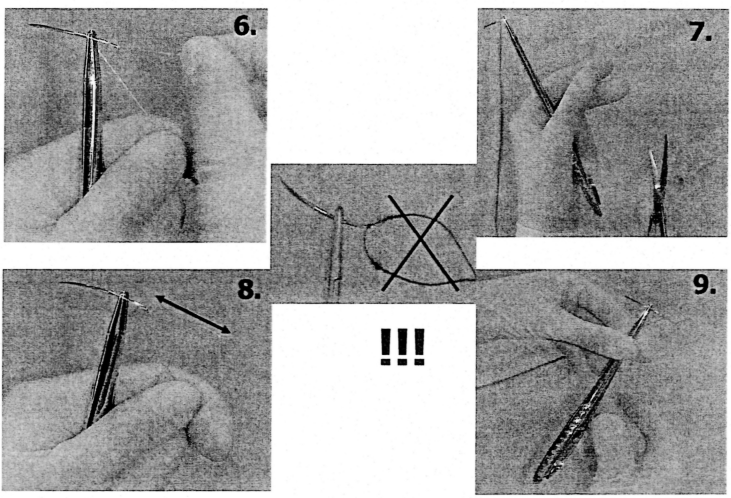
Calcium Chloride Solution

STEPS IN TAKING A STICH

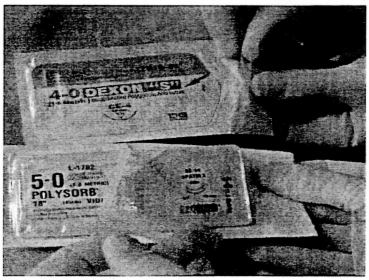
SEMINAR

Taking suture material into the needle's shaft conventional techniques



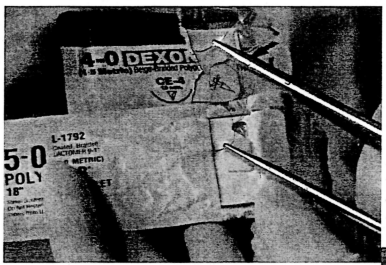


Handling atraumatic needle – suture material

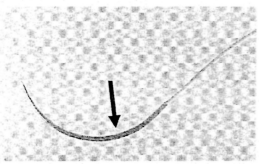


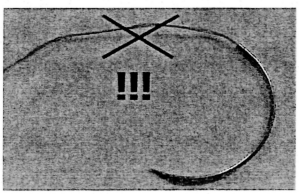
opening of the suture material package

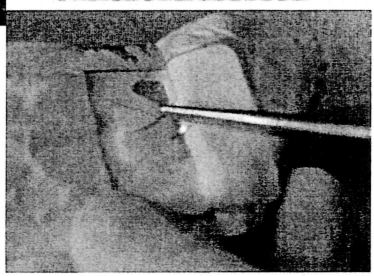




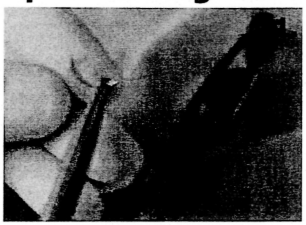
needle fixation

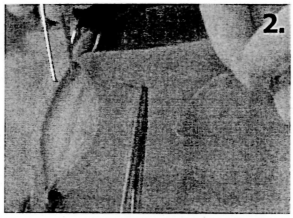


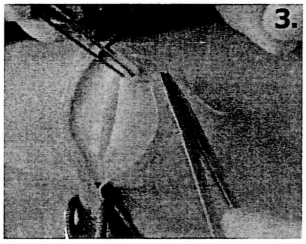


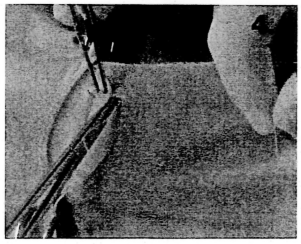


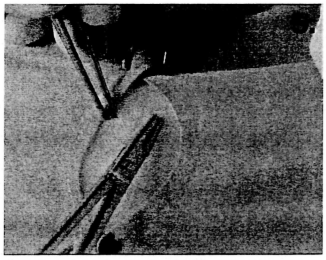
Steps in taking a simple interrupted stitch I.

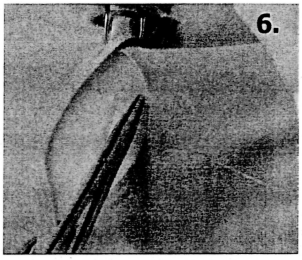


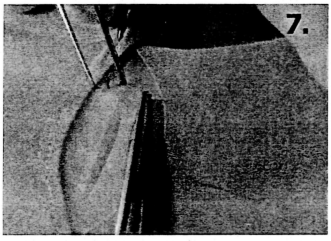


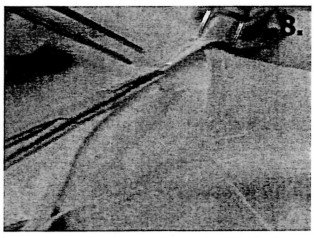






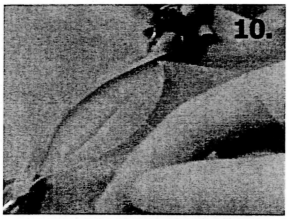


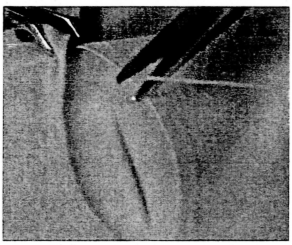


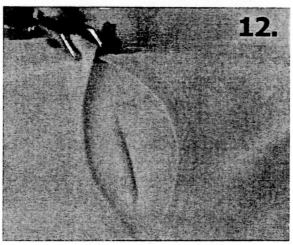


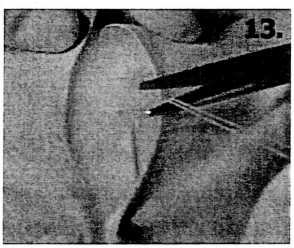
Steps in taking a simple interrupted stitch II.

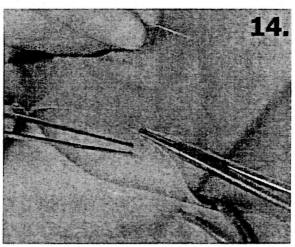


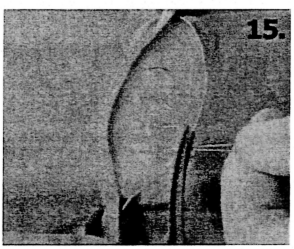


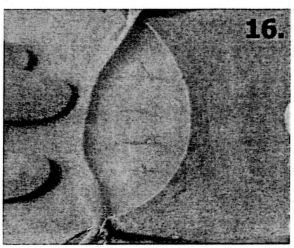




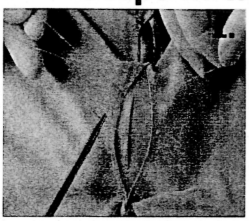


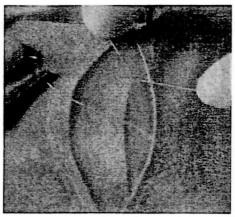


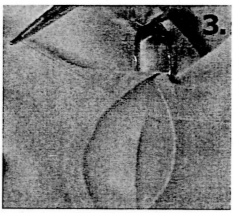


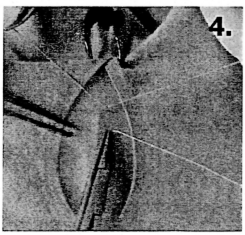


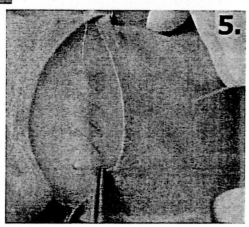
Steps in taking a continuous stitch

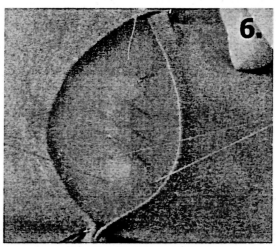




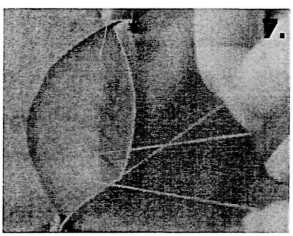


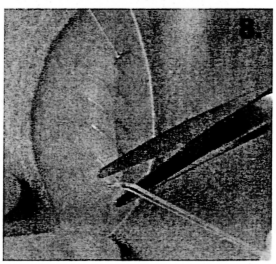




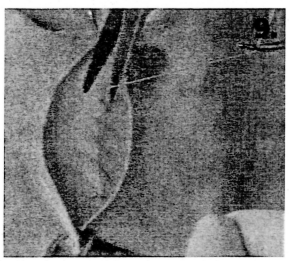


knotting

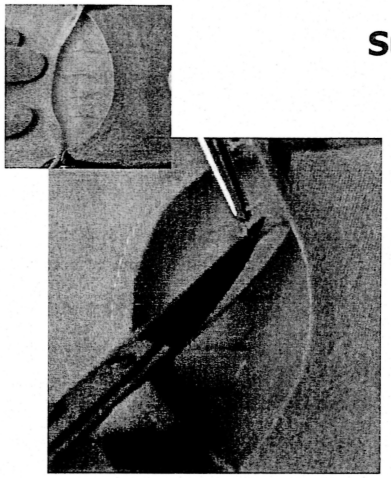


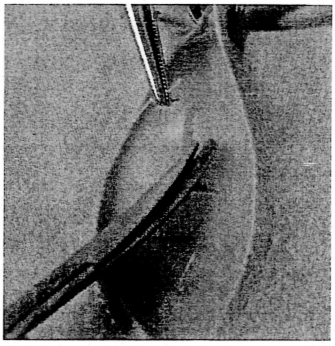


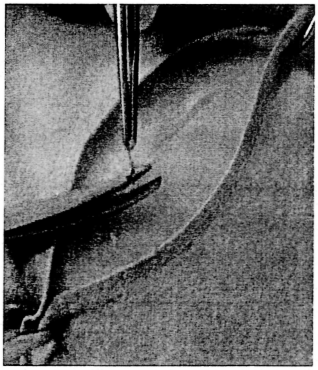
cutting the ends of sutures

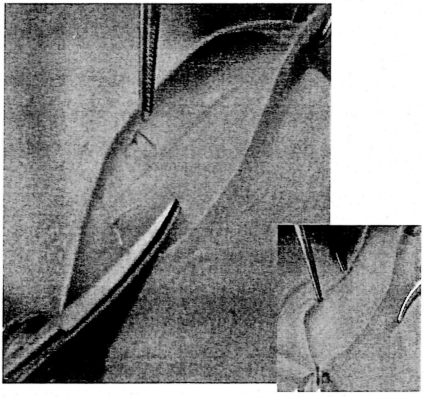


Suture removal

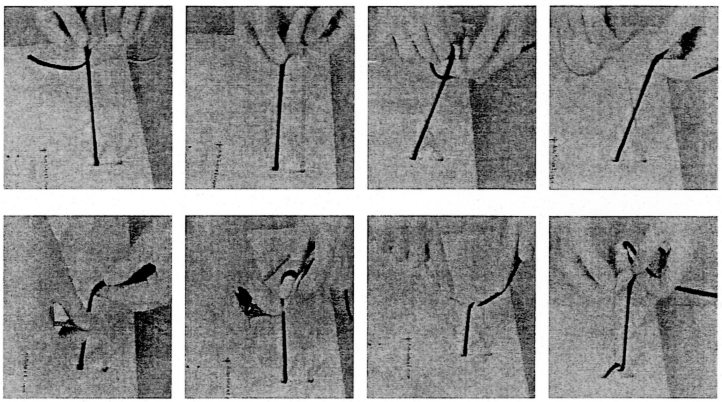


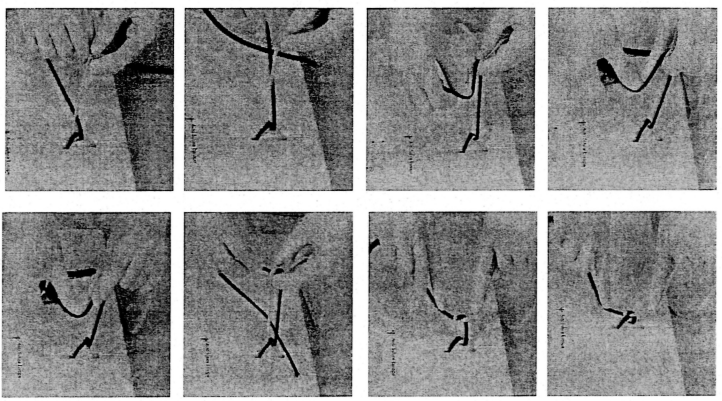






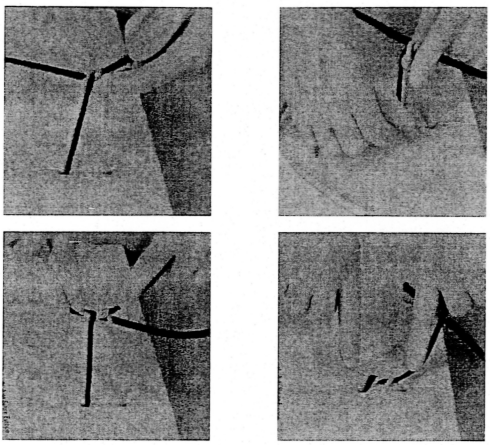
Mariner knot

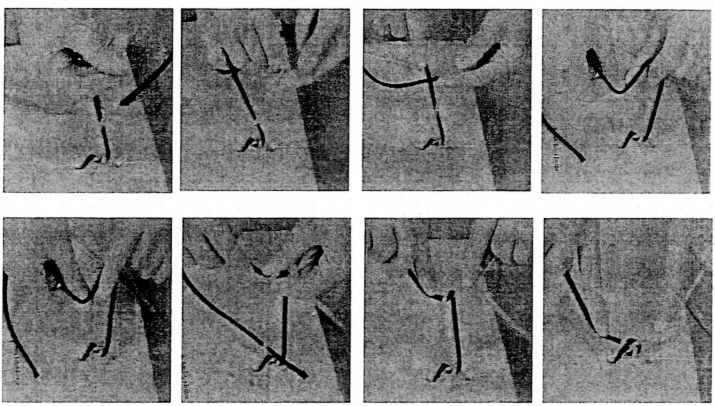




X 1 X 1

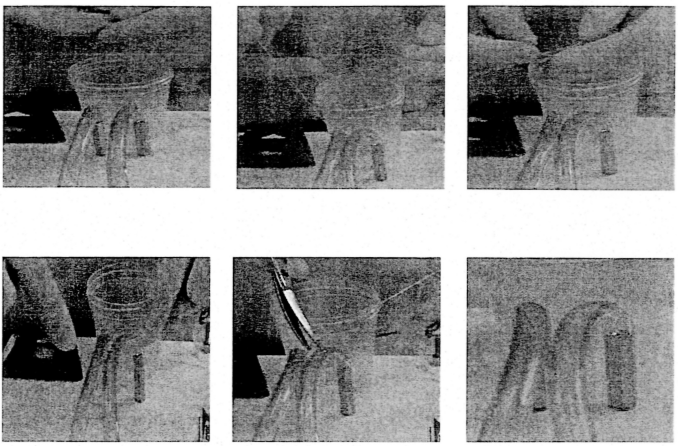
Surgical knot



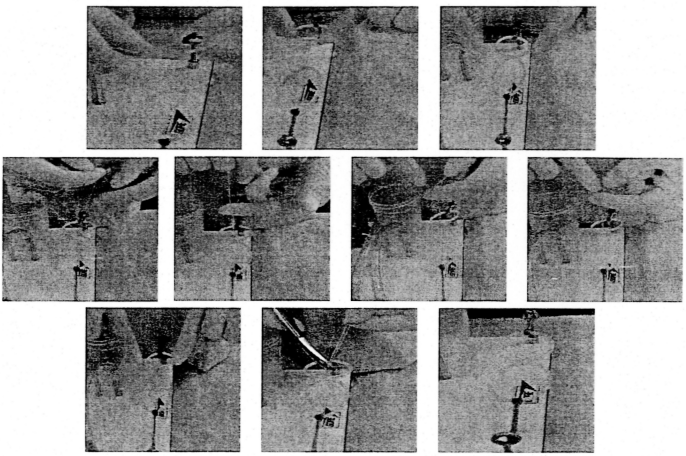


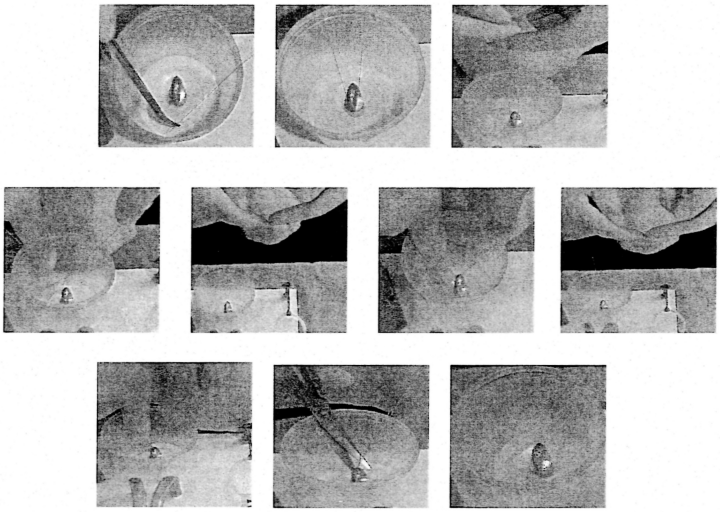
X 2 X 1

Training tables for knots I



Training tables for knots II





PREPARATIONS FOR OPERATION.

PREPARATIONS FOR OPERATING ROOM PERSONNEL.

3.

ASEPSIS

the prevention of contact with microorganisms

- design of the operating theatres
- behaviour in the operating theatre
- sterilization (clothing, instruments, isolation towels)

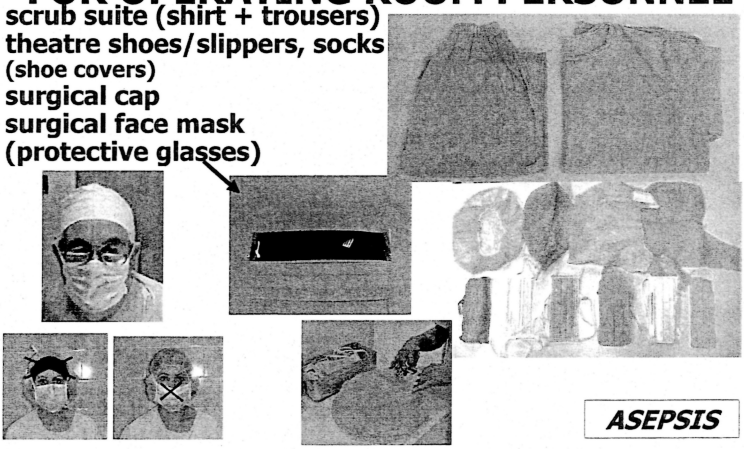
ANTISEPSIS

the prevention of infection by inhibition of infective agents

- hand and arm disinfection (scrubbing)
- disinfection of the operative field
- isolation of the operative field

CLOTHING FOR OPERATING ROOM PERSONNEL

scrub suite (shirt + trousers)
theatre shoes/slippers, socks
(shoe covers)
surgical cap
surgical face mask
(protective glasses)



ASEPSIS

HAND AND ARM DISINFECTION (SCRUBBING)

Aim

Removing all pathogenic agents (microorganisms) from the surface of the skin (transient flora - completely resident flora - partially)

Reducing bacterial count in deep pores and fixing them

ANTISEPSIS

DISINFECTION SOLUTIONS

Historical data

Semmelweis (1847) hand-wash with chloride of lime

Lister (1867) hand-wash with soap + carbolic acid

(1865. Carlisle – 1867. Glasgow, Royal Infirmary)

Fürbringer (1888) hand-wash with soap + sublimate

Ahlfeld (1896) hand-wash with soap + alcohol

Spasokukotzky-Kotschergin liquor ammoniae solution

ANTISEPSIS

SCRUB SOLUTIONS / SKIN ANTISEPTICS

Disinfection components

- izopropyl-alcohol
- benzalconium-chlorid
- undecylenacid
- ethyl-alcohol
- benzylalcohol
- hydrogen peroxide

Scrub solutions

- Skinman Soft N
- Skinman asept
- Biotensid
- Sterillium

ANTISEPSIS

Requirements

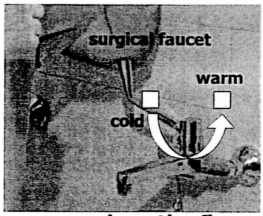
- bactericid (tuberculocid)
- virucid (HBV, HIV)
- fungicid
- sporocid

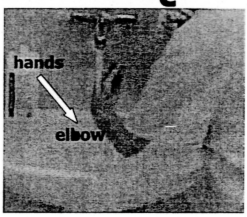
} effect (Skinman Soft N)

- form a film on the skin
- blood and other tissue fluids don't reduce their effect
- don't dry the skin
- no allergic

ANTISEPSIS

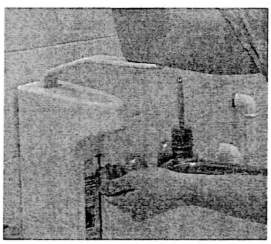
SCRUBBING TECHNIQUE





- clean the fingernails prior to the scrub (NO artificial fingernails, NO nail-polish, NO jewellery)
- wash hands and forearms with soap and warm running water
- rinse from the hands downwards toward the elbow !

ANTISEPSIS



- rub the antiseptic solution into hands and forearms
- length of the scrub takes a minimum of 5 minutes

5x1 minute, 5-5 ml

- hands should be dry at the end of scrubbing!



fingers

interdigital folds

thenar

hypothenar

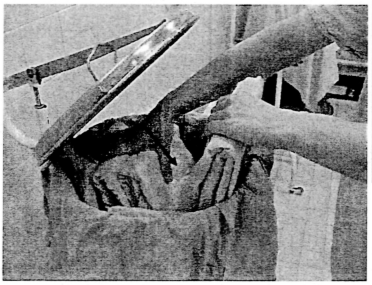
SCRUB ROOM

GOWNING



Schimmelbusch box

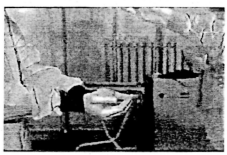
indicator tape

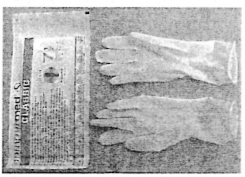




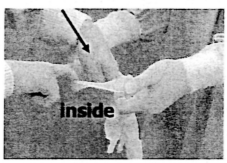
Nothing touched!!!

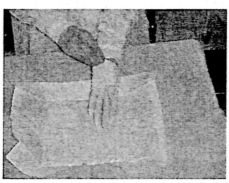
GLOVING

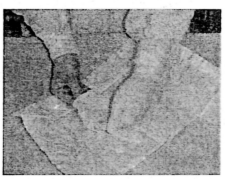


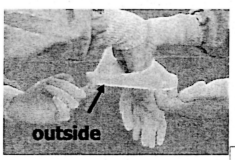


Various sizes:
6; 6 1/2; 7; 7 1/2; 8









After gloving the hands must be held up
clasped in front of the chest
Never dropped below the waist!!!

→ *TALCUM GRANULOMA, ADHESION*

DISINFECTION OF THE OPERATIVE FIELD

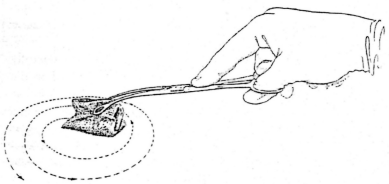
Skin disinfection

start at the center ⇒ work outward

- in concentric circles or

- in stripes on two sides alternately

minimum 2x or 3x!



Disinfection solutions

- **Betadine**
- **Dodesept**
- **Kodan**
- **Cutasept**

iodine burning or allergy! →



ANTISEPSIS

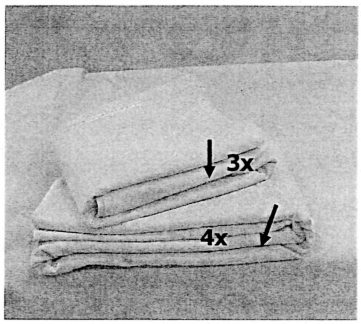
ISOLATION OF THE OPERATIVE FIELD

Isolation towels/drapes

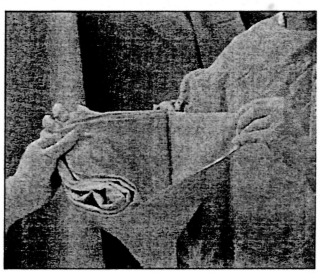
1 large (big table)

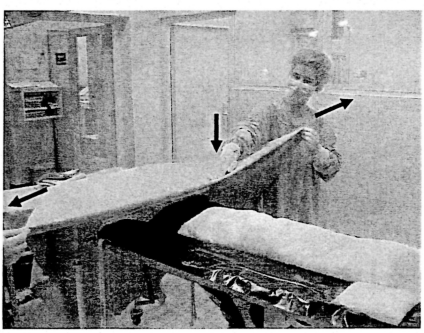
2 large (4x folded)
2 small (3x folded)
1 small

(linen or disposable materials)



DRAPING





OPERATING ROOM ENVIRONMENT

Sterilization techniques

steam autoclaving (atm-^{0}C)
gowns, isolation towels, instruments
120 ^{0}C - 2,5 atm - 15-30 mins

dry heat (^{0}C)
instruments
160 ^{0}C - 2 hours
180 ^{0}C - 1 hour

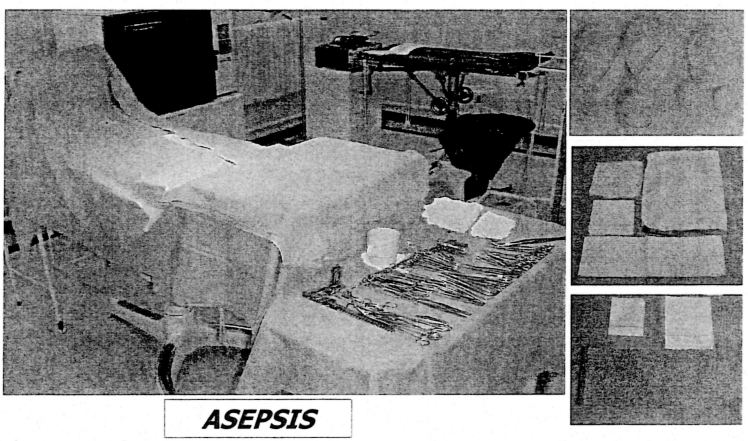
gases (EO) (^{0}C)
gloves, catheters, tubes

ASEPSIS

γ - irradiation
suture materials, solutions, gloves

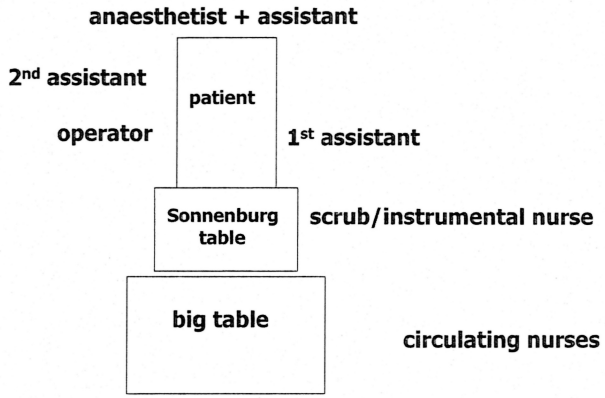
cold sterilization (glutaraldehyde)
plastic devices, endoscopic instruments

Sterile conditions – dressings/swabs/bits



ASEPSIS

OPERATING THEATRE'S STAFF



BEHAVIORIAL RULES AND REGULATIONS IN THE OPERATING THEATRE

surgeons (operator, assistants)
anaesthetist (doctor, assistant)
scrub/instrumental nurses
circulating nurses
labor assistants
technical staff
visitors (medical students, guests)

ASEPSIS - ANTISEPSIS

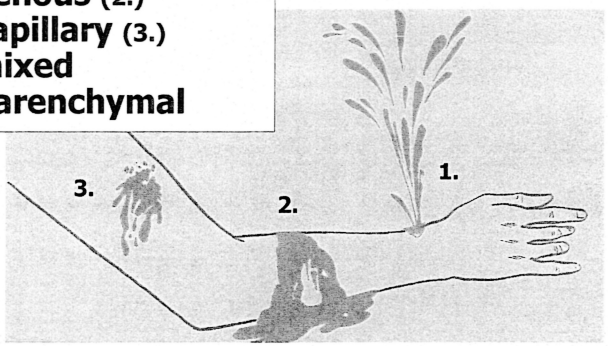
TYPES OF BLEEDING.

DIFFERENT METHODS OF SURGICAL HEMOSTASIS.

4.

TYPES OF BLEEDING

arterial (1.)
venous (2.)
capillary (3.)
mixed
parenchymal



HEMOSTASIS

I. Temporary methods (first aid)

II. Definitive methods (surgery)

1. closing of the lumen
2. reconstruction of the lumen (vascular surgery)

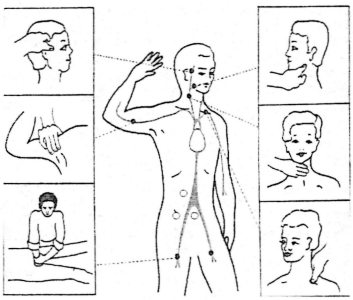
III. Treatment of the consequence of the bleeding

1. intravenous therapy
   - i.v. injection
   - i.v. cannulation
2. venous cutdown technique (surgery)

I. STOP THE BLEEDING TEMPORARY

1. Arterial bleeding

- **digital pressure – centrally from the bleeding site**



superficial temporal artery
facial artery
common carotid artery
subclavian artery
axillary artery
brachial artery
abdominal aorta
external iliac artery
femoral artery

Arterial bleeding

„pressure bandage" - **application of tamponade**



„tourniquet"- **till disappearing of the peripheral pulsation (damage of vessels, nerves)**



clamping the vessel - **only in life saving situation!**



secondary bleeding!

I. STOP THE BLEEDING TEMPORARY

- ***Venous bleeding*** **- pressure bandage**

BUT: no tourniquet!
(injury of nerves, paralysis)

- ***Capillary bleeding*** **- sterile bandage**

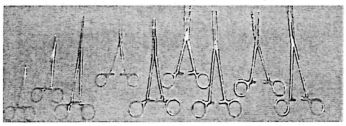
BUT: hematological disorders!
anticoagulant therapy!

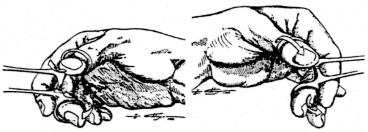
II. STOP THE BLEEDING DEFINITIVELY

1. Closing of the lumen

hemostatic instruments

- **Péan**
- **Kocher**
- **Lumniczer**
- **mosquitos**





2. Reconstruction of the lumen (vascular surgery)

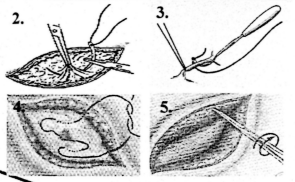
special instruments (vascular clamps)

METHODS FOR CLOSING THE LUMEN

a./ Mechanical

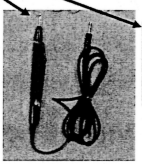
1. ligation of vessel
2. suture ligation
3. ligation in continuity
4. surrounding ligature
5. torsion





b./Physical

- electrocoagulation
- laser coagulation
- ultrasound coagulation



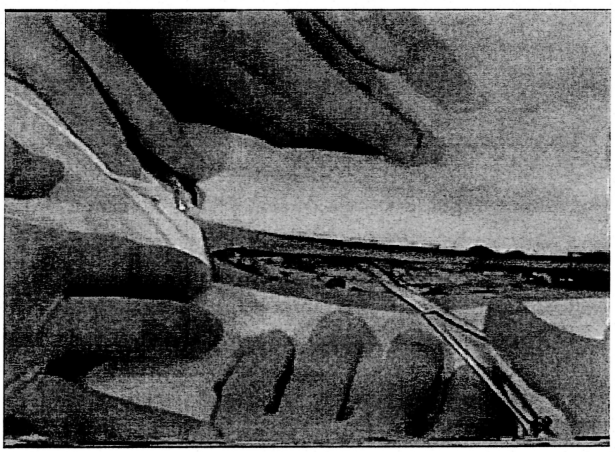
c./ Chemical (drugs)

d./ Biological

(bioplasts - hemostatic agents)



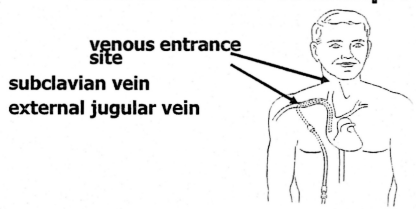
e./ Combined methods

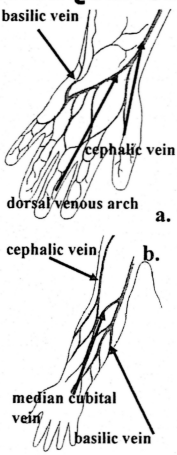


III. TREATMENT OF THE BLEEDING'S CONSEQUENCE

1. Intravenous therapy

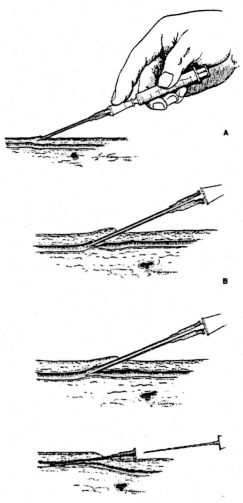
- **injection - superficial veins**
  - **a./ hand veins**
  - **b./ forearm veins**
- **central venous techniques**

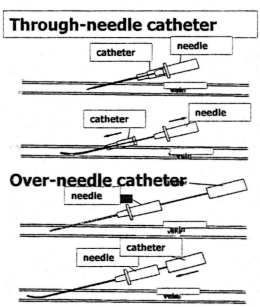




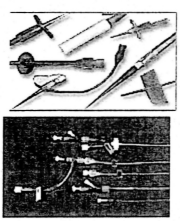
2. Venous cutdown technique

INTRAVENOUS TECHNIQUE





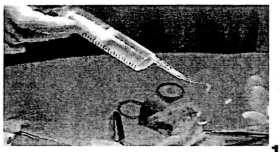
Tools of venous injection



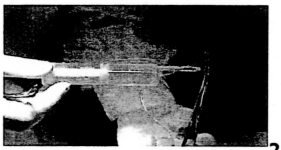
Technique of intravenous injection

VENOUS CUTDOWN TECHNIQUE

catheter preparation

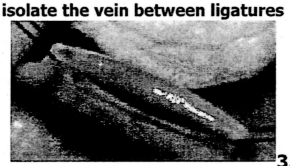


1.



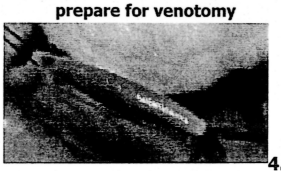
2.

isolate the vein between ligatures



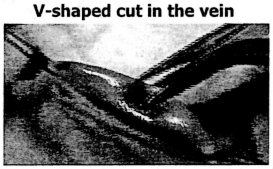
3.

prepare for venotomy



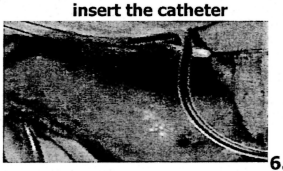
4.

V-shaped cut in the vein



5.

insert the catheter



6.

secure the catheter



7.

secure the catheter with an additional suture



8.

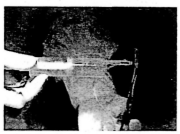
SEMINAR

STEPS OF THE VENOUS CUTDOWN TECHNIQUE

patient's position
(pillow under the shoulders)



catheter preparation
(without air bubbles)



instruments' preparation

skin disinfection and isolation
(orientation)

skin incision
stop the bleeding
expose the vein
isolate the vein between ligatures
distal ligature
V-shaped cut (venotomy)
insert the catheter (6-8 cm)
central ligature
connect the infusion
fixing the catheter, U-stitch
close the incision

BIOPLASTS

Bioplasts are preparations made of natural materials arteficially.

Implanted in the body they absorb completely causing minimal or no damage to tissues.

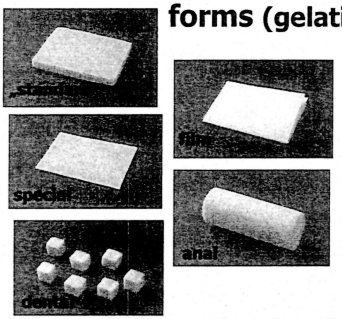
ADVANTAGES OF USING BIOPLASTS

excellent haemostatic effect
absorbable
minimal tissue reaction
no antigen effect
no toxic effect
easy to form or cut
easy to handle
good conditions for wound healing

BIOPLASTS

Basic material	Name	Form
fibrin	SEVAC	spongious
gelatine	GELASPON	spongious
	GELITA-TAMPON	spongious
	SPONGOSTAN	„standard"film, spongious
	GELFOAM	spongious
oxidized cellulose	SURGICEL	mesh
collagen	COLLAGEN IMPLANT	spongious
	LYOSTYPT	spongious
	GARAMYCIN	spongious
	AVITENE	microfiber
	ACTIFOAM, HELISTAT, INSTAT, HEMOSTAGEN	spongious
collagen + fibrin	TACHOCOMB	spongious

Spongostan application forms (gelatine)



Tachocomb application forms (collagen+fibrin)



Surgicel application forms (oxidized cellulose)

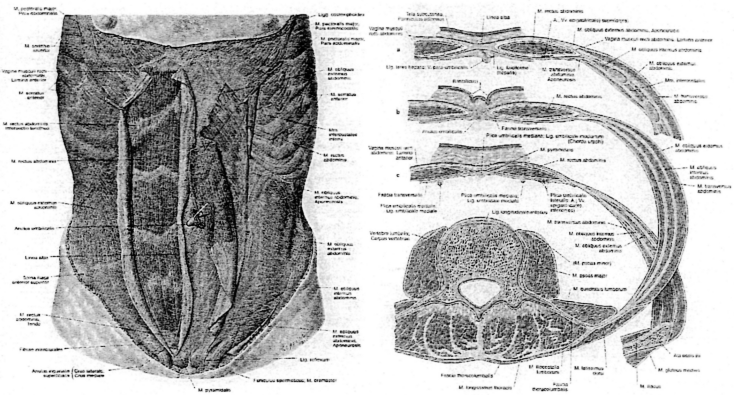


SURGICAL INCISION

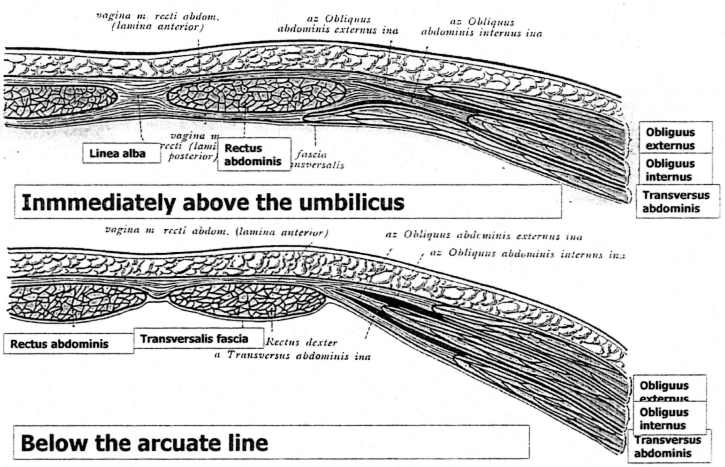
LAPAROTOMY,
LAPAROSCOPY.

LAPAROTOMY

Anatomy of the abdominal wall



Transverse section through the anterior abdominal wall



LAPAROTOMY

Incision's directions

1. Vertical
midline
paramedian
tranrectal
pararectal

2. Transverse
transrectal
Pfannenstiel

3. Oblique
subcostal or paracostal
McBurney

4. Combined

5. Laparoscopic

LAPAROTOMY

Incisions not cutting muscles

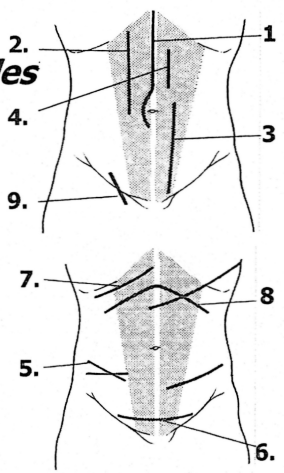
1. midline
2. paramedian
3. pararectal

Incisions dividing muscles

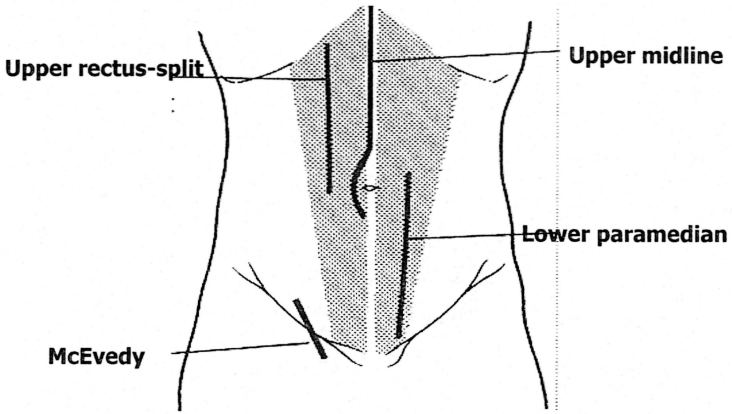
4. vertical transrectal
5. McBurney incision
6. Pfannenstiel incision

Incisions cutting muscles

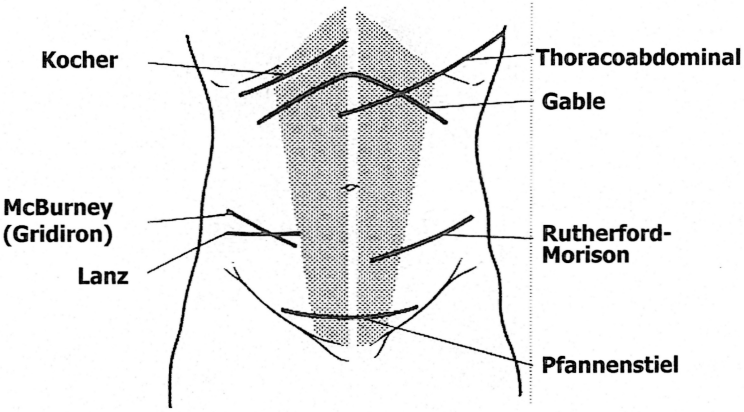
7. paracostal (Kocher) or subcostal
8. transverse transrectal
9. inguinal



LAPAROTOMY



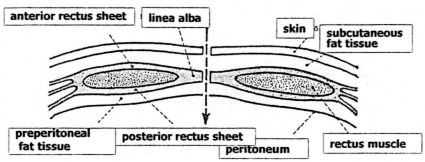
Incisions I.



Incisions II.

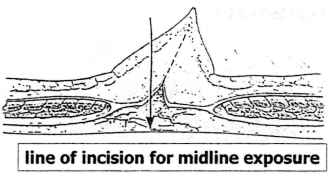
(Kirk: Basic Operative Techniques, 1998)

LAPAROTOMY - midline



Anatomy

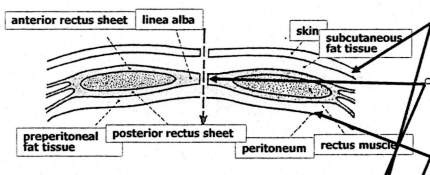
- skin
- subcutaneous fat tissue
- linea alba
- transversal fascia and preperitoneal fat tissue
- parietal peritoneum



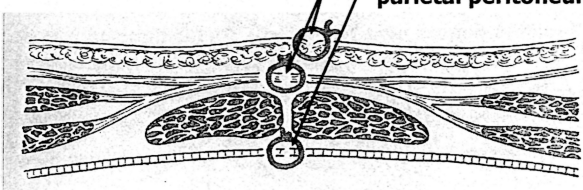
line of incision for midline exposure

CLOSURE OF MIDLINE LAPAROTOMY

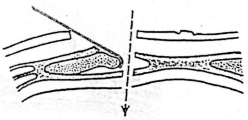




- skin
- subcutaneous fat tissue
- linea alba
- transversal fascia and preperitoneal fat tissue
- parietal peritoneum

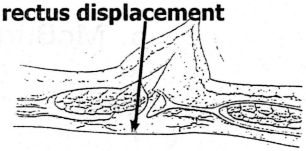


LAPAROTOMY - paramedian

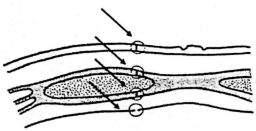


Anatomy

rectus displacement

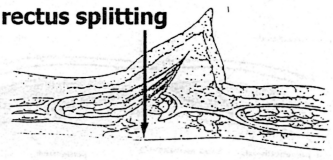


Closure of paramedian laparotomy



„strong"

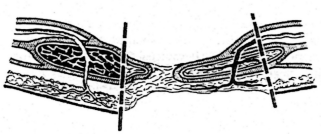
rectus splitting



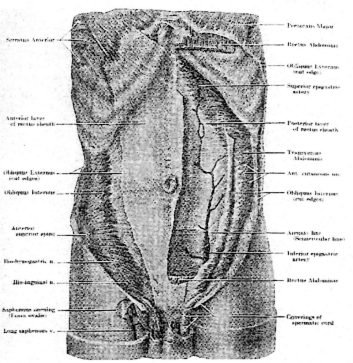
lines of incision for paramedian exposure



innervation of the rectus muscle

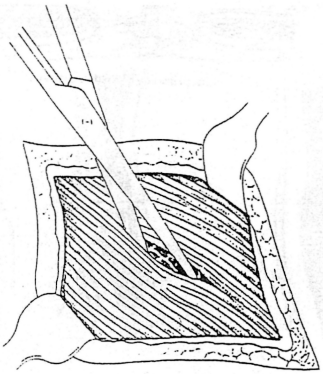


atrophy after cutting

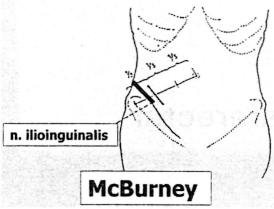


segmental innervation

McBurney incision

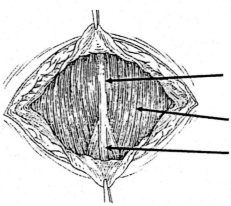


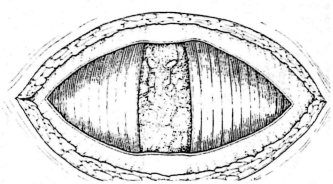
muscle splitting

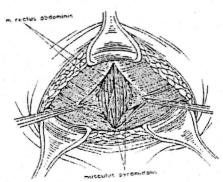


Pfannenstiel incision

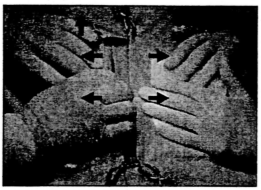
transverse
abdominal incision

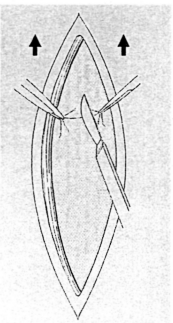


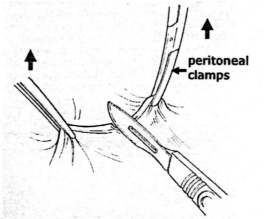




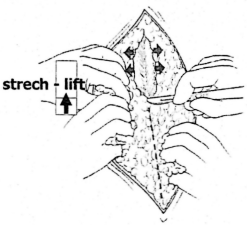
LAPAROTOMY - exposure

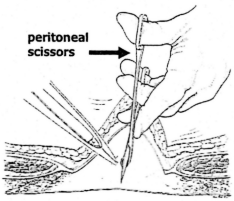






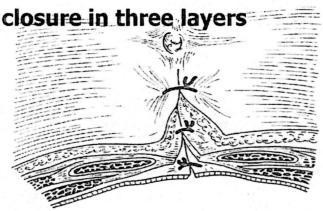
incision of the parietal peritoneum

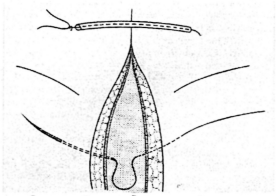




CLOSURE OF THE ABDOMINAL WALL

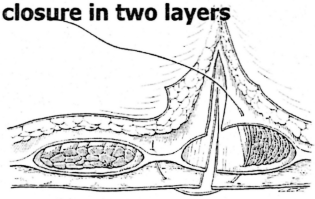
closure in three layers

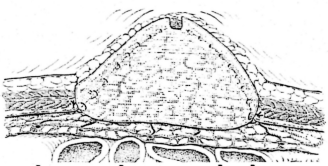




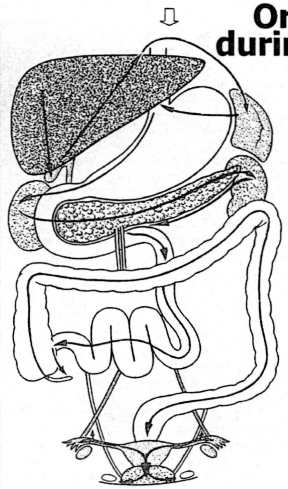
deep tension sutures

closure in two layers





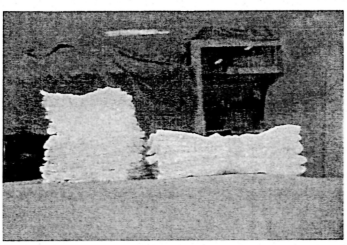
polypropylene mesh closure



Order of the examinations during exploratory laparotomy

Don't be uncertain after the examination !!!!!

and neither before the abdominal closure !!!



COUNT



SURE

!

control

LAPAROSCOPIC INSTRUMENTS

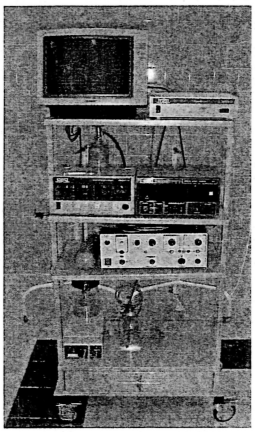
insufflator

optical system
- **endovision camera**
- **telescope**
- **monitor (TV)**

light transmission
- **light sources**
- **light cable**

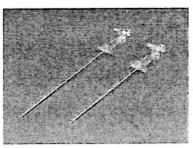
electrocoagulator

instruments of aspiration and irrigation

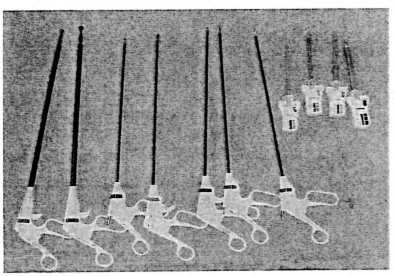


Veres needle

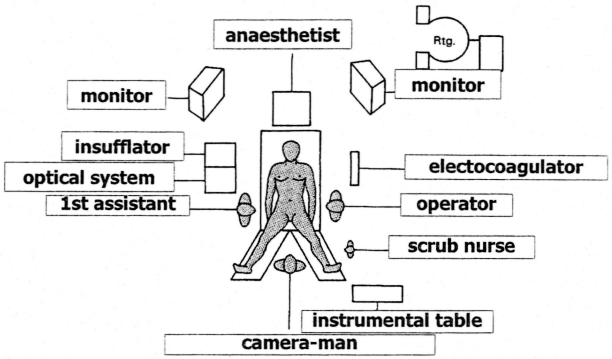
trocars

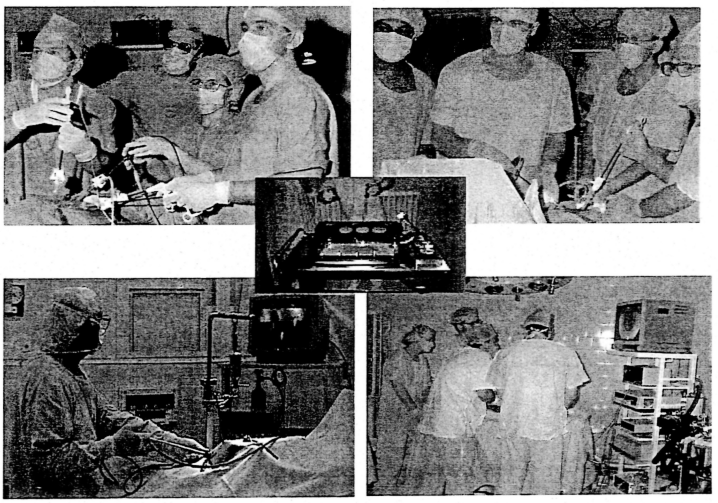


special instruments
- **clamps**
- **dissectors**
- **scissors**
- **clip appliers**



OPERATING THEATRE'S STAFF





CONICOTOMY,

TRACHEOSTOMY.

5.

Life-saving method!!!!!

CONICOTOMY
(cricothyroidotomy)

emergency operation

TRACHEOSTOMY

elective operation

Cause: upper airway obstruction

Symptoms: dyspnoe
inspiratory stridor
cyanosis
unconscious patient

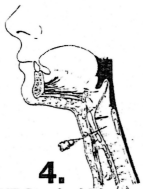
brain damage occurs in 4 minutes!

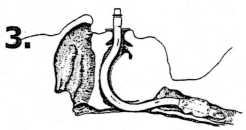
PRIORITIES

1. mechanical cleaning
2. pharyngeal airway (pipe)
3. endotracheal tube
4. needle cricothyroidotomy
5. conicotomy or tracheostomy



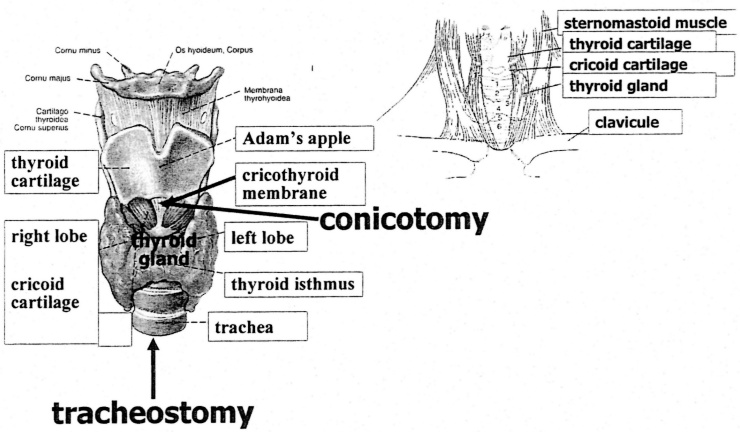






(L.W. Way: CURRENT Surgical Diagnosis & Treatment, pp. 216, 1994)

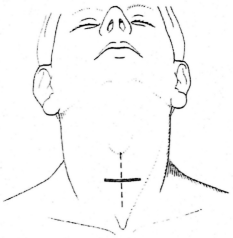
ANATOMY



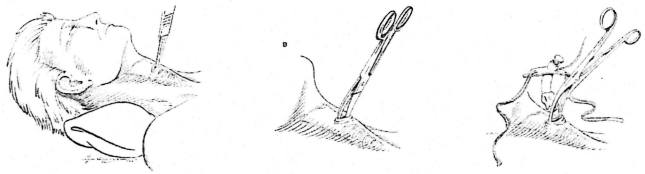
CONICOTOMY
(cricothyroidotomy)



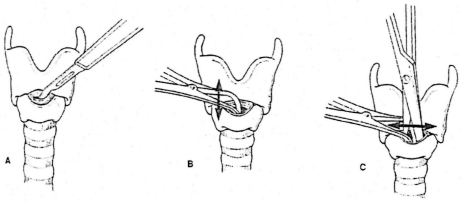
emergency!



- patient's position (pillow!)
- orientation
- skin incision
- cut the cricothyroid membrane
- keep the hole open



(C.W.Van Way, C.A. Buerk: Pocket manual of basic surgical skills, pp. 194-195, 1986)



cricothyroidotomy

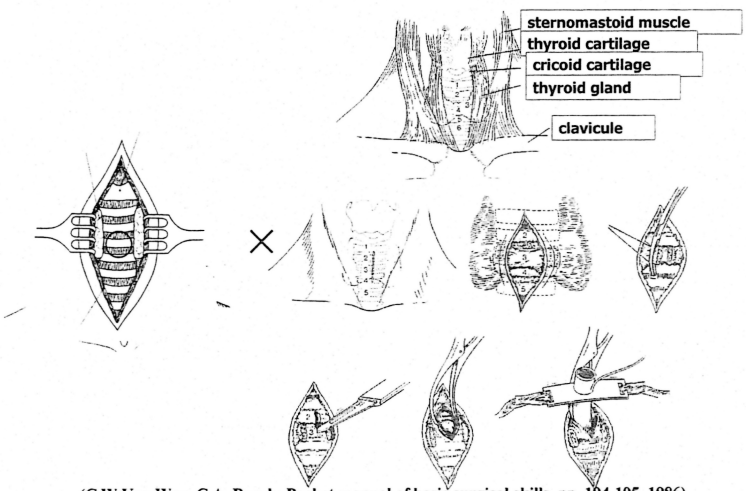
(L.W. Way: CURRENT Surgical Diagnosis & Treatment, pp. 219, 1994)



TRACHEOSTOMY



- patient' position (pillow!)
- orientation
- skin disinfection and isolation
- skin incision
- divide the muscles at the median line
  (sternohyoid and sternothyroid muscles)
- cut the pretracheal fascia
- cut between 2-3 or 3-4 „C" cartilages
- cut 3rd or 4th „C" ring at the median line
  (T shape incision or „window" on the trachea)
- insert the tube (Luer)
- close the wound



(C.W.Van Way, C.A. Buerk: Pocket manual of basic surgical skills, pp. 194-195, 1986)

COMPLICATIONS

Intraoperative

injury of nerves
- vagus nerve
- recurrent laryngeal nerve

injury of vessels
- common carotid artery
- jugular vein
- inferior thyroid artery
- plexus thyroideus

injury of oesophagus

„fossa route"

Postoperative

early

haematoma
bleeding
subcutaneous emphysema

late

laryngitis sicca
stenosis
stricture
arrosive bleeding
chondromalacia

POSTOPERATIVE TREATMENT

Care of the patient

- humidity and warm air
- suck the secretion through the tube
- keep the wound sterile

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