

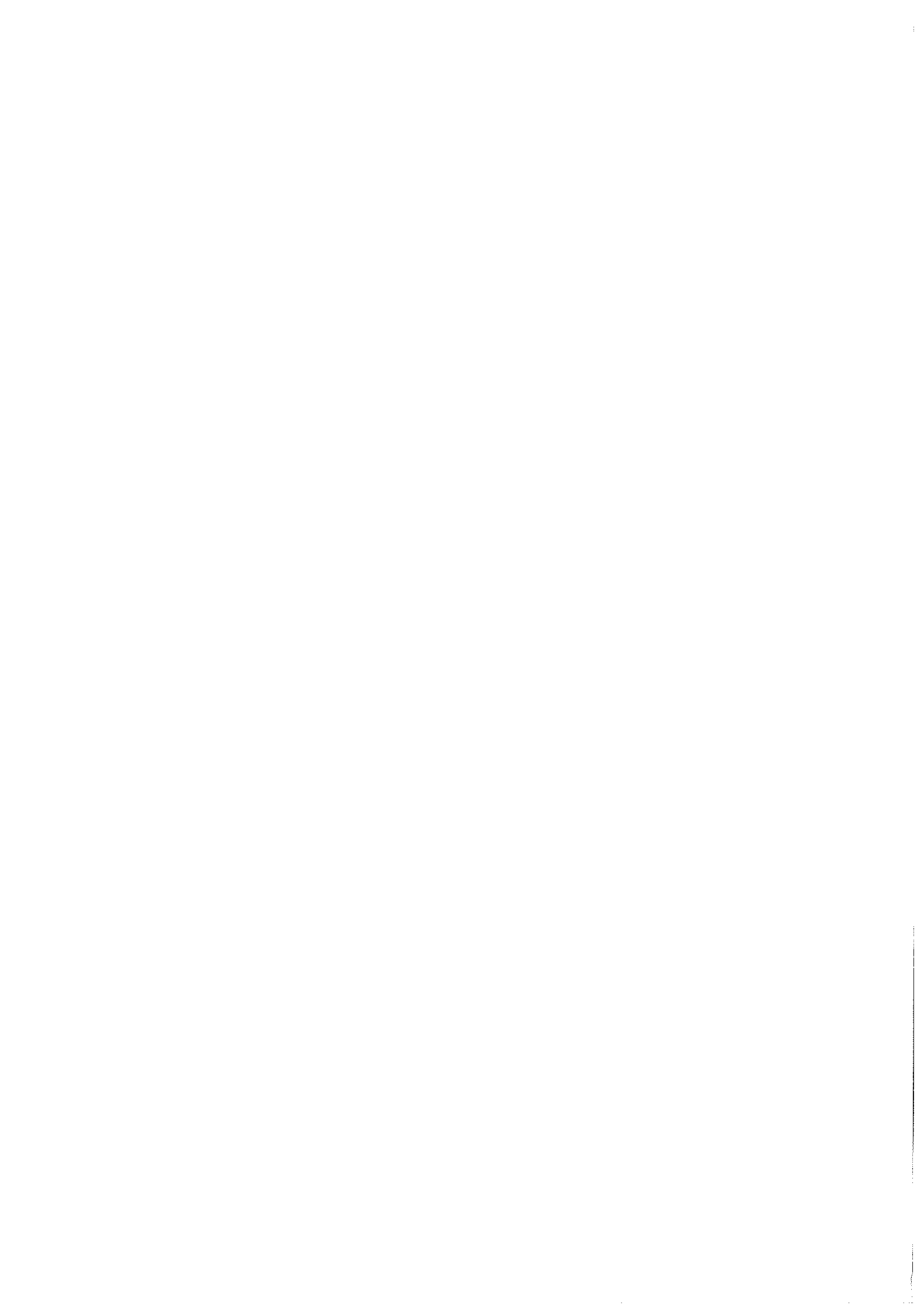


SURGERY

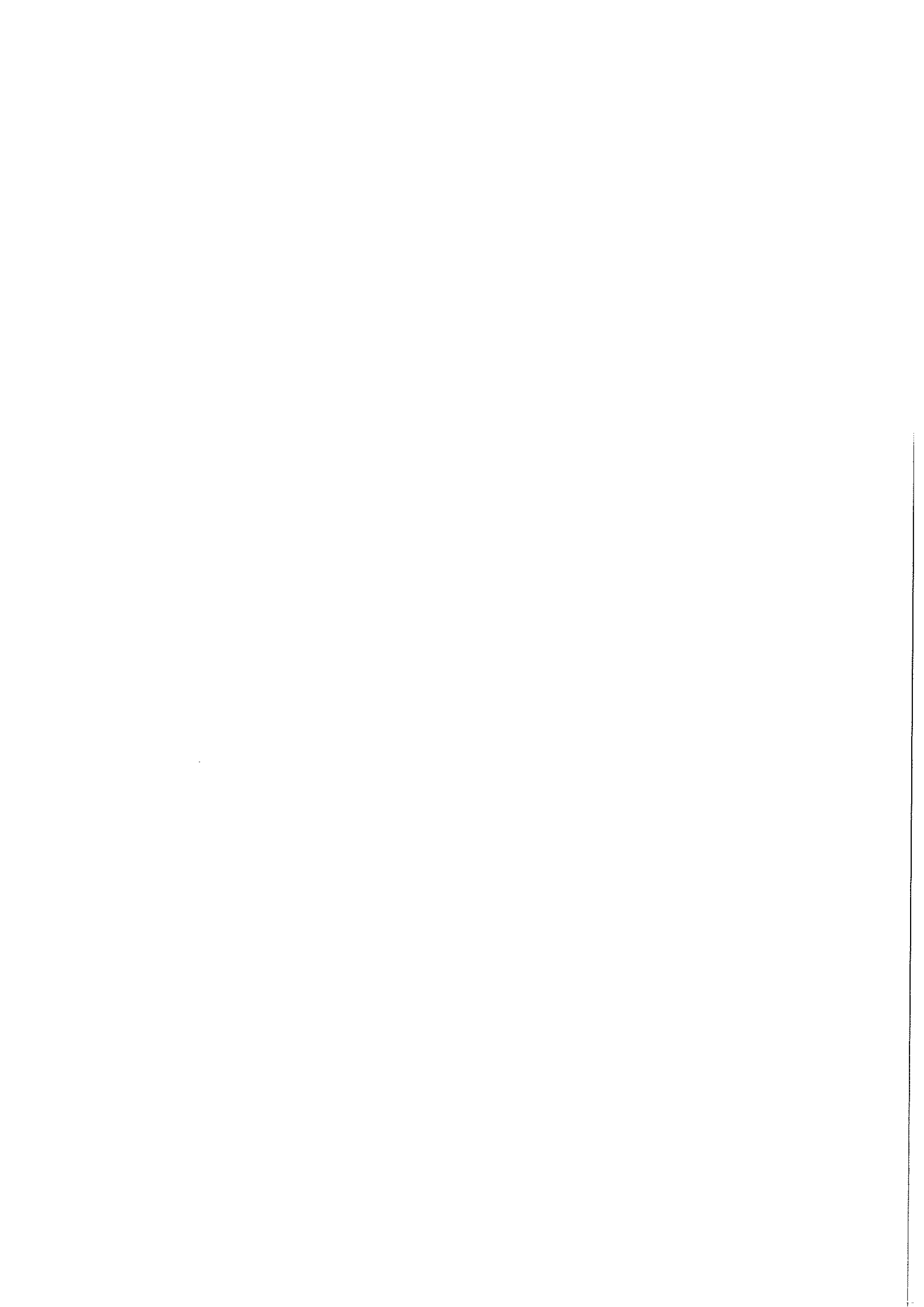
2009-2010



DEVANGNA BHATIA

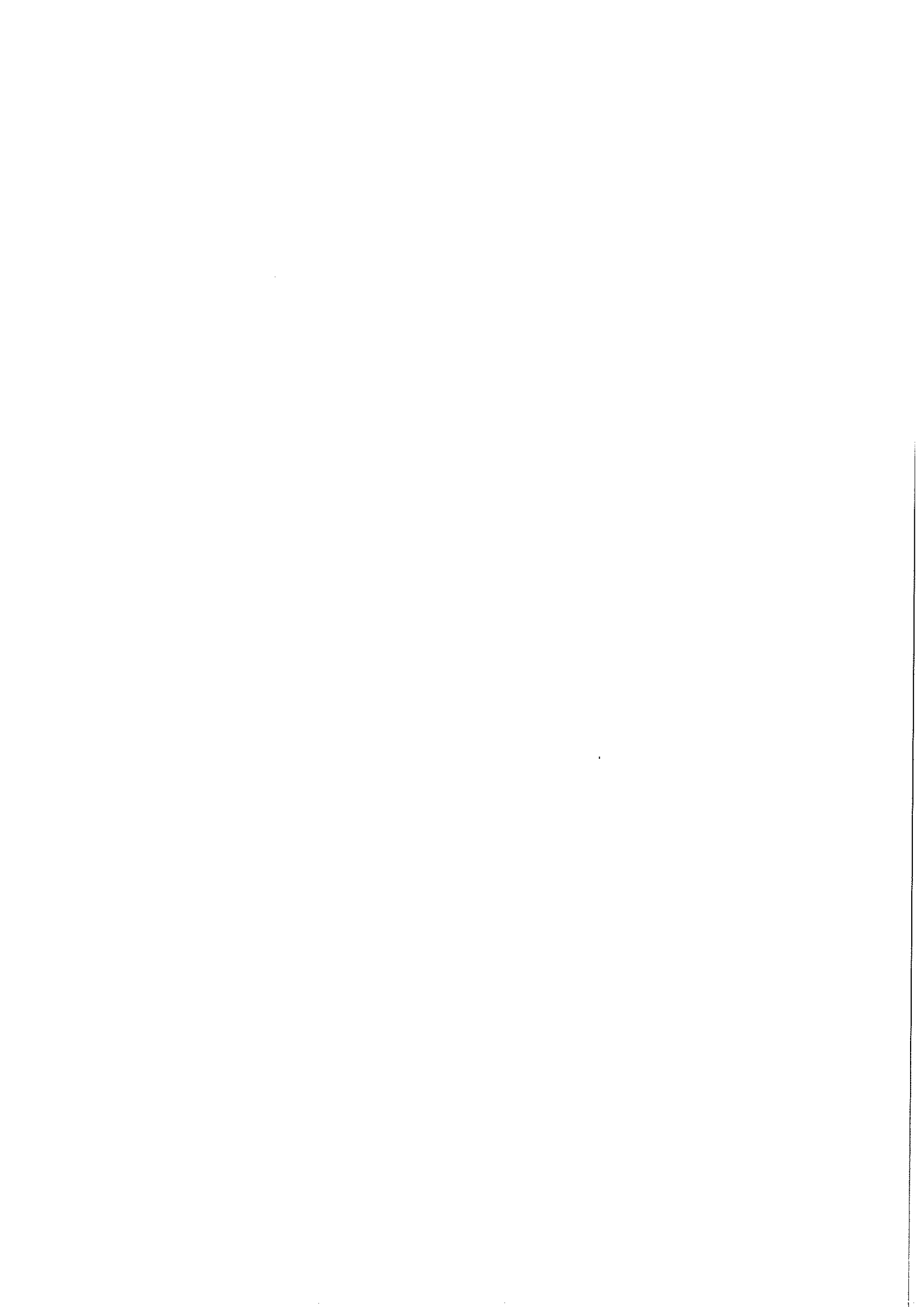


1. Medical examination of mamma
2. Distorsion and luxation
3. Disinfection, antisepsis, asepsis.
Principles of operative surgery.
4. Fractures, early fracture stabilization.
5. Types of dermatoplasties.
6. Prevention of tetanus.
7. Healing of fracture.
8. Shock.
9. Putrid infection.
10. Surgical oncology.
11. Medical examination of abdomen.
12. Wound healing.
13. Panaritium
14. Blood transfusions.
15. The operating room team and discipline.
16. Medical examination of the knee.
17. Puncture of the abdominal cavity.
18. Medical examination of the joints.
19. Postoperative complications, wound infections.
20. Burns.
21. Local anesthesia.
22. Acute arterial occlusion, embolism.
23. Diet in surgery.
24. Antibiotics in surgery, choice of antibiotics.
25. Principles of preoperative preparation
of the surgery patients.
26. Phlegmona abscessus.
27. Injury of bones, tendons and muscles.
28. The skin transplantation.
29. Disorders of internal environment
30. Surgical infection.
31. Wounds.
32. Surgical infection - anaerobes.
33. Pain, types of the pains, acute abdominal pain.
34. Postoperative complications deep
vein thrombosis and pulmonary embolism.
35. Fluid, electrolyte and pH imbalance.
36. Punctures of the joints.
37. Postoperative fever and infection.
38. Retentio urinae, catheters.
39. Anesthesia, general, regional.



40. Puncture of the thorax.
41. Bedsore, decubitus.
42. Nonsurgical peroperative disorders
(respiratory, cardiogenic complic.)

1. First aid in case of the war injuries.
2. First aid in case of the unconsciousness.
3. Venesection.
4. Wound care.
5. Incision, excision, extirpation.
6. Tracheotomy.
7. First aid in case of fracture.
8. First aid in case of abdominal injuries.
9. Cardiovascular resuscitation.
10. First aid in case of drowning.
11. The primary goal of operative management of panaritium.
12. Prehospital care of burn patients.
13. Prehospital care of patients with electric injury.
14. Prehospital care of patients with shock.
15. Symptoms and signs of hypovolemic
shock, diagnosis, treatment.
16. Prehospital care of patients with brain
and cranium injury.
17. Prehospital care of patients with joint injury.
18. Prehospital care of patients respiratory failure.
19. Methods of transportation of the injured victim.
20. Prehospital care of patients with cardiogenic failure.
21. Prehospital care of patients with bleeding.
22. Prehospital care of patients with thorax trauma.



① Medical examination of mammawhen to do breast exam?

- ↳ women > 45 years
- ↳ presence of secretions of milk at times not associated w/ pregnancy (galactorrhoea)
- ↳ when breast lumps/modules are found
- ↳ breast pain
- ↳ discoloration or change in the quality of the skin:
 - ↳ Redness - inflam / infec
 - ↳ "Peau d'orange" / "Orange peel" like texture - uncommon, aggressive inflam. malign. (under the skin)

① Inspect: sitting patient w/ hands above their head - position of nipples
 look for inflam (redness), oedema, variations in size + contour, "orange peel"

② Palpation: supine, hands above her head

↳ 2 methods: ① Concentric circles: start at the areola, go around, then move outwards & around again.
 ↳ at the end - eem. the tail of the axilla breast - in the upper, right quadrant → axilla

② Spokes of the wheel: start at the nipple then go towards the 3 o'clock, → 4 o'clock → 5 → 6 → etc o'clock positions.

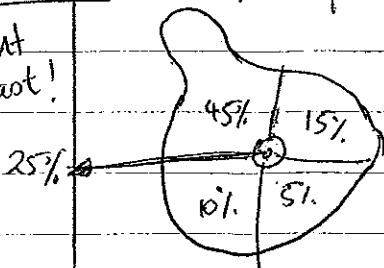
↳ back + forth fm the nipple → outwards → nipple
 softly → firmly → softly

↳ palpate the nipple

③ Vertical strip method: examines the breast in overlapping vertical strips moving across the chest.

Quadrants: % of all cancers

Right Breast!



② Distorsion + luxation

Luxation: joint dislocation; occurs when bones in a joint become displaced or misaligned.

↳ due to sudden impact to the joint

↳ ligament ALWAYS becomes damaged

↳ most common sites:

- Shoulders - fingers - knees - wrists - elbows

↳ symptoms:

- swelling - intense pain - immobility of the affected joint

usually ⁺ accomp. w/ a fracture

↳ causes:

- trauma - fall - blow - might be a result of some disease or defective ligament.
- rheumatoid arthritis

↳ treatment:

- joint needs to be "reduced" back into its normal position - very painful ∴

done in either A&E under sedation or in OR under GA.

- should be done asap, coz blood supply to the joint + distal parts may be compromised - esp. true in the ankle joint - foot!

- weakening of the muscles + ligaments which keep the joint in place - ∴ ↑ risk of dislocating it again (esp. shoulder joint)

↳ medical conditions where dislocations are freq + spontaneous:

- Ehlers-Danlos syndrome - Congenital hip dysplasia

↳ aftercare:

- use splints or bandages

↳ fingers

↳ shoulder

Subluxation: incomplete / partial dislocation of a joint

↳ medical attention needed to relocate or reduce the joint

Distorsion: means twisted, i.e. twisted / sprained ankle - very common!

↳ 1 or more ligaments are (partially) torn - Ant. talofibular lig most common

↳ 85% of sprains - lat. aspect of the ankle; occurs when the foot is rolled / turned beyond motions considered norm. fr the ankle.

↳ Inversion = falling inward + pain on the lat side; Eversion = foot is twisted outwards
↳ deltoïd lig. is stretched; pain on the med. side

③ Disinfection, antiseptics, asepsis: Principles of operative surgery

Disinfection: process of killing the common pathogenic bacteria but usually not their spores

↳ chemical methods:

① Peracetic acid: conc. of 0.1-0.2% - disinf. of hands

1% " " of surfaces, e.g. floors, furniture etc

② Iodine: form of tincture of iodine (3.5% I + 2.5% KI in alcohol)

↳ may cause an allergic reaction

↳ can ↑ its effect by using agents which ↓ skin surface tension + enhance penetration, e.g. Betadine

③ Modern Agents, e.g. based on chlorhexidine or hexachlorophene

Antiseptics: to actively destroy the bacteria in the wound + prevent sepsis

↳ antiseptics: agents that reduce or kill germs chemically + are applied to skin + wound surfaces

↳ common antiseptics:

① Alcohols: ethanol (60-90%), 1-propanol (60-70%), 2-propanol / Isopropanol (70-80%)
↳ called "surgical alcohols" - used to disinfect the skin before injections

② Chlorhexidine: 0.5-4.0%, skin antiseptic, used for gingivitis

Asepsis: state of being free from disease causing contaminants - hands, instruments, sutures + dressing material

↳ surgical site is washed, shaved & skin is exposed to a germicide (betadine - iodine)

↳ preparation of surgical instruments: cleaning, disinfection + sterilisation

↳ surgeons: scrub up, masks, gowns, gloves

4) Fractures, early fracture stabilisation:

- ↳ break in the continuity of a bone
- ↳ due to: high force impact / trauma stress

Common sites: pelvis + femur (old ppl)
u. ext. hand, wrist, shoulder
l. " : ankle, mid-tibial

trivial injury - when bones are weakened already e.g. osteoporosis, bone cancer or osteogenesis imperfecta = pathologic fracture

↳ types of fractures:

- ① Closed (simple) fractures: skin is intact
- ② Open (complex) fracture: wounds that communicate with the fracture or where fracture haematoma is exposed ∴ contamination of the bone may occur.
↳ ↑ risk of infection - need abx + debridement (removal of all dirt, contaminants + dead tissue)
- ③ Multi-fragmentary fractures: aka "comminuted fractures" - bone splits into multiple pieces.
- ④ Compression fractures: in the vertebrae, e.g. when the front portion of a vertebrae collapses due to osteoporosis (with or without trauma)
- ⑤ Complete: bone fragments separate completely
- ⑥ Incomplete: " " are still partially joined
- ⑦ Linear: fracture that is parallel to the long axis of the bone
- ⑧ Transverse: " " " at a right angle " " " " "
- ⑨ Oblique: " " " diagonal to the " " " " "
- ⑩ Impact: bone fragments are driven into each other

↳ Signs + symptoms: painful because: ① breaking in the continuity of periosteum (+ may in the endosteum) ⇒ contain nociceptors

② oedema of nearby tissues

③ muscle spasms trying to hold bone fragments in place

↳ Diagnosis: history, physical exam., X-ray, CT

↳ Immobilisation: aligning the bone = reduction

↳ plaster/fiberglass cast or splint - holds the bones in place + above + below the joint

↳ if surgical - then nails, screws, plates, wires - to hold it in place

⑤ Types of dermatoplasties

Dermatoplasty: the use of skin grafts in plastic surgery to correct defects or replace skin destroyed by injury or disease.

↳ used to treat: ① extensive wounding or trauma

② Burns

③ areas of extensive skin loss due to infection, e.g. necrotising fasciitis

④ specific surgeries that may require skin grafts for healing to occur

↳ 2 purposes: ① ↓ the course of treatment needed

② improve the func + appearance of the area of the body receiving the graft

↳ Graft taxonomy: ① Autologous: aka autograft - donor + recipient are the same

② Isogenic: donor + recipient are genetically identical; isograft ^{monozygous twins}

③ Allogeneic: donor + recipient are the same species; allograft

④ Xenogeneic: xenograft - donor + recipient are diff. species

⑤ Prosthetic: lost tissue is replaced w/ synthetic materials - metal, plastic, ^{ceramic}

↳ 3 kinds: ① split-thickness: epidermis + variable amounts of dermis

↳ taken from the thigh + buttocks

↳ donor site heals by re-epithelialisation for the dermis + surrounding

skin + needs dressing

② Full-thickness: epidermis + all of the dermis

↳ donor site - sutured directly OR split-thickness skin grafted

③ Composite graft: small grafts containing skin + underlying cartilage +

other tissue

↳ donor sites = ear skin + cartilage → nasal alar rim defects

⑥ Prevention of tetanus

- ↳ preventable by active immunisation
- ↳ tetanus toxoid (anatoxin) - as part of DTP vaccine for 1^o immunisation of children
diphtheria toxoid (Td) for immunisation of older adults + children
- ↳ 1^o immunisation in adults \Rightarrow tetanus toxoid given in 2 doses - 4-6 weeks apart
3rd dose - 6-12 months later
- ↳ Boosters - every 10 years \Rightarrow to ensure maintenance of protective anti-toxin levels
- ↳ if last immunisation < 5 yrs ago = give nothing
5-10 yrs ago = tetanus toxoid only
don't know or > 10 yrs ago = tetanus toxoid + anti-tetanic human Ig
(250-400 units)

anatoxin absorbed on aluminium oxide

1st dose = 0.5ml

2nd dose = 1.0ml 6 weeks later

3rd dose = 0.5ml 6 months later

} near complete immunity for 2 yrs &
partial immunity for 10 years

- if a wound is greatly contaminated w/ soil or in presence of necrotic tissue, tetanus prophylaxis should be performed even in a immunised patient!

⑦ Healing of fractures

↳ Bone healing, fracture healing \Rightarrow multif. physiological process, in which the body facilitates the repair of a bone fracture

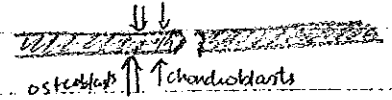
↳ length of this process depends on the extent of the injury \Rightarrow upper body = 2-3 weeks

↳ Phases of fracture healing: lower body = \geq 4 weeks

① Reactive Phase:

↳ Fracture + inflam. phase: haematoma can form after a few hrs

↳ Granulation tissue formation



② Reproductive Phase:

↳ Callus formation: periosteal cells replicate + transform

↳ cells prox. to the fracture \rightarrow Chondroblasts \rightarrow hyaline cartilage

↳ "distal" " " \rightarrow Osteoblasts \Rightarrow woven bone

↳ they grow until they unite w/ their counterparts from other pieces of the fracture

↳ Lamellar bone deposition: hyaline cartilage + woven bone is replaced by lamellar bone \Rightarrow called **ENDOCHONDRAL OSSIFICATION**, in the form of trabecular bone

③ Remodelling Phase:

↳ Remodelling to original bone contour: substitution of the trabecular bone w/ compact bone

↳ trabecular bone is reabsorbed by osteoclasts \rightarrow forms a shallow pit aka **"Howship's lacuna"**

↳ then deposition of compact bone, in this pit

↳ closely duplicates the bone's original shape + strength

hyaline cartilage + woven bone \rightarrow lamellar bone \rightarrow trabecular bone \rightarrow compact bone

⑧ Shock:

"SNACH"

Clinical Syndrome, in which there is a systemic ~~to~~ imbalance between O_2 supply + demand
↳ charac. by ↓ in tissue perfusion, to a point at which it is inadequate to meet cellular metabolic needs

↳ life-threatening failure of the circulatory system w/ a critical ↓ in organ perfusion resulting in hypoxic + metabolic disturbances of cellular func.

↳ Different kinds of shock, depending on the 1^o cause:

① Hypovolemic shock: due to severe reduction of circulating blood volume; due to:

↳ bleeding = haemorrhagic shock - external or internal

↳ trauma = traumatic shock - bleeding combined w/ exudation into the contused tissue, toxic effects of fragments of damaged tissue + pul. microembolism

↳ burns - loss of plasma through burned skin surface + into the interstitium.

↳ dehydration - loss of water & electrolytes due to diarrhoea, vomiting; exudation into peritoneal cavity + interstitium in peritonitis or in ileus

↳ charac. by ↓ in circulatory volume → hypotension

↓ central venous pressure + CO

↳ compensatory tachycardia w/ periph. vasoconstriction

↳ signs + symp. vary acc. to magnitude of fluid loss:

① Mild shock: loss of 10-20% of circ. vol

manifested by poor perfusion of non-vital organs = skin, muscle, fat, bone

patient is pale + has tachycardia; cool + moist skin
normal BP + conc. urine

② Moderate shock: loss of 20-40% of blood vol.

charac. by preservation of remaining b. flow. to organs (heart + brain) at the expense of other ones (kidney + liver, intestines + lungs)

↓ BP to abt 100-80 mmHg

pulse rate 100-120/min

oliguria

patient perspires, is pale, restless + anxious.

③ Severe: loss of $>40\%$ of the circulating volume \Rightarrow inadequate perfusion of the heart + brain

\hookrightarrow BP drops <80 mmHg, pulse is feeble + very rapid

anhylinia + signs of HI may appear

oliguria \rightarrow anuria

restlessness + agitation \rightarrow stupor + coma

② Cardiogenic shock: caused by 1^o failure of the heart to pump efficiently due to MI, pul. embolism, compression of the heart or venae cavae in cardiac tamponade, pneumothorax, elevated diaphragm etc

③ Neurogenic shock: by pathological vasodilation, ^{+ hypotension} esp. in the splanchnic region + in the muscles due to stimulation of the parasymp. NS, e.g. in spinal cord trauma
lowest form of shock!

④ Anaphylactic shock: caused by a severe allergic reaction to drugs, vaccines, insect bites, snake venom + other allergens.

\hookrightarrow release of histamine \rightarrow widespread vasodil \rightarrow hypotension + $\uparrow\uparrow$ capillary permeability

⑤ Septic shock: caused by bacterial toxins \rightarrow vasodil

\hookrightarrow in patients w/ peritonitis, infec of the urinary/biliary system, burns, septic abortion, infected central or periph venous cannulas or from other infectious foci

\hookrightarrow Gram bac: Escheria, Proteus, Pseudomonas, Klebsiella, Clostridium

\hookrightarrow patient is weak, has fever w/ chills, oliguria or anuria

tachycardia + hypotension but the skin is ^{dry +} warm \Rightarrow due to vasodil + open A-V shunts; called "WARM SHOCK"

leukocytosis + thrombocytopenia

respiratory alkalosis

\hookrightarrow if DIC develops, the patient bleeds from surgical wounds, puncture sites, from the nose + around the catheters + cannulas

Treatment:

Hypovolemic shock: open airways, control of bleeding + securing a reliable venous access

↳ oxygen delivery by mask or nasal prongs

↳ infusion therapy - crystalloid solutions (Ringer's lactate 2-3L)

- then colloids (HES, Dextran) can be used

↳ all drugs must be given intravenously, CO₂ absorption from GIT, subcutaneous tissue or muscle is impaired

↳ pain - controlled by opiates (pentazocine)

↳ hypotension ⇒ vasoactive drugs - catecholamines (↓ periph vascular resistance)

↳ dopamine = 10-30-60 mg/hr - ↑ myocardial activity

contractility without periph vasoconstriction + to improve renal perfusion ∴ ↑

diureis

Septic shock: infusion of crystalloids

catecholamines

Small doses of heparin (300-600 units/hr) ⇒ prophylaxis of DIC

admin. of abx (cephalosporins, aminoglycosides) + elim. of the infec. source

⑨ Putrid Infection

↳ mixed infc. w/ G-rods, microaerophilic strept, staphy + anaerobes (peptococci, pepto streptococci) → severe necrotising infc w/ thrombosis of vessels → dark grey/black tissue necrosis.

↳ Gangrene = complication of necrosis, charac. by decay of body tissues → become black + malodorous.

↳ caused by infc or ischaemia (*C. perfringens* or thrombosis)

↳ usually assoc. w/ diabetes & long-term smoking

Fournier's gangrene: affects the scrotum & perineum

↳ source, basal skin infc in the perineal region or peri-anal infc.

↳ diabetes = common pre-condition

↳ general symp. of sepsis are present ⇒ treat this & atb are compulsory!

↳ whole scrotum (often perineum as well) is affected but testicles are spared!

↳ remove necrotic skin, bare testicles are buried under unaffected skin of the thighs or hypogastrum before plastic surgery reconstruction is possible

↳ perineal gangrene ⇒ needs a diverting colostomy

Welch's synergistic gangrene: chronic progressive skin necrosis caused by the synergistic action of aerobic haemolytic *S. aureus* & microaerophilic non-haemolytic strept.

↳ entry point = banal puncture wound or sutures in a surgical wound

↳ purplish central area gradually becoming necrotic + ulcerated, surrounded by pale red cellulitis

↳ lesion slowly enlarges + very painful

↳ radical excision, atb therapy w/ penicillin + delayed skin grafting

Types of gangrene:

↳ Dry: due to ischaemia (arteriosclerosis), toes + feet of elderly; diabetes

↳ Wet: in ~~the~~ naturally moist tissue + organs ⇒ mouth, bowel, lungs, cervix + vulva

↳ incl. bedsores (on sacrum, buttocks + heels); saprogenic microorgs. (*Bac. perfringens*)
(↳ causing putrefaction)

↳ due to blockage of venous &/or arterial blood flow

↳ Gas: bac infc that produces gas within tissues.

↳ deadly form by *C. perfringens*; infc spreads rapidly

↳ found in the soil; prod. bac. exotoxin

↳ causes necrosis, gas prod + sepsis

↳ rapid progression to toxemia + shock

① Surgical oncology

↳ Most tumours, except haematologic malignancies, can be surgically treated

↳ Benign tumours: grow slowly

localised but can cause severe symp by impingement on imp. organs
some are prone to recurrence (e.g. phyllloid tumour of the breast)

↳ Malignant tumours: more dangerous!

grow invasively

form metastases + recurrences are common

leading cause of death, after CVS disease (adults) + trauma (children)

↳ 1° prophylaxis ⇒ directed at environmental factors

+ health education of the general population

↳ 2° prophylaxis ⇒ tries to eliminate precancerous lesions + detect early stages of tumour growth

↳ 3° prophylaxis ⇒ early detection of recurrences or metastases after successful treatment of the 1° tumour

- uses tumour markers i.e. enzymes ⇒ α -fetoprotein in liver tumours etc

↳ early stages of malign. tumours = asymptomatic

↳ symptomatic tumours = quite advanced!!

↳ Paraneoplastic syndrome ⇒ disease/symptom that is the consequence of the presence of cancer in the body, but not due to the local presence of cancer cells.

↳ accompanies ~ 5% of tumours

↳ 4 main categories: endocrine, neurological, mucocutaneous + haematological

Assessment of malignant tumours:

① Localisation, size, invasion to adjacent tissues or organs: physical exam, X-ray, CT

MRI + US, Endoscopy, laparoscopy, thoracoscopy

② Metastases: lymphogenic: firstly affects the regional LN, blocks them + then remote nodes are affected

haematogenous: in the GIT → Liver via portal vein

systemic circulation → lungs, brain, liver, adrenals,

bone + less freq. other organs (skin)

+ gynaecological
GIT tumours → metastasise + form implantation on the peritoneum

Lung tumours → pleura

③ Histological type: done via biopsy - pre or peri-operative

↳ typing of the tumour: SARCOMA ⇒ fm mesenchyme (muscle, bone, tendon, cartilage, fat, vessels, lymphoid + c.t.)

CARCINOMA ⇒ epithelial origin

↳ adenocarcinoma (glandular)

↳ sq. carcinoma (epidermoid)

↳ transitional/undiff. carcinomas

TERATOMA ⇒ mixed + derived fm >1 embryonic germ cell layer

④ Biological activity, i.e. grade of malignancy:

G1 - highly diff, low malig

G2 - medium diff, medium malig

G3 - poorly " or dedifferentiated, high malig

Gx - impossible to classify the differentiation

TNM classification: size, local spreading + presence of metastases:

T = Tumour

T₀ = primary tumour not found

T_{is} = pre-invasive, in situ tumour

T₁, T₂, T₃, T₄ = size of tumour; differs in diff. organs, e.g. breast cancer:

T₁ = < 2cm Ø, T₂ = 2-5cm, T₃ = > 5cm Ø, T₄ = invading skin/chest wall

T_x = extent of 1° tumour cannot be assessed.

N = LN

N₀ = no palpable LN

N₁, N₂, N₃ = different extension of regional LN involvement

N₄ = involvement in juxtaregional LN

N_x = regional LN cannot be assessed

M = metastases

M₀ = no distant metastases found

M₁ = distant metastases confirmed

M_x = " " cannot be assessed

Staging is based on TNM + varies for all organs.

Colonic Cancer - use Duke Classification as well

A = localised in the mucosa

B = invasion of muscularis mucosae

C = metastases in regional LN

D = distant metastases

Therapy of malign. tumours:

↳ planned as a team: surgeon, oncologist + anaesthesiologist

↳ depends on tumour grading, staging, typing

↳ Choices: ① surgery: main mode for solid tumours

↳ radical operation = removes all of the tumour + regional LN

↳ palliative " = doesn't remove the tumour but improves

the patient's wellbeing.

↳ must have regular check ups after operations

↳ cured only after a 5 year tumour-free interval; breast cancer = 10 yrs

② Chemotherapy: anti-tumour therapy

↳ should have specific toxicity against ~~these~~ tumour cells but not against normal cells => not been found yet

↳ best results in haematologic malignancies, but also useful in solid organ tumours.

↳ presently used chemo agents:

① Hormones: ① glucocorticoids - breast + prostate tumours

② oestrogens - postmenopausal women w/ breast cancer, prostate can

③ androgens - pre-menopausal " " " "

④ anti-oestrogen - (Tamoxifen) => postmenopausal breast cancer w/ +ve

oestrogen receptors

② Alkylators: against proliferating + non-proliferating cells

↳ effect is not as selective as hormones in hormonally dependent tumours

∴ norm. cells also affected

↳ Cyclophosphamide - treatment of lymphoma, neuroblastoma, ovarian, breast + lung cancer

③ Nitrosourea: carmustine + lomustine act simultaneously as alkylating agents => brain tumours

↳ streptozocine => insulinoma

④ Anti-metabolites: have a structure similar to substances normally used by the cells but interfere w/ the synthesis of nucleic acids & stop cell prolif.

↳ Methotrexate: choriocarcinoma treatment; orofacial cancer + tumours of the breast, testicle, lung + brain.

⑤ Cytotoxic abx: doxorubicin → breast cancer

⑥ Plant alkaloids: Taxol → ovarian, breast + lung cancer

⑦ Miscellaneous: cisplatin → testicular, u. bladder, ovarian + oesophageal cancer

Side effects of chemo: vomiting, diarrhoea, alopecia ⇒ common

anaphylactic reactions, stomatitis + dermatitis, hepatic, renal, CNS or haematologic toxicity can be severe

↳ ↑ Efficacy + ↓ toxicity = 3-5 chemotherapeutic agents are used (combined) & delivered in cycles

↳ targeted to the tumour: intra-arterial infusion: hepatic a. or portal vein → hepatic metastases

③ Radiation: Low linear energy transfer (LET) X-rays, γ-rays, electrons, β-rays; others ⇒ neutrons, protons, α-particles + ions of heavy metals ⇒ high LET

↳ Brachytherapy: source of radiation: close to the tumour, inside the tumour, interstitially or intracavitally, in form of needles, wires, small tubes or granules

↳ Teletherapy: source of radiation = outside the body

↳ unit for absorption dose = 1 Gray (Gy) = 1 joule per 1kg of tissue = 100 rad

↳ lethal dose for tumours ⇒ 40-70 Gy

↳ radiotherapy can be used on its own, for radiosensitive tumours (lymphoma), in patients unfit for surgery or in combination w/ chemo.

↳ usually follows surgery though!

④ Immunotherapy: improving the native endogenous anti-tumour immunological defence system

↳ not as good as expected

↳ non-specific immunotherapy, stimulating the immune system = more efficient

① Medical examination of the abdomen:

"Acute" abdomen \Rightarrow sudden, severe ab. pain that is < 24 hours in duration
 \hookrightarrow medical history should always incl. info on eating habits + last meal consumed

\hookrightarrow also: loss/gain of weight

anorexia, nausea

vomiting (freq., amount, appearance)

passage + time of flatus (gas)

shit (freq. of bowel movement, colour)

micturition (urination)

females \Rightarrow regularity of menses + date of last menses

\hookrightarrow 5 Steps:

① Inspection: relationship of ab. wall to thoracic wall \Rightarrow same, above or below the level (preg, obesity, intestinal distention, intra-ab mass, fluid.)
resp. movements of the ab. wall

presence of scars after prev. op. or trauma

protusions at common sites of ext. hernias \Rightarrow umbilical, inguinal, femoral, + lumbar regions

contracted \Rightarrow scaphoid ab \Rightarrow sign of diffuse peritonitis (unless due to cachexia)

② Auscultation: norm \Rightarrow scattered sounds of norm. peristalsis

diarrhoea \Rightarrow short, freq. sounds

intestinal obstruction \Rightarrow long, intensive sounds of a metallic character

peritonitis or ileus \Rightarrow complete absence of peristalsis

aortic murmur \Rightarrow stenosis of the aorta or its branches (celiac, renal, mesent. aneurysm)

③ Percussion: normally \Rightarrow tympanitic sounds of diff. height

high tympany over entire ab \Rightarrow intestinal distention or presence of free air due to perforation of a hollow organ

dull percussion sound \Rightarrow over an ab. mass / over fluid

ascites \Rightarrow "shifting dullness" = border of dullness changes w/ the patient's position

peritoneal irritation \Rightarrow painful percussion

④ Palpation: FIRST! gentle, superf. palpation \Rightarrow w/ a flat hand

\hookrightarrow assesses the tone of the ab wall + presence of spasm

spasm \Rightarrow due to peritoneal inflam ("guarding / defense musculaire") \Rightarrow felt over

the entire ab in diffuse peritonitis

localised in reg. right iliac fossa \rightarrow acute appendicitis

SECOND! deep palpation using fingertips!

- ↳ assesses the presence of a mass + its character - localisation, size, demarcation, ^{surface + mobility}
- ↳ " of tenderness - most accurate w/ 1 fingertip
- ↳ pain maybe elicited by pressure + decompression => BLUMBERG'S SIGN =>

indicates peritoneal inflam.

⑤ Rectal examination: supine patient; gloved, well lubricated finger -> rectum

↳ spastic sphincter => fissure or inflam in the anorectal region

↳ relaxed " => ^{w/} old age, advanced peritonitis + neurological disorders

↳ evaluate content of the rectal ampulla => empty; filled w/ soft or hard stool

↳ Males => prostate palpation => size, consistency + tenderness

↳ Females => uterine cervix " => " " + "

↳ Rectal polyps / tumour can be found

↳ Exam. of Douglas' pouch => assesses its tenderness + prominence, if there is accum. of exudate or blood.

↳ remnants of the rectal content on the glove are examined => blood, mucus +

record colour of faeces: norm = brown

acholic = light yellow / whitish grey

melena = black (GIT haemorrhage; black => oxidation of Fe in Hb)...

Other ab exams => gastroduodenal + colorectal endoscopy

X-ray, US, CT + laparoscopy

Peritoneal signs: diagnosis of peritonitis!

- 1) Blumberg's sign: ab wall is slowly compressed + then rapidly released; presence of pain = ^{the} _{sign}
- 2) Rovsing's sign: palpation of the lower left quadrant => pain in the Right Lower Quadrant = +ve
↳ appendicitis
- 3) Plemer's sign: percussion of the ab. & pain is in the affected area
- 4) Je lance sign: contraction of ab. wall muscles in case of peritonitis

(12) Wound healing

- ↳ 3 basic types: ① 1°, 1st intention, per primam (p.p.)
- ② 2°, 2nd " " secundam (p.s.)
- ③ 3°, per tertiam (p.t.)

1° healing: ideal healing of clean, surgically well managed wounds

- ↳ 2 main phases: ① inflammatory phase
- ② restorative, cellular or anabolic phase

inflamm phase charac by coag & inflam.

- ↳ lumina of the severed vessels are occluded by thrombi
- ↳ thrombin, activated platelets + fibrin → attack + activate macros
- ↳ cytokines are released from the injured cells
- ↳ serotonin, histamine & kinin release → vasoconstriction (helps w/ haemostasis) then vasodil
- w/ ↑ exudation of plasma + leukocytes into the interstitial spaces
- ↳ leukocytes are activated by cytokines (IL-1, IL-2, IL-6) + TGF
- ↳ phagocytosis removes damaged cells + invading bacteria
- ↳ locally invading cells (macro + microphages) have a high metabolic demand → local energy crisis w/ ↓ pO₂
- & ↑ pCO₂ + lactate → TISSUE ACIDOSIS

restorative phase: neovascularity - angiogenesis from new capillary buds - forms new vascular network + reconnects the old one

- ↳ fibroblasts appear → large cells, from local mesenchyme cells (adventitia + muscular layers of vessels that prod. collagen)
- ↳ appear on the 2nd-3rd day; prod ↑ for 3-5 weeks + then slowly stops
- ↳ wound is filled w/ collagen - first haphazardly, then partly reabsorbed, partly remodelled + tightened + organised acc. to press + tension forces acting on the wound (their tensile strength ↑)
- ↳ epithelialisation of the wound surface ~ 2 days
- ↳ tensile strength ↑↑ for 3 weeks rapidly
- ↳ 4 months slowly
- ↳ very slow remodelling can take upto 1 year!
- ↳ perfect healing ⇒ scar tensile strength = ~80% of norm. skin & ↓ elasticity

2° healing: when the edges of the wound are not adapted together.


- ↳ similar processes to 1° healing, but defect is filled w/ granulation tissue \Rightarrow fibroblasts, macrophages, newly formed collagen + capillaries; Tink
- ↳ epithelisation from the edges of the skin cover this up.
- ↳ resulting scar wide, but smaller than original wound \Rightarrow since contraction occurs.
- ↳ contraction: beneficial in some areas & limiting in others, since it can limit movements
- ↳ in some large, slowly healing wounds, epithelisation may never be complete + a chronic ulcer w/ a tendency to malignant degeneration may persist.

3° healing: occurs in wounds that started to heal by 2° healing but after a few days the edges were approximated by a delayed 1° or 2° suture.

Healing can be slowed down by:

- 1) impaired perfusion + oxygenation
- 2) malnutrition (prot. deficiency, vit C, A, magnesium deficiency)
- 3) steroids, immunosuppression
- 4) diabetes (influence of macro- & microangiopathy, neuropathy, insulin deficiency)
- 5) old age
- 6) infection

Complications:

- 1) maybe slow but otherwise normal
- 2) imperfect resulting in an atrophic scar or a skin ulcer
- 3) non-union of c.t. + insufficiency of an anastomosis
- 4) xs. prod. of gran. tissue, leads to overgrowth above the niveau of the surrounding skin w/ impaired epithelisation \Rightarrow CARO LUXURIANS 
- 5) dev. of a keloid scar \Rightarrow hypertrophic, reddish-brown scar; cosmetically unpleasant + may itch excessively

(13) Panaritium

- ↳ pyogenic infections of the fingers
- ↳ diff forms & most commonly the consequence of small puncture or cut wounds contaminated by staphy; less freq. by strep or other bacteria
- ↳ maybe superficial → erythema or phlyctena (small blister)
- deep ⇒ underneath the skin
- ↳ special form = collar-button abscess ⇒ smaller portion above the skin but a larger portion below, requiring incision

↳ Types:

① Paronychia: very common & superf.

↳ inflam. of the soft tissue surrounding the fingernail

↳ easily spreads under the nail & a subungual abscess develops ⇒ needs partial removal of the nail

② Eponychium: superf. inflam of the cuticle around the nail

↳ due to minor trauma or improper manicure

↳ just cut off this superf. abscess ∴

③ Pulpous panaritium (felon): inflam of the ^(palm side) volar part of the fingertip

↳ richly supplied by Ns + b. vessels & covered by relatively thick skin

↳ there are radially arranged fibrous septae ∴ infec. develops in a relatively closed ^{space}

↳ exudation into the tissue → severe pain, ↑ w/ every pulse ("pulsating pain")

↳ unbearable, esp. at night

↳ infec. can spread to deeper tissues - bone or joint

↳ maybe small on the surface ∴ best is early ^(lateral incision) incision, to avoid progression into the bone joint or tendon.

④ Bone panaritium (osteomyelitis of the fingertip):

↳ develops from an improperly treated felon

↳ swelling + secretion of pus persists

↳ bone destruction can be seen on X-ray, but appears late (10-14 days)

↳ wide incisions, evacuation of pus + necrotic tissues, drainage, prolonged immobilisation in a plaster cast + appropriate antibiotic treatment can save the finger

↳ many cases amputation necessary

⑤ Joint panaritium (arthritis):

↳ due to extension of a felon or a consequence of an open trauma

↳ finger is swollen, painful + tenderness on pressure or traction in the axis of the finger

↳ joint must be opened, drained & immobilised

↳ atb treatment!

↳ loss of func = common consequence

⑥ Tendinous paronychia (purulent tenosynovitis):

(felon)

↳ consequence of the spread of a pulpous paronychia or of an open injury to the tendon sheath

↳ swollen finger; semiflexed position

↳ dorsal extension = extremely painful

↳ drainage, systemic atb + lavage of the tendon sheath w/ atb = treat the infec.

↳ loss of func.

Palmar spaces of the hand can be affected:

↳ infected by direct trauma or by extension of the inflam. of the fingers

↳ synovial sheaths of the thumb + little finger continue into the palm → infec. leads to the involvement of thenar + hypothenar spaces

↳ fm the tendon sheath of the 5th finger → this tendon enfolds tendons going to the 2nd-4th fingers ∴ middle palmar space can become infected

↳ infec. fm the sheath of the 5th finger → thumb + vice versa (⇒ V-phlegmone)

↳ prox. the infec can reach Parona's space = between pronator quadratus muscle + tendons of the deep flexor of the fingers

↳ treated by: incisions (sparing Ns + b. vessels), ^{+ tendons} drainage, immobilisation + atb + surgical procedure

(14) Blood transfusions

↳ Typing = grouping

↳ Crossmatching = selecting the blood of the same ABO & Rh groups, mixing ("reacting") the donor cells w/ recipient serum + recipient cells w/ donor serum both in saline + w/ the addition of albumin

↳ Coomb's test = indirect antiglobulin test done at 37°C

↳ in urgent situations, O⁻ blood ("universal donor") can be used without crossmatching

Indications:

- ① replacement of blood vol (only in severe bleeding w/ rapid loss > 1000-1500 ml blood)
- ② correction of anaemia (if low Hb levels endanger inadequate tissue oxygenation)
- ③ " " haemocoagulation disorders

Donors:

① Autologous: patient is his/her own donor

↳ performed as:

① postural - in emergencies, by elevation + compression bandage of l. extremities

② pre-operative donation, weeks before op - RBCs regenerate; 2-4 units of blood can b.

withdrawn, prepared + stored, until needed.

③ Immediately before an op - in patients w/ a ↑↑ haematocrit

↳ 1-2 units of blood can be drawn + replaced by normal saline ⇒ **ISOVOLEMIC**

HAEMONILUTION

④ during op - blood fm the op site is ^{sucked up,} filtered + returned to the patient ⇒

BLOOD RECOVERY

② Allogeneous transfusion: from voluntary donors,

↳ carefully screened for transferrable diseases, HIV, hepatitis, syphilis, malaria...

Speed of transfusion:

- ↳ Normal rate of transfusion 80-100 drops/min \rightarrow 500ml in abt 1.5-2 hours
- ↳ severe + rapid bleeding \rightarrow faster transfusion rate
- ↳ large bore cannulas + pressure can be \uparrow by applying an inflatable cuff around the bag containing the blood
- ↳ must measure Central Venous Pressure (CVP) to prevent circulation overload
- ↳ Massive transfusion: rapid transfusion of an amount equal to or $>>$ than the patient's own blood vol, i.e. ≥ 10 units in an adult
 - ↳ Risks: ① stored blood = more acidic, loss of 2,3-DPG (diphosphoglycerate) = $\uparrow\uparrow$ affinity of Hb to O_2 \rightarrow impaired Hb delivery to tissues
 - ② stored blood = cold + can lower core body temp \Rightarrow arrhythmia or asystole
 - ③ Loss of platelets + coagulation factors \Rightarrow bleeding disorders or DIC
 - ④ Aggregates of destroyed platelets, cellular fragments & prot⁻ ppts \rightarrow pul. microembolisation + contribute to the dev. of ARDS

Safety:

- ① Blood should be warmed in a special heater + dactron filters should be used
- ② If > 1 unit in 5 min, then 10ml of calcium gluconate is applied in a diff vein for every 2 units of blood \Rightarrow prevent citrate toxicity
- ③ After every 5 units, 1 unit of fresh frozen plasma should be given
- ④ after 10 units - platelet count, fibrinogen + (A)PTT should be checked
 \downarrow
partial thromboplastin time

Complications:

Non-specific: phlebitis, circulatory overload + air embolism \Rightarrow due to IV delivery of any fluid/sol in large amounts

Early specific: ① haemolytic reaction: most dangerous complication; incompatible blood or in patients isoimmunised by prev. transfusions or pregnancy.

- ↳ 1 in 20,000 transfusions
- ↳ symp.: fever, chills, headaches, pain in ^{the} back, ab. pain, diarrhoea, hypotension, oliguria w/ haemoglobinuria + finally kidney failure + anaemia
- ↳ lethality 6-20%; die in circulatory collapse

↳ first symp → STOP TRANSFUSION.

↳ infusion of electrolytes + mannitol may prevent renal failure

② Pyretic reaction: more common

↳ responsible for 60% of complications

↳ weak incompatibility by antibodies against the donor's leukocytes

↳ other causes: cellular / chemical pyrogens in stored blood

↳ anti-pyretics

③ Allergic reaction: 30% of complications

↳ moderate w/ skin rash, urticaria, pruritus

↳ sometimes - bronchospasms

↳ rarely - allergic shock

↳ anti-histamines, corticosteroids or epinephrine needs to be administered ⇒

depends on severity of symp.

④ Other reactions: Rare + serious! = hyperkalemia or jaundice (large amounts of older blood)

Late specific complications:

↳ infection by hepatitis (hepc) or HIV ⇒ MOST IMP!

↳ less serious ⇒ infec by CMV or EBV

↳ precautions against transfusion of sypilis or malaria

⑮ Operating room team & discipline

↳ consists of: ① Surgeon

② Anaesthesiologist

③ Operating room (OR) nurse

↳ if it is a teaching hospital => interns, residents + nursing students

Surgeon: performs the operation
leads the surgical team

Anaesthesiologist: directly + indirectly involved in all 3 stages of surgery
(preoperative, operative & postoperative)
↳ focus on pain management + patient safety

Operating nurse: comprehensive care, assistance + pain management during
each phase

↳ team member that provides the most continuity between the stages of care

↳ general assistant to the surgeon during the operating phase

(16) Medical examination of the knee

↳ several parts:

① Inspection: ① while standing:

- Baker's cyst \Rightarrow popliteal cyst
- (Knock-knees) - Valgus deformity \Rightarrow outward angulation of the distal segment of a bone
- (bowlegged) - Varus " \Rightarrow inward " " " " " " "
- Gait - antalgic gait? (pattern of movement of the limbs)
- genu recurvatum \Rightarrow hyperextension of the knee

② while supine: look for

- masses
- scars
- lesions
- signs of trauma / prev. surgery
- swelling (oedema) \Rightarrow esp in the medial fossa
- erythema (redness)
- muscle bulk + symmetry (esp. atrophy of the med. aspect of the quadriceps: vastus medialis)
- displacement of the patella

② Palpation: 5 signs of inflam \Rightarrow tumor, ruber, calor, dolor + loss of func

① Temperature: use back of hand - feel the temp. below, over & above the patella

- ↳ should be slightly cooler on the patella, relative to above + below
- ↳ compare both knees

② Joint line tenderness - flexing^(bending) the knee + palpating the joint line w/ the thumb

③ Effusion, test for:

① patellar tap - for larger effusions

② Ballotement - defined as a palpatory technique for detecting/exam. a floating object in the body

③ Bulge sign - for smaller effusions

③ Movement: should be able to move it 0° - 135°

↳ examination of crepitus & clicking of the joint w/ motion

Ligament tests:

Ant drawer sign: tests the Ant. cruciate lig (ACL) - flex the knee + observe for the lat side. hands behind prox. tibia + thumbs under patella * pull fwd

Post. " " : " " Post " "

Lachman test

Med + Lat. collateral lig.: flex knee to 15° + stress knee to opp. sides (push the knee left + right)

Meniscus test:

° McMurray test: medial meniscus is tested by external rotation + lateral force (Med)
lat " " internal " + medial "

Reflex hammer test: for deep tendon reflexes

(but part of neurological physical exam - abnorm in CNS or PNS)

①7 Puncture of abdominal cavity

↳ Paracentesis: surgical procedure during which fluid from the ab. is removed through a needle => abdominocentesis

↳ Purpose: ① remove fluid out of the abdomen => ① to analyse it
(ascites => accum. of fluid in the ab) ② to relieve pressure

↳ slowly removed => rapid removal of large amounts of fluid => sudden BP drop

↳ circulation given time to adapt - just leave a tube there

↳ Peritonitis: caused by: ① Liver disease - cirrhosis

② Infection - gall bladder, stomach, any part of the intestine

+ appendix - cause peritonitis when they leak or rupture

↳ also TB peritonitis

③ Inflams - pancreatitis -> sterile peritonitis (no fee bac. in it)

④ Cancer - esp. Meigs' syndrome (tumour of the ovary that leaks)

⑤ Kidney Disease + nephrosis & nephrotic syndrome

⑥ Heart Failure - firstly liver affected & then other organs

↳ Description: special needles are used - careful not to hit internal organs.

↳ fluid for analysis = < 200ml removed

↳ pressure relief = lots removed + slowly

↳ Aftercare: adhesive bandage + single stitch close to the insertion site

Similar procedure:

culdocentesis: removes ascitic fluid from the very bottom of the ab. cavity, through the back of the vagina

↳ used to diagnose female genital disorders, e.g. ectopic pregnancy -> may bleed or exudate fluid into the peritoneal space.

⑪ Medical examination of the joints:

Inspection: shape of the joint, its surrounding structures, skin above the joint & the mobility of the joint

↳ Swelling

↳ Deformity - pathologic position or configuration of the articulating bones

① Deviation ↳ knock-kneed \Rightarrow valgus deformity
↳ bowlegged \Rightarrow varus "

② Derangement \Rightarrow bony facets articulate but the axes of the articulating bones don't cross ⁱⁿ the functional centre of gravity of the joint

③ Subluxation \Rightarrow partial dislocation

④ Luxation \Rightarrow dislocation

↳ knots (nodes) maybe found in the vicinity of articulations or at some distance

↳ various size + consistencies; most common in rheumatoid arthritis

↳ Baker's cysts \Rightarrow popliteal cysts; more common in women

Palpation: skin colour, temperature (same on both sides)

Mobility: of the joint; causes of \downarrow mobility = pain (usual cause)

Auscultation: ^{during movements} ① crackles - insignificant

② crepitus - prod. by sliding motions of tendons in the joint area

③ creaks - sign of disease. "Hard" creaks - loss of cartilage (= osteoarthritis)

↳ "Soft" creaks - presence of gran. tissue in inflam. processes. (= pannus) ^{in arthritis}

Test muscle strength as well !!

(look at exam. of the knee)

⑭ Postoperative complications wound infections

Postoperative complication: any untoward event occurring within 30 days of surgery.

- ↳ signalled by dev. of fever, tachycardia, tachypnoea or hypotension
- ↳ maybe caused by faulty surgical technique or insuff. post-op. ~~care~~ preparation or by ineffective post-op. care or nosocomial infection
- ↳ but usually due to poor health state of the patient \Rightarrow age, malnutrition + accompanying diseases

wound complications:

Seroma, hematoma, infection, dehiscence (bursting open of a surgically closed wound)

① Seroma: accum. of clear, yellow or slightly pinkish fluid (transudate), when the closure of a wound is imperfect & some dead space remains

↳ slightly elevated & tender

!! ↳ Infection of the seroma!! \therefore evacuated by removing ≥ 1 stitches or wound (tearing apart) division w/ a probe

② Haematoma: consequence of imperfect hemostasis or impaired haemocoagulation

↳ larger ones should be evacuated - danger of infec.

③ Abscess: localised collection of pus in the body tissues, often accompanied by swelling + inflam + freq. caused by bacteria. Has it's own boundary.

↳ due to (exogenous) endogenous infec at the time of surgery

↳ bac need time to reproduce \therefore inflam seen after 3-5 days

↳ indicated by fever, reddening of the wound that is swollen + tender

↳ best is wide opening of the wound (removing all stitches) + drainage

④ Wound disruption: complete (if all layers of the wound break apart) OR partial - superf = skin + subcutaneous, deep = muscular layer, while the skin closure holds

↳ complete \rightarrow organ protrusion, prolaps + evisceration (protruding through an opening)

↳ partial \rightarrow post-op. hernia, intestinal obs. due to bowel adhesions or strangulation of the bowel

↳ causes of disruption:

Impaired healing - most common cause; in patients w/ hypoalbuminaemia, vit deficiencies

↳ in patients w/ malignancies; obese / cachectic patients

② Faulty surgical technique - less common cause

↳ slipped knots, too tight tying so that tissue between the stitches necrotises
or too thin / fragile suture material

③ Infection of the wound

④ Mechanical stress - coughing, sneezing, slipping on the floor

↳ manifestations in an already imminent disruption

Treatment: re-suture

↳ patients in poor condition &/or w/ wound infec \Rightarrow disruption without bowel obstruction can be treated conservatively by moist dressing; postpone the re-suture.

②0 Burns

↳ most devastating injuries - due to the magnitude of ^{the} pathophys. body responses

↳ factors influencing the severity of burns:

- ① Depth of injury \Rightarrow 1st, 2nd, 3rd degree (+ 4th degree)
- ② SA affected \Rightarrow size of the burn
- ③ Age & prior state of health of the victim
- ④ Location of the burn wound
- ⑤ Severity of associated injuries - if any.

① Depth: 1st degree burn: only the epidermis

↳ sunlight overexposure, brief scalding by steam or a brief exposure to heat or flame

↳ erythema, pain; minimal skin oedema & rare systemic effects

↳ protective func. of the skin remain intact

↳ pain resolves in 2-3 days; damaged epi peels off in 5-10 days w/ NO residual scarring

2nd degree burn: epidermis + part of the dermis

(IIA) ↳ Superf. 2nd degree \Rightarrow most of the dermis is preserved

(IIB) ↳ deep 2nd degree \Rightarrow only deep sweat glands + hair follicles remain intact

↳ infec. can destroy remaining epi \Rightarrow full thickness - loss of skin similar to 3rd degree burns.

↳ Superf: erythematous, painful, blisters, blanch to touch

↳ spontaneously re-epithelialise 10-14 days w/ minimal scarring; skin discoloration

↳ Deep: more pale, don't blanch to touch, painful to pinprick

↳ re-epithelialises in 14-35 days - fragile epithelial covering + dense scarin

↳ skin grafting is necessary.

3rd degree burn: full thickness through the epidermis + dermis; often to the subcutane or deeper tissues

↳ skin = tough, leather like, brown, tan, black or white / black scab (eschar)

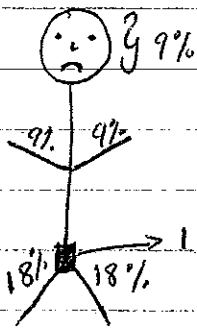
↳ painless - since pain receptors are destroyed

- ↳ no epidermal or dermal appendages
- ↳ re-epithelialisation from the wound edges
- ↳ excision w/ skin grafting needed
- ↳ severe systemic reaction

4th degree burns: involves other organs beneath the skin - muscle, bone, brain

② Size: estimated in % of the total body surface area (TBSA)

↳ "Rule of 9" ⇒ ADULTS ONLY!



FRONT: 18%

BACK: 18%

PALM: 1% - useful for assessment of small-sized burns

CHILDREN: head = 19% Head + neck = 21%

↳ extremities = 13%

③ Age: any/all types of burns ⇒ < 2 yrs & > 60 yrs = high mortality

↳ associated conditions - CVS disease, diabetes, COPD ⇒ worsen prognosis

④ Location: because of different thickness of the skin (e.g. face vs back) & cosmetic + func. consequences

↳ any burn size on the face, hands, feet, perineum + airway = SERIOUS!

Face, feet, hands, perineum, any inhalation injury, electrical injury or burns complicated w/ other trauma & poor risk patients (age or disease assoc.) ⇒ MAJOR BURN INJURY

Systemic Reaction:

① ↑↑ vascular permeability + oedema

② Immunosuppression: plasma [IgA, IgM, IgG & complement] ↓, impaired func of B+T-lymphs

↳ ↑ risk of infec!

③ ↓ renal b. flow → ARF

- ④ Altered haemodynamics: loss of plasma vol, ↑ periph vascular resistance, ↓ CO
- ⑤ Hypermetabolism: ↑ energy expenditure, proteolysis, lipolysis; release of catabolic hormones - catecholamines
- ⑥ ↑ gut mucosal permeability

↳ Main feature of burn injury = coagulation necrosis

↳ 3 diff zones of tissue reaction to thermal injury:

- ① Zone of coagulation w/ irreversible cellular changes + NO capillary flow
- ② Zone of stasis w/ sluggish capillary flow; reversible if treated properly
- ③ Hyperaemia zone - similar to the inflam response to injury

↳ depth of zone depends on temperature & length of exposure:

↳ $> 65^{\circ}\text{C}$ = cellular death

↳ $60^{\circ}\text{C} > 1\text{min}$ = full thickness skin loss

↳ Hypovolemia! Most imp. pathophys. consequence of any burn injury.

↳ loss of plasma through the burned skin \Rightarrow white bleeding

↳ ↑ capillary permeability - generalised in burns affecting $> 20\%$ of body surf.

↳ 5-8 hours after the injury, upto 80% of the vol can be lost!

↳ leads to: ↓ CO, ↑ blood viscosity, ↑ prod. of catecholamines, corticosteroids

angiotensin, aldosterone + ADH.

↳ signs of hypovolemic shock: tachycardia, oliguria, hypotension, anuria

Therapy: First - stop further exposure to the source of injury

② cool the burned surface w/ cold water ($17-20^{\circ}\text{C}$) \Rightarrow should influence

the zone of stasis + stop the progression of irreversible changes into the deeper layers:

↳ anaesthetic effect; should be done for 45 mins

Minor burn injuries: burnt area washed w/ sterile soap lotion or normal saline

↳ perforate blisters - DON'T remove them

↳ occlusive, compressive & non-adherent bandage is applied

↳ facial burns \Rightarrow open method treatment

↳ occlusive bandages - change every 2-3 days; completely healed = 2-3 weeks

Moderate/major burn injury: admitted to hospital

↳ adequate airway should be assessed - intubate if necessary

↳ large bore IV cannula + urinary catheter should be inserted

↳ start IV drip; burned skin is debrided + clean w/ saline

↳ cooling for 45 mins (beneficial)

↳ amount of fluid infusions \Rightarrow Brooke Army Hospital Update Formula

↳ 3-4 mL/kg/percent burned surface per 24hrs

↳ but depends on patient's response \Rightarrow urine output (0.5-1.5 mL/kg/hr,

& Central venous pressure (CVP)

↳ pain control \Rightarrow opiates or pentazocine via IV

↳ tetanus prophylaxis!

↳ if +ve bac culture result = abx treatment.

↳ 2nd degree burns (on extremities) \Rightarrow application of occlusive dressings w/ anti-microbial agents (silver sulfadiazine)

↳ changed every 12-24 hours

Open method \Rightarrow trunk + head burns

↳ cover with sulfadiazine or some other anti-microbial agent

3rd degree burns: similar treatment

↳ circular burn on the extremity/trunk \Rightarrow immediate longitudinal/zigzag

escharotomy (incision into a burn eschar in order to lessen its pull on the surrounding tissue) or escharectomy (excision of all/part of an eschar)

↳ if not done \Rightarrow \uparrow pressure under the eschar fm dev. oedema \rightarrow tourniquet effect \rightarrow extensive deep tissue necrosis

↳ cover w/ skin graft afterwards \Rightarrow split-thickness autografts used (permanent) \rightarrow in form of a "mesh graft"

↳ if eschar on the trunk \rightarrow severely limit breathing + dev. of ARDS

↳ maybe connected w/ blood loss, as the demarcation line & real extent of the injury maybe diff. to assess.

Complications of Burns:

① hypovolemic shock - avoided by proper infusion therapy

② Infection most common complication

↳ chronic septicemia / septic shock - leading cause of death

③ Gastrointestinal complications: acute gastric ulcer - severe bleeding or perforation

↳ asymptomatic acute gastric ulcers - in abt 75% of burn patients

↳ paralytic ileus may develop

④ Respiratory complications: serious!

↳ thermal injury of the airway → oedema → airway obstruction

↳ if in a closed space → intoxication: of Carbon Monoxide & serum [carboxyHb] must be checked.

Electric Burns: depends on: intensity of the current, duration + presence of additional flame burns from clothing

↳ pathophysiological changes in heart + brain

↳ ↑ resistance, the more intensive the dev. of thermic energy

↳ Nerves (→ least resistance) then blood, mus, skin, tendon, fat + bone (↑_{resi})

↳ visible area of necrosis = only small portion of the destroyed tissue

↳ skin = high resistance to electric current = mostly spared

↳ mus = major tissues through which the current flows ⇒ sustains most damage

↳ "grounded" area = foot usually

↳ b-vessels = progressive thrombosis → further tissue loss from ischaemia

Low voltage injuries ⇒ similar to thermal burns; only local damage

↳ zones of injury extend from surface → tissue

↳ most household cements

High voltage injuries ⇒ cutaneous burn at the entry + exit sites

↳ w/ hidden destruction of deep tissue

Alternating current (AC) ⇒ violent tetanic muscular contractions → dislocations + fractures

Therapy: CPR (for VF)

↳ pharmacologic treatment - disarrhythmias

↳ most injury to deep tissues - ∴ assessment of circ. to distal vascular beds ⇒

immediate excharotomy + fasciotomy maybe needed.

↳ debridement of devitalised tissues + amputation (maybe necessary)

Probs: ↳ muscle damage → myoglobin release → obstructive nephropathy

↳ vigorous hydration: NaHCO₃ (Na-bicarbonate) + mannitol infusion

↳ neurologic defects - cortical encephalopathy, hemiplegia, aphasia, B.S. dysfunc.

② Local Anaesthesia (LA)

- ↳ technique to render part of the body insensitive to pain without affecting consciousness
- ↳ also for relief of non-surgical pain
- ↳ LA can block almost every Nerve between the periph. nerve endings & the CNS
- ↳ injection of LA = pain; to ↓ the pain ⇒ buffering the solution w/ bicarb + warming

① Surface anaesthesia: LA spray/sol or cream to the skin/mucous mem.

- ↳ short lasting + limited to the area of contact

② Infiltration anaes: injection of LA to the tissues

- ↳ surface + infiltration anaes = TOPICAL ANAESTHESIA

③ Field block: subcutaneous injection of LA in an area bordering on the field to be anaesthetised

④ Periph. N. block: injec. of a LA into the vicinity of a periph N to anaesthetise its innervation area.

⑤ Plexus anaes: injection of LA in the vicinity of a N. plexus, often inside a tissue compartment. Affects all branches of the plexus

⑥ Epidural anaes: LA injected into the epidural space → acts on the Spinal Nerve roots. Depends on injection site + vol ⇒ limited areas of the abd. to large regions of the body

⑦ Spinal anaes: LA → CSF; lumbar spine → spinal N. roots + part of the S.C.
↳ from the legs → abdomen/chest

⑧ Intravenous regional anaes: (Bier's block): interrupt blood circ. of a limb, using a tourniquet; inject a large vol of LA into a periph vein; diffuses into periph Ns & nerve endings are anaesthetised.

⑨ LA of body cavities, e.g. intrapleural anaes; intra-articular anaes.

Uses: dentistry

eye surgery

ENT operations, head + neck surgery

Shoulder + arm surgery

Heart + lung surgery

Ab surgery

Gynaec + obs + urological

Bone, joint surgery of the pelvis, hip + leg

Surgery of skin + periph blood vessels

(Some are combined w/ GA!)

Risks = Cardiac Anest, allergic reactions, resp. paralysis, cramps

(partial or complete block of the AP of n. fibres)

- Short = 30-60 mins

- Middle = 60-120 mins

- Long = upto 400 mins

② Acute arterial occlusion, embolism

↳ periph. artery occlusive disease (PAOD)

↳ obstruction of large arteries in the arms & legs

↳ causes: atherosclerosis; smoking, DM, ↑BP

inflamm. processes → stenosis, embolism or thrombus formation

↳ leads to acute or chronic ischaemia (usually the legs)

↳ Divided into stages: FONTAINE STAGES:

① mild pain when walking ⇒ "claudication"

② severe pain when walking, relatively shorter distances ⇒ "intermittent claudication"

③ pain while resting ⇒ "rest pain"

④ Biological tissue loss ⇒ "gangrene"

Symptoms: 1) claudication - pain/weakness/numbness or cramping in muscles due to ↓ b. flow

2) sores, wounds/ulcers - heal slowly or not at all

3) Change in limb colour (blueness) + temp (coldness)

4) ↓ hair + nail growth on affected limb + digits

Associations: have APEXORIS or have had MI

↑ risk for stroke

Therapy: conservative measures: stop smoking, exercise

angioplasty (in large arteries, e.g. femoral)

plaque excision

bypass maybe needed

if there is gangrene ⇒ amputation (prevent septicemia)

EMBOLISM: when an embolus migrates from one part of the body & causes a blockage (occlusion) in another part

↳ Thromboembolism ⇒ if a piece (or whole) thrombus breaks loose from its location + travels to another location, causing an occlusion.

↳ diff kinds of emboli:

① thromboembolism

② cholesterol embolism - from an atherosclerotic plaque

③ Fat embolism - bone fracture or fat droplets

- ③ Air embolism - air bubbles, e.g. rupture of alveoli
- ④ Septic " - pus-containing bacteria embolism
- ⑤ Tissue " - small fragments of tissue
- ⑥ Foreign body embolism - foreign material, e.g. talc or other small objects
- ⑦ Amniotic fluid " - amniotic fluid, fetal cells, hair - enter mother's blood stream via the placental bed of the uterus + triggers ~~an~~ allergic reaction

Arterial or venous:

Arterial: part of the systemic circulation (any part of the body)

- ↳ start in the heart (LA 2° to AF)
- ↳ goes to brain → **STROKE!**
- ↳ prosthetic valves - ↑ risk of thromboembolism
- ↳ Consequences: Infarction!

Venous: a thrombus formed in a systemic vein → LUNGS! (after passing thru the ^{right heart})

- ↳ forms a pulmonary embolism (DVT in femoral veins (most common))
- ↳ Deep veins of the calf = most common site of thrombi, **NOT** emboli!

Antegrade direction: in the direction of blood flow

Retrograde " : opposite direction to blood flow ⇒ in vessels w/ low pressure (veins) or emboli of high weight

(23) Diet in Surgery

↳ nutritional demands depend on age, body weight + physical activity

↳ ↑ in pathologic stages ⇒ ↑ x1.2 in an elective operation

↑ x1.5 - peritonitis + sepsis

↑ x2.0 - extensive burns

↳ ↑ in body temp ⇒ ↑ >37°C ⇒ ↑ 0.1 - for every 1°C

↳ Basic energy requirements:

↳ Basal ⇒ 120-150 kJ/kg/day

Medium ⇒ 150-200 kJ/kg/day

High ⇒ 200-250 kJ/kg/day

Carbs: simple saccharides (glc, fructose)

disaccharides (maltose, lactose)

polysaccharides (cellulose, starch)

Fibre - can't be absorbed but needed for intestinal motility + proper digestion

Glucose ⇒ main source of energy ⇒ used by all tissues, 1^o source of energy for the BRAIN

↳ used in aerobic & anaerobic metabolism

↳ stored as glycogen in the liver + muscles ⇒ lasts for 24 hours of starving

Fat: main store of energy

transported as fatty acids (FA) bound to albumin in plasma

30-50% of non-protein calories daily

Proteins + AA: source of energy, if other sources are lacking

Essential AA: can't be made by the body

↳ their deficit ⇒ impair protein synthesis

0.8-1g/kg protein daily (↑ in children)

Vitamins: parts of co-enzymes

hypovitaminosis - lack of intake or ↑ demands

Minerals: Na^+ , K^+ , Cl^- , Ca^{2+} , Mg^{2+} \Rightarrow main ones

trace elements \Rightarrow Fe = oxygen carrier + hemopoiesis

Zn \Rightarrow protein degradation, glycolysis + part of the insulin molecule
 \hookrightarrow deficiency \Rightarrow impaired wound healing + growth of gran tissue

Cu^{2+} \Rightarrow oxidation + hemopoiesis

I \Rightarrow deficit \Rightarrow func of thyroid

deficit in trace elements: ^{occurs in \Rightarrow} impaired intestinal absorption

large losses from GIT (diarrhoea, intestinal fistula)

inadequate parenteral nutrition

Oral nutrition: 55-60% carbs + 30-35% fat \Rightarrow energy needs

protein \Rightarrow 0.8 - 1 kg / body weight / 24hrs

vitamins + trace elements + fibre \Rightarrow 20g / 24hrs

Enteral nutrition:
- gastro - nasogastric tube
- stomy - gastrostomy
- percutaneous
- jejunal - nasojejunal tube
- stomy - jejunostomy
- percutaneous

Nutritionally defined \Rightarrow amount of
carbs, max. size of their molecules,
amounts of oligo- & polypeptides,
minerals + vitamins is given

Chemically defined \Rightarrow exact composition of AA, carbs, lipids etc.

\hookrightarrow Food for nasogastric tube / gastrostomy catheter \Rightarrow body temp, free of pathogens but not sterile

\hookrightarrow contains milk, milk products, eggs (NOT raw), meat, veg, fruits, fruit juices + cereals, veg. oils (essential AAs)

\hookrightarrow total caloric intake \Rightarrow \sim 15% protein

35% lipids

200ml in 2-3 hour intervals

50% carbs

Polymeric formulae \Rightarrow obtained commercially; directly into the stomach

Elemental + oligomeric formulae \Rightarrow minimal lnc digestion + easily absorbed

Parenteral nutrition - periph. vein cannulation
- central venous catheter

(24) Antibiotics in surgery, choice of antibiotics (atb)

↳ 2 uses in surgery: ① treat established infections
② prevent post-op infection

Benzyl penicillin: cheap + safe

↳ for sensitive organisms

↳ works when penicillin fails

Metronidazole: against anaerobes - works against ^(bactericidal) most of them
drug of choice against non-clostridial anaerobic infect + amoebiasis
unknown resistance + few side effects
good for intra-ab. sepsis
intravenous metronidazole = expensive but suppositories = cheap

Chloramphenicol: cheap + broad spectrum ⇒ G⁻ ^(aerobic) bacilli & G⁺ cocci

Cephalosporins: cephradine (e.g.) - cheaply available
oral route
10% of penicillin-sensitive patients → sensitive to cephalosporins

Gentamicin: broad spectrum aminoglycoside atb
for organisms which are likely to be resistant to other atb

Tetracycline: Oxytetracycline ("Terramycin") cheapest option

Ways to give atb:

① Perioperatively: high concs. reach patient's wound at the time of surgery
↳ I.V. route w/ pre-medication
↳ 24-48 hours afterwards

② Infuse them slowly into the peritoneum after pus from peritonitis has been washed out - tetracycline = effective at preventing postop. sepsis in the peritoneum
+ in the wound in the ab. wall

Antibiotic prophylaxis indications: ① peritonitis

- ② any op. which is likely to contaminate a patient's peritoneal cavity
- ③ any op. on the urinary tract when urine is already contaminated
- ④ hysterectomy
- ⑤ Emergency Caesarean section

Contra-indications: ① already well localised infec
② hernias, ovarian cysts etc.

Prophylaxis ⇒ is a measure taken to maintain health + prevent spread of disease

Indications: heart valve surgery
dental surgery
immunosuppressed ppl
surgeries w/ a high risk of infection

② Principles of pre-operative preparation of the surgery patient

① Diagnostic workup - accurate diagnosis (via proper history), physical exam., lab tests & imaging methods; evaluated for any risk factors:

- 1) nutrition - sudden weight loss; obesity
- 2) medications - influence immunity or haemocoagulation
- 3) allergy to drugs
- 4) DM - ↑ risk by metabolic complications; impaired wound healing
- 5) Resp. diseases - COPD - may lead to postop. pulmonary complications \Rightarrow pneumonia & resp insuff.
- 6) CV diseases - IHD, ↑BP, C.V. insuff \rightarrow thromboembolism
- 7) Renal " - risk of postop. acute renal failure
- 8) Liver " - very imp for the choice of anaesthesia
- 9) Mental disorders - impair patient's co-operation

② Informing the patient: incl. diagnosis, reason for surgery, & possible risks + complications
 \hookrightarrow patient needs to sign a consent form

③ Pre-operative preparation: (if poss) correct certain metabolic abnormalities, to ↓ the risk

- 1) malnutrition - postpone non-urgent op. & improve patient's nutrition
- 2) Resp. func - stop smoking, special rehab
- 3) Cardiac " + ↑BP - medications; temporary pacemaker for arrhythmias
- 4) if ↑ risk of thromboembolism - anti-thrombotic treatment \Rightarrow heparin
- 5) Diabetics - glycaemia $\leq 10 \text{ mmol/l}$, long acting insulin should be preferred
 \hookrightarrow morning operation
 \hookrightarrow before, during + after the op - control blood glucose by i.v. 10% glc or insulin
- 6) shower a day before
- 7) Fast for 6-8 hours
- 8) Dentures + other artificial devices (contact lens) should be removed before surgery
- 9) Enema (injection of fluid into the rectum to cause bowel movement)
- 10) area to be operated on is shaved \Rightarrow prevent contamination + growth of bac in small scratches (that occur in patients shaved the day before)
- 11) Disinfection of the op. site \Rightarrow immediately before

② Phlegmon + Abscess

Phlegmon: is a spreading diffuse inflammatory process w/ formation of suppurative / purulent exudate or pus covered in hair

↳ no borders

↳ commonly by bacteria - streptococci, spore & non-spore forming anaerobes etc.

↳ virulence of bacteria + immunity strength affect the dev. of a phlegmon.

Classification: 1) by clinical course: acute or subacute

2) " severity of condition: mild, average, severe (spread elsewhere)

3) by location: Superf - cutaneous
subcutaneous
interstitial tissue
intramuscular

deep - mediastinal
retroperitoneal

4) aetiology: single

mix (eg. spore + non-spore forming anaerobes)

5) pathogenesis: per continuitatem (through neighbouring tissues) (venous plexus of the face)
haematogenous (through non-valvular veins)
odontogenous

6) exudative character: purulent phlegmon
purulent-haemorrhagic
putrefactive

7) presence of complications: w/ complications (disturbance of mastication, ingestion, speech, CVS + Resp. Sys.)

without complications

Clinically: ↑ body temp (38°C - 40°C), general fatigue, chills
inflammation (5 signs)

Abscess: collection of pus (dead neutrophils) that has accumulated in a cavity formed by the tissue in which the pus resides on the basis of an infectious process or other foreign materials.

↳ defensive reaction of the tissue to prevent the spread of infectious materials to other body parts

↳ cytokines are released (foreign orgs. kill local cells) → inflam. process

↳ ENCAPSULATED! - prevents immune cells from attacking bacteria in the pus.

Manifestations: 5 signs of inflam.

- ↳ occur in any solid tissue but also on skin surface $\left\{ \begin{array}{l} \text{superf. pustules (boils)} \\ \text{deep skin abscesses} \end{array} \right.$
in the lungs, brain, teeth, kidneys & tonsils
- ↳ major complication: spreading of abscess material to adjacent/remote tissues & extensive regional tissue death (gangrene)
- ↳ rarely heal by themselves \therefore need drainage
- ↳ can be fatal (rare) - if it compresses vital structures e.g. trachea in deep neck abscess

27 Injury of bones, tendons & muscles

TENDONS: Tendinosis / tendinitis / chronic tendinitis:

- ↳ abnorm. condition of the tendon
- ↳ tendinitis is rare
- ↳ tendons in the extremities are more susceptible
- ↳ caused by microtears in the c.t. in & around the tendon → ↑ in tendon repair cells
- ↳ chance of rupture ← ↓ tensile strength ←
- ↳ swelling → ↑ water content & disorganised collagen matrix

Tenosynovitis: inflam of the fluid-filled sheath, surrounding the tendon

- ↳ Symp.: pain, swelling, + difficulty moving the joint
- ↳ when it causes the finger to "stick" in a flexed position ⇒ "stenosing" tenosynovitis
- ↳ unknown causes; runs in families; more often in males
- ↳ mild: NSAIDs, eg. diclofenac
- ↳ more acute cases: cortisone (steroid) injections then a course of paracetamol + ibuprofen

"Trigger finger"

Avulsion: acute tendon injury resulting from high tensile loads ⇒ tendon is forcibly torn away from its attachment site on the bone

- ↳ majority ⇒ occurs at the musculotendinous junc ⇒ prod. a strain-musculotendinous ^{unit}
- ↳ occurs when a large muscle attaches to a small site on the bone, eg. hamstrings
- ↳ sometimes - musculotendinous fibres remain intact & the tendon pulls away from its bony attachment site

MUSCLES: strains, ~~spasms~~, cramps & repetitive ^(strain) stress injury

Strains: injury, in which the muscle fibres tear as a result of overstretching

- ↳ "pulled" muscle
- ↳ symp.: localised pain, stiffness, discolouration + bruising and the strained muscle
- ↳ result of muscle-fibre tears due to overstretching
- ↳ occur while doing everyday tasks
- ↳ Treatment: Rest
- ↳ Ice
- ↳ + NSAIDs
- ↳ Compression
- ↳ Elevation

Repetitive Strain Injury (RSI):

↳ injury of the musculoskeletal + nervous systems that maybe caused by repetitive tasks, forceful exertions, vibrations, mechanical compression or sustained awkward positions

↳ symp: pain in the arm, back, shoulders, wrists or hands (diffuse pain)

↳ worse w/ activity

weakness, lack of endurance

Cramp:

↳ unpleasant painful sensations caused by muscle contraction or overshortening

↳ most common causes: muscle fatigue & Na^+ imbalance

↳ smooth mus. cramps → menstruation or gastroenteritis

↳ often sites ⇒ calves, thighs + arches of the foot (skeletal mus)

↳ if due to fatigue ⇒ treat by stretching + massage

external heat cramps ⇒ fluids + sufficient salt improves the symp.

BONES: fractures (Q4)

↳ break in the continuity of the bone

↳ high impact (stress) or medical conditions which weaken bones - tumours, osteoporosis

dislocations

↳ displacement of a body part, esp. the temporary displacement of a bone from its joint socket

LIGAMENTS: Sprain

↳ from a fall, sudden twist or a blow to the body that forces a joint out of its normal position + stretches/tears the ligament supporting that joint

②8 Skin Transplantation

Skin grafting: type of medical grafting involving the transplantation of the skin.
↳ transplanted tissue = skin graft

Indications: extensive wounding or trauma
burns

areas of prior infec w/ extensive skin loss

specific surgeries that may require skin grafts for healing

-excision of the damaged skin is followed by skin grafting

2 purposes: ① ↓ course of the treatment needed

② improve func + appearance of the body area receiving the graft

3 types: ① split thickness: epidermis + variable amounts of dermis

↳ taken from thigh + buttocks

↳ donor site heals by re-epithelialisation for the dermis + surrounding skin + needs dressing

② Full-thickness: epidermis + (full) all of the dermis

↳ donor site: sutured or split-thickness skin grafted

③ Composite graft: small grafts containing skin + underlying cartilage + other tissue

↳ donor site = ear skin + cartilage → nasal alar rim defects

Graft taxonomy: ① Autologous: autograft - donor + recipient are the same

② Isogenic: isograft - donor + recipient are genetically identical ^(monozygote twins)

③ Allogenic: allograft - donor + recipient are the same species

④ Xenogenic: xenograft - donor + recipient are diff. species

⑤ Prosthetic: lost tissue is replaced w/ synthetic materials, e.g.

metal, plastic or ceramic "prosthetic implant."

② Disorders of internal environment

same as Q35

SSI = Surgical
site
infect.

③ Surgical infections

Surgical infec. dev. when a wound gets contaminated at the end of a surgical procedure.

↳ Endogenous infec.: microorgs from the patient - present on their skin / from an opened ^{viscus.}

↳ Exogenous infec.: microorgs from instruments / theatre environment contaminate the op. site - traumatic wound, enter the wound before the skin has been sutured.

↳ Haematogenous: Rare! via blood from a distant source of infec.

↳ attach to a prosthesis / other implant left in an op. site.

Preventing infec.: ① remove microorgs that normally colonise the skin

② prevent microorgs replication ⇒ prophylactic ~~micro~~ antimicrobial therapy

③ enhance patient's immune defense

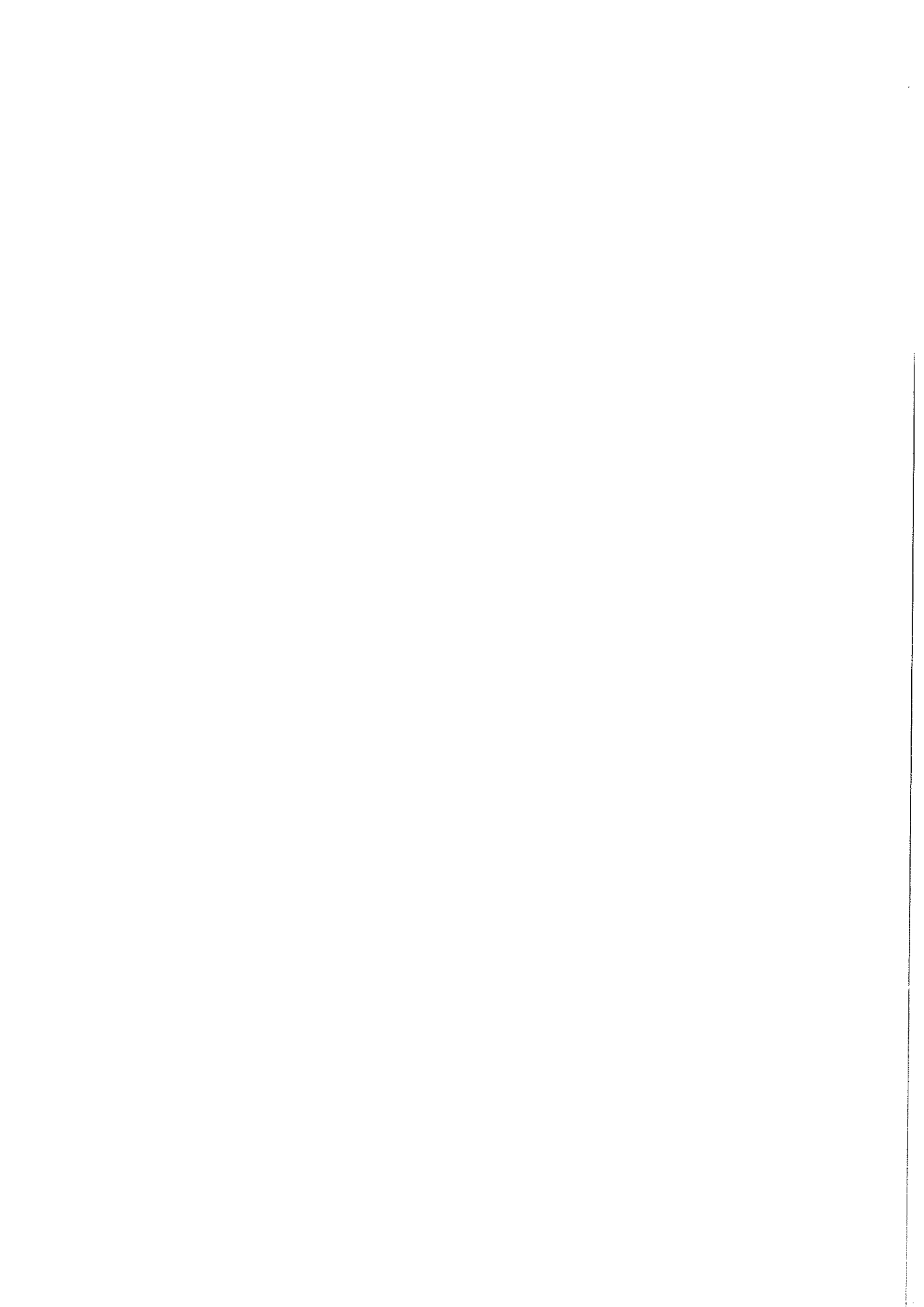
④ wound dressings - post. op

S. aureus, *S. epidermidis* ⇒ common micro-orgs!

Management of surgical infec. sites:

① removal of sutures w/ drainage of pus

② debridement + open wound care



31) Wounds

↳ type of injury, in which the skin is torn / cut / punctured OR where blunt force trauma causes a contusion.

↳ 2 main types: open or closed wounds

Open wounds: class. acc. to the object that caused the wound:

① Incisions: clean, sharp-edged object - knife, razor or a glass splinter

② Lacerations: irregular tear like wounds, caused by blunt trauma

③ Abrasions (grazes): superf. wounds, in which the epidermis is scraped off.

↳ sliding fall onto a rough surface

④ Puncture wounds: objects puncturing the skin, eg. nail, needle

⑤ Penetration wounds: objects entering the body, e.g. knife

⑥ Gunshot wounds: bullet or similar projectile driving into / through the body.

↳ maybe 2 wounds: entry + exit sites

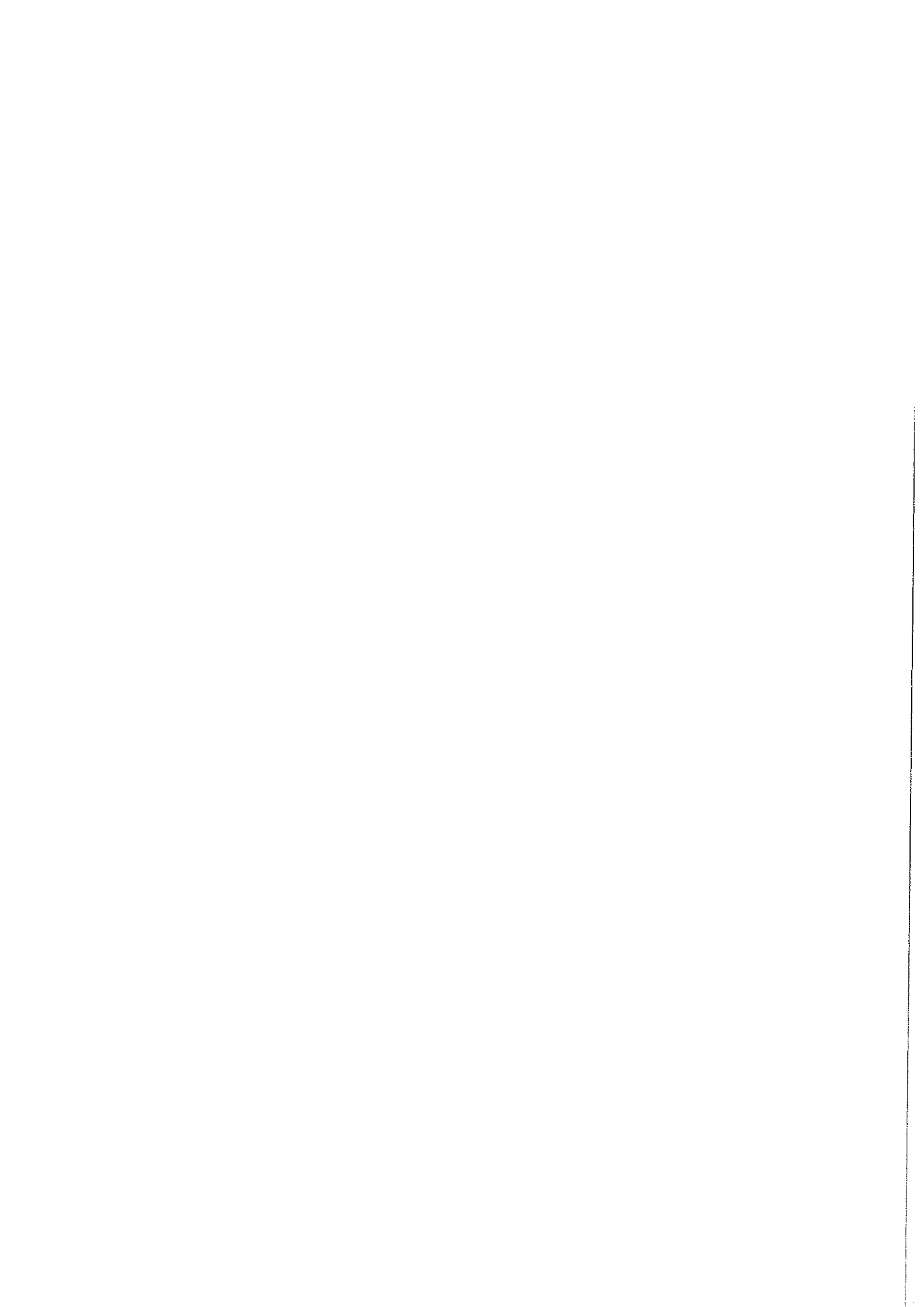
↳ aka "through-&-through"

Closed wounds: just as dangerous, as open wounds:

① Contusions (bruises): blunt force trauma, that damages tissue ^{under the} skin

② Haematoma (blood tumours): damage to a blood vessel that causes blood to accumulate under the skin

③ Crushing injury: great or extreme amount of force applied over a long period of time



SSI = surgical site infection

③2 Surgical infection - Anaerobes

↳ non-sporulating anaerobes are part of the normal flora - skin, mouth, GIT, vagina

Clostridium Tetani - soil, faeces (horse)

↳ enters via a small wound + multiplies in the wound + produces exotoxin → circulation

↳ Symp: pain, tingling or twitching in the wound

spasms of masseter mus ⇒ lock jaw

" " facial mus ⇒ risus sardonicus

stiffness of the neck

spasms of the back ⇒ opisthotonus.

profuse sweating, high temp

spasms of diaphragm + resp mus ⇒ Apnea ⇒ can be fatal

* Tetanus prophylaxis * (Q6)

C. difficile ⇒ pseudomem. colitis

C. myositis ⇒ gas gangrene ⇒ affects + destroys muscles

* After colorectal surgery ⇒ enterobacteriaceae + anaerobes → SSI

③③ Pain - types of pain, acute ab. pain

Pain: sensory experience that may be described as the unpleasant awareness of a noxious stimulus or bodily harm.

↳ 5 categories:

① Duration: acute (short-lasting) - < 30 days
 ↳ chronic (long-lasting) - > 6 months ^{cancer} ^{benign}
 ↳ subacute (1-6 months)

② Region + system: headache, pelvic pain, low back pain or

↳ acc. to the system affected: rheumatic, myofascial pain

④ Cause: somatogenic pain - nociceptive pain (activation of nociceptors)
 - neuropathic pain (damage/malfunc of the NS)

psychogenic (in ur mind)

⑤ Temporal characteristics: intermittent, constant etc...

Hepatitis, acute	Right	Left	Ruptured spleen, gastric ulcer, aortic
cholecystitis, PN,	Upper	Upper	aneurysm, PN
duodenal ulcer	Quadrant	Quadrant	
	Right	left	
Appendicitis, Crohn's disease,	Lower	lower	Acute pancreatitis, intestinal obstruction,
Salpingitis, ruptured	Quadrant	Quadrant	Salpingitis, renal/ureteral stone
ectopic pregnancy			

Acute abdomen: sudden, severe pain < 24hrs in duration

↳ medical emergency

↳ Causes: acute appendicitis, Acute PN, acute cholecystitis, acute peritonitis, acute pancreatitis, acute peptic ulcer complications

↳ Ab. Xray, CT, Full blood count

↳ usually need surgical treatment

③ Postoperative Complications - DVT + PE

DVT: dev. in 30-60% ppl; 50% = silent DVT

Virchow's 3 pathogenic factors: ① ↓ b. flow (slowed)

- ↳ found in many post op. patients
- ② hypercoagulability
- ③ injured intima

Risk factors: compression of large veins in the soleus mus. of prone, immobilised patients

old age

obesity

malignancy

HD

oral contraceptives

leg trauma

immobility

- ↳ Thrombosis of calf veins ⇒ few/no symp: slight peri-malleolar oedema + tenderness ^{calf}
- femoral/popliteal veins ⇒ pronounced oedema, distention of superf. veins, tachy + fever.

↳ Ileo femoral thrombosis ⇒ form of phlegmasia coerulea dolens

↳ whole extremity = swollen, painful + cyanotic

↳ can impair perfusion ⇒ venous gangrene - toes + dorsum of the foot

↳ Phlegmasia alba dolens ⇒ pseudoembolic form (less common)

↳ cold, pale extremity ⇒ concomitant arterial spasm ⇒ cyanosis

Diagnosis: US (doppler), phlebography - using Xray contrast ^{less invasive} iodine IV or radionuclide Technetium 99

Complication of DVT = pul. embolism (PE) + dev. of post-thrombotic syndrome due to destruction of venous valves

Prophylaxis: max. patient mobility; post-op. exercise of the lower limbs in bed; compression bandage of superf + varicose veins (↑ b. flow in deep veins)

↳ Heparin! 5000 units SC every 8-12 hours ⇒ "mini-heparinisation"

↳ starts 2hrs before surgery & continue for 7-10 days.

Treatment: bed rest w/ elevated lower extremities + full IV heparinisation ⇒ oral warfarin after 2-3 days.

PE: serious, potentially fatal complication

↳ main source of emboli: thrombi of femoral/iliac vein OR thrombosis of large pelvic veins

↳ mechanical obstruction of the pul. A \Rightarrow speeded up by reflex bronchoconstriction + vasoconstriction.

↳ Large emboli \Rightarrow dyspnoea, tachypnoea, chest pain, tachycardia + hypotension

↳ also poss: haemoptysis, cyanosis + pleural friction rub

Pul. rates are common.

Patient may die in syncope; cardiogenic shock + acute insuff. of the R. heart

↳ small emboli \Rightarrow oligosymptomatic or asymp.

Successive embolisation \rightarrow pul. TBP

Diagnosis: clinical signs + symp, ECG (depression of ST segment, enlarg. P wave, T wave inversion)

imbalance of ventilatory + perfusion lung scanning

pul. angiography \Rightarrow confirms/excludes PE

Treatment: heparinisation + thrombolysis (if poss)

circulatory + ventilatory support

35) Fluid, electrolyte + pH imbalance

Fluid = water

electrolytes \Rightarrow ICF = K^+ , Ca^{2+} , Mg^{2+} , phosphate⁻, sulphate⁻, organic acids⁻ + protein

ECF = Na^+ , Cl^- , bicarbonate⁻

Water \Rightarrow Total Body Water (TBW) = 60% body weight (Males; 50% Females)

$\frac{2}{3}$ ICF $\frac{1}{3}$ ECF $\left\{ \begin{array}{l} \text{interstitial } (3/4) \\ \text{intravascular } (1/4) \end{array} \right.$

TBW \downarrow w/ age : old men \Rightarrow 52% body weight of 65 yrs
women \Rightarrow 47% " " " "

- ADH from pituitary \Rightarrow affects tubular reabsorption
- Thirst mechanism \Rightarrow hypothalamic ^{osmo} receptors + vascular (right atrial) volume receptors + baroreceptors \rightarrow trigger ADH release

Major probs \Rightarrow ① too much water in the plasma \Rightarrow expansion of ECF \Rightarrow haemodilution + seen as: hyponatraemia + hypoosmolality

② too little water in the plasma \Rightarrow depletion of ECF \Rightarrow haemoconcentration + seen as: hypernatraemia + hyperosmolality

* Normal plasma osmolality \Rightarrow 280-295 mmol/kg *

Sodium : 135 - 145 mmol/L

Hyponatraemia:

① Hypotonic hyponatraemia : low plasma osmolality, ECF \Rightarrow ^{1) low vol OR} ^{2) norm vol OR} ^{3) high vol} congestive HF, liver cirrhosis, nephrotic syn.
 \hookrightarrow XS sweating, burns, vomiting, diarrhoea
Addison's, diuretic drugs

② Hypertonic hyponatraemia : assoc. w/ shifts of fluid due to osmotic press.

Hypernatraemia:

① Hypovolemic : inadequate H₂O intake

XS H₂O loss from urinary tract - glycosuria
severe watery diarrhoea
XS sweating

② Euvolemic: XS excretion of water for kidneys - diabetes insipidus
inadequate ADH prod or impaired responsiveness

③ Hypervolemic: intake of a hypertonic fluid - large vol of conc Sodium Bicarbonate
mineralocorticoid XS => Conn's sy. or Cushing's

Potassium 4.5-5.0 mmol/l

Hypokalaemia: (KCl infusions)

- ① ↑ loss of K^+ via GIT (diarrhoea) + skin (XS sweating)
- ② Renal losses (diuretics); metabolic acidosis
- ③ Low K^+ intake over a long time (fat diets)
- ④ metabolic changes - stress, hypothermia, alkalosis

Hyperkalaemia: > 6 mmol/l (IV glc w/ insulin)

- ① XS K^+ overload => oral / parenteral admin. of K^+ salts
- ② Endogenous K^+ load for tissue destruction ← haemolysis, rhabdomyolysis, major surgery, XS GI bleeding, major burns
- ③ Renal Insuff w/ oliguria → inability of kidneys to excrete K^+
↳ dialysis patients
- ④ Adrenal pathology: ~~ad~~ mineralocorticoid deficiency, Addison's
- ⑤ Redistribution of K^+ from ICF → ECF: metabolic acidosis, hyperglycaemia
- ⑥ Medications: β -blockers

Calcium: ~ 2.5 mmol/l

Hypocalcaemia:

- ① Idiopathic or post-surgical hypoparathyroidism
- ② Renal failure
- ③ Acute pancreatitis
- ④ Rhabdomyolysis
- ⑤ Mg^{2+} deficiency
- ⑥ vit D "

tetany
↑ irritability
lethargy
confusion
seizures

Hypercalcaemia

- ① Neoplasms: breast cancer, lung cancer, hypernephroma
- ② hyperparathyroidism: 1° adenoma + hyperplasia
2° \Rightarrow renal failure, osteomalacia / malabsorption
- ③ endocrinopathies: hyper + hypothyroidism
acromegaly
pheochromocytoma
- ④ Medications: vit D, A, lithium
- ⑤ Immobilisation
- ⑥ Sarcoidosis

$> 3 \text{ mmol/l} \Rightarrow$ CNS disturbances,
fatigue, lethargy, confusion, headaches,
seizure, coma, muscle weakness,
arrhythmias

pH imbalance:

Normal pH = 7.35 - 7.45

Metabolic Acidosis: \downarrow in HCO_3^- & $\uparrow \text{H}^+$; acidemia occurs
pH ≤ 7.35

laboured, deep rapid breathing, Kussmaul respirations (Diabetic ketoacidosis)

Compensation: \uparrow breathing

Treatment: $< 7.1 \text{ pH} \Rightarrow$ IV bicarbonate 50-100 mmol/l

Metabolic Alkalosis: $\uparrow \text{HCO}_3^-$, $\downarrow \text{H}^+$ alkalaemia occurs.
pH > 7.6

hypventilation

causes: admin of large amounts of alkali (IV bicarb, antacids)
massive blood transfusions

vs loss of acids - vomiting or NG suction

Confusion, hypotension, cardiac arrhythmias + hypovent.

Treatment: KCl + volume

Cl⁻ responsive

loss of H^+
loss of Cl^- + water

Cl⁻ resistant

- retention of HCO_3^-
- shift of H^+ to ICF space
- Alkalotic agents

Respiratory acidosis ↑ pCO₂

Lung disease (COPD, asthma, emphy) (Chronic)

CNS depression neuromuscular disorders (Acute)

- can't eliminate CO₂ by the lungs → ↑ pCO₂ → ↓ pH
- muscle twitching, somnolence, ↑ BP, muscle twitching + tachycardia
- hypoventilation
- Acute or Chronic → pCO₂ > 4.7 mmHg + norm. blood pH ~~or~~
near norm pH 2° to renal compensation +
↑ HCO₃⁻ > 30 mmHg.
↑ acidemia pH < 7.35

Resp. alkalosis ↓ pCO₂

Hyperventilation → ↓ pCO₂ → ↑ pH

↳ anxiety, preg, severe infec, liver dis., BS tumours.

↳ drugs - catecholamines

Chronic ⇒ 10 mmHg drop in pCO₂ (blood) = 5 mmol/L HCO₃⁻ drop

↳ compensation (metabolic)

Acute ⇒ 10 mmHg drop in pCO₂ (blood) = 2.5 mmol/L HCO₃⁻ drop.

- dizziness, lightheadedness, paresthesias, tetany, seizures, syncope, cardiac arrhythmias

36) Structure of the joints

Surgical puncture of the joint space to remove fluid = Arthrocentesis
Synovial fluid = Synovial tap

- to give medications - corticosteroids / LA
- remove fluid from joints to relieve pain / remove pus from septic joint / blood.
- LA given, surgical asepsis

Norm. Synovial fluid \Rightarrow clear, straw-coloured, slightly viscous
inflam \Rightarrow watery + turbid

\uparrow leukocytes, prot⁻ & \downarrow glc⁻

- synovial fluid + glacial acetic A \Rightarrow viscous clot
- inflame \rightarrow " " " \Rightarrow flocculent, easily broken clot

Indications: Joint effusions
arthritic complaints
suspected infectious arthritis
gout
monitoring of Abx response in patient w/ septic arthritis
blood = darkest

Contraindication: cellulitis - prevent entry into body
bacteraemia

slightly flex the knee, palpate patella, disinfect, LA - 1% lidocaine
needle - post. the patella, don't touch bone.

Complications: Infec
local trauma
pain
reaccum. of effusion

③ Post operative fever + infection

↳ immediately after the op \Rightarrow sub-norm. temp. poss

↳ once awake \Rightarrow shivering + severe vasoconstriction

↳ exposure of the open body cavities to cold air in the op room + infusion of cold _{sol}

Prophylaxis: proper heating of the op room.

application of warm, wet compressions on exposed organs (esp. intestines)

room temp infusions

Therapy: warming the patient

Fever: due to an infection, chemical pyrogens, dehydration, loss of body's cooling mechanism (sweating + evaporation), endocrine stimuli + hypothalamic lesions

1st postop. day \Rightarrow mild \uparrow ($< 38^\circ\text{C}$) = common after major surgery

↳ \uparrow catabolism

Hyperpyrexia $> 39-40^\circ\text{C}$ \Rightarrow after op. of toxic goitre (thyrotoxic crisis) or after neurosurgical procedures (near the hypothalamus)

following days: $> 38^\circ\text{C}$ = complication

↳ 24-48hrs after op \Rightarrow pulm. atelectasis or aspiration

↳ 3rd day \Rightarrow thrombophlebitis in a cannulated vein, UTI or pneumonia

↳ 3rd-5th day \Rightarrow wound infec

↳ $> 5^{\text{th}}$ day \Rightarrow dev. of intra-ab. abscess or pneumonia

Severe hyperpyrexia: physical measures: (prevent brain damage - cont withstand \uparrow Km)

↳ ext cooling - ice cold wet bedsheets, ice baths

↳ int. cooling - stomach lavage w/ cold solutions.

③ Retention, urinary catheters

Urinary retention: inability to empty the bladder

Chronic: asymp - unable to urinate but may have lower urinary tract
Symps (LUTs) related to storage + voiding difficulties \Rightarrow hydronephrosis + renal impairment

Acute: painful + unable to urinate despite a full bladder

\hookrightarrow medical emergency

Causes of chronic \Rightarrow most common = bladder outlet obstruction:

\hookrightarrow ① Benign Prostatic hyperplasia

② Prostatic carcinoma \Rightarrow obstruct urethra $\begin{matrix} \text{- direct press on} \\ \text{- invasion of the wall} \end{matrix}$

③ Drugs \Rightarrow cause bladder sphincter dysfunction:

\hookrightarrow Antihistamines

Anticholinergics

Antispasmodics

Botulinum toxin (to treat overactive bladder)

④ Iatrogenic

⑤ Congenital deformities: 1^o bladder neck obs.

2^o bladder neck obs - urethral deformity

meatal stenosis (boys)

⑥ Urethral strictures: lurec - TB, gonorrhoea

Trauma - fractured pelvis, iatrogenic

Palpable, enlarged, non-tender bladder.

Catheters: a tube inserted into a body cavity, duct or vessel \Rightarrow allow drainage, injection of fluids or access by surgical instruments.

Uses: \hookrightarrow draining urine from the u. bladder - Foley catheter

\hookrightarrow suprapubic catheterisation \Rightarrow damaged urethra

\hookrightarrow drainage of urine from the kidney \Rightarrow percutaneous nephrostomy

\hookrightarrow angioplasty, angiography, balloon septostomy, balloon sinuplasty \Rightarrow Seldinger

Technique

\hookrightarrow measure BP - artery, vein; Intracranial press.

↳ Central Venous Catheter (CVC): giving drugs/fluids into a large bore catheter in a vein near the heart or just inside the atrium.

↳ Swan-Ganz catheter ⇒ pul. A to measure pressures in the heart

↳ periph. venous catheter ⇒ IV fluid, medication or parenteral nutrition

Urinary bladder catheterisation:

① relief of urinary retention

② continuous monitoring of urine output

③ pre-op - empty bladder for op.

- soft catheters w/ a blunt tip (Nelaton type)

sizes ⇒ 16-21 French (F) = 0.33mm

- urethral narrowing (e.g. enlarged prostate) - stiffer catheter w/ a beak tip ⇒ ^{like}

THIEMANN TYPE

↳ ↑ risk of urethral injury

- long term catheter ⇒ permanent urinary bladder drainage

↳ FOLEY CATHETER w/ a balloon below the tip

- unnecessary catheterisation should be avoided ⇒ risk of UTI

urethral injury

urethral stricture

- lubricate urethra or catheter + disinfect ⇒ MEN - meatus + glans penis (by doctor)

FEMALES - meatus + labia (skilled nurse)

- Strict ~~aseps~~ aseptic conditions using sterile gloves

- Catheter should be positioned below the thigh ⇒ to avoid siphon effect

39) General anaesthesia, regional

GA: state of total unconsciousness due to GA drugs

- ↳ unconsciousness, amnesia + analgesia
- ↳ in the op. room or a special ante-room
- ↳ via IV injection or inhalation induction
 - ↳ faster (10-20sec)

Stage 1: induction

2: excitement stage

3: surgical stage

4: DD! - need CPR \Rightarrow severe B.S + medullary depression

↳ maintaining GA: breathing a controlled mixture of O_2 , N_2O + volatile anaesthetic agent

↳ Recovery 1-3mins after stopping GA use

↳ intubation is needed \Rightarrow loss of airway management

↳ Monitoring: Continuous ECG

" pulse oximetry (SpO_2)

BP monitoring: cuff on arm + readings at regular intervals
invasive BP \Rightarrow heart/lung disease

[Agent] measurement

CO_2 measurement - Capnography

Temp. "

EEG - depth of anaesthesia

Regional anaesthesia ^(RA): anaesthesia affecting large parts of the body, e.g. a limb

↳ Central (RA): neuroaxial blocks (epidural + spinal anaes.)

↳ Peripheral (RA): plexus blocks or single N. blocks.

↳ given as a single shot or via catheter (continuous) - prolonged time period

↳ Bier block: tourniquette + injecting LA \rightarrow veins of the arm \Rightarrow Intra-venous Regional Technique

indications: shoulder + arm procedures

labour + childbirth \Rightarrow epidural ^{combined} or spinal

C-sec.

⑩ Puncture of the thorax

Thoracentesis \Rightarrow air or fluid accum. in the pleural cavity

Tense pneumothorax \Rightarrow 2nd/3rd intercostal space (ICS) MCL - under LA

Fluid (blood, pus, exudate) \Rightarrow 6th/7th ICS - middle post axillary line

↳ always at the upper border of the lower rib - avoid injury to intercostal N. or A - using a LA



Slight popping sensation \Rightarrow penetration of parietal pleura
↳ then u can aspirate the content

Must be careful not to cause a pneumothorax

Syringe - filled to the needle by a 3-way stopcock \Rightarrow entrance of air into the pleural cavity is prevented during the exchange of syringes

Use Chest Xray to check correct position of the tube + effect of suction.

④ Bedsores, decubitus

Pressure ulcers \Rightarrow lesions due to: unrelieved press., friction, humidity, shearing forces, temp., age, continence + medication

\hookrightarrow any body part, esp. parts over bony / cartilaginous areas \Rightarrow Sacrum, elbow, knees, ankles

\hookrightarrow fatal! if found early - treatable; preventable

3 diff. tissue forces:

① Pressure: or compression of tissues

\hookrightarrow force of bone against a tissue - patient in a single position for a long time

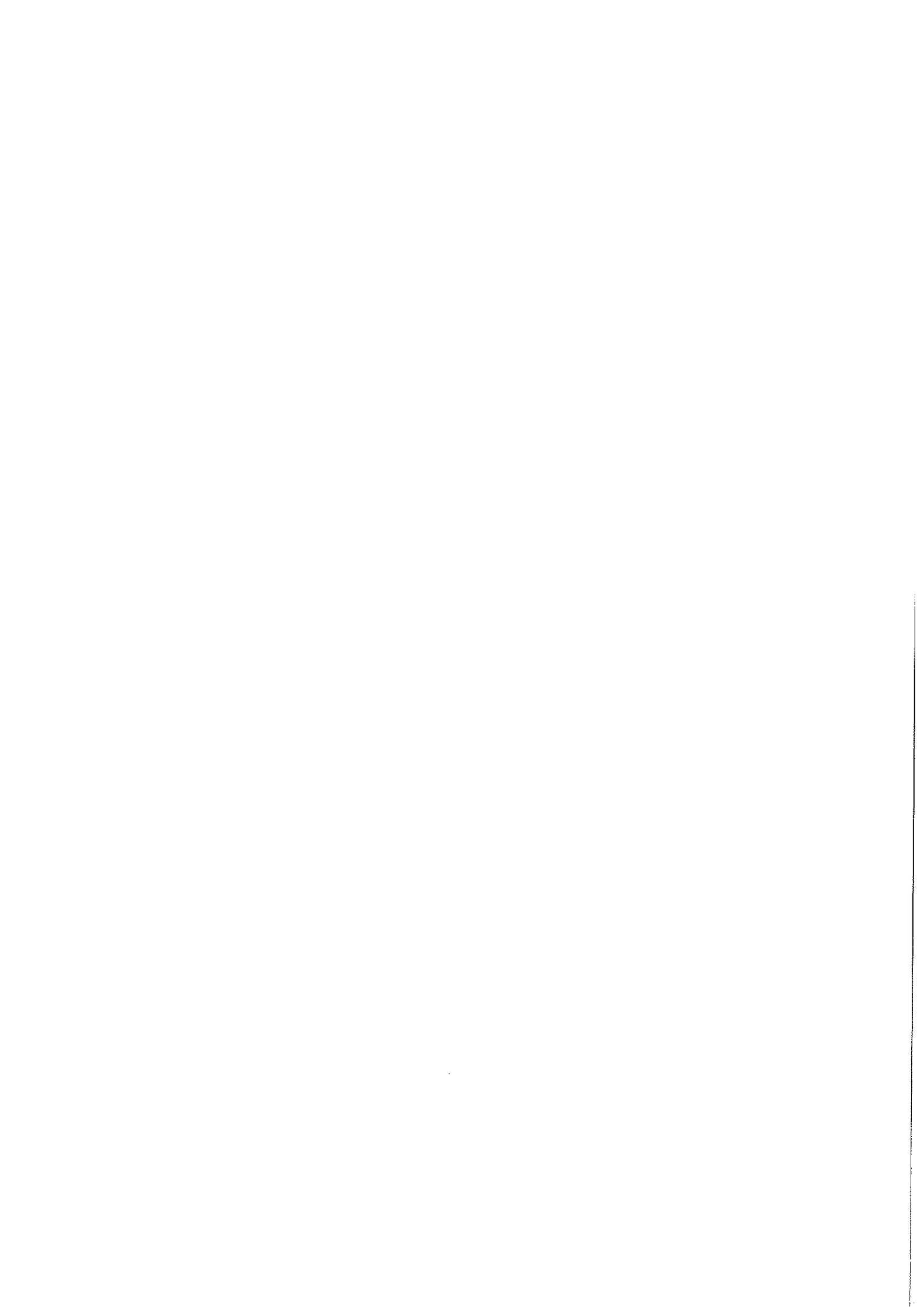
\hookrightarrow after a while \Rightarrow \downarrow tissue perfusion \rightarrow ischaemia \rightarrow tissue necrosis (if left untreated in an immunocompromised patient)

② Shear force: force created when the skin of a patient stays in 1 place as the deep fascia + skeletal mus. slide down w/ gravity.

\hookrightarrow pinching off of b. vessels \rightarrow ischaemia \rightarrow tissue necrosis

③ Friction: force resisting the shearing of skin.

\hookrightarrow \times s shedding through layers of epidermis



1. First aid in case of the war injuries

Triage

• is a process of prioritizing patients based on the severity of their condition so as to treat as many as possible when resources are insufficient for all to be treated immediately.

Triage separates the injured into four groups:

- Black (Deceased) which entails no care needed
 - Red (Immediate) which entails life threatening injuries
 - Yellow (Delayed) which entails non-life threatening injuries
 - Green (Minor) which entails minor injuries
- A simplified but effective description of the triage is taught in the Israeli army to non-medical personnel: the injured who are lying on the ground silently should be prepared for immediate transportation; injured lying on the ground but screaming are injured whose transportation can be delayed; and the walking wounded need help less urgently. Non-medical personnel have no authority to tag an injured person as deceased.

Injury classification

Shot

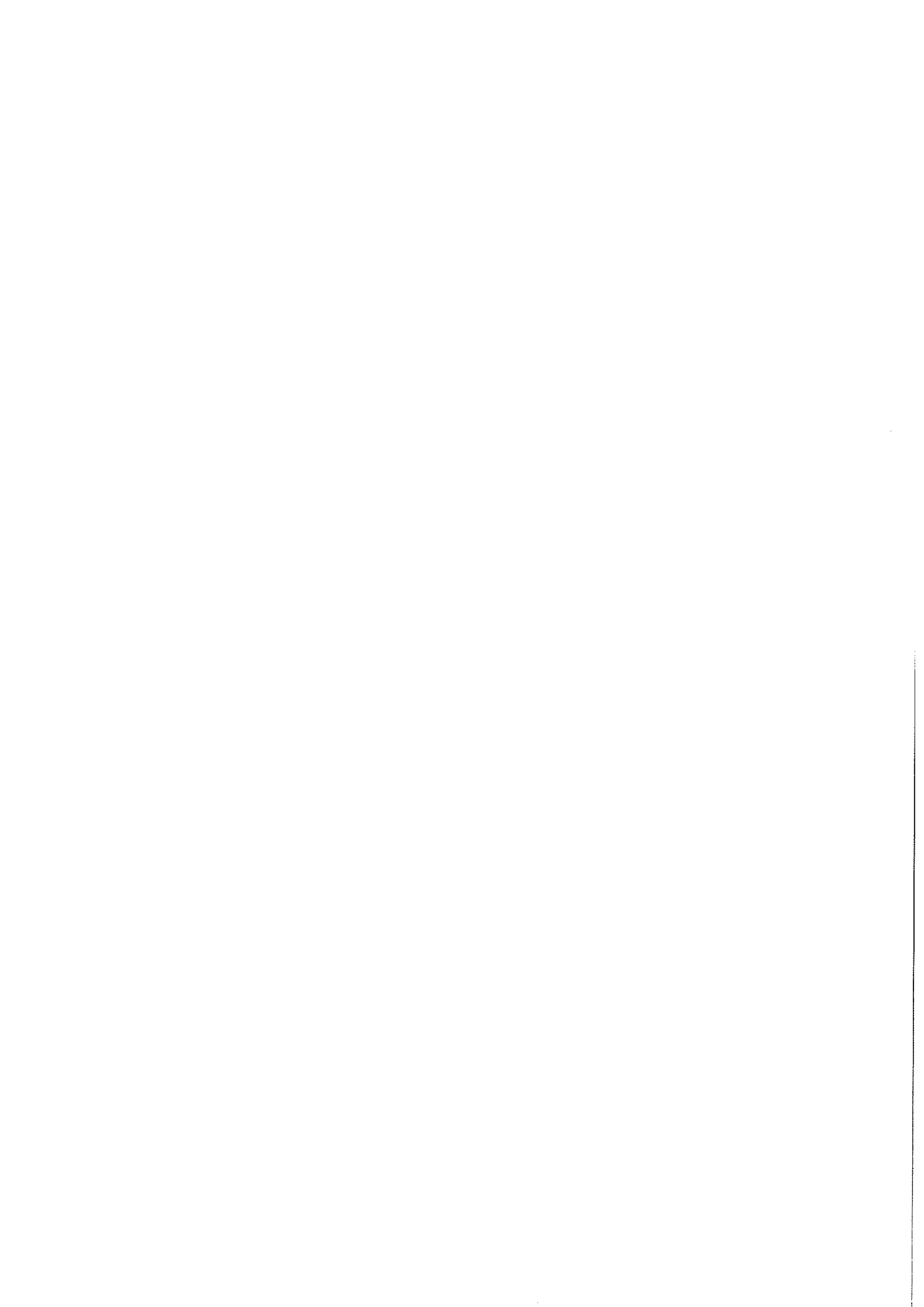
- 7.62 mm bullet - very large caliber, when it penetrates the body it cause total destruction of the adjacent tissue.
 - 5.56 mm bullet - M16 rifle has a centrifugation ability which means that when it penetrate the body it does not stop but continue spinning causing massive tissue damage of the body. For example this bullet can enter the body trough the leg and come out trough the thorax.
 - Hollow-point bullet - the bullet deforms and sometimes fragments upon impact due to the indentations. This creates a larger wound channel or channels with greater blood loss and trauma.
 - Treatment for all kinds of shooting injuries depend on the locating, but all involve the ABC with emphasize on the circulation, bleeding must be stop to prevent shock
- Ricochet from missiles, bombs, shootings
 - Can penetrate the body and cause severe bleeding. take same action like shoot wound
 - In a case of amputated limb → compress the main vessels proximal to the area, if its not possible use tourniquet
 - Burning - There is possibility of burn injury after missile or bomb and exploded near by → see burn treatment
 - Shock (psychological) - evacuate the soldier from the area if need use force.

2. first aid in case of the unconsciousness

- States of unconsciousness range from a brief period of fainting to a deep and prolonged coma. It has many possible causes, such as poisoning, epilepsy, suffocation, bleeding, head injury, stroke, heart attack, diabetes and alcohol and drug overdose
- Unconsciousness is potentially life-threatening. An unconscious person is in danger of choking from vomit, saliva or blood because the normal reflexes such as coughing are not effective. If the person is laying face upwards, there is a danger that the tongue or throat soft tissue may obstruct the airway.

Signs of An unconscious person:

- Is unaware of his surroundings and does not respond to sound
- Makes no purposeful movements
- Does not respond to questions or to touch



- May or may not be breathing or have a pulse

Immediate care

- To determine whether a person is unconscious or not, ask with a loud voice: Are you OK? If there is no response, tap on the chest or shoulder or gently shake the shoulders to see whether he responds and ask again. (If you suspect a head or neck injury, do not shake the shoulder). In the case of a baby, tap the feet.
- The greatest danger to an unconscious casualty exists whilst they are lying on their back. The first aider must ensure a clear and open airway by rolling the casualty gently on their side whilst protecting their neck and spine as much as possible.
- Check the ABC Airway, breathing and circulation. If the person is not breathing, start mouth-to-mouth breathing. If there is no pulse, start full CPR.
- If you do not suspect a head or spinal injury, move the person into the recovery position. This will prevent the airway from being blocked by the tongue, blood or vomit.
- Look for a Medic-Alert tag that may explain the cause of the unconsciousness.
- Look and treat for any obvious injuries, such as fractures or bleeding.
- Keep the person warm. Do not give anything to eat or drink when the person awakes.
- Monitor the level of response, breathing and pulse regularly until medical help arrives.
- Note: If a back or neck injury is suspected, do not move the person.

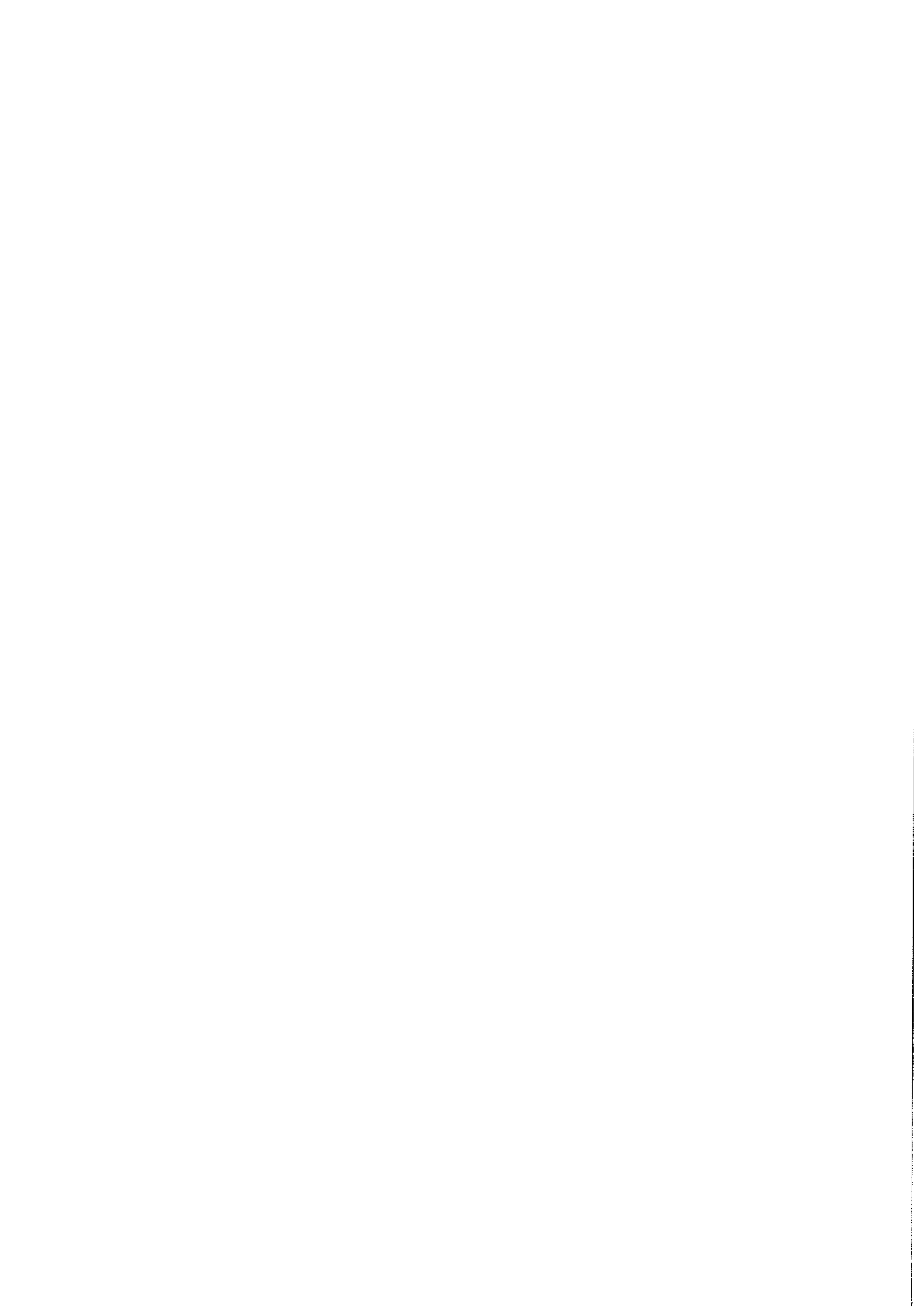
Causes of Unconsciousness

- Carbon monoxide poisoning
- Hypothermia (low body temperature usually caused by over-exposure to cold temperatures or cold water)
- Stroke
- Shock
- Epilepsy
- Heat exhaustion
- Diabetic coma
- Excessive bleeding
- Alcohol abuse
- Drug overdose
- Poisoning
- Head injury/concussion
- Low blood sugar
- Too fast, too slow and/or irregular heartbeats
- Heart attack
- Medications
- Hypothermia (very low body temperature)
- Heart valve disease

3. venesection (also known as venepuncture or phlebotomy)

- Is the process of obtaining a sample of venous blood. Usually a 5 ml to 25 ml sample of blood is adequate depending on what blood tests have been requested.
- Blood is most commonly obtained from the median cubital vein
- Phlebotomy (incision into a vein) is also the treatment of certain diseases such as:
- Hemochromatosis - a rare disease in which iron deposits build up throughout the body. Enlarged liver, skin discoloration, diabetes mellitus, and heart failure may occur. The disease most often develops in men over 40 years of age and as a result of some anemias requiring multiple blood transfusions and primary and secondary
- Polycythemia: an abnormal increase in the number of red blood cells. It may occur with lung or heart disease, or with being in high altitudes for a long time (also known as erythrocytosis)

Equipment:



- Venipuncture with evacuated or vacuum tubes: (test tube that contains a vacuum that automatically aspirates blood into itself), the Tubes have color-coded stoppers to indicate what type of anticoagulant or other substance is in the tube
- Venipuncture with needle and syringe: The very young, very old and anyone with problematic veins are all candidates for this old-fashioned method, then its transferred to a tube with the anticoagulation substances

4. wound care: stop bleeding - compressive bandage / direct pressure.
prevent infection - cover w/ sterile gauze.

First aid wound care: future infection prevention

- the main step is to control the bleeding, it is achieved by a compressive bandage and in case of large arteries by direct pressure on the bleeding vessel or tourniquet.
- prevention of infection - by covering of a clean sterile gauze
- future tissue damage prevention - tourniquet should be used only if absolutely necessary, ischemic tissue are prone to anaerobic infections, use moist dressing under moderate pressure - just to stop the bleeding, do not use aggressive disinfectants.

Definitive wound care:

- assessment of the wound type and extend of injury
- removal of foreign bodies and necrotic tissue
- final hemostasis by ligation of the vessels or coagulation factors
- suture
- unsutured wounds should be treated with moist dressing changed 3 times a day

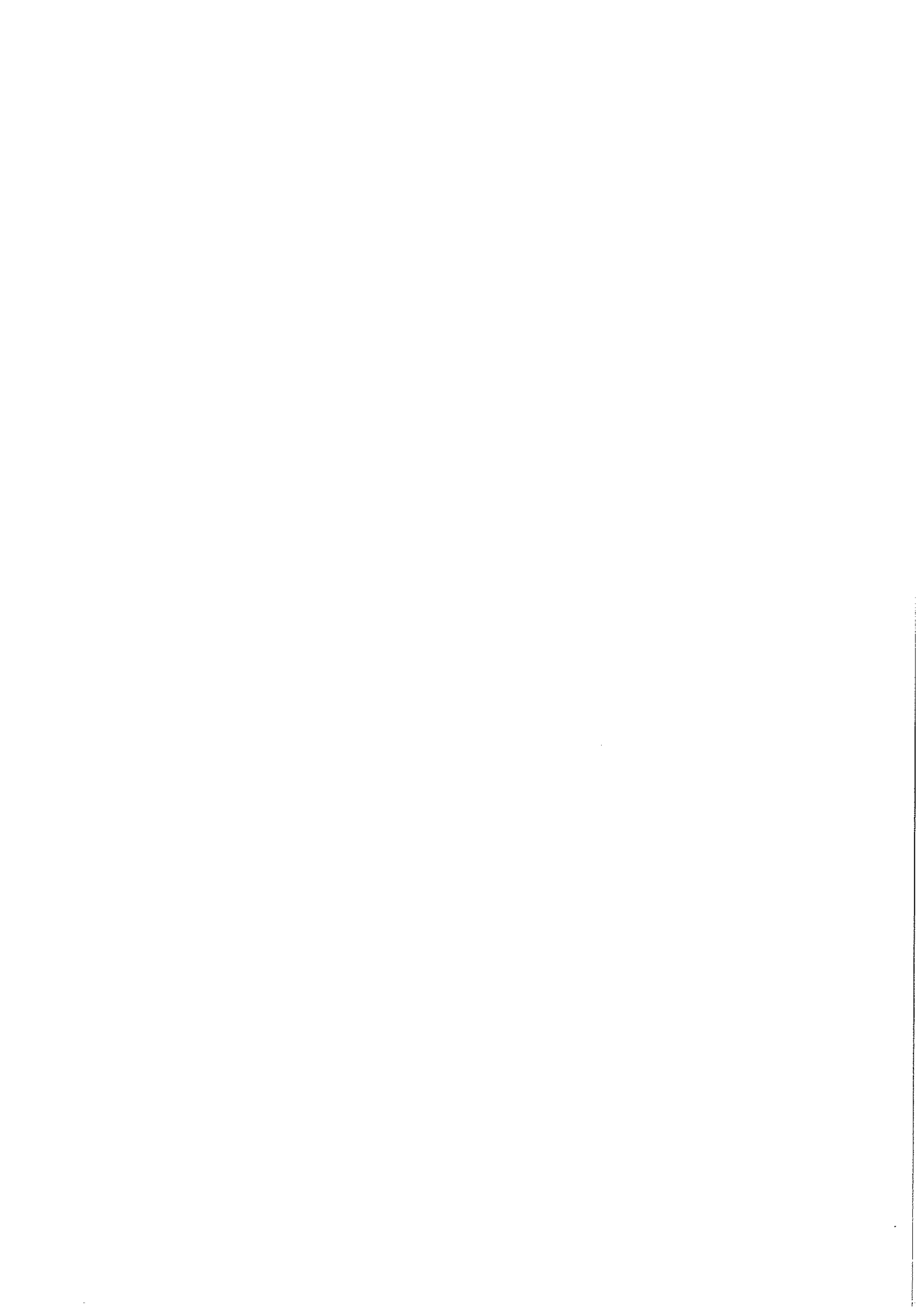
5. Incision, Excision, Extirpation

- Incision - is a simple surgical cut. It may be a complete operation (incision of abscess), or it may be the 1st step in any operation (creating an opening into an organ or body spaces)
- Excision (resection) is removal of a superficial lesion.
- Extirpation - is removal of a more deeply localized lesion. the 1st step is incision, then follows dissection and removal of the lesion or organ, then closure and suture of the incision
cancer p-e.

6. Tracheotomy

- an incision made into the trachea through the neck below the larynx.
- It is done to get access to the airway below a blockage with a foreign body, tumor, or fluid pooling in the vocal apparatus (edema of the glottis).
- The opening may be made as an emergency measure at an accident site at a hospitalized patient's bedside, or in the operating room. Local or general anesthesia may be used, if available.
- The patient's neck is stretched out. An incision is made through the skin through the second, third, or fourth tracheal ring. A small hole is made in the fibrous tissue of the trachea. The opening is then widened to allow the intake of air.
→ bring trachea forward.
- In an emergency any available instrument may be used as a widener, even the barrel of a ballpoint pen with the inner portion removed.
- If the blockage lasts, a tracheostomy tube is inserted. If the blockage does not last, the incision is closed once normal breathing is established. After surgery the patient is observed for renewed breathing problems or bluish skin (cyanosis).
- Tracheotomy - means incision of the trachea, while tracheostomy mean making an orifice in the trachea

The conditions in which a tracheotomy may be used are:



- Acute - maxillofacial injuries, large tumors of the head and neck, congenital tumors, e.g. bronchial cyst, acute inflammation of head and neck.
- Chronic / elective - when there is need for long term mechanical ventilation and tracheal toilet, e.g. comatose patients, surgery to the head and neck.
- In emergency settings, in the context of failed endotracheal intubation or where intubation is contraindicated, cricothyroidotomy may be performed in preference to a tracheostomy.

Complications

- Immediate - pneumothorax or pneumomediastinum, tracheoesophageal fistula, injury to great vessels or recurrent laryngeal nerves, bleeding, e.g. from divided thyroid isthmus.
- Early - secretions and mucus plugging, dislodged tube, respiratory arrest and post obstructive pulmonary edema (when tracheostomy is performed in a patient with longstanding upper airway obstruction, and is dependent on hypoxic drive for respiration).
- Late - bleeding from trachea, tracheal stenosis (from ischemia induced by a cuffed tracheostomy tube), tracheoesophageal fistula, tracheocutaneous fistula and cosmetic deformity must be considered upon decannulation.
- Immune problems - air inhaled through a stoma is not filtered or moistened like it is when inhaled through the nose or the mouth.
- Drowning - as little as two teaspoons of water in the stoma can drown the person; therefore, they cannot swim and bathing must be done with extreme care.
- Suffocation - if the stoma is covered, the person will suffocate, as in some cases they cannot breathe through their nose or their mouth.

7. first aid in case of fracture

Fracture recognition

- distortion, swelling, and bruising at the site of injury
- Pain and difficulty to move the injured part.
- There may be bending, twisting or shortening of the limb
- A wound with bone protrusion (open fracture)

In case of closed fracture:

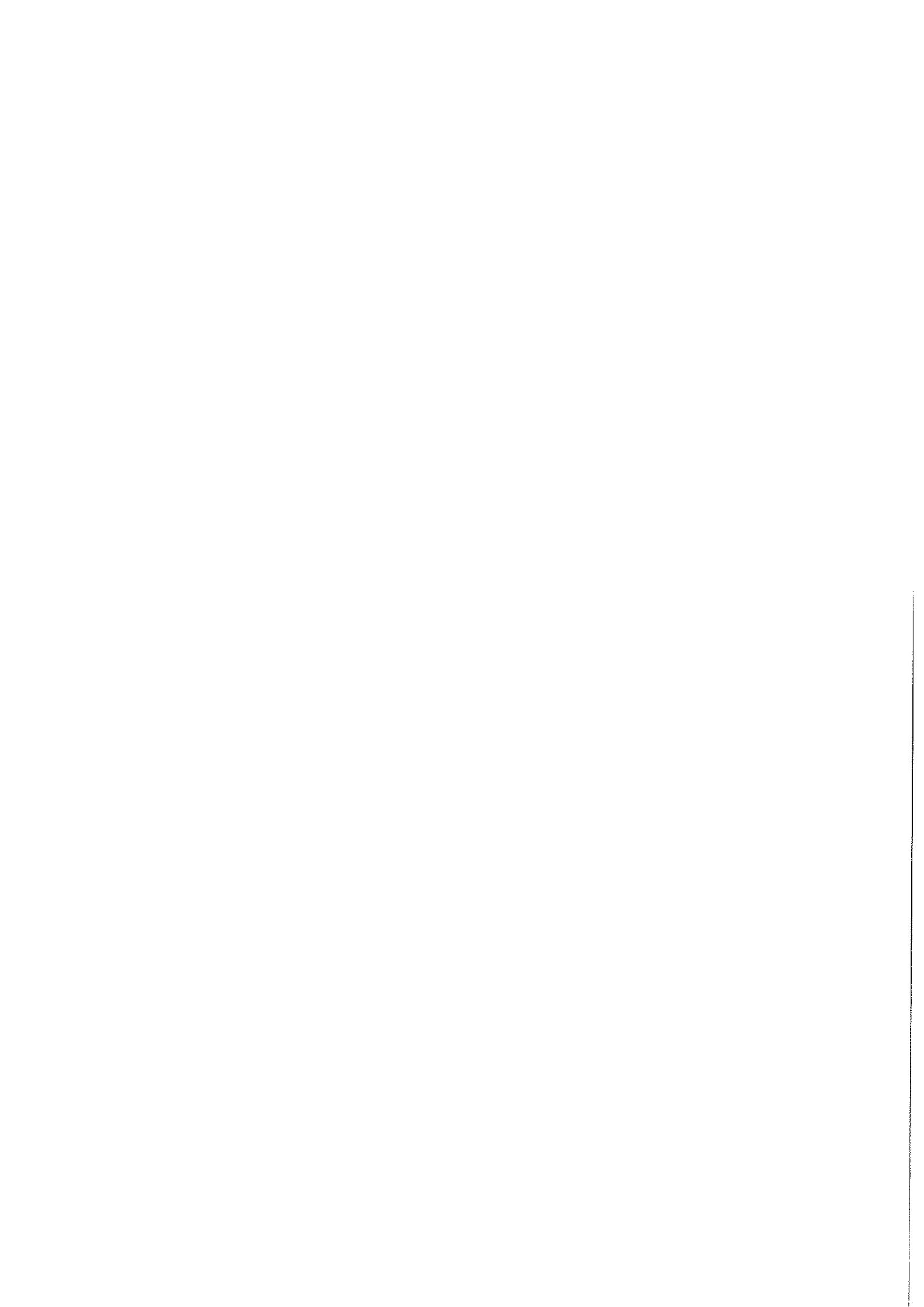
- Steady and support the injured part in the most comfortable position (most important is not to cause any more pain with wrong movement of the broken bone)
- Protect injury with padding (towels or cushions)
- Call emergency service or evacuate to the hospital by yourself
- Monitor the vital signs

In case of open fracture:

- Cover the wound with a sterile dressing
- Apply pressure to control the bleeding, but do not press on the protruding bone
- Secure the dressing with a bandage (not so tightly that it impairs the circulation)
- Immobilized the injured part as in close fracture

Special fracture cases:

- In case of facial fracture the main concern is that blood, saliva, bone or other tissue will obstruct the airway. So the main aim is to keep the airway open also use cold compression to reduce pain and limit the swelling
- Fractured pelvis maybe complicated by tissue injury (internal hemorrhage), so hypovolemic shock may develop.
- Broken (ribs) can cause breathing difficulties (due to pneumothorax) -the emergency treatment is to find the position that makes the least breathing difficulties
- Spinal fractures -are most common in the neck and lumbar area. Very important to avoid unnecessary movement of the head and neck to prevent further injury (move only in life threatening situation). Support the area of injury (without moving it)



- Note that in all fractures do not let the patient Eat, Drink, Smoke as general anesthetics may be needed

8. first aid in case of abdominal injuries

Blunt Injury {for example after car accident (steering wheel injury)}

- Blunt injury of the abdomen will damage mainly the spleen, kidneys, liver, and the intestine.
- The impact of the damage may cause the rupture of the ligaments of those heavy organs and their vessels
- For a blunt wound injury it is best to place the injured person on their side in a comfortable position. Since abdominal wounds prompt vomiting, by placing the person on one side it will allow them to expel the vomit with less likelihood of choking.

Penetrating Injury (for example stab wound)

- It is best to assume that a penetrating wound to the abdomen has caused damage to the victim's internal organs and treat them accordingly. If the penetrating object is impaled, do not attempt to remove the object. This action would most likely cause further damage to the injured person.
- Instead, stabilize the object and control the bleeding by placing a bulky dressing around the object. By surrounding the embedded object with a protective bandage you may prevent an object from moving or being driven in deeper causing further damage. Dressing the wound will help control bleeding, prevent infection and contamination, as well as absorb blood and drainage from the wound.
- Never remove a blood soaked dressing. Rather add layers of new, clean dressing material over the existing bandage. Again, seek immediate medical attention for the injured party.
- In the hospital :The surgeons must open the abdomen and explore for more damage of the abdomen.(investigating laparotomy)

Protruding organs

- In the case that an abdominal wound has resulted in causing protruding organs, do not attempt to reinsert the organs into the victim's body. This action could possibly damage the intestines or introduce infection in the body.
- The best course of action is to cover the protruding organs with a sterile dressing. The dressing needs to be sterile, because this material comes in direct contact with the open wound.
- Do not cover the organs tightly or cover them with any type of material that clings to the skin or would disintegrate when it becomes wet. Fluffy cotton or cotton balls would be a poor choice for dressing materials, because they contain fibers that can get into the wound causing difficulty upon removal.
- In order to help preserve the organs you may then pour water onto the dressing to keep the organs from drying out until emergency medical help arrives

Clinical signs for abdominal injury

- Abdominal swelling with hardening of the abdominal muscles
- Rib fracture in the left posterior side may indicate a spleen injury
- Radiated pain of the shoulders may indicate injury of the diaphragm (phrenic .N)
- Right shoulder radiated pain may indicate a liver injury
- Hematuria indicates on injury of the urinary system (kidneys ,bladder ,ureter)

9. cardiovascular resuscitation

- It is used in heart attack or near drowning, in which someone's breathing or heartbeat has stopped.

- CPR involves a combination of chest compression and mouth-to-mouth rescue breathing that keeps oxygenated blood flowing to the brain and other vital organs until more definitive medical treatment can restore a normal heart rhythm.
- When the heart stops, the absence of oxygenated blood can cause irreparable brain damage in only a few minutes. Death will occur within eight to 10 minutes. Time is critical when you're helping an unconscious person who isn't breathing.

AIRWAY: Clear the airway

1. Put the person on his or her back on a firm surface.
2. Open the person's airway using the head-tilt, chin-lift maneuver. Put your palm on the person's forehead and gently tilt the head back. Then with the other hand, gently lift the chin forward to open the airway.
3. Check for normal breathing, taking no more than 10 seconds:
 - Look for chest motion,
 - listen for breath sounds,
 - feel for the person's breath on your cheek and ear.

Card breaths
30:2

BREATHING: Breathe for the person

Rescue breathing can be mouth-to-mouth breathing or mouth-to-nose breathing if the mouth is seriously injured or can't be opened.

1. With the airway open (using the head-tilt, chin-lift maneuver) pinch the nostrils shut for mouth-to-mouth breathing and cover the person's mouth with yours, making a seal.
2. Prepare to give two rescue breaths. Give the first rescue breath — lasting one second — and watch to see if the chest rises. If it does rise, give the second breath. If the chest doesn't rise, repeat the head-tilt, chin-lift maneuver and then give the second breath.
3. Begin chest compressions to restore circulation.

CIRCULATION: Restore blood circulation with chest compressions

1. Place the heel of one hand over the center of the person's chest, between the nipples. Place your other hand on top of the first hand. Keep your elbows straight and position your shoulders directly above your hands.
2. Use your upper body weight (not just your arms) as you push straight down on (compress) the chest 2 inches (approximately 5 centimeters). Push hard and push fast — give two compressions per second, or about 100 compressions per minute.
3. After 30 compressions, tilt the head back and lift the chin up to open the airway. Prepare to give two rescue breaths. Pinch the nose shut and breathe into the mouth for one second. If the chest rises, give a second rescue breath. If the chest doesn't rise, repeat the head-tilt, chin-lift maneuver and then give the second rescue breath. That's one cycle. If someone else is available, ask that person to give two breaths after you do 30 compressions.
4. If the person has not begun moving after five cycles (about two minutes) and an automatic external defibrillator (AED) is available, apply it and follow the prompts. The American Heart Association recommends administering one shock, then resuming CPR — starting with chest compressions — for two more minutes before administering a second shock.
5. Continue CPR until there are signs of movement or until emergency medical personnel take over.

To perform CPR on a child: (age 1-8)

- Use only one hand to perform heart compressions.
- Breathe more gently.
- Use the same compression-breath rate as is used for adults: 30 compressions followed by two breaths. This is one cycle. Following the two breaths, immediately begin the next cycle of compressions and breaths.
- After five cycles (about two minutes) of CPR, if there is no response and an AED is available, apply it and follow the prompts. Use pediatric pads if available.
- Continue until the child moves or help arrives.

30:2

To perform CPR on a baby:

- Most cardiac arrests in infants occur from lack of oxygen, such as from drowning or choking. If you know the infant has an airway obstruction, perform first aid for choking. If you don't know why the infant isn't breathing, perform CPR.
- To begin, assess the situation. Stroke the baby and watch for a response, such as movement, but don't shake the child.
- If there's no response, follow the ABC procedures below and time the call for help as follows:
- If you're the only rescuer and CPR is needed, do CPR for two minutes — about five cycles — before calling 911 or your local emergency number.
- If another person is available, have that person call for help immediately while you attend to the baby.
- Cover the baby's mouth and nose with your mouth. -Prepare to give two rescue breaths. Use the strength of your cheeks to deliver gentle puffs of air (instead of deep breaths from your lungs) to slowly breathe into the baby's mouth one time, taking one second for the breath. Watch to see if the baby's chest rises
- If the chest still doesn't rise, examine the mouth to make sure no foreign material is inside. If the object is seen, sweep it out with your finger. If the airway seems blocked, perform first aid for a choking infant.
- Imagine a horizontal line drawn between the baby's nipples. Place two fingers of one hand just below this line, in the center of the chest.
- Count aloud as you pump in a fairly rapid rhythm. You should pump at a rate of about 100 to 120 pumps a minute.
- Give two breaths after every 30 chest compressions.
- Perform CPR for about two minutes before calling for help unless someone else can make the call while you attend to the baby.
- Continue CPR until you see signs of life or until a professional relieves you.

1

Check response.
Can you hear me?
Open your eyes.
What's your name?
Squeeze my hand.



2

Establish an airway
Support the jaw and
tilt the head.
If you see fluid or
foreign objects, turn
the patient onto
their side and clear.



3

Check for breathing
Look at the chest.
Listen for air
escaping.
Feel for air escaping
and chest rising.



4

If no breathing, give
two rescue breaths.



At A Glance



Check for danger



Call for help



If no signs of
life, give CPR

5

If still no signs of life
Give 30 compressions
on the centre of
the chest and two
rescue breaths.
Do this at least 5
times in 2 minutes.



6

If the person shows
signs of life, then
place the person on
their side.



7

Continue until help
arrives.
If available,
implement a
defibrillator as soon
as possible.



What happens when you call 000?

Firstly, a Telstra operator will confirm which agency you require, your location and the state you are in.
Ask for an Ambulance.
Then a trained Ambulance Communications Officer will dispatch paramedics having asked you the following questions:

- the location of the incident
- the call back phone number
- details of the incident
- if the casualty is conscious
- if the casualty is breathing
- the casualty's exact injury or illness.

The Communications Officer will then make you aware of the actions you should take until the paramedics arrive.

Adult CPR

1. Tilt head
2. Give 2 full breaths
3. Start compressions using both hands - 30 times
4. Repeat - 2 breaths, 30 compressions
5. Continue until the ambulance arrives, patient recovers or it is impossible to continue.



Child CPR (1-8 years)

1. Tilt head
2. Give 2 full breaths
3. Start compressions with one hand - only 30 times
4. Repeat - 2 breaths, 30 compressions
5. Continue until the ambulance arrives, patient recovers or it is impossible to continue.



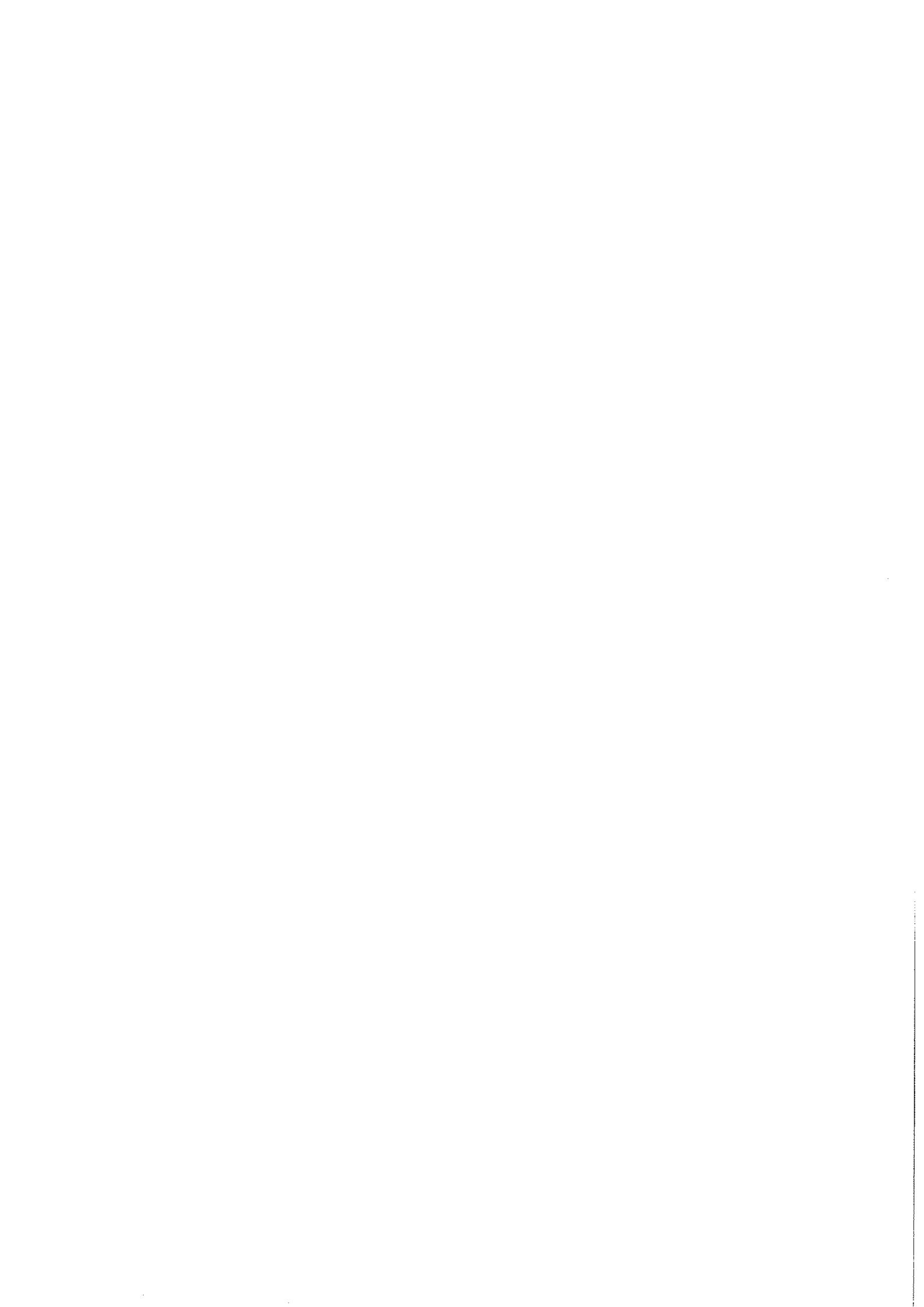
Infant CPR (0-1 years)

- DO NOT TILT HEAD!**
1. Give 2 breaths (puffs)
 2. Start compressions using two fingers only - 30 times
 3. Repeat - 2 breaths, 30 compressions
 4. Continue until the ambulance arrives, patient recovers or it is impossible to continue.



10. First aid in case of drowning

- Get the person out of the water. Do not try to rescue someone if it will severely endanger your life. Rather call for help, and try to reach the person from land with a pole or rope. Tie yourself to something secure on shore if you have to swim to the person.
- When the drowning man is taken out of the water, he is laid with his feet higher than his head. This helps the water go out of the lungs. The mouth is cleared with the forefinger.
- Do the ABC's. Check for foreign bodies in the airways, such as weed, but do not waste time by trying to drain swallowed water. If the person needs CPR, start immediately.



- Once on shore, place the person in the recovery position if there are no spinal injuries. Keep the person warm.
- If you suspect a spinal injury and CPR is not required, don't move the person to land. Keep him lying face up in the water until help arrives.
- All near-drowning victims should be observed in hospital for 24 hours.
- If the airway is obstructed making breathing impossible, perform the Helmlich maneuver to clear it.
- Once on shore, reassess the victim's breathing and circulation. If there is breathing and circulation without suspected spine injury, place the person in recovery position (lying on the stomach, arms extended at the shoulder level and bent, head on the side with the leg on the same side drawn up at a right angle to the torso) to keep the airway clear and to allow the swallowed water to drain. If there is no breathing, begin CPR.
- Continue CPR until help arrives or the person revives.
- Keep the person warm by removing wet clothing and covering with warm blankets to prevent hypothermia.

Medical Treatment

- Someone with no symptoms after a near drowning will be observed in the emergency department for 6-12 hours and should follow up with a doctor in 1-3 days.

Someone with symptoms will be treated as follows:

- CPR if not breathing
- Oxygen for people with low oxygenation
- Breathing tube and machine if person is not breathing properly
- Heated Intravenous fluids to increase low blood pressure and to warm up the victim
- Stomach tube to decrease abdominal distension that may cause vomiting
- Immobilization of neck with a collar for suspected neck injury
- Invasive monitors if person has cardiac or respiratory instability
- Bronchodilators to decrease airway spasm
- Antibiotics for lung infections
- Steroids to decrease lung inflammation
- Treatment for shock and hypothermia
- Hyperbaric chamber for divers with decompression sickness (the bends)

11. The primary goal of operative management of panatrium:

See question A 13

- Primary goal: Inhibition of spreading of infection -> cleaning the wound from pus and necrotic tissue to prevent an infection of tendons, ligaments or bones which can lead to amputation.

- Treatment: Immobilization of the region, opening of the wound that pus can flow-out, remove necrotic tissue if necessary, install drainages, pay attention to hygiene (e.g. change bandages every day, work with gloves, etc.), antibiotics prophylaxis

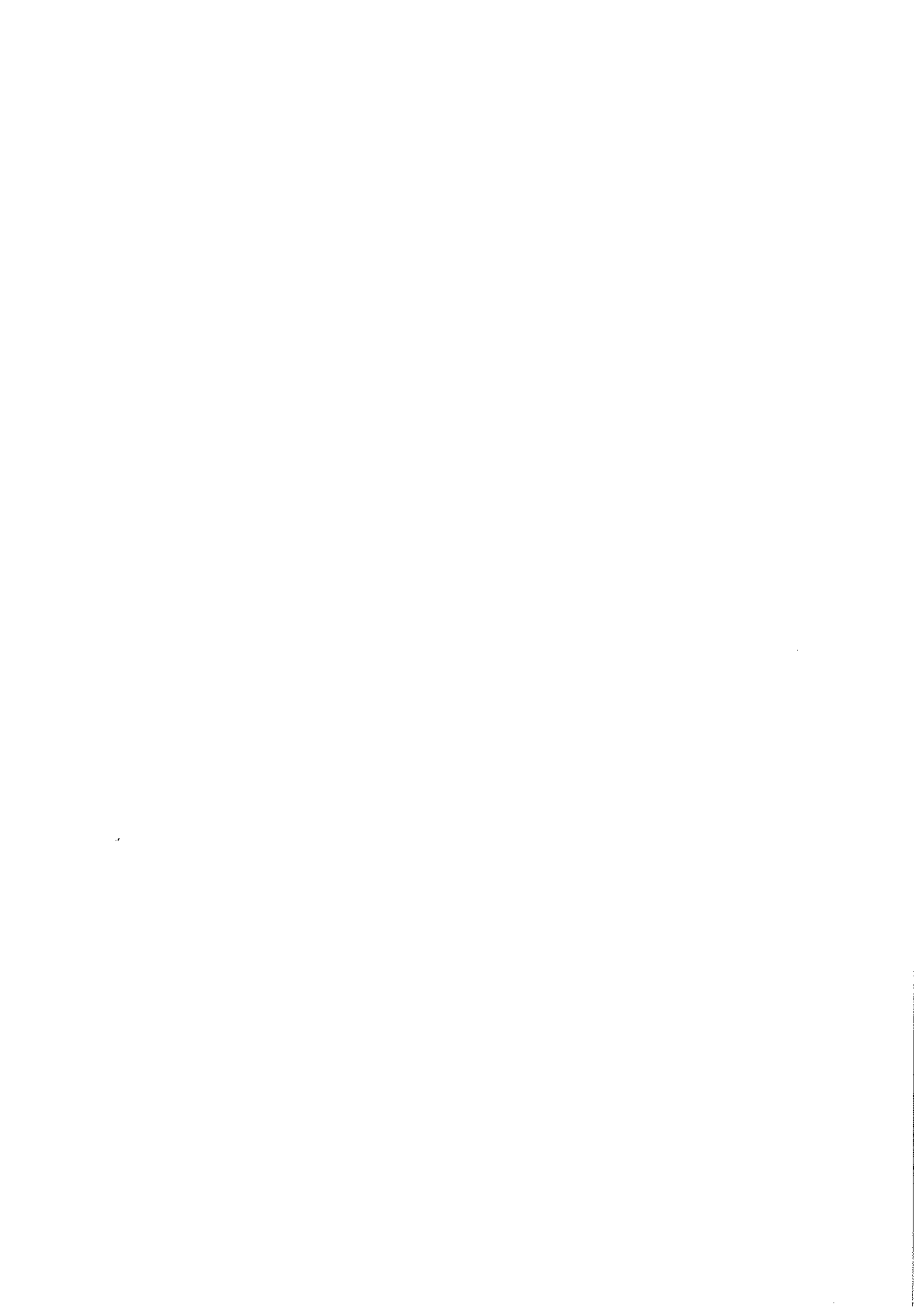
- possible complications:

that longer you wait with the treatment that higher is the possibility for complications amputation or inhibition of the movement
if infection reached tendons or bones, you may have to perform a second operation phlegmona (spreading of the inflammation)
sepsis/ blood poisoning

- CLEANING
- IMMOBILIZATION
- OPENING / DRAINAGE
- AB PROPHYLAXIS

12. Prehospital care of burn patients:

Burns can cause: pain, reddened skin, blisters, breathing difficulties, signs of shock, in case of burns caused by fire, assume that smoke or hot air has also affected the respiratory system



Severe burns and scalds:

- the longer the burning the more severe the injury will be
- stop the burning
- open airways and check breathing
- lie down the patient
- douse the burn with plenty of cold water (at least for 10 min)
- remove ring, watches, belts (in case of swelling), remove burnt cloth unless it is sticking to the burn
- cover the injured area with sterile dressing to protect it from infection (exception: burns in the face are not covered!)
- regularly monitor his/her vital signs
- DON'T: don't over-cool (-> lowering of body temperature), don't remove any sticking to the burn, don't touch burned area, don't burst any blisters, don't apply lotions, ointments, fat to the burned area

Minor burns and scalds:

- douse the burn with plenty of cold water (at least for 10 min)
- remove ring, watches, belts (in case of swelling)
- cover the injured area with sterile dressing to protect it from infection
- in case of blisters: normally no treatment, if the blister breaks, apply a non-adhesive dressing and leave it till it subsides

Burns to the airways:

- recognition: soot and skin damage around the mouth, singeing of nasal hairs, redness and swelling of the tongue, hoarseness of the voice, breathing difficulties
- urgent removal to the hospital
- give patient small sips of cold water or ice (prevention of swelling of the airways)
- monitor vital signs

Electrical burns:

look at question B 13

Chemical burns:

- ventilate the area to disperse fumes, seal the chemical container
- flood the burn with water (at least 20 min) to stop burning and disperse the chemical
- remove cloth while flooding the injury
- make sure that the airways are open and monitor vital signs
- keep the details of the chemical substance

Chemical burn to the eyes:

- don't touch the eye or remove contact lenses
- hold the affected eye under gently running cold water (for at least 10 min), the water has to run away from the face (!)
- if there is spasm of the eyelid, pull the open
- put a sterile eye dressing on the affected eye

Flash burns of the eye:

- don't remove contact lenses
- cover both eyes with a sterile pad

13. Prehospital care of patients with electrical injuries:

Electrical injuries can cause: stopping of breathing or heartbeat, cardiac arrest, unconsciousness, signs of shock, swelling, muscular spasm, burns

High-voltage current:

- keep distance more than 18 m, cut off the power
- normally you find an unconscious patient, open airways, check breathing, start with chest compression and rescue breath of necessary, if patient is breathing put him/her in the recovery position
- monitor and record vital signs (level of response, pulse, breathing)

Low-voltage current:

- break contact with the electrical supply (stand on a dry isolated material, use a wooden stick to push the electrical source away)
- normally you find an unconscious patient, open airways, check breathing, start with chest compression and rescue breath of necessary, if patient is breathing put him/her in the recovery position
- monitor and record vital signs (level of response, pulse, breathing)

Electrical burns:

- break the contact with the electrical source
- flood site of injury (at entry and exit point of the current) with plenty of cold water
- place a sterile dressing, a clean, folded triangular bandage over the burn to protect it against airborne infection
- if necessary treat him for shock

14. Prehospital care of patients with shock:

- TACHYCARDIA, SWEATING, WEAKNESS, THIRST, RAPID SHALLOW BREATHING.

- Recognition:
1. rapid pulse, pale, cold and clammy skin, sweating
 2. grey-blue skin (cyanosis), weakness and dizziness, nausea and vomiting, thirst, rapid and shallow breathing, weak pulse
 3. restlessness and aggressiveness, gasping for air, unconsciousness

Treatment:

- treat any obvious cause of shock (e.g. bleeding, burns)
- Lay patient down and reassure him constantly
- Raise legs to improve blood supply to vital signs (brain, lungs heart)
- Loosen cloth on neck, chest and waist and keep patient warm
- Monitor vital signs (level of response, breathing, pulse), if person becomes unconscious: open airways, check breathing, chest compression
- DON'T let patient drink, eat, smoke, don't leave the patient unattended

Anaphylactic shock:

- Recognition: Anxiety, red and blotchy skin eruptions, swelling of tongue and throat, puffiness around the eyes, impaired breathing/gasping for air, normal signs of shock

Treatment:

- urgent transport to the hospital
- Check if the patient carries the necessary medication for self-administration (e.g. adrenaline, epinephrine) → VASOCONSTRICTION, ↑HR; BRONCHODILATOR
- Treat like in normal shock

15. Symptoms and signs of hypovolemic shock, diagnosis, treatment:

- Decrease in circulatory volume leading to hypotension, decrease of central venous pressure and cardiac output, compensatory tachycardia with peripheral vasoconstriction
- circulatory blood volume = 7% of body weight or approx .5 Litres in 70kg man

Class I/mild shock:

- loss of up to 15% of circulatory volume (500 cc),
- poor perfusion of non-vital organs – skin, muscle, fat, bone
- mild tachycardia
- BP, respiratory rate, urine output are normal
- capillary blanch test is normal (press on fingertip → colour-change, if it stays white there is a shock)
- treatment: crystalloid solution (no blood transfusion)

Class II/Moderate shock:

- 15-30% circulatory volume loss (750-1500 cc)
- Preservation of the remaining blood flow to heart and brain at the expense of other organs
- Tachycardia (100-120/min)
- Minimal decrease in BP, anxiety, urine output (20-30 ml/h)
- Patient is (pale, anxious, restlessness)
- Treatment: crystalloid solution (no blood transfusion, if patient is mid-age and healthy)

Class III/moderate shock:

- 30-40% of volume loss (1500-2000 cc)
- Pulse greater than 100/min, tachypnea
- Diastolic and systolic hypotension
- Urine output: 5-15ml/h
- Treatment: crystalloid solution in combination with blood transfusion

Class IV/ severe shock:

- over 40% volume loss (more than 2000ml)
- Inadequate perfusion of heart and brain
- life threatening stage
- all classical shock-symptoms are present: skin is cold, clammy and pale, pulse rate 140 or higher, hypotension, urine output minimal (anuria), sometimes coma
- treatment: crystalloid solution and blood transfusion, central venous access in V. subclavia

MODS: multiple organ dysfunction syndrome: most common cause of death for patients with shock

16. Prehospital care of patients with brain and cranium injuries:

Impaired consciousness:

- AVPU-Code: A= Alert? -> open eyes and respond to questions
 V= Voice? -> answering of simple questions and obey to commands
 P= Pain? -> opening of eyes when pinched
 U= Unresponsive? -> respond to any stimuli

Cerebral compression:

Recognition: level response, history of recent head injury, intense headache, noisy and low breathing, unequal pupil size, weakness or paralysis, drowsiness, high temperature, change in personality

Treatment: urgent remove to the hospital
 If conscious: check vital signs and move him into rescue position *recovery position*
 If unconscious: open airways, check breathing, if necessary chest compression and rescue breaths *CPR*

Skull fracture:

Recognition: wound or bruise on head, depression or soft area on skull, swelling behind ear, clear fluid or blood running from nose or ear, blood in white of eyes, lack of symmetry in face, deterioration in level of response

Treatment: DON'T turn head
Control bleeding by apply pressure on wound.
If discharge of one ear, cover it with sterile dressing and secure it with a Bandage
 If conscious: check vital signs (level of response, pulse, breathing)
 If unconscious: open airways, check breathing, if necessary chest compression and rescue breaths *CPR*

Stroke:

Recognition: Problem with speech and swallowing, ask to show the teeth -> check if only one side moves up or both, loss of power or movement in limbs, sever and sudden headache, confused emotional and mental state, sudden loss of consciousness

Treatment: lay down, shoulders and head inclined
Loosed cloth which could inhibit breathing
If conscious: check vital signs (level of response, pulse, breathing)
If unconscious: open airways, check breathing, if necessary chest compression and rescue breaths

Meningitis:

Recognition: high temperature, vomiting, neck stiffness, headache, joints and muscle pain, drowsiness, confusion, dislike of bright light, seizures, skin rash (doesn't fade when you press a glass against rash)

Treatment: urgent medical help
Reassure the patient and keep him cold

17. Prehospital care of patients with joint injuries:

1000 e majica diti

Fractures:

Recognition: deformity, swelling, bruise, pain, difficulties in moving the are, signs of shock, wounds

Treatment: Immobilizes with bandages (upper limbs: against the trunk, lower limbs: against healthy leg)
check circulation beyond bandages every 10 min -> if no circulation, looses bandages
In case of an open fracture: cover wound with sterile dressing without pressing on protruding bone and immobilize it

Dislocated joint:

Recognition: sickening, severe pain, difficulties in moving the area, swelling and bruises, shortening, bending or twisting of the area

Treatment: Immobilize the injured part in the most comfortable position for the patient
Treat for shock, check vital signs and circulation beyond bandages (10 min)

Strains and Sprains:

Treatment: support injured part in a comfortable position and cool it to reduce swelling and pain
apply gently pressure around the injured part with a thick layer of bandages
check circulation beyond bandages (10 min)
raise and support the injured part to reduce blood flow to the injury
RICE ^{rest}
_{ice}
compression
elevation

18. Prehospital care of patients with respiratory failure:

Recovery position or C-PR

Airway obstruction:

Recognition: features of hypoxia, difficulties in speaking and breathing, nolsy breathing, red and puffy face, dry cough

Treatment: remove the obstruction (if it is external or visible)
Monitor vital signs, if necessary give chest compression and rescue breaths

Hangings or Strangulation:

Treatment: remove any constriction, open airways, place the victim in recovery position, if vital signs are present, if not: chest compression and rescue breaths

Inhalation of fumes:

reatment: remove victim form source of fumes,
If he is unconscious: chest compression and rescue breaths, if not: recovery

Poison
Check vital signs

Hyperventilation:

Recognition: fast breathing, dizziness, cramps in hand and feet

Treatment: calm patient down, if necessary ask patient to rebreath slowly her own exhaled air from paper bag (10 breath in bag, 15 sec without, 10 breath with...)

Asthma:

Recognition: difficulties in breathing and speaking, wheezing, hypoxia, distress and anxiety, Cough

Treatment: look for patients own medication
Put patient in the most comfortable breathing position
(mild attacks ease within 3min)

19. Methods of transportation of the injured victim:

- check vital signs (breath, circulation, consciousness, loss of fluid), recheck every 5 min
- provide intubation (if no breathing), vein excess, etc.
- act like patient has a severe injury, be always prepared for emergency, e.g. patient crushes suddenly -> act fast
- immobilization of the patient
- give painkillers (intravenously, because it is more effectely)
- document patients condition, applied drugs, etc.
- inform the hospital about the arriving of the patient and the kind of injury
- don't waste time

ABC:

A = Airways

B = Breathing (e.g. saturation)

C = Circulation (e.g. heart frequency)

D = Disability (e.g. response, stimull, abnormal pupils)

E = Electrolytes

F = Fluids

G = Gastrointestinal

H = Hematology (laboratory tests)

I = Infections

Lines (e.g. catheter, venous excess)

M = Medication

N = Nutrients

20. Prehospital care of patients with cardiogenic failure:

Angina pectoris:

Recognition: Vice-like central chest pain which can spread to the jaw and down the arms, shortness of breath, weakness, anxiety

Treatment: ease stress on the heart by ensuring that the patient rests and is in a comfortable position

Look for patient medication for angina (tablets, pump-actions or aerosol spray)
If pain persists or comes back, suspect a heart attack

Heart attack:

Recognition: persistent, vice-like central chest pain, often spreading to jaw or arms, breathlessness, collapse, dizziness, blueness of lips, weak and irregular pulse, sweating, air hunger

Treatment: ease stress on the heart by ensuring that the patient rests and is in a comfortable position (most common: half-sitting, shoulders and neck well supported, bent the knees)
if patient is conscious: 300mg (aspirin) tablets -> let patient chew them slowly or if present: medication for angina
constantly monitor vital signs
if patient is unconscious: open airways, check breathing, chest compression and rescue breath if necessary

Fainting:

Recognition: brief loss of consciousness, slow pulse, pale and cold skin, sweating

Treatment: raise legs of patient (improve blood flow to the brain)

21. Prehospital care of patients with bleeding:

Sever bleeding:

Treatment: remove clothing to expose the wound

1. If no subject is inside the wound:

apply directly pressure over the wound with your fingers or palm in best case over a sterile dressing

Raise and support the injured limb above the level of the heart

Lay patient down and secure the dressing with a bandage (maintain pressure, but, make sure that there is still circulation)

if further bleeding occurs, put a second bandage over the first one
monitor vital signs and check circulation beyond the bandage

2. If subject is in the wound:

Press firmly on either sides of the embedded object to push the edges of the wound together

Lay patient down and raise the the limb above the level of the heart

Build up a padding on either side of the object, bandage carefully over the object with out pressing on it

monitor vital signs and check circulation beyond the bandage

Amputation:

Treatment: 1. Patient:

Control blood loss by applying pressure and raise the injured part

Apply a sterile pad and fix it with bandage

monitor vital signs and check circulation beyond the bandage

2. the amputated part:

Wrap the severed part in kitchen film or a plastic bag, wrap it in soft fabric and put it into a container full of crushed ice

mark the container with the time of injury and casualty's name

Crush injury:

Treatment: 1. Crushed for less than 5 min:

Release casualty quickly and control external bleeding, cover the wounds

Secure and support fractures, treat for shock - reassure them, raise limbs, warm, lie down, vital signs, loosen clothing

monitor vital signs

2. Crushed for more than 15 min.:

DON'T release patient(!!!)

monitor vital signs

(PR (if needed), don't let them eat, drink, smoke anything)

Vaginal bleeding:

Reasons: Menstrual bleeding, cramps, pregnancy, recent abortion or childbirth, Internal

Treatment infection, injury as a result of sexual assault
clean towel, make her comfortable, for cramps/menstrual bleeding:
painkillers
If necessary treat for shock

Bleeding varicose vein:

Treatment: lay patient down, lift up leg -> reduce bleeding
apply firmly pressure on the area, use a sterile dressing
remove garments or elastic-topped stockings
monitor vital signs and check circulation beyond the bandage

22. Prehospital care of patients with thorax trauma:

Pneumothorax/ penetrating chest wounds:

Recognition: difficulties and painful breathing, hypoxia, coughed-up red blood, crackling feeling in the skin around the wound, blood bubbling out of wound, sound of air being sucked into chest, veins in the neck become prominent

Treatment: encourage the victim to lean toward the injury side and use palm of his hand to cover the wound.
place a sterile dressing on the wound, cover it with kitchen foil or a plastic bag and fix it with tape
If conscious: check vital signs (level of response, pulse, breathing)
If unconscious: open airways, check breathing, if necessary chest compression and rescue breaths

Crush Injuries:

Question: 21

Injuries of the ribcage:

Recognition: sharp pain in the side of fracture, pain in deep breathing, shallow breathing, shock

Treatment: support the arm on the injured side
Treatment like in pneumothorax
If you put victim in recovery position, lay him on injured side -> lung at the healthy side can work better

if Left lung injured, lay down on left side

