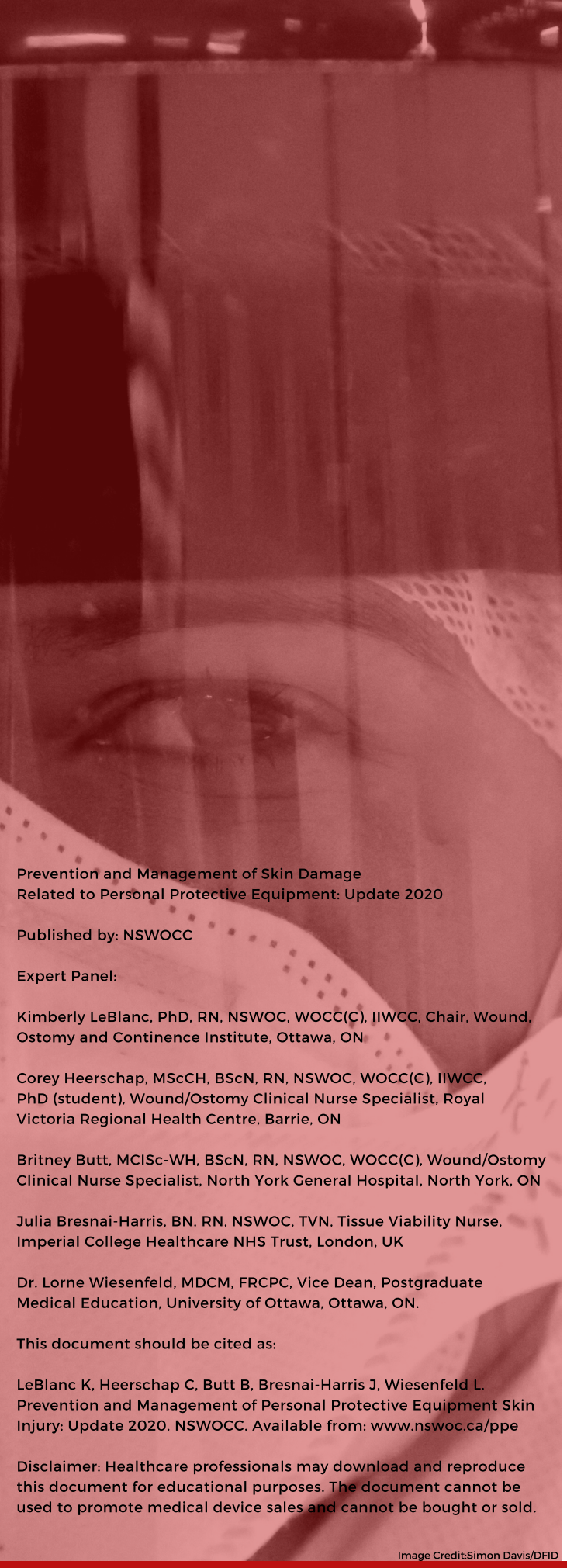
PREVENTION AND MANAGEMENT OF SKIN DAMAGE RELATED TO PERSONAL PROTECTIVE EQUIPMENT: UPDATE 2020

+1 888-739-5072
www.nswoc.ca
office@nswoc.ca



Prevention and Management of Skin Damage
Related to Personal Protective Equipment: Update 2020

Published by: NSWOCC

Expert Panel:

Kimberly LeBlanc, PhD, RN, NSWOC, WOCC(C), IIWCC, Chair, Wound, Ostomy and Continence Institute, Ottawa, ON

Corey Heerschap, MScCH, BScN, RN, NSWOC, WOCC(C), IIWCC, PhD (student), Wound/Ostomy Clinical Nurse Specialist, Royal Victoria Regional Health Centre, Barrie, ON

Britney Butt, MCISc-WH, BScN, RN, NSWOC, WOCC(C), Wound/Ostomy Clinical Nurse Specialist, North York General Hospital, North York, ON

Julia Bresnai-Harris, BN, RN, NSWOC, TVN, Tissue Viability Nurse, Imperial College Healthcare NHS Trust, London, UK

Dr. Lorne Wiesenfeld, MDCM, FRCPC, Vice Dean, Postgraduate Medical Education, University of Ottawa, Ottawa, ON.

This document should be cited as:

LeBlanc K, Heerschap C, Butt B, Bresnai-Harris J, Wiesenfeld L. Prevention and Management of Personal Protective Equipment Skin Injury: Update 2020. NSWOCC. Available from: www.nswoc.ca/ppe

Disclaimer: Healthcare professionals may download and reproduce this document for educational purposes. The document cannot be used to promote medical device sales and cannot be bought or sold.

Image Credit:Simon Davis/DFID

WARNING

It is the responsibility of each healthcare professional to verify with their institutional infection control team that any measure taken to prevent or manage PPE-related skin injuries do not interfere with the efficacy of the PPE nor are in contravention to any workplace policy.

This document is intended to highlight the emerging concern of PPE-related skin injury and to provide prevention and management solutions for potential PPE related skin injury. Individuals may require a repeat mask fit testing to ensure prevention and management efforts do not interfere with PPE efficacy.

THE PROBLEM

Given the dramatic increase in the use of PPEs by Canadian healthcare professionals related to the 2020 Coronavirus Pandemic, the NSWOCC is providing this evidence summary for the prevention and management of PPE-related skin injuries.

Since the onset of the COVID-19 pandemic, skin conditions mainly related to the use of PPE and frequent skin cleansing have emerged including pressure injuries, contact dermatitis, itching, and hives related to pressure.1 Despite numerous personal and media reports by healthcare professionals of PPE-related skin injuries (pressure injuries, friction injuries, contact dermatitis and moisture associated skin damage), there exists limited published evidence to support the prevention of these wounds.2 It has been reported that increased duration of PPE use can be associated with skin irritation and breakdown.3 Findings of 542 healthcare workers have demonstrated symptoms including burning, itching, stinging, erythema, papules, maceration and scaling; 97% of which have been associated with the prolonged use of PPE.1 Their most common areas were found to be the nasal bridge, cheeks, forehead and hands.1 Due to long-term glove use occluding the skin and causing a moisture imbalance, coupled with excessive hand cleansing irritation maceration, erosion and dermatitis become possible.1 With only 22% of healthcare workers applying a skin protective cream after washing their hands, the frequent application of hand cream especially following hand washing and before applying PPE should be recommended.1

PPE-related skin injuries are frequently seen as mild irritations and it is believed that they are often overlooked or minimized. It must be noted that even small skin irritations may increase the risk to healthcare professionals as skin irritation may predispose many to inadvertently touch their face (when not wearing a PPE) and break PPE protocol unconsciously.3 During the 2003 Severe Acute Respiratory Syndrome (SARS) outbreak, a study in an acute care hospital in Singapore (n=109) reported staff who used masks regularly reported acne (59.6%), facial itch (51.4%), and rash (35.8%) from N95 mask use. Additionally, staff reported dry skin (73.4%), itch (56.3%), and rash (37.5%) related to prolonged glove usage.4

In an upcoming editorial for Wound Management and Prevention, Dr. Gefen stresses that skin failure under a medical face mask will be a portal for the coronavirus to penetrate the body and will also allow other hospital-acquired bacterial, viral or fungal infections to take hold.5

PPE related skin conditions include but are not limited to; dermatitis, eczema, infections. Breaks in a health care professional's hand skin integrity can increase the risk of breaching infection control policy (itching and premature removal of PPE), and can lead to a decrease in work productivity and absence from work.6

SOLUTION

The global community is working together to tackle this emerging skin issue. The Portuguese Wound Management Association (APTFeridas) recently released a global consensus document pertaining to best practices for the prevention of skin lesions caused by personal protective equipment (PPE).2

KEY RECOMMENDATIONS

The following summary of key recommendations have been adapted with permission2:

1. Adequate skin care before and after the use of PPE. Application of barrier protectors and regular moisturizing should be carried out.

2. Moisturize hands regularly, and ensure hands are clean and dry prior to donning gloves.

3. Use of dressing material as an interface between the PPE and the skin in the areas of adhesion / pressure / friction. Healthcare workers MUST confirm with their infection control team that the dressing material used will not diminish the efficacy of their PPE. Dressing material will not interfere with surgical masks, however, MAY interfere with the efficacy of fit-tested masks.

STEP-WISE APPROACH

The key recommendations have been adapted for a Canadian context and presented in a step-wise approach utilizing three successive levels of management. These recommendations can be seen in Table 1 below.

Level of Tissue Damage	Recommendations		
	Hands Prior to Donning Gloves	**Non-Airtight Personal Protective Equipment** (e.g. surgical mask, goggles, face shield)	**Airtight Personal Protective Equipment** (e.g. N95, N99)
	Options	Options	Options
Level One (Intact – Non Erythemic Skin) Prevention	• Provide staff with appropriate hand moisturizing skin care products (and encourage regular, frequent use) to minimize the risk and occurrence of irritant contact dermatitis associated with hand hygiene. • Optimally, the best hand cream is one where the hand cream's fat content is approximately 70%. • Remove all nail polish, artificial nails prior to applying gloves • Avoid wearing jewelry and wrist watches • Ensure hands are dry (after washing, using hand sanitizers or applying moisturizer) prior to applying gloves • Seek medical attention if irritation persists	• Moisturizing cream • Barrier cream • Barrier wipe / spray • Dimethicone cream	• Moisturizing cream • Barrier cream • Barrier wipe / spray • Dimethicone cream
Level Two (Intact – Erythemic skin) Stage 1 Pressure Injury		• Thin adhesive foam dressing • Perforated silicone adherent sheet • Non-perforated silicone adherent sheet • Thin hydrocolloid Sheet	• Non-perforated silicone adherent sheet • Thin hydrocolloid sheet • Only **IF** approved by HCP's institution and does not interfere with the efficacy of the PPE
Level Three (Non- Intact Skin) Stage 2 Pressure Injury		• Thin adhesive foam dressing • Thin hydrocolloid sheet	• Thin hydrocolloid sheet • Only **IF** approved by HCP's institution and does not interfere with the efficacy of the PPE

DRESSING CATEGORIES FOR THE PREVENTION AND TREATMENT OF PPE RELATED SKIN DAMAGE

Dressing Type	Description	
	Description	**Examples (Not Exhaustive List)**
Dimethicone Cream	• Dimethicone is a type of silicone which can act as a skin barrier. Often used as a skin protectant ingredient for wound healing and treatment of dry skin.	• Prosheild • Secura protective dimethicone cream • Sween 24 cream • Braza Cleanse and Protect • Remedy Phytoplex Hydraguard
Hydrocolloid	• A hydrocolloid dressing is an opaque or transparent dressing for wounds. • In contact with wound exudate, the polysaccharides and other polymers absorb water and swell, forming a gel.	• Tegaderm hydrocolloid • Duoderm thin • Nuderm • Comfeel • Brava Elastic Barrier Strips
Foam	• Absorptive dressings comprised of polyurethane or silicone. Provide moist wound healing.	• Mepilex Lite- Non-Border • Allyven thin – Non-Border • Opticel Light
Non-perforated silicone sheet	• Silicone dressing sheet with adherent backing • No moisture absorption.	• Medi-Clear Scar
Perforated silicone adherent sheet	• Perforated silicone dressing sheet with adherent backing • No moisture absorption.	• Mepitel- One • Adaptic Touch
Moisturizing Cream	• Treat or prevent dry, rough, scaly, or itchy skin and other minor skin irritations	• Sween Cream • Atrac-tain • Smith and Nephew Professional Cream • Remedy Phytoplex Cream
Barrier Cream	• Protective cream • Protects intact or damaged skin from moisture, adhesive trauma and friction	• Remedy Phytoplex Moisturising Barrier Cream • Brava Barrier Cream • Cavilon durable barrier cream
Barrier Wipe / Spray	• Alcohol-free liquid barrier film that protects • Protects intact or damaged skin from moisture, adhesive trauma and friction • Forms a breathable, transparent film on the skin	• Cavilon No Sting Barrier film • Smith and Nephew No sting Barrier Film • Brava Skin Barrier Film

SUMMARY OF KEY RECOMMENDATIONS (ADAPTED WITH PERMISSION)1:

A. Skin Protection

Perform daily hygiene routine followed by moisturizing cream and/or skin protector. Consider using an acrylate polymer and/or dimethicone based cream (longer durability). Moisturizer should be applied to regions of greater surface contact (ears, forehead, nose and malar area) with PPE.

Moisturize hands regularly, and ensure hands are clean and dry prior to donning gloves.

NOTE: Ensure that the moisturizer has been allowed to dry to form a film not affecting the seal of the PPE prior to application so as not to interfere with PPE efficacy.

B. Use the PPE appropriate to the level of care to be provided and institutional policy.

Ensure that you have been properly fitted for your PPE and that you are using that PPE when required. Follow your local protocol for applying and removing your PPE. Adjust the device to the shape of your nose/face before definitively applying PPE. Confirm that you do not feel discomfort at any specific point of contact between the skin and the device. Skin irritation can be related to the misapplication of PPE.

C. Use of Dressing Material / Interface between PPE and the Skin.

When appropriate and if it has been deemed that the use of a dressing will not disrupt the efficacy of the PPE. See Figure 1 for cutting patterns.

- Wash and dry the face, specifically in the places where the dressing material will be applied
- Cut and adjust the material to the application site. Proposed materials include thin foams with silicone. Alternatives include thin hydrocolloids and film dressings however these should be used with caution as they are occlusive and may not best manage humidity and temperature.
- The material-PPE interface should be re-evaluated on a regular basis to ensure best fit and appropriate skin management
- Apply interface to skin WITHOUT tension to avoid medical adhesive related skin injury.
- Assess for “good” fit after applying PPE, verifying the PPE seal and insuring no areas of additional pressure.

D. Pressure Relief

It is recommended that PPEs be removed and pressure areas relieved every 4 hours. This should be done in accordance with local policy and procedures.

Note: If the dressing or the PPE becomes wet or soiled it must be changed immediately.

E. Skin Cleansing and Hydration

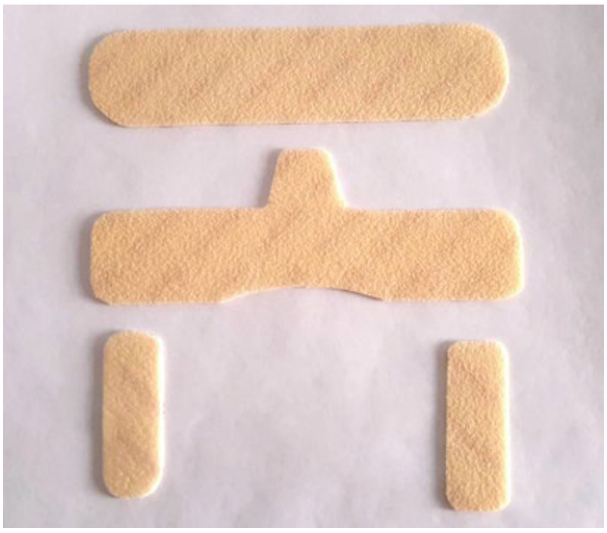
Once the PPE has been removed (as per local policies and procedures), the dressing should be removed and skin inspected.

After proper hand washing, face and neck should be thoroughly cleansed using soap and water paying special attention to areas under pressure. Do not rub these areas as this may increase tissue damage.

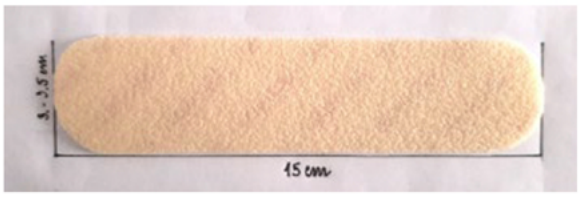
Dry the face and then apply a moisturizer to the face. If skin breakdown is present, dressings may be required. Daily skin care with hydration and protection will aid in maintaining skin integrity and wound prevention.

Note: Healthcare professionals need to optimize hydration and nutrition to ensure skin health and a balanced physiological response.

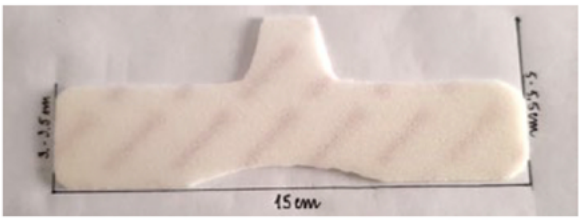
Figure 1. Courtesy of Paulo Alves: Cutting molds and adaptation to pressure areas



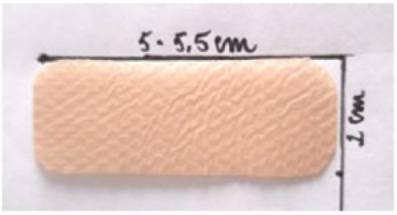
Forehead



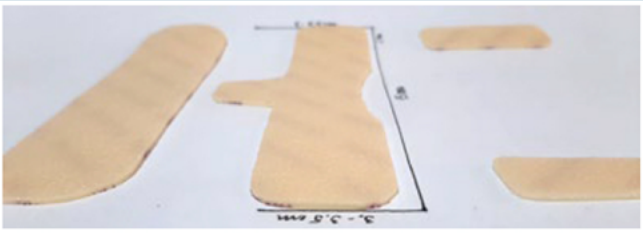
Nose and face



Ears



Thickness



PREPARED BY:

Kimberly LeBlanc PhD, RN, NSWOC, WOCC(C), IIWCC
Corey Heerschap MScCH, BScN, RN, NSWOC, WOCC(C), IIWCC, PhD (student)
Britney Butt MCISc-WH, BScN, RN, NSWOC, WOCC(C)
Julia Bresnai-Harris BN, RN, NSWOC, TVN
Dr. Lorne Wiesenfeld MDCM, FRCPC

Special thanks to Dr. Paulo Alves for his generosity in sharing educational resources for the preparation of this document.

REFERENCES:

1) Darlenski R, Tsankov N. (in press). Covid-19 pandemic and the skin – What should dermatologists know? Clinics in Dermatology. Doi: https://doi.org/10.1016/j.clindermatol.2020.03.012

2) Alves, P; Moura, A.; Vaz, A.; Ferreira, A.; Malcato, E.; Mota, F.; Afonso, G.; Ramos, P.; Dias, V.; Homem-Silva, P. (2020) PREPI | COVID19. PRevenção de lesões cutâneas causadas pelos Equipamentos de Proteção Individual (Máscaras faciais, respiradores, viseiras e óculos de proteção). Journal of Tissue Healing and Regeneration. Suplemento da edição Outubro/Março XV.

3) Kantor, J. (2020). Behavioural considerations and impact of personal protective equipment (PPE) use: Early lessons from the coronavirus 9COVID-19 outbreak. Journal of the American Academy of Dermatology. Doi: https://doi.org/10.1016/j.jaad.2020.03.013.

4) Foo CCI, Goon ATJ, Leow YH, Goh CL. (2006). Adverse skin reactions to personal protective equipment against severe acute respiratory syndrome - A descriptive study in Singapore. Contact Dermatitis, 55(5), 291–4.

5) Gene A. Skin tears, Medical Face Masks, and Coronavirus. Wound Management and Prevention. April 2020 66(4) 6-7.

6) Ontario Agency for Health Protection and Promotion (Public Health Ontario), Provincial Infectious Diseases Advisory Committee. (2014). Best Practices for Hand Hygiene in All Health Care Settings. 4th ed. Toronto, ON: Queen's Printer for Ontario.

+1 888-739-5072
WWW.NSWOC.CA
OFFICE@NSWOC.CA