HYDROGEL DRESSINGS IN EMERGENCY MEDICINE
HYDROGELS AS POLYMER BIOMATERIALS

Hydrogels are usually defined as systems with at least two components, in which one component is a hydrophilic polymer, whereas the other component is water. A chemical hydrogel is insoluble in water due to its chains being linked into a spatial network.

The ability to absorb liquids without permanent loss of shape and mechanical properties is a very important hydrogel property, also found in many natural organs, such as: muscles, tendons, cartilages, intestines. Sorption of water by hydrogels is caused by their hydration and the presence of capillary areas.

Sufficient mechanical strength
INNOVATIVE TECHNOLOGY

- developed at the Lodz University of Technology
- an aqueous composition of natural and synthetic polymers: povidone, polyethylene glycol and agar
- polymerization and radiation sterilization
- Radiation engineering - as a result of radiation absorption, permanent chemical bonds are formed between separate polymer chains.
- Possibility of initiating a reaction without the need to introduce chemical initiators into the system.
The technology of production of hydrogel dressing was awarded on International Exhibition of Innovation EUREKA in 1993.
AWARDS AND DISTINCTIONS

In 1996 the technology was awarded again on Technical Exhibition GENIUS, in Budapest.
AWARDS AND DISTINCTIONS

First Degree Award, "Leader of State Security" Gala organized by the National Security Bureau
AWARDS AND DISTINCTIONS

The main distinction in the category of "Emergency and Action-Supporting Equipment" during the EDURA 2014 Fair.
MADE IN POLAND

The only manufacturer of specialty hydrogel dressings in Poland

We have 25 years of experience
CERTIFICATES CONFIRMING COMPLIANCE WITH INTERNATIONAL PRODUCTION REQUIREMENTS
DRESSING PROPERTIES

- a hydrogel patch with 3.5 mm thickness and water content of approximately 90%
- forms and maintains humid environment in the wound
- constitutes a barrier to external bacteria
- enables gas exchange (permeating oxygen)
- absorbs the wound exudate
- soothes pain, thus providing patient comfort
- does not adhere to the wound
- dressing change is painless
- biologically neutral, completely biocompatible
- Transparent - healing can be observed without removing the dressing
- plastic, thanks to which it can be used on body surfaces which are difficult to dress, e.g. palms, face
Hydrogel dressing regulates the moisture level in the wound.

- Hydrogel releases the absorbed moisture and hydrates dry wounds.
- In the case of exudate wounds, the dressing absorbs the exudate into its structure.
**BurnTec** is a hydrogel dressing for universal use in first aid. It is used by emergency medical services, rescue and fire-fighting units, police and civil services. It is used not only in burn management, but in addition, it is effective in case of:

- deep abrasions
- open fractures
- all other skin injuries

As a stable hydrogel, the only one available on the market, it does not pose a risk of flooding the body cavities when used in combination with facial dressing and oxygen therapy.
Burn is defined as damage to the skin's surface and - depending on its degree - also to deeper tissues and organs caused by heat (thermal burn), corrosive substances (chemical burn), electric current (electric arc burn). Extensive burns, especially deep burns, additionally create the risk of shock, and resulting death of a victim.

Assessing the burns in terms of their depth and surface is an extremely important element. Specially prepared classifications are used for this purpose.
The burn depth is assessed by classifying the damage into four grades, as below:

- **first-degree burn**: covers only the epidermis; the treatment lasts about 2-3 days
- **second-degree burn**: covers the epidermis and the deeper layers of the skin; there are two distinguished subgroups – IIa damage to the part of the dermis (blisters filled with serum fluid), IIb complete skin burns
- **third-degree burn**: necrosis includes the complete skin, including the dermal vessels and nerves, as well as adipose tissue.
- **fourth-degree burn**: necrosis reaches deeper tissues including muscles, tendons and bones; in the most severe cases, the burnt part of the body is carbonized.
ASSESSING THE SIZE OF THE BURN

Assessing the size of a burn wound is as important as determining its depth. There are several schemes allowing such a calculation:

- **Wallace rule of nines**: according to this rule, the body area is divided into areas of 9 percent.

- **Rule of palm**: is used to assess the burn area in adults, according to which the burn victim's palmar area accounts for 1% of the total body area.

- **Table and diagram methods**: based on specially developed tables and diagrams precisely determining the percentage distribution of each body surface; this method is most often used in burn treatment centers.
ASSESSING THE SIZE OF THE BURN

To make it easier to identify the extent of burns, each BurnTec dressing has an indication of the estimated percentage of total body surface to be covered.
Hydrogel dressings are particularly suitable for first aid in case of burns. Hydrogels ensure effective cooling of the burns due to their high water content and thermal capacity.

- Hydrogel dressings are characterized by high thermal capacity and high heat transfer coefficient.
- There is no risk of developing hypothermia.
- Protection of the wound against infection (sterile dressing), the dressing is bacteriostatic.
- Possibility of continuing clinical treatment with hydrogel dressings.
A forearm photo taken with a thermal imaging camera

The same forearm with hydrogel dressing, after 10 minutes.
At the moment, there are two types of hydrogel dressings on the market:

- Semi-fluid hydrogels – poured from a bag with a separate piece of non-woven fabric
- A hydrogel dressing in stable form where the non-woven fabric is combined with hydrogel.
hydrogel in stable form, no risk of cooling substance spillage

- even distribution of hydrogel over the entire wound surface, even in case of extensive injuries
- the dressing is completely removed when changed - no additional intervention is needed in the morning
- it presents absorbent properties, the exudate is retained in the gel together with the toxins
- possibility to use in other injuries (open fractures, cuts, tears, abrasions)

• Risk of accidental spillage of cooling substance during dressing application
• the cooling substance pours down under the influence of gravity forces, causing uneven distribution of the hydrogel
• after removing the dressing, gel residue requires removing from the wound
• the dressing does not present absorbent properties
• applicable in case of burns only.
USE IN WOUND TREATMENT

Hydrogel dressings are used to treat burn wounds and, in addition, to treat all types of difficult-to-heal wounds, bedsores, ulcerations and other skin injuries, the therapy of which requires access to oxygen and a moist, sterile environment.

Aqua-Gel in combination with a mesh dressing with silver. The dressings can be combined with enzymatic or pH-regulating agents.

The hydrogel dressing absorbs the exudate and keeps the environment moist only within the wound.

Hydrogel dressing used on surgical wounds.
USE IN WOUND TREATMENT

BurnTec (in wound management known as Neoheal – both dressings are identical hydrogel composition) is often used in wound treatment. It is the best choice in covering of donor sites. During 10-14 days with 3-4 changes of dressings typical donor sites were healed properly. Changing of dressing is painless - hydrogel does not adhere to the wound.
USE IN WOUND TREATMENT – IIb deg. burn treatment because of hot exhaust of a motobike
USE IN ULTRASONOGRAPHY

BurnTec can be used during ultrasound examinations as a special distance agent to improve the visibility of structures located near the surface or in case of wounds or injuries, including their examination.
• NATO certificate with NCAGE Code for the manufacturer

• All BurnTec dressings are NSN (NATO Stock Number) listed

• BurnTec is a standard burn dressing of every IFAK (Individual First Aid Kit) of US Marine and US Navy Corps
NATO Stock Numbers for BurnTec® sterile hydrogel dressings

<table>
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<th>Product Name</th>
<th>Size</th>
<th>NSN</th>
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<td>BurnTec</td>
<td>5 cm x 5 cm</td>
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<td>BurnTec</td>
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<td>BurnTec</td>
<td>40 cm x 60 cm</td>
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</table>
We have been manufacturing following sizes of dressings:

- 5x5 cm
- 6x12 cm
- 10x10 cm
- 12x12 cm
- 12x24 cm
- 22x28 cm
- 20x20 cm
- 20x40 cm
- 40x60 cm
- 25x25 cm
- 30x40 cm
- 40x60 cm
We also offer ready-made hydrogel dressing kits meeting the requirements of the National Headquarters of the State Fire Service (KG PSP) for R-1 emergency bag equipment.

The kit includes:

- 6x12 cm dressing – 4 pieces
- 10x10 cm dressing – 4 pieces
- 12x24 cm dressing – 2 pieces
- 10x40 cm dressing – 1 piece
- 20x20 cm dressing – 2 pieces
- 20x40 cm dressing – 2 pieces
- Face dressing – 2 pieces
- Semi-fluid hydrogel with antibacterial properties, 120 ml – 2 pieces
- Bag for dressing storage.