

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

BASIC SURGICAL TECHNIQUES

Faculty of Medicine

4th (enlarged) Edition



UNIVERSITY OF DEBRECEN
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DEPARTMENT OF OPERATIVE TECHNIQUES
AND SURGICAL RESEARCH

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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

Before the operation

patient

medical doctor

mentally

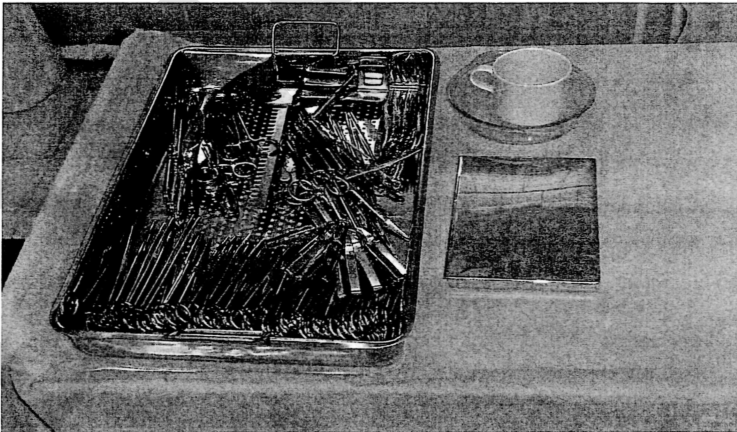
physically

During the operation

After the operation

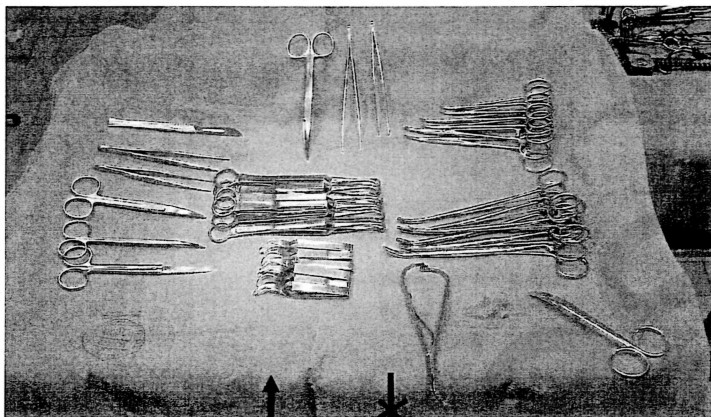
SURGICAL INSTRUMENTS

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

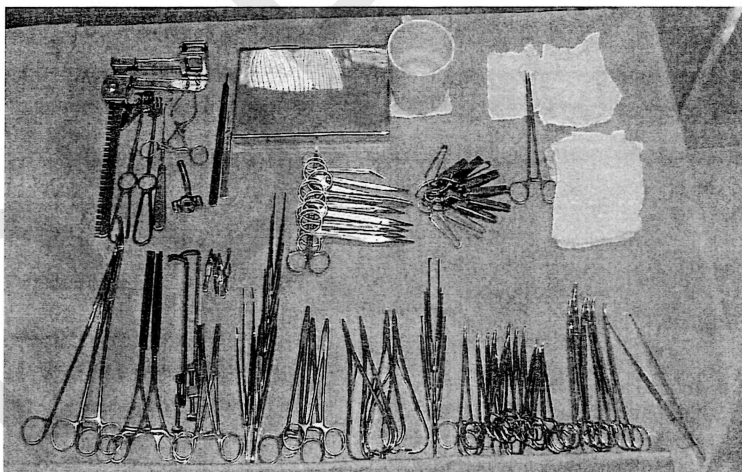


big table

SURGICAL INSTRUMENTS



Sonnenburg table



big table

CUTTING INSTRUMENTS

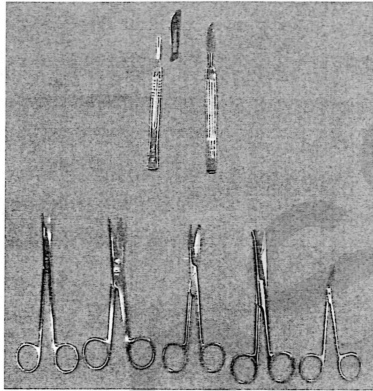
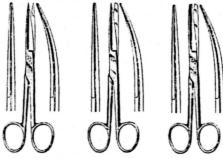
scalpels

conventional
changeable blade

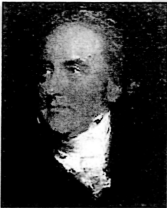
scissors

straight - curved
sharp - blunt

Cooper, Mayo scissors
knee-, peritoneal scissors



Cooper scissors



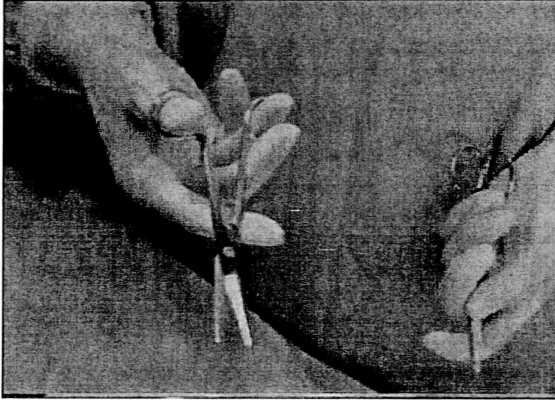
Sir Astley Cooper
1768-1841

Mayo scissors

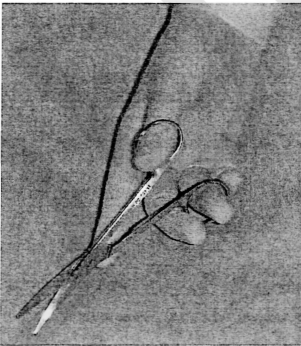


Charles Horace Mayo
1865-1939

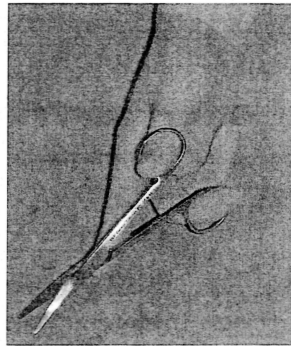
Handling of scissors



thumb – ring-finger



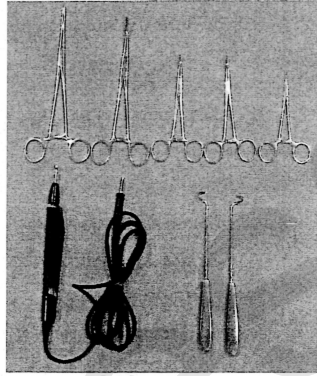
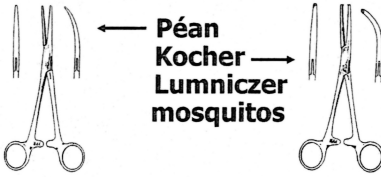
thumb – ring-finger



thumb – middle-finger

HEMOSTATIC INSTRUMENTS

Hemostatic clamps



Diathermy
(cutting and coagulation function)
Deschamps needle

Péan

Kocher

Lumniczer



Émile-Jules Péan
1830-1898

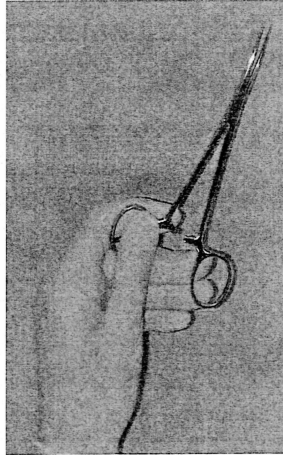
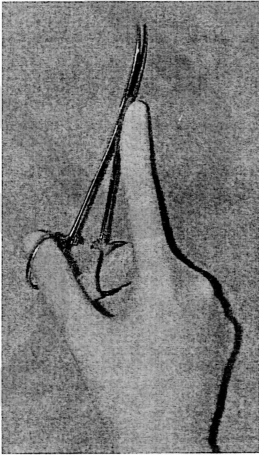
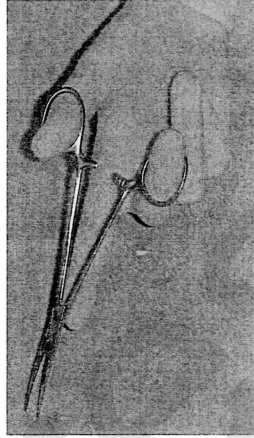
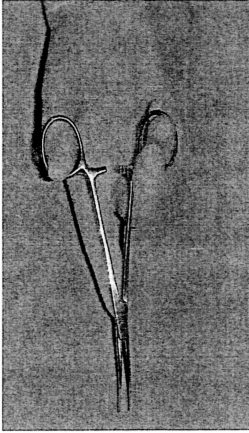


Theodor Kocher
1841-1917
Nobel - Prize



Lumniczer Sándor
1821-1892

Handling of hemostatic clamps

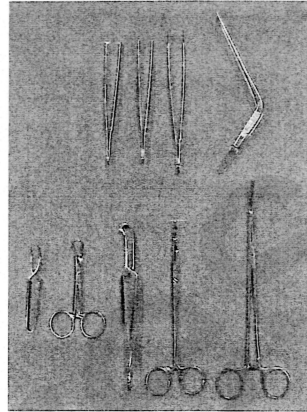


GRASPING AND RETRACTING INSTRUMENTS I.

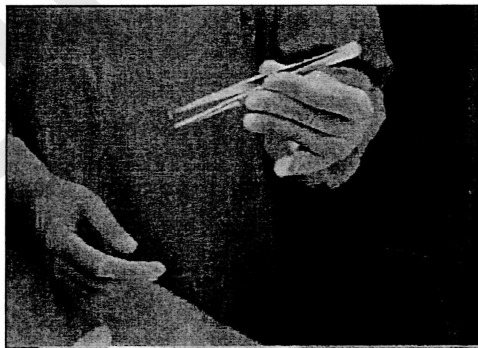
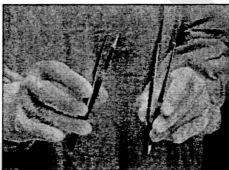
Grasping instruments

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.

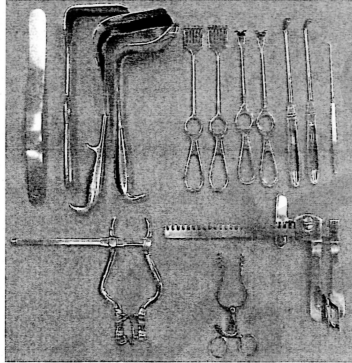
Retracting instruments

manual-retractors

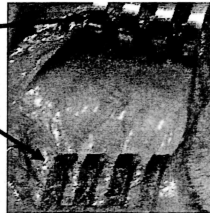
Langenbeck (1 prong)
2 to 8 prongs
retractors for deep surgery
skin retractor

spatulas

auto-retractors
mastoid retractor



manual retractors

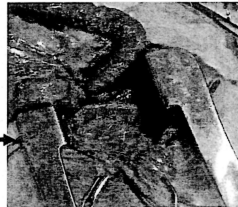


self retaining retractors
(auto-retractors)

mastoid retractor



abdominal retractor



SPECIAL INSTRUMENTS

intestinal clamps (1)

dissector (2)

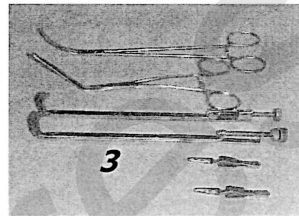
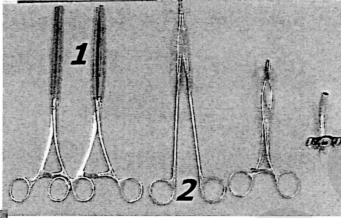
vascular clamps (3)

Satinsky
De Bakey
Bialock
bulldog

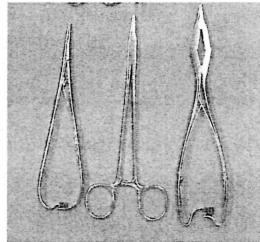
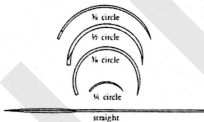


Alfred Blalock
1899-1964

tissue and organ forceps (3)



SUTURING INSTRUMENTS



needle holders

Mathieu

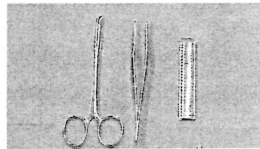
Hegar (atraumatic)

needles

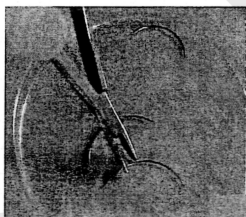
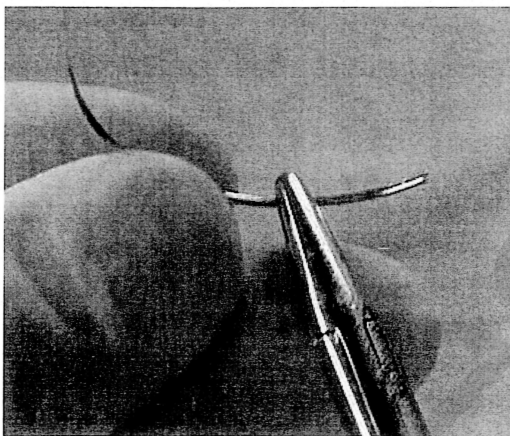
suture materials

clips

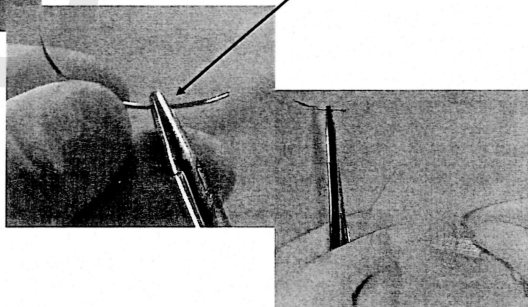
clip applying forceps
clip removing forceps



Correct fixation of needle



positioning the needle in
the needle holder

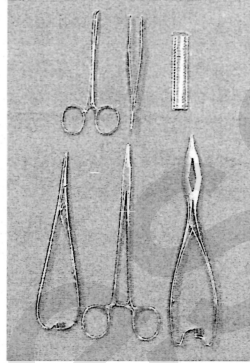
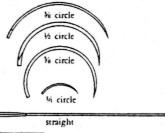


SURGICAL SUTURES.

SURGICAL SUTURE MATERIALS.

2.

DYNAMIC UNIT



surgeon

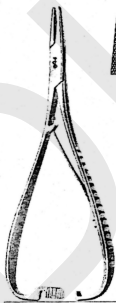
needle holders

surgical needles

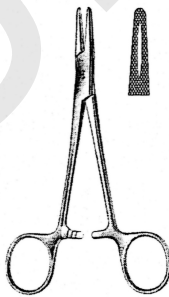
surgical suture materials

(clips, tissue adhesives)**

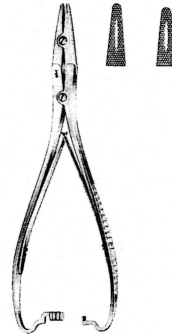
Different types of needle holders



Mathieu



Hegar

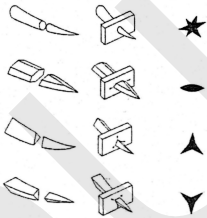
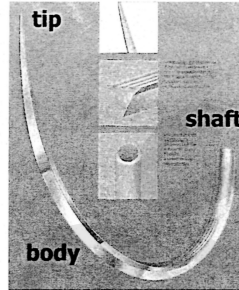
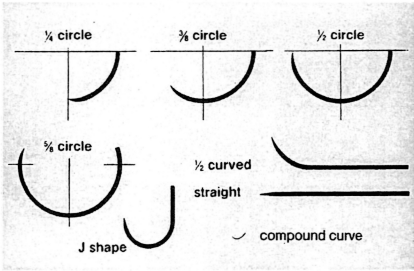


Zweifel

SURGICAL NEEDLES

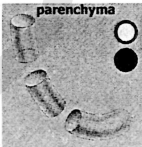
Shape

straight - curved



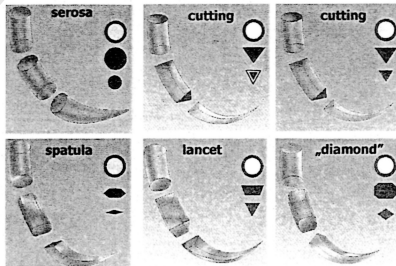
Tip

sharp - blunt



Body cross-section

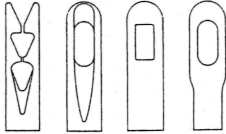
★ round bodied (serosa)
 ◐ triangular (cutting)
 spatula, lancet, diamond...



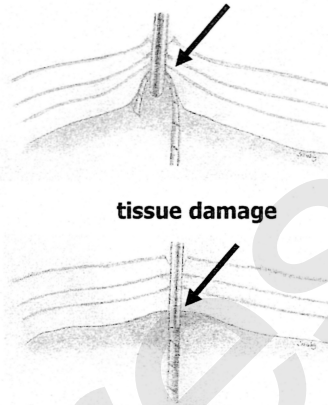
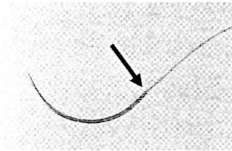
SURGICAL NEEDLES

Shaf

conventional

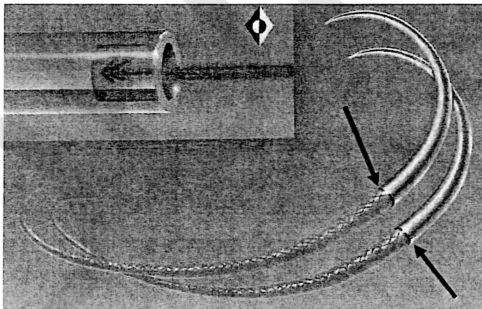


atraumatic



tissue damage

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

Chemical properties

Resistance to { acids
alkalis
bacteria
enzymes

Biological properties

no { edema
allergic
toxic
carcinogenic effect
drainage effect
minimal tissue reaction

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

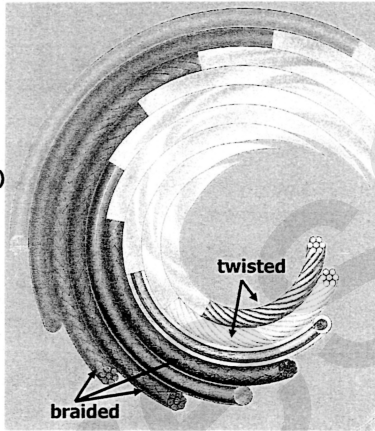
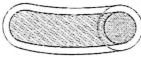
monofilament



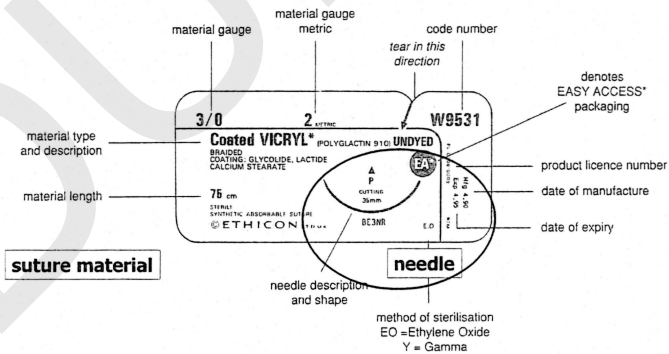
polyfilament (twisted, braided)



pseudo-monofilament



EXPLANATION OF LABELLING SUTURE MATERIALS



SIZE OF SUTURE MATERIALS

USP	EP
3	6
2	5
1	4
0	3.5
2/0	3
3/0	2
4/0	1.5
5/0	1
6/0	0.7
7/0	0.5
8/0	0.4
9/0	0.3
10/0	0.2



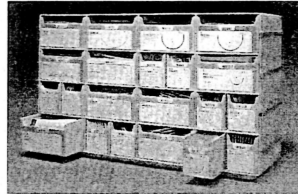
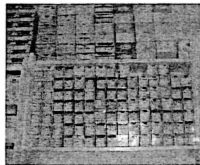
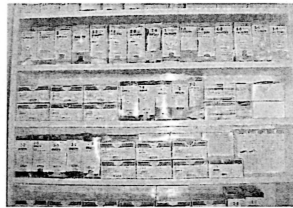
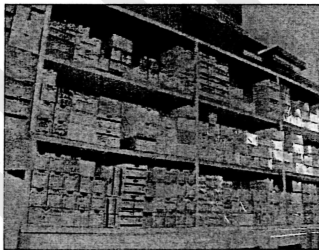
Metric size

(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

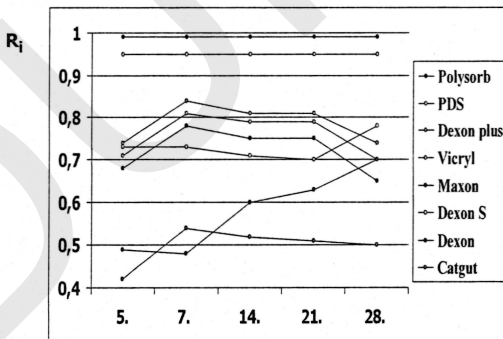
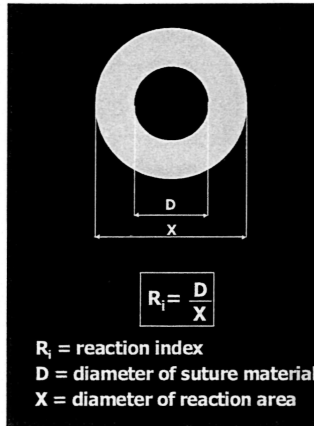
Intraoperative

handling
flexibility
knotted ability
knot holding security
cutting or serrating effect

Postoperative

adhesions
reaction index
histological examinations

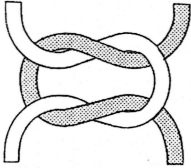
REACTION INDEX (R_i)



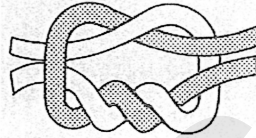
time/ days

KNOTTING TECHNIQUES

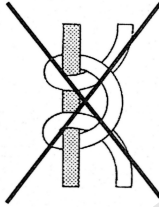
mariner knot
(square knot)



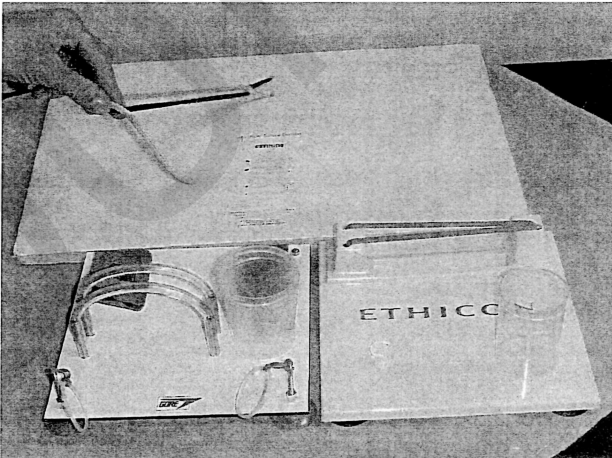
surgical knot



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



Training tables

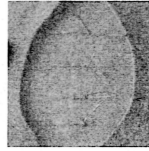


SUTURING TECHNIQUES I.

Interrupted sutures

simple
special

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



simple



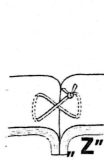
horizontal
„mattress”



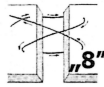
Donáti
(vertical „mattress”)



„U”



„Z”



„8”

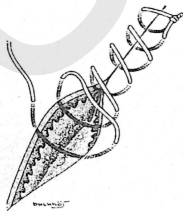
parenchymal



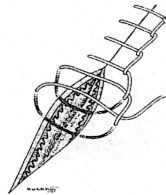
„X”

SUTURING TECHNIQUES II.

Continuous sutures



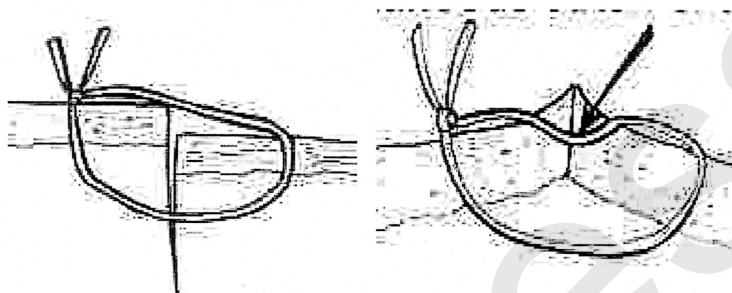
simple



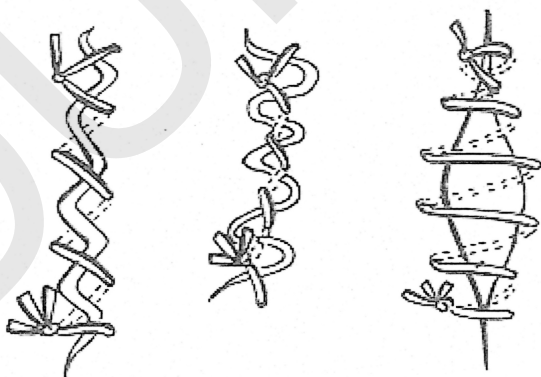
special
„locked”

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)**

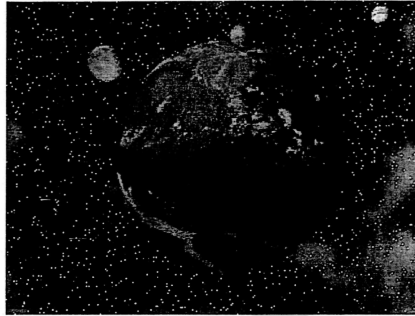
**using threads made
not for surgery
(fishing-line)**

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

SURGICAL STAPLERS



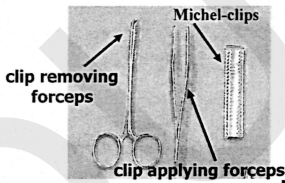
Petz, Aladár
1888-1956



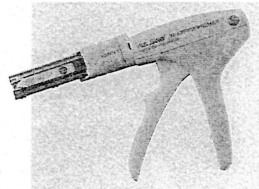
The creator of the principle
of surgical staplers

SURGICAL CLIPS

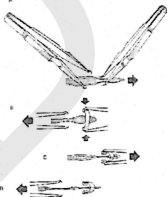
conventional



staplers



paperclip-theory



clip removing tools

SURGICAL CLIPS

absorbable

non-absorbable

clips for ligation

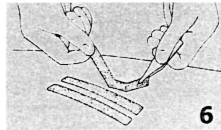
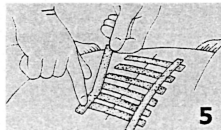
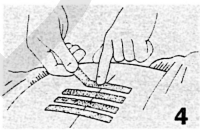
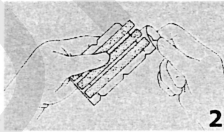
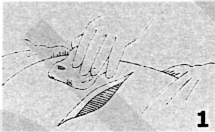
lactomer 9-1
(Poly Surgiclip)
polydioxanone
(Absolok plus)

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

clips for surgical staplers

Polysorb stapler, Reticulator 55 Poly Surgiclip

OTHER POSSIBILITIES FOR WOUND-CLOSURE (SKIN)



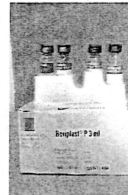
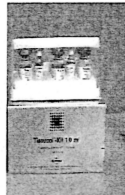
SURGICAL TISSUE ADHESIVES

**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

37°C

Body temperature

2 Aprotinin solution

1 Fibrinogen concentrate

3 Thrombin

4 Calcium chloride solution

Fibrinogen solution

Thrombin solution

Fibrinotherm

37°C 98°F

37°C 99°F

Beriplast

Komponente 1
Composant 1

Component 1
Composante 1

Komponente 2
Composant 2

Component 2
Composante 2

Room temperature

2

1

4

3

Fibrinogen Concentrate

Aprotinin Solution

Thrombin

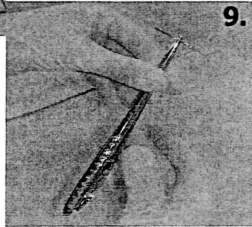
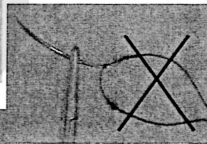
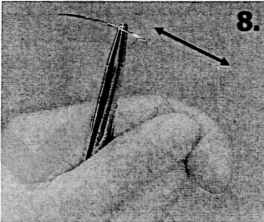
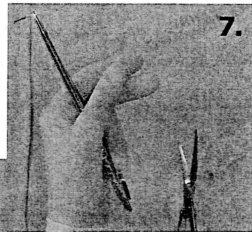
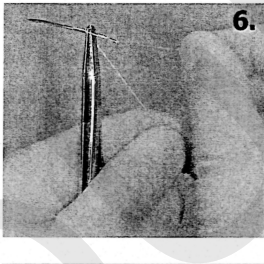
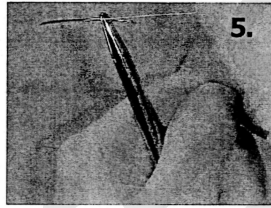
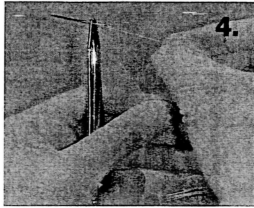
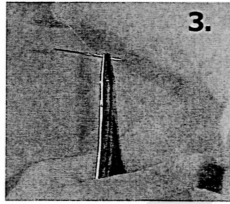
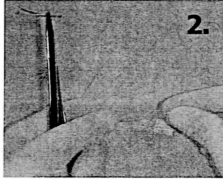
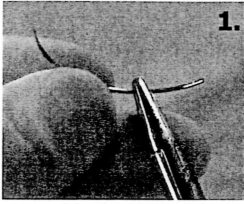
Calcium Chloride Solution

new!!
now with spray-nozzles
for extensive application

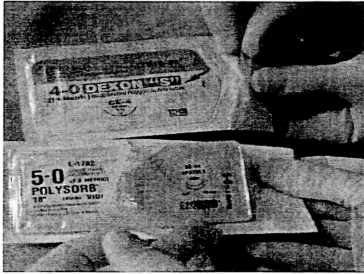
STEPS IN TAKING A STICH

SEMINAR

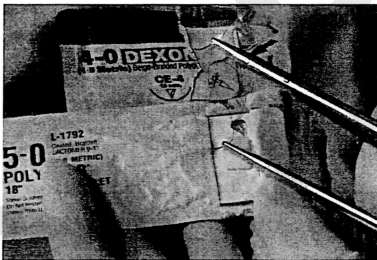
Taking suture material into the needle's shaft conventional techniques



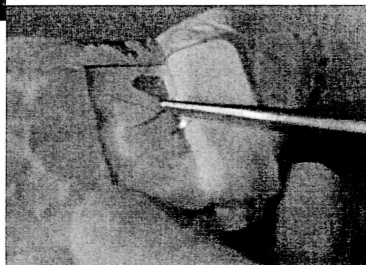
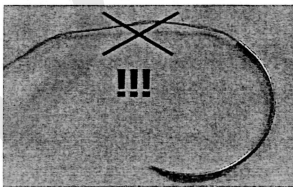
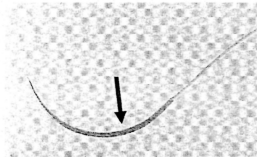
Handling atraumatic needle – suture material



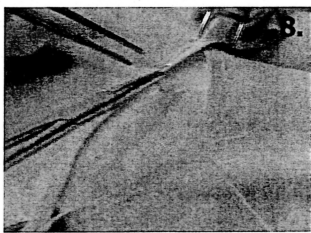
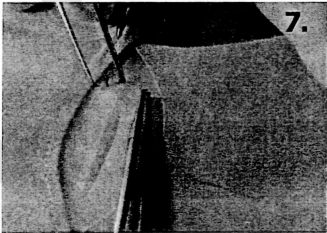
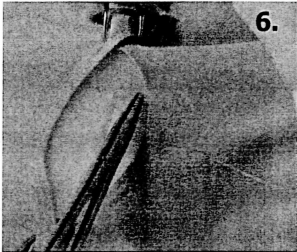
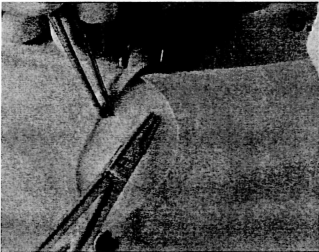
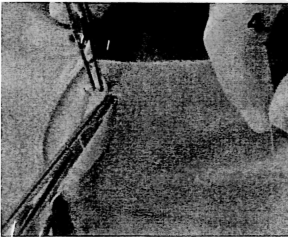
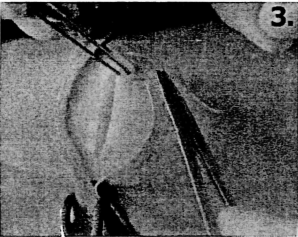
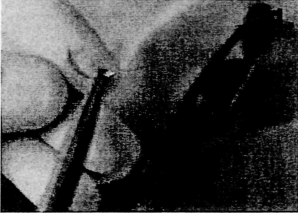
opening of the suture material package



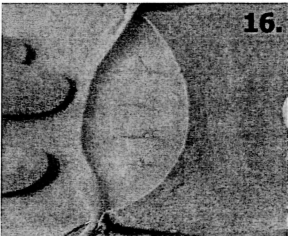
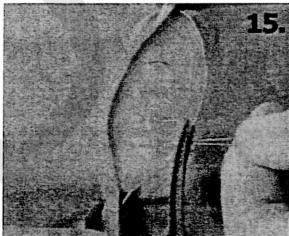
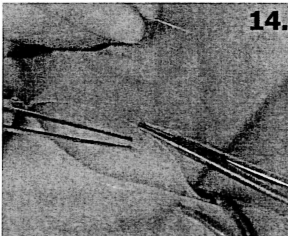
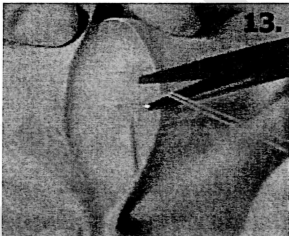
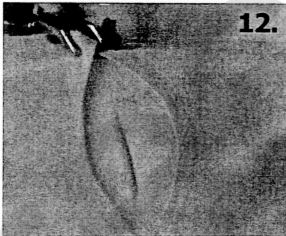
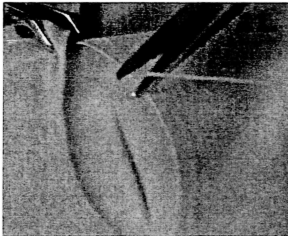
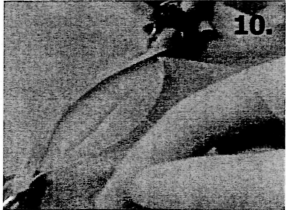
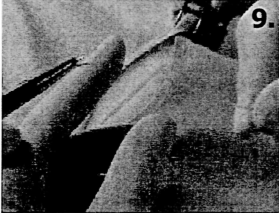
needle fixation



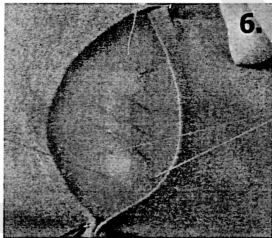
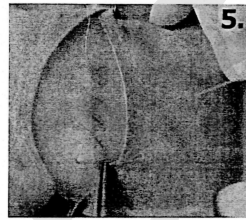
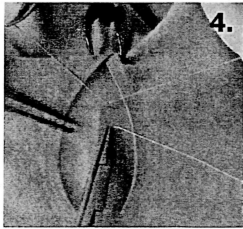
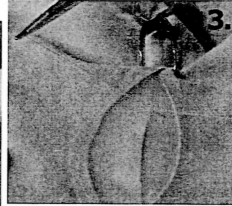
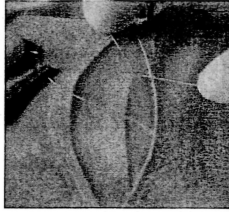
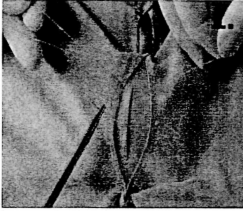
Steps in taking a simple interrupted stitch I.



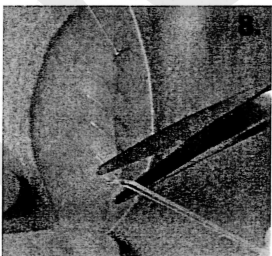
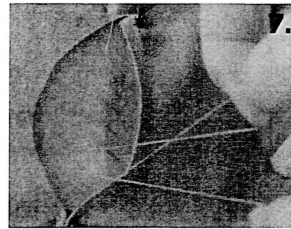
Steps in taking a simple interrupted stitch II.



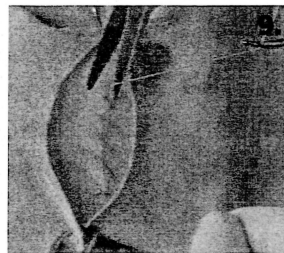
Steps in taking a continuous stitch



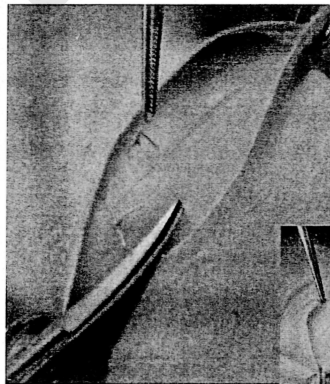
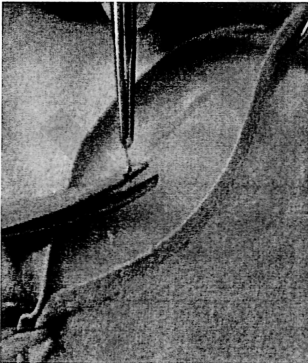
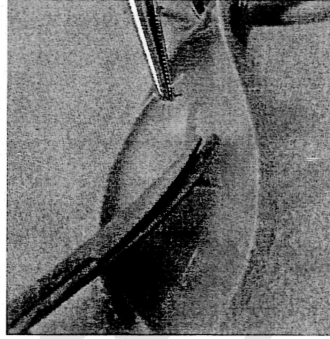
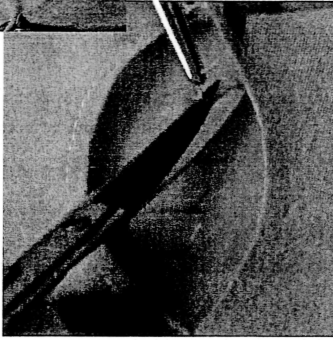
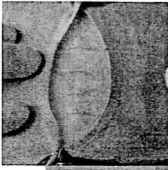
knotting



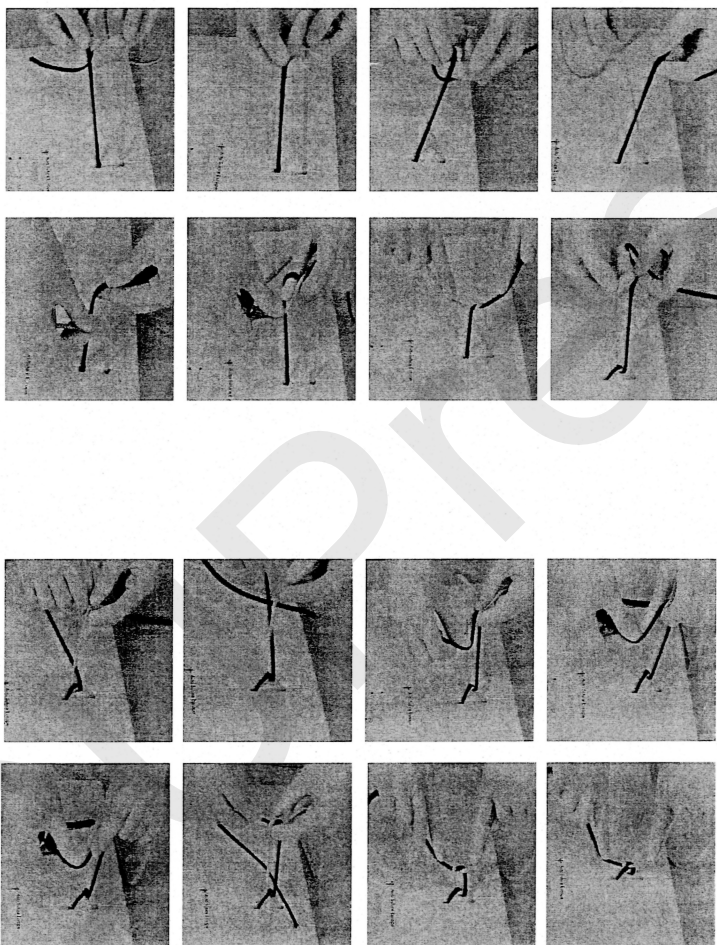
cutting the
ends of
sutures



Suture removal

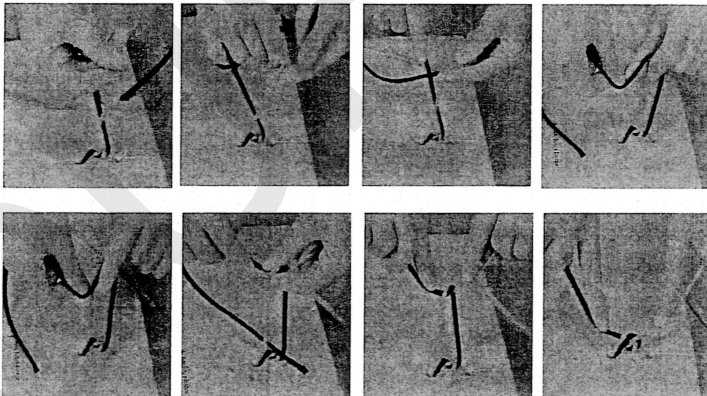
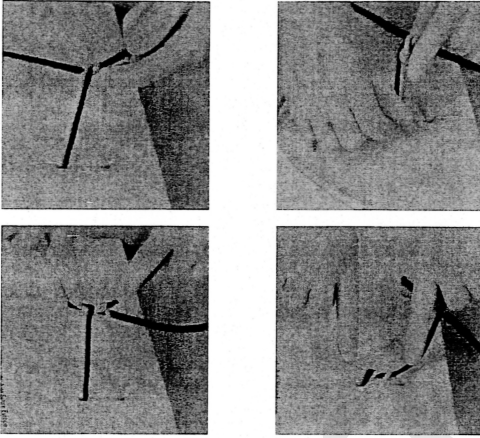


Mariner knot



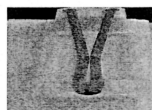
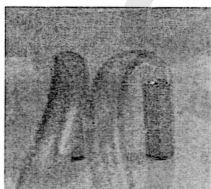
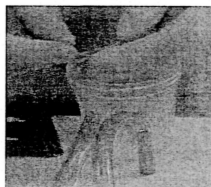
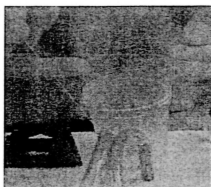
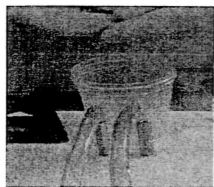
X 1 X 1

Surgical knot

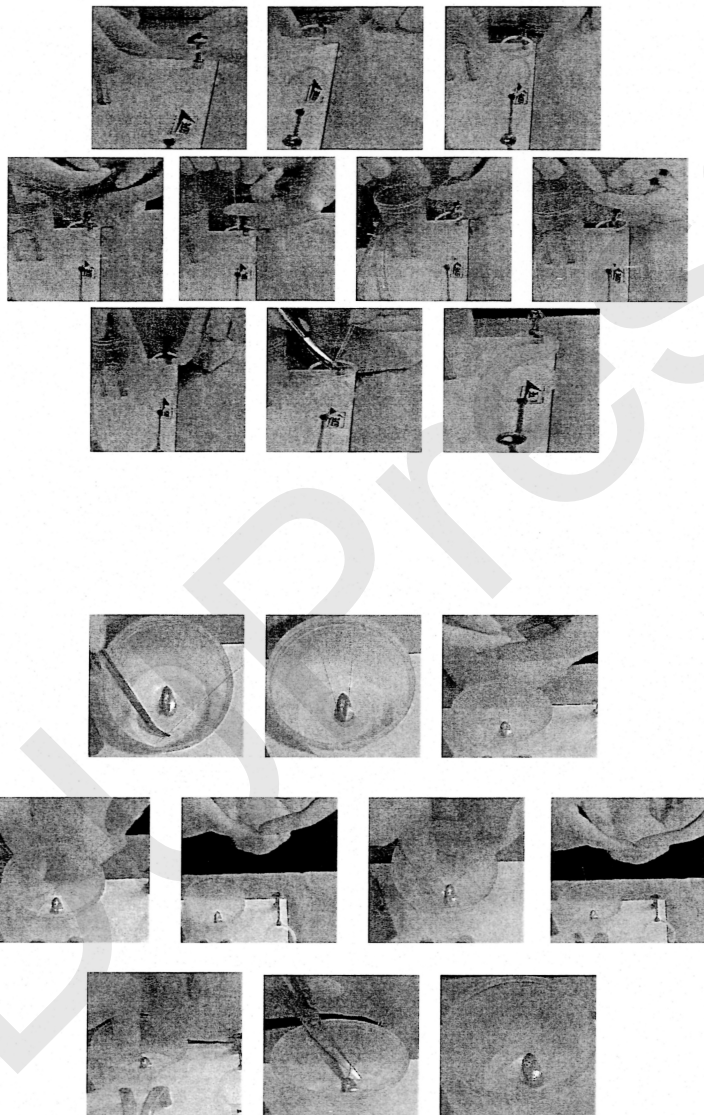


X 2 X 1

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)

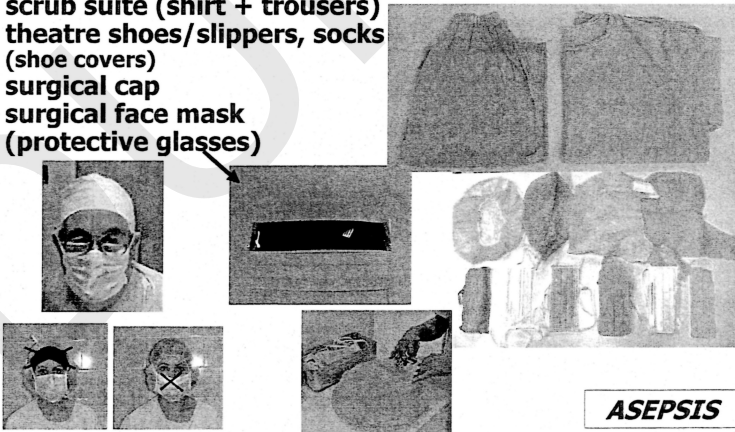
ANTISEPSIS

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)



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

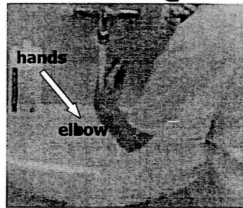
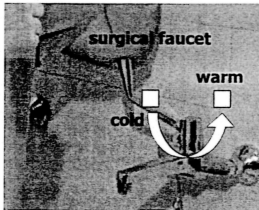
ANTISEPSIS

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

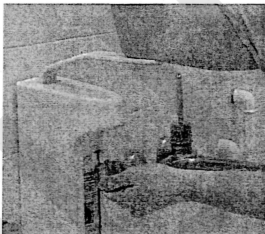
ANTISEPSIS

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

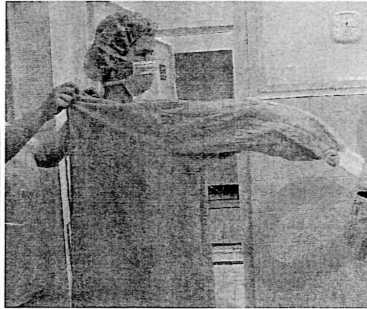
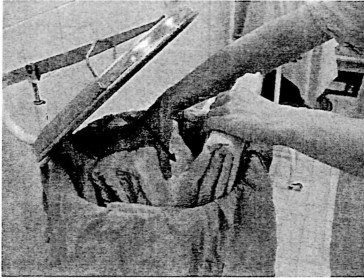
SCRUB ROOM

GOWNING



Schimmelbusch box

indicator tape 

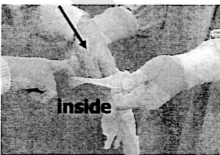
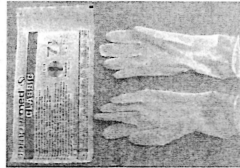


Nothing touched!!!

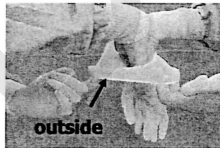


GLOVING

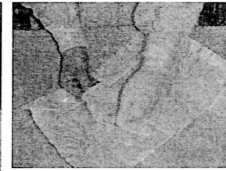
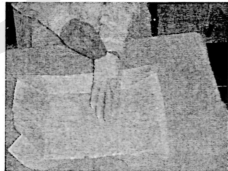
Various sizes:
6; 6 1/2; 7; 7 1/2; 8



inside



outside



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

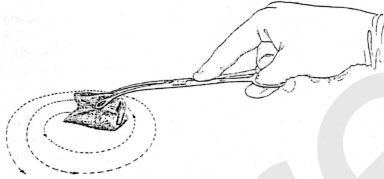
TALCUM GRANULOMA, ADHESION

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

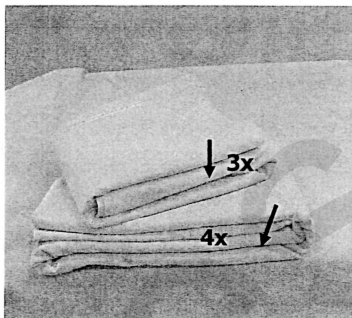
1 large (big table)

2 large (4x folded)

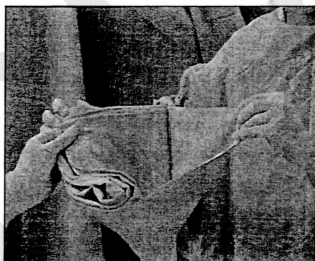
2 small (3x folded)

1 small

(linen or disposable materials)



DRAPING



OPERATING ROOM ENVIRONMENT

Sterilization techniques

steam autoclaving (atm-°C)
gowns, isolation towels, instruments
120 °C - 2,5 atm - 15-30 mins

dry heat (°C)
instruments
160 °C - 2 hours
180 °C - 1 hour

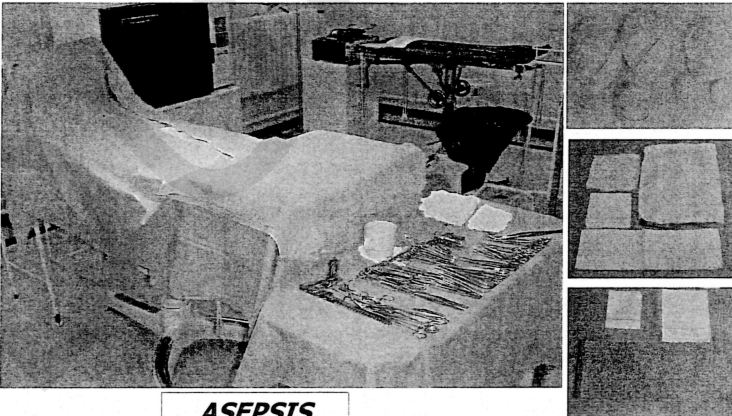
gases (EO) (°C)
gloves, catheters, tubes

γ - irradiation
suture materials, solutions, gloves

cold sterilization (glutaraldehyde)
plastic devices, endoscopic instruments

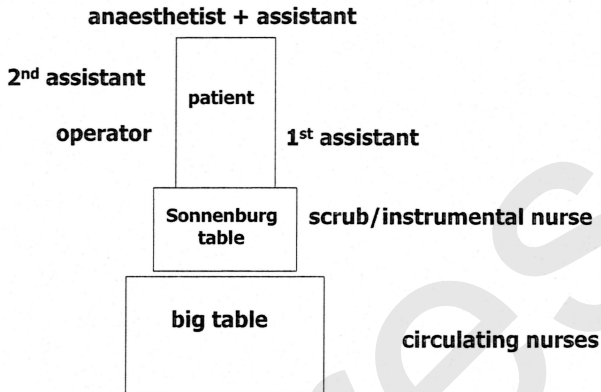
ASEPSIS

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

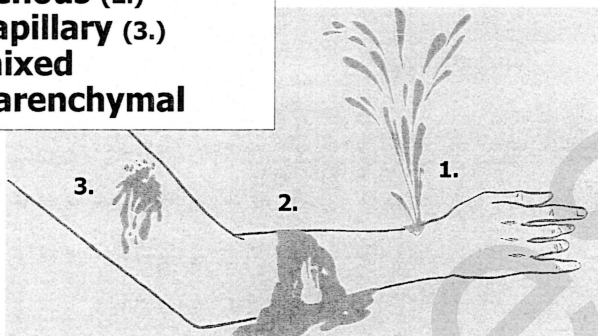
TYPES OF BLEEDING.

**DIFFERENT METHODS OF
SURGICAL HEMOSTASIS.**

4.

TYPES OF BLEEDING

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



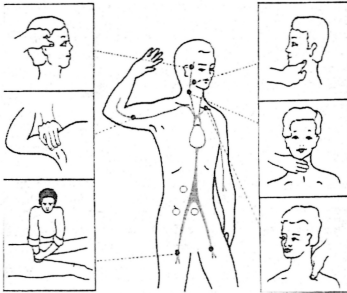
HEMOSTASIS

- 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

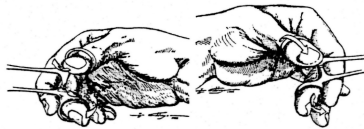
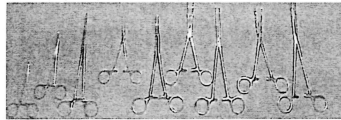
BUT: hematological disorders!
anticoagulant therapy!

II. STOP THE BLEEDING DEFINITELY

1. *Closing of the lumen*

hemostatic instruments

- Péan
- Kocher
- Lumniczer
- mosquitos



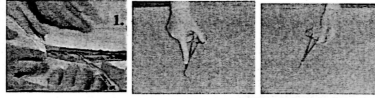
2. *Reconstruction of the lumen* (*vascular surgery*)

special instruments (vascular clamps)

METHODS FOR CLOSING THE LUMEN

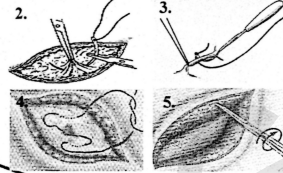
a./ Mechanical

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



b./ Physical

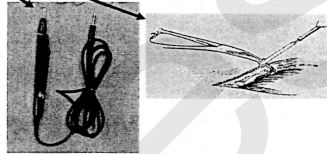
- electrocoagulation
- laser coagulation
- ultrasound coagulation



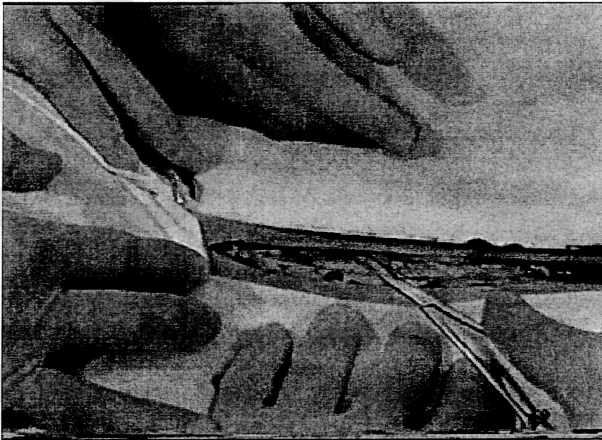
c./ Chemical (drugs)

d./ Biological

(bioplasts - hemostatic agents)



e./ Combined methods

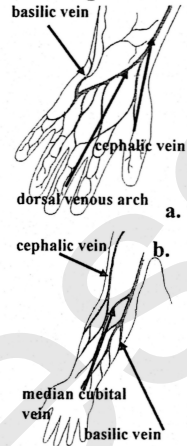
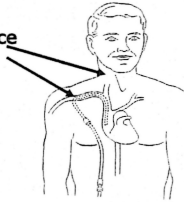


III. TREATMENT OF THE BLEEDING'S CONSEQUENCE

1. Intravenous therapy

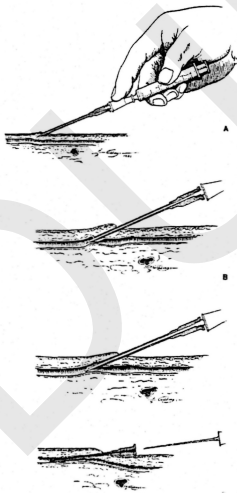
- injection - superficial veins
 - a./ hand veins
 - b./ forearm veins
- central venous techniques

venous entrance site
subclavian vein
external jugular vein

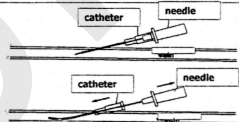


2. Venous cutdown technique

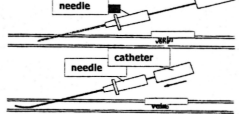
INTRAVENOUS TECHNIQUE



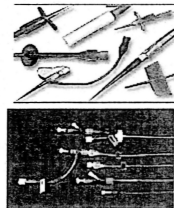
Through-needle catheter



Over-needle catheter



Tools of venous injection



Technique of intravenous injection

VENOUS CUTDOWN TECHNIQUE

catheter preparation



1.



2.

isolate the vein between ligatures



3.

prepare for venotomy



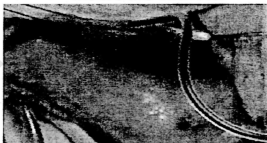
4.

V-shaped cut in the vein



5.

insert the catheter



6.

secure the catheter



7.

secure the catheter with an additional suture

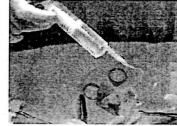


8.

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
fibrin
gelatine

Name
SEVAC
GELASPON
GELITA-TAMPON
SPONGOSTAN

Form
spongius
spongius
spongius
„standard“film,
spongius

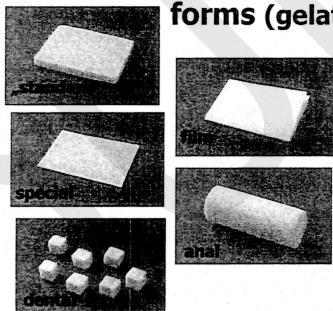
oxidized cellulose
collagen

GELFOAM
SURGICEL
COLLAGEN IMPLANT
LYOSTYPT
GARAMYCIN
AVITENE
ACTIFOAM, HELISTAT,
INSTAT, HEMOSTAGEN
TACHOCOMB

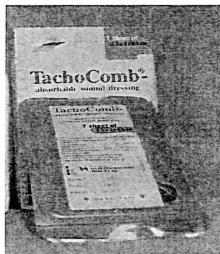
spongius
mesh
spongius
spongius
spongius
microfiber
spongius
spongius

collagen + fibrin

Spongostan application forms (gelatine)



Tachocomb application forms (collagen+fibrin)



Surgicel application forms (oxidized cellulose)

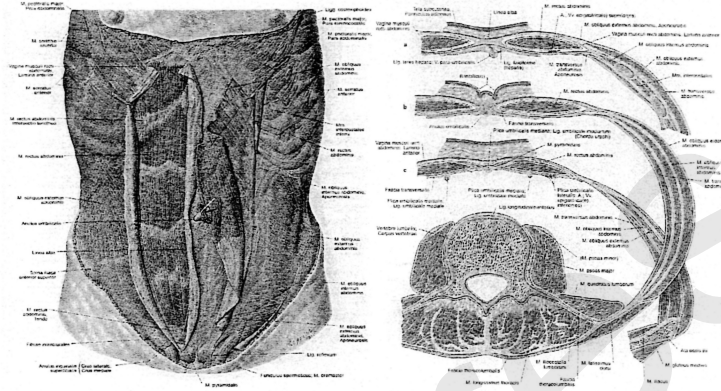


SURGICAL INCISION

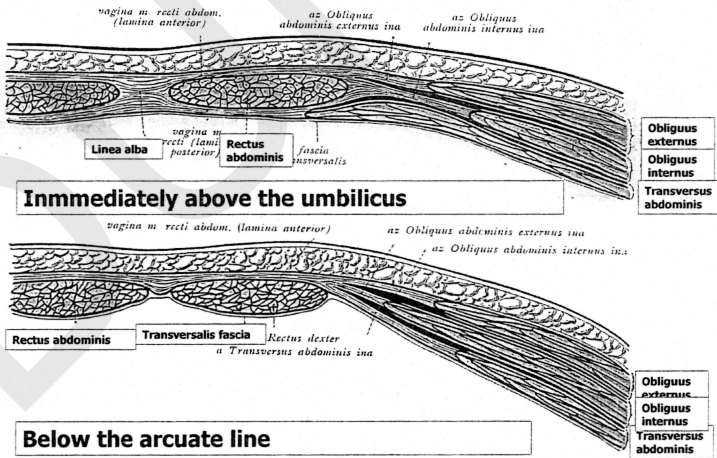
**LAPAROTOMY,
LAPAROSCOPY.**

LAPAROTOMY

Anatomy of the abdominal wall



Transverse section through the anterior abdominal wall



LAPAROTOMY

Incision's directions

1. Vertical
midline
paramedian
transectal
pararectal
2. Transverse
transrectal
Pfannenstiel
3. Oblique
subcostal or paracostal
McBurney
4. Combined
5. Laparoscopic

LAPAROTOMY

Incisions not cutting muscles

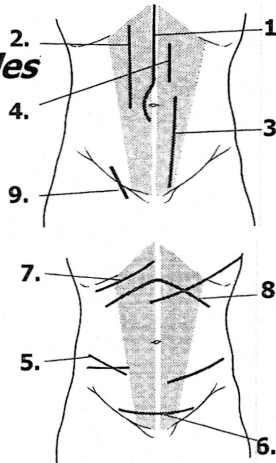
1. midline
2. paramedian
3. pararectal

Incisions dividing muscles

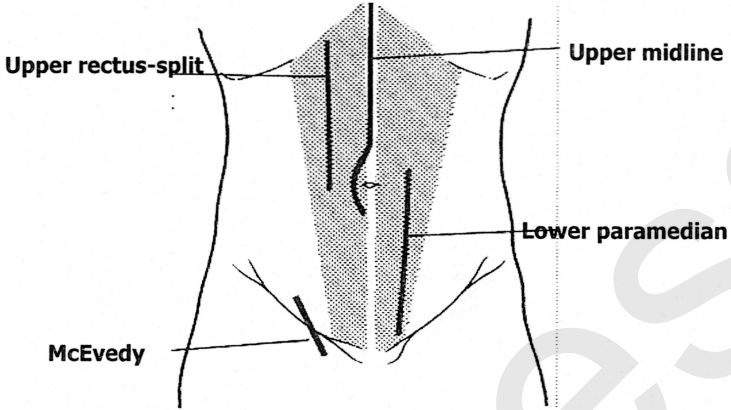
4. vertical transrectal
5. McBurney incision
6. Pfannenstiel incision

Incisions cutting muscles

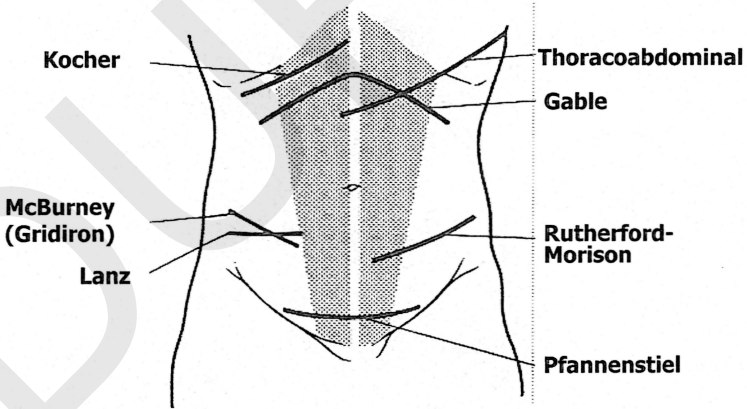
7. paracostal (Kocher) or subcostal
8. transverse transrectal
9. inguinal



LAPAROTOMY



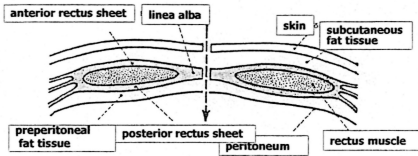
Incisions I.



Incisions II.

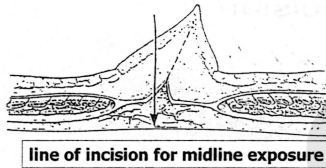
(Kirk: Basic Operative Techniques, 1998)

LAPAROTOMY - midline

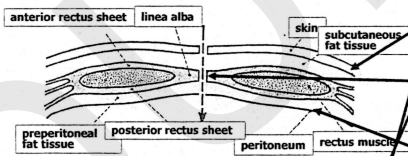


- skin
- subcutaneous fat tissue
- linea alba
- transversal fascia and preperitoneal fat tissue
- parietal peritoneum

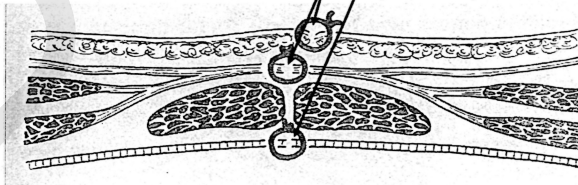
Anatomy



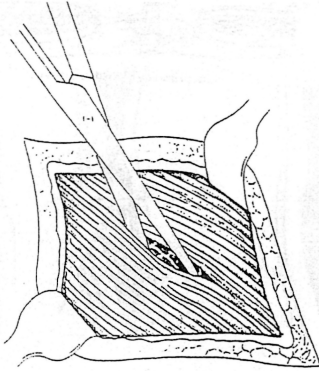
CLOSURE OF MIDLINE LAPAROTOMY



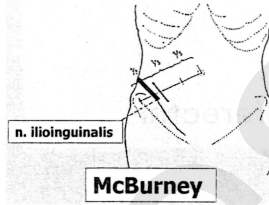
- skin
- subcutaneous fat tissue
- linea alba
- transversal fascia and preperitoneal fat tissue
- parietal peritoneum



McBurney incision

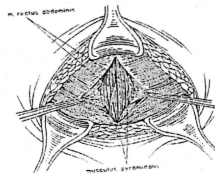
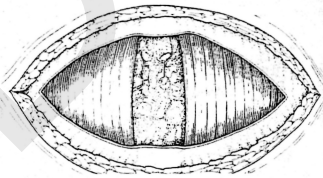
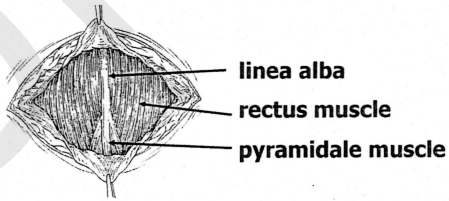


muscle splitting

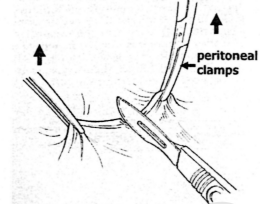
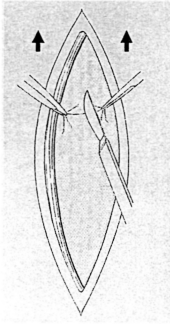
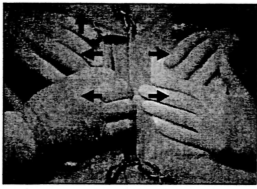


Pfannenstiel incision

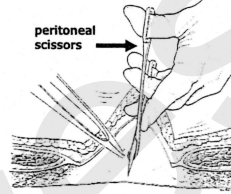
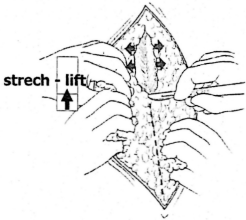
transverse
abdominal incision



LAPAROTOMY - exposure

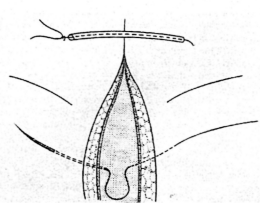
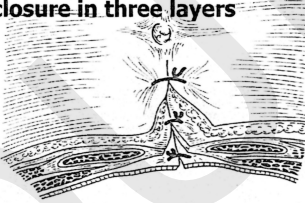


incision of the parietal peritoneum



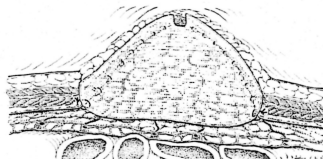
CLOSURE OF THE ABDOMINAL WALL

closure in three layers



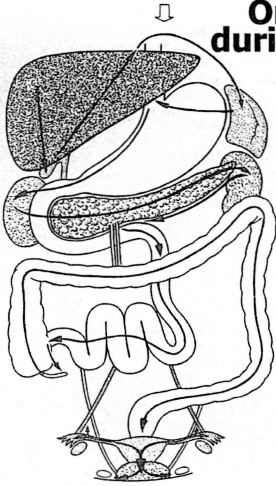
deep tension sutures

closure in two layers

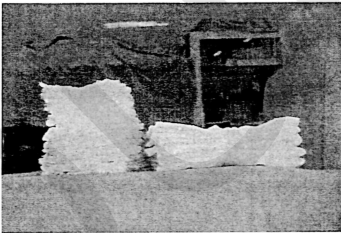


polypropylene mesh closure

**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)

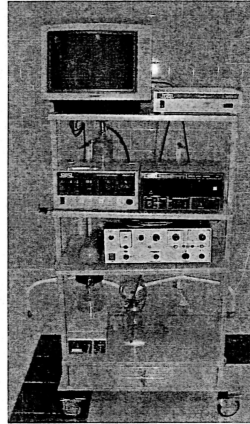
light transmission

light sources

light cable

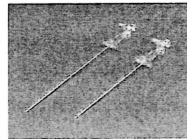
electrocoagulator

**instruments of aspiration
and irrigation**



Veres needle

trocars



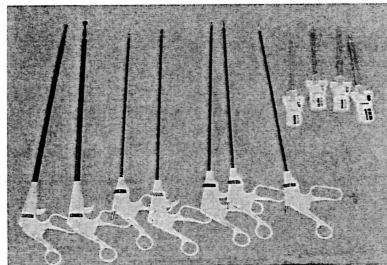
special instruments

clamps

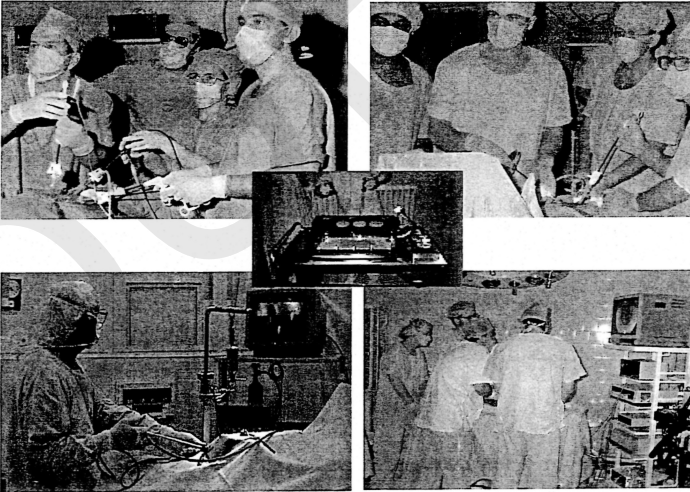
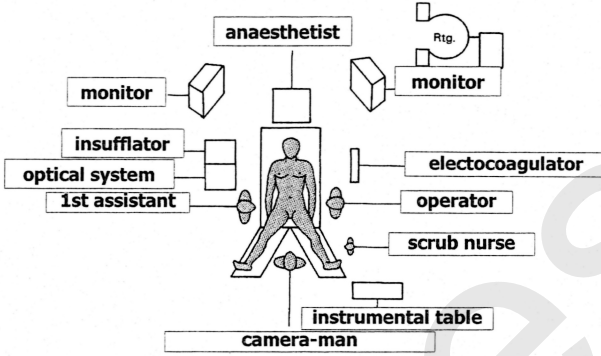
dissectors

scissors

clip applicators



OPERATING THEATRE'S STAFF



CONICOTOMY,

TRACHEOSTOMY.

5.

Life-saving method!!!!!

CONICOTOMY
(cricothyroidotomy)
emergency operation

TRACHEOSTOMY
elective operation

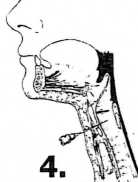
Cause: upper airway obstruction

Symptoms: dyspnoea
inspiratory stridor
cyanosis
unconscious patient

brain damage occurs in 4 minutes!

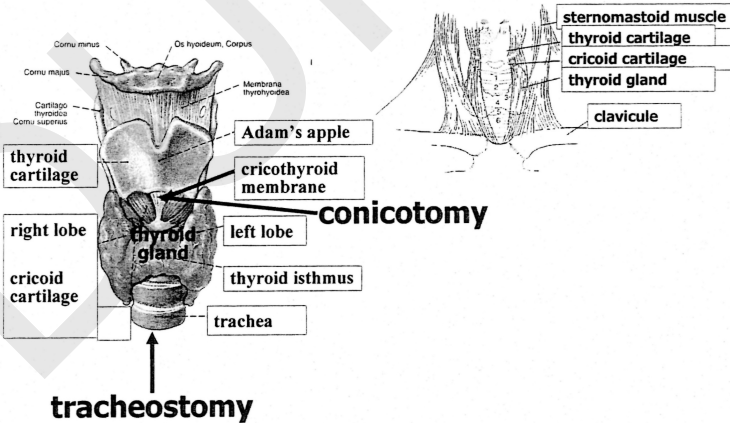
PRIORITIES

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)

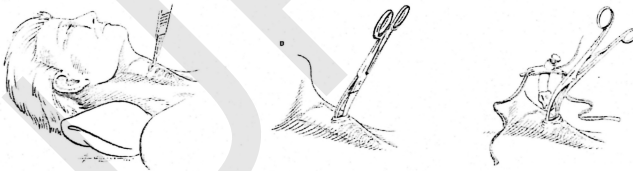
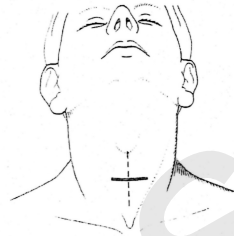
ANATOMY



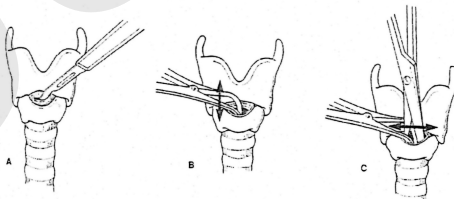


CONICOTOMY (cricothyroidotomy)

- 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

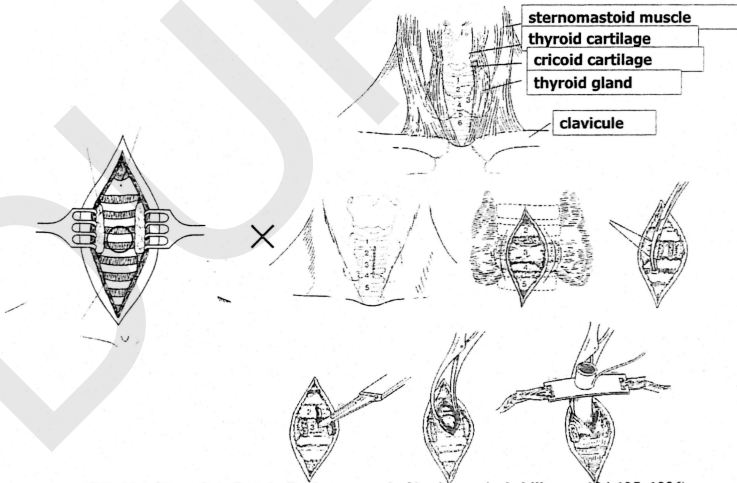
(L.W. Way: CURRENT Surgical Diagnosis & Treatment, pp. 219, 1994)



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

