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## Use of microcurrent in pressure ulcers

A utilização da microcorrente em úlceras por pressão

El uso de micro corriente en las úlceras por presión

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### ABSTRACT

**Objective:** To ascertain the effectiveness of the use of microcurrent in pressure ulcers, indicating the benefits of this treatment to the client. **Method:** This is an exploratory update study based on scientific journals and modern reading material published in the Scientific Electronic Library Online (SciELO), Digital Library of the USP and Electronic Journal Quarterly Ward. **Results:** It was found that the use of microcurrent is a therapeutic resource that confers a major benefit to the treatment of pressure ulcers, since the curing process is optimized and the financial costs for the hospital sector are minimized, optimizing the nursing process. **Conclusion:** In this approach we expect better answers for nursing care by optimizing the time of care and patient hospitalization in his ailing condition driven by scabs.

**Descriptors:** Nursing; Microcurrent; Pressure ulcer.

### RESUMO

**Objetivo:** Conhecer a eficácia do uso da microcorrente nas úlceras por pressão, sinalizando os benefícios deste tratamento para o cliente. **Métodos:** Trata-se de um estudo de atualização de caráter exploratório baseado em leitura corrente e periódicos científicos publicados no Scientific Electronic Library Online (SciELO), Biblioteca Digital da Universidade de São Paulo (USP) e Revista Eletrônica Quadrimestral de Enfermaria. **Resultados:** Verificou-se que o uso da microcorrente é um recurso terapêutico que constitui um equipamento de grande benefício quanto ao tratamento das úlceras por pressão, vez que o processo de cura é agilizado e os custos financeiros para o setor hospitalar são minimizados, otimizando o processo de enfermagem. **Conclusão:** Nesta abordagem teremos melhores respostas para os cuidados de enfermagem, otimizando o tempo da assistência e da hospitalização do paciente em sua condição enfermo motivada pelas escaras.

**Descritores:** Enfermagem, Microcorrente, Úlcera por pressão.

### RESUMEN

**Objetivo:** Conocer la eficacia de la utilización de micro corriente en las úlceras por presión, indicando los beneficios de este tratamiento para el cliente. **Métodos:** Se trata de un estudio exploratorio basado en actualización lectura actual y periódica científica publicada en el Scientific Electronic Library Online (SciELO), la Biblioteca Digital de la USP y Diario electrónico trimestral Ward. **Resultados:** Se encontró que el uso de micro corriente es un recurso terapéutico que es un beneficio importante del producto y el tratamiento de las

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úlceras por presión, ya que el proceso de curado es aerodinámico y los costos financieros para el sector hospitalario se minimizan optimizando el proceso de enfermería. **Conclusión:** En este enfoque vamos a tener mejores respuestas para la atención de enfermería optimizando el tiempo de atención y hospitalización del paciente en su condición de enfermo impulsado por costras.

**Descriptores:** Enfermería, Microcorriente, Úlcera por presión.

## INTRODUCTION

Long-term hospitalized patients are at risk of developing pressure ulcers - skin lesions caused by pressure and, consequently, blood disruption in certain areas of body pressure, being considered a serious problem, especially in the elderly and patients with chronic degenerative diseases.<sup>1</sup>

The disorder is reported by several scientists as the most frequent experience when related to venous ulcer caused by tissue aggression, ischemia, hypoxia, inflammation, infection or by adherence of the rubbed wounds to the bed. With the manifestation of these symptoms, there is a delay in the healing process and losses in daily activities, reducing mobility and leading to sleep disorders revealing psychological and emotional changes such as reduced confidence in performing daily tasks, maintenance of social and recreational activities manifested by a sense of isolation, identity loss, mood swings, and decreased quality of life.<sup>2-3</sup> It is known, therefore, that chronic venous ulcers are determinants for the worsening of socioeconomic conditions because they configure reasons for absenteeism, generating impact to the health and social security system, establishing functional dependence and eroding family relationships.<sup>4-5</sup>

The layers found in the skin are divided into epidermis, the most superficial layer where five strata are identified: corneous, lucid, granular, spinal and basal. Deeply located, we find the dermis, below the basal stage of the epidermis where the hair follicles originate from, along with the sebaceous and sweat glands. In this layer two strata can be distinguished: the papillary, which is richer in fibroblasts, collagen fibers, elastic fibers, mast cells and macrophages and the reticular stratum, deeper, presenting a bundle of collagen fibers that reaches the subcutaneous interface between fat lobes.<sup>6</sup>

Below the dermis the subcutaneous tissue can be found, also known as hypodermis - rich in adipose tissue - that vary with each organism. Concerning its immune function, there are several dermal cells, such as Langerhans cells, interleukin-1 keratinocyte producers and T lymphocyte subgroups. There are also three varieties of the human leukocyte antigen whose importance is extreme, since this is the protein marker in leukocytes that indicate the cell type.<sup>6</sup> Therefore, the pressures exerted on these elements cause serious damage to the regions protected by them.

The microcurrent is a type of electrical stimulation that uses currents with parameters of intensity in the low frequency microampere range, presenting continuous or alternating currents. Its effect is a thousand times less intense than conventional electrotherapy. Its application occurs

at levels that do not activate subcutaneous sensory nerve fibers. In these cases, the patient has no perception of the tingling sensation so commonly associated with electrotherapeutic procedures.<sup>7</sup>

Using microcurrent therapy provides electrical signals similar to those of the human body when recovering the injured tissue. Microcurrent devices are specifically designed to resemble and amplify the minute bioelectrical signals of the human organism, allowing to work at the cellular level, creating an electric current vehicle to compensate for the decrease of the available bioelectric current to the injured tissue, increasing the body's ability to transport nutrients and metabolic waste from the cells in the affected area.<sup>7</sup>

It is then questioned how and what actions could be taken towards a better cost benefit in face of this problem and what strategies should be employed as an initiative for the safety and comfort of the clientele affected by this event.

To answer this question, the following objective was outlined: to ascertain the effectiveness of microcurrent use in pressure ulcers, signalling the benefits of this treatment to the client, because we believe in the relevance of studies of this nature, since the pressure ulcer affects a large scale of bedridden patients, being therefore of great concern in the field of nursing and that the microcurrent can help in the treatment of bedsores effectively.

## METHOD

This is an exploratory update study based on modern reading material and scientific journals published in the Scientific Eletronic Library Online (SCIELO), USP Digital Library and Four-month Electronic Journal of Nursing. As a criterion for the selection of journals, all the works in Portuguese and English that presented their abstract related to the subject were selected, mainly focused on pressure ulcer care, and were available for full access to the databases. We selected books and journals published between 2000 and 2014, considered of importance for the interaction of this theme.

## RESULTS AND DISCUSSION

The results found in this literature bring to nursing the knowledge learned about the integumentary system, its physiology and anatomy, which point out the possibility of generating methods for the patient comfort. In the creation of a curative strategy, the comprehension of the ulcer concept, how and why it occurs and which risk factors are related would be the fundamental basis for the beginning of effective procedures.

Pressure ulcer can be described as a localized skin lesion caused by disruption of the blood supply to the area, usually brought about by pressure, shear, friction or a combination of the three. This injury not only hampers the healing process but also exerts an emotional upset to the affected person due to the pain and shame of the

injury sometimes related to unpleasant odors, leading to a low self-esteem.<sup>8</sup> Therefore, nursing plays a fundamental role in the care and emotional support of clients and their families.

The public most affected by this type of ulcers are usually the patients confined in bed during long hospitalization times, with the critical patients being the most affected. Due to the bed restriction and immobility, the pressure exerted on the skin leads to small vessel thrombosis and tissue necrosis.

Therefore, the bony protrusions of body weight support are more susceptible to these lesions, making the main tissues more affected in the sacral and coccygeal regions, greater trochanter, calcaneus, knee, malleolus, medial condyle of the tibia, fibula head, scapula and elbow.<sup>8</sup>

Among the factors presented, the nurse should evaluate the patient to verify the risks that can lead to the injury, for example: analysis of the mobility in the bed, evaluation of skin integrity two or more times a day, inspect each pressure site, observe current health problems, malnutrition, mechanical forces, altered skin unit, among other factors. In the case of evaluation of the lesion, the Braden scale is classified in 4 stages - it is the responsibility of the nurse to analyze and record the degree of damage presented.<sup>8</sup>

## BRADEN SCALE

The Braden Scale presents four stages: Stage I is an area with erythema that does not fade with pressure and has elevated temperature. The tissue is swollen and congested, and the patient reports pain or discomfort in the affected region with a blue-gray erythema. Stage II is considered as a worsening of the diagnosis where the skin tears, a blister or shallow crater occurs, persistence of oedema may develop infection. Stage III takes place when the ulcer extends into the subcutaneous tissue, necrosis appears and the development of the infection becomes visible. In Stage IV, the ulcer extends to the underlying muscle and bone, presenting deep infection bags and increased necrosis and drainage.<sup>8-9</sup>

It can be seen that the last two ulcer stages are the most complicated in terms of healing. An ulcerative wound in stage IV in the sacral region, for example, can be identified via the bony prominences clearly. In this particular region, there is the nerve ligament presenting damage in the equine tail, and depending on the extension, lesion in the medullary cone.<sup>8-9</sup>

## FINANCIAL IMPACT

Studies<sup>10</sup> carried out in England have observed that the cost of treatment for pressure ulcer can reach 750 million pounds per year, surpassing the cost of heart disease, which would amount to 500 million pounds per year. Therefore, the cure of an injury such as this is of high financial value, creating a budget deficit for treatment institutions and implying greater care and wound prevention. The

coverings used with the other materials such as gauze, plaster and supposedly efficient and expensive coatings like hydrocolloid requires a financial problem, because the ulcers depend on the organism conditioning for a good cicatrization.

## MICROCURRENT UTILIZATION

The use of the microcurrent for a better response to the treatment as a way to help and accelerate the healing process against a pressure ulcer, widely used in the physiotherapeutic environment, has great value. The correct application in the injured tissue tends to increase the flow of the endogenous current, since the body is static and the blood is the source of energy conduction. As this flow increases, the traumatized area can recover its functional capacity. The resistance of the injured tissue will be reduced by promoting the entry of bioelectricity, restoring homeostasis. The electric microcurrent acts as a catalyst in the initiation and continuity of numerous electrical and chemical reactions in the healing process.

The electrical impedance leads to reduction in blood supply, oxygen, and nutrients to tissues, leading to tissue spasms. Decreased circulation causes an accumulation of metabolic waste, resulting in local hypoxia, ischemia, and harmful metabolites leading to pain. The body's electrical impulses need a determined current to overcome the impedance barrier inherent in the traumatized tissue, resulting in an obstacle to the body's own ability to begin the healing process until the tissue substantially recovers from the trauma.<sup>7</sup>

The microcurrent acts by replenishing the adenosine triphosphate (ATP) and the movements flow back into the injured cells next to the residues of the metabolic products that will be expelled out of the cell. Among many factors, the electric microcurrent benefits the active transport of amino acids that depends directly on ATP. It promotes a better synthesis of proteins by acting in the lymphatic system, increasing the mobilization of proteins within this system. It also has analgesic functions due to the promotion of homeostasis, reducing nociceptive stimuli and accelerating the cicatrization process - it functions as an anti-inflammatory due to the circulation increase in the injured area, concomitantly with the elevation of the organic defense, macrophages and antibodies responses and phagocytic cells.<sup>7</sup>

Regarding the electric microcurrent, it can be a great ally for the treatment of pressure ulcers due to the benefits presented. Therefore, the healing process will be accelerated and, combined with the materials needed for healing, we can supposedly reduce material costs once the process of tissue re-stabilization is accelerated.<sup>11</sup>

## CONCLUSION

It was verified in this study that the use of the microcurrent is a therapeutic resource that constitutes a equipment of great benefit for the treatment of pressure ulcers, since the

healing process is optimized and the financial costs for the hospital sector are minimized.

It is believed, therefore, that we will have better answers to the nursing care with this approach, optimizing the time of care and the hospitalization of the patient in his ailing condition motivated by the bedsores.

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