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Characteristics of Convex Skin Barriers and Clinical Application

Results of an International Consensus Panel

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ABSTRACT

Regulatory bodies do not set parameters for measuring certain ostomy product characteristics. As a result, each manufacturer has a different way of measuring specific convex skin barrier characteristics that may create confusion among clinicians when selecting a product. In order to alleviate this confusion and encourage consistency in reporting product characteristics, an international meeting of clinicians with expertise in the care of persons living with an ostomy was convened. The goal of the meeting was to define and establish consistency in convex skin barrier characteristics and their clinical application of the product based on these characteristics. Twelve nurse panelists from 11 countries reviewed, discussed, and reached consensus on a group of proposed statements designed to provide standard definitions of convex skin barrier characteristics and clinically relevant application. The group reached consensus on 5 characteristics of convex skin barriers: depth, compressibility, flexibility, slope, and tension location. These statements provide a basis for quantifying the most clinically relevant characteristics of convex skin barriers and a framework for their application in clinical practice.

KEY WORDS: Compressibility, Consensus development conference, Convexity, Depth, Flexibility, Ostomy, Skin barrier, Slope, Surgical stomas, Tension location.

INTRODUCTION

Ostomy skin barriers are available in different shapes. A flat skin barrier has a level or even adhesive surface and is ideally suited for a stoma that protrudes above a flat peristomal

skin surface that is free of creases and folds. The curvature of a convex skin barrier is designed to create a secure seal for a stoma that does not protrude above the peristomal skin plane or an ostomy surrounded by peristomal skin that has creases and folds.¹ Selecting a convex skin barrier that achieves a secure seal or good fit depends on multiple components of skin barrier construction.²

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Hollister Incorporated provided funding for the meeting.

The panelists and authors received sponsorship or payment from Hollister in relation to activities of the International Clinical Expert Forum (ICEF). Kim Smitka is an employee and shareholder of Hollister Incorporated.

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DOI: 10.1097/WON.0000000000000831

Regulatory bodies do not set parameters for measuring certain ostomy product characteristics. As a result, manufacturers have adopted different means for measuring and describing specific characteristics of convex skin barriers such as depth, slope, or compressibility. Variability in the methods force clinicians to select convex skin barriers based on subjective assessment rather than objective criteria. We assert that objective and reproducible measurements for convex skin barriers are essential when comparing the performance of convex to flat skin barriers (skin barriers that do not incorporate convexity). Therefore, the goal of this publication is to define essential characteristics of convex skin barriers in order to facilitate a more objective evaluation when selecting a convex skin barrier, encourage consistency among manufactures when identifying characteristics of their convex skin barriers, and provide a basis for the quantitative clinical research needed to provide an evidence-based practice.

METHODS

Due to a lack of evidence to guide selection of ostomy skin barriers with convexity, we chose to base statements on consensus. The consensus process we selected provides a structured approach for constructing and achieving consensus around

statements.³ Specifically, the process was designed to ensure that recommendations reflect a synthesis of opinion from a diverse group of expert clinicians via a panel purposely selected from multiple geographic regions, health care settings, and serving a diverse group of patients living with an ostomy.³ Essential steps for the consensus process included identification of the goals of the consensus document and completion of a literature review to identify evidence related to these goals. Draft statements are generated from this process that are presented to a diverse panel of stakeholders with expertise in the area, and consensus is sought for each proposed statement using a formalized and anonymous process that provided equal input from all panelists while avoiding unintended bias or coercion. The expert panel comprised 12 nurses from 11 countries in Australia, Europe, North America, and the United Kingdom (Box 1). They have extensive experience in caring for adult and/or pediatric patients with ostomies; their median years of experience in ostomy care is 19.5 years (range: 8-31 years). The panelists practiced in a broad range of settings, including acute and post-acute care, community/ambulatory care, and home care. The group was led by an experienced facilitator (Mikel

Gray) with expertise in a wound, ostomy, and continence care (WOC) nursing specialty practice and in group facilitation for the purposes of building consensus.

Prior to the consensus meeting, we searched the literature in ostomy care. The literature summary was generated from an exploratory review of articles indexed in CINAHL and MEDLINE electronic databases during a 10-year period (January 2010 to December 2020). Search terms included “ostomy,” “convex,” “convexity,” and “skin barriers.” Inclusion criteria included articles written in the English language and focused on adult patients with fecal or urinary stomas. Exclusion criteria were publications in languages other than English and focused on infants or children and individual case studies.

Our review did not identify any randomized controlled trials, non-randomized comparison cohort studies, or any other study with a control or comparison group evaluating the characteristics of convex skin barriers. However, the review did identify two key references that were read in full by panelists prior to participation in the consensus process. Hoeflok and colleagues⁴ published an integrative review and summary of a consensus conference that examined features of convex skin barriers in patients living with an ostomy. They identified more than 20 terms applied to convex skin barriers and related products that are used to create or enhance convexity. The list was then narrowed down to five essential features of a convex skin barrier: depth, silhouette/profile, flexibility, tension, and construction.

Hoeflok's group⁴ conceptualized these five characteristics as overarching concepts and defined each via qualitative terms. For example, depth was not explicitly defined in their narrative; instead, it was illustrated in a figure that did not provide explicit terms for the base or apex. Depth was nevertheless divided into three categories (shallow, medium, and deep), though no quantitative cut points were identified to distinguish these categories. Similarly, the silhouette/profile of a convex skin barrier was defined as a collection of different angles or slopes categorized as conical versus smooth and shallow versus steep. The tension of a convex skin barrier was defined as the rigidity of the product; it was divided into two distinct dichotomous categories, magnitude (low vs high) and location (central vs peripheral). While Hoeflok and colleagues⁴ acknowledged prior work by Rolstad and Boarini,⁵ who recommended quantifying tension as force per square inch. They ultimately rejected this quantitative measure due to concerns about variability in the forces created when a convex skin barrier is applied to the abdomen. A fourth characteristic, flexibility, was not explicitly defined, though it was dichotomously characterized as soft versus firm in a figure that outlined relationships among convexity features. Similarly, the fifth characteristic, construction, was not explicitly defined; instead, it was also dichotomously categorized as integrated versus custom reported in the same figure.

In 2017, Hoeflok and associates⁶ convened a consensus conference to provide consensus and evidence-based guidelines focusing on patient assessment, indications, outcomes, and characteristics of convex products in ostomy care. They reached consensus on 26 statements, including four that focus on characteristics of convex skin barriers. Two of the four statements provide recommendations related to convex skin barrier flexibility, acknowledging that some convex skin barriers are firm while others are soft. A third statement noted that an ostomy belt can be used to enhance the convexity effect created by a convex skin barrier. The fourth statement asserted that the effect of convexity is enhanced if positioned close to the base of the stoma. This statement builds on the concept of tension.

BOX 1.

Consensus Panel Members

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Members of the current consensus panel concurred that these prior works performed an important function for defining features that act together to provide unique performance attributes when convex skin barriers are compared to those with a flat profile. Nevertheless, panelists also recognized that these resources do not provide the objective and quantifiable definitions needed to fully inform clinicians when using convex skin barriers in clinical practice, or for manufacturers seeking to clarify and define the features of a commercially available convex skin barrier. This consensus document expands on the previous work by Hoeflok and colleagues^{4,6} by creating objective and quantifiable definitions for fundamental characteristics that all convex skin barriers share regardless of the manufacturer.

In preparation for the meeting, panelists participated in an educational session and discussion with a design engineer (Greg Czaplowski), who described the process and technical terms used by product and design engineers during the development and manufacturing of convex skin barriers. This session focused on how engineers describe and measure various features of convex skin barriers. The purpose of this discussion and educational session was to enable panelists to better understand how convexity is incorporated into convex skin barriers and how engineers identify and measure each of these characteristics. The design engineer is employed by Hollister Incorporated.

During virtual consensus meetings, the facilitator presented draft statements to the expert panel. Prior to taking an initial

vote on each statement, the facilitator invited questions concerning clarification of the intended purpose of the statement and clarification of any terms whose meaning was not clear. Panelists voted anonymously by sending a private message to the meeting facilitator through the video communications platform. Anonymous voting was adopted to minimize unintended bias created by open voting. An initial vote was taken, and if 80% or more of panelists agreed to the statement as written, the vote was considered to have reached consensus. If consensus was not reached, the moderator led up to two rounds of discussion that were designed to revise the statement so that a consensus could be reached. Statements that did not reach consensus through this process were discarded.

CONSENSUS STATEMENTS

Twenty-seven draft statements were presented by the facilitator. Panelists reached consensus on definitions of five fundamental convex skin barrier characteristics and 18 clinical application statements. The five characteristics were depth, compressibility, flexibility, tension location, and slope. These characteristics build on characteristics identified by Hoeflok and colleagues⁶ and they provided quantifiable and standardized definitions not provided in this earlier work.

Depth

Box 2 presents the consensus statements, highlights of the panel discussion, illustrations, and clinical photographs

BOX 2.

Depth

Definition: The depth of the convex skin barrier is defined as the measurement from the apex of the dome to the base.

Discussion: As illustrated in Figure 1, the panel defined depth using two key points of the skin barrier, the base and the apex of the dome. These points can be readily identified in any convex skin barrier and can enable quantitative measurement of the magnitude of convexity from the base lying on the peristomal skin to the highest point of the barrier. Given the existence of these reference points, manufacturers can easily quantify the depth of a given convex barrier in centimeters or millimeters and quantifiable cut points can be defined allowing accurate and reproducible labeling of a particular product depth as light or shallow, moderate or deep.

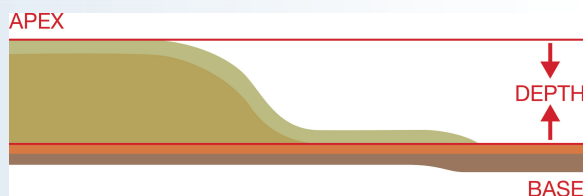


Figure 1. Depth.

Clinical Application Statement 1: The depth of creases and folds around the stoma should be considered when determining the depth of the convex barrier.

Discussion: In clinical practice, assessment of the abdominal creases and folds should be considered in determining the product depth needed. Additional product depth may be required to provide a good seal with the ostomy skin barrier, as the depth of abdominal creases and folds increase as illustrated in Figures 2-4.

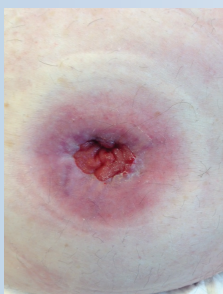


Figure 2. Flush stoma with shallow creases at 3 and 9 o'clock.

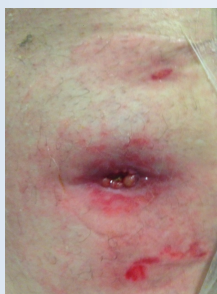


Figure 3. Retracted stoma with moderate creases at 3 and 9 o'clock.



Figure 4. Protruded stoma within a deep fold.

Clinical Application Statement 2: The use of a belt augments the efficiency of the convex barrier.

Discussion: A belt can enhance the effect of the convexity by providing more barrier depth. The belt is worn snug to the body to apply pressure to the pouching system, increasing the depth of the convexity and enhancing the seal. Figure 5 shows how the use of a belt will help enhance the effect of convexity for this patient with a stoma that needs additional pressure on the pouching system to protrude the stoma. It is important that the belt fit snug but not too tight, as this can damage the skin.¹ Figure 6 shows a pressure injury that resulted from wearing a belt too tightly.

(continues)

BOX 2.**Depth (Continued)**

Figure 5. The use of a belt will help enhance the effect of convexity for this patient with a stoma that has minimal protrusion and needs additional pressure on the pouching system for adequate protrusion.



Figure 6. A belt worn too tight can create a pressure injury.

Clinical Application Statement 3: The compressibility of the convex dome influences the depth of convexity.

Discussion: The more compressible the skin barrier is, the less influence the depth of the barrier provides. This can be easily seen when comparing a soft convex barrier versus a firm convex barrier. Understanding how these two characteristics impact the convex barrier's ability to provide the right amount of depth is important to understanding how to achieve a good seal around the stoma with the right barrier.

Clinical Application Statement 4: The depth of the convex barrier should be limited to the least amount needed to obtain a seal.

Discussion: The use of soft and firm convex barriers depends on each individual's stoma and abdominal topography and tone. A proper clinical assessment of these patient characteristics will help determine the right amount of depth needed to achieve a good seal and prevent convex skin barriers from becoming problematic. It is important to choose the least amount of depth in a convex barrier while still being able to obtain a good seal. Figure 7 illustrates what can happen if a convex skin barrier with the incorrect depth is chosen for the patient.



Figure 7. Potential skin issues that may occur around the stoma if the depth of the convex skin barrier is too deep.

related to depth of the convex skin barrier. The definition and statements around depth will ensure that all clinicians have a clear understanding and consistency/standardization of where depth should be measured on a convex barrier, regardless of manufacturer. Although there is no consistency in categorizing depth as light, moderate, or deep, defined definitions will ensure that there is consistency in depth measurement.

Compressibility

Consensus statements, discussion, illustrations, and clinical photographs related to compressibility of the convex skin barrier are presented in Box 3. Panelists engaged in extensive discussion on the best way to define compressibility and provide proper clinical application guidelines for this characteristic. Panelists observed that most clinicians tend to classify convex skin barriers as soft or firm without considering the concept of compressibility as a barrier characteristic. Providing a standardized and quantifiable definition of compressibility allows a more objective and reproducible assessment of this

essential component of convex skin barriers. This discussion also led to recognition that compressibility influences depth; this important relationship was incorporated into consensus statements related to clinical application of convex skin barriers.

Flexibility

Box 4 presents the consensus statements, highlights of the panel discussion, illustrations, and clinical photographs related to flexibility of the convex skin barrier. Panelists were more critical of previously established definitions of this convexity characteristic than any other. Previous consensus publications categorized this convex skin barrier characteristic using the words firm and soft, among others.^{4,6} In contrast, panelists deemed the terms firm and soft to be more closely associated with compressibility. While the draft statement for flexibility incorporated the terms soft and firm, the final statement focused on how easily the convex skin barrier can bend. This definition was adopted because it provides a basis

BOX 3.**Compressibility**

Definition: Compressibility is the capacity of the convex dome to be displaced or flattened.

Discussion: As illustrated in Figure 8, the panel defined compressibility as the capacity of the convex dome to be displaced or flattened. Pressing on the back of the convex skin barrier is an easy way to determine how much force is required to displace or flatten the convex dome. Less force is needed to compress a soft convex skin barrier, making it easily compressible. More force is required to compress a firm convex skin barrier, making it less compressible. Understanding the force needed to compress the barrier will be a key measurement point to help classify convex skin barriers as soft or firm.

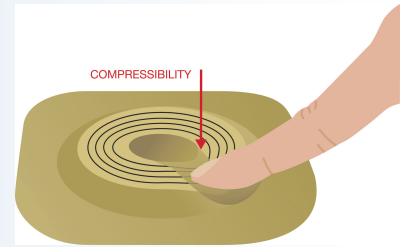


Figure 8. Compressibility.

Clinical Application Statement 1: An easily compressible convex barrier should be considered when there is postoperative edema and convexity is required to achieve a good seal.

Clinical Application Statement 2: An easily compressible convex barrier should be considered when convexity is required in patients with a firm abdomen.

Clinical Application Statement 3: An easily compressible convex barrier is indicated when the barrier needs to conform securely to the abdominal contours.

Discussion: Panelists reached agreement to describe a firm convex barrier as less compressible and a soft convex skin barrier as easily compressible. They reached consensus on three clinical application statements that provide guidance on the use of an easily compressible skin barrier. What clinicians may consider to be a “soft” convex barrier has more compressibility and therefore exerts less pressure around the stoma or a peristomal area. This may be important in the immediate postoperative phase, when there is a great deal of postoperative edema causing the abdomen to be firm, as illustrated in Figure 9, when the abdominal tone is firm, as illustrated in Figure 10, and when the convex skin barrier needs to conform to challenging abdominal contours, as illustrated in Figure 11.



Figure 9. An easily compressible convex skin barrier may help achieve a correct fit with less pressure at the base of the stoma for the patient with postoperative edema and a firm abdomen.



Figure 10. A patient with firm abdominal tone who requires convexity may benefit from an easily compressible convex barrier to help prevent pressure-related injury.



Figure 11. A patient with a deep crease to the left of the stoma. An easily compressible convex skin barrier may be able to conform securely to this challenging abdominal contour.

Clinical Application Statement 4: A less compressible convex barrier is indicated when the barrier needs to flatten the abdomen and/or assist with stoma protrusion.

Clinical Application Statement 5: A less compressible skin barrier should be considered when convexity is required in patients with a soft abdomen.

Discussion: Integrated firm convex products are thought by many ostomy and stoma care nurses to provide support to the abdomen and stabilize abdominal contours. A firm convex barrier has less compressibility and therefore puts more pressure on the peristomal skin, providing support to the topography and tone of the abdominal area surrounding the stoma, allowing the skin barrier to flatten the peristomal skin and help “push” the stoma upwards, giving it a higher profile as would be needed for the stoma in Figure 12. In patients with soft abdominal tone who require convexity, as illustrated by Figure 13, a less compressible convex skin barrier should be considered to provide adequate support around the stoma.



Figure 12. A less compressible convex barrier could put more pressure on the peristomal skin, providing the support needed to flatten the creases around the stoma.

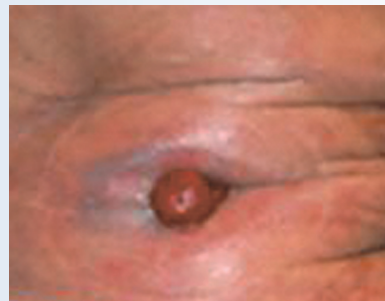


Figure 13. A patient with soft abdominal tone who requires convexity and may require a less compressible convex skin barrier to provide adequate support around the stoma.

(continues)

BOX 3.**Compressibility (Continued)**

Clinical Application Statement 6: Peristomal skin health should be considered when selecting the compressibility of the convex barrier when convexity is indicated.

Clinical Application Statement 7: When using convexity, the most compressible skin barrier should be considered to avoid potential peristomal skin complications.

Discussion: These two clinical application statements address the assessment of the peristomal skin and prevention of peristomal skin complications. Panelists felt that this was important, given the high rate of peristomal skin complications noted in the literature. Careful consideration of how compressible a convex skin barrier is should be taken into account to maintain peristomal skin health.

for consistency among manufacturers when describing the bend force of a barrier, defined as the amount of bend within a length of material. In the case of an ostomy skin barrier, when a given force is applied at a particular point⁷ demonstrating its flexibility.

Panelists rejected a draft statement on flexibility when considering one- and two-piece pouching systems, noting variability in this characteristic between common ostomy products

that is not dependent on the pouching system being one- or two-piece. Additional discussion focused on the advantages and disadvantages of tape borders to enhance flexibility and conform to abdominal contours, including those that are integrated into the product and those added by the user to enhance security. The panelists concluded that the magnitude of influence of a tape border was not clinically relevant to the flexibility of the convex skin barrier and voted to remove a

BOX 4.**Flexibility**

Definition: Flexibility is how easily the convex skin barrier can bend.

Discussion: As illustrated in Figure 14, flexibility is how easily the convex skin barrier can bend. Flexibility of a convex skin barrier can be demonstrated by using a thumb and index finger to flex the barrier into a half-moon shape. Understanding bend force is key to understanding how flexible a convex skin barrier is. The flexibility of the convex skin barrier is an important feature when a skin barrier needs to bend in order to conform to abdominal contours.

In the first clinical application statement, panelists rejected the concept of flexibility and compressibility used together as a single characteristic. Panelists rejected the need for a statement about firm convex skin barriers and the flaccid abdomen or with suboptimal stoma protrusion, noting that it would be redundant with the compressibility clinical application statements. After discussion that flexibility is a feature that is important when a skin barrier needs to conform to abdominal contours, a revised statement passed on the first attempt.

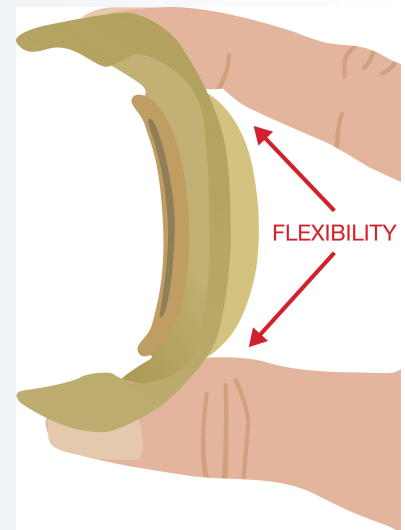


Figure 14. Flexibility.

Clinical Application Statement 1: A more flexible convex skin barrier should be considered when convexity is needed and the barrier needs to conform securely to abdominal contours.

Discussion: Abdominal contours around the stoma vary by patient and can be rounded, bulging, or creased. Sometimes stomas may even be located in a deep fold. Figure 15 features a patient with multiple creases around the stoma. Achieving a secure seal in all of these clinical situations depends on the convex skin barrier being flexible enough to conform securely to challenging abdominal contours.



Figure 15. A flexible convex skin barrier is indicated for this patient to conform securely to the multiple creases around the stoma due to loose skin.

statement focused on the effect of a tape border on convex skin barrier flexibility.

Tension Location

Box 5 presents the consensus statements for tension location, along with highlights from the panel discussion, illustrations, and clinical photographs. Initially, panelists viewed tension in terms of pressure but were reluctant to use this term because of the negative connotation and association with the risk of skin damage. There was considerable discussion around “tension” and “pressure” and the panelists solicited commentary from the ostomy design engineer (G.C.), who highlighted the difference between the two terms, clarifying that pressure and tension are

not identical concepts. Based on this clarification, panelists agreed that “tension” was a more clinically relevant term and reached consensus on a definition for tension location.

Slope

Consensus statements, discussion, illustrations, and clinical photographs for slope of the convex skin barrier are presented in Box 6. The magnitude of steepness, which is also referred to as slope, was recognized as a fundamental characteristic of a convex skin barrier. Subsequent discussion centered on where slope would be measured on a barrier. Panelists again consulted the design engineer to clarify how the slope of a convex skin barrier is measured. The engineer stated that the slope

BOX 5.

Tension Location

Definition: Tension location is the position in which the convex dome exerts downward and outward forces on the peristomal topography.

Discussion: As illustrated by Figure 16, tension location is the position in which the convex dome exerts downward and outward forces on the peristomal topography. Initially, panelists were thinking of tension in terms of pressure but were reluctant to use the word “pressure” because of the negative connotation and association with the risk of skin damage. There was considerable discussion around “tension” and “pressure” and the panelists solicited commentary from the Hollister design engineer to help understand the difference between the two terms. The design engineer was able to point out that pressure and tension are not identical terms. After the terms were clearly defined, the panelists agreed that tension was a more clinically relevant term. The panelists went on to reach consensus on the definition for tension location.

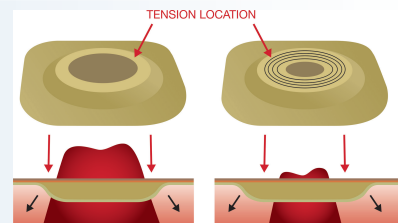


Figure 16. Tension location.

Clinical Application Statement 1: A convex barrier in which the greatest tension is located as close as possible to the stoma should be considered if protrusion of the stoma is needed.

Discussion: The first clinical application statement addresses the proper positioning of tension location for a stoma that is flush to the skin or retracted below the skin. Positioning the apex, or curvature of convexity, on the convex skin barrier as close as possible to a flush or retracted stoma can help prevent leakage of stoma output under the barrier. A precut convex skin barrier may be able to provide the greatest tension directly around the stoma for a consistent, reliable seal for a stoma that is flush to the skin, as illustrated in Figure 17.



Figure 17. Using a precut convex skin barrier may provide the greatest tension directly around this flush stoma for a consistent, reliable seal.

Clinical Application Statement 2: A convex barrier in which the greatest tension is located away from the stoma should be considered if the peristomal skin needs to be flattened.

Discussion: The second clinical application statement addresses proper positioning of tension location when creases and folds may be present around the stoma. Positioning the apex, or the curvature of convexity, on a convex barrier further out from the stoma will help flatten creases and folds that would otherwise interfere with getting a good seal. A cut-to-fit skin barrier, one size up from what the measuring guide indicates, can help provide the greatest tension away from the stoma to help flatten the peristomal skin for a good seal, as illustrated in Figure 18.



Figure 18. A cut-to-fit skin barrier can help provide the greatest tension away from the stoma to help flatten the peristomal skin around this stoma for a good seal.

(continues)

BOX 5.**Tension Location (Continued)**

Clinical Application Statement 3: Select the most appropriate tension location, taking into consideration the location of the opening of the stoma and/or pH, volume, and consistency of the output.^b

Discussion: The correct positioning of tension location will enhance a product's ability to provide the right fit and create an effective seal between the skin barrier and the peristomal skin. It is important to consider the location of the opening of the stoma and/or pH, volume, and consistency of the output in determining where to position the greatest tension location. Figure 19 shows a stoma with an opening that is off center and has a loose consistency of output. Positioning the tension location as close as possible to the stoma may help create an effective seal for this patient by protruding the off-center opening above the skin and preventing the loose output from going under the skin barrier.



Figure 19. Positioning the tension location as close as possible to the stoma may help create an effective seal for the patient whose stoma is off center and has a loose consistency of output.

^an = 11/12 panelists.

^bn = 10/12 panelists.

BOX 6.**Slope**

Definition: The slope is the angle from the base of the convex skin barrier to the apex of the dome.

Discussion: As illustrated in Figure 20, another important property of convexity refers to the amount of steepness, which is also labeled as the slope of convex skin barriers. In clinical practice, various types of convex products with a different slope are available. Understanding that the angle of the slope is measured from the base of the convex skin barrier to the apex of the dome can help clinicians determine if a slope is shallow or steep. This understanding can then be aligned with clinical assessment of the patient's abdominal topography to help make a well-considered choice regarding the type of slope incorporated in the skin barrier.

Selection of the right slope is dependent on the condition of the peristomal skin, such as the prevalence of creases, and the position of the stoma, which can be elevated or retracted. In fact, the skin barrier should form a mirror image of the peristomal plane to fit as adequately as possible at the level of the peristomal skin and around the stoma.⁵

Clinical Application Statement 1: Consider a convex skin barrier with a less steep slope and wider plateau to flatten the peristomal skin.

Discussion: If creases and folds are found around the stoma, as illustrated in Figure 21, they can compromise the seal. A convex barrier can help flatten the creases.¹ Achieving a good seal around the stoma will prevent leakage and help maintain skin health.

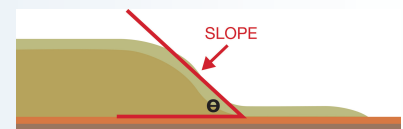


Figure 20. Slope.



Figure 21. Creases and folds around the stoma can compromise the seal. A convex skin barrier with a less steep slope and wider plateau can help flatten the peristomal skin to achieve a good seal.

^an = 10/12 panelists.

is quantified as the angle from the base of the convex skin barrier to the apex of the dome. Panelists strongly concurred that clarification and quantification of this measurement will support clinical application of convex skin barrier selection. Panelists also asserted belief that this quantification will assist manufacturers in providing descriptions for tension location among these products.

DISCUSSION

The statements resulting from this international panel of clinical experts in ostomy care extend previous work in this area by defining fundamental characteristics of convex skin barriers and guidance for their application in product selection. Specifically, these statements provide a basis for five objectives and easily identifiable characteristics (depth, compressibility, flexibility, slope, and tension location) that we believe every clinician should consider when selecting the best convex skin barrier for a patient's individual needs. We also assert that these statements provide a basis for standardized and quantifiable descriptions of existing and future convex skin barriers as light or shallow, moderate or deep. It is important to understand the force needed to compress the barriers and clearly define those characteristics that render the product as suitable for specific clinical applications such as a recessed stoma or creases in the peristomal skin surface. This will be a key measurement point to help classify convex skin barriers as soft or firm. If clinicians better understand bend force, they will be able to identify how flexible a convex skin barrier is. Understanding how the slope of a convex skin barrier is measured can result in choosing the convex skin barrier that will form a "mirror" image of the peristomal plane and fit around the stoma.⁵

For example, by identifying quantifiable reference points for depth, clinicians and manufacturers can work together to create meaningful cut points needed to label a convex skin barrier as light or shallow, moderate or deep. Similarly, quantifying and improving our understanding of bend forces and the force needed to compress the barrier will enable classification of convex skin barriers as soft or firm. It is important to understand the position of tension location because it will impact where the convex dome exerts downward and outward forces on the peristomal skin. Position of tension will assist clinicians in choosing a convex skin barrier that will provide the greatest tension location where it is needed most to achieve a good seal. For example, tension location close to the stoma will support stoma protrusion and tension location away from the stoma will flatten creases and folds in the abdominal topography.

In addition to its influence on clinical practice, we are confident that this work can form a basis for standardizing nomenclature and ensure consistency when comparing different ostomy skin barriers with a convex construction, particularly relevant in the research setting. Standard nomenclature can facilitate the collection and reporting of global observations in practice and can influence the establishment of common outcome measures. Students learning about ostomy management will benefit from refined search terms and key words. Common language among ostomy care providers will enhance the development of research

questions and improved uptake following the dissemination of findings. Further refinement of objective criteria used to match pouching products to a patient's abdominal contours is needed. The authors acknowledge that establishing terms and definitions is an early step in the standardization process for product features.

CONCLUSION

Selecting the right convex skin barrier for a person with an ostomy primarily relies on clinical experience and historical tradition. While prior work has been done in recognizing the need for identifying fundamental characteristics of convex skin barriers, existing definitions do not provide sufficient detail or a quantifiable measure to enable clinicians and manufacturers to investigate and compare features across products or between various manufacturers. The work conducted by this international panel will provide both expert and generalist clinicians with a framework that will enhance selection criteria of convex ostomy skin barrier products. In addition, this framework will provide a basis for researchers to design clinical trials that are urgently needed to evaluate various features of convex skin barriers and ensure that patients maintain healthy skin by achieving the right fit with a convex skin barrier.

ACKNOWLEDGMENTS

The authors acknowledge the members of the Hollister International Clinical Expert Forum for their participation (Box 1). Donna Simcoe, MS, MBA, CMPP, of Simcoe Consultants, Inc, who was funded by Hollister Incorporated, provided guidance about the overall publication process and gave input on the draft manuscript written by the authors. Greg Czaplewski, senior product design engineer with Hollister Incorporated, provided education about how Hollister convex product characteristics are measured in the lab and was available during the meeting to answer questions related to product design.

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