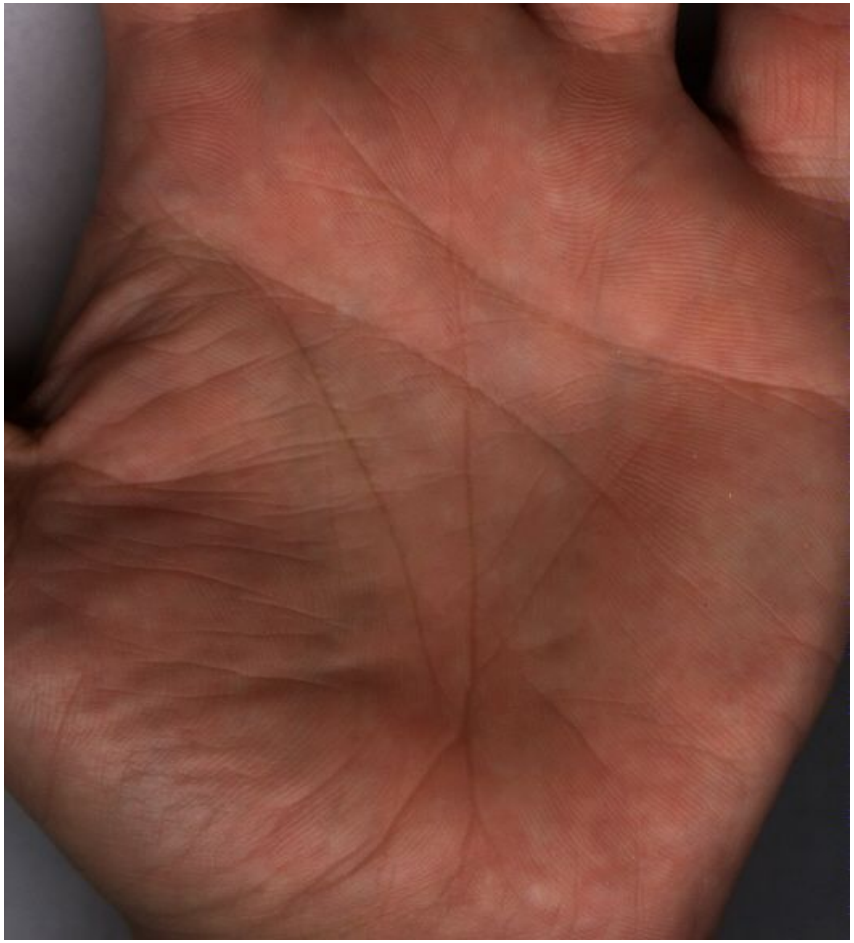
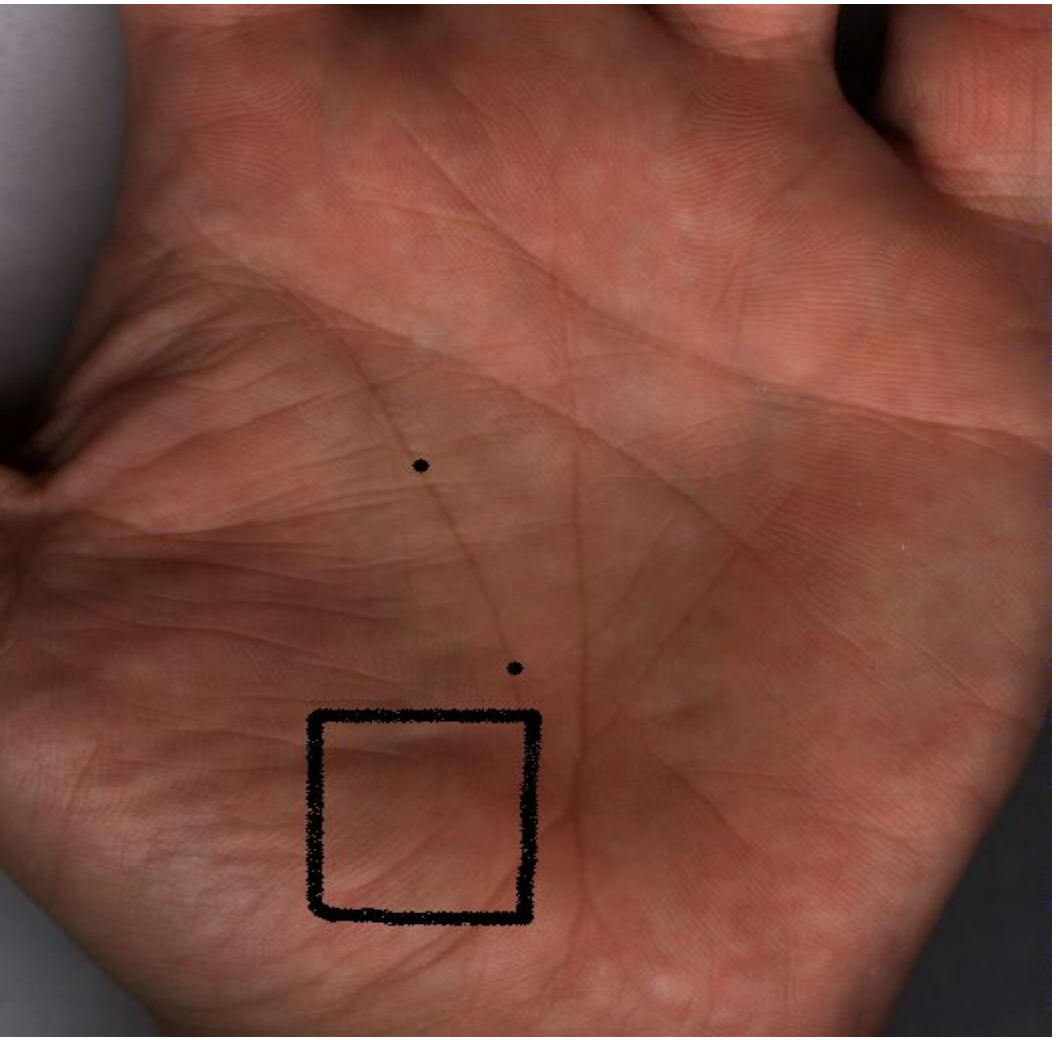
Topographical anatomy of the hand and fingers. Incisions.

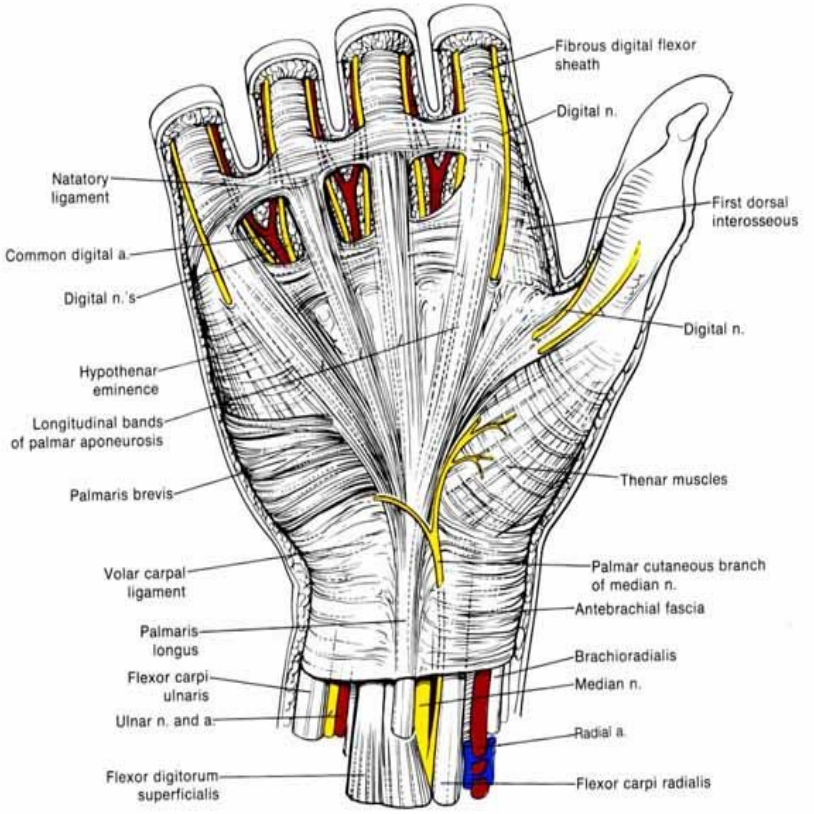
The meaning of hand and fingers is enormous for life. Person can’t fulfill a lot of jobs without hand or fingers. So, operative surgery of hand is a very important unit in general medicine.

Look at your hand! You can see some lines.
1) Thenar line
2) transverse proximal line
3) transverse distal line
In operative surgery and topographical anatomy this lines are used for determination of arteries and nerves projection.

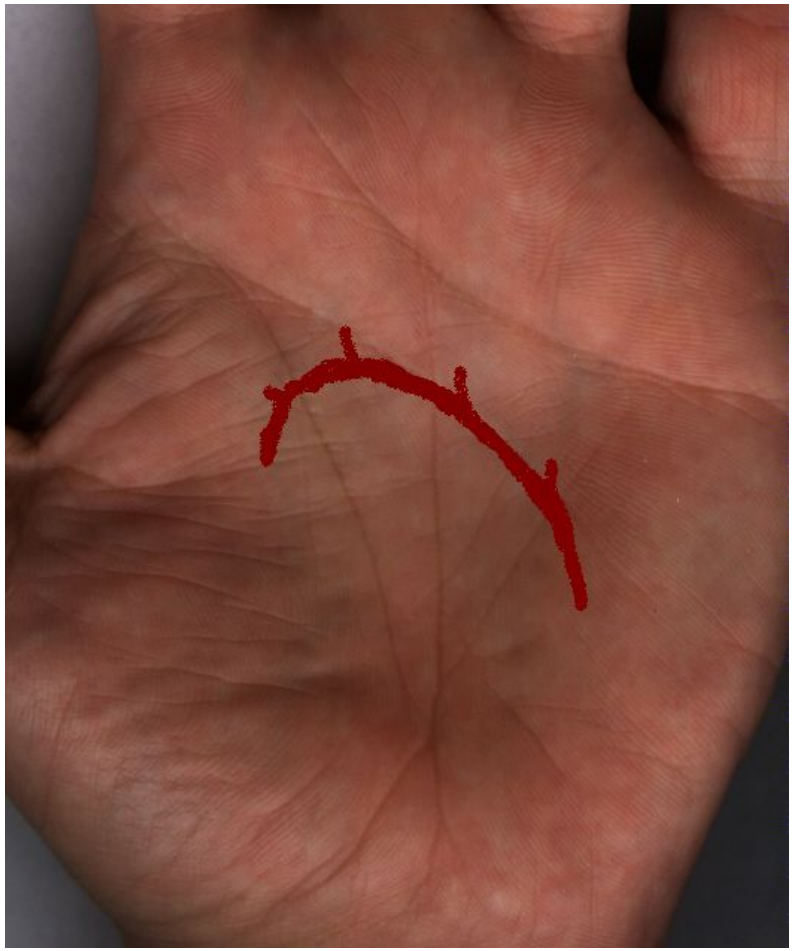


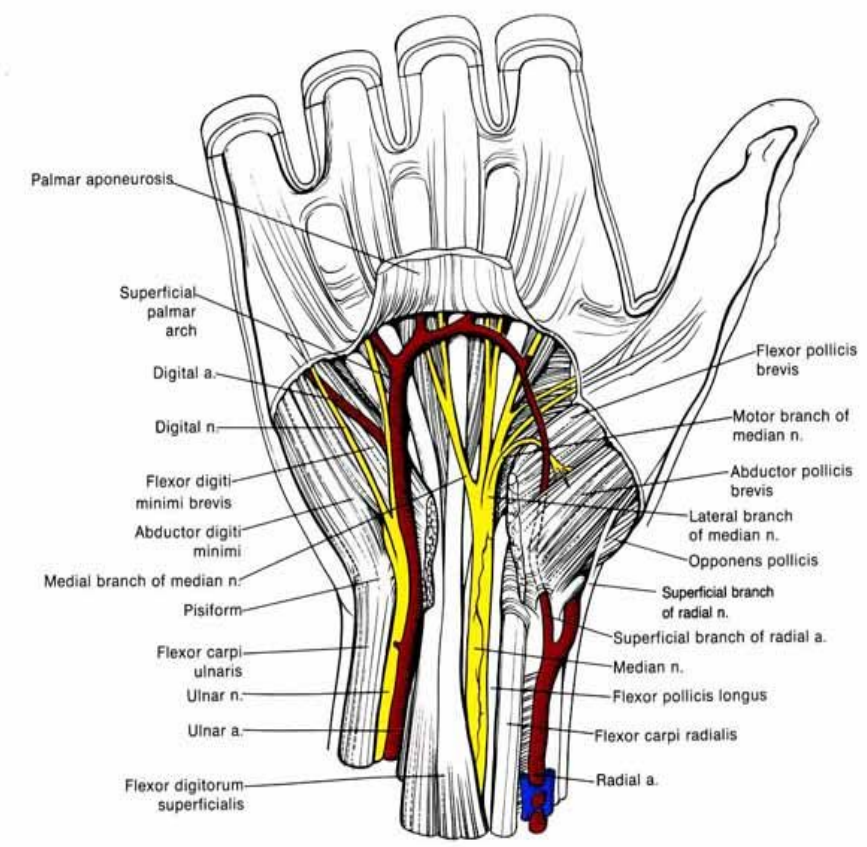
If you divide thenar line into three parts and draw a square, where a proximal third is one side of square, you'll get Kanavel's prohibited area – the brunsh of n.medianus to m. opponens pollicis is located here. Incisions in this area are forbidden, because m. opponens pollicis may lost its function.



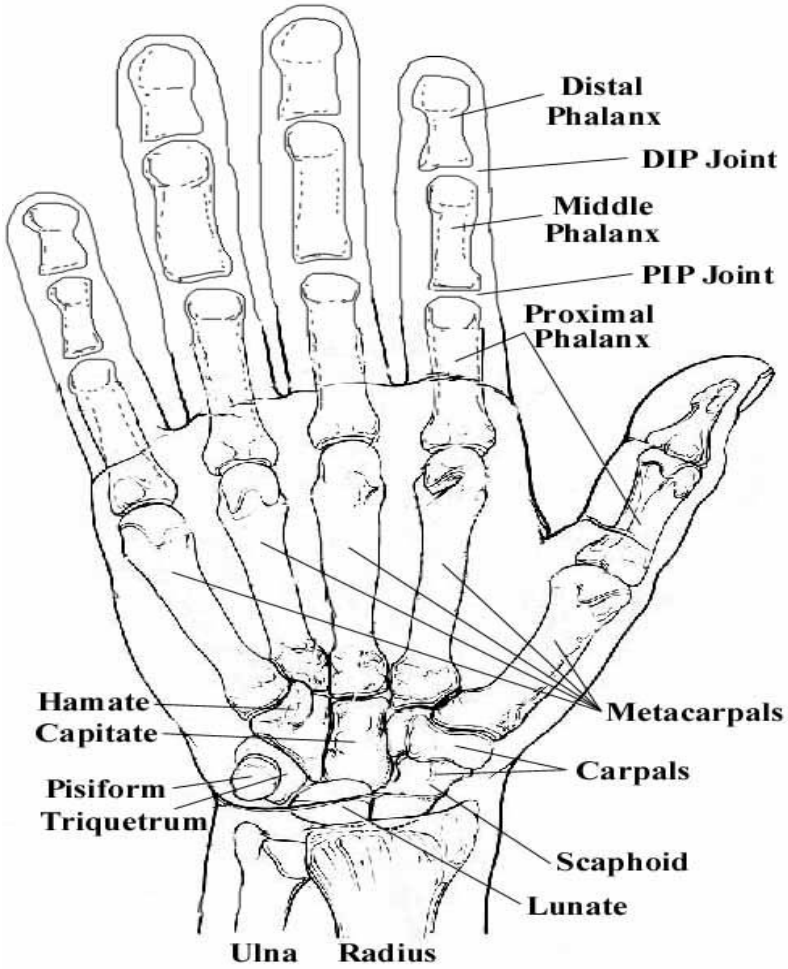


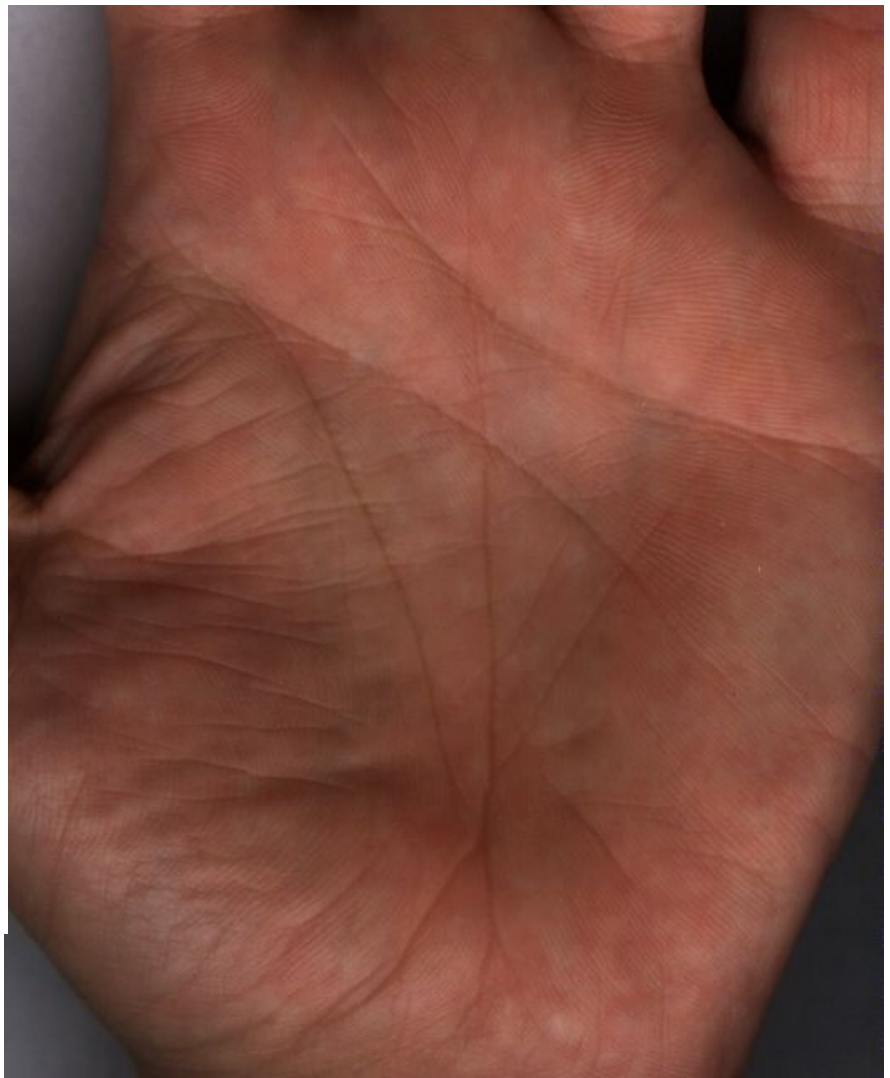
Transverse proximal line is projection of arcus palmaris superficialis





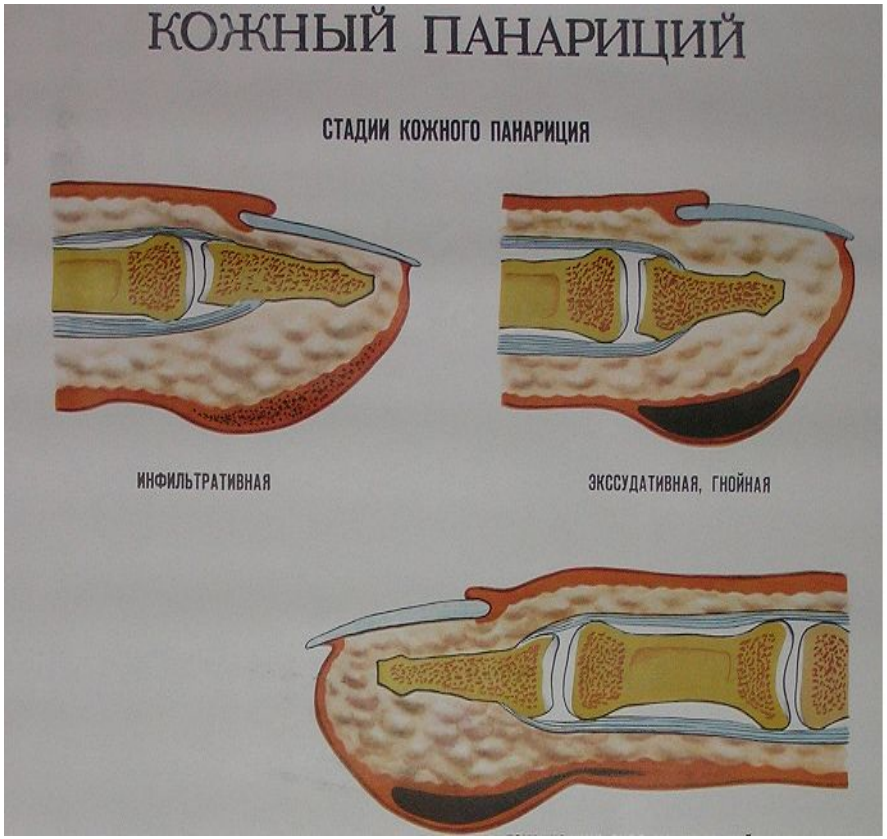
Transverse distal line is projection of metacarpophalangeal joint
Proximal interdigital line is the middle of proximal phalanx
Medium and distal interdigital line is interphalangeal [digital] joint





Scin and its characteristics:

1. Epithelial tissue consist of more then 100 rows of cells
2. Pigmentation, sebaceous glands, hair are absent
3. There are a lot of sudoriferous [sudoriparous] glands

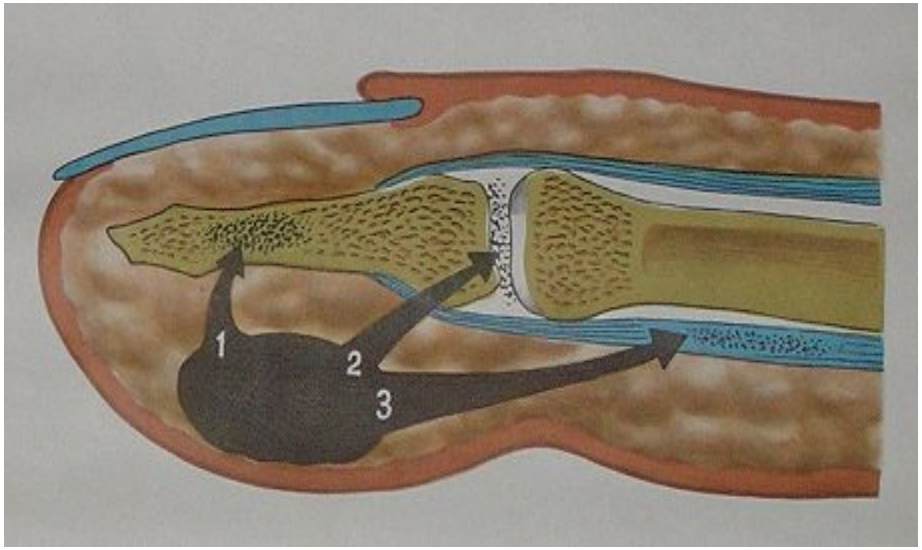


Characteristics of subcutaneous fat

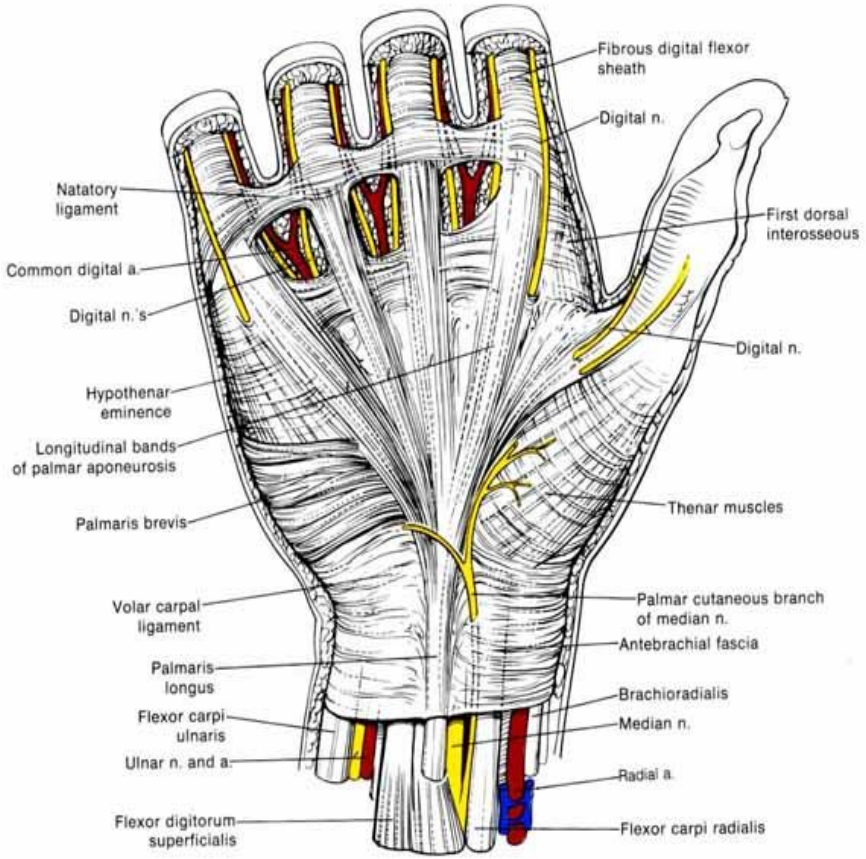
1. Slow subcutaneous fat regeneration.
2. Lack of fascia superficialis.
3. Subcutaneous fat in the fold area is considerably less.
4. Subcutaneous fat has cellular structure.

Characteristics of cellular structure

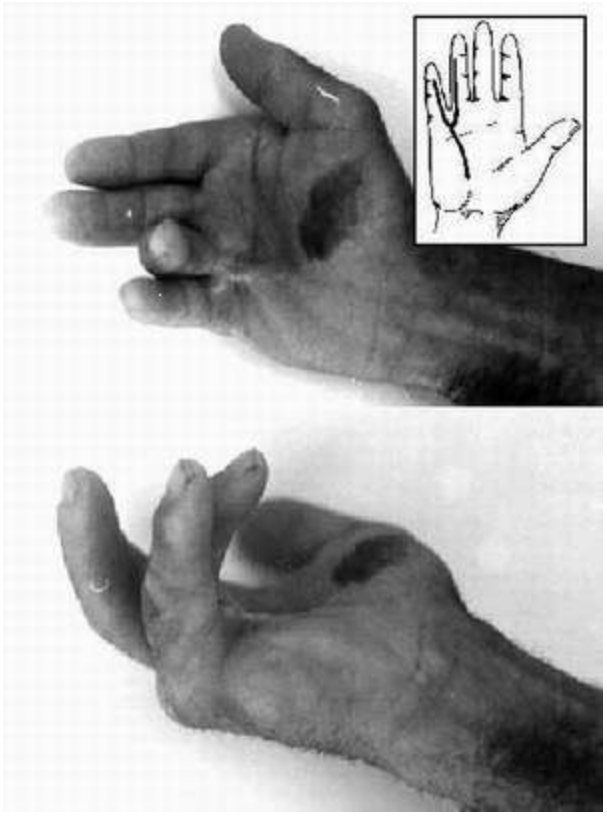
- Purulent process tends to spreading inside
- Infiltration anesthesia is very difficult – block anesthesia is used



Palmar aponeurosis has triangular shape.
One of the illnesses of palmar aponeurosis is Dupuytren's contracture.



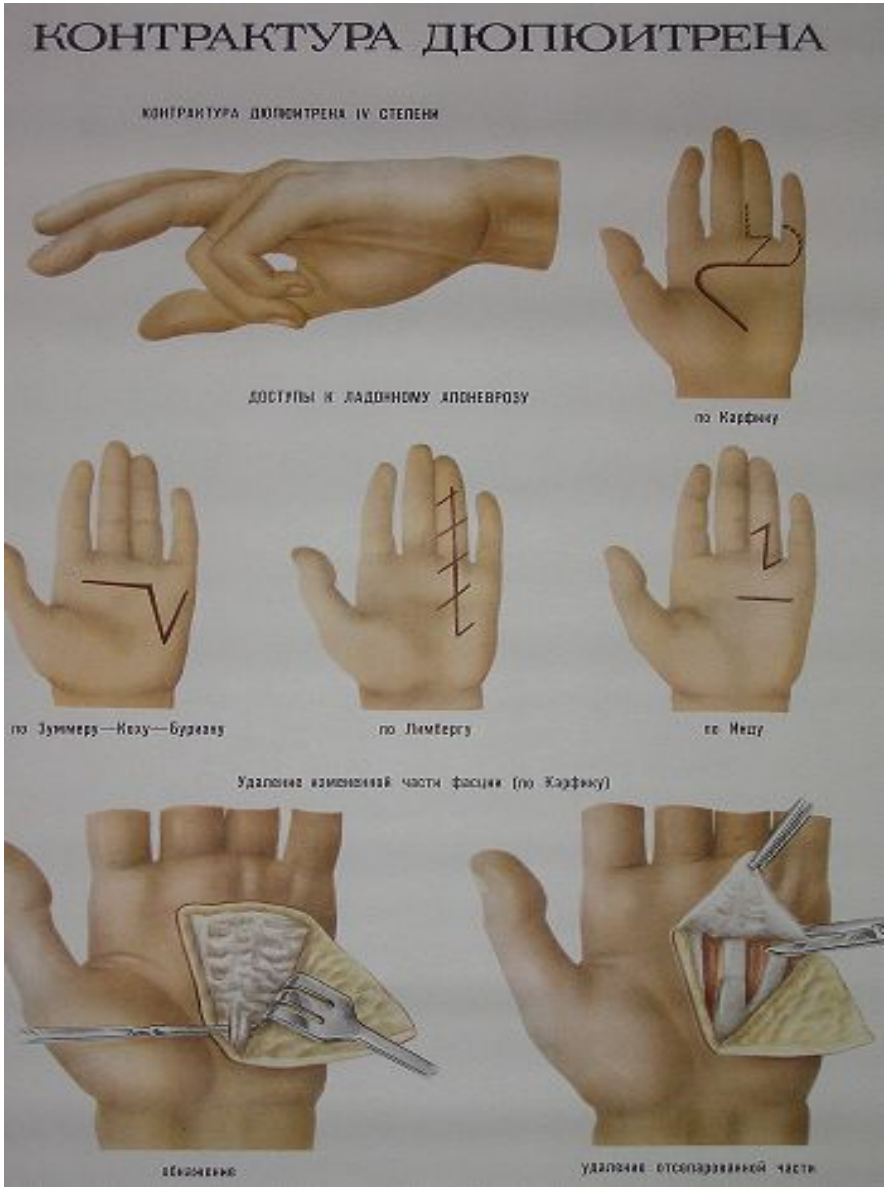
- Dupuytren's contracture



- Dupuytren's contracture (also known as "Morbus Dupuytren," "Dupuytren's disease," or "Palmar fibromatosis", and sometimes misspelled as Dupuytren's constricture) is a fixed flexion contracture of the hand where the fingers bend towards the palm and cannot be fully extended (straightened). It is named after Baron Guillaume Dupuytren, the surgeon who described an operation to correct the affliction.

- Dupuytren's contracture is caused by underlying contractures of the palmar fascia. The ring finger and little finger are the fingers most commonly affected. The middle finger may be affected in advanced cases, but the index finger and the thumb are nearly always spared. Dupuytren's contracture progresses slowly and is usually painless. In patients with this condition, the tissues under the skin on the palm of the hand thicken and shorten so that the tendons connected to the fingers cannot move freely. The palmar aponeurosis becomes hyperplastic and undergoes contracture.

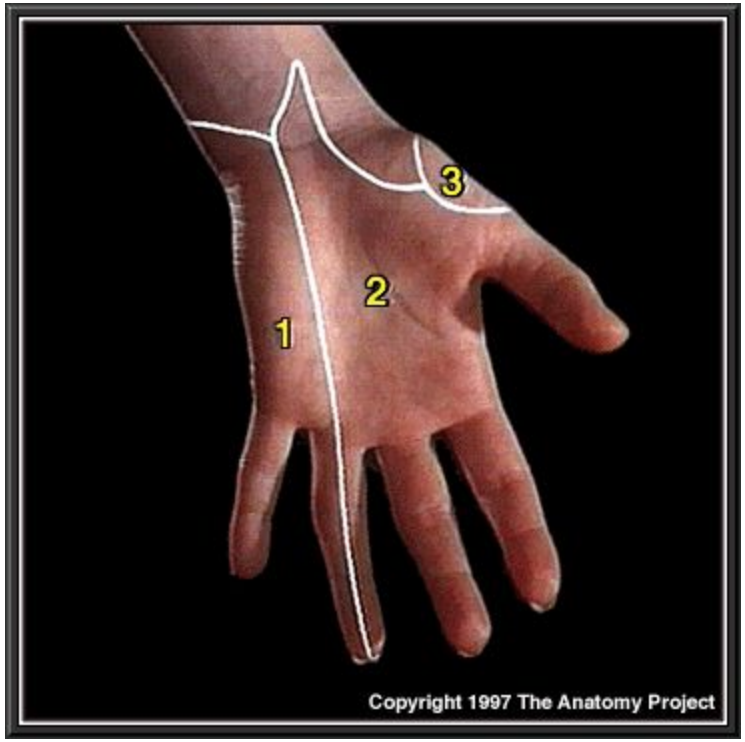
It’s operative [surgical] technique for Dupuytren's contracture

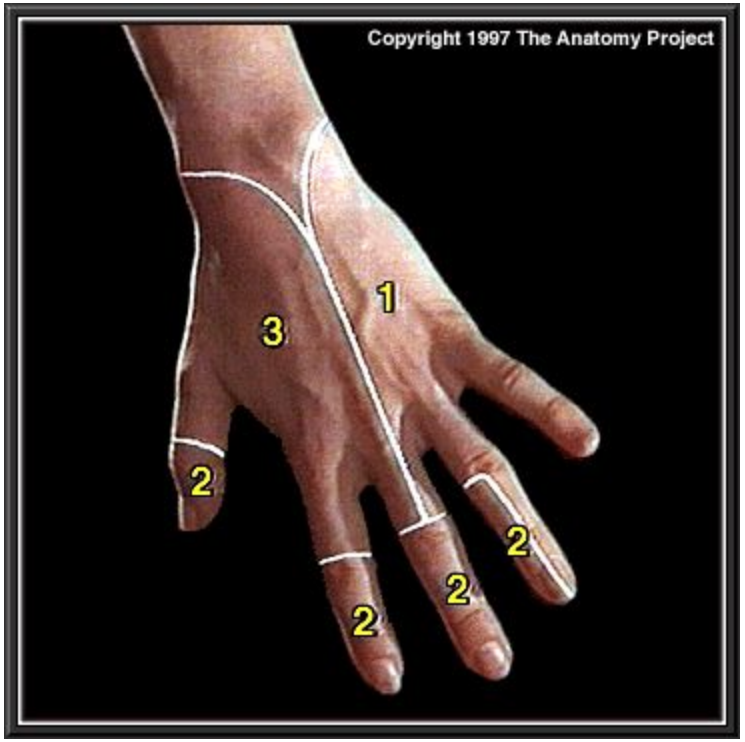


Skin innervation

1 – ulnaris, 2 – medianus 3 - radialis

Lack of sensitivity in different parts of hand is a result of damage of nervs





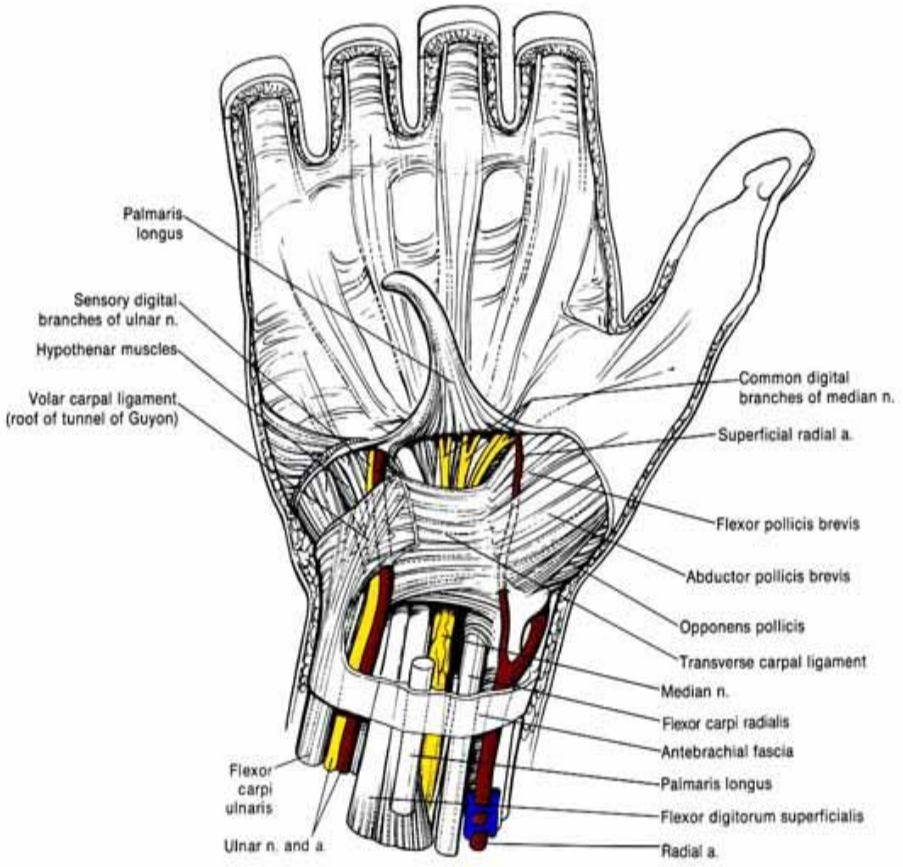
Innervations of muscles

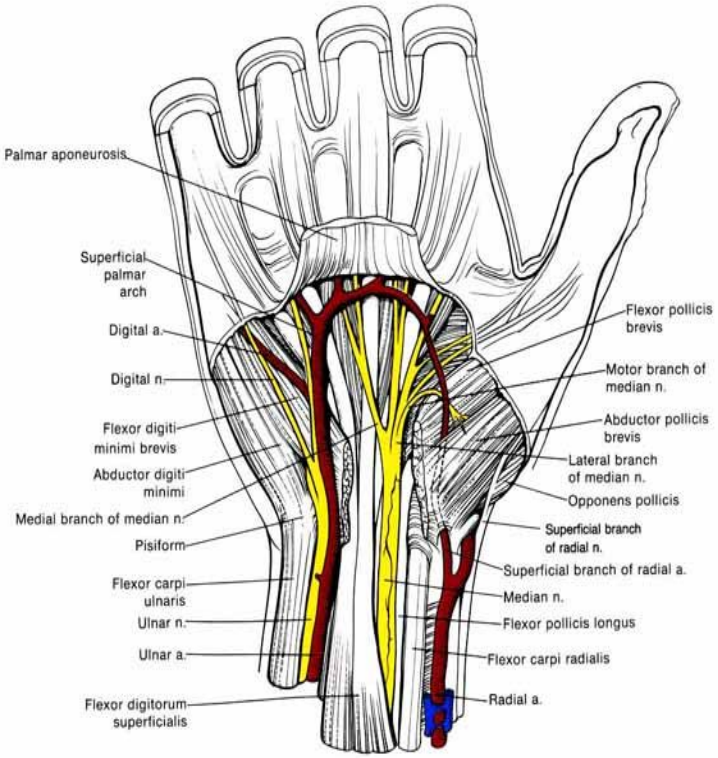
- N. medianus – m.m. of thenar , 1,2 lumbrical muscles
- N. ulnaris m.m. of hypothenar, 3,4 lumbrical muscles, all m.m. interossea
- N. radialis – flexors on fore arm

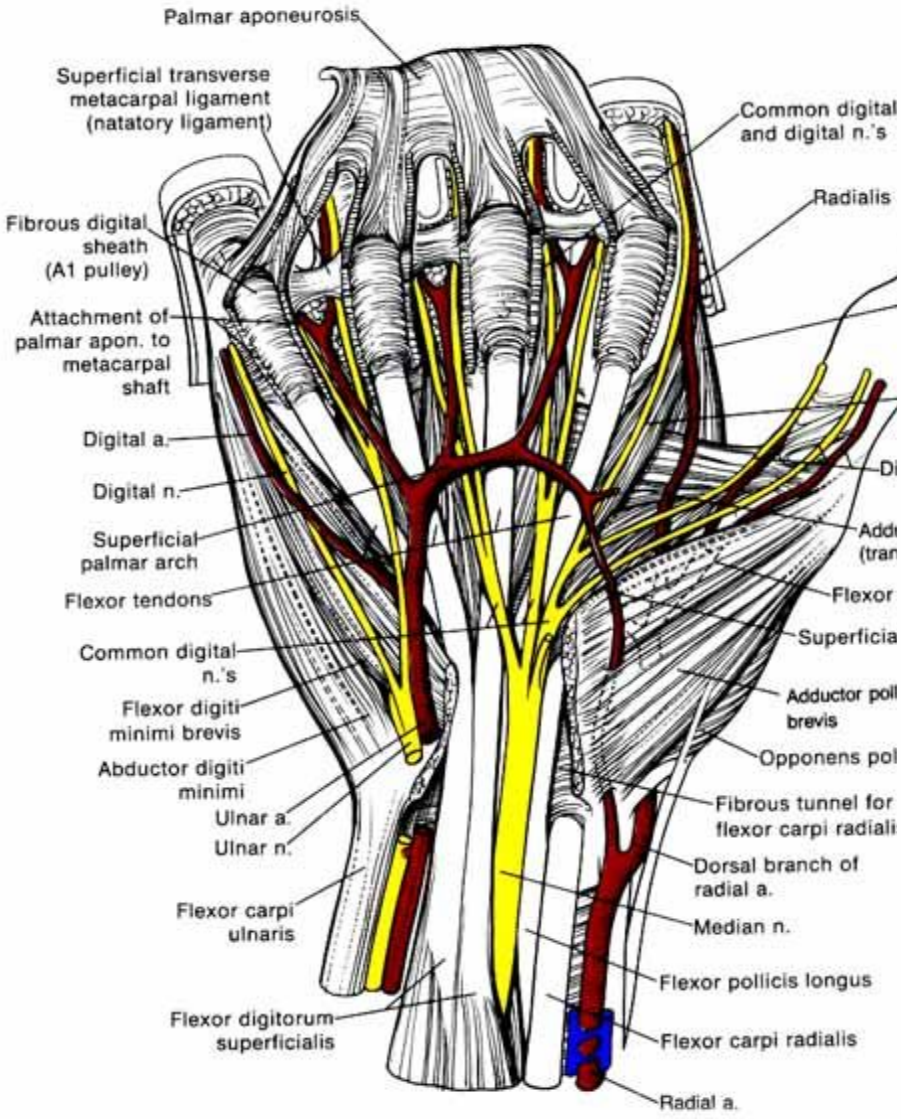
Symptoms of nerves damage:

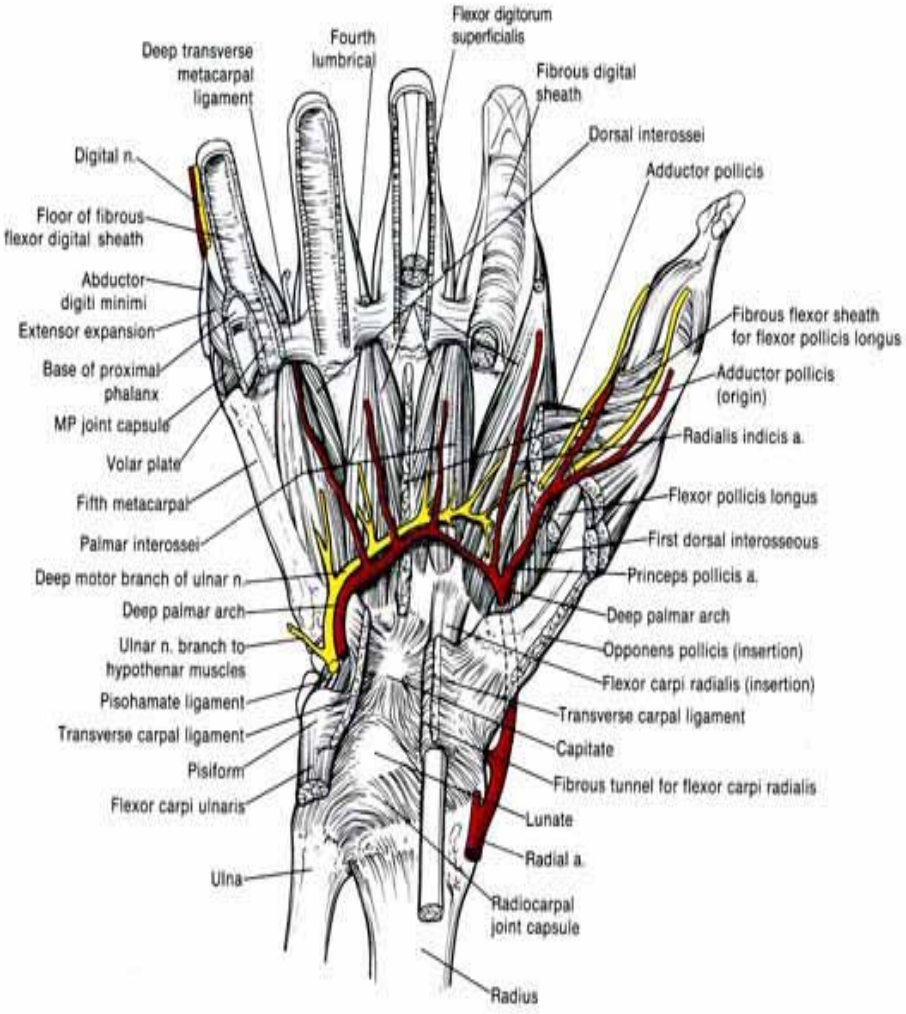
- N. medianus – «Gynecologist's hand»
- N. ulnaris– «clawhand», and/or symptom «sheet of paper»
- N. radialis– «chicken hand»

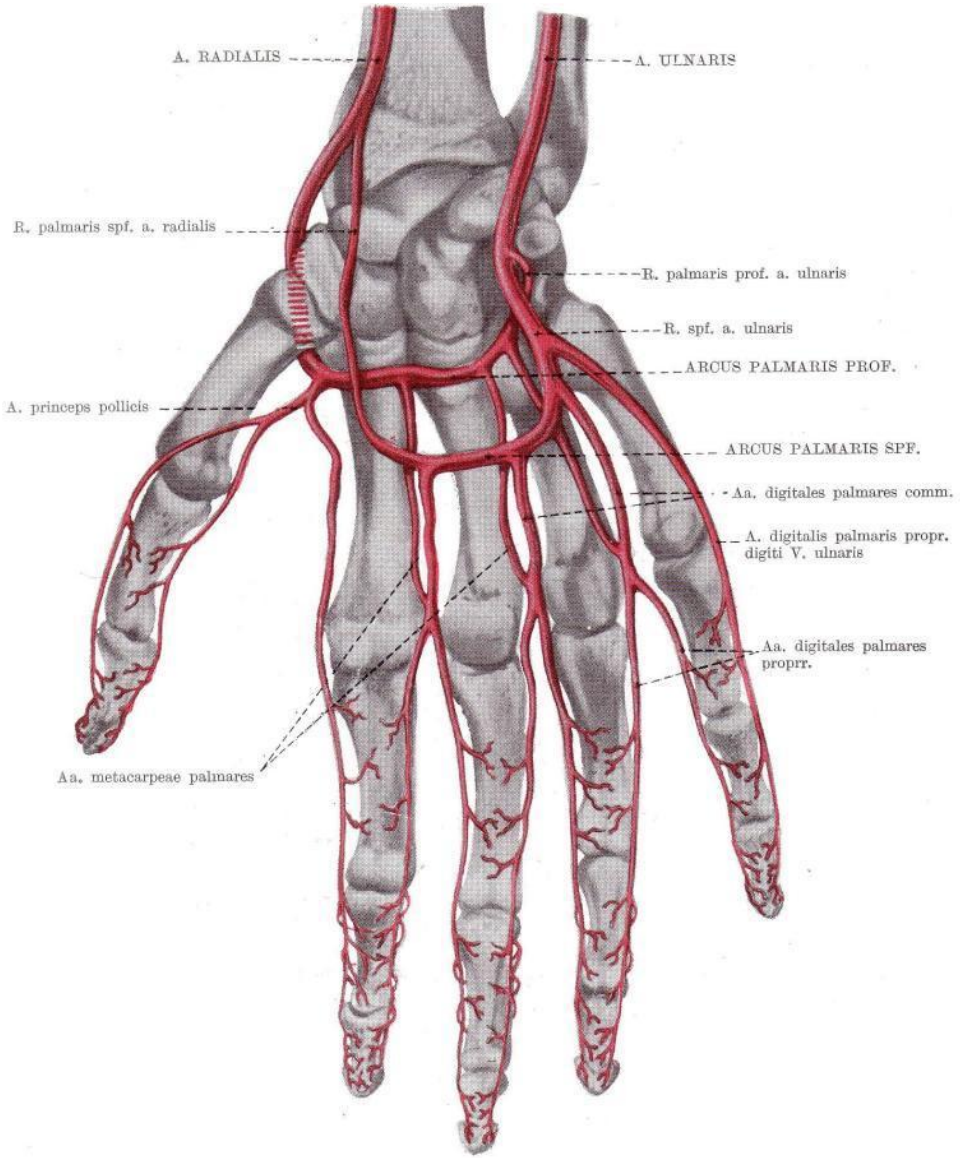
Blood supply





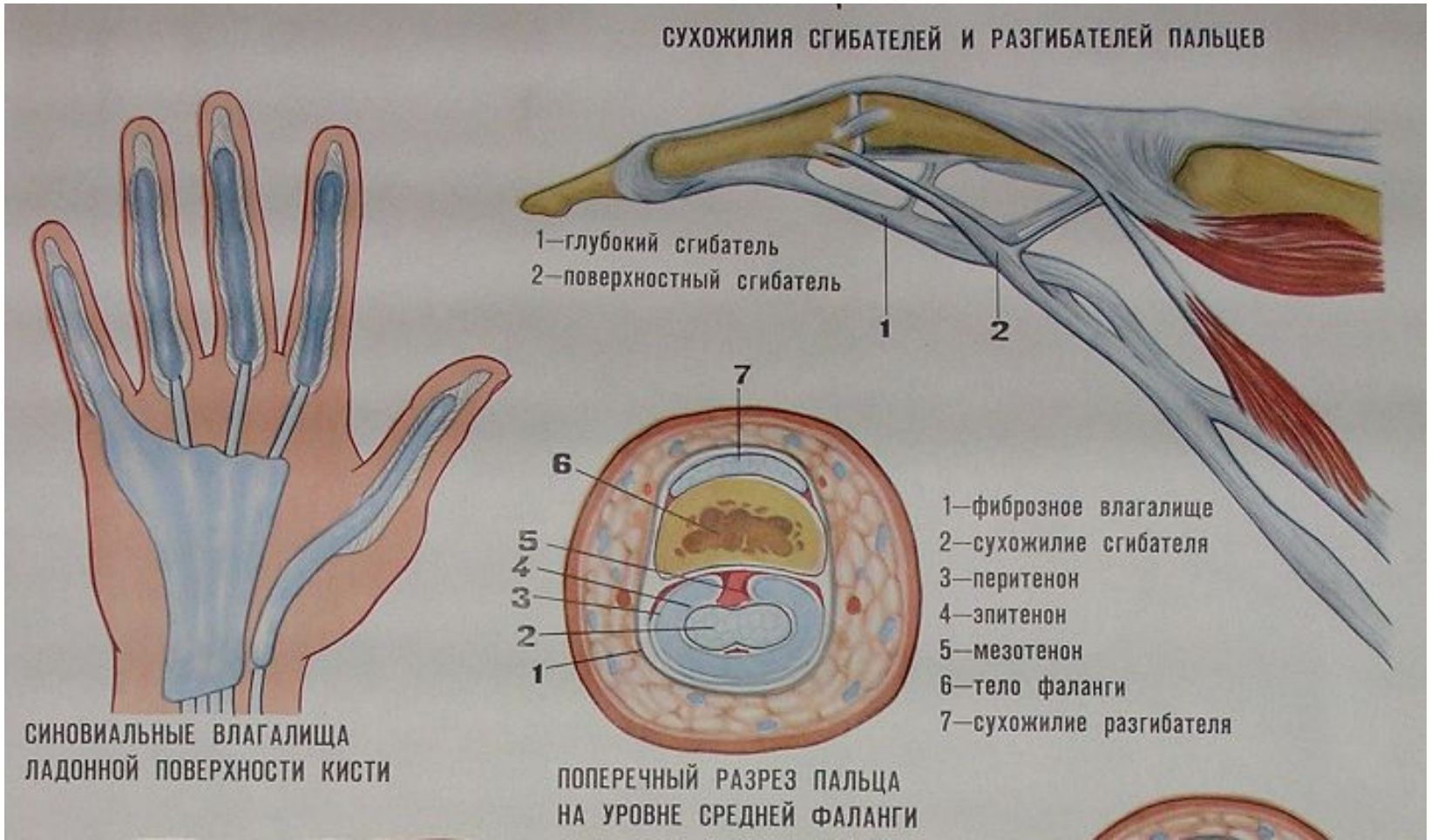

Palmar aponeurosis
Superficial transverse metacarpal ligament (natatory ligament)
Fibrous digital sheath (A1 pulley)
Attachment of palmar apon. to metacarpal shaft
Digital a.
Digital n.
Superficial palmar arch
Flexor tendons
Common digital n.'s
Flexor digiti minimi brevis
Abductor digiti minimi
Ulnar a.
Ulnar n.
Flexor carpi ulnaris
Flexor digitorum superficialis
Common digital and digital n.'s
Radialis
Flexor
Superficia
Adductor poll brevis
Opponens pol
Fibrous tunnel for flexor carpi radiali
Dorsal branch of radial a.
Median n.
Flexor pollicis longus
Flexor carpi radialis
Radial a.


Deep transverse metacarpal ligament
Fourth lumbrical
Flexor digitorum superficialis
Fibrous digital sheath
Dorsal interossei
Adductor pollicis
Digital n.
Floor of fibrous flexor digital sheath
Abductor digiti minimi
Extensor expansion
Base of proximal phalanx
MP joint capsule
Volar plate
Fifth metacarpal
Palmar interossei
Deep motor branch of ulnar n.
Deep palmar arch
Ulnar n. branch to hypothenar muscles
Pisohamate ligament
Transverse carpal ligament
Pisiform
Flexor carpi ulnaris
Ulna
Fibrous flexor sheath for flexor pollicis longus
Adductor pollicis (origin)
Radialis indicis a.
Flexor pollicis longus
First dorsal interosseous
Princeps pollicis a.
Deep palmar arch
Opponens pollicis (insertion)
Flexor carpi radialis (insertion)
Transverse carpal ligament
Capitate
Fibrous tunnel for flexor carpi radialis
Lunate
Radial a.
Radiocarpal joint capsule
Radius


A. RADIALIS
A. ULNARIS
R. palmaris spf. a. radialis
R. palmaris prof. a. ulnaris
R. spf. a. ulnaris
ARCUS PALMARIS PROF.
A. princeps pollicis
ARCUS PALMARIS SPF.
Aa. digitales palmares comm.
A. digitalis palmaris propr. digiti V. ulnaris
Aa. digitales palmares proprr.
Aa. metacarpeae palmares

Tendons and ligaments of fingers

Every finger has m.flexor digitorum superficialis and m.flexor digitorum profundus
Tendons are surrounded with bursa synovialis
bursa synovialis begin from distal phalanx and ends:
Bursa of thumb ends on the fore arm
Bursa of 2, third, fourth fingers end on the metacarpophalangeal jonts
Bursa of fifth fingers takes tendo of m.flexor 4,3,2 fingers and ends on the fore arm
Also, There is a mesenterium near the basis of tendo m.flexors
Mesenterium contains vessels and nervs
If there is a pus inside bursa synovialis the mesenterium vessels is comressed and pressure necrosis develops



The finger can’t be bended because of tendon necrosis. It needs endoplastic. Usually tendon of m.palmaris longus is used.

There are the different structure variants of bursa synovialis

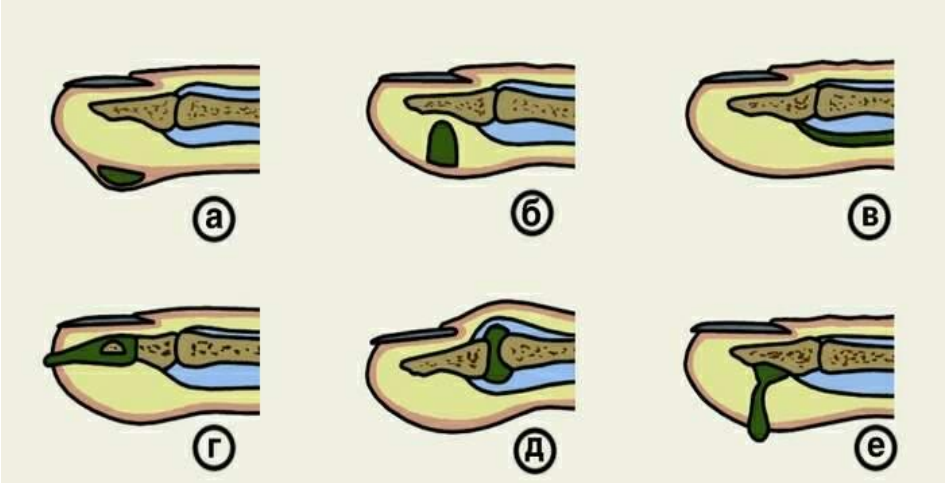
Panaritium

Panaritium – purulent inflammation of finger.

Agent –streptococcus and staphilococcus

Localisation

- Intradermal
- Subdermal
- ***Paronychia*** – paraungual panaritium
- subungual
- joint
- osteal
- tendinous
- Pandactylitis is purulent inflammation of all finger tissues



Paronychia

Pandactylitis

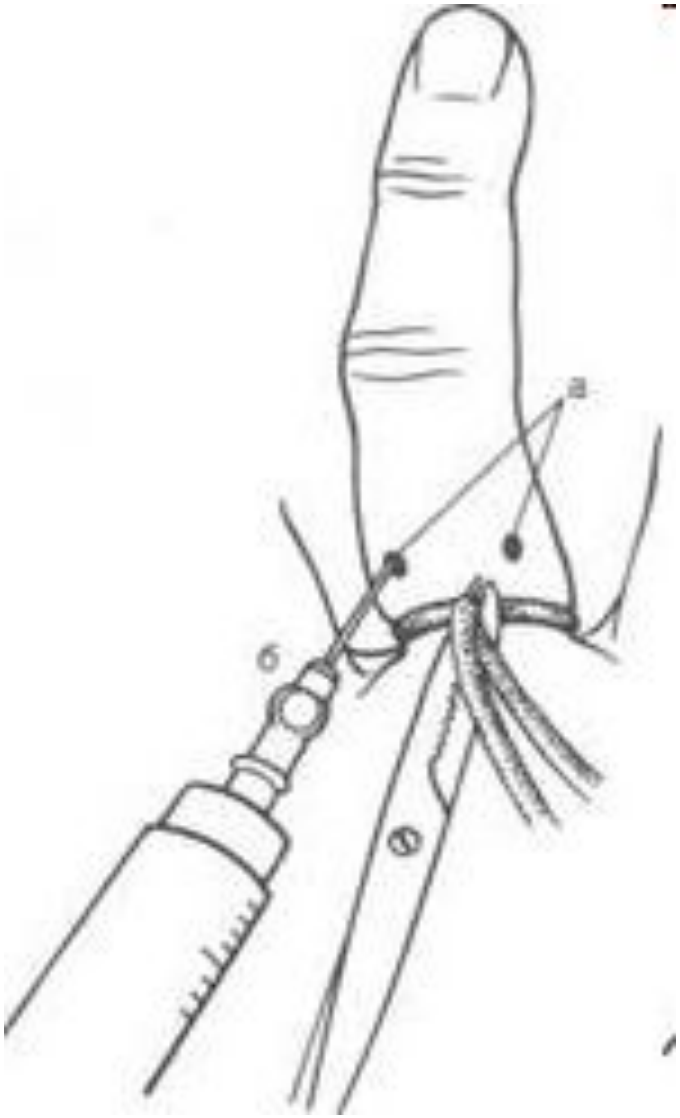
Ttreatment (operation)

Anesthesia is local (Oberst's Anesthesia)

1. Injection 2-4 ml of Lidocain (Novocain) to finger basis on each side.

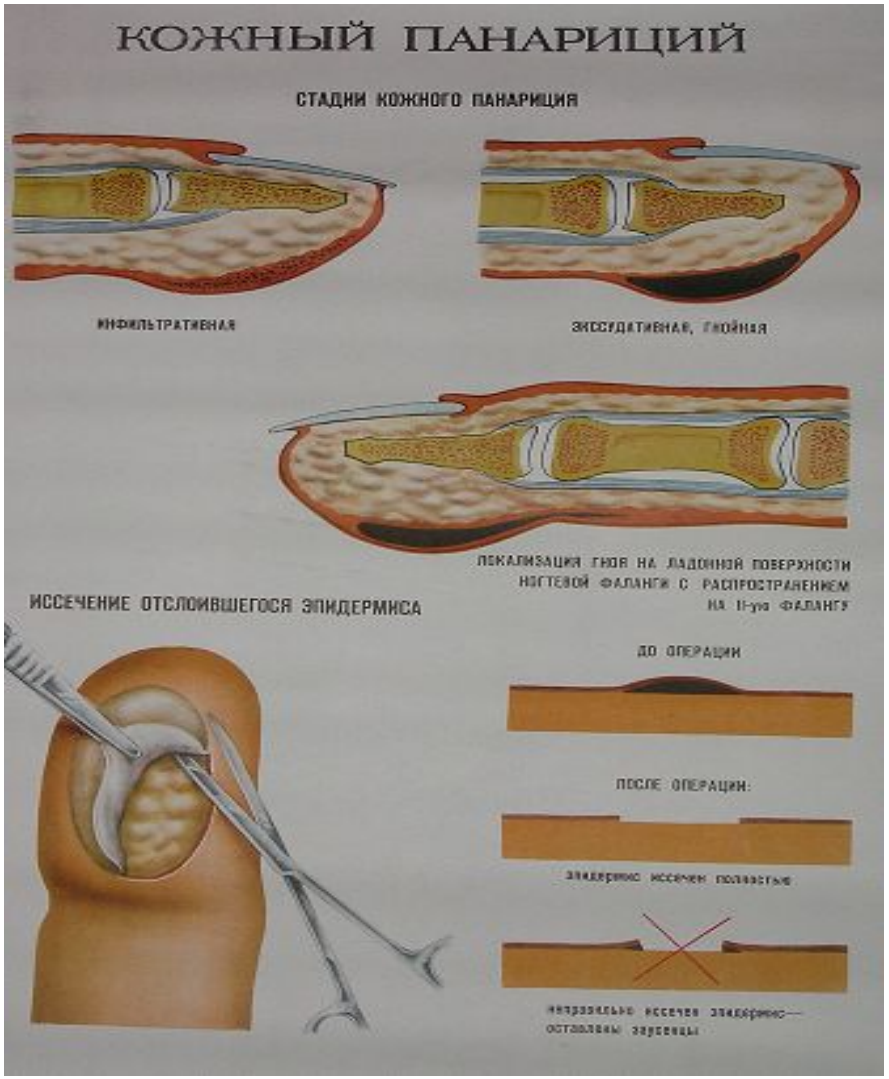
2. Tourniquet to finger basis

3. Anesthesia begins in 4-7 min.

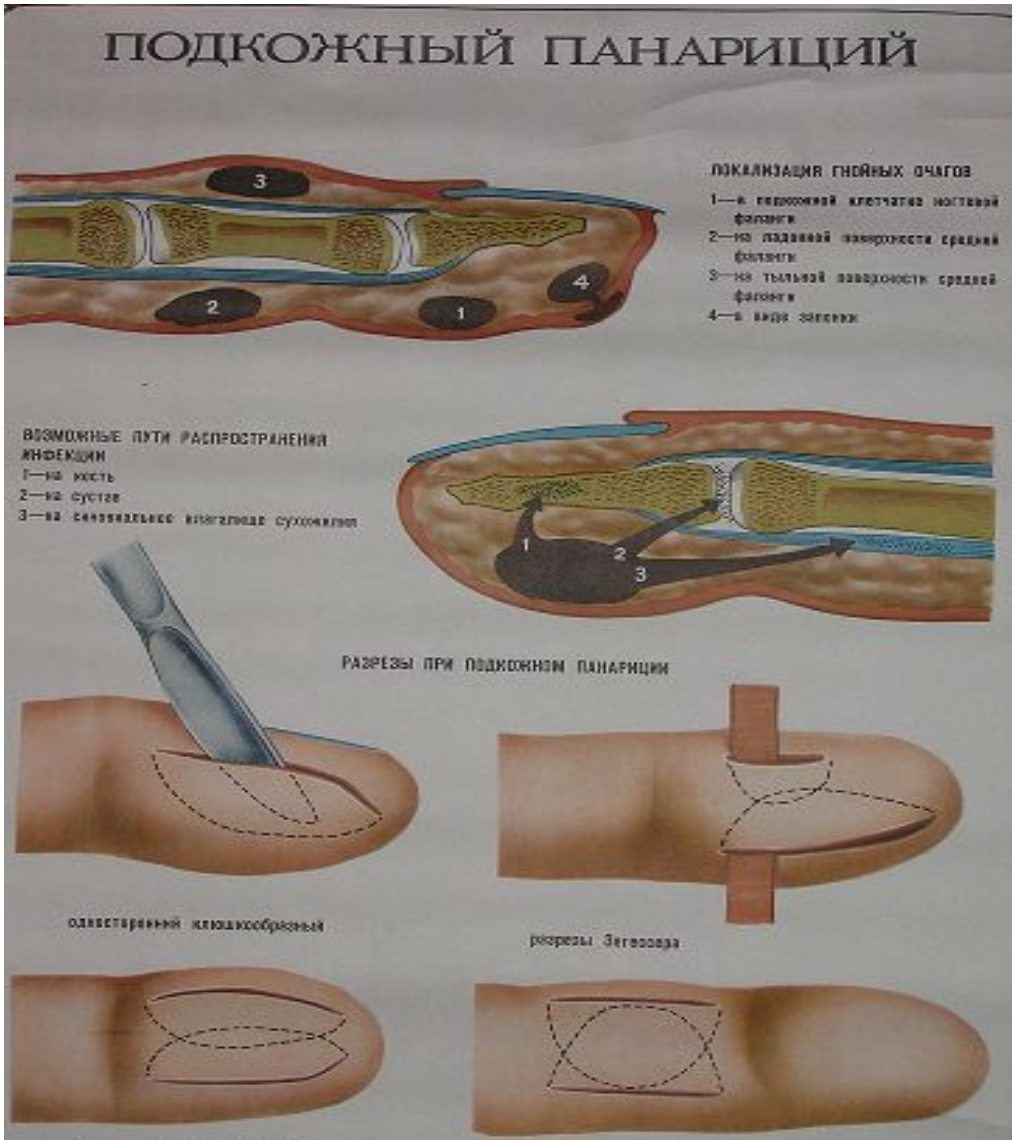


Incisions in case of Intradermal localisation

It is necessary to cut spalled Epithelial tissue

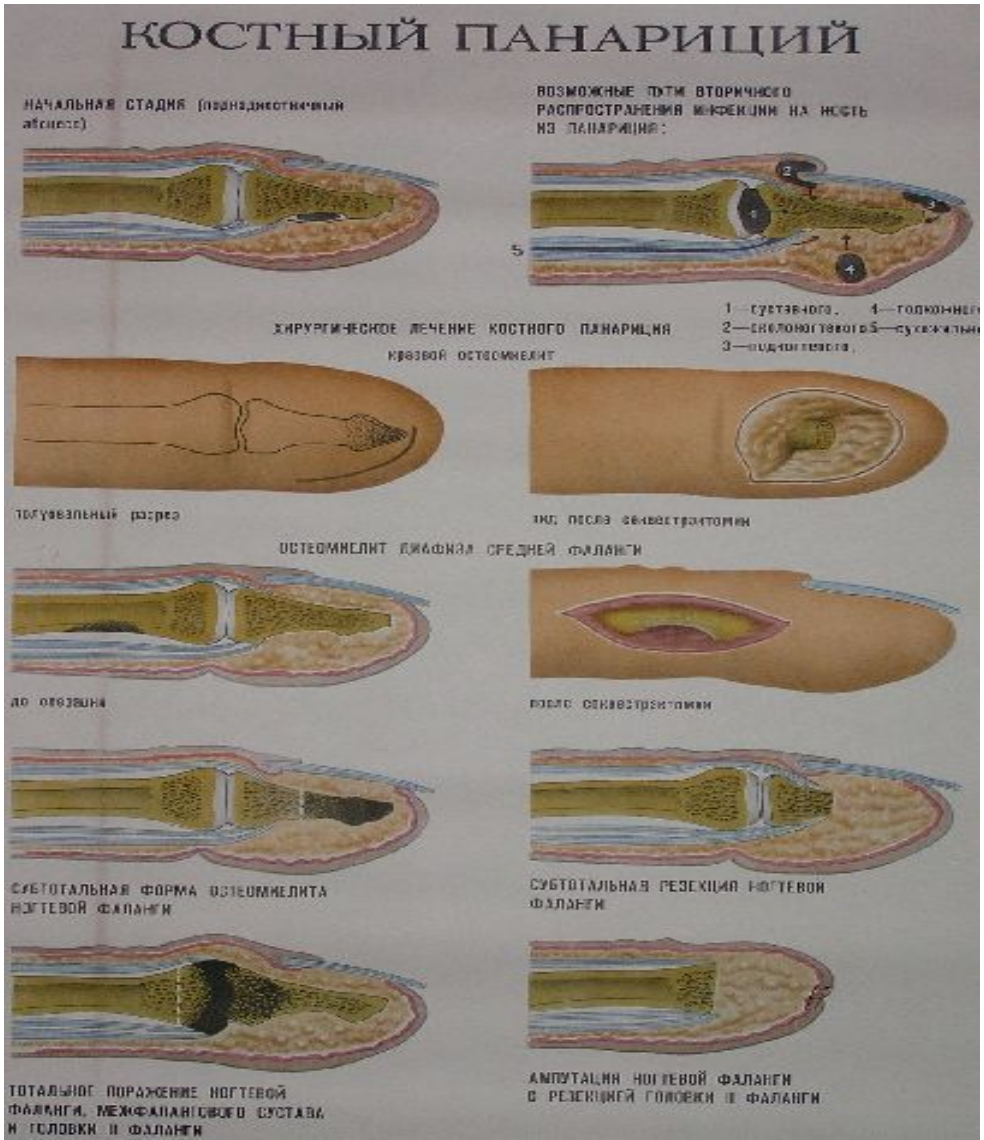


Incisions in case of subdermal localisation are fulfilled on each side between interdigital line and drainage.



Incisions in case of tendinous localisation are fulfilled on each side between interdigital line and drainage. Drainage doesn't have to be through to not damage the mesenterium.

Operative [surgical] technique in case of osteal localisation may be different: necr(os)ectomy or amputation.



Also Operative [surgical] technique in case of jont localisation may be different: puncture, necr(os)ectomy or osteoarthrotomy