BAUER BANDAGE
Interactive bandage based on the activated micro-filament carbon and diffusion pump

VENOUS ULCERATION
Ulcus cruris
RECOMMENDED FRAMEWORK FOR TREATMENT PROCEDURE
with the use of Bauer Bandage medical device (hereinafter BB)

The text is an introduction into the issue of treatment of the aforementioned type of tissue defect. The text contains basic information and recommendations for application of sorption cover based on activated micro-filament carbon the effect of which is potentiated by the presence of diffusion activity additional composite layer in the form of unwoven textile made of a pre-defined fibre mix.

The BB sorption covering based on activated carbon is suitable for treatment of venous ulcers regardless of the aetiology of their origin. From freshly opened small defects to seemingly non-healing conditions of several years.

Treatment with active cover with direct contact between the carbon layer and the tissue defect surface differs in several regards from the generally accepted wound treatment principles under the conditions of classic asepsis. Therefore we believe it is necessary to point out the main differences.

**Condition of permanent maintenance of aqueous solution environment (the so-called “watery wound healing”)**

To enable the utilisation of the BB sorption capability in the treatment of a chronic defect to the full degree and long-term it is necessary to ensure and, for the entire duration of treatment, maintain the sorption cover mass in the aqueous solution liquid phase environment. If using the nursing practice set terminology, this is an application rather than a bandage. In practice, this means continuous supply of sterile distilled water or other suitable sterile, ideally colourless, aqueous solution (physiologic solution, hydrogen peroxide) through repeated spraying or careful pouring from the outer side of the diffusely active or auxiliary sorption outer layer of BB (the white layer of the covering unwoven textile) to compensate the evaporation or other losses by water supply. At the same time, it is unnecessary and, in many cases, not desirable to uncover the surface of the defect when supplying water since this disturbs the healing process. The aforementioned procedure does not create the threat of introducing other infectious agents into the wound. The co-operation between the sorption and diffusely active layers forms an efficient barrier against microbes entering the bottom of the defect from outside. The diffusely active layer ensures concentration gradient with the “pump” effect from the surface of the defect; moreover, the sorption layer would retain the majority of infectious agents. The agents that might possibly reach the surface of the wound will not, if the sorption cover is applied correctly, find enough nutrients necessary for reproducing.

**Cover exchange indication**

An imperative impetus to exchange the BB cover is (while observing the previous principle strictly) the depletion of the active carbon layer sorption capacity. This occurs in dependence on the quantity of the agents absorbed, their character, exudation dynamism and exudates character. The depletion of the sorption capacity is indicated by the colouring of the top, diffusely active, layer of the unwoven textile. If any substances from the wound are entering the layer through the carbon layer and discolouring it (blood, albumin, pus etc.) it is necessary to exchange the cover immediately since it is not functional in this condition. With respect to the fact that the most frequent discolouration is yellow (exudates, tissue fluid) it is not recommended to use colourful solutions for moistening the BB cover (e.g. the yellow Ringer solution) in such cases (exchange of cover based on visual assessment) since their application makes correct assessment of the sorption capacity stage difficult. The possibility of checking the state of the active cover of the defect based on visual assessment since their application makes correct assessment of the sorption capacity stage difficult. The possibility of checking the state of the active cover of the defect based on visual assessment since their application makes correct assessment of the sorption capacity stage difficult. The possibility of checking the state of the active cover of the defect based on visual assessment since their application makes correct assessment of the sorption capacity stage difficult. The possibility of checking the state of the active cover of the defect based on visual assessment since their application makes correct assessment of the sorption capacity stage difficult. The possibility of checking the state of the active cover of the defect based on visual assessment since their application makes correct assessment of the sorption capacity stage difficult. The possibility of checking the state of the active cover of the defect based on visual assessment since their application makes correct assessment of the sorption capacity stage difficult. The possibility of checking the state of the active cover of the defect based on visual assessment since their application makes correct assessment of the sorption capacity stage difficult. The possibility of checking the state of the active cover of the defect based on visual assessment since their application makes correct assessment of the sorption capacity stage difficult. The possibility of checking the state of the active cover of the defect based on visual assessment since their application makes correct assessment of the sorption capacity stage difficult. The possibility of checking the state of the active cover of the defect based on visual assessment since their application makes correct assessment of the sorption capacity stage difficult. The possibility of checking the state of the active cover of the defect based on visual assessment since their application makes correct assessment of the sorption capacity stage difficult. The possibility of checking the state of the active cover of the defect based on visual assessment since their application makes correct assessment of the sorption capacity stage difficult. The possibility of checking the state of the active cover of the defect based on visual assessment since their application makes correct assessment of the sorption capacity stage difficult. The possibility of checking the state of the active cover of the defect based on visual assessment since their application makes correct assessment of the sorption capacity stage difficult. The possibility of checking the state of the active cover of the defect based on visual assessment since their application makes correct assessment of the sorption capacity stage difficult. The possibility of checking the state of the active cover of the defect based on visual assessment since their application makes correct assessment of the sorption capacity stage difficult. The possibility of checking the state of the active cover of the defect based on visual assessment since their application makes correct assessment of the sorption capacity stage difficult. The possibility of checking the state of the active cover of the defect based on visual assessment since their application makes correct assessment of the sorption capacity stage difficult. The possibility of checking the state of the active cover of the defect based on visual assessment since their application makes correct assessment of the sorption capacity stage difficult. The possibility of checking the state of the active cover of the defect based on visual assessment since their application makes correct assessment of the sorption capacity stage difficult. The possibility of checking the state of the active cover of the defect based on visual assessment since their application makes correct assessment of the sorption capacity stage difficult.

In all other cases the BB is applied within the recommended scheme of wound treatment and exchange of sorption cover is regulated by the time schedule as stipulated in the scheme, in the manufacturer’s detailed
manual for covers with differentiated thicknesses of sorption layers made of unwoven textile. In such cases colourful solutions may be used. The scheme calculates a sufficient time reserve before using up the sorption capacity. The defect must be paid more attention in the introductory stage of therapy when the demands for cover exchange as well as water supply are higher. Each defect must be viewed individually and looked after intensely and carefully until the nurse is sure that the wound has been cleaned, local infections managed and the defect has been generally stabilised with transition to the healing stage – only then is it possible to adopt the routine of one of the recommended schemes.

Visual check of the effect

It is necessary to bear in mind that by applying BB we are not applying the classic “sterile” cover but that this is another (material) active element in the complex therapy. Due to the “activity”, the introductory stage of treatment lasts significantly shorter compared to other materials used, that is, depending on the character and scope of the defect, from several tens of seconds or a few minutes (when stopping bleeding in fresh wounds) to several tens of minutes to a few hours (for trophic defects, infected wounds, in tissue detoxication). Therefore it is recommended to uncover, at least partially, the BB layer at the end of application and check visually how the defect responds to application of BB. It is not rare that even after a few minutes the eye can see an effect resulting in the reduction of the swelling, disappearance of surrounding erythema and other signs of inflammation (if they had been there before). This effect discovered through an early check is the first sign that the treatment has been applied correctly and the mechanism of sorption potentiated by osmosis has been started effectively.

Primary treatment

1. Perform careful mechanical cleaning of the defect including the removal of demarcated necrosis, drain exudates.
2. Treat the unaffected skin around the venous ulcer preventively against maceration by applying a thin layer of a suitable indifferent ointment.
3. By soaking the BB in a bowl of a suitable sterile solution, saturate the BB fully with the solution - carefully wring small air bubbles out of all BB layers under the surface of the solution. If the defect is a deeper one adapt the BB carefully by cutting the edges off to allow putting it in the defect without creating areas with no contact or even spaces filled with air (in the case of deeper defects, the treatment assumes the character of a “tamponade”).
4. Carefully press the BB against the bottom of the venous ulcer, trying not to cause pain to the patient. Make sure again that no air was left between the sorption layer and the surface of the defect that would prevent the active cover from its proper function.
5. With a syringe, supply solution to the outer diffusely active or auxiliary water-retaining layer of BB since some of the solution could have been extracted by the previous manipulation.
6. Leave the treated defect for 2 to 3 minutes. Make sure that the patient is not complaining about increased pain resulting from the contact of the defect with the BB carbon layer. After several minutes, take off a corner of the BB with tweezers and check the condition of the defect. Check whether there has been any air retention under the sorption layer and try to assess the response of the bottom of the burn and its immediate surroundings (colour, oedema). After removing the possible faults from the perspective of presence of air, adhesion etc. and finding out that the tissue does not respond in an undesired manner cover the entire defect again and proceed to the final step in the treatment.
7. Fix the BB while using light covering with a dry, permeable sterile material (where a cover layer of unwoven textile is not part of BB, add sterile gauze compresses etc.) and ensure light fixation (plaster, gauze bandage).
Re-bandage

1. By taking off a corner of the BB in a careful manner, make sure that the active carbon layer has not adhered (stuck) to the surface of the venous ulcer. That alone is always an alarming sign of insufficient continuous solution supply and breach of the rule of treating the venous ulcer in a watery environment.

2. If such a complication is not discovered, proceed identically to the initial treatment in all steps. Pay special attention to manipulation with the BB, both with the cover with the depleted sorption capacity when taking it off and with the freshly applied cover. Take care not to disturb the newly formed granulations or the delicate layer of epithelium by insensitive manipulation.

3. If a complication in the sense of increased adhesion (sticking) of the BB to the bottom of the defect, discontinue the attempts at taking the sorption cover off immediately and repeatedly supply a suitable sterile solution to the surface of the cover. Wait for several tens of minutes until the BB is released from the bottom. Only afterwards take it off, very carefully. Then proceed identically to the initial treatment.

4. If local signs of microbial inflammation remain in the defect even after three days from the initial application of BB, consider the application of a generally taken antibiotic or a modification of the ATB therapy so far in accordance with the result of microbiological examination for cultivation and sensitivity.

5. Carry out re-bandaging according to the character and development of the defect, initially after approx. 6 hours while gradually extending the intervals to the frequency of once in three days or longer.

With respect to the scope of the indication spectrum of the aforementioned material, extraordinary demands are put on the nurse with regards individual assessment of the wound (tissue defect) development while applying the active sorption cover and, therefore, the instruction text cannot fully replace the therapist's own erudition.