

**MINISTRY OF HEALTH OF UKRAINE**  
**UKRAINIAN MEDICAL STOMATOLOGICAL ACADEMY**  
 Department general surgery with care of the patient

“APPROVED”

on the meeting of the chair  
 of the general surgery with care of the patient  
 head of the chair

professor \_\_\_\_\_ Ligonenko O.V.

“ \_\_\_\_ ” \_\_\_\_\_ 2021

**METHODICAL INSTRUCTIONS**  
**FOR INDEPENDENT WORK OF THE STUDENT**  
**IN TIME FOR PREPARATION TO THE PRACTICAL STUDY**  
**(auditorium work)**

<i>Academic discipline</i>	<b>general surgery</b>
<i>module number 2</i>	<b>Surgical infection. Mortification. Fundamentals of transplantology and clinical oncology. Methods of examination of surgical patients</b>
<i>Content Module 1</i>	<b>Surgical infection. About death .</b>
<i>Theme of lesson №23</i>	<b><i>Felon. Phlegmon of the hand. Lymphangitis. Lymphadenitis: etiology, pathogenesis, clinical, diagnosis, treatment principles.</i></b>
<i>Course</i>	<b>III</b>
<i>Faculty</i>	<b>Medical No. 1.2, training of international students</b>

**Poltava**

## **1. Actuality of theme:**

Treatment of purulent-inflammatory diseases of the hand is one of the oldest and most difficult problems of clinical medicine. Panaritium is the most common purulent disease of the hand. It is observed annually in 0.5-1.0% of the population. Of the total number of patients who first sought help from a surgeon, 15-31% are patients with panaritium. Temporary disability in panaritium is observed in 8-10% of persons engaged in physical labor. In this disease, there can be fatalities, and according to some authors, they occur in 0.8% of patients. The high level of unsatisfactory results of panaritium treatment is a matter of serious concern, especially in its complicated forms.

Ankylosis, deformities and amputations of the fingers and phalanges - a frequent finale not only of outpatient but also inpatient treatment of panaritium. Amputation of phalanges and fingers in the bone form is performed in approximately every 3rd patient, and the duration of treatment in this form of panaritium often reaches 3-4 months. Unsatisfactory results of treatment indicate that in many cases the cause of disability of patients is not only the severity of the disease or late treatment, but also defects in diagnosis and surgical treatment.

Knowledge of panaritium is important not only for surgeons, but also for doctors of other specialties, who must be able to diagnose the pathology and refer the patient to a specialist in a timely manner.

## **2. Learning objectives:**

### **Know:**

1. Know the features of the surgical anatomy of the fingers and hands, which are important for the course, diagnosis and treatment of panaritium.
2. Know the classification of panaritium.
3. Know the etiology, pathogenesis, clinical signs and features of certain forms of panaritium methods of diagnosis of panaritium.
4. Master the indications for conservative and surgical treatment
5. Know the methods of analgesia and surgery for various forms of panaritium.

### **Be able:**

- 1 . Master the technique of performing research that allows you to distinguish between different forms of panaritium, using a button probe.
- 2 . Be able to make a differential diagnosis of panaritium with other purulent-inflammatory processes of soft tissues that may be localized on the finger.
- 3 . Be able to choose the method of analgesia and method of surgery for various forms of panaritium.

## **3. Materials of pre-classroom work of students.**

### 3. 1 Basic knowledge, skills, abilities necessary for studying the topic (interdisciplinary integration)

Name of previous disciplines	Acquired skills
1. Anatomy	Anatomy of the hand, structure of tendon sheaths, blood supply and innervation of fingers and hands
2. Microbiology	Principles of conducting research on the content of the microflora and its sensitivity to antibiotics. Sterility control. Material collection technique.
3. Pathophysiology	Signs of inflammation
4. Pharmacology	Antibiotics and principles of their use. To know medicinal substances, ways of their introduction, mechanism of action

**The list of the basic terms, parameters, characteristics which the student should master at preparation for employment:**

Term	Definition
Antisepsis	A set of tools and organizational methods aimed at combating existing infection in the wound
Asepsis	A set of tools and organizational methods aimed at preventing microorganisms from entering the wound
Contamination	Penetration of microbes into the human body (microbial contamination)
Felon	it is an acute inflammation of the tissues of the finger, which usually occurs due to minor damage.

**The student must have an idea of:**

- on the etiology, pathogenesis, classification, clinic and structure of purulent wounds;
- modern classification of the wound process;
- types of wound healing;
- about the general reaction of the body to inflammation;
- about special methods of clinical examination of patients.

**The student must know:**

- basics of asepsis and antiseptics;
- definition of the concept of wound;
- etiology and pathogenesis of the wound;
- histological structure of skin, fat, mucous membranes;
- possible general and local complications;
- the main stages of surgery;
- features of wound management;
- methods of wound healing;
- different types of bandages that can be used;
- principles of care for patients with wounds;
- basic mechanisms and term wound regeneration.

**The student must be able to:**

- apply the principles of care for surgical patients (hygiene of patients, taking into account the location of the disease);
- examine the patient and the place of the disease;
- be able to give a clinical interpretation of the identified symptoms;
- to form a clinical diagnosis;
- prescribe conservative treatment for wounds of different localization;
- justify the indications for surgery;
- to carry out postoperative supervision of patients and to carry out care;
- apply preventive measures for the development of infection in the wound

**Mastering practical skills by a student:**

- to master the technique of palpation in determining the boundaries of the impression of tissues and organs;
- determine the symptoms of inflammation in the wound;
- learn to detect fluctuations or softening in the site of inflammation;
- learn to wash wounds with antiseptics;
- to determine clinical and morphological signs of wound healing by primary and secondary tension;
- to improve the technique of applying different types of bandages, depending on the location of the wound;
- to master the technique of taking material for the sensitivity of the microflora to antibiotics.

**3.2 Content of the lesson topic.****Acute suppurative diseases of the fingers (panaritium)**

Problem treat panaritium, despite the long history remain relevant not only because of the frequency of disease (in Ukraine panaritium annually observed in 1% of the population). In practice surgeons so far kept the tradition of long-term use of conservative treatments, performing inadequate surgical approaches that provide only the evacuation of pus without adequate necrectomy. In some cases, purulent process is reduced and the wound heals, but the finger as functioning anatomical structure becomes unusable due to scar contracture and disorders of innervation.

Panaritium - an acute purulent inflammation of tissues finger or less feet. On the palmar surface of the finger skin combined with palmar aponeurosis tendon thick strands between which are the accumulations of adipose tissue. In inflammatory skin lesions or inflammation of injuries quickly spread along connective strands on deep tissue tendon, bone formation joints. Furthermore, accumulation of fluid in a closed cavity between connective tissue bridges leads to poor circulation due to compression of the supplying vessels and the rapid development of tissue necrosis.

Panaritium often occurs as a result of minor injuries palmar surface of the fingers in the home, at work, at least it is a result of disruption of burrs or microtraumas in manicure. Contributed to and protracted course panaritiums diabetes, chronic circulatory disorders. Causative agent of this disease is simple puss production organisms (staphylococci,

streptococci). Atrium is small skin lesions (rapture, cracks, scratches). Often the cause of inflammation are foreign bodies (splinters, metal shavings).

***Panaritiums classification:*** A. Surface shape - paronychia, subungual, cutaneous, subcutaneous, B. Deep shape - bone, joint, tendon, pandactylitis.

***General characteristics and clinical presentation.*** There are several forms of panaritiums. However, their clinical manifestations largely coincide. First of all, patients worried swelling and redness of the affected area of the finger. Body temperature may rise, with severe lesions significantly worse overall. Characteristic for panaritiums is pulling, intense, constant pain.

Necessary to noted that due to the theme of anatomy wrist the localization of abscess on the palmar surface of the finger, swelling and redness will be more pronounced on its rear surface.

***Skin panaritium.*** Manure is located in the uppermost layers of the skin, destruct it. This forms a bubble filled with purulent or bloody fluid.

***Subcutaneous panaritium.*** At closer inspection you can notice swelling and tension fabric finger located near interphalangeal creases. Redness dim.

***Paronychia*** - inflammation paranail roll, accompanied by his painful swelling and redness of the surrounding tissues. On examination marked overhanging affected paranail roll over the nail plate. In some cases the pus can get under the nail. This fluid is glimpsed through the peeling of the nail.

***Subungual panaritium*** - characterized by an accumulation of pus under the nail plate. With advanced process manure is seen at all or fingernail under one of its edges.

***Articular panaritium*** - occurs more frequently after finger injury to the back surface of the joint. The pain is intense, skin furrows in the joint smoothed, the skin is red, because of the swelling of the finger becomes fusiform. Trying to bend the finger leads to a acute increase in pain. In advanced cases, the joint is destroyed, can be formed fistula. Pain while slightly reduced, but the function of the finger is not restored. There unnatural mobility, crunching sensation in the area diseased joint.

***Bone panaritium*** - or develops during the transition inflammation of soft tissue or bone by direct injury (injection sewing needle, chips, fish bone). In case the inflammation of the soft tissues surrounding the bone, after a period of apparent improvement complete recovery does not occur. The pain is constant aching in nature, formatted fistula with purulent discharge meager. Finger whole gradually thickens, it functions completely lost.

***Tendon panaritium*** - a purulent process in subcutaneous felons without proper treatment can spread to the flexor tendons of fingers. It comes significant deterioration. Throbbing, pulling pain spreads throughout the fingers. All finger along the length edema, skin red. Interphalangeal creases smoothed. Finger becomes like a sausage and slightly bent. This forced position reduces tendon tension and reduces pain.

***Pandactylitis*** - purulent inflammation of all tissues of the finger. Proceeds hard, accompanied by headache, high body temperature. Growth nearest lymph nodes. Pandactylitis may develop as a result of injury to the finger, but more likely it is untreated simple forms felons. With the development pandactylitis pain becomes arching nature. Edematous finger blue-purple color. All fabrics are gradually drawn into the process and necrotizing. With fistulas or postoperative wounds flowing manure in small quantities. Touching finger acutely painful. Trying movement causes a acute increase in

pain. Further development of the pathological process leading to the spread of suppuration of the wrist and then - the entire limb.

**First aid.** Panaritium is developing very fast. In the initial stages, when the toe area there is a feeling of pain when moving or clicking, you can try to stop the use of anti-inflammatory drugs, alternating warm saline bath with vodka dressing.

*All attempts at self-treatment or conservative ! There is a figurative expression that determines the timing of the operation: "If the patient met the morning star, suffer from pain in the fingers, then the tattoo it must be operated."*

## **Medical treatment and treatment of certain forms of felons**

**Paronychia.** Practitioners often underestimate this pathology, considering it serious. Meanwhile, if the wrong treatment paronychia may take a chronic course, delivering a lot of trouble the patient.

The cause paronychia usually is burrs or disease develops after an injury skin roller in manicure. There is swelling, redness paranail roll, intense pain. Further there is detachment of the epidermis roller manure on the edge nail plate begins to develop abnormal granulation. Treatment should begin as soon as possible. At the first signs of inflammation (redness, pain) should strike a thin gauze or ribbed strip soaked alcoholic chlorhexidine solution under the skin paranail roll, bundle it from the nail plate in the area of inflammation. In some cases this is enough to reduce inflammation within 2-3 days. When a detachment of the epidermis manure should immediately neatly cut (ie cut, not just pierce - as is often erroneously) peeling area to evacuate purulent exudate and apply a bandage with an alcoholic solution of chlorhexidine, caused by skin roller gauze strip soaked with this solution. In case of skin between paranail ridge and nail plate pathological purulent granulation - required surgical treatment. A cut on the dorsum of the nail phalanx, carefully remove all necrotic tissue, granulation, sometimes have resect a sprout area nail plate. Postoperatively, the wound is open, Bandages with ointment "Levomekol."

**Skin panaritium.** Developed as a result of microtrauma. Often skin felon accompanied by severe symptoms of lymphangitis and lymphadenitis, which may disturb the patient more than the original process.

Surgical treatment - carried removal of exfoliation of the epidermis, usually does not require anesthesia. Evacuated purulent exudate, then you must carefully examine the eroded surface, so as not to miss a felon as a "cuff" (when suppurative process spreads narrow course in the subcutaneous tissue). Inflammatory effects disappear within 5 - 10 days depending on the prevalence of the process.

**Subungual panaritium.** The disease occurs as a consequence of paronychia, with direct introduction of infection under the nail plate (needle stick, nail), or a complication of subungual hematoma (often after trauma finger door). Prevention of disease - competent treatment paronychia and early evacuation of subungual hematoma after injury. When delimited local detachment nail plate manure (less than 1/3 of its total area) is allowed to perform resection nail only the distorted area. In case of more extensive damage to completely remove the nail plate, nail retaining sprout area (if possible). Typically erosion surface nail bed well epithelizing on average 10 - 15 days after surgery.

***Subcutaneous panaritium.*** The disease develops in contact infection in subcutaneous finger with the further development of purulent inflammation. Typically a consequence of microtrauma - injection, cuts, splinters, etc. First appears mild swelling and redness finger further inflammation progresses, the pain become pulsating nature, are very intensive. On the nail phalanx finger held oblique incision on the middle phalanx and the main incision is made on the lateral surface. Skin and subcutaneous flaps are raised in different directions and performed a thorough necrectomy. Typical error in treating subcutaneous felons - failure necrectomy. Very often, surgeons are limited to only cut on inflammation, which leads to temporary improvement being patient, and suppurative destructive process spreads to deeper tendons and bone foundation finger. After necrectomy cavity formed, executed gauze strip of Levomekol so that the edges of the wound were divorced. Further, performed daily replacement of bandages. When adequately executed necrectomy in the postoperative period in the wound should not be a purulent discharge. The presence of pus within 2-3 days after the operation is an indication for repeated necrectomy. After cleaning the cavity in the subcutaneous tissue wound edges adapted plaster can impose secondary sutures.

***Tendon panaritium.*** One of the most difficult types of felons. There is a symptom of purulent abscess. The disease develops or because the primary introduction of infection into the flexor tendon sheath (for cuts, puncture, etc.), or progression of subcutaneous process with inadequate treatment of the latter. With the development of septic infection in tendon sheath clinical picture is quite bright - patient concerns expressed pain along the tendon, any movement is extremely painful. Surgical assistance should be provided as early as possible because the tendon quickly die under ambient purulent process. The operation is performed under regional anesthesia.

In the absence of purulent inflammation in the subcutaneous fat finger (and it happens when the infection enters directly into the shell of the tendon at the prick) is allowed to perform surgical treatment of primary wounds, tendon vagina revealing in this area, and make the cut in the projection of "blind twisting" flexor tendon sheath also dissection of the latter. Vagina thoroughly washed antiseptics on both sides and drains perforated polymer tube.

Where there is a purulent inflammation of subcutaneous tissue incision is made on the lateral surface of the finger with the palm arched extension in the projection of "blind twisting" flexor tendon sheath. Palmar skin and subcutaneous flap preparation from surrounding tissues, provide a thorough necrectomy in fat, menus and sanation of tendon vagina. In identifying necrosis tendon last resection within healthy tissue. The operation completes execution wound gauze strip of Levomekol so that the edges of the wound were maximally deployed, allowing for further dressings monitor the tendons (if saved). Later, as cleaning the wound, the edges adapted strips or superimposed secondary sutures. With confidence in the completeness of implementation necrectomy possible stitching of wound after the imposition of drainage drilling system (system of perforated plastic pipes, drainage cavity formed).

***Articular panaritium.*** Developed in direct contact infection in the joint space (when injured), or as a consequence of prolonged purulent process in the soft tissues of the finger joint. Often surgeons with arrangements festering wounds in the projection knuckles not revise the joint capsule and damage the latter are visible, and suppurative arthritis diagnosed later, when there is a characteristic clinical picture. For articular panaritiums

typical fusiform enlargement finger in projection interphalangeal joint, marked limitation of motion in the joint, pain on palpation and during movement, abnormal mobility and crepitus in the joint.

Treatment is only surgical - performed arthrotomy, thorough dental antiseptics joint, then the joint cavity drains perforated polymer tube. It is necessary to be sure to close the wound on the cavity of the joint. The fundamental point - after surgery should be distraction to reduce intra articular pressure and prevent further destruction of the articular ends. Distraction is made or overlapping distraction device, or removing the finger from the nail phalanx, gips spokes Kirchner. Distraction spokes Kirchner terminated with decreasing inflammation (7-10 days), and distraction device is held in the fingers 1-1,5 months., It begins to develop movement in the joint.

***Bone panaritium.*** Develops, usually either by direct contact infection in bone (with infected open fractures), or dissemination of purulent process on the bone with surrounding soft tissue at the wrong treatment of more superficial suppurative processes in the fingers. Very quickly the infection spreads to comb nail phalanx in the development of purulent process on top of a finger. If this zone purulent inflammation persists for 6-7 days, we can assume that the bone is involved in the process, even in the absence of radiographic changes. Generally, it must be remembered that the X-ray picture always sometimes "late" compared to real changes in the tissues. Despite this, the x-ray examination - a mandatory component in the diagnosis of bone felons. Treatment is surgical. A section that provides good exposure for the revision of the affected bone. After necrectomy in the soft tissues is performed sequestrectomy in bone from the finger bone acute spoon - gently dissection of affected areas. All viable piece of bone stored. If surgery is performed under conditions of acute inflammation in the soft tissues of the finger, the operating wound is opened (ligation of Levomekol). In the case of an operation when remitting inflammatory phenomena (for long periods of the disease, fistula formation) after radical necresequestrectomy possible closure of the wound with leaving perforated plastic drainage of trapped finger formed. Rolls daily for dressings and washed away for 5-7 days.

***Osteoarticular panaritium.*** Develops, usually due to the progression of articular felons, with inadequate treatment of the latter. When the disease occurs in suppurative process involving the articular ends of the interphalangeal joints with the development of their destruction. The fundamental difference from pandactylitis is to keep tendons surrounding the joint (flexors and extensors). Treatment is surgical. Often made oblique cut on the rear toe in the projection corresponding joint or incision on the side of the finger (when you cannot completely eliminate the proliferation of purulent process on the palmar surface of the finger).

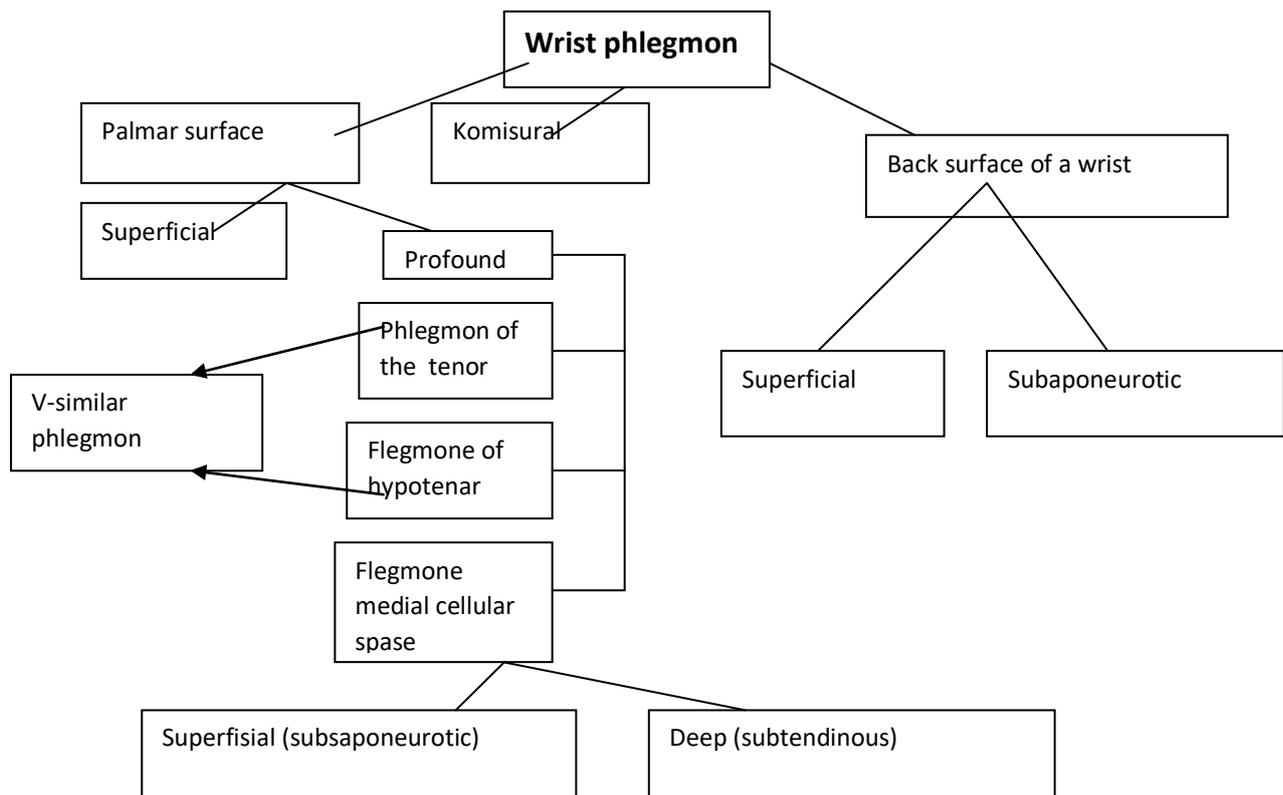
Exposed extensor tendons, which can detect a defect that leads into the joint cavity. Tendons cut over joints in the longitudinal direction of the fibers apart, which provides a good overview of the joint cavity. A removal of purulent exudate, purulent pathological granulation of the joint cavity, washing antiseptics. Then a acute spoon gently carried sequestrectomy in the affected bone sites. After the final dental replacement last drained in the transverse direction perforated polymer tube, the ends of which are derived through separate beats. Restored the integrity of the extensor tendons atraumatic thread 6/0 and superimposed skin sutures. With extensive resection of the articular ends when between them created diastase than 4 mm special decompression is required. If the

pressure is kept articular ends of each other, the required decompression in the joint by applying distraction device, or by extraction from nail phalanx (see articular felon)

**Pandactylitis.** This is the hardest purulent affection of thumb. Includes skin lesions, subcutaneous tissue, tendon structures, bone and (or) joint. So far, many sources you can find recommendations to amputate the finger at pandactylitis. However, at the present stage of development of medicine should seek to preserve the anatomical integrity of the finger and its functional activity.

Surgical access for this pathology should provide a good overview of all of the affected structures. The incision is made on the lateral surface of the finger. If necessary revisions zone "blind" twisting flexor tendon sheath incision along the arc continues on hand in the projection head corresponding metacarpal bone. Blunt stands palmar neurovascular bundle finger, then palmar skin and subcutaneous flap peels of flexor tendons. Similarly prepared rear flap. Both patches are deployed, providing good exposure. Performing thorough necrectomy in all structures finger, according to those principles, which are described in the treatment of subcutaneous, tendon, joint and bone and articular felons. If necessary, superimposed drainage flushing system, according to the postoperative period is distraction in a joint way or another method. In some cases, resulting necrectomy or from primary trauma formed extensive skin defects. Their earliest, as cleaning wounds should be closed cutaneous grafting to avoid degradation of subordinate structures. In the presence of granulation in the wound, preference should be given free plastic split skin graft, if the wound bare tendon and bone structures - expedient plastic (one way or another). This approach allows in many cases to avoid undue amputation of a finger.

### Phlegmons of WRIST



**Classification.** Highlight localization following phlegmons:

1. Interdigital phlegmon

2. Phlegmon thenar region
3. Phlegmon hypothenar region
4. Epyaponeurotic medial palmar space abscess
5. Subaponeurotic medial palmar space abscess:
  - a) surface,
  - b) deep,
5. Phlegmon rear wrist
6. Cross (U-shaped) abscess wrist with defeat space Pirogov-Paronymy
7. Associated phlegmons.

This diffuse purulent lesions fat spaces wrist. Depending on the location have characteristic symptoms. Local signs of inflammation include swelling and redness tissue dysfunction hand, the local temperature increase tenderness. The degree of severity of these symptoms varies and depends on the extensiveness of the inflammatory process, the virulence of the pathogen defense response, its immunobiological reactivity, etc.

A acute increase of the thumb accompanied by swelling of the thenar and acute radial edge of the back surface of the wrist. Acute pain on palpation, tissue tension, limiting the mobility of the swollen tissue thenar, palmar smoothing skin folds - the characteristic symptoms of inflammation of the fat tenor.

A acute hypothenar revealed moderate edema, hyperemia and tissue tension, tenderness on palpation. Movement five fingers lead to increased pain.

**Commissural abscess.** Atrium is cracked corn rough skin in the metacarpophalangeal joints palm. Hence another name - corn abscesses, "Namin." Inflammatory foci formed, usually in commissural spaces P-V fingers.

A acute accompanied by pronounced pain, swelling of the distal surfaces of both hands. Fingers in the neighborhood of septic foci slightly separated and bent at the interphalangeal joints. Extension of painful because of tension inflamed palmar aponeurosis. Perhaps direct distribution of manure through oval slit of palmar aponeurosis on the dorsum of the hand, and the involvement of deep flexor tendon, which is in close proximity to the purulent focus. Spreading infection can occur in the proximal direction through the channels vermiform muscles. In these cases, the main foci of inflammation joins medial palmar space.

**Phlegmon medial palmar space** between localized palmar aponeurosis and fascia covering the flexor tendons of the fingers - subaponeurotic abscess. Clinically, accompanied by severe purulent intoxication, headaches, high fever. The central part of the palm exploding palmar creases smoothed, fingers bent and attempt active or passive movements in them accompanied by a acute pain.

**Overlapping or U - shaped abscess.** It is the result of combined lesions of synovial bags palm - ulnar and radial. The disease is the result of festering abscess I or V finger. Under certain conditions, manure spreading on synovial bag or radial ulnar side of the hand, causing inflammation. These phlegmon involving severe intoxication, high fever, general weakness, headache. Wrist swollen, blue, fingers bent movements in them because of pain possible. Palpable biggest pain in the area of the projection of the flexor tendons I and V finger in the proximal part of the hand.

**Subcutaneous abscess** Dorsum of the hand causing swelling and hyperemia without clear boundaries subcutaneous tissue and skin on the rear hand. Accompanied by pain, fever, lesions of the hand and fingers.

**Subaponeurotic phlegmon** Dorsum of the hand are tight, painful infiltrate, edema and hyperemia of the skin on the rear hand. These cellulitis, is usually secondary to inflammatory diseases of the palmar surface of the hand. Boil, carbuncle wrist. Local manifestations typical for all locations boils and carbuncles. Functional activity of the wrist is always broken. Sure abscess developed secondary wrist. Inflammatory foci formed, usually in commissural spaces II - IV fingers. Openings palmar aponeurosis contribute to the spread of infection from superficial abscesses inside.

**General principles of treatment phlegmons:**

- Treatment of patients with phlegmon of the hand should be in the surgical hospital.
- It is necessary to accurately determine which fat space wrist amazed that it is important to select adequate access.
- Surgical intervention should be early and be in strict compliance with the rules of asepsis.
- Necessary optimal analgesia and complete bleeding hand.
- necrectomy and drainage of abscess - the most important moments of operation.
- Adequate antibiotic therapy based on sensitivity microflora.
- The use of different types of local therapy after surgery, depending on the location of inflammation.
- Immobilization.
- Rehabilitation of patients, prevention of complications.

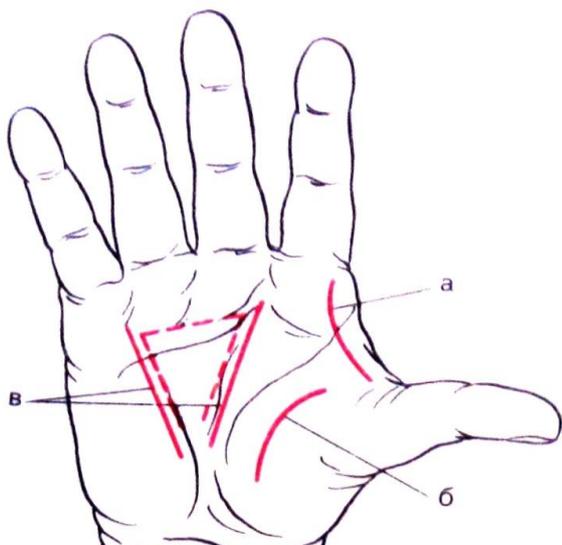


Figure 1. Autopsy when opening the phlegmon of the hand.

a – incision for Izelen

b - incision for Canavel

c- deep incense space forthe Peak (point to the dash marked projection of the middle incense space)

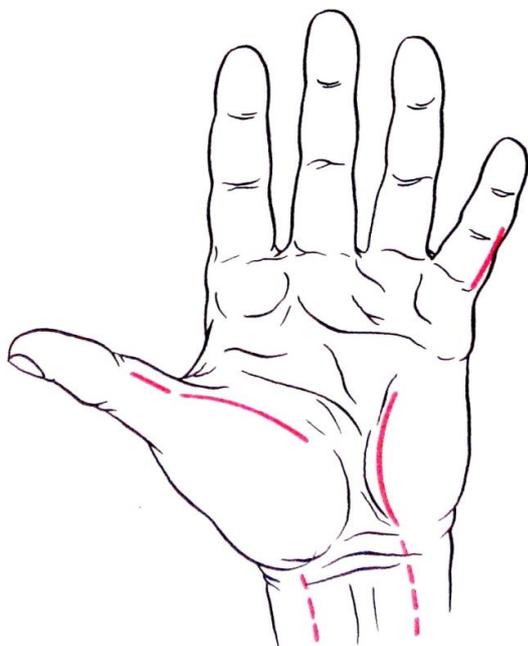


Figure 2. Disclosure of purulent tendobursitis by Kanavel.

## **Errors in the treatment of felons and phlegmons**

The most typical mistake outpatient surgery is rejection of primary surgical treatment of accidental injuries wrist. Purulent wound must be subjected to surgical treatment - under regional anesthesia performed necrectomy with the audit of all damaged structures. Special attention needs to wounds on the dorsum of the fingers and hands in the projection interphalangeal and metacarpophalangeal joints.

***Errors of diagnosis.*** To establish the correct diagnosis at the clinic does not require expensive equipment or performing complex analyzes. It is enough to collect history, carefully examine the patient and perform hand radiographs. Wrong diagnosis forms felons or phlegmons entails inadequate surgical care and ultimately can lead to disease progression. We consider it necessary to identify a number of important aspects that will help make the correct diagnosis.

***Purulent inflammation of the palm and dorsum of the fingers and hands*** proceeds differently due to different structure of subcutaneous tissue. At the rear wrist spread purulent exudate occurs mainly on the plane while on the palmar surface of the zone of necrosis rapidly distributed in the tissues, involving destructive process tendon and bone structure. The structure of the fiber palmar surface of the type of "hundreds" makes futile attempts of conservative treatment of purulent wounds of localization without adequate necrectomy, while the rear hand conservative measures in some cases can be justified.

***Prolonged purulent discharge from the wound distal phalanx of the finger nail*** (for five or more days) to consider the possibility of bone felons with lesions comb nail phalanx, even with a negative X-ray picture. In this zone, the process quickly spread to the bone, and changes on radiographs are usually late and found the 10-14th day of the disease.

With the localization of wounds and inflammation on the fingers in the projection of the flexor tendon sheaths, be sure to check for tenderness to palpation probe bellied in the projection of "blind twisting 'tendon sheaths even at constant integuments in this area. Severe pain along the flexor tendons due to accumulation of inflammatory exudate, allows the development of tendon suspected felons, but in this pathology operational assistance should be made as early as possible to avoid the development of necrosis tendons.

Abnormal lateral mobility and crepitation in the interphalangeal joints, especially in the localization of the wounds in the projection of joint allows great confidence diagnose articular or osteo-articular felons.

Wounds in the projection metacarpophalangeal joints require a thorough revision, as often penetrate into the joint cavity that remains unrecognized by the review. Later, when developing destructive foci in bone structures that articulate the function of the joint and the finger will be irreversibly lost.

***Errors when performing anesthesia.*** One of the mistakes that often occur is inadequate anesthesia. Patients with long remember feeling pain during surgery and continue with fear waiting for repeat their sensations in some cases as an excuse to abandon the operation.

In addition, the method of anesthesia is not always selected correctly. In inflammatory diseases of the fingers and hands local infiltration anesthesia should not be used if you do not provide adequate relief. Displaying perform anesthesia at different levels (level metacarpal bones, wrist, upper third of the forearm, axillary fossa), and the

injection of anesthetic should be located outside the inflammation. We believe strongly contraindicated multiple input local anesthesia solutions of antibiotics in inflamed edematous tissue because this procedure leads to a further increase of interstitial pressure with subsequent necrosis of soft tissues.

***Errors in choosing operational access.*** Illegal repeated parallel sections of the palmar surface of one phalanges. This skin "bridges" necrotising, sections do not provide adequate outflow of fluid, and most importantly, these wounds further complicating the implementation of radical necrosectomy.

Access during surgery for inflammatory diseases of fingers and hands should be chosen depending on the presence or absence of wounds. With existing skin lesions on the back or volar surface blemishes to economically cut and cut to simulate the type Z-like fingers and arched or S-shaped at hand. At wounds on the sides of the finger section expands on the "neutral line". When intact integument access the fingers should be on the side surfaces or Z-shaped with the back surface. Palmar surface of the finger should be possible to spare. Categorically unacceptable conduct long longitudinal incisions in the palm and dorsum of both fingers and hands, as it further leads to marked scar contractures and severe disorders of sensitivity.

***Errors in the processing of purulent focus.*** Rough and unfortunately, the most common error that occurs is to perform skin incision without removing necrotic tissue hoping to further self-exclusion necrosis by ligation. This tactic is flawed because after opening pressure in the tissues is reduced, decreasing pain, doctor and patient is regarded as a positive trend, but this time suppurative destructive process progresses into the tissue, affecting important anatomical education. Further radical necrectomy can result in amputation or phalanx.

***Necrectomy*** - a prerequisite surgery panaritiums and phlegmon wrist. Any removal of nonviable tissue on the fingers and hands should be performed with full bleeding, which is achieved by imposing the rubber bands on your finger or on the tonometer cuff on the forearm. Suppose also use rubber bandage on the forearm, which is superimposed on the spiral. Manipulation of tissues "blind" can cause damage to the neurovascular bundle and tendon structures with all its negative consequences.

***Errors in the completion of surgery and postoperative care.*** Necrectomy fingers and hand finished dental antiseptic solutions and loose performance wounds with gauze strips or napkins with ointments on water-soluble basis (levosyn, Levomekol etc.). Use liniment Vishnevsky and ichtiol ointment at present is unacceptable because these tools facilitate the progression of suppurative destructive process. In the absence of signs of deterioration in the local process strip away from the wound on the second or third day. Visually estimated state cavity. If adequate necrectomy wall cavity in these terms are clean, there is granulation, discharge from the wound meager, sero-purulent. If the wound with copious purulent discharge from necrotic tissue, perifocal inflammation with no tendency to reduce the need to decide on re necrectomy.

### **Theoretical questions for the lesson:**

1. Modern view on the etiology, pathogenesis, clinical and morphological characteristics of panaritium.
2. Clinic, diagnosis of the wound process.

3. Methods of diagnosis and control of the wound process in panaritium.
4. Modern principles and methods of treatment.
5. Types of wound healing after treatment of panaritium.
6. Technique of surgical treatment of panaritium.
7. General characteristics of drugs used for local treatment and prevention of infectious complications.
8. Therapy depending on the phase of the wound process.
9. Preventive measures for further disease progression.

### **Practical works (tasks) used in the class:**

- 1 Transport patients to the dressing room.
2. Laying the patient on the dressing table in accordance with the area of manipulation.
3. Treatment of hands to perform the intervention.
4. Be able to wear a sterile robe.
5. Collect anamnesis in patients.
6. Evaluate the results of laboratory research methods and make a plan for additional examination.
7. Make a treatment plan for a specific patient.
8. Compilation of stage epicrisis.
9. Development of primary documentation (case histories).
10. Analysis of archival material.
11. Prepare a set for washing the wound.
12. Prepare a set for bandaging.
13. Taking material for bacteriological control.
14. Different types of cleaning in the purulent dressing.
15. Disposal of dressings.
16. Production of tables and other illustrative material (photos, slides, drugs).

### **3. 3Materials for self-control.**

#### **Tasks for self-control.**

##### **Question:**

1. Definition of panaritium.
2. Etiology of panaritium.
3. Pathogenesis of panaritium.
4. Clinical classification of panaritium.
5. Local signs of panaritium.
6. General symptoms of panaritium.
7. Diagnosis of panaritium.
8. Methods of treatment of panaritium.
9. Tactics of management of patients with panaritium.
10. Features of anesthesia in the treatment of panaritium.
11. Methods of temporary cessation of bleeding during panaritium surgery.
12. Laboratory changes in the blood with panaritium.
13. Management of the postoperative period.

14. Causes of death from panaritium.
15. Prevention of panaritium.

**Task:**

The causative agent of panaritium is often:

- 1) Escherichia coli
- 2) Staphylococcus
- 3) Vulgar proteus
- 4) Staphylococcus in associations
- 5) Escherichia coli in associations

Choose the correct sequence of actions of the surgeon when performing surgery for bone panaritium.

1. Sequestration nectar
2. Ensuring active suction
3. Processing of the operating field
4. Autopsies on the lateral surfaces of the finger along the neutral lines
5. Installation of PVC pipes for permanent irrigation of the lesion
6. Anesthesia
7. Applying an aseptic bandage
8. Immobilization
9. Applying the tourniquet to the base of the finger
10. Suturing with fixing tubes

**Tests for self-control (initial level of knowledge)**

*Tests and tasks to check the initial level of knowledge.*

1. Paronychia is an inflammation:
  - A. all tissues of the finger
  - B. white nail plate
  - B. nail bed
  - G. interphalangeal joint
  - D. tendon sheath of the finger
  
2. Of these forms of panaritium does not exist:
  - A. cartilaginous
  - B. subcutaneous
  - B. bone
  - G. articular
  - D. skin
  
3. Pandactylitis is a purulent inflammation:
  - A. nail
  - B. subcutaneous tissue
  - B. white nail plate
  - G. tendon sheath of the finger

D. all tissues of the finger

4. Panaritium in the form of a cufflink is:

A. subcutaneous panaritium with a breakthrough of pus under the epidermis

B. tendon panaritium

B. paronychia

G. bony panaritium

D. purulent melting of all tissues of the finger

5. Complications of subcutaneous panaritium of the third finger of the hand are not:

A. tendon panaritium

B. bony panaritium

B. articular panaritium

G. bursitis of the elbow joint

D. phlegmon of the forearm

6. Panaritium and finger can be complicated:

A. phlegmon of the tenor

B. phlegmon of the hypotenor

B. V- shaped phlegmon of the hand

G. phlegmon of the middle space of the hand

D. phlegmon of the shoulder

7. There are the following clinical forms of panaritium:

A. gangrenous

B. fat

B. phlegmonous

G. bone

D. skin

8. There are the following clinical forms of panaritium:

A. tuberculosis

B. bone and joint

C. septic

G. articular

D. post-traumatic

9. The symptom of crepitation on palpation of the finger may indicate:

A. the presence of a bone and joint form of panaritium

B. the presence of a subcutaneous form of panaritium

B. the presence of tendon panaritium

G. the presence of lymphatic panaritium

D. the presence of an articular form of panaritium

10. Differential diagnosis of panaritium is performed with:

A. phlegmon

- B. erysipelas
- B. polyarthritis
- G. lymphadenitis
- D. fracture

11. To diagnose panaritium use:

- A. determination of crepitation on palpation
- B. determination of local temperature rise
- B. determining the relative and absolute length of the finger
- G. identification of areas of pain with a button probe
- D. determination of skin sensitivity on the finger

12. In the postoperative period in the treatment of bone form of panaritium may use:

- A. multicomponent method
- B. through method
- B. method of skeletal traction
- G. closed method
- D. semi-open method

13. Phlegmon of the Pirogov-Paron space can develop as a result of:

- A. Tendon panaritium and finger
- B. Subungual panaritium of the third finger
- B. Tendon panaritium of the second finger
- G. Subcutaneous panaritium and finger
- D. Purulent tendo-vaginitis of the V finger

14. Phlegmon of the hand can be:

- A. catarrhal
- B. commissural
- V. tenor
- G. basal
- D. lateral space

15. Phlegmon of the hand can be:

- A. deep space
- B. hypotenor
- B. basal
- G. subponeurotic
- D. medial space

16. Phlegmon of the hand can be:

- A. raising the third finger
- B. middle space
- B. lateral space
- G. catarrhal
- D. V -shaped

17. The entrance gate for the development of commissural phlegmon of the hand are:
- A. erythema of the palmar surface of the hand
  - B. calluses of the skin with cracks on the palmar surface of the hand
  - B. boil of the palmar surface of the hand
  - G. carbuncle of the palmar surface of the hand
  - D. watery calluses on the palmar surface of the hand
18. Tendon sheaths of which fingers end blindly at the level of the palmar fold?
- A. II
  - B. I and II
  - B. V
  - D. III
  - D. IV and V
19. Anatomical prerequisite for the rapid development of bone lesions in panaritium in the nail phalanx are:
- A. The bone of the nail phalanx does not have a separate supply artery
  - B. The bone of the nail phalanx has a narrow bone marrow canal
  - B. The bone of the nail phalanx has a thick periosteum
  - G. the bone of the nail phalanx is spongy
  - D. The bone of the nail phalanx has poor innervation

### **Situational problems for the initial level of knowledge**

1. Patient K., 26 years old, complains of pain in the right hand for 4 days. The pain initially appeared at the base of the second and third fingers. Then the swelling and swelling of the back of the hand began to grow rapidly. II and III fingers are half-bent in the interphalangeal joints, unbent and spread in the metacarpophalangeal joints, the wrist has the appearance of a "rake". Your diagnosis and tactics of treatment of this patient?

2. A 53-year-old woman came to the surgeon with complaints of itching and burning of the skin on the third finger of the left hand. From the anamnesis it became known that 3 days later the patient developed fish at home and pricked a finger with a bone. A day later there was swelling on the fingers, redness of the skin. Examination of the dorsal-lateral surface of the finger shows a spot of redness of the skin with a bluish-purple tinge. The edges of the redness are scalloped. The finger is swollen, movements in the interphalangeal joints are limited, painful. What disease should I think about? With what pathology it is necessary to carry out differential diagnosis? What method of treatment will be used in this patient?

3. The patient complains of severe throbbing pain in the second finger of the right hand. Four days later, she pricked her finger while developing the fish. The last two nights she could not sleep due to pain. The nail phalanx of the finger is swollen, there is swelling and acute pain on its palmar surface. Movements in the interphalangeal joints

are moderately limited. Inguinal lymph nodes are not enlarged. What is your diagnosis? What help should be given to this patient.

4. Patient K., 36 years old, with a rope deeply pricked the first finger of his right hand. A day later there was swelling and throbbing pain in the finger. He did not seek medical help, and only two sleepless nights forced him to come to the surgeon. The nail phalanx of the finger is thickened like a mace, there is pain on palpation with a probe almost all the softer distal phalanx of the finger. There is a restriction of movement in the interphalangeal joint. What will be your diagnosis and possible operative autopsy?

5. A patient with purulent subcutaneous panaritium of the second finger of the right hand came to the reception. Indications for surgery are unconditional. The patient's consent to the intervention was obtained. But before the autopsy, to carefully remove all the affected, non-viable tissue, you need effective bleeding of the finger. How do you create it?

6. The mother brought a 9-year-old boy to the surgeon, who is worried about pain in the first finger of his right hand. Ill for 3 days. On examination of the palmar surface of the nail phalanx of the finger is determined by the area of swelling of a cloudy white diameter up to 0.8 cm, surrounded by a thin strip of redness. What help should be given to the child?

7. Patient O., 44 years old, complained of pain in the first finger of her left hand. Sick for about a week from the moment I removed the splinter (herringbone) from under the nail. Immediately the pain was minor. I used baths with salt solution, with potassium permanganate, applied compresses with Vishnevsky's ointment, fried onions. There was no improvement. A sleepless night the day before "made" me come to the doctor. At inspection it is defined in the form of a triangle of turbidity in the center of a nail plate. Pressing on the nail plate is acutely painful. Movements in between the phalangeal joint in full. Your diagnosis and treatment tactics?

### **Tests of the III level of complexity**

1. A 35-year-old man went to the clinic with complaints of moderate pain in the nail phalanx of the second finger of the right hand. The pain bothers me for two weeks. After 5 days from the onset of the disease there was a discharge of purulent contents from the formed fistula on the nail phalanx of the finger, after which the pain decreased. Then the pain and swelling of the finger periodically increased, but after the release of pus came relief. Over the past day, there was an increase in pain intensity and swelling of the finger in the nail phalanx began to grow, the pus did not go away. An objective examination revealed: swelling and redness (skin color is bluish with a purple tinge) of the nail phalanx of the second finger of the right hand, which extends to the distal part of the middle phalanx. On the palmar surface of the phalanx there is a fistula up to 2 mm in diameter, from which a small amount of purulent contents is released when pressed. Examination with a button probe revealed a zone of marked pain throughout the nail phalanx of the

second finger of the right hand. The radiograph of this finger revealed foci of destruction of the distal phalanx.

How will you diagnose this patient? What will be the further tactics of his treatment?

2. The patient, 35 years old, was admitted to the clinic with a diagnosis of tendon pararitium and the finger of the right hand. In what order should the surgery be performed on him and what method of anesthesia should be used?

3. A 9-year-old patient was admitted to the clinic and diagnosed with subcutaneous panaritium of the third finger of the left hand. The purulent-necrotic process is localized on the nail phalanx. The last time the child ate and drank 1 hour later.

What should be the surgeon's tactics in this case?

4. The patient, 73 years old, was admitted to the surgical department 15 days after the onset of the disease. Complains of moderate constant pain in the V finger of the right hand, pain and swelling of the hand in the hypotenor, fever up to 39 °C, general weakness, thirst. From the anamnesis it is known that she has been suffering from type II diabetes for 25 years, recently she took maninil to correct her sugar level. Examination of the right hand revealed: V finger thickened with areas of necrotized skin; on the nail and middle phalanges there are purulent fistulas with a diameter of 2 and 3 mm, from which a significant amount of purulent contents is released; at a palpation of a finger crepitation and pathological mobility in a proximal interphalangeal joint is defined. the area of the hypotenor is infiltrated, the hyperemia of the skin is indistinct, the symptom of fluctuation is not defined; during the study with a button probe revealed pain along the tendon sheath. What preliminary diagnosis will you make? What additional research methods need to be applied to this patient? What will be the tactics of treatment?

5. A 34-year-old patient was hospitalized in the surgical department with complaints of pain in the index finger of the right hand for 22 days from the onset of the disease. It is known that in the clinic on the 8th day after the disease he was operated on for subcutaneous panaritium. After the operation he used saline baths and bandages with Vishnevsky's ointment. UHF therapy was performed. There was no improvement in two weeks of such treatment. The nail phalanx of the finger is thickened, painful. On its radial surface there is a linear wound with excessive granulations and scanty serous-purulent discharge. With suspicion of what complication the patient is directed to a hospital? What additional tests need to be performed to verify the diagnosis?

6. Patient R., 23 years old, was admitted to the surgical department with complaints of pain in the second finger of the left hand. Two weeks later, he pricked his finger with metal shavings. During the last week he was treated in the clinic: puncture, antibiotic therapy, immobilization. There was no improvement, so he was sent to hospital. The finger in the proximal between the phalangeal joint is half-bent, spindle-shaped thickened, swollen, the skin is hyperemic, palpation in the joint is acutely painful, movements in the joint are almost absent. What is your diagnosis? What additional research needs to be done? Your treatment tactics?

7. Patient C, 34 years old, went to the clinic about the progression of the pathological process in the left inguinal region. In particular, he notes a acute pain and redness of the skin over the lymph nodes; the latter are fused together and fused with the surrounding tissues, immobile. Body temperature is high, bothered by a headache, the expressed weakness; the onset of the disease is acute, duration - 4 days. What pathological process can be assumed in the patient?

1. Acute purulent lymphadenitis
2. Phlegmon of the left groin.
3. Osteomyelitis of the pelvic bones.
4. Tuberculosis of the lymph nodes.
5. Acute nonspecific coccyx

7. In patient C, 19 years old, during the professional examination revealed signs of right cervical purulent lymphadenitis. From the anamnesis - for a long time was in a room with drafts. Laboratory data - an increase in the number of leukocytes in the blood, an increase in ESR, a shift of the leukocyte formula to the left. What treatment should be performed?

1. Dissect the skin over the site of severe fluctuations, revision of the site of inflammation and its drainage, the use of antibacterial and anti-inflammatory therapy
2. Puncture of lymph nodes followed by washing of tissues from which pus was sucked out with an antiseptic solution.
3. General antibacterial, anti-inflammatory and detoxification therapy in combination with local anti-inflammatory treatment.
4. Physiotherapeutic treatment.
5. Observations in dynamics.

8. Patient P, 29 years old, was diagnosed with acute truncular lymphangitis of the left lower extremity. Which of the following is contraindicated for this patient?

1. Massage of the left lower extremity.
2. UHF to the affected area.
3. Quartzation of the affected area
4. Immobilization of the left lower extremity.
5. Sulfanilamide drugs.

## 7. References:

General:

1. General Surgery. Textbook for students of higher medical educational establishments / [ Lihonenko O.V., Chorna I.O. , Zubaha A.B., Khimich S.D et all.]; Edited by Prof. S.D. Khimich, Prof. M.D. Zheliba Kyiv AUS Medicine Publishing, 2019.- 608 p.
2. General Surgery. Textbook for students of higher medical educational establishments / [ Lihonenko O.V., Chorna I.O. Khimich S.D et all.]; Edited by Prof. Ja.S.Bereznickij, M.P.Zacharash, M.P.Mishalov,. Vinnica: New book, 2019-344c
3. Methodological recommendations for classroom and independent work of students.
4. General Surgery / Ed. S.P.Zhuchenko, M.D.Zheliby, S.D.Himicha - Kiev.: Health, 1999.
5. Cherenko MP, JM Vavryk General surgery in anesthesiology, intensive care, and the basics of patient care - Kiev.: Health, 1999.

6. Gostishchev VK General Surgery: Textbook. - Moscow: Medicine, 1993
7. Gostishchev VK "Guide to practical training in general surgery." M., "Medicine" - 1987.

Additional:

1. AA Simodeyko, SS Philip A. Boldizhar General Surgery Questions and Answers. Uzhgorod, "Willow" - 2005.
2. SM Genyk, MV Prokopishin, VM Rat and others. Case Studies on hirurgii.Ivano-Frankivsk, "Lileya-NV" - 2003.
3. AA Simodeyko, SS Philip A. Boldizhar, V. Pant Practical skills in general surgery patient care. Uzhgorod, Uzhgorod National University. - 2001.
  - Website akady <http://www.umsa.edu.ua>
  - Website department of general surgery [http://www.umsa.edu.ua/kaf\\_zaghir](http://www.umsa.edu.ua/kaf_zaghir)
  - Library UMSA <http://www.umsa.edu.ua/pidrozdilhome/biblioteca/biblhome.html>

**The distribution points are awarded to students:**

At mastering topic number 23 to module 2 for training activities for students rated a 4-point scale (traditional) scale, which is then converted into points as follows:

<b>rating</b>	<b>Points</b>
5 (excellent)	5
4 (good)	4
3 (satisfactory)	3
2 (poor)	0

Guidelines prepared  
 assistant, Department of General Surgery  
 Yaroshenko R.An.\_\_\_\_\_