



## Brazilian Recommendations for Handling of the Current Coverings in the Treatment of the Burned Patient

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### Abstract

**Aim:** The purpose of the study was to elaborate nursing actions based on recommendations about the proper management of coverage for the treatment of burn patients.

**Methods:** This is a review study. The data collection performed in a virtual environment in the Virtual Health Library (VHL), PubMed and specialized magazines such as BURNS and Brazilian Society of Burns. We used the books and periodicals of the health area, which functioned as a conceptual basis with the following descriptors Mesh / DeSC: Burns; Coverings; Prevention; Nursing. Publications with a trajectory of the last 10 years were used as inclusion criterion. With languages in Spanish, English and Portuguese and articles available in full.

**Results:** The care of burn injuries requires the maintenance of tissue perfusion, infection prevention and protection from trauma, promoting proper healing. To achieve these effects is important to use the best coverage, operating in debridement, cleaning and prevention of wound infections. It was identified in this study that the appropriate choice of coverage for treatment of burn patients shall be based on knowledge of the coverage action, the patient's comfort, relationship benefit cost, adaptability, change time, clinical evolution and healing process, prevention infection and pain control. Thus, ensuring the quality and safety of nursing care in the treatment of wounds of burned patients.

**Conclusion:** The recommendations for the coverages to be used, is based on the degree of burn. It is observed that the first care is paramount and directly governs the recovery and diagnosis of the victim based on ethical and professional care and with training of the team in order to offer a minimum of trauma to the patient, be it physical, mental and social.

### Keywords

Nursing Care; Dresses; Burn

### Introduction

This study covers the coverages in the treatment of the burned patient, having as object the recommendations for the nursing team,

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Received: April 17, 2017 Accepted: May 12, 2017 Published: May 19, 2017

related to the appropriate management and choice in the treatment of burns.

Burns are a worldwide public health problem. Most of these occur in low- and middle-income countries. The risk is still higher in developing countries such as Brazil, where living conditions are precarious in a large part of the population and access to burn care is limited [1].

Burns and fires are responsible for more than 300,000 deaths a year worldwide, the vast majority of burns are not fatal, it is estimated that every year 1% of the population has burn injury. However, 90% of deaths from burns occur where prevention programs are uncommon and the quality of acute care is inconsistent [2].

More than one million burns occur in the United States each year. About 5,000 of these injuries are fatal, making burn the fourth leading cause of death from unintentional injuries, with about 40,000 requiring hospitalization. In Brazil, studies show that around 1 million burn accidents happen per year, 2,500 of those injured come to death and only 10% seek hospital care [3,4].

Burns are the greatest traumas that the human being can be exposed to. They are traumatic injuries caused in the majority of the times, by thermal, chemical, electrical or radioactive agents. They act on the coating tissues of the human body, determining partial or total destruction of the skin and its attachments, being able to reach deeper layers such as subcutaneous cellular tissue, muscles, tendons and bones. Its classification depends on the extent and depth of the lesion [5].

According to the Brazilian Society of Burns, the main causal agents of burns are superheated liquids, fuel, direct flame, superheated surface, electricity, chemical agents, radioactive agents, solar radiation, cold and fireworks.

For years, mortality rates were higher in children and the elderly. Due to the technological evolution and the great diversity of new coverings, today they are able to survive great burns. Survival and recovery depend intrinsically on the injury, as well as on the health status, pre-injury and age of the patient. Burn victims will require intensive skilled nursing care because of the injuries and sequelae resulting from the event. In the case of elderly people, whose skin is atrophic, thinner, dehydrated and less vascularized, subject to deeper lesions and slower healing, with a higher risk of infection, it is a challenge for the nurse to draw care plans that To the innumerable physical threats that may occur, in addition to the social and psychological aspects [6,7].

The initial evaluation of the burn condition is necessary to select the best treatment method, adopting venous hydration, pain and infection control protocols, as well as adequate coverage, requiring human and material resources, available for the burn care [6].

Over the past 50 years, the evolution of burn treatment has led to a significant reduction in mortality. Major advances were made in relation to early resuscitation, respiratory care, infection control, modulation of the hypermetabolic response and nutritional support [8].

The care of the lesions by burns implies in the maintenance of the tissue perfusion, prevention of infection and protection against trauma, promoting a good cicatrization [9]. In order to reach these effects, it is important to use the best coverage, acting on the debridement, cleaning and prevention of wound infections [10].

The search for therapies that minimize the number of irreversible marks has grown considerably, focusing on an improvement in the aesthetic appearance in relation to the cicatricial deformities [11]. This search leads to the application of different ablative therapies, which undoubtedly improve the appearance of the scar, but can cause adverse effects such as fibrosis of the papillary dermis, hypo or hyperpigmentation due to the lesion or destruction caused in the epidermis. Currently, there is a strong tendency to indicate less invasive procedures, with reduction of complications [11].

Some factors hamper and delay the healing process of burns, making it difficult to care for the lesions, including age extremes, nutritional status, presence of infection, diseases such as diabetes mellitus and vascular insufficiency. It is important that management of risk factors occur during treatment, achieving timely healing and minimal complications [12].

Nursing in the care process of the burned patient should focus on the appropriate choice of coverages based on comfort, cost-benefit ratio, adaptability, not requiring frequent changes, clinical evolution in the healing process, prevention of wound infection, regarding quality In pain control and improvement of feeding capacity [13-15].

Wound healing is multifactorial and can take months to occur. In designing and developing new dressings, the desirable features include solid anti-microbial activity, contributing to wound healing, and pain relief. Effective but painful coverage in its application will have little clinical utility [9].

To ensure quality care for the burned patient related to the coverages, the following questions guide this study: What has been published about the most current coverages used in the treatment of burn and what recommendations related to the adequate management of these coverages?

To answer these questions, the objective of the study was to identify the nursing actions regarding the adequate management of coverages for the treatment of the burned patient.

Burns cause extensive damage and are notoriously complicated by loss of fluid and infection of the burned area. Despite advances in treatment, mortality rates remain high. Burned patients should be treated in a humanized way with a holistic view, as it is a patient that, in addition to physical pain, has multiple factors that lead to sepsis, invasive procedures and physical incapacity.

Based on this premise, it is justified the idealization of this study to intensify the works already described, at the international level and in the epidemiological view in the national scope with the intention of elaborating nursing actions based on the recommendations about the adequate management of coverages for the treatment of the burned patient .

Research that leads to advances in burn care represents a continuous and necessary process. They are reflected in the literature year after year, being fundamental to the professional this incorporation of current and proven knowledge.

The publications on burns show small and constant growth. The predominant type was the original article, published in

surgical journals. The publication in burns does not suffer financial influence and the greater production was generated in the university environment, being the English language used more frequently.

The relevance for the elaboration of this work arose due to the need of the scientific base regarding the management and adequate indication of coverages, optimizing the nursing process and the time of rehabilitation of the patient.

## Materials and Methods

This is a review study. The data collection performed in a virtual environment in the Virtual Health Library (VHL), PubMed and specialized magazines such as BURNS and Sociedade Brasileira de Queimaduras. We used the books and periodicals of the health area, which functioned as a conceptual basis with the following descriptors Mesh / DeSC: Burns; Coverings; Prevention; Nursing. Publications with a trajectory of the last 10 years were used as inclusion criterion. With languages in Spanish, English and Portuguese and articles available in full.

## Results

Based on the literature review and data collection of the scientific researches reviewed and deepened, we have as a result, the creation of tables in which we summarize the management recommendations and choose the best coverage for the treatment of the burned patient, based on the characteristics found in the evidences Current scientific knowledge.

In this way, we approached the following characteristics of the coverages, which was verified in the research based on the presentation, indication and contraindication used in the treatment of the burned patient (Table 1).

Following the rationale and the clinical evidence, we created a second table focusing on the mechanism of action, mode of application and time of change with respect to the main coverage (Table 2).

## Discussion

The aim of making a good choice when it comes to placing the most adequate coverage is to control bacterial growth, remove devitalized tissue and stimulate epithelization, or prepare the bed to perform autogenic and also stimulate the growth of keratinocytes [16].

These functions do not exist in a single topical treatment, so there is no ideal topic. The ideal is to alternate several topics with debridements, according to the stage that the injury and the location that is.

For the treatment of burns we have to choose the cover that will act the best way in the injury. During the evaluation of the lesion we have to observe if there is sphincter, necrosis, exudate, granulation tissue and attenuate to bacterial load in the place. A high bacterial load on the lesion disrupts its healing process and can cause increased infection.

Today we have many dressings with multiple functions, acting both on bacterial control and on devitalized tissue removal, re epithelization and pain control. It is divides the covers for the treatment of burn as follows: covers with silver and covers without silver [17].

Table 1: The characteristics of the coverages.

Coverings	Presentation	Indication	Contraindication
<b>Sulfadiazine silver 1%</b>	Topic	2nd and 3rd degree burns	Sulfa hypersensitivity
<b>Silver Nanocrystalline (Actcoat Flex 3 and Actcoat Flex 7)</b>	Flexible Polyester Mesh containing nanocrystalline silver	2nd Degree, 3rd Degree Burn and Graft Receptor Sites	Do not use in patients with silver sensitivity and in patients who will undergo Magnetic Resonance
<b>Suprasorb®X</b>	Hydrobalanced Coverage	Indicated for 2nd degree burn, graft donor and recipient areas	No contraindication
<b>Hydroalginate</b>	Coating composed of calcium alginate, carbixymethylcellulose and nylon fibers covered with elemental silver.	2nd degree burns	Should be removed in case of silver hypersensitivity, pregnant and lactating
<b>AGE- Essential Fatty Acids</b>	Oil	Surface open wounds with or without infection	No evidence of contraindication
<b>Collagenase</b>	Ointment for topical use	Wounds with devitalized tissue	Wounds with healing by first intention
<b>Hidrogel</b>	Clear gel	Moderate superficial wounds or low exudation. Remove crusts, fibrins, granulation tissue. Dermato-dermal graft donor and recipient sites.	In the wound that presents purulent secretion.
<b>Non-adherent gauze</b>	A cellulose acetate-impregnated cellulose acetate cover.	Surface burns of 2nd degree. Wounds with formation of granulation tissue. Dermato - dermal graft donor and recipient areas.	It preserves the granulation tissue and does not adhere to the wound bed.
<b>Hydrocolloid</b>	Coating composed of gelatin, pectin, sodium carboxymethicose and polyurethane foam.	Burn of partial thickness, clean with medium or small amount of exudate. 2nd degree burns.	Maintains local moisture interacting with injury; Produces a gel that promotes autolytic debridement.
<b>Dermal Regeneration Matrix</b>	Internal layer: Three-dimensional matrix originated from collagen and glycosaminoglycan (GAG) pilimerization. Outer layer: Silicone Clean wounds.	Deep 2nd and 3rd degree burns.	The delay in grafting in approximately 3 to 4 weeks (time required for epithelial development, fragility, less resistance to infection and higher incidence of graft loss.
<b>Aloexertos (derivados da pele de cadáver).</b>	Enxerto de pele derivadas de cadáveres.	Especialmente importante em grandes queimados. Pode ser usado para teste terapêutico do leito receptor	
<b>Allografts (derived from corpse skin)</b>	Graft of skin derived from corpses	specially important in large burnings. Can be used for therapeutic testing of the recipient bed Xenografts (derived from the skin of animals) Graft derived from the skin of animals Bovine Origin: 1 Matriderm® - Indicated for total thickness burns associated with skin grafting. 2 PriMatrix®- Recommended for coverage of complex wounds. Swine Origin: 1 OASIS Wound Matrix - It is commonly used in the treatment of lower limbs. 2 Permacol® - dermis collagen derivative and porcine elastin. It is an acellular, non-allergenic matrix similar to the AlloDerm® allograft concept.	

There are two basic methods of burn dressing: the occlusive and the expositive, both of which are commonly used simultaneously, which we call mixed.

Among the articles selected, Sulfadiazine Silver 1% was the most commented, but other coverages were more advantageous. In comparison to Nanocrystalline it was less painful than that, hydrofibrated with silver which caused less anxiety and pain during the exchanges. There was also a decrease in pain in the hydrocolloid with silver sulphadiazine, the biocelulose was pointed with a degree of reduction of the faster pain.

Several studies classify Sulfadiazine as first choice topical coverage due to its antimicrobial action that aims to debride necrotic tissues and fight local infection. Recommended in second and third degree burns, it is the most commonly used topical agent due to its application capacity and mainly easy removal [17].

It does not cause pain and there are few side effects, among them we can mention mild leucopenia after a few days of use and allergies in less than 5% of the patients, and there is no need to interrupt the use.

Its action occurs with the release of Silver in a slow and sustained form of ions (silver) binding to bacterial deoxyribonucleic acid promoting inhibition of growth and bacterial multiplication. During the treatment we can use different types of dressings being: wet, protective film, occlusive dressing, if these resources do not reach the goal, it can be resorted to surgical treatment.

Another topical agent used is papain, which is a complex of proteolytic enzymes, extracted from latex of papaya papaya (*Carica papaya*), whose active site carries a sulfhydryl (SH) radical, making it difficult to associate it with another therapeutic resource, Since it undergoes oxidation by replacing sulfur with iron, oxygen and iodine derivatives. Its mechanism of action occurs through the dissociation of protein molecules, resulting in chemical debridement, being an enzyme of easy deterioration, it should always be kept in a cool, dry, ventilated and protected from light.

Temporary skin substitutes are effective materials in the treatment of recent surface burns and also in the skin covering while awaiting definitive grafting. They can be changed at regular intervals

**Table 2:** The mechanism of action, mode of application and time of change to the main coverage.

COVERINGS	MECHANISM OF ACTION	MODE OF APPLICATION	TIME OF EXCHANGE
<b>Sulfadiazine silver 1%</b>	Antimicrobial action. It promotes weakening of the microbial cell wall and consequently the rupture of the cell.	Aseptic application of a thick layer and covered with absorbent gauze.	Every 12 hours or when the secondary dressing is saturated
<b>Silver Nanocrystalline (Actcoat Flex 3 and Actcoat Flex 7)</b>	Continuous Silver Release	Highly malleable follows body shapes to maintain contact with burned surface	Every 3 days for Actcoat Flex 3 and 7 days for Actcoat Flex 7
<b>Suprasorb®X</b>	Has the ability to absorb and release moisture at the same time (hydrobalance)	Applied 2 to 3 days after grafting	5 to 7 days
<b>Hydroalginate</b>	Combines the moisture-absorbing properties of alginate and carboxymethylcellulose with the broad microbicidal spectrum of the action of silver ions.	Model the alginate inside the wound moistening the fiber with physiological solution. Do not allow the alginate fiber to cross the edge of the wound. Occlude with sterile secondary coverage.	Infected wounds (24 hours), clean wounds with bleeding (48 hours), clean wounds or intense exudation (when saturated)
<b>AGE- Essential Fatty Acids</b>	Promotes chemotaxis and angiogenesis, keeps the medium moist and speeds up the tissue granulation process.	Apply AGE to the wound bed or soak sterile gauze. Occlude with sterile secondary gauze cover and set.	Whenever the secondary dressing is saturated or at most every 24 hours.
<b>Collagenase</b>	Age degrading the wound's native collagen.	Apply the ointment over the area to be treated. Apply wet contact gauze. Cover with gauze cover dry and fix	Every 24 hours or in less time in case of excess exudate
<b>Hydrogel</b>	Softens and removes devitalized tissue through autolytic debridement	Wash the wound bed. Spread the dressing or insert it into the cavity aseptically. Occlude the wound with sterile secondary coverage.	From one to three days, depending on the amount of exudate.
<b>Non-adherent gauze</b>	Preserves the granulation tissue and does not adhere to the wound bed.		On average every 24 hours.
<b>Hydrocolloid</b>	Maintains local moisture interacting with the lesion; Produces a gel that promotes autolytic debridement.		With saturation of the product on average in the 5 or 6 day. In this case, the hydrocolloid will have a lighter color and a less dense consistency.
<b>Papain</b>	Acts as a chemical debriding facilitator of the healing process. It has bacteriostatic, bactericidal and anti-inflammatory action. Provides alignment of the collagen fibers, promoting uniform tissue growth		Its replacement is indicated every 12h.
<b>Dermal regeneration matrix.</b>	.		When the INTEGRA product is used, the silicone plaque is removed within three weeks, with the dermo-epidermal graft being performed.
<b>Allografts (derived from corpse skin).</b>	Combination of culture of autologous keratinocytes on the dermal matrix, in search of the greatest possible similarity to the patient's skin		
<b>Xenografts (derived from the skin of animals)</b>	Combination of culture of autologous keratinocytes on the dermal matrix, in search of the greatest possible similarity to the patient's skin		

or maintained until healing or grafting, if adherence is good or there is no infection

The properties of skin substitutes should be: adhesion, water vapor transport, elasticity, durability, low antigenicity and toxicity, hemostatic capacity and antibacterial action. They can also be classified into biological substitutes constituting the allografts (homografts), xenografts (heterografts) and amniotic membrane.

Some temporary skin substitutes available, such as Opsite® \* and Tegaderm® \*, are polyurethane films, polyvinyl chloride membrane, polyvinyl chloride films that give the material greater elasticity and vapor permeability of Water, these films adhere to the skin and not the wound.

## Conclusion

From the evaluation and classification of the burn, the treatment of the burned patient is directed and it is necessary to carry out such

an evaluation, to consider the type of cover indicated according to the classification of the burn.

The use of topical toppings are more commonly used in superficial or first degree burns, being applied directly to the injured tissue in an open way favoring healing, maintaining humidity and local heat. The burned area is completely covered by the topic and remains exposed to the environment. The most indicated areas are face, neck, thorax and perineum.

In the second degree burns, we must perform the rupture of the Flictena with sterile material, incorporating the silver as a therapeutic modality in its various presentations constitute the new generation of treatment of 2nd degree burns, with application of topical coverage, gauze and bandage for occlusion.

The adjunct components of these dressings, such as delicate, non-traumatic and non-adherent interfaces to the wound bed and

absorbent pads of exudate, exclude the use of secondary dressings and incorporate new technologies that tend to become the standard for the treatment of these wounds<sup>30</sup>.

Moreover, the popularization of its use associated with few changes of dressings during the healing process that extends for 21 to 28 days make these new therapeutic modalities economically viable<sup>30</sup>.

Finally, third-degree lesions that affect the deep layers of the skin must be cleaned, the devitalized tissue must be removed, and then the cover is chosen for easy application, removal and longer residence time.

All deep burn (3rd degree or 2nd deep) should be treated with early grafting to avoid retraction and sequelae. In extensive burns there is no possibility of healing of the wound by epithelialization.

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