

EXPERIENCE OF APPLICATION OF NAPKINS MADE FROM SORPTION COTH AUT-M-2

(manufactured by OJSC SVETLOGORSKHKHIMVOLOKNO, BELARUS) WWW.SOHIM.BY

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DISEASE HISTORY

Successful treatment of the diabetic foot

In August 1998, at the Elisabeth Hospital, Essen, was entered 42 year-old patient with a thrombotic leukemia and followed amputation of the leg (namely amputation of the right leg in the area of the hip), and diabetic foot. In addition, the following diseases have been diagnosed: anemia left leg, dry gangrene of fingers, insulin-dependent diabetes.

On the patient had been observed serious pyonecrotic tissue injury in the area of amputation. Overall, it took 21 inspection and dressings of a wound under anesthesia due to severe pain.

During the first 8 dressings, compresses and Betadine solutions were applied. At the end of September 1998, we began to use as dressing material Sterilized sorbing carbon napkins. These napkins were used along with Betadine solution. This contributed to a rapid cleansing of the wound and apparent tendency to healing.

Since November 1998, we moved to atraumatic carbon napkins (+ Betadine solution) as a dressing material. The dressings with carbon material had been passing without pain. In addition to local treatment, the patient regularly took antibiotics. Healing was occurring very quickly, and by December 10, the patient was transferred to the sanatorium.

During further dressings local anesthesia was no longer needed.

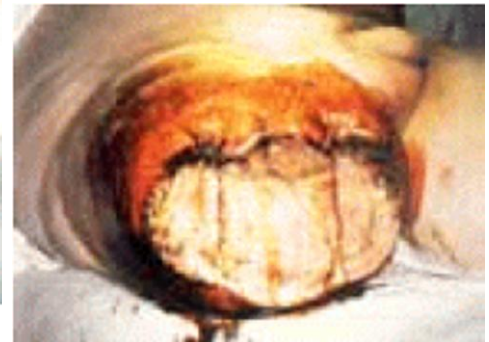
As a result, a stable and active granulation was observed on the entire surface of the wound of about 25 cm, and shortly almost the entire slice was covered with granulation tissue. Further inflammatory processes had been eliminated.



Thrombectomy with subsequent amputation of the right leg above the knee, and infection at the point amputation, of 28.08.1998



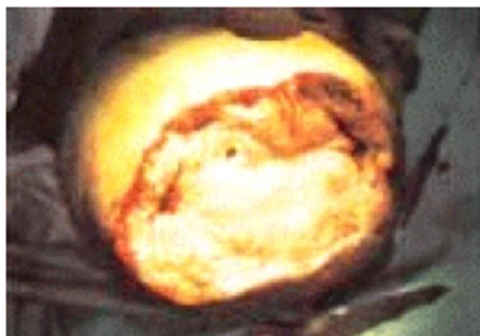
Overlaying the Sterilized sorbing carbon cloth onto the wound, 25.09.1998



The result of treatment, 01.10.1998



The result of treatment, 08.10.1998



The result of treatment, 28.10.1998

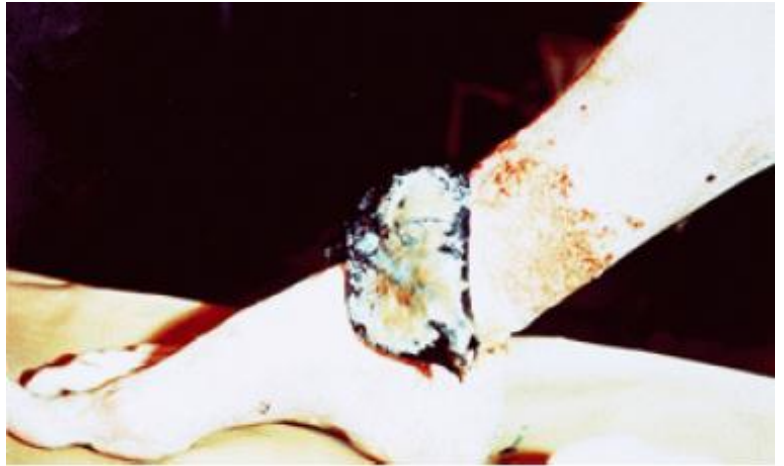


The result of treatment, 12.04.1999

MOSCOW MEDICAL ACADEMY NAMED AFTER I.M. SECHENOV, THE FACULTY SURGICAL CLINIC

Clinical trials of Sterilized sorbing carbon cloth on patients with purulent wounds after abdominal surgery and patients with trophic ulcers in the phase of pyonecrotic changes. Tests were carried out along with a general clinical medical therapy. Result:

It was established that the material, due to its hygroscopicity, is capable of absorbing wound secretions, including and purulent, provides active drainage of exudate, prevents the suction of toxic substances in the blood, as evidenced by the positive dynamics of the level of intoxication patients (reduction of the temperature reaction, an improvement of peripheral blood). With its help is possible to in optimal time to completely clean the wound or ulcer and switch to atraumatic carbon cloth until complete epithelialization. The use of material did not cause side effects and was well tolerated for all patients.



MOSCOW CITY CLINICAL HOSPITAL № 7

Clinical trials of atraumatic carbon cloth at treatment of wounds of various etiologies. In the control groups were included patients with similar injuries who had been treated with traditional dressings.

EXTENSIVE SCALPED WOUNDS OF LIMB

The material was used in the early stages (1-2 days after entering). Changing dressings was carried once in 2-3 days, depending on the degree of exudation. The effectiveness of treatment was determined by the dynamics of wound healing process and changes in the general condition of patients. Locally called attention to the type of wound, the presence or absence of purulent discharge, period of epithelialization, wound granulation character. The material is laid down well onto the wounds of any relief, does not cause discomfort, allergic reactions or symptoms of local irritation, removed easily, without pain, leaving no fibers. Pyeses of wounds is not observed at any patient.

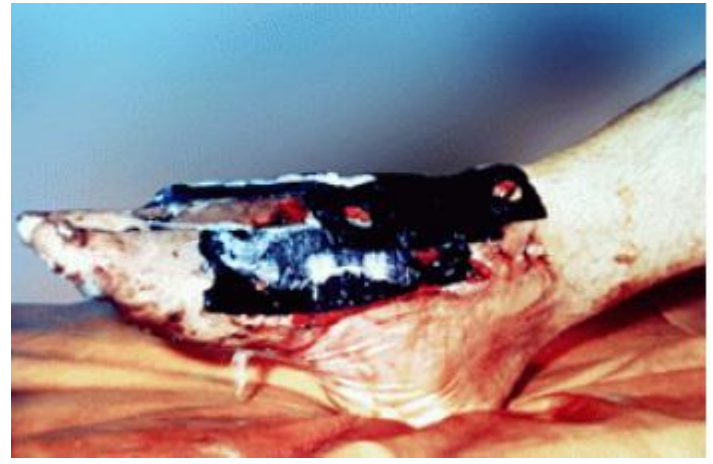
Complete cleansing of wounds with forming on its bottom the fine grained, juicy bright pink granulation had occurred on 4-5 day (after 2 dressings), and then began an active epithelialization from the edges of the wound. Dressings were carried out once in 3-4 days (within 2 weeks). Using additional (by applying to the material before bandaging) medicines for local treatment of wounds (ointment Levomikol) was applied only at one patient with extensively polluted wound with dirt, mechanical injuries of the skin, soft tissue injuries around the wound near the hip. For other patients, additional medicines were not used.



Burn hand; atraumatic carbon cloth dressings. View wounds after 11 days after injury.



Result of treatment after 9 months



The treatment process using atraumatic carbon cloth

Wound healing for all patients came with the formation of soft, elastic scar in the following terms: for the area 50-150 cm² – 28 days, 150-250 cm² – 35 days. The patients with a wound area 350 cm², with 40% epithelialization of the wound surface at 30th day was produced dermepenthesis by Tirso with a good result, in order to accelerate the healing of extensive wound defect (engraftment of skin flaps). General clinical examination of these patients, including laboratory (blood test, urine test, blood biochemistry test and etc.) did not reveal changes in the homeostasis and did not require further medicamental correction.

In the control group observed: long (4-5 days) inflammatory changes, fibrinous scurf (up to 7-9 days) with followed formation of hypergranulation in the wound, which demanded cauterization, and in one case – excision. The treatment demanded during the first week the daily dressings involving drying of the material to the wound surface and thus moistening bandages with antiseptic solutions.

It caused painful sensations when removing the dressings, bleeding from injured granulation in the bottom of the wound. The healing of these wounds came in average time of 48 days, and for 2 patients it was necessary to provide at 50th and 56th days a dermepenthesis with excision of scarry degeneration the edges of wounds (early stage of formation of trophic ulcers).

SOFT TISSUE DEFECTS IN OPEN FRACTURES

During primary surgical treatment, the wounds were sewn in with stopping drains, but festering wounds appeared at observed patients (at 4th-5th day), necrosis of skin flaps (1-2 day), thereby were formed the wounds of 5 to 15 cm², the bottom of which was a bone in the fracture zone. Before applying to the wound atraumatic carbon material was wetted with a solution of most active antibiotics acting on the micro flora of the patient's the wounds (including microbiological research). In addition, depending on indications were conducted sequestrectomy when dressings.

Cleansing the wounds from necrotic masses for all patients took on average 4-5 days, resulting in wounds filled with fine-grained, juicy granulations actively crawling on bone. The consequence of this was the fact that only one patient had to resort to sequestrectomy, where was not executed a timely adequate reposition of bone fragments in the apparatus of external fixation and bone fragment came on 0.3 cm out of the wound. Bone tissue of patients was covered with granulation in the average time of 7.5 days; hereinafter – wound healing with the formation of a soft, elastic scar. When dressing changes material after cleansing wounds, not removed within 7-10 days, and the medicines were applied from the top by impregnating it.

The patients in the control group passed 7 necrotomies, which was caused a slow (in terms of 10-12 days – only 2 patients) covering the bone with granulation tissue, which led to bone necrosis. Bandaging was carried at least 1 time in 2 days, and the dressing changes were accompanied with pain. Hypergranulation in wounds observed in 5 cases.

BEDSORES OF THE SACRAL AREA

Patients suffered from hypodynamia as a consequence of combined injuries and immobilization features (double stretching with the forced loads). Decubitus wounds were taken for medical treatment since the necrotic-inflammatory stage; treatment was started with sanitation of wounds (including surgical methods – necrosectomy) but at this stage a full sanitation as a rule impossible to provide a completely because of the intimate connection of necrotic tissue with the underlying areas. Later on the wound surface was applied atraumatic carbon material impregnated with antiseptic solutions for periods of 2-3 days, depending on the level of exudates. Daily, up to cleansing of wounds, irrigation of material with antiseptic solutions were conducted.

After cleansing of wounds (average time of 4-5 days) on the material were applied ointments containing an antiseptic while dressing 1 time in 3-4 days. After appearing of the active edge epitalization of wounds napkins applied without impregnation medicines, and most of observations were carried 1 time per week.

Epithelialization of wounds occurs at all patients within the period of 35 days if the size of bedsores after necrectomy was 120 cm² and up to 50 days if size was up to 200 cm² of wounds. Dermepentesis was not applied in any case. In the control group with the same bedsores after necrectomy applied gauze bandages with solutions of antiseptic, antibiotics and ointment dressings. Cleansing of wounds occurred in periods of 6-8 days. Later on for 2 patients were performed dermepentesis, 6 patients were formed hypergranulation: friable, acinar proliferation, with the formation of saped edges. Wound healing came within 60 days.

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INTRODUCTION

The goal of aseptic treatment of surface of burn wounds is to prevent the intrusion of bacteria in the wound surface and the subsequent infection of the wound. Usual for this applies antiseptics, such as Betadine (povidine iodide) and Flamazin (sulfadiazine silver salt). Burn wound has elevated permeability to water, proteins and electrolytes, due to damage of the epithelium.

Accordingly, can be observed increase of secretions, leading to leakage of bandages and occurring of the danger of infection in wounds during the first 3-5 days after injury. During this period of exudation frequent, daily dressings are required. Also at the same time is necessary to use analgesics to relieve pain for patient, these operations are time consuming for the staff and lead to a large consumption of dressings. Market launch of new carbon materials made it possible to create a new secure and simple method of treatment that does not cause pain for patients, not damaging the surface of wounds and saves time of staff as well as dressings.

MECHANISM

The carbon cloth is hygroscopic active and absorbs wounds secretions, thereby clearing the wound surface. It does not stick to the wound, and thus lies well to the wound with any relief. It is easily removed from the wound surface, with no epithelial damage or zones of granulation tissue. Carbon dressings protect the wound from mechanical damage and infection. It prevents any wound maceration and promote the formation of dry scab in case of deep burns. In the case of surface burns, the carbon material provides epithelialization within 8-12 days. Carbon dressings do not cause allergic reactions and noncytotoxic. Side effects were not identified. Due to the soft texture of the dressings, change of its well-held by patients.

METHOD

Starting from January 1996 carbon fiber dressings used in the Central Hospital of the Armed Forces of Germany in Koblenz for the local treatment of burn wounds. This treatment is called "Koblenz model". Within 24-29 hours after entering the patient burn wound was disinfected with Betadine solution, in the case of an allergic reaction to iodine-solution Lavasept (poligezanidin), and on the wound surface was applied Sterilized sorbing carbon napkin which was fixed with gauze bandages. Due to its high adsorption capacity, a napkin absorbs a large amount of fluid during this first period, when a wound has a high tendency to hypersecretion. The carbon cloth replaced when it is completely wet. Usually, replacement is necessary after 4-6 hours. Before the imposition of a new carbon-dressing material, burned surface disinfectant again with Betadine solution, diluted with normal saline solution 1:5 or with Lavasept.

With decreasing the secretion on the second day, the wound is dressed using atraumatic carbon napkin. Before applying to the wound and fixation with a bandage, this carbon napkin impregnated with aforementioned solution of Betadine, and in cases of burns on the face or allergic reaction to iodine-Lavasept.

This dressing remains on the wound within 2 days and moistened with appropriate disinfectant solution every 6 hours. Napkin can be easily removed from the wound surface almost painless on the condition that the napkin was wetted with physiological saline before removal. We have found that with this method of local treatment of wounds, burns dry quickly and the burn surfaces of 11-degree and 11-6 are covered with epithelium and heal, usually within 10 days. Another advantage of this method of treatment is extremely good possibility of observing wounds, particularly when it comes to its depth, which allows more accurately estimate and provide a "map of wound". This helps to determine the optimal time of surgical intervention in the case of deep burns. It was found that in cases of wound infection with *Pseudomonas strain aeruginosa* wetting of carbon dressings with 1% acetic acid is an effective way of antiseptics.

SUMMARY

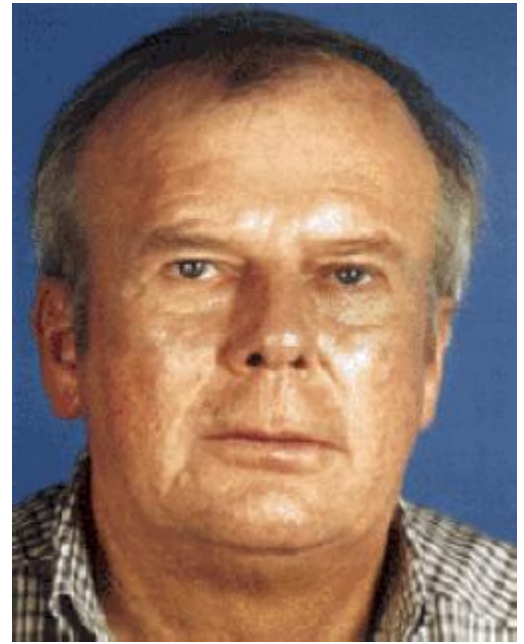
Local treatment of burn wounds in accordance with the "Koblenz Model" is a simple, cost-effective method to reduce the amount of dressings. Patient tolerance to this method of treatment is extremely high due to the painless dressings change. Compared to other methods of treatment monitoring of the extensiveness and depth of wounds is extremely favorable, and therefore the present method of treatment should be recommended.



Facial burns



Dressings of the face with Sterilized sorbing carbon napkin



Result of treatment after 1 year

Varicose and trophic ulcers. Monitoring of treatment with atraumatic carbon napkins and sterilized sorbing carbon napkins. Two-stage treatment with using carbon dressings

METHODS

Observed the treatment 154 patients with varicose and trophic ulcers of various dermatological clinics in Germany. Treatment with carbon materials was carried out in 2 stages:

STAGE 1. DRY TREATMENT USING STERILIZED SORBING CARBON NAPKINS.

The first stage included a dry treatment within 2-4 days. The purpose of this treatment was to reduce the number of microbes and bacteria, creating a barrier against re-infection and draining and cleaning of the wound. The dressing was replaced when it was completely saturated with secretions of the wound.

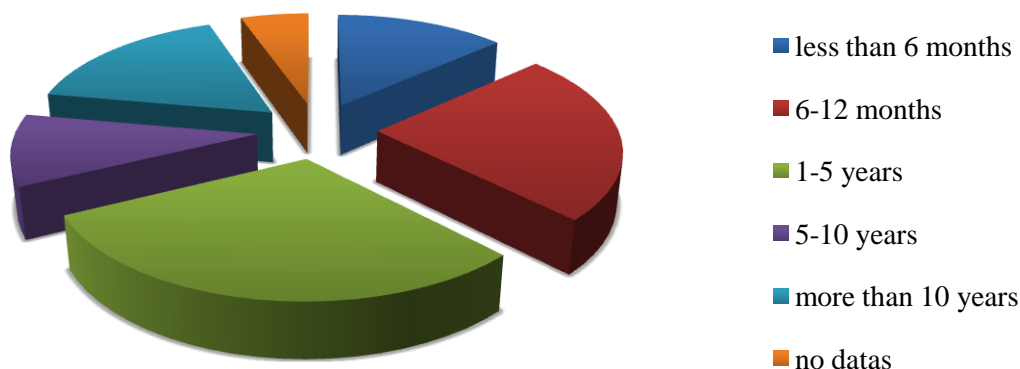
STEP 2. WET TREATMENT WITH ATRAUMATIC CARBON NAPKINS.

After a complete cleaning of the wound (after 2-4 days) the second stage of treatment using atraumatic carbon napkins has begun. Wet treatment was carried out in combination with local antiseptics. The aim of the second wet stage was to ensure granulation and epithelialization of the wound. Dressings were replaced as needed; at necrotic or infectious stage – every 1-3 days; at regeneration stage – every 5-7 days.

PATIENTS' DATAS

The observed group of patients consisted of 54 males and 100 females; average age – 68 years old (min – 31, max – 94). At the beginning of the observation 26% of patients were treated from 1 to 5 years.

Duration of the treatment before the beginning of observation



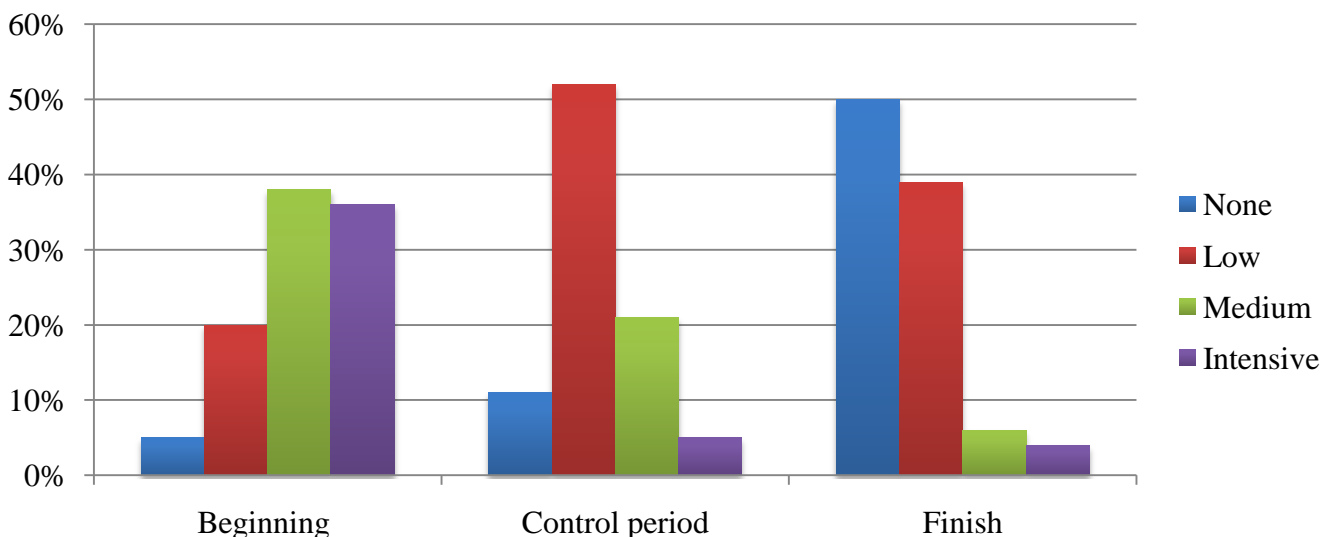
CHARACTERISTICS ULCERS

To determine the size of the ulcer was defined the maximum length and maximum diameter. Effective area was calculated using the known formulas, considering that the ulcer has an elliptical shape. The average size of the wound at baseline was 21.3 cm² (median 8.9 cm), at the end of the observation - 13.2 cm² (median – 2.4 cm²).

EXUDATION

There was a noticeable decrease of exudates at the beginning of treatment (stage 1 - dry treatment). And 87% of patients were not observed exudation or exudation was very low at the end of the observation period (stage 1 – wet treatment).

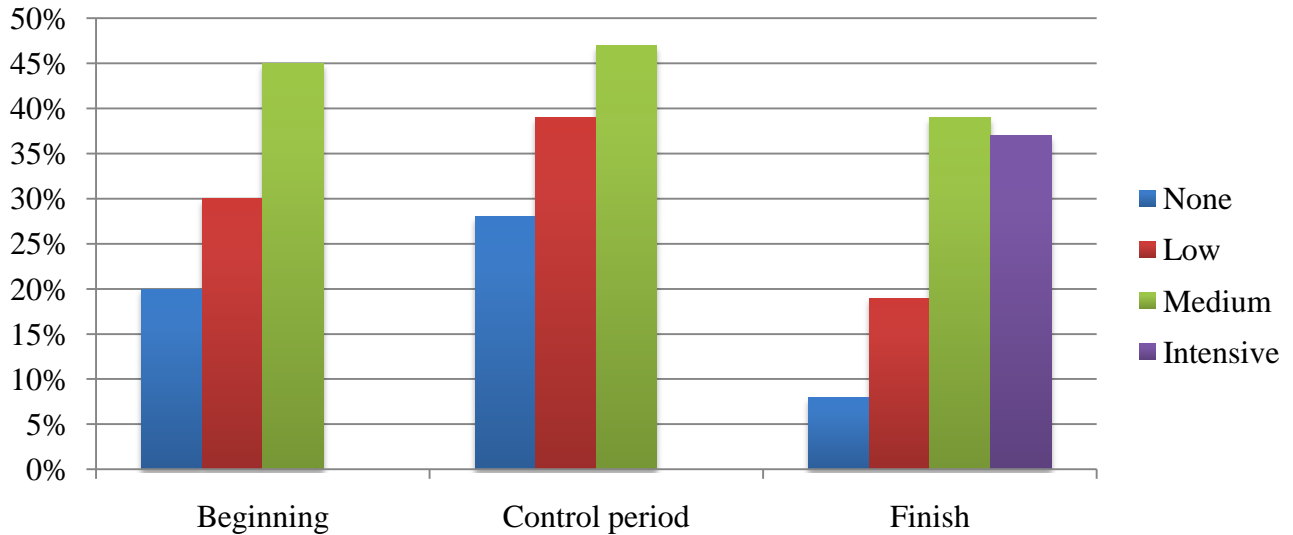
EXUDATION



GRANULE FORMATION

84% of patients were not noted the formation of granules, or it was low in the initial period of observation. After applying atraumatic carbon napkins, 75% of patients had strong or medium granule formation.

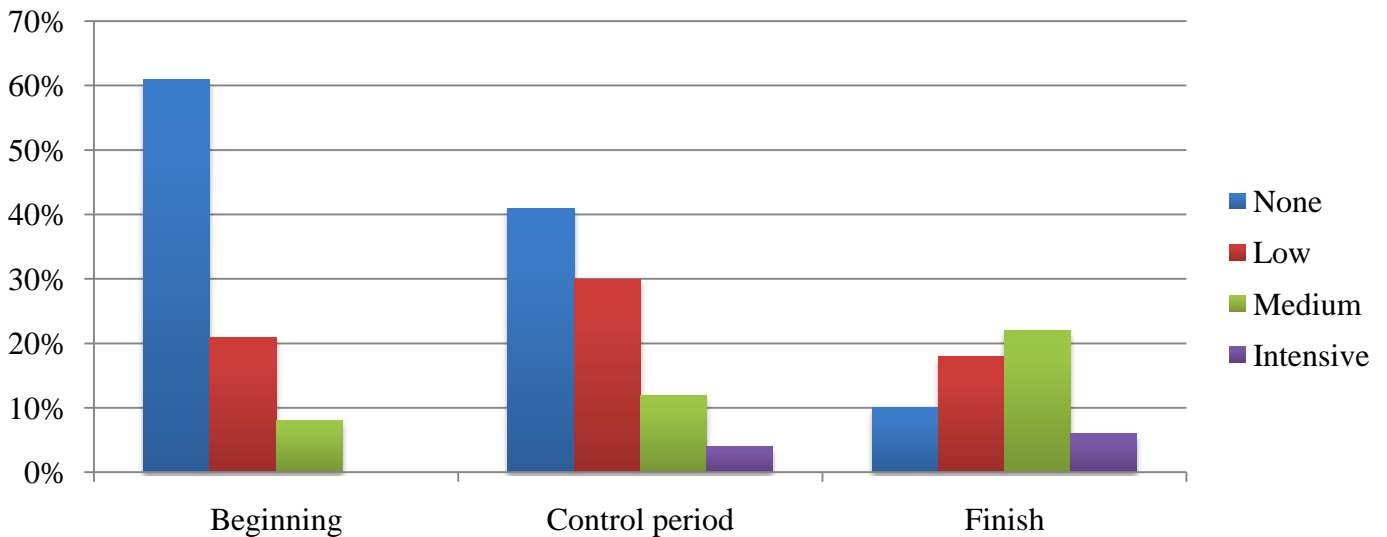
GRANULE FORMATION



EPITHELIALIZATION

In the initial period of observation, 93% of patients epithelialization was not observed or was extremely insignificant. During stage 1 (dry treatment) intense or medium epithelialization was noted at 17% of patients. At the end of observation the intensive epithelialization was observed at 33.8% patients, medium - 32.5%, and weak - 18.9% of patients.

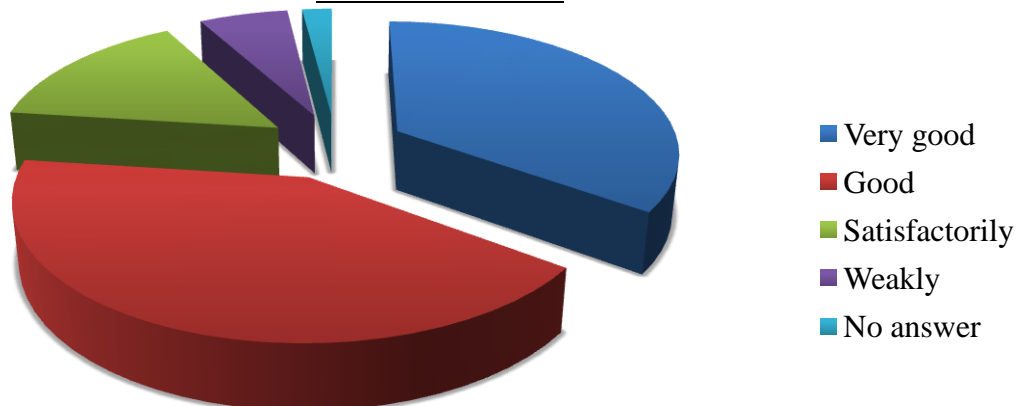
EPITHELIALIZATION



EVALUATION OF DRESSINGS BY THE ATTENDING PHYSICIANS

The effectiveness of carbon dressings was assessed as "very good" - 39% doctors, as "good" - 45% doctors who were involved in the observation. Side effects when using of dressings have not been noted.

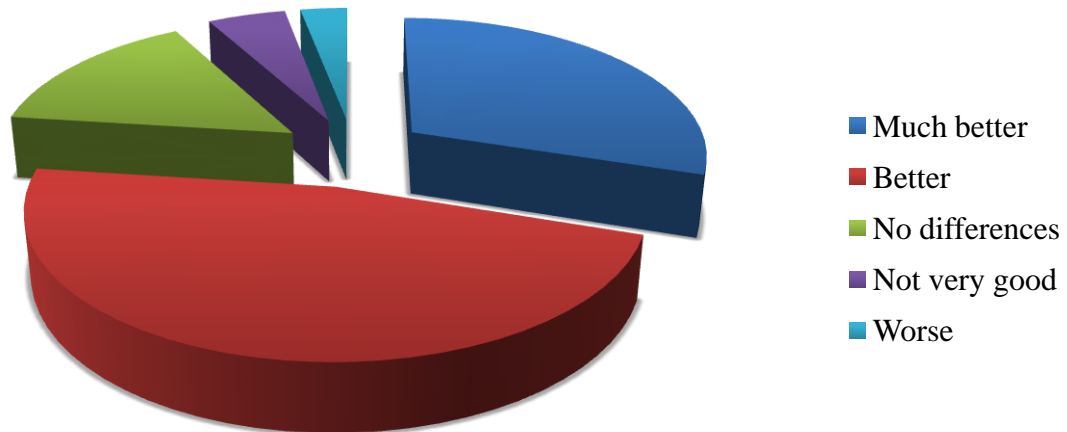
EFFECTIVENESS



COMPARISON OF CARBON MATERIALS

with other dressings (doctors' estimates). 46% of physicians estimate the carbon materials in comparison with other materials as "better" and 34% - "Much better".

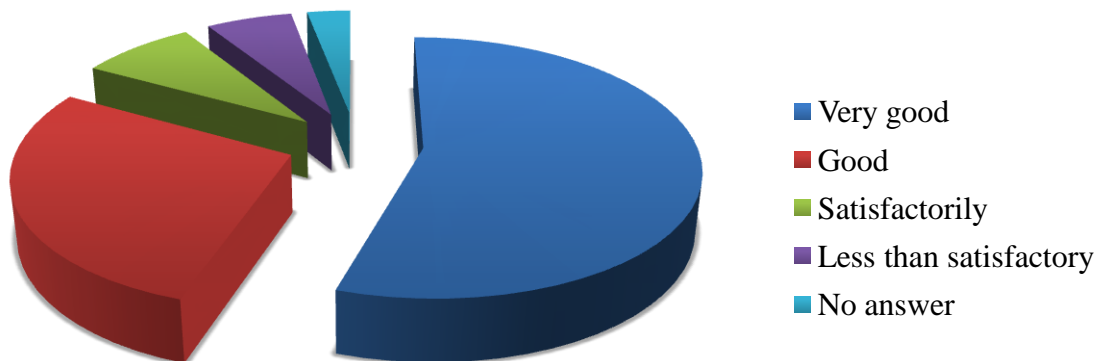
COMPARISON WITH OTHER DRESSINGS



CONCLUSION

Treatment of varicose and trophic ulcers is a very long process and gives unsatisfactory results. The use of carbon dressings composed of pure carbon has shown that due to the properties of the dressings they are an effective way of treatment. High adsorption and cleaning properties of Sterilized sorbing carbon napkins combined with the ability to granule formation and epithelialization by atraumatic carbon napkins led to shown here positive results (epithelialization of 87% observed patients after treatment).

PHYSICIAN'S ESTIMATE



THE RESULTS OF CLINICAL APPLICATION OF CARBON NAPKINS

Research Institute of Emergency Care named after N.V. Sklifosovsky. Moscow Burn Center

The Burn Centre of Moscow Institute of Emergency Care named after N.V. Sklifosovsky since August till November 2000, were conducted clinical trials of carbon napkins. On the treatment were 35 patients in the age 35-63 years, among them 25 men and 10 women. Among the studied patients, 16 persons had burns of I-P-SHA degree, and 19 persons had burns of II-III-IV degree. Area of burns which were treated by carbon napkins, varied from 10 to 40% of body surface. The causes of burn injury were flame and hot liquid. Carbon atraumatic napkins applied as a rule in the early period after trauma (1-3 days) in two cases where the absences of festering wounds were, and 6 patients were treated at 6th-8th day after injury, which was caused being in other hospitals and due to that later entering to Burn Center of Moscow.

In both cases, before applying the dressing was done careful treatment of burn surfaces which consists of removing bubbles (purulent discharge for patients who admitted later), desquamated epidermis, washing with antiseptic solutions. The effectiveness of treatment is determined by the dynamics of the process of wound healing: a view of the wound, the presence or absence of purulent discharge, presence or absence of crusts, terms of epithelialization, wound cleansing periods from non-viable tissue.

In the overall picture of disease was recorded condition of the patients, the presence of pain, general and local complications.

Carbon napkins does not cause allergic or irritant reactions, well fixed on the surface of the wound, repeating its relief, did not cause unpleasant and painful sensations, relatively easily and painlessly removed during dressings. When treating of burns degree I-II and the imposition of napkins in the first days after entering hospital, napkins would not need to change up to 6-8 days, and, as a rule, in these times there is complete or almost complete epithelialization of burn surfaces. In patients with festering wounds changing dressings made 2-3 times. It should be noted that such burns more appropriately treated with Sterilized sorbing carbon napkins.

With burns P-Sha degree first change of napkins performed on the 5th, 6th day from the moment of trauma; in future if there was a festering wounds - changing after 2, 3 or even 4 days. Burns healing was observed after 19 + 2, 1 days, and in those cases where patients do not arrive in the first days from the moment of trauma - in 22 + 2, 4 days. When treating of burns IY degree always managed to transfer its from a wet to a dry condition almost in 2-3 days. The use of carbon napkins reflected on the general status of the patients, primarily in the fact that they have been less expressed febrile period and therefore in the peripheral blood was less marked leukocytosis and the shift of formula to the left, than similar patients in the same period of burn disease, who were treated traditional dressings.

In addition, it should be noted a significant suction and deodorizing effect of used materials, expressed in the absence of the characteristic odor, even in the presence of pathogenic microflora.

Thus, disposable carbon napkins are highly effective dressing for the local treatment of burn wounds. Application of napkins does not cause local irritant and allergic reactions, it prevents the festering wounds, promotes rapid drying of wet necrosis, activates self-epithelialization of subdermal burns, has a deodorizing effect, saving the dressing.

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APPLICATION OF CARBON NAPKINS IN TREATMENT OF INFECTED WOUNDS

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There is an ongoing search for effective treatments for patients with injuries of the musculoskeletal system, complications of chronic purulent process. Despite the constant improvement of methods of treatment, is still relatively high rate of infection with the formation of extensive necrotic wounds accompanied by severe intoxication due to the action of proteolytic cleavage products of damaged tissues and bacterial toxins. In the treatment of patients with purulent complications in modern conditions is more common resistant wound microflora, excessive allergy to drugs used for the local treatment, reduced immunity, which leads to the need for new ways of influence on microflora of purulent wound.

The most perspective direction in the treatment of infected wounds acquires local sorption detoxification in direct contact of the wound surface with the sorbent. As a tool for applicative sorption in orthopedic and traumatology department of MRSRCI since 1999 applied carbon napkins.

Napkins superposed in one layer with overlapping edges of the wound 1-2 cm. Previously they impregnated with an antiseptic solution (furacilin, dioxide and others), using the sterile water-proof wrapping. Napkins go down well, repeating the relief of the wound surface, and does not dry to the wound, easily, without pain, remove while dressing, do not have allergic and locally irritant, have a deodorizing effect.

Clinical studies have shown that the sorption properties of carbon material contribute to effective cleansing of wounds from pyonecrotic formations and in a short time causes epithelialization. There was a significant superiority of the activated carbon fabric as dressing material in comparison with traditional sanitation methods such as wet-and-drying bandages and ointment dressings.

In addition, the marked positive effect in the treatment of burn wounds, trophic ulcers, bedsores. In the presence of the deep pockets and cavities of purulent, and napkins used at the same time to drain as well.

Thus, the use of carbon napkins as an alternative to traditional bandages have a positive impact on the course of wound healing as a result of expressed sorbent effect and stimulating effect on the regeneration processes in the wound, which is particularly important in preparation for the followed kinds of surgical interventions.

REPORT OF CLINICAL TRIALS OF DISPOSABLE CARBON NAPKINS

In the 1st Burn Unit of the Republican Burn Center in Research Institute of Traumatology and Orthopedics in Nizhny Novgorod, was passed trials of carbon atraumatic napkins. Napkins were applied for 4 patients with burns 11-Shab degree and burned area 5-60% of the body surface, in a period of 1-5 days from the date of injury.

When the depth ShB degree of burns bandages superimposed on the granulation tissue formed after excision of scab. Before applying the napkins conducts a full treatment of the wound, homeostasis when necessary. Change bandages should be every second day, while the standard gauze bandage with an antiseptic solution has to be changed every day or even twice a day. As noted more intensive growth of granulation tissue and its "maturation" to perform autodermoplasty.

When the depth of the wound 11-Sha degree, the bandage was imposed at 1st-2nd day after trauma and the wounds were completely cleaned before applying napkins. Napkin was superposed in dry form without prior wetting with antiseptics. Changes of napkins were not required before the complete epithelialization of wounds. Thus, the use of napkins allows reducing the frequency of dressings, tissue trauma and preoperative preparation.

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Head of 1st Burn Unit of the Republican Burn Center, S.A. Vilkov

Junior Researcher Department of thermal injuries, N.G. Guseva