

# Sorbent Carbon Fiber AUT-M



Burn wounds

Fistulas

Complicated postoperative wounds

Purulent cavities of various etiologies

# AUT-M: WOUND-CARE CARBON CLOTH (SORBENT CARBON FIBER AUT-M TYPE 2)

- rayon-based carbon material
- made for treatment of varicose ulcers, diabetic defects, decubitus ulcers, burns, impetigo traumatic changes, infected operation wounds, secerning infected wounds, excreting tumor defects, etc.
- applied in surgery, traumatology, combustiology, obstetrics and gynecology, proctology, stomatology
- cloth is black-color, dull, without glitter
- cloth weaved in twill 2x2
- activated carbon fibers have high level of micro-, meso-, and macro-porosity
- produced in: rolls of fabric / rolls of tape / readymade napkins

## FEATURES:

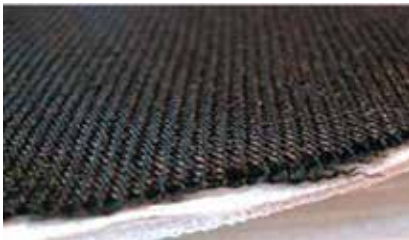
- absorbs microorganisms & toxic substances; wounds disappear in 2 times faster
- helps to clean the wound quicker and ease the restore of granulation
- applied onto the wound surface perfectly
- no traumatic effects when rebandage
- no scars
- rapid wound granulation
- accelerates process of healing by removing the mediators of inflammation
- has the deodorant effect and ease the working environment for both patient and nursing staff
- can be used without additional help of hospital's staff
- provides effective sorption of low-, mid-, and high molecular substances, including protein decomposition (putrefaction) products, toxins, microbes



Burn hand; atraumatic carbon cloth dressings.  
Wound's view in 11 days after injury.



Result of treatment after 9 months



## SPECIFICATION for napkin

Length, mm	Width, mm
150±5	135±5
400±10	135±5
50±3	42±3
100±5	42±3

MEDICINE	FILTERS
<ul style="list-style-type: none"> <li>wounds (including postoperative), sequelae after purulent and putrefactive infections with manifest pyonecrotic layer</li> <li>pyo-inflammatory diseases</li> <li>treatment of bedsores, burns, ulcers; slowly granulating wounds; fistulas; purulent cavities of different origin</li> <li>milled fiber AUT-MI is used as enterosorbent and filler for ointments (burns treatment)</li> </ul>	<ul style="list-style-type: none"> <li>in pharmaceutical industry</li> <li>in food industry</li> <li>highly efficient water filters</li> <li>filters for aggressive media</li> <li>manufacturing of personal protective equipment (PPE)</li> <li>odor absorption</li> </ul>
	MAKE-UP
	<ul style="list-style-type: none"> <li>base for skin-rejuvenation mask</li> </ul>

### SPECIFICATION for fabric

	AUT-M-1	AUT-M-2	AUT-M-3
Surface density, g/m <sup>2</sup>	110	200	750
Breaking strength, N/5 cm	150	300	700
Pores volume (benzol), cm <sup>3</sup> /g, min	0,5	0,5	0,5
Width of fabric, mm	135±5; 510±30	42±3; 100±10; 150±10; 500±20	510±20

### HOW TO APPLY:

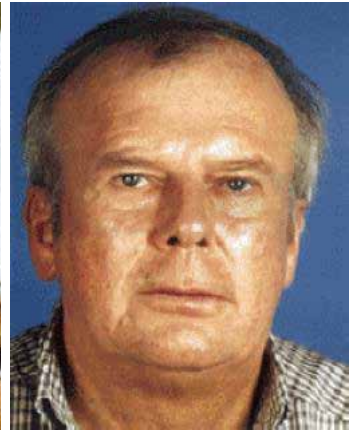
	Napkin AUT-M	Fabric AUT-M
<b>Step 1</b>	Open the sterile package. Cut into pieces which are a bit bigger than a wound size, if needed.	Sterilize (Gamma rays, by autoclaving at 120 ° C and a pressure of 1.2 atm. during 45 min) cloth AUT-M. Cut into pieces which are a bit bigger than a wound size.
<b>Step 2</b>	Apply onto the wound. If the wound is too dry, the material can be moistened with 3% solution of boric acid, or 3% solution of hydrogen peroxide, or antibiotic – it helps to activate material.	
<b>Step 3</b>	Fasten the napkin/cloth with gauze, or bandage, or adhesive plaster. If the injury is not very serious, bandage can be changed without removing the carbon material.	
<b>Step 4</b>	Duration of application depends on the extent of damage and the type of injury. As a rule, can vary from a few hours till 2 days. Then the napkin/cloth must be replaced. Number of dressings is unlimited and carried out before full healing of injury.	



Facial burns



Dressings of the face with Sterilized sorbing carbon napkin



Result of treatment after 1 year

# CASE STUDY AT IBN NAFEES MEDICAL CENTER ABU DHABI, U.A.E - 2023

## INTRODUCTION

An open wound is a wound that may be caused by external or internal break in the body tissue. Examples of external break is puncture or abrasion, laceration, or avulsion. Internal breaks include open surgical procedures that need the wound to open, examples of these are large infected pilonidal sinus. Minor open wounds which are less than half an inch and there is no much bleeding can be treated at home, larger wounds more than half an inch or associated with bleeding and infection needs to be treated at hospital. After the control of the general condition and bleeding or there is delay of closure on the wound for more than six hours, the wound need to heal by secondary intention. Control of associated conditions and comorbidities like diabetes mellitus, hypo immunity states, abscesses need to be controlled. This needs the wound to be cleaned and dressed and dressing has special characters.

An ideal wound dressing, is a dressing that controls moisture around the wound, eliminate the excess debris and exudates to protect the wound from microorganisms and secondary infection, enhance epithelialization, easy to be changed and removed from the wound, it is biocompatible and non-toxic and decreases or relieves pain and should be costly acceptable.

We are here writing our experience with two case reports of treating an open wound.

## CASE REPORT 1

Patient, male with the age of 57 years, came in last Feb. 26, 2023, complaining of an attack of multiple painful swellings over the right side of the abdominal wall for 5 days. The patient is a known case with type 2 diabetes mellitus and obesity. Examination showed multiple ulcerative lesions collectively about 12cm, they were deep to the fascia, infected and a lot of debris could be seen, underneath all there was a big mass with multiple fluctuations and abscesses. The patient tried to manage the condition by applying some topical ointments. Investigation done and they were as follows:

1. Pus culture and sensitivity showed coagulase positive gram-positive bacteria
2. Random blood sugar result is 451.4 mg/dL
3. High triglycerides
4. C-reactive protein is 36.63 mg/dL

The abscesses were drained under local anesthesia, the wound debrided and a piece of Sorbent Carbon Fiber applied.



The infected area before debridement and drainage.



After debridement and drainage.



The material that we applied to the wound.

The diabetes mellitus was controlled by the treating physician and it comes in few days from the previous level around 150 mg/dL.

The sorbent carbon fiber was applied every three days and about two weeks the size went smaller and he granulation tissue start to built up.



The dressing continued in the same rate and the wound gradually decreased in size and depth and becomes clean and no discharge and less surrounding hyperemia.



Picture after forty-five days.

## CASE REPORT 2

Patient, was a female of 16 years, came in with father last Feb. 14, 2023, complaining of low back pain and discharge since nine months after an operation of pilonidal sinus excision done in another medical center. Examination showed an obese female patient with open wound of the previous excision of pilonidal sinus with plenty of debris and infected material and surrounded by hyperemia with mild tenderness.

During this period the patient was dressed randomly by the doctor who did the operation and sometimes by the patient at home.



The wound was cleaned, debrided and wash with normal saline and hydrogen peroxide and the Sorbent Carbon Fiber applied every three days.

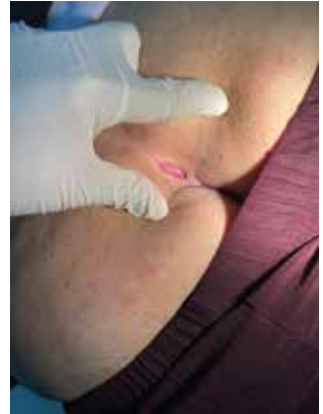
On March 01, 2023 the wound was dry and no debris and pinkish granulation tissue started to heap up.



Dressing of the patient continued using the same material.



March 29, 2023, notice that the arrow is pointing toward a new epithelialization of the skin and the wound is smaller.



May 21, 2023

## CASE REPORT 2

Chronic non-healing open wounds needs a special kind of management, the main objective is to have the wound healed as soon as possible. An ideal wound dressing should not accelerate wound healing only but it needs to reduce protein, fluid, and electrolyte from the wound since large wounds with mean large amount of fluids, electrolytes and protein losses. Other aims in the treatment of wounds include decreasing the intensity of pain and reduce the incidence of infection by removing wound debris and absorption of toxins. Selecting the appropriate dressing for open wounds is a challenging issue to the clinician. There are large numbers of material claiming a good results. In the last two months we came across a kind of carbon fibers called SORBENT CARBON FIBER which we were using topically on the wounds and we find them to be effective in promoting rapid wound healing and improving the quality of life of patients. In addition, it is easily tolerated by the patients. We find them very effective in treating wound infection and other kinds of debris. We advised to use the sorbent Carbon Fiber to treat chronic, non-healing open wounds and burn patients.



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## DISEASE HISTORY

### Successful treatment of the diabetic foot

At the Elisabeth Hospital, Essen, a 42 year-old patient was admitted 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 of left leg, dry gangrene of toes, insulin-dependent diabetes. A serious pyonecrotic tissue injury was observed in the area of amputation. Overall, it took 21 examinations and dressings of a wound under anesthesia due to severe pain.

During the first 8 dressings, compresses and Betadine solutions were applied. After that we began using 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. The rebandaging with carbon material passed without pain. In addition to local treatment, the patient regularly took antibiotics. Healing was occurring very quickly, and by the next month, 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 were eliminated.



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



**Overlaying the Sterilized sorbing carbon cloth onto the wound 1 month later.**



**The result of treatment 2 months later.**



**The result of treatment two and a half months later.**



**The result of treatment after two and a half months.**



**The result of treatment after nine months**

MOSCOW MEDICAL ACADEMY NAMED AFTER I.M. SECHENOV,  
THE FACULTY OF 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 stated that the material, due to its hygroscopicity, is capable of absorbing wound secretions, including 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 of the patients (reduction of the temperature reaction, improvement of peripheral blood). With its help is possible in optimal time to completely clean the wound or ulcer and switch to traumatic 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. Patients with similar injuries were included in the control group and were treated with traditional dressings.*

### EXTENSIVE DEGLOVING INJURY OF LIMBS

The material was used in the early stages (1-2 days after entering). Changing dressings was carried out 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 well onto the wounds of any shape, does not cause discomfort, allergic reactions or symptoms of local irritation, removed easily, without pain, leaving no fibers. Suppuration 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).

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: for the area 50-150 cm<sup>2</sup> - 28 days, 150-250 cm<sup>2</sup>- 35 days. The patients with a wound area 350 cm<sup>2</sup>, with 40% epithelialization of the wound surface on 30th day Thiersch skin grafting was performed 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 medicament 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. during the first week The treatment required the daily dressings, the material adhered to the wound surface and thus moistening bandages with antiseptic solutions was required. 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 dermepentesis 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 cm<sup>2</sup>, 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 affecting the micro flora of the patient's wounds (including microbiological study). In addition, depending on indications sequestrectomy was conducted when dressing.

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, as timely adequate reposition of bone fragments in the apparatus of external fixation had not been executed and bone fragment came 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 rebandaging, after cleansing wounds, dressing was not removed during 7-10 days, and the medicines were applied from the to by impregnating it.

The patients in the control group passed 7 necrotomies, which was caused by a slow (during 10-12 days - only 2 patients) covering of the bone with granulation tissue, which led to bone necrosis. Bandaging was carried out 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 gravity traction 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 is impossible to provide 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 epithelialization of wounds, napkins were applied without impregnating medicines, and most of observations were carried out 1 time per week.

Epithelialization of wounds occurs at all patients within the period of 35 days if the size of bedsores after necrosectomy was 120 cm<sup>2</sup> and up to 50 days if size was up to 200 cm<sup>2</sup> of wounds. Skin grafting was not applied in all cases. In the control group with the same bedsores after necrosectomy 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 skin grafting, with 6 patients hypergranulation was identified: 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. Usually antiseptics such as Betadine (povidine iodide) and Flamazin are applied. (sulfadiazine silver salt). Burn wound has elevated permeability to water, proteins and electrolytes, due to damage of the epithelium.

Accordingly, increase of secretion can be observed leading to leakage of bandages and 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 shape. 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 are noncytotoxic. Side effects were not identified. Due to the soft texture of the dressings, re-dressing is 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 (poligekamidin), 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 is disinfected again with Betadine solution, diluted with normal saline solution 1:5 or with Lavasept. With decreasing of 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 is impregnated with aforementioned solution of Betadine, and in cases of burns on the face or allergic reaction to iodine- Lavasept should be used

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 II-A degree and II-B 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

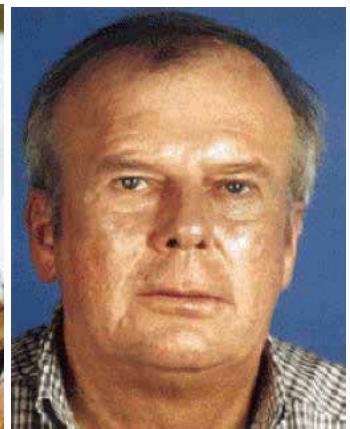
Local treatment of burn wounds in accordance with the "Koblenz Model" is a simple, cost-effective method to reduce the amount of dressings. Patient tolerance to this method of treatment is extremely high due to the painless dressings change. Compared to other methods of treatment monitoring of the extensiveness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

## 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 material was carried out in 2 stages:

#### STAGE 1. DRY TREATMENT

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

After a complete cleaning of the wound (after 2-4 days) the second stage of treatment 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

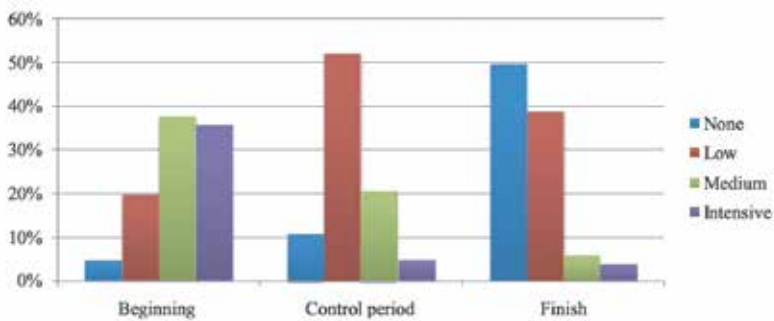


## CHARACTERISTICS ULCERS

To determine the size of the ulcer the maximum length and maximum diameter was defined. 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 cm<sup>2</sup> (median 8.9 cm), at the end of the observation - 13.2 cm<sup>2</sup> (median - 2.4 cm<sup>2</sup>).

## EXUDATION

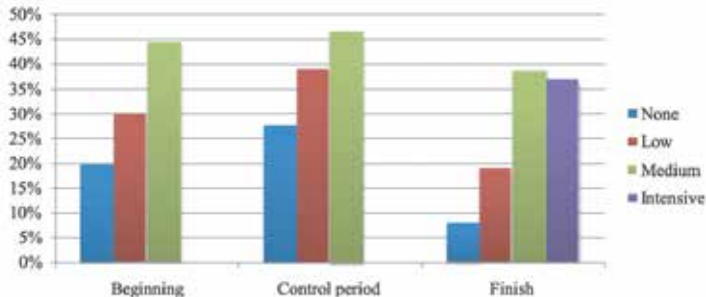
There was a noticeable decrease of exudates at the beginning of treatment (stage 1 dry treatment). And among 87% of patients exudation was not observed or exudation was very low at the end of the observation period (stage 1 - wet treatment).



## GRANULE FORMATION

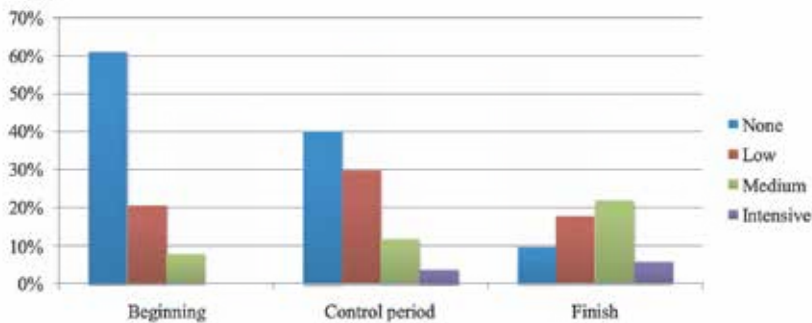
In 84% of patients the formation of granules was not observed, or it was low in the initial period of observation. After applying atraumatic carbon napkins, 75% of patients had strong or medium granule formation.

## GRANULE FORMATION



## EPITHELIALIZATION

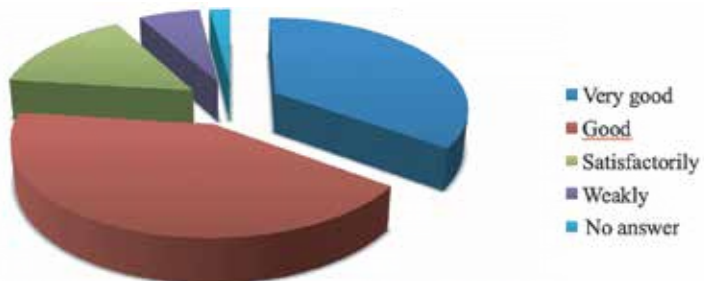
In the initial period of observation, in 93% of patients epithelialization was not observed or was extremely insignificant. During stage 1 (dry treatment) intense or medium epithelialization was noted at 17% of patients. At the end of observation the intensive epithelialization was observed at 33.8%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



## 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

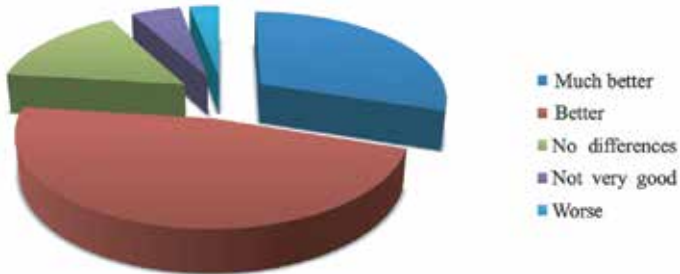




## COMPARISON OF CARBON MATERIALS

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 clinical trials of Sorbent Carbon Fiber were conducted. 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-II-III A degree, and 19 persons had burns of II-III A-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 do 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 burns degree I-II and the overlay of napkins in the first days after entering the hospital, napkins would not need to be changed 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 II-III A degree first change of napkins was performed on the 5th, 6th day from the moment of trauma; in future if there was a festering wound - changing after 2, 3 or even 4 days. Burns healing was observed after 19 + 2, 1 days. And in those cases when patients do not arrive in hospital the first days from the moment of trauma healing was observed in 22 + 2, 4 days. When treating of burns IV degree always managed to transfer it 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 pronounced 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-epithelization of subdermal burns, has a deodorizing effect, saving the dressing.

**The head of the Moscow Burn Center, Professor S.V. Smirnov**  
**Leading researcher, PhD in Medical sciences, L.P. Loginov**  
**Research assistant, M.V. Shahlamov**

## APPLICATION OF CARBON NAPKINS IN TREATMENT OF INFECTED WOUNDS A.V. Eremin, V.N. Tsarev, R.B. Nasyrov

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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, there 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 is 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 carbon napkins are applied. 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 II-III A B 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 III B degree of burns bandages are superimposed on the granulation tissue formed after excision of scab. Before applying the napkins a full cleaning of the wound is conducted, with homeostasis when necessary. Change of 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. A more intensive growth of granulation tissue is noticed and its "maturation" to perform autodermoplasty. When the depth of the wound II-III A 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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## USER MANUAL

of Sorbent Carbon Fiber AUT-M

## APPLICATION

Sorbent carbon fiber AUT-M is applied for local usage in the treatment of burn wounds, trophic ulcers, flaccid wounds, fistulas, purulent cavities of various etiologies, complicated postoperative wounds

## SPECIFICATIONS

Sorbent carbon fiber AUT-M is a black elastic fabric with a glossy surface, obtained by heat treatment of a hydrated cellulose material. Total porosity is 0.6-0.8 cc's per gram. Sorbent has significant capillary activity. It actively absorbs microbial bodies and chemicals, has a deodorizing effect and low adhesiveness. The sorbent is non-toxic and does not cause adverse changes in the wounds.

## METHOD OF APPLICATION

A piece of sterile sorbent slightly larger than the size of the wound is laid on the area of the wound surface, covered with a double gauze cloth, and fixed with a bandage or adhesive plaster. The duration of exposure is determined by the degree of damage and the type of wound and can usually vary from a few hours to two days.

After this period the sorbent is replaced. The multiplicity of dressings is unlimited and is carried out until complete epithelialization of the wound surface.

In the treatment of purulent cavities, the material is introduced in the form of turunda for 1 day, followed by replacement with a new one (more frequent replacements of the turunda after 6-12 hours are carried out with abundant excretion of pus).

Sorbents in the original packaging labeled "sterile" under the condition of integrity, or a sorbent that has been sterilized with hospital conditions immediately prior to use, are allowed for clinical use without prior sterilization. For sterilization open the sealed packaging, remove the sorbent from it and sterilize by autoclaving at 120 °C and with a pressure of 1.2 atm within 45 min in accordance with OST 42-21-2-85. Sterilization of the sorbent in formalin vapors is strictly prohibited.

## SIDE EFFECTS

Some patients may have itchy skin and burning in the area of sorbent overlay. In such cases the replacement of the sorbent should be made after 4-6 hours or switch to using of other types of bandages.

## RELEASE FORM

Sorbent is released in 2 variants:

- a) sterile, ready to use.
- b) non-sterile, requiring sterilization in the hospital in stationary conditions.

## STORAGE CONDITIONS

Sorbent AUT - M is not allowed to be stored together with organic solvents. Warranty period of storage- 5 years.

## دليل الاستخدام لألياف الكربون الماصة AUT-M

الياف الكربون الماصة (AUT-M) – دواعي وتعليمات الاستخدام:

دواعي الاستخدام:

- 1- الحروق والجروح المقيحة بشكل عام دون استثناء.
- 2- العمليات الالتهابية (الجروح الملتهبة بالطفح أو التفحيج بعد اتمام العمليات الجراحية).
- 3- التقرحات بجميع انواعها وحالاتها دون استثناء.
- 4- القرحة المزمنة.
- 5- القرحة الغذائية والقرحة الناتجة عن مرض السكري (القدم السكري).
- 6- الجروح والاصابات بشكل عام دون استثناء.
- 7- الجروح والتقرحات التي قد تصيب اي جزء من الجسم والناتج من كثرة الاستلقاء السريري.

نجاحة المنتج:

نسيج الياف الكربون الماصة (AUT-M)، لدية نشاط شعري كبير.

فهو يمتص الكائنات الحية الدقيقة والميكروبات والبكتيريا والمواد الكيميائية والتصريف القلبي والخلايا المتهنكة في الجروح وجميع الافرازات والسوائل النابعة من الجروح اي كانت.

وكنك يعمل على تخفيف الألم ويمتص الرائحة الكريهة الناتجة من تعفن الجروح وهو خامل تماما.

طريقة استخدام المنتج :

يتم تنظيف الجرح تماما بألياف الكربون الماصة، بحيث تتداخل الياف الكربون الماصة مع سطح الجرح الى حد ما ، ويتم ربطها بطبقة مزبوجة من الشاش ومثبتة بشريط لاصق من البلاستر او معقود بحيث يضمن عدم ارتخاء الشاش و بقاء قطعة الياف الكربون الماصة ملتصقة بسطح الجرح بشكل جيد .

يتم تحديد مدة التطبيق باستخدام الياف الكربون الماصة بحسب درجة الضرر ونوع الجرح , ويمكن أن يختلف بدرجات متفاوتة تكون من عدة ساعات الى يومين و بعد هذه الفترة يتم استبدال قطع الياف الكربون الماصة التي كانت على الجرح باخرى , وفقاً لما يراه الطبيب المعالج وبما يلزم للجرح الذي تتم معالجته .

عند استخدام الياف الكربون الماصة لعلاج التقرحات والجروح والتهتكات الجلدية والجروح الناتجة عن الحريق وغيرها من الجروح المختلفة فإن تلك الجروح تبقى نظيفة وجافة.



**كقاعدة عامة**، من يوم الى يومين كافية لعلاج الجروح والحروق الخفيفة وفي حالات الجروح الكبيرة قد يكون أكثر من ذلك. الياف الكربون الماصة غير قابلة للاشتعال بنائاً، مما يدل على سر تصنيعها وجودتها العالية جداً وفعاليتها الممتازة للغاية، ولا يوجد لها اي منافس عالمي من حيث الجودة والاداء. وهي معقمة 100% بأشعة جاما. لا تترك اي ندبات او تشوهات ما بعد علاج الجروح وخاصة الناتجة عن الحرائق والجروح المتهنكة والمصابة بدرجة كبيرة من التعفن الجلدي. الياف الكربون الماصة عند استخدامها تعمل على عزل سطح الجروح تمامًا عن البكتيريا الخارجية. تعتبر الاولى عالمياً من حيث الجودة والاداء.

### المواصفات

ألياف الكربون الماصة AUT-M هي نسيج أسود مرن بسطح لامع، يتم الحصول عليها عن طريق المعالجة الحرارية لمادة السليلوز المميعة. إجمالي مسامية 0.6-0.8 سم مكعب لكل غرام .

المادة الماصة لها نشاط شعري كبير. يمتص بنشاط الأجسام الميكروبية والمواد الكيميائية، وله تأثير إزالة الروائح الكريهة وقلة الالتصاق. المادة الماصة غير سامة ولا تسبب تغيرات عكسية في الجروح

### الاثار الجانبية

قد يعاني بعض المرضى من حكة في الجلد وحرقان في منطقة تلامس المواد الماصة. في مثل هذه الحالات، يتم استبدال المادة الماصة بعد 4-6 ساعات أو التحول لاستخدام أنواع أخرى من الضمادات .

### اشكال المنتج

- يتم انتاج المادة الماصة في نوعين مختلفين :
- (أ) عقيم جاهز للاستخدام .
  - (ب) غير عقيم، ويتطلب التعقيم في المستشفى في ظروف ثابتة .

### شروط التخزين

لا يُسمح بتخزين المادة الماصة AUT-M مع المذيبات العضوية .

فترة الضمان للتخزين - 5 سنوات

## Manufacturer:



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