

DOI: <https://doi.org/10.36489/nursing.2021v24i276p5700-5713>

# Prophylactic dressing for pressure injuries in the face of health professionals during COVID-19

**ABSTRACT** | Objective: To propose the development of prophylactic dressing to prevent pressure injuries on the face of health professionals by the use of a mask during the pandemic caused by Covid-19. Methods: This a methodological study divided into two stages: narrative review of the literature and elaboration of prophylactic dressing, using pre-established criteria by the researchers. Results: The prophylactic dressing, proposed in this study, has a roll presentation, not sterile and should be used only on intact skin. It will be composed of a soft silicone tape, perforated, with micro-adherence, 2.5 cm wide; central layer of extra-fine polyurethane foam, with 1 cm wide; and external polyurethane film. Conclusions: The prophylactic dressing proposal will promote moisture absorption, will reduce pressure and shear and, consequently, pressure injuries on the face of health professionals through the use of individual protection masks.

**Keywords:** Prevention & Control; Occlusive dressings; Pressure ulcer; Equipment and Supplies.

**RESUMEN** | Objetivo: proponer el desarrollo de coberturas profilácticas para prevenir lesiones por presión en el rostro de los profesionales de la salud mediante el uso de mascarilla durante la pandemia causada por Covid-19. Métodos: se trata de un estudio metodológico dividido en 2 etapas: revisión narrativa de la literatura y elaboración de la cobertura profiláctica, utilizando criterios preestablecidos por los investigadores. Resultados: la cobertura profiláctica, propuesta en este estudio, tiene presentación en rollo, no es estéril y debe usarse solo sobre piel intacta. Consistirá en una cinta de silicona microadhesiva perforada, suave y de 2,5 cm de ancho; capa central de espuma de poliuretano extrafina de 1 cm de ancho; y parte exterior de película de poliuretano. Conclusión: la propuesta de cobertura profiláctica promoverá la absorción de humedad, reducirá la presión y el cizallamiento y, en consecuencia, las lesiones por presión en el rostro de los profesionales de la salud mediante el uso de máscaras de protección individual.

**Palabras claves:** Prevención & Control; Apósitos oclusivos; Úlcera por presión; Equipos y Suministros.

**RESUMO** | Objetivo: propor a elaboração de cobertura profilática para prevenção de lesão por pressão na face de profissionais de saúde pelo uso de máscara durante a pandemia provocada pela Covid-19. Método: trata-se de um estudo metodológico dividido em 2 etapas: revisão narrativa de literatura e elaboração da cobertura profilática, utilizando critérios pré-estabelecidos pelos pesquisadores. Resultados: a cobertura profilática, proposta neste estudo, tem apresentação em rolo, não estéril e deverá ser utilizada somente em pele íntegra. Será composta por uma fita de silicone macio, perfurado, com micro aderência, de 2,5 cm de largura; camada central de espuma extrafina de poliuretano, com 1cm de largura; e parte externa de filme de poliuretano. Conclusão: a proposta da cobertura profilática promoverá a absorção da umidade, reduzirá a pressão e o cisalhamento e, consequentemente, as lesões por pressão na face de profissionais de saúde pelo uso de máscaras de proteção individual.

**Palavras-chaves:** Prevenção e Controle; Curativos oclusivos; Úlcera por pressão; Equipamentos e Provisões.

## Rafael Colodetti

Doctoral student of the Graduate Program in Biotechnology at the Federal University of Espírito Santo (UFES). Master in Nursing (UFES). Stomatherapist Nurse (UERJ). Physiotherapist (UVV). Specialist in Musculoskeletal Rehabilitation (EMESCAM).  
ORCID: 0000-0001-7642-3702

## Walckiria Garcia Romero Sipolatti

PhD in Physiological Sciences (UFES). Master in Physiological Sciences (UFES). Professor of the Professional Master's Course in Nursing at UFES (PPGENF). Professor of the Undergraduate Nursing Course at UFES.  
ORCID: 0000-0002-1365-4797

**Received on:** 03/11/2021

**Approved on:** 04/05/2021

## Maria Edla de Oliveira Bringuete

PhD in Nursing (UFRJ). Master in Education (UFES). Professor of the Professional Master's Course in Nursing at UFES (PPGENF).  
ORCID: 0000-0002-5151-5368

## INTRODUCTION

The pandemic caused by the causative agent of the new coronavirus SARS-CoV-2, known as Covid-19, has caused a great threat to the world population, leading thousands of people to seek health services. The first reports began in December 2019, when a series of pneumonia cases of unknown origin emerged in Wuhan, China, with clinical

presentations very similar to viral pneumonia<sup>(1)</sup> with high lethality, mainly in immunocompetent patients and with associated comorbidities.<sup>(2)</sup>

Due to its high spread among people, the World Health Organization (WHO) declared on January 30th, 2020 the outbreak by Covid-19, a Public Health Emergency of international interest and, on March 11 of the same year, it was characterized as a pandemic.<sup>(3)</sup>

The form of transmission in the population is mainly between people after close contact and through respiratory droplets, produced when an infected person coughs or sneezes. Health professionals are particularly vulnerable to contagion, as they provide direct and

close assistance to these patients. In previous outbreaks caused by other types of coronavirus, health professionals accounted for a significant portion of the number of infected cases, having contributed to the expansion of epidemics.<sup>(4)</sup>

In an attempt to reduce contamination by Covid-19, the Ministry of Health advises that all health professionals, responsible for dealing with suspected or confirmed cases, use personal protective equipment (PPE), such as: cap, goggles or face shield, mask, long-sleeved waterproof apron and procedure gloves.<sup>(4)</sup> Thus, with the use of effective measures, China has managed to significantly reduce transmission by Covid-19, one of which is the strict use of PPE in all health professionals.<sup>(5)</sup>

According to the National Health Surveillance Agency (ANVISA), health professionals must use particle respirator N95 (mask N95), filter facepiece-PFFP2 (mask PFFP2), or equivalent, when performing aerosol-generating procedures such as intubation or orotracheal aspiration, invasive and non-invasive mechanical ventilation, cardiopulmonary resuscitation, manual ventilation before intubation and collections of nasotracheal samples. Such masks guarantee protection in two ways, because it has an air filter that blocks at least 95% of the suspended particles and helps protect against diseases caused by air transmission, such as the coronavirus. However, the mask must be properly adjusted to the face to ensure its effectiveness and reduce the risk of transmission.<sup>(6)</sup>

Despite WHO guidance on the use of personal protective masks for up to four hours<sup>(7)</sup>, during the occurrence of the pandemic by Covid-19, PPE may be used for longer periods than that instructed by the manufacturer, due to the low availability of these materials in the work environment.<sup>(6)</sup>

Thus, the prolonged and excessive use of this equipment can cause pressure injuries in the region of the face

of health professionals, which is already clearly evidenced in the literature.<sup>(8-9)</sup>

According to the National Pressure Ulcer Advisory Panel (NPUAP), the pressure injury is a damage or alteration in the skin and soft tissues, resulting from the continuous and prolonged pressure on bony prominences, also related to the use of medical devices, being recommended the interruption of this strength in a period of up to two hours.<sup>(10)</sup>

It is necessary to emphasize that the incidence and prevalence of pressure injuries, in healthy or sick people, are related to reduced sensitivity, prolonged bed restriction, advanced age, degenerative diseases, urinary or intestinal incontinence, malnutrition or obesity.<sup>(11)</sup>

However, in the course of the pandemic, the appearance of pressure injuries on the face of health professionals, young and apparently healthy (8-9), brings evidence that the prolonged and rigorous use of these protective devices are important factors in their development.

## OBJECTIVE

Propose the development of prophylactic coverage to prevent pressure injuries in areas at risk of the face, such as the nostril and zygomatic region, of health professionals due to the use of a mask during the pandemic caused by Covid-19.

## METHOD

### Type of study

This is a methodological study carried out in the months of March and April 2020, by the Postgraduate Professional Master's Program in Nursing at the Federal University of Espírito Santo, which develops nursing technologies to assist the general population. To carry out the research, two stages were used: 1) narrative review of the literature and 2) proposal for the elaboration of the prophylactic coverage.

## First stage: literature review

The first stage of the study was carried out through a narrative review of the literature, where the results provided subsidies for the adequate choice of characteristics and type of product susceptible to make up the prophylactic coverage. To this end, the following databases were accessed: Medical Literature Analysis and Retrieval System Online (MEDLINE), Latin American and Caribbean Health Sciences Information Literature (LILACS). The search for LILACS publications was made through the Virtual Health Library (VHL) and MEDLINE studies were researched through the VHL and PubMed. Protocols and guidelines from the Ministry of Health and WHO containing information about Covid-19 were also accessed. In order to guide the research, it was questioned which types of dressings would be more suitable to compose a prophylactic coverage for the prevention of pressure injuries related to the use of PPE.

To this end, the Health Science Descriptors (DeCS), in English and Portuguese, "pressure injury", "prevention and control", "occlusive dressings" and "equipment and supplies" were used.

## Second stage: prophylactic coverage proposal

In the second stage of the research, after a narrative review of the literature, the types of materials that could make up the prophylactic coverage were analyzed by the researchers for further definition of the characteristics, as well as, of the most suitable genres of products to be used in the face region. Therefore, the composition of the inputs and final characteristics were defined by the literature review and the researchers' experience in stomatherapy and special dressings.

## Selection criteria

For the selection of studies found in the narrative literature review, the

following inclusion criteria were used: original articles, published in the period 2010-2020, in two languages (English and Portuguese). The exclusion criteria were: duplicate articles, unavailable in full and that did not address the theme.

Initially, an analysis was carried out based on the titles and abstracts of all articles that met the inclusion criteria. After reading the abstracts, all of the selected articles were obtained in full and then examined for confirmation of eligibility and inclusion in the study.

For the choice of products, the researchers defined as inclusion criteria: malleable components, which are anatomically adapted to the face, mainly to the nasal and zygomatic regions, capable of absorbing moisture, as well as reducing the pressure and shear between the skin and the individual protection mask.

**Data analysis**

To assist in data analysis, studies were identified and selected in the item "Results" of the articles, being

typed and organized in a Microsoft Office Excel® 2013 spreadsheet as follows: year of publication, authors, article title and results. Data analysis was done manually by the researchers.

**RESULTS**

Ten scientific studies were selected in the narrative review of the literature, which helped researchers in choosing the products susceptible to make up the prophylactic coverage (Chart 1).

**Chart 1. Distribution of scientific studies, found in the literature review, according to the year of publication, authors, title and results, for the elaboration of prophylactic coverage to prevent pressure injuries on the face of health professionals during Covid-19. Vitória, ES, Brazil, 2020.**

Year of publication	Authors	Title	Results
2018	Moore ZEH, Webster J <sup>(12)</sup>	Dressings and topical agents for preventing pressure ulcers. Cochrane Database of Systematic Reviews	Although the incidence of pressure injuries was reduced when the dressings were used to protect the skin, the results were compromised by the low quality of the included studies.
2019	Burch J, Tort S <sup>(13)</sup>	Can silicone dressing help prevent pressure ulcers?	The incidence of pressure injuries in stages 1 and 2 was lower with silicone dressings than without dressings.
2012	Brindle CT, Wegelin JA <sup>(14)</sup>	Prophylactic dressing application to reduce pressure ulcer formation in cardiac surgery patients	The group of patients who received standard treatment had a 3,6 higher risk of developing pressure injuries when compared to the group that received intervention with a silicone bandage, but this difference was not statistically significant.
2013	Santamaria N, Gertz M, Sage S, McCann J, Freeman A, Vassiliou T, et al. <sup>(15)</sup>	A randomized controlled trial of the effectiveness of soft silicone multi-layered foam dressings in the prevention of sacral and heel pressure ulcers in trauma and critically ill patients: the border trial	The prophylactic coverage with soft multilayer silicone was able to reduce the incidence of pressure injuries in general, especially in the sacral and calcaneus regions, when compared to the control group.
2012	Chaiken N <sup>(16)</sup>	Reduction of sacral pressure ulcers in the intensive care unit using a silicone border foam dressing	The use of a foam dressing with a silicone edge was able to reduce the pressure injury incidence rate from 13,6% to 1,8%.
2016	Black J, Kalowes P <sup>(17)</sup>	Medical device-related pressure ulcers	The use of silicone foam dressings reduced the formation of pressure injuries associated with a medical device.
2015	Huang L, Woo K, Liu L, Wen R, Hu A, Shi C <sup>(18)</sup>	Dressings for preventing pressure ulcers: a meta-analysis	The results showed that the hydrocolloid dressings, film and silicone and polyurethane foams, were more effective than a standard care protocol in patients at risk of pressure injury.

2016	Truong B, Grigson E, Patel M, Liu X <sup>(19)</sup>	Pressure ulcer prevention in the hospital setting using silicone foam dressings	Silicone foam dressings, when used as a prophylactic treatment, appear to be superior to the standard pressure injury prevention approach.
2014	Clark M, Black J, Alves P, Brindle CT, Call E, Dealey C, Santamaria N <sup>(20)</sup>	Systematic review of the use of prophylactic dressings in the prevention of pressure ulcers	The use of topical dressings reduces the incidence of pressure injuries, as well as injuries associated with medical devices, in patients in the Intensive Care Unit..
2015	Dutra RAA, Salomé GM, Alves JR, Pereira VOS, Miranda FD, Vallim VB, Brito MJA, Ferreira LM <sup>(21)</sup>	Using transparent polyurethane film and hydrocolloid dressings to prevent pressure ulcers	The transparent polyurethane film performed better and was more effective than the hydrocolloid dressing in preventing the development of pressure injuries.

The prophylactic coverage proposed in this study originated from the critical analysis of scientific studies on the types of products that could make up the prophylactic coverage, in addition to the clinical experience of researchers on special dressings for the prevention of pressure injuries.

Thus, the proposal is that the prophylactic cover should be presented in a roll, non-sterile, with five meters in length. It will consist of a perforated soft silicone tape, forming a 2,5 cm wide contact layer with micro-adhesion and atraumatic removal, being used only on intact skin. Such product will also allow the passage of moisture, which will be absorbed quickly by the 1cm wide layer of extrafine polyurethane foam, located in the central portion of the tape, of excellent flexibility, in addition to the ability to alleviate the pressure and shear forces.

The outer part will be composed

of polyurethane film with a high rate of transmission of wet steam, being even a barrier against the entry of microorganisms. The roll presentation will make it possible to cut and use it according to the health professional's needs. Thus, the prophylactic coverage proposal is presented in the following format, as shown in figure 1.

## DISCUSSION

This study proposes the development of prophylactic, non-sterile coverage to reduce pressure injuries on the face of health professionals, through the redistribution of pressure and absorption of skin moisture under the individual protection mask used for long periods, during the Covid-19 pandemic.

The prevention of these injuries constitutes an emergency action, since such aggravation causes pain and

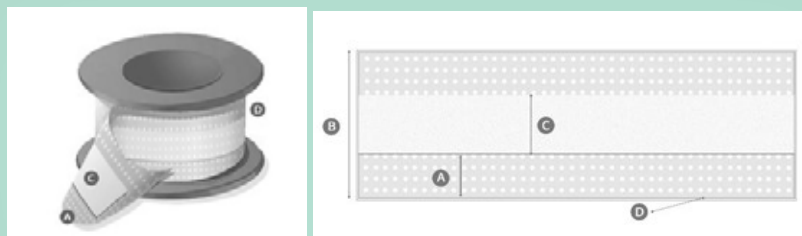
discomfort produced by tissue ischemia during local pressure.<sup>(22)</sup> Furthermore, considering the skin as a defense mechanism against the invasion of microorganisms, these injuries can compromise the health of professionals, in addition to causing embarrassment, low self-esteem, disturbed self-image, stigmatization and feelings of inferiority.

The National Pressure Injury Advisory Panel (NPIAP) defines that masks, glasses, as well as any PPE are considered medical devices and these can cause skin injuries through pressure and shear, in addition to microclimate changes.<sup>(23)</sup> The microclimate is the combination of temperature and humidity and, sometimes, of the air flow in a local region, compared to the surrounding area or the surrounding area, where its balance is an important factor in preventing injuries.<sup>(24)</sup>

Moisture is a primary causal factor in the emergence of pressure injuries by decreasing the permeability of intact skin, weakening the epidermis and dermis, which, consequently, will become more vulnerable to the effects of pressure and shear.<sup>(25)</sup> Excessive skin moisture leads to excessive hydration and impairs normal barrier function, increasing the risk of injury.<sup>(26)</sup>

We observed, then, that the formation of pressure injuries in health professionals by the use of a mask is not linked only to pressure and shear. The use of individual protection masks for

**Figure 1. Proposed prophylactic, non-sterile roll cover to reduce pressure injuries on the face of healthcare professionals through the use of personal protective masks during the Covid-19 pandemic. Composed of perforated silicone layer (A and B), polyurethane foam (C) and polyurethane film (D).**



longer periods than recommended, associated with stress and excessive workload, can promote alteration of the microclimate by raising the local temperature and increasing perspiration, contributing to the decrease in air movement, which, consequently, promotes the development of injuries. <sup>(24)</sup> These risk factors, together, cause tissue deformation, inflammatory edema and ischemia that cause pressure lesions in bone anatomical sites imitating the shape and distribution of medical devices used on the face. <sup>(27)</sup> Recent research shows that the nasal region was the anatomical structure most affected by pressure injuries caused by the use of PPE, followed by the zygomatic region, being mainly caused by sweating of the face. <sup>(28)</sup>

A study carried out by North American nurses highlights three important actions in the prevention of pressure injuries: consider the application of dressings that promote pressure redistribution and absorb body moisture in areas in contact with medical devices and fixatives; bandaging under medical devices, lifting and/or moving the device frequently to examine the skin below it; and reposition for pressure relief. <sup>(29)</sup>

Thus, knowledge of effective prevention strategies represents a powerful tool in the management of care for people at risk of developing injuries. It is necessary to work with an involved nursing professional with scientific knowledge, capable of recognizing the risk factors for the development of pressure injuries, thus being able to intervene effectively in the use of the most appropriate materials and coverings. <sup>(30)</sup>

For the purpose of preventing pressure injuries, the types of coverings found in the literature were: semi-permeable dressings (a thin polyurethane membrane coated with a layer of acrylic adhesive); hydrocolloids (dressing containing gelatin, pectin and carboxymethylcellulose,



The coverings, described in the literature review, were evaluated by the researchers and it was defined that the proposal for the silicone product was due to the fact that it has already demonstrated effectiveness in decreasing humidity and preventing the emergence of pressure injuries related to the use of PPE.



together with other polymers and adhesives forming a flexible dressing); foam (porous, hydrophobic polyurethane); multilayer foam with silicone (dressing coated with silicone as an adhesive or layer of contact with the wound). These topical agents can be used alone, with combination use being more appropriate. <sup>(12)</sup> Other types of dressings, found in the literature review, were not included in this study because they do not fit the purpose of prevention, but, in the treatment of pressure injuries.

The coverings, described in the literature review, were evaluated by the researchers and it was defined that the proposal for the silicone product was due to the fact that it has already demonstrated effectiveness in decreasing humidity and preventing the emergence of pressure injuries related to the use of PPE. <sup>(13)</sup>

The effectiveness of dressings and topical products in preventing pressure injuries has been evaluated in nine studies in a systematic review and researchers have come to the conclusion that silicone dressings can reduce the incidence of pressure injuries. However, as the level of evidence is still low, more research is needed to confirm this result. <sup>(12)</sup>

However, other clinical studies describe the importance of foam dressings in the prevention of pressure injuries and highlight significant differences in the incidence of pressure injuries, in the sacral region, in patients using multilayer soft silicone foam dressings, before transfer for the Intensive Care Unit <sup>(15)</sup>, reinforcing that the application of prophylactic cover containing silicone can prevent the appearance of pressure injuries. The incidence of pressure injuries decreased from 13,6% to 1,8% after the application of the bandage with silicone edges, indicating that this type of coverage effectively prevents the incidence of pressure injuries in the

sacral region of critically ill patients. (16) Likewise, it contributed to the reduction of pressure injuries associated with a medical device. (17)

In addition to silicone, the proposed combination with extra-fine polyurethane foam is due to the fact that this product can also add pressure reduction and greater moisture absorption. The covers containing extra-fine polyurethane foam are absorbent and can be indicated for treatment and prevention of pressure injuries. Corroborating, data from four clinical studies with 467 patients showed an 84% reduction in the incidence of pressure injuries due to the use of polyurethane foam when compared to the hydrocolloid plate. (18)

Polyurethane foam dressings help to reduce vertical pressure, shear and friction on the fabric by up to 50%, effectively preventing pressure injuries from occurring. (19) An in vitro study demonstrated that polyurethane foam, when compared to other coatings, is better at absorbing, retaining and releasing moisture, since it maintains the balance in preserving the appropriate microclimate, avoiding skin maceration. (14) In addition, the use of a soft silicone dressing or polyurethane film to prevent sacral pressure injuries has been shown to be more effective compared to the absence of a local dressing. (20)

Polyurethane foams also minimize pain and trauma during dressing changes, as they have selective micro-adhesion (28) and the proposal to change the coverage in periods of up to 12 hours may reduce the risk of skin damage caused by friction, as this way, frequent removals are avoided.

Another proposal is that the external part of the prophylactic cover should be composed of a transparent polyurethane film and the results of a study suggest that this product had better effects, being more effective than hydrocolloid dressings in preventing pressure injuries, mainly because of



Non-sterile prophylactic coverage may contribute to the increase in professionals' adherence to the use of PPE during the pandemic period, due to its low cost, practicality and pleasant sensation of relief when reducing local pressures and injuries.



their high ability to transmit wet steam, in addition to being a barrier against the entry of microorganisms. (21)

Likewise, the malleability of the prophylactic cover will allow adjustment to the anatomical shape of the face and will contribute to the reduction of local pressure. In addition, the proposal to present the prophylactic cover in a non-sterile roll becomes an innovation, whereas the existing dressings are limited to skin protection only in the regions of the nostrils and are commercially expensive because they present, in the great majority, sterile individual plaques.

It should also be considered that the use of a prophylactic cover under the mask, does not replace other prevention strategies, being essential the inspection of the skin, observing the signs of pressure, due to the use of PPE and that the risk of injuries by pressure on the face, caused by these devices, is not restricted to the period of the pandemic caused by Covid-19.

### Contributions to nursing

Non-sterile prophylactic coverage may contribute to the increase in professionals' adherence to the use of PPE during the pandemic period, due to its low cost, practicality and pleasant sensation of relief when reducing local pressures and injuries.

### Study limitation

As a limitation of this study, the low scientific production on the topic in question stands out, resulting in a reduced number of specific citations that could corroborate with the discussions carried out in this study.

### CONCLUSION

The prophylactic cover, proposed in this study, consists of an extra-thin, malleable and absorbent polyurethane foam surface, in combination, with a perforated transparent silicone contact

layer to aid fixation on the skin. Thus, it reduces skin moisture, pressure and shear, while allowing the mask, regardless of model or individual anatomical variations, to serve its protective purpose. 🌱

## References

- World Health Organization. Novel coronavirus – China. World Health Organization [Internet]. 2020 (cited 2020 Mar 29). Available from: <http://www.who.int/csr/don/12-january-2020-novel-coronavirus-china/en/>
- Benvenuto D, Giovanetti M, Ciccozzi A, Spoto S, Angeletti S, Ciccozzi M. The 2019-new coronavirus epidemic: Evidence for virus evolution. *J Med Virol*. 2020; 1-5. DOI: 10.1002/jmv.25688
- Organização Pan-Americana da Saúde (OPAS). OMS afirma que COVID-19 é agora caracterizada como pandemia [Internet]. 2020 (cited 2020 Mar 29). Available from: [https://www.paho.org/bra/index.php?option=com\\_content&view=article&id=6120:oms-afirma-que-covid-19-e-agora-caracterizada-como-pandemia&Itemid=812](https://www.paho.org/bra/index.php?option=com_content&view=article&id=6120:oms-afirma-que-covid-19-e-agora-caracterizada-como-pandemia&Itemid=812)
- Brasil. Ministério da Saúde. Protocolo de Tratamento do Novo Coronavírus (2019-nCoV) (Internet). Brasília; 2020 (cited 2020 Apr 04). Available from: [https://www.arca.fiocruz.br/bitstream/icict/40195/2/Protocolo\\_Tratamento\\_Covid19.pdf](https://www.arca.fiocruz.br/bitstream/icict/40195/2/Protocolo_Tratamento_Covid19.pdf)
- World Health Organization. Report of the WHO-China Joint Mission on Coronavirus Disease 2019 (COVID-19). World Health Organization [Internet]. 2020 (cited 2020 Mar 06). Available from: <https://www.who.int/docs/default-source/coronaviruse/who-china-joint-mission-on-covid-19-final-report.pdf>
- Brasil. Nota técnica GVIMS/GGTES/ANVISA nº 04/2020. Orientações para serviços de saúde: medidas de prevenção e controle que devem ser adotadas durante a assistência aos casos suspeitos ou confirmados de infecção pelo novo coronavírus (SARS-CoV-2) [Internet]. (Atualizada em 21/03/2020). 2020 (cited 2020 Apr 01). Available from: <http://portal.anvisa.gov.br/documents/33852/271858/Nota+T%C3%A9cnica+n+04-2020+GVIMS-GGTES-ANVISA/ab598660-3de4-4f14-8e6f-b9341c196b28>.
- OPAS/OMS Brasil – Organização Pan-Americana da Saúde. Máscaras faciais durante surtos: quem, quando, onde e como usá-las [Internet]. 2020. (cited 2020 Mar 29). Available from: [https://www.paho.org/bra/index.php?option=com\\_content&view=article&id=6115:mascarasfaciais-durante-surtos-quem-quando-onde-e-como-usa-las&Itemid=812](https://www.paho.org/bra/index.php?option=com_content&view=article&id=6115:mascarasfaciais-durante-surtos-quem-quando-onde-e-como-usa-las&Itemid=812).
- Utaraité N. Chinese nurses share pictures of how their faces look after countless hours fighting the coronavirus. Bored Panda [Internet]. 2020 (cited 2020 Mar 30). Available from: [https://www.boredpanda.com/chinese-nurses-face-masks-coronavirus/?utm\\_source=google&utm\\_medium=organic&utm\\_campaign=Organic](https://www.boredpanda.com/chinese-nurses-face-masks-coronavirus/?utm_source=google&utm_medium=organic&utm_campaign=Organic)
- Ramalho AO, Freitas PSS, Nogueira PC. Lesão por pressão relacionada a dispositivo médico nos profissionais de saúde em época de pandemia. *Estima. Braz. J. Enterostomal Ther*. São Paulo. 2020; 18: e0120. DOI: 10.30886/estima.v18.867\_PT
- National Pressure Ulcer Advisory Panel (NPUAP). National Pressure Ulcer Advisory Panel (NPUAP) announces a change in terminology from pressure ulcer to pressure injury and updates the stages of pressure injury [Internet]. 2016 (cited 2020 Mar 29). Available from: <http://www.npuap.org/national-pressure-ulcer-advisory-panel-npuap-announces-a-change-in-terminology-from-pressureulcer-to-pressure-injury-and-updates-the-stages-of-pressure-injury/>
- Palagi S, Severo IM, Mengon DB, Lucena AF. Laser therapy in pressure ulcers: evaluation by the Pressure Ulcer Scale for Healing and Nursing Outcomes Classification. *Rev Esc Enferm USP*. São Paulo. 2015; 49 (5): 820-826. DOI: 10.1590/S0080-623420150000500017
- Moore\_ZEH, Webster\_J. Dressings and topical agents for preventing pressure ulcers. *Cochrane Database of Systematic Reviews*. 2018; 12. DOI: 10.1002/14651858.CD009362.pub3
- Burch J, Tort S. Can silicone dressing help prevent pressure ulcers? *Cochrane Clinical Answers*. 2019. DOI: 10.1002/cca.2386
- Brindle CT, Wegelin JA. Prophylactic dressing application to reduce pressure ulcer formation in cardiac surgery patients. *J Wound Ostomy Continence Nurs*. 2012; 39: 133-142. DOI: 10.1097/WON.0b013e318247cb82
- Santamaria N, Gerdtz M, Sage S, McCann J, Freeman A, Vassiliou T, et al. A randomized controlled trial of the effectiveness of soft silicone multi-layered foam dressings in the prevention of sacral and heel pressure ulcers in trauma and critically ill patients: the border trial. *Int. Wound J*. 2013; 12 (3): 302-308. DOI: 10.1111/iwj.12101
- Chaiken N. Reduction of sacral pressure ulcers in the intensive care unit using a silicone border foam dressing. *J. Wound Ostomy Continence Nurs*. 2012; 39, 143–145. DOI: 10.1097/WON.0b013e318246400c
- Black J, Kalowes P. Medical device-related pressure ulcers. *Chronic Wound Care Management and Research*. 2016; 3: 91-99. DOI: 10.2147/CWCMR.S82370
- Huang L, Woo K, Liu L, Wen R, Hu A, Shi C. Dressings for preventing pressure ulcers: a meta-analysis. *Advances in Skin & Wound Care*. 2015; 28 (6): 267-273 7p. DOI: 10.1097/01.ASW.0000463905.69998.0d
- Truong B, Grigson E, Patel M, Liu X. Pressure ulcer prevention in the hospital setting using silicone foam dressings. *Cureus*. 2016; 8: e730. DOI: 10.7759/cureus.730
- Clark M, Black J, Alves P, Brindle CT, Call E, Dealey C, Santamaria N. Systematic review of the use of prophylactic dressings in the prevention of pressure ulcers. *Int J ferida*. 2014; 11 (5): 460-471. DOI: 10.1111/iwj.12212
- Dutra RAA, Salomé GM, Alves JR, Pereira VOS, Miranda FD, Vallim VB, Brito MJA, Ferreira LM. Using transparent polyurethane film and hydrocolloid dressings to prevent pressure ulcers. *Journal of Wound Care*. 2015; 24 (60), 268-327. DOI: 10.12968/jowc.2015.24.6.268
- Otto C, Schumacher B, Wiese LPL, Ferro C, Rodrigues RA. Fatores de risco para o desenvolvimento de lesão por pressão em pacientes críticos. *Enferm Foco*. 2019; 10 (1): 07-11. DOI: 10.21675/2357-707X.2019.v10.n1.1323
- European Pressure Ulcer Advisory Panel (EPUAP), National Pressure Ulcer Advisory Panel (NPUAP), Pan Pacific Pressure Injury Alliance (PPPIA). Prevention and treatment of pressure ulcers: quick reference guide. Haesler E (ed) [Internet]. 2014 (cited 2020 Apr 07). Available from: <https://www.epuap.org/wp-content/uploads/2010/10/Quick-Reference-Guide-DIGITAL-NPUAP-EPUAP-PPPIA-16Oct2014.pdf>
- Kottner J, Black J, Call E, Gefen A, Santamaria N. Microclimate: a critical review in the context of pressure ulcer prevention. *Clin Biomech*. 2018; 59: 62-70. DOI: 10.1016/j.clinbiomech.2018.09.010
- Woo KY, Beeckman D, Chakravarthy D. Management of moisture-associated skin damage: a scoping review. *Adv Skin Wound Care*. 2017; 30 (11): 494-501. DOI: 10.1097%2F01.ASW.0000525627.54569.da
- Demarre L, Verhaeghe S, Van Hecke A, Clays E, Grypdonck M, Beeckman D. Factors predicting the development of pressure ulcers in an at-risk population who receive standardized preventive care: secondary analyses of a multicentre randomised controlled trial. *J Adv Nurs*. 2015; 71: 391–403. DOI: 10.1111/jan.12497
- Gefen A, Alves P, Ciprandi G, Cover F, Milne CT, Ousey K, Ohura N, Waters N, Worsley P. Device related pressure ulcers: SECURE prevention. *J Wound Care*. 2020; 29 (Sup2a): S1–S52. DOI: 10.12968/jowc.2020.29.Sup2a.S1
- Otero DP, Dominguez DV, Fernández LH, Magariño AS, González VJ, Klepzing JVG, Montesinos JVB. Preventing facial pressure ulcers in patients under non-invasive mechanical ventilation: a randomised control trial. *Journal of Wound Care*. 2017; 26 (3), 128-136. DOI: 10.12968/jowc.2017.26.3.128
- Black JM, Alves P, Brindle CT, Dealey C, Santamaria N, Call E, et al. Use of wound dressings to enhance prevention of pressure ulcers caused by medical devices. *Int Wound J*. 2015; 12 (3): 322-327. DOI: 10.1111/iwj.12111
- Araujo M, Castanheira L, Guimarães MC, Silva Y. Análise de custo da prevenção e do tratamento de lesão por pressão: revisão sistemática. *Revista Enfermagem Atual* [Internet]. 2019; 89 (27). Available from: <http://www.revistaenfermagematual.com.br/index.php/revista/article/view/47>