2006 Update: **Principles and Techniques in the Use of Convexity**

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Purpose

The purpose of this paper is to discuss the concept of skin safety in the ostomy patient and risk reduction for peristomal skin compromise. It describes peristomal skin as tissue at perpetual risk for compromise and discusses the role of convexity as a prevention and management strategy.

Background

Skin safety is a concept used in risk assessment and prevention of pressure ulcers. It is applicable to ostomy care as well because two critical goals in skin safety are to provide safe care and to reduce the risk of complications.

The peristomal skin is at perpetual risk for compromise from chemical and mechanical injury as well as fungal infection. Less common etiologies for peristomal skin compromise include bacterial infection, disease-related lesions and allergic contact dermatitis. Because of the high potential for morbidity in these patients, risk reduction strategies include ongoing routine assessment and early interventions throughout the lifespan.

For example, the patient who reports decreased wear time or peristomal skin compromise should be evaluated and the need for convexity considered. In the early postoperative period, a retraction at the base of the stoma merits immediate preventive consideration which may include filling and flattening the irregularity with a convex product. This action deters the likelihood of a leaking pouch and subsequent peristomal skin compromise. Not providing these preventive services results in pouch leakage, odor, pain, skin compromise and decreased self-esteem. The costs related to these problems are seen in higher product usage, increased visits to health care providers and decreased productivity/activity levels.

Healthy peristomal skin is achieved, in great part, by a pouching system that provides a sustained, predictable wear time[1]. Wear times are impacted by many factors such as humidity, stoma construction and location, volume and type of discharge, skin condition, technique, and type of skin barrier used. In general, twice weekly pouch changes are considered within normal for the adult. In the younger population, 24 to 48 hours may be acceptable in the preterm infant and neonate but should approach two to four days as the child gets bigger.

A well-sited and constructed stoma is key to the maintenance of intact skin and is directly related to the adherence of a pouching system. A well-sited stoma is located away from boney prominences, creases and scars. It is placed through the rectus muscle and at the superior aspect of the unfraumbilical bulge. Ideally, there is a 3-inch peristomal skin surface that is flat with intact skin surrounding the site for a new stoma. This placement allows for anatomic support and unimpeded application of a pouching system. The stoma is constructed with approximately 2.5 cm protrusion with the opening at the apex.

Less than ideal circumstances result in stomas that do not meet these specifications. The pouching system must provide adaptations to accommodate for these problems and achieve the goals of sustained, predictable wear time. Additionally, even with the ideal stoma, individualized circumstances (e.g., obesity) may adversely impact wear time and peristomal skin integrity.

Indications for Use

Stoma Characteristics

Convexity is used to manage irregularities of the stoma. When the stoma is flush to the skin, retracts below the skin, or telescopes, convexity should be considered. The shape and support from convexity attempts to improve stoma protrusion with gentle pressure at the peristomal skin surface.

Peristomal Skin Characteristics

The peristomal skin surface should be observed when the patient is sitting, standing, laying and bending forward. This will reveal areas of retraction or protrusion. The peristomal skin surface has been classified as flat, retracted or protruding.

Surface features of the peristomal skin are frequently changing as a result of normal activity. Irregularities in the peristomal topography, such as retraction, hernia or scarring are problematic. However, they may be accentuated by movement-induced skin changes. Pouching systems selected for these situations must adapt to the irregularities and provide a mirror image of the peristomal skin. Convexity attempts to correct for these irregularities by preventing the skin from creasing.

Abdominal Muscle Tone

Abdominal muscle tone is the anatomic support in the peristomal field. It may be firm, soft or flaccid. The pouching system selected acts as a counterforce to the changes that occur in this area. A firm abdomen usually requires no additional support. However, the soft and flaccid abdomen will require a firm level of support to stabilize the pouching system (Fig. 1, 2).

Fig.1 Gently palpating soft abdomen.

Convexity provides varying degrees of support. When the convexity is soft, it is a filling agent with little support. Soft convexity is effective with the firm abdomen to fill a retraction proximal to the base of the stoma. Conversely, when abdominal support is lacking, the abdomen is soft or flaccid. These situations will generally require a pouching system with firm support.

Fig. 2 Soft abdomen with oval, flush stoma.

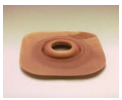
Convexity Demystified

Convex is a shape with an outward curving. Adding convexity to a pouching system will provide shape and a degree of support at the base of the stoma. The goals of adding convexity to a pouching system should be to: maintain intact peristomal skin, increase comfort and satisfaction for the patient, increase wear time in comparison to non-convex pouching systems, and provide an effective management approach[2].

The convex shape is applied toward the abdomen to fill a defect or flatten a space and thus provide a continuous contact between the adhesive surface of the pouching system and the skin. The convex shape provides a mirror image to the abdomen surface.

Convex products are firm or soft with shallow, moderate or deep surfaces. Firm convexity usually has an integrated ring that provides resistance to deforming. This helps add support and gentle pressure. The soft convex surface provides the form but is flexible, moving more easily with changes in the abdominal surface. Shallow convexity is less than ⅛ inch deep, while moderate is less than ¼ inch and deep convexity greater than ¼ inch[1].

Convexity can be achieved in many ways. (Refer to Table and case studies.) One of the important factors to consider is ease-of-use for the user. Some systems require more assembly and dexterity than others.

Convexity Products	Description	Comments
Pre-Sized Convex Barrier 	Part of a one- or two-piece disposable pouching system. The convex shape is integrated. Openings are round.	✔ Provides firm support. ✔ If the stoma is not round, need to protect exposed skin. ✔ Easy to use.
Cut-to-Fit Convex Barrier 	Part of a one- or two-piece disposable pouching system. The convex shape is integrated. Skin barrier surface may be cut or molded to shape of stoma.	✔ Provides firm support ✔ Useful for oval stomas or those with edema postop. ✔ Requires some dexterity.
Skin Barrier Rings - Convex 	Extended wear barrier rings with a convex shape. Tapers to a thin edge. Adhesive on both sides.	✔ Provides soft convexity if added to a flexible pouching system. ✔ Increases depth of convexity when added to a system with integrated convexity. ✔ Can be used to create oval convexity.
Skin Barrier Rings - Flat 	Extended wear or standard wear skin barrier rings with a flat shape. Barrier is same thickness from center to edge. Adhesive on both sides.	✔ Provides minimal convexity when added to a pouching system. ✔ Several rings may be stacked and added to back of a pouching system to create more depth. ✔ Can be used to create oval opening.
Skin Barrier Strips 	Extended wear barrier strips. Triangular shape. Adhesive on both sides.	✔ Provides soft convexity. ✔ Different than paste which is a filling agent. Paste does not maintain a shape.
Convex Inserts	Pre-sized plastic inserts that are snapped into a flat, cut-to-fit skin barrier of a two-piece pouching system.	✔ May be dificult to use with manual dexterity issues. ✔ Provides shallow convexity.
Reusable Faceplates	Faceplate is made of plastic, rubber or metal. Is cleaned and reused.	✔ Provides firm convexity. ✔ System requires assembly and may be difficult to use. ✔ May require addition of a barrier for skin protection.
Ostomy Belts and Binders	Accessory items	✔ Provides additional support to pouching system. ✔ May enhance the effect of convexity by providing support to the skin. ✔ If used incorrectly, can decrease wear time or cause injuries such as laceration or pressure.

Precautions

During the immediate postoperative period, clinicians may hesitate to use a firm or rigid convex pouching system. The concern exists because excessive pressure on the abdomen may result in a mucocutaneous separation. Additionally, a pouch aperture placed too close to the stoma with firm convexity may lead to stomal ischemia if the stoma begins to swell. However, the need to prevent leakage should be weighed against these potential risks and a conservative approach to convexity may be used. Soft convexity or shallow convexity may provide the limited filling and support needed to secure the pouching system.

The parastomal hernia with retracted peristomal skin may benefit from the use of convexity. However, there is risk in using a firm convex surface with a hernia. In order to secure the pouching system and prolong wear time, a soft or shallow convex product may provide the necessary shape to fill the retraction.

Erythema of the peristomal skin under the convex portion of a pouching system should be evaluated for pressure etiology. Decreasing convexity depth or eliminating the use of a convex product should be considered, if excessive pressure is suspected. If an ostomy belt is being used, the clinician should evaluate if the belt is being used correctly since stomal laceration, pouch dislodgement or undue pressure may result.

Conclusion

Predictable, sustained wear time for an ostomy pouching system represents best practice in ostomy care. By providing a secure seal for a predictable period of time, leakage is minimized while the peristomal skin is protected from chemical, mechanical and, quite possibly, fungal infections. The use of convexity as a prevention and management strategy can be an effective risk reduction approach.

Convexity options have now been expanded to include soft convexity and integrated convex skin barriers. These options increase skin safety and ease of use for the patient.

Understanding the relationship between the characteristics of the stoma, abdominal muscle tone and peristomal skin surface will direct critical decision making when selecting convexity. Stomas change, as do abdominal contours and muscle tone. Safe care of the ostomy patient throughout the lifespan requires ongoing, routine assessment to decrease morbidity associated with peristomal skin compromise.

References

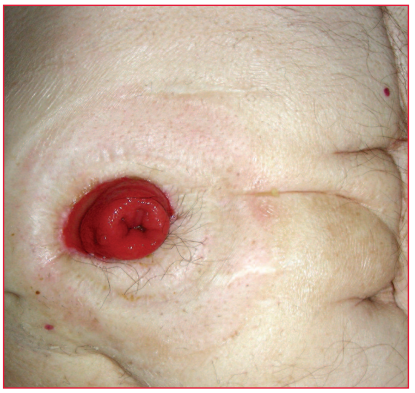
1. Rolstad BS, Boarini JH. Principles and Techniques in the Use of Convexity. *Ostomy/Wound Management,* 42(1), January/February, 1996.
2. Wound Ostomy and Continence Nurses Society. Convex Pouching Systems: A Fact Sheet for Clinicians, 2003.

Case 1 #1
Patient in supine position. Soft, flat peristomal skin surface. Stoma minimally protruding.

Case 1 #2
Note retraction at base of stoma and creases at 3 and 9 o'clock that becomes visible when patient is sitting.
Firm abdomen.

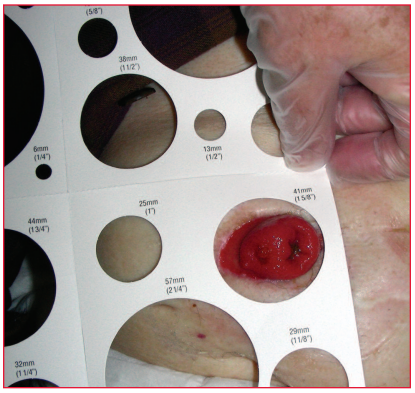
Case 1 #3
Application of soft, convex skin barrier to the flexible pouching system.

Case 1 #4
Soft convexity with one-piece pouching system to provide shallow filling of retraction, yet very little support.

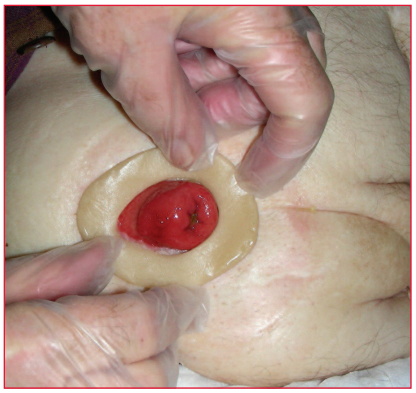


Case 2 #1
Complex abdomen with patient reclining on exam table. Protruding stoma with shallow retraction in the peristomal skin surface, soft abdomen.

Case 2 #2
Patient sitting. Note stoma protrusion, moderate retraction, soft abdomen.



Case 2 #3
Fitting the oval stoma, moderate retraction, soft abdomen with convexity.



Case 2 #4
Application of the moldable skin barrier ring to build convexity. An integrated one-piece pouching system was then applied.

Case 2 #5
Trace and cut oval shape in an integrated, cut-to-fit convex skin barrier. Apply to skin.

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