



**WOCN**<sup>®</sup> Wound, Ostomy, and  
Continence Nurses Society<sup>®</sup>

# **PEDIATRIC OSTOMY COMPLICATIONS**

BEST PRACTICE FOR CLINICIANS



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## **Acknowledgments**

Pediatric Ostomy Complications: Best Practice for Clinicians

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## Introduction and Purpose

Pediatric ostomy care poses many unique challenges to parents, caregivers, and wound, ostomy and continence (WOC) nurses who do not have regular contact with the pediatric ostomy population. This document was originally developed by the Wound, Ostomy and Continence Nurses Society's (WOCN®) Clinical Practice Pediatric Subcommittee as a trouble-shooting guide to address common clinical issues encountered when caring for an infant or child with an ostomy (WOCN, 2008).

The purpose of this updated document is to facilitate the identification and treatment of common stomal, peristomal, ostomy-related, and pouching complications to enhance the WOC nurse's ability to provide competent care for infants and children with ostomies that includes parental and caregiver involvement. This document provides a definition and description of several common pediatric ostomy complications along with suggestions for interventions and treatment. Please see Appendix A (Figures 1-20) for images of complications (WOCN, 2008).

<b>Stomal Complications</b>		
<b>Complication</b>	<b>Definition/Description</b>	<b>Intervention/Treatment</b>
Stomal Necrosis	<ul style="list-style-type: none"> <li>• Necrosis is death of stomal tissue due to impaired blood flow that typically occurs within 24 hours of ostomy surgery resulting in a dark, necrotic stoma (Butler, 2009; WOCN, 2014):</li> <li>The stoma appears maroon to black and is typically soft and flabby to palpation (Butler, 2009), or it might be hard and dry (Jordan &amp; Burns, 2013; WOCN, 2014).</li> <li>Causes of stomal necrosis include varied factors such as constricting sutures, excessive mesenteric tension, emboli, hypotension/hypovolemia, excessive edema, or pressure from a skin barrier/wafer that is too tight (Butler, 2009; Jordan &amp; Burns, 2013; WOCN, 2014).</li> </ul>	<ul style="list-style-type: none"> <li>• Assess the color of the stoma and mucosal appearance every 8 hours for the first 72 hours after surgery. Notify the surgeon if color is not red/pink (WOCN, 2014).</li> <li>• The extent of necrosis can be assessed by gently passing a small, well-lubricated glass tube into the stoma, and visualizing the lumen using a penlight (Butler, 2009; WOCN, 2010). Consider visualizing the lumen of the stoma to identify the extent of necrosis in a school age or older child. Would use extreme caution in a neonate or infant.</li> <li>If the necrosis is below the fascial level, notify the surgeon immediately (WOCN, 2010).</li> <li>If the necrosis is superficial (above the fascial level), notify the surgeon. Sloughing of the necrotic tissue may reveal pink, healthy tissue that can be managed with conservative, local care (Butler, 2009; WOCN, 2010).</li> <li>• Size/resize the pouching system to prevent constriction of the stoma and ensure a proper fit as nonviable tissue sloughs (Butler, 2009; WOCN, 2014).</li> <li>• For patients with a fecal ostomy, change the diet to low-residue/low-fiber foods (see Appendix B) to facilitate passage of the stool (Butler, 2009).</li> <li>• Monitor the stoma frequently for edema and stenosis (WOCN, 2014).</li> <li>• Protect the peristomal skin and control odor (WOCN, 2010).</li> <li>• Manage hypotension/hypovolemia (WOCN, 2014).</li> </ul>

## Stomal Complications

Complication	Definition/Description	Intervention/Treatment
Stomal Stenosis	<ul style="list-style-type: none"> <li>• Stenosis is a narrowing or contracting of the stomal opening that may occur at the skin or fascial level (WOCN, 2014). It is considered an early complication (Butler, 2009), but it can also be a late stomal complication (Husain &amp; Cataldo, 2008).</li> <li>• The patient will have reduction or elimination of output depending on the type of ostomy:               <ul style="list-style-type: none"> <li>o Fecal diversion: diarrhea, cramping pain, excessive and loud flatus, explosive passage of stool, and narrow caliber of stool (Jordan &amp; Burns, 2013; WOCN, 2014).</li> <li>o Urinary diversion: decreased urine output, flank pain, high residuals of urine in the conduit (e.g., urine passing in a projectile fashion or in large amounts if catheterized), or recurrent urinary tract infections (Black, 2009; Jordan &amp; Burns, 2013; WOCN, 2014).</li> </ul> </li> <li>• Risk factors for stenosis include scar tissue around the base of the stoma at the skin or fascial level (WOCN, 2010) as a result of multiple factors:               <ul style="list-style-type: none"> <li>o Mucocutaneous separation (Black, 2009; WOCN, 2010).</li> <li>o Epithelial hyperplasia (Black, 2009; Butler, 2009).</li> <li>o Recurrent disease such as Crohn's or cancer (WOCN, 2010, 2014).</li> <li>o Inadequate suturing of the fascial layer or excision of the skin during formation of the stoma (Husain &amp; Cataldo, 2008; WOCN, 2010, 2014).</li> <li>o Ischemia, necrosis, infection, or retraction of the stoma (Husain &amp; Cataldo, 2008; WOCN, 2010).</li> <li>o Poor maturation of the stoma (Black, 2009).</li> <li>o Alkaline encrustation in urinary stomas (WOCN, 2014).</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• First, rule out recurrent disease (Bafford &amp; Irani, 2013).</li> <li>• Maintain a secure pouch seal to prevent trauma to the stoma and peristomal skin breakdown.</li> <li>• For fecal stomas, change the diet to low-residue/low-fiber foods (see Appendix B), increase fluid intake, and consider stool softeners (Butler, 2009; Jordan &amp; Burns, 2013; WOCN, 2010).</li> <li>• For urinary diversions, the urine should be maintained in an acid state unless otherwise indicated. Examples of acid foods are: most meats, breads and cereals, cheese, corn, cranberries, eggs, macaroni, nuts, pasta, prunes, fish, and poultry (United Ostomy Associations of America, 2011).</li> <li>• Promptly treat hyperplasia; benign lesions may be cauterized with silver nitrate (Butler, 2009).</li> <li>• Avoid routine dilation of the stoma (WOCN, 2010, 2014).               <ul style="list-style-type: none"> <li>o Dilation is controversial due to concerns that tissue trauma from dilation can promote fibrosis and strictures (Bafford &amp; Irani, 2013).</li> <li>o There is insufficient evidence to support dilation of the stoma (WOCN, 2010).</li> </ul> </li> <li>• Surgical revision may be needed (WOCN, 2010).</li> </ul>

**Stomal Complications (continued)**

<b>Complication</b>	<b>Definition/Description</b>	<b>Intervention/Treatment</b>
<p>Stomal Prolapse (See Figures 1, 2)</p>	<ul style="list-style-type: none"> <li>• A prolapse occurs when a full-thickness length of bowel intussuscepts and protrudes out of the stomal opening in a telescoping manner (Black, 2009; WOCN, 2010, 2014). The length of the prolapse can vary.</li> <li>• The prolapsed stoma can lengthen and become edematous from the dependent position, with a potential for compromised blood flow and an increased risk of trauma (Butler, 2009; WOCN, 2010, 2014).</li> <li>• Risk factors include: loop colostomies, an abdominal wall opening that is larger than the stoma, inadequate fixation of the bowel to the abdominal wall, increased abdominal pressure from crying or coughing, weak muscle tone, and obesity (WOCN, 2010).</li> <li>• Loop ostomies in children with obstructive conditions such as Hirschsprung’s disease have an increased risk of prolapse from the decrease in the size of the bowel after release of the obstruction while the opening in the fascia remains large (Harrison &amp; Boarini, 2004).</li> <li>• The stomal prolapse may be classified as fixed or sliding (Bafford &amp; Irani, 2013):               <ul style="list-style-type: none"> <li>o A fixed prolapse is a permanent eversion of the prolapsed bowel.</li> <li>o A sliding prolapse is intermittent protrusion of the bowel through the stomal orifice such as when there is increased intra-abdominal pressure.</li> </ul> </li> <li>• In infants, the prolapse may be intermittent when the baby cries, but the stoma may reduce when the infant is calm (Harrison &amp; Boarini, 2004).</li> <li>• The patient may not have any symptoms from the prolapse (Husain &amp; Cataldo, 2008), or it might cause pain, bulging, and problems with the fit of the pouching system (Bafford &amp; Irani, 2013).</li> <li>• Complications of the prolapse that warrant surgical evaluation or intervention include inability to reduce the stoma, ischemia of the stoma, obstruction, incarceration, and strangulation (Bafford &amp; Irani, 2013; WOCN, 2014).</li> </ul>	<ul style="list-style-type: none"> <li>• Revise the pouching system.               <ul style="list-style-type: none"> <li>o Adjust the size of the opening in the skin barrier/wafer and the pouch size to accommodate the changes in the size of the stoma to prevent trauma to the stoma (Black, 2009; WOCN, 2010, 2014).</li> <li>o The skin barrier/wafer may be modified with radial slits or “darts” in the stomal opening (see Figure 3) to allow the skin barrier/wafer to expand as the prolapse enlarges (WOCN, 2014).</li> </ul> </li> <li>• Educate patient’s caregivers on techniques to manually reduce a prolapsed stoma to facilitate pouching (Harrison &amp; Boarini, 2004; WOCN, 2010).               <ul style="list-style-type: none"> <li>o To manually reduce the prolapsed bowel, the child should be calm and in a supine position.</li> <li>o Application of cold compresses to the prolapse can temporarily reduce the edema to enhance the reduction (Black, 2009; Jordan &amp; Burns, 2013; WOCN, 2014).</li> <li>o Some sources report topical application of table sugar to the prolapse temporarily reduces the edema and size of the prolapse due to a localized osmotic effect, and facilitates manual reduction (Bafford &amp; Irani, 2013; Husain &amp; Cataldo, 2008; Jordan &amp; Burns, 2013; WOCN, 2014).</li> <li>o To reduce the prolapse, gentle pressure is applied with both hands to the prolapsed portion of bowel, starting at the distal portion, progressively making sure the bowel is eased back into the abdomen and does not immediately slide out again.</li> <li>o Prolapsed stomas typically do not stay reduced after manual reduction, and will often prolapse again.</li> </ul> </li> <li>• Consider use of a pediatric hernia belt with a prolapsed stoma overbelt addition (Harrison &amp; Boarini, 2004; Jordan &amp; Burns, 2013; WOCN, 2010, 2014). The support belt should be applied while the prolapse is reduced and with the patient in a supine position (WOCN, 2014).</li> <li>• Educate patient’s caregivers to seek immediate medical care if patient’s symptoms progress to include: abdominal pain, decreased output, signs/symptoms of an obstruction; or there is a prolonged change in the color of the stoma that is not associated with crying.</li> </ul>

**Stomal Complications (continued)**

<b>Complication</b>	<b>Definition/Description</b>	<b>Intervention/Treatment</b>
Stomal Bleeding	<ul style="list-style-type: none"> <li>• The stomal mucosa contains many small blood vessels close to the surface, which can lead to superficial bleeding from minor trauma such as:               <ul style="list-style-type: none"> <li>o Aggressive cleaning of the stoma.</li> <li>o Friction/trauma from the pouching system.</li> <li>o Shaving to remove abdominal hair with an incorrect technique (e.g., too close to the stoma with a sharp razor).</li> <li>o Injuries related to activity.</li> </ul> </li> <li>• Profuse bleeding from the stoma site may be an indication of more serious conditions such as portal hypertension or recurrent disease (Husain &amp; Cataldo, 2008).</li> </ul>	<ul style="list-style-type: none"> <li>• Minor superficial bleeding should stop spontaneously, but if bleeding does not stop, direct pressure can be applied with cold compresses (Husain &amp; Cataldo, 2008; WOCN, 2011a).</li> <li>• Topical hemostatic agents such as calcium alginate or Surgicel® (Ethicon US, LLC, a Johnson &amp; Johnson Company, New Brunswick, NJ) can be used to control bleeding. If bleeding is excessive silver nitrate can be used (Husain &amp; Cataldo, 2008), which may require an order from the primary healthcare provider (WOCN, 2014).</li> <li>• Use a pouching system that avoids pressure or trauma such as a flexible one-piece or two-piece pouching system with an adhesive coupling and an appropriately sized opening to avoid constriction of the stoma. Monitor the frequency that the pouching system is changed.</li> <li>• Consider using a rigid, protective, dome cover over the stoma during activities that have a potential for forceful injuries, such as contact sports or physical labor (WOCN, 2014).</li> <li>• Use caution with infants/children who have thrombocytopenia or portal hypertension as they are both at risk for bleeding: Instruct the patient and caregiver to use a gentle technique when removing or reapplying the skin barrier/wafer and cleansing of the stoma and peristomal area.</li> <li>• Instruct the parents/child to seek medical help if excessive bleeding occurs from trauma that cannot be stopped (Husain &amp; Cataldo, 2008).</li> </ul>

**Stomal Complications (continued)**

<b>Complication</b>	<b>Definition/Description</b>	<b>Intervention/Treatment</b>
Stomal Hyperplasia	<ul style="list-style-type: none"> <li>• Stomal hyperplasia is an overgrowth of tissue on the stoma from excessive exposure to stomal effluent (Sung, Kwon, Jo, &amp; Park, 2010).</li> <li>• It most commonly occurs in nonelderly patients and those with urostomies or stomas that are less than one centimeter in height (Sung et al., 2010).</li> <li>• Lesions may bleed during cleansing of the stoma or during changing of the pouching system.</li> </ul>	<ul style="list-style-type: none"> <li>• Evaluate the fit of the pouching system and adjust the size of the opening in the skin barrier/wafer to prevent irritation/trauma to the stoma and minimize exposure to effluent.</li> <li>• Use a gentle technique for cleansing and care of the stoma and peristomal skin.</li> <li>• Consider use of a topical hemostatic agent if bleeding occurs.</li> </ul>
Stomal Laceration/Trauma (see Figures 4, 5)	<ul style="list-style-type: none"> <li>• A stomal laceration is a cut or tear that is most often caused by trauma or pressure from an improperly sized or misaligned opening in the skin barrier/wafer or poor pouching technique (Black, 2009; Colwell, 2004; Jordan &amp; Burns, 2013; WOCN, 2014). The injury can also be due to tight clothing/belts, or sports-related accidents (Colwell, 2004).</li> <li>• It usually presents as a yellow or white linear discoloration in the stomal mucosa, but may also present as a dark red, friable area with bleeding (Jordan &amp; Burns, 2013; WOCN, 2010, 2014).</li> <li>• The area is generally shallow and painless.</li> <li>• The child/parent/nurse may notice the appearance of fresh blood in the pouch.</li> </ul>	<ul style="list-style-type: none"> <li>• Identify and eliminate the causative factor (Colwell, 2004).</li> <li>• Assess the stoma for bleeding.</li> <li>• Direct pressure or topical hemostatic agents such as silver nitrate may be needed to control bleeding (WOCN, 2014). Silver nitrate may require an order from the primary healthcare provider (WOCN, 2014).               <ul style="list-style-type: none"> <li>o If bleeding is severe, the patient should be referred to a physician for treatment (Jordan &amp; Burns, 2013).</li> </ul> </li> <li>• Measure the stoma and assess the fit of the pouching system.               <ul style="list-style-type: none"> <li>o The skin barrier/wafer opening will need to be resized as the child grows.</li> <li>o If the stoma has prolapsed, check that the stoma is not being pinched by the pouching system or rubbing against the flange.</li> </ul> </li> <li>• Teach adolescent patients to use caution if shaving abdominal hair: Use of an electric razor is preferred.</li> <li>• If the laceration is related to activity, provide information about use of protective devices such as a protective dome cover over the stoma (Varma, 2009; WOCN, 2014).</li> </ul>

**Stomal Complications (continued)**

<b>Complication</b>	<b>Definition/Description</b>	<b>Intervention/Treatment</b>
<p>Stomal Retraction (see Figure 6)</p>	<ul style="list-style-type: none"> <li>• A retraction occurs when the stoma is drawn or pulled to or below the skin level; the depth of the retraction may increase when the patient is in a sitting position (Butler, 2009; Colwell, 2004).</li> <li>• Multiple factors are associated with an increased risk for a stomal retraction: short mesentery, obesity, surgical technique (e.g., insufficient mobilization of the mesentery, inadequate stomal length, improper skin excision), excessive tension on the suture line at the fascial level, necrotic stoma, mucocutaneous separation, early rod removal from loop ostomies, excessive scar tissue or adhesions, malnourishment, immunosuppression, etc. (Bafford &amp; Irani, 2013; Black, 2009; Butler, 2009; Colwell, 2004; Jordan &amp; Burns, 2013).</li> <li>• A retraction can create a concave area in the abdomen around the stoma, resulting in a difficult pouching surface and an inability to maintain an effective seal of the pouching system due to undermining of the skin barrier/ wafer (Black, 2009; Butler, 2009; Jordan &amp; Burns, 2013).</li> </ul>	<ul style="list-style-type: none"> <li>• The surgeon should be notified of the retraction so he/she can determine the depth and if surgical revision is needed. A stomal retraction below the fascial level along with a complete mucocutaneous separation warrants immediate surgical intervention to prevent intra-abdominal contamination and peritonitis (Bafford &amp; Irani, 2013; Butler, 2009).</li> <li>• Conservative care includes maintaining a secure pouching system to prevent undermining between the skin barrier/wafer and the peristomal skin.               <ul style="list-style-type: none"> <li>o Consider use of convexity and a belt to maintain a reliable seal (Bafford &amp; Irani, 2013; Black, 2009; Butler, 2009; Jordan &amp; Burns, 2013).</li> <li>o Convexity may also be created with barrier supplements/strips or plastic inserts (see Figure 7).</li> <li>o Retracted stomas in a deep crease may need a flexible one-piece pouching system.</li> </ul> </li> </ul>

**Stomal Complications (continued)**

<b>Complication</b>	<b>Definition/Description</b>	<b>Intervention/Treatment</b>
<p>Multiple Stomas (see Figure 8)</p>	<ul style="list-style-type: none"> <li>• Multiple stomas are common in premature babies to preserve as much intestine as possible such as with surgery for necrotizing enterocolitis (Rogers, 2003).</li> <li>• Children with an imperforate anus may have a double-barrel, descending colostomy with the stomas close together (Rogers, 2003).</li> </ul>	<ul style="list-style-type: none"> <li>• Stomas in close proximity may be pouched within the same pouch:               <ul style="list-style-type: none"> <li>o When possible, create a pattern with two openings to adequately protect the skin bridge between the stomas.</li> <li>o The use of moldable strip paste or small pieces of barrier rings between the stomas adds more durability and protection to the skin bridge.</li> <li>o If a starter hole is present on the skin barrier/wafer, it can be covered with a piece of barrier or a hydrocolloid.</li> </ul> </li> <li>• Patients with an imperforate anus who have a double-barrel stoma should have the mucous fistula pouched separately from the functioning stoma to prevent crossover of stool to the distal limb of the bowel. However, this is not always possible if the stomas are very close.</li> <li>• The mucous fistula may produce large amounts of mucus and may need to be pouched separately, or a foam cover dressing may be used.</li> <li>• Consider “picture framing” the edges of the skin barrier/wafer of the pouch with silicone tape, a hydrocolloid dressing, transparent film dressing, or waterproof tape to prevent moisture from an adjacent mucous fistula, gastrostomy tube, or wound from loosening the seal.</li> <li>• Choose adhesive products that cause the least amount of trauma to the tissue upon removal (when possible) such as silicone tape, strips of a hydrocolloid dressing, or a transparent film dressing (Association of Women’s Health, Obstetric and Neonatal Nurses [AWHONN], 2013).</li> </ul>

**Stomal Complications (continued)**

Complication	Definition/Description	Intervention/Treatment
<p>Obstruction: Partial/Complete</p>	<ul style="list-style-type: none"> <li>• A partial or complete obstruction is a decline or absence of output from a stoma due to adynamic or dynamic factors (Black, 2009):               <ul style="list-style-type: none"> <li>o Adynamic factors: Absence of peristalsis resulting in a paralytic ileus. Examples: bowel not active due to recent abdominal surgery, medications, spinal disease, metabolic disease, or trauma.</li> <li>o Dynamic factors: Pathological causes of an obstruction, which can result in a surgical emergency. Examples: Crohn’s disease, adhesions, strangulated hernia/bowel, food blockage, epithelial hyperplasia, trauma, and stenosis of a urinary stoma.</li> </ul> </li> <li>• Complete obstructions occur most commonly in patients with an ileostomy, but can occur in any type of ostomy (Black, 2009).</li> <li>• Inadequate fluids, poorly chewed food or too much high-fiber food can create a mechanical blockage and contribute to the development of an obstruction (Black, 2009).</li> <li>• Symptoms: Physical presentation of an obstruction will vary according to the site, duration, and etiology of the obstruction (Vicario &amp; Price, 2011).               <ul style="list-style-type: none"> <li>o Fecal ostomies:                   <ul style="list-style-type: none"> <li>o Foul-smelling, watery/liquid stool (Black, 2009; Carmel &amp; Goldberg, 2004).</li> <li>o Abdominal cramping, sharp colicky-like pain (Black, 2009; Carmel &amp; Goldberg, 2004).</li> <li>o Abdominal distension (Carmel &amp; Goldberg, 2004).</li> <li>o An obstruction due to dynamic factors may initially produce high-pitched bowel sounds that diminish after several hours; patients with an adynamic ileus may have diminished or absent bowel sounds (Vicario &amp; Price, 2011).</li> <li>o Nausea or vomiting (Black, 2009).</li> <li>o Stomal swelling (Carmel &amp; Goldberg, 2004).</li> </ul> </li> <li>o Inability to pass flatus, constipation or complete absence of stomal output; some stool and gas may pass with a partial obstruction (Vicario &amp; Price, 2011).</li> </ul> </li> <li>o Urostomies:               <ul style="list-style-type: none"> <li>o Recurrent urinary tract infections.</li> <li>o Note: Lack of output of a urinary stoma can be indicative of obstruction, infection or dehydration, and immediate medical intervention should be sought.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Prevention:               <ul style="list-style-type: none"> <li>o Avoid high-fiber foods for 6 weeks after ostomy surgery such as raw fruits (e.g., citrus fruit membranes, fruits with seeds/skins), raw vegetables, dried fruit, corn, bean sprouts, bamboo shoots, mushrooms, coconut, celery, nuts, and peanuts (Black, 2009; Floruta, 2004). See Appendix B for additional foods to avoid (Canadian Association for Enterostomal Therapy [CAET], 2007; University of Pittsburgh Medical Center [UPMC], 2013, 2014).</li> <li>o After the initial 6 weeks, slowly introduce new foods one at a time, and monitor the effects on output.</li> <li>o Instruct caregivers/child that foods should be chewed thoroughly and fluid intake increased. See Appendix B for a list of low-fiber/low-residue foods to choose that are easy to digest (CAET, 2007; UPMC, 2013, 2014).</li> <li>o Instruct caregivers to offer small, frequent meals.</li> <li>o Teach caregivers and patients (older children) signs/symptoms of an obstruction.</li> </ul> </li> <li>• Intervention for an obstruction:               <ul style="list-style-type: none"> <li>o Teach caregivers to:                   <ul style="list-style-type: none"> <li>o Place the child in a warm bath.</li> <li>o Remove or replace the pouch with a larger pouching system to accommodate stomal swelling.</li> <li>o Add “darts” around the skin barrier/wafer opening to accommodate an increase in the size of the stoma.</li> <li>o Place the child in a side-lying position with their knees bent up toward the abdomen, and perform peristomal massage.</li> <li>o Increase the fluid intake if the child is not vomiting. Provide warm fluids to stimulate peristalsis.</li> <li>o Notify the physician if a blockage does not pass or symptoms worsen. Seek medical attention immediately if symptoms of a complete blockage occur, or if the child begins to vomit. Note: Children with ileostomies are more prone to dehydration.</li> <li>o The medical team may perform a lavage of the stoma.</li> </ul> </li> </ul> </li> </ul>

### Peristomal Complications

Complication	Definition/Description	Intervention/Treatment
<p>Allergic Contact Dermatitis (see Figure 9)</p>	<ul style="list-style-type: none"> <li>• Allergic contact dermatitis, considered to be a rare occurrence, is an inflammatory response due to a hypersensitivity to chemical elements in products (e.g., skin barrier/wafer, skin pastes, wipes, tape) that contact the peristomal skin (Husain &amp; Cataldo, 2008; WOCN, 2010).</li> <li>• A characteristic of an allergic reaction is that the irritated/inflamed area on the skin is the same size and shape as the irritant/allergen (Bafford &amp; Irani, 2013; Colwell, 2004; Husain &amp; Cataldo, 2008; WOCN, 2010).</li> <li>• Symptoms may vary from mild erythema and itching to severe blistering, burning, pain, or skin breakdown (Bafford &amp; Irani, 2013; Husain &amp; Cataldo, 2008).</li> </ul>	<ul style="list-style-type: none"> <li>• Consider patch testing to determine the offending allergen/product: If assistance is needed, contact the WOC nurse/ostomy nurse, clinical nurse specialist, an advanced practice nurse, or the medical provider.               <ul style="list-style-type: none"> <li>o A patch test involves applying the suspected product to the skin in a site that is distant from the affected area, leaving it covered and intact for 2 days, and observing for a reaction upon removal of the product (Husain &amp; Cataldo, 2008). The product should be removed sooner if itching, burning, blistering, etc., are noted prior to 2 days.</li> <li>o Discontinue the offending product(s).</li> </ul> </li> <li>• Consult with the healthcare provider regarding treatment of the affected area with topical anti-inflammatory products (Bafford &amp; Irani, 2013; Husain &amp; Cataldo, 2008; WOCN, 2010).</li> <li>• Refer the patient to a dermatologist for evaluation and treatment for persistent or unresponsive reactions.</li> </ul>
<p>Candidiasis/Fungal Infection (see Figure 10)</p>	<ul style="list-style-type: none"> <li>• A common cause of fungal infections in patients with ostomies is an overgrowth of <i>Candida</i> (most commonly <i>Candida albicans</i>) that causes inflammation, infection, or skin disease in the peristomal area (Colwell, 2004; WOCN, 2010).</li> <li>• It presents as pustules or papules with diffuse erythema, and maceration:               <ul style="list-style-type: none"> <li>o Satellite lesions may be present along the advancing edge of the affected skin; and</li> <li>o the patient may complain of itching or burning around the stoma (Colwell, 2004; Husain &amp; Cataldo, 2008; WOCN, 2007, 2010).</li> </ul> </li> <li>• Common risk factors for peristomal candidiasis/ fungal infection include prolonged exposure to moisture, immunosuppressants, corticosteroid therapy, diabetes mellitus, and use of antibiotics (Colwell, 2004; WOCN, 2007, 2010).</li> </ul>	<ul style="list-style-type: none"> <li>• Assess the fit of the pouching system to minimize exposure of the skin to effluent; resize the stomal opening in the skin barrier/wafer as needed.</li> <li>• Use an antifungal powder and alcohol-free skin sealant prior to application of the skin barrier/wafer (WOCN, 2010).               <ul style="list-style-type: none"> <li>o Systemic, prescription strength antifungals may be needed in severe cases (WOCN, 2010).</li> <li>o Avoid antifungal creams, which can interfere with adhesion of the skin barrier/wafer (WOCN, 2007).</li> </ul> </li> </ul>

**Peristomal Complications (continued)**

<b>Complication</b>	<b>Definition/Description</b>	<b>Intervention/Treatment</b>
Folliculitis	<ul style="list-style-type: none"> <li>• Folliculitis is an inflammation of the hair follicles usually caused by Staphylococcus aureus, streptococci or Pseudomonas aeruginosa (WOCN, 2007, 2010).</li> <li>• Folliculitis presents as pustules, papules or erythema around the follicles and progresses to crusted lesions that may be painful and pruritic (WOCN, 2007, 2010).</li> <li>• Folliculitis results from friction, frequent/aggressive shaving of peristomal hair, or traumatic pouch removal that abruptly pulls hair out of the skin (Colwell, 2004; WOCN 2007, 2010).</li> <li>• Contributing risk factors include immunosuppression, diabetes, and use of antibiotics (Colwell, 2004; WOCN 2007, 2010).</li> </ul>	<ul style="list-style-type: none"> <li>• Use an antibacterial skin cleanser to cleanse the peristomal skin during pouching system change (Colwell, 2004; WOCN, 2010).</li> <li>• In severe cases, consider applying an antibiotic powder to the affected area (WOCN 2007, 2010).</li> <li>• Teach the parents/patients/caregivers to:               <ul style="list-style-type: none"> <li>o Gently remove the skin barrier/wafer from the skin by using “push/pull” technique;</li> <li>o shave in the direction of hair growth with frequency as indicated by re-growth of peristomal hair, avoid overly frequent shaving, and avoid use of a safety razor;</li> <li>o use an electric razor or hair clippers to remove large amounts of body hair (WOCN, 2007, 2010).</li> </ul> </li> </ul>
Hernia (see Figure 11)	<ul style="list-style-type: none"> <li>• A defect in the fascia that allows one or more loops of intestine to protrude through the area of weakness into the overlying skin, with a noticeable bulge around the area of the stoma (WOCN, 2010, 2011b).</li> <li>• A peristomal hernia is a common complication in infants/children due to underdeveloped abdominal muscles, which are needed to support the stoma, and increased intra-abdominal pressure that occurs during crying, which can stretch the fascial opening to create a hernia (Harrison &amp; Boarini, 2004).</li> <li>• Other risks include: poor nutrition, infection, history of steroid use, excessive coughing or vomiting, obesity, too large an opening in the abdominal wall, double-barrel or loop stoma, previous stomas, stomas outside the rectus abdominis muscle, weak abdominal musculature, and laparoscopic technique (Husain &amp; Cataldo, 2008; WOCN, 2011b, 2014). Note: When divided stomas are located within an incision, a peristomal hernia may form along the entire area (Harrison &amp; Boarini, 2004).</li> <li>• Common symptoms of a peristomal hernia are discomfort or pain around the stoma, or problems with the fit of the pouch, although many individuals do not report any symptoms (Bafford &amp; Irani, 2013; WOCN, 2011b).</li> <li>• A peristomal hernia can lead to complications of incarceration, strangulation, and obstruction.</li> </ul>	<ul style="list-style-type: none"> <li>• Correct the underlying problem causing the excess exposure to moisture or drainage.</li> <li>• To control bleeding, the area can be treated with topical hemostatic agents such as calcium alginate or Surgicel®; cauterizing the lesions with silver nitrate may be used if bleeding is excessive (Colwell, 2004; Colwell et al., 2011; WOCN, 2007, 2010).</li> <li>• Evaluate the pouching system:               <ul style="list-style-type: none"> <li>o The stomal opening in the skin barrier/wafer is often too large, or more frequent changes may be needed to prevent erosion of the skin barrier/wafer (Colwell, 2004; WOCN, 2007).</li> <li>o Resize the stomal opening in the skin barrier/ wafer to cover the affected area and prevent the effluent from irritating the peristomal skin (Colwell, 2004; Colwell et al., 2011; WOCN, 2007).</li> <li>o Choose a pouch with an extended-wear barrier if drainage is dissolving the skin barrier/wafer (Turnbull, 2006; WOCN, 2007).</li> </ul> </li> <li>• If the patient has a urostomy or vesicostomy:               <ul style="list-style-type: none"> <li>o Instruct the parents/patients/caregivers to increase the oral fluid intake to dilute/acidify urine.</li> </ul> </li> </ul>

**Peristomal Complications (continued)**

<b>Complication</b>	<b>Definition/Description</b>	<b>Intervention/Treatment</b>
<p>Hyperplasia of Skin (Pseudoverrucous Lesions)</p>	<ul style="list-style-type: none"> <li>• Hyperplasia is a benign condition of thickened epidermis from chronic exposure to an irritant, and is commonly due to an improperly sized stomal opening in the skin barrier/wafer (Colwell, 2004; Szymanski, St-Cyr, Alam, &amp; Kassouf, 2010).</li> <li>• Hyperplasia presents as raised, wart-like lesions in the peristomal area; is most commonly associated with exposure to urine in patients with a urostomy; but may develop in a patient with an ileostomy or colostomy (Colwell, 2004; Turnbull, 2006; WOCN, 2007).</li> <li>• The lesions occur at the mucocutaneous border around the base of the stoma and vary in color (e.g., white-gray, reddish-brown, dark red); lesions bleed easily and may be painful (Szymanski et al., 2010; Turnbull, 2006; WOCN, 2007, 2010).</li> </ul>	<ul style="list-style-type: none"> <li>• Correct the underlying problem causing the excess exposure to moisture or drainage.</li> <li>• To control bleeding, the area can be treated with topical hemostatic agents such as calcium alginate or Surgicel®; cauterizing the lesions with silver nitrate may be used if bleeding is excessive (Colwell, 2004; Colwell et al., 2011; WOCN, 2007, 2010).</li> <li>• Evaluate the pouching system:               <ul style="list-style-type: none"> <li>o The stomal opening in the skin barrier/wafer is often too large, or more frequent changes may be needed to prevent erosion of the skin barrier/wafer (Colwell, 2004; WOCN, 2007).</li> <li>o Resize the stomal opening in the skin barrier/wafer to cover the affected area and prevent the effluent from irritating the peristomal skin (Colwell, 2004; Colwell et al., 2011; WOCN, 2007).</li> <li>o Choose a pouch with an extended-wear barrier if drainage is dissolving the skin barrier/wafer (Turnbull, 2006; WOCN, 2007).</li> </ul> </li> <li>• If the patient has a urostomy or vesicostomy:               <ul style="list-style-type: none"> <li>o Instruct the parents/patients/caregivers to increase the oral fluid intake to dilute/acidify urine.</li> <li>o Use a pouch with an anti-reflux valve (WOCN, 2007).</li> <li>o If the urostomy or vesicostomy is managed with a diaper, change the diaper frequently and apply barrier products to protect the skin (Douri &amp; Shawaf, 2012).</li> <li>o Peristomal skin and stoma can be treated with 1/4 to 1/2 strength white vinegar soaks with each pouch change; vinegar dissolves the gritty, white crystal deposits/alkaline encrustation that can occur on the peristomal skin (WOCN, 2008).</li> <li>o If prescribed by the medical provider, vitamin C may be used to acidify the urine, but it should be used with caution as it may be contraindicated in some patients (Szymanski et al., 2010; Turnbull, 2006).</li> </ul> </li> </ul>

**Peristomal Complications (continued)**

<b>Complication</b>	<b>Definition/Description</b>	<b>Intervention/Treatment</b>
<p>Moisture-Associated Dermatitis</p>	<ul style="list-style-type: none"> <li>• Peristomal moisture-associated dermatitis is inflammation and erosion of the peristomal skin due to prolonged exposure to urine, stool, water, perspiration, or wound exudate; and extends up to a 4 inch radius from the stoma/skin junction (Colwell et al., 2011).</li> <li>• Additional factors that contribute to the dermatitis include the volume and type of stomal effluent, characteristics of the stoma (e.g., location, stomal height, abdominal contours), mechanical skin stripping, and prolonged wear of the skin barrier/wafer (Colwell et al., 2011; Gray et al., 2011):               <ul style="list-style-type: none"> <li>o Prolonged wearing of the skin barrier/wafer or high output stomas will cause faster meltdown and faster erosion of the skin barrier/wafer, which compromises the seal and allows moisture to be in contact with the peristomal skin.</li> <li>o Output from a fecal stoma contains intestinal enzymes that can digest the skin and lead to a secondary bacterial infection, particularly liquid stool.</li> <li>o Effluent from a urostomy differs slightly from urine found in the bladder. The urine from a urostomy carries a far higher concentration of bacteria, as well as mucus provided by the ileal or large bowel conduit (Gray et al., 2011). Urine output is alkaline and may overhydrate and soften the skin leading to loss of the epidermal barrier, and in some cases alkaline crystal deposits may form on the skin.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Determine the cause of the moisture.</li> <li>• Identify an appropriate pouching system and maintain an effective seal (Colwell et al., 2011):               <ul style="list-style-type: none"> <li>o Use an extended-wear product for patients with a urostomy or ileostomy.</li> <li>o Use a cut-to-fit skin barrier/wafer for the first 6 weeks after surgery and for irregularly shaped stomas.</li> <li>o Consider convexity for a flush stoma or if abdominal creases/folds are present. A belt can be used to obtain the optimal benefit of the convexity.</li> <li>o Consider the use of moldable barrier rings to increase the seal.</li> </ul> </li> <li>• Teach the parents/patients/caregivers to:               <ul style="list-style-type: none"> <li>o Establish a regular schedule for changing the pouching system. Monitor the skin barrier seal continually for undermining or erosion and seek treatment if the skin becomes irritated (Colwell et al., 2011).</li> <li>o Measure the size of the stoma with each pouch change for the first 6 weeks; cut the skin barrier/wafer to the appropriate size (i.e., no more than 1/8 inch larger than stoma).</li> <li>o Use a “push/pull” technique for removal of the pouch (i.e., push down on the skin while gently pulling up on the skin barrier/wafer of the pouch during removal).</li> <li>o Gently cleanse the skin with warm water to remove the effluent and digestive enzymes. Do not use soap as this could affect the adherence of the new pouch.</li> <li>o Apply a light layer of stoma powder to the moist skin and seal the powder with an alcohol-free skin barrier/sealant.</li> <li>o Caution: Do not brush powder toward an infant’s face.</li> <li>o Consult with the healthcare provider regarding use of a steroid spray for severe skin irritations.</li> </ul> </li> </ul>

**Peristomal Complications (continued)**

<b>Complication</b>	<b>Definition/Description</b>	<b>Intervention/Treatment</b>
<p>Mucocutaneous Separation (see Figure 12)</p>	<ul style="list-style-type: none"> <li>• A mucocutaneous separation is an early postoperative complication in which there is a partial or complete separation of the stoma from the surrounding skin (Butler, 2009; WOCN, 2010).</li> <li>• The separation can be deep or superficial, and can lead to retraction of the stoma (Colwell, 2004; WOCN, 2014).</li> <li>• Symptoms may include pain, burning, and increased drainage.</li> <li>• Common risk factors include:               <ul style="list-style-type: none"> <li>o Compromised healing due to infection, malnutrition, corticosteroids, diabetes mellitus, or recurrent disease;</li> <li>o tension at the stoma's suture line; and</li> <li>o stomal necrosis (Butler, 2009; Colwell, 2004; WOCN, 2010, 2014).</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Determine the location and extent of the separation (Butler, 2009; Colwell, 2004; WOCN, 2014).               <ul style="list-style-type: none"> <li>o The location of the separation and the amount of the circumference involved can be described by referring to the stoma as the face of a clock (e.g., separation present from the 12 o'clock to 6 o'clock position).</li> <li>o Gently measure the depth of the separation (in centimeters) using a cotton-tip applicator; do not force the applicator into the defect.</li> </ul> </li> <li>• Identify if necrotic or granulation tissue is present.</li> <li>• Assess amount and type of drainage. Stool present in the defect might indicate a fistula (Butler, 2009; Colwell, 2004; WOCN, 2014).</li> <li>• Management options:               <ul style="list-style-type: none"> <li>o Irrigate the separated area with normal saline; fill the defect with an absorptive material such as pectin powder, a hydrofiber, or a calcium alginate prior to pouching (Butler, 2009; Colwell, 2004; WOCN, 2010, 2014).</li> <li>o Use an antimicrobial dressing along with antibiotic therapy if there is concern about infection (WOCN, 2010).</li> <li>o If drainage from the separation interferes with the seal of the pouching system, it may be necessary to cover the filler material with an additional dressing (e.g., hydrocolloid) to create a dry, level pouching surface.</li> <li>o Consider incorporating the separation into the stomal opening of the skin barrier/wafer if there is a large volume of drainage from the separation.</li> <li>o Change the pouching system frequently to assess wound healing and change the absorptive fillers; assess for stenosis or retraction as the area heals (Butler, 2009).</li> <li>o Surgical intervention is indicated for a complete mucocutaneous separation and stomal retraction below the fascial level (Butler, 2009; WOCN, 2014).</li> </ul> </li> </ul>

**Peristomal Complications (continued)**

<b>Complication</b>	<b>Definition/Description</b>	<b>Intervention/Treatment</b>
<p>Umbilical Stump Adjacent to the Stoma (see Figure 13)</p>	<ul style="list-style-type: none"> <li>• The stoma is located close to an intact umbilical stump.</li> <li>• If the skin barrier/wafer of the pouch overlaps onto the umbilical stump, it will keep the stump moist and delay detachment of the stump; the moisture from the stump may also loosen the edges of the skin barrier/wafer.</li> </ul>	<ul style="list-style-type: none"> <li>• Offset the stomal opening in the skin barrier/wafer and trim the edges to avoid the umbilicus (see Figure 14).</li> <li>• If necessary, fold the pouch back onto itself so it is kept off the umbilical stump and allows air to circulate.</li> <li>• To protect the skin barrier/wafer from moisture from the adjacent umbilicus, “picture frame” the edges of the wafer with silicone tape, a hydrocolloid dressing, a transparent film dressing, or waterproof tape.</li> </ul>
<p>Varices</p>	<ul style="list-style-type: none"> <li>• Peristomal varices (also known as caput medusa) are dilated cutaneous veins around the stoma in patients with portal hypertension or liver disease (Colwell, 2004; Husain &amp; Cataldo, 2008; Khan, Vessal, &amp; Gordon-Williams, 2011; WOCN, 2010).</li> <li>• The peristomal skin has a bluish/purple hue, is thin and fragile, and dilated tortuous veins may be visible on the skin and proximal to the stoma (Colwell, 2004; Husain &amp; Cataldo, 2008; WOCN, 2010).</li> <li>• Spontaneous bleeding from the stoma or the stoma/skin junction may occur (Colwell, 2004; Khan et al., 2011).               <ul style="list-style-type: none"> <li>o Bleeding may be sporadic and can be profuse with a large volume of blood loss. Minor bleeding may stop spontaneously.</li> <li>o Recurrent bleeding may be due to trauma from the pouching technique or the inflexibility of the pouching system (Husain &amp; Cataldo, 2008).</li> </ul> </li> <li>• Patients with liver disease are at risk for developing varices (Khan et al., 2011).</li> </ul>	<ul style="list-style-type: none"> <li>• Initial interventions for bleeding include direct pressure, cauterization with silver nitrate, calcium alginate or other topical hemostatic dressings, or sclerotherapy (Husain &amp; Cataldo, 2008; Khan et al., 2011; Pabon-Ramos, Niemeyer, &amp; Dasika, 2013; WOCN, 2010).</li> <li>• Severe, refractory bleeding may require more extensive interventions such as suture ligation, surgical intervention such as a transjugular portosystemic shunt to lower the portal pressure, or a liver transplant (Husain &amp; Cataldo, 2008; Khan et al., 2011; Pabon-Ramos et al., 2013; WOCN, 2010).</li> <li>• The parents/caregivers/patients should be instructed in measures to minimize trauma to the stoma/peristomal area that can exacerbate bleeding.               <ul style="list-style-type: none"> <li>o Use a gentle technique when providing care to the stoma and peristomal area.</li> <li>o Avoid pouching systems that provide pressure to the peristomal area encroach on the mucosa, or constrict the stoma (Colwell, 2004; WOCN, 2010).</li> <li>o Use a flexible one-piece or a two-piece pouching system that has a floating flange.</li> <li>o Use an alcohol-free skin barrier to protect the peristomal skin (AWHONN, 2013).</li> <li>o Avoid frequent changes of the pouching system and unnecessary adhesive products.</li> </ul> </li> </ul>

**Peristomal Complications (continued)**

<b>Complication</b>	<b>Definition/Description</b>	<b>Intervention/Treatment</b>
<p>Wound or Incision Adjacent to the Stoma (see Figure 15)</p>	<ul style="list-style-type: none"> <li>• Stomas are commonly located near incisions/ wounds in premature infants, but may be seen in any age group.</li> <li>• Incisions or wounds adjacent to the stoma often create drainage or an uneven pouching surface that requires some modifications of the pouching system to insure a secure seal.</li> </ul>	<ul style="list-style-type: none"> <li>• Treatment of the surgical incision: The skin barrier/wafer can be placed directly over the surgical incision.</li> <li>• Treatment of the wound:               <ul style="list-style-type: none"> <li>o Fill the wound with pectin powder or pack the wound with an absorbent dressing (e.g., hydrofiber, alginate).</li> <li>o Cover the wound with a silicone or hydrocolloid dressing to create a level pouching surface.</li> <li>o Barrier rings, strips or alcohol-free paste may be used improve the pouch seal. Note: Paste should be avoided in infants (AWHONN, 2013).</li> <li>o If frequent dressing changes are required, a wound management system that allows access to the wound may be useful.</li> <li>o Negative pressure wound therapy (NPWT) may be used on open abdominal wounds that are in close proximity to the stoma. Case studies and retrospective studies have reported that NPWT (V.A.C.® Therapy, KCI, San Antonio, TX) has been used successfully in treating a variety of wounds in pediatric patients of all ages including neonates and infants (Baharestani, 2007; Baharestani et al., 2009; Bookout, McCord, &amp; McLane, 2004; Contractor, Amling, Brandoli, &amp; Tosi, 2008; McCord et al., 2007).</li> <li>o Follow the facility's policy for use of NPWT.</li> <li>o The NPWT dressing is applied first, followed by the pouching system.</li> <li>o To prevent skin stripping upon removal of the transparent drape, application of a non-alcoholic skin barrier/sealant to the skin prior to application of the drape is beneficial.</li> <li>o The pouch may overlap onto the NPWT dressing.</li> <li>o Follow the manufacturer's guidelines for the frequency of dressing changes.</li> </ul> </li> </ul> <p>Commonly NPWT dressings are changed every 2 days or 3 times a week; more frequent dressing changes might be needed for infection (Baharestani, 2007), or excess ingrowth of granulation tissue into the dressing (Bookout et al., 2004; Contractor et al., 2008).</p> <ul style="list-style-type: none"> <li>o Lower negative pressures are usually utilized for pediatric patients: -50 to -75 mmHg for neonates and infants up to 2 years of age; and -75 to -125 mmHg for children older than 2 years of age and adolescents up to 21 years of age (Baharestani, 2007).</li> <li>o Consider pain control options prior to the NPWT dressing change.</li> <li>o If the patient has discomfort from removal of the foam dressings, consider lining the wound bed with non-adherent foam; prior to the dressing changes; instill saline through the suction tubing into the foam dressing and clamp the tubing for at least 15 minutes to loosen the foam; or instill a 1% lidocaine hydrochloride solution through the tubing into the foam and clamp the tubing for 15 to 20 minutes to provide analgesia (Bookout et al., 2004).</li> <li>o Children of all ages on NPWT should be carefully monitored for fluid loss and dehydration, particularly neonates (Baharestani, 2007).</li> </ul>

**Additional Ostomy-Related Complications**

<b>Complication</b>	<b>Definition/Description</b>	<b>Intervention/Treatment</b>
<p>Perianal Incontinence-Associated Dermatitis after Closure of a Fecal Ostomy (see Figure 16, 17)</p>	<ul style="list-style-type: none"> <li>• After the ostomy is closed, the sudden exposure of the perianal skin to caustic fecal enzymes can result in skin breakdown.</li> <li>• A shortened intestinal length from a bowel resection can decrease the gastrointestinal (GI) transit time and result in malabsorption, producing stool with more fecal enzymes and bile salts, and a higher pH than normal stool (WOCN, 2008).</li> </ul>	<ul style="list-style-type: none"> <li>• Prevention of incontinence-associated dermatitis should be initiated immediately after ostomy closure.               <ul style="list-style-type: none"> <li>o Change diapers promptly when wet or soiled to decrease skin moisture and contact with fecal enzymes.</li> <li>o Consider using disposable diapers made of super absorbent gel materials, which keep the perineal/perianal skin drier than those without absorbent gel or cloth diapers (AWHONN, 2013).</li> <li>o If the patient is a breastfeeding infant, encourage continuation of breastfeeding: Stools of breastfed infants have lower levels of enzymes (i.e., ureases, lipases, proteases), and their urine has a lower pH (AWHONN, 2013).</li> </ul> </li> <li>• Key components of a skin-care regimen for prevention and management of incontinence-associated dermatitis are cleansing, moisturizing, and protection of the skin (Gray et al., 2011).               <ul style="list-style-type: none"> <li>o Cleansing:                   <ul style="list-style-type: none"> <li>o Clean the skin after each episode of urine or stool passage; use a no-rinse product if possible (Black et al., 2011).</li> <li>o Avoid using bath basins when providing perineal care as they may be contaminated.</li> <li>o Use a pH neutral product with emollients or warm water to gently clean the skin (Black et al., 2011).</li> <li>o Wipe gently to remove stool; avoid scrubbing or excessive cleansing (Black et al., 2011).</li> <li>o Be sure to check all skin folds for residual stool and urine.</li> <li>o For neonates up to 28 days old, use soft cloths, water, and a gentle cleanser (AWHONN, 13).</li> <li>o Avoid wipes with alcohol, preservatives, or perfumes (AWHONN, 2013).</li> <li>o Moisturizing: Apply a moisturizer with emollients and humectants to the intact skin (Black et al., 2011).</li> <li>o Protection of the skin:                       <ul style="list-style-type: none"> <li>o Apply a barrier cream containing zinc oxide or dimethicone to the perianal skin (Lekan-Rutledge, 2006).</li> <li>o Do not “rub off” the protective barrier when cleansing the skin; dab off the stool down to the clean layer; reapply the barrier (AWHONN, 2013).</li> <li>o Alcohol-free plasticizing barrier films can also be used to protect the skin (Lekan-Rutledge, 2006).</li> <li>o Avoid topical products containing isopropyl alcohol, camphor, salicylates, boric acid, baking soda or benzocaine:</li> </ul> </li> </ul> </li> </ul> </li> </ul>

**Additional Ostomy-Related Complications (continued)**

<b>Complication</b>	<b>Definition/Description</b>	<b>Intervention/Treatment</b>
<p>Perianal Incontinence-Associated Dermatitis after Closure of a Fecal Ostomy (see Figure 16, 17)</p>		<ul style="list-style-type: none"> <li>o Avoid topical products containing isopropyl alcohol, camphor, salicylates, boric acid, baking soda or benzocaine:</li> <li>Substances applied to the perineum are absorbed transepidermally in greater quantities than in other areas of the body, which for infants/children wearing diapers (occlusive products) can be harmful (WOCN, 2008).</li> <li>• Perform hand hygiene and put on gloves prior to performing perineal/perianal skin care to prevent transmission of bacteria (Lekan-Rutledge, 2006).</li> <li>• Measures to treat perianal skin breakdown:               <ul style="list-style-type: none"> <li>o Cleanse the skin gently with warm water or a pH balanced cleanser. Use a soft cloth or cotton balls and pat dry.</li> <li>o Use a bottle with a spray attachment filled with warm water if a cloth/cotton ball becomes too painful, and the infant/child is sensitive to touch.</li> <li>o If cleaning with soap, use a mild, pH-neutral soap. Alkaline soaps disrupt the acid mantle of the skin and can change the cutaneous flora.</li> <li>o Use infant wipes that are alcohol-free/ fragrance-free, or use wipes that are for sensitive skin.</li> <li>o Consider warm sitz baths, which can be soothing and can assist with cleansing (Colwell, 2004).</li> <li>o Use cotton balls and mineral oil to remove dried feces or barrier ointment from the skin without causing trauma.</li> <li>o For large areas of moist dermatitis, consider using wet compresses of normal saline (WOCN, 2008).</li> <li>o Burow’s solution (e.g., aluminum sulfate, acetic acid, precipitated calcium carbonate, and water; Mosby’s Medical Dictionary, 2009), or Domeboro® solution (e.g., aluminum acetate solution; one packet to 16 oz water; Medscape, 2014) can be applied prior to application of a barrier ointment to soothe painful skin (Lekan-Rutledge, 2006). Note: There is no data to support the use of Burow’s solution on preterm infants.</li> <li>o Protect the skin with a zinc oxide-based barrier cream, ointment, or paste.</li> <li>o When removing stool from the skin, clean only the visible contamination, leaving residual barrier ointment.</li> <li>o All of the barrier ointment does not need to be removed.</li> <li>o Frequent or vigorous removal of barrier ointment can further traumatize damaged skin</li> </ul> </li> </ul>

**Additional Ostomy-Related Complications (continued)**

<b>Complication</b>	<b>Definition/Description</b>	<b>Intervention/Treatment</b>
<p>Perianal Incontinence-Associated Dermatitis after Closure of a Fecal Ostomy (see Figure 16, 17)</p>		<ul style="list-style-type: none"> <li>o If the barrier ointment does not adhere to the denuded skin, consider an alcohol-free, barrier paste (e.g., pectin or carboxymethylcellulose- based) that will adhere to moist skin.</li> <li>n Consider applying a layer of petrolatum or zinc oxide ointment over the barrier paste; the petrolatum layer can then be wiped away with the stool, leaving the pectin-based paste in place.</li> <li>o Reapply the barrier ointment and petrolatum as needed with each diaper change.</li> <li>o Consider lightly dusting denuded skin with pectin powder to absorb the moisture and sealing it with an alcohol-free barrier film to provide a dry surface to which a zinc oxide ointment can then be applied.</li> <li>o Following removal of barrier ointment from the skin or after bathing, air-drying the area can help reverse over-hydration of the skin caused from urine.</li> <li>o Avoid routine use of antibacterial ointments (AWHONN, 2013).</li> <li>o Due to altered skin integrity, secondary skin infections can occur. While fungal infections (<i>Candida albicans</i>) are predominant in skin compromised from incontinence-associated dermatitis, secondary bacterial infections (e.g., <i>Staphylococcus aureus</i>, <math>\beta</math>-hemolytic streptococcus; <i>Pseudomonas aeruginosa</i>, <i>Cornebacterium</i>, and <i>Proteus mirabilis</i>) have also been associated with incontinence- associated dermatitis (Gray et al., 2011).</li> <li>o Identify and obtain treatment orders for secondary skin infections with appropriate topical or oral antifungals or antibiotics.</li> <li>o when applying an antifungal cream, apply the antifungal first and cover it with the barrier cream, or use a moisture barrier that has an antifungal component included (Lekan-Rutledge, 2006).</li> </ul>

### Pouching Complications

Peristomal Complications	Definition/Description	Intervention/Treatment
<p>Non-Pouching Option for Fecal Stomas</p>	<ul style="list-style-type: none"> <li>• Often infants are managed without pouches such as with a colostomy if stool can be contained in a diaper; however a pouch is necessary for a stoma with a high output or caustic effluent such as an ileostomy or ascending colostomy (Doughty, 2006; Harrison &amp; Boarini, 2004)</li> <li>• At times, a stoma cannot be pouched effectively due to challenging characteristics such as when the stoma is retracted, stenosed, flush with the abdominal surface, or in a difficult location; and non-pouching should be considered if all other options have failed.</li> </ul>	<ul style="list-style-type: none"> <li>• Protect the peristomal skin from the effluent anytime a pouch is not used.                             <ul style="list-style-type: none"> <li>o Apply pectin powder to denuded skin; cover the powder with an alcohol-free skin sealant; then apply a protective skin preparation (e.g., zinc oxide-based moisture barrier, petrolatum).</li> <li>o When a pouch is not used, do not use a skin barrier/pectin paste (ostomy paste) or hydrocolloids on the peristomal skin as a barrier to effluent.</li> </ul> </li> <li>• Fluffed gauze, a diaper, or an absorbent dressing may be placed around the stoma to absorb the effluent. Return to a pouching system as soon as possible.</li> <li>• Consider double diapering. Apply one small diaper over the stoma, then a larger diaper in the normal diapering method.</li> <li>• Change the diaper frequently (e.g., every 1 to 3 hours and as needed).</li> </ul>
<p>Vesicostomy</p>	<ul style="list-style-type: none"> <li>• A vesicostomy is an opening made through the suprapubic abdominal wall into the bladder, and the bladder mucosa is sutured to the abdominal skin to create a small stoma, which may have the appearance of a small hole (WOCN, 2011a).</li> <li>• Vesicostomies are flush with the skin, often in difficult locations, and may retract over time, which can make successful pouching difficult (Harrison &amp; Boarini, 2004).</li> </ul>	<ul style="list-style-type: none"> <li>• Use a large diaper or an absorbent pad to cover the stoma. Change the diaper frequently. Gently cleanse the skin with water and pat dry.</li> <li>• Use a protective skin barrier cream:                             <ul style="list-style-type: none"> <li>o Routine complete removal of the barrier cream is not necessary and may irritate skin.</li> <li>o Removal of the cream may be done by soaking the area with warm water and gentle cleansing using cotton balls or a soft cloth and mineral oil or baby oil (WOCN, 2011a).</li> </ul> </li> </ul>
<p>Retention Ring/Rod in Stoma (see Figures 18.19)</p>	<ul style="list-style-type: none"> <li>• Loop stomas, common for patients with Hirschsprung's disease, are created by bringing a loop of bowel through the abdominal wall, and they are often stabilized on the abdominal surface by a retention ring or rod until the abdominal wall heals (WOCN, 2011a).</li> <li>• The loop stoma is usually oval in shape, temporary, and may be constructed anywhere in the intestine.</li> <li>• The retention ring is usually a loop made from a red rubber catheter.</li> <li>• The retention rod is usually a short, straight piece of catheter that is slid under the stoma with each end visible on either side of the stoma.</li> <li>• The retention ring/rod is removed at the discretion of the surgeon approximately 1 to 2 weeks after surgery.</li> </ul>	<ul style="list-style-type: none"> <li>• To pouch a stoma with a retention ring: Cut the stomal opening in the skin barrier/wafer slightly larger than the stoma; may need to squeeze the retention ring to elongate it so that it can fit through the stomal opening as the skin barrier/wafer and pouch are applied.</li> <li>• To pouch a stoma with a retention rod:                             <ul style="list-style-type: none"> <li>o Apply dabs of stoma paste over both ends of the rod to seal and level the pouching surface of the skin.</li> <li>o Cut the stomal opening in the skin barrier/wafer (i.e., usually 1/8 inch larger than the stoma) so that it easily fits over just the stoma. The retention rod will be under the skin barrier/wafer.</li> <li>o Apply alcohol-free stoma paste or a moldable barrier product to seal the space around the opening cut for the stoma, and apply the pouch.</li> </ul> </li> </ul>

<b>Pouching Complications</b>		
<b>Peristomal Complications</b>	<b>Definition/Description</b>	<b>Intervention/Treatment</b>
Central or Intravenous Lines and Stomas (see Figure 20)	<ul style="list-style-type: none"> <li>• Patients with central or intravenous lines located near an ostomy are at risk for infection.</li> <li>• Leakage from the pouch may contaminate central/intravenous lines if they are near the pouch.               <ul style="list-style-type: none"> <li>o In a study investigating Candida central line- associated blood stream infections (CLABSI), on the initial analysis, the risk of CLABSI was more than 2-fold higher (<math>p = .013</math>) for patients with an ileostomy or colostomy (<math>n = 15</math>) compared to controls (<math>n = 19</math>); and</li> <li>o upon further analysis, the key independent factors associated with CLABSI were presence of a gastrostomy tube, intestinal failure, and previous total parenteral nutrition/blood transfusions (Klatte, Newland, &amp; Jackson, 2013).</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• To prevent contamination of central/intravenous lines with feces, position the central/intravenous lines and ports away from the ostomy.</li> <li>• Utilize tubular, stretch net dressings where needed to secure the lines.</li> <li>• Schedule routine changes of the pouching system to avoid leakage.</li> <li>• When emptying the pouch, position the central/intravenous lines away from the ostomy pouch outlet.</li> </ul>
High Output Fecal Stoma	<ul style="list-style-type: none"> <li>• The location and type of ostomy can affect the type and volume of output. A high output is most commonly due to extensive bowel resection, diseases such as Crohn's disease, infection, or medications (Bafford &amp; Irani, 2013).</li> <li>• Excessive fluid losses can cause dehydration, electrolyte imbalance, vitamin deficiencies, and malnutrition (Bafford &amp; Irani, 2013).</li> <li>• Colon: Output from an ostomy placed in the right or transverse colon is more liquid or loose with a higher volume than a left-sided or sigmoid colostomy (Harrison &amp; Boarini, 2004).</li> <li>• Small bowel: Output from ostomies in the small intestine (i.e., ileostomy, jejunostomy, duodenostomy) are liquid or loose, and can have a high volume of output (Harrison &amp; Boarini, 2004).</li> </ul>	<ul style="list-style-type: none"> <li>• Management of high ostomy output may require a combination of oral and intravenous fluid/electrolyte replacement, vitamin supplementation, restriction of hypotonic fluid intake, and medications to decrease the output as appropriate according to the age of the patient and ordered by the medical provider (Bafford &amp; Irani, 2013).</li> <li>• Carefully monitor the patient with a high output (including weights and intake/output measures) to identify signs/symptoms of dehydration (Doughty, 2006).</li> <li>• Assess the dietary intake:               <ul style="list-style-type: none"> <li>o Limit foods known to increase or loosen stool output such as fruits/fruit juices (e.g., apples, prunes) and vegetables (e.g., beans, cabbage); and</li> <li>o consider foods that can thicken the stool to slow the output such as applesauce, bananas, cheese, potatoes without skin, boiled rice and pasta, creamy peanut butter, marshmallows, and tapioca pudding (Floruta, 2004).</li> </ul> </li> <li>• Use a high output pouch or urostomy pouch connected to a urine collection bag/container.</li> <li>• Empty the pouch frequently.               <ul style="list-style-type: none"> <li>o Place absorbent crystals/granules or cotton balls into the pouch to absorb fluid.</li> <li>o Weigh the pouch/cotton balls prior to use for accurate intake/output.</li> </ul> </li> </ul>

**Pouching Complications (continued)**

<b>Peristomal Complications</b>	<b>Definition/Description</b>	<b>Intervention/Treatment</b>
Pouch Leakage	<ul style="list-style-type: none"> <li>• An inadequate pouch-to-skin seal allows fecal effluent or urine to undermine the seal resulting in leakage and skin damage (Colwell, 2004).</li> <li>• Leakage may be caused by multiple factors (Colwell, 2004):               <ul style="list-style-type: none"> <li>o Infant or child may pull at the pouch and loosen the seal.</li> <li>o An incorrectly fitted pouch.</li> <li>o A flush or retracted stoma.</li> <li>o Weight changes that affect the patient's abdominal contours.</li> <li>o Location of the stoma in an abdominal crease, or in or near an incision.</li> <li>o A high output stoma.</li> <li>o Prolonged wear time.</li> <li>o Denuded peristomal skin.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Gently remove pouching system using “push/pull” technique:               <ul style="list-style-type: none"> <li>o Use a silicone-based adhesive remover to take off the pouching system, if necessary (AWHONN, 2013).</li> <li>o Avoid using alcohol-based or oil-based solvents/adhesive removers for low birth weight infants or neonates (i.e., birth to 28 days of life for term infants) due to the risk of absorption and toxicity from chemicals in the solvents; use of solvents should only be considered in situations where an aggressive adhesive would strip off the epidermis upon removal (AWHONN, 2013; WOCN, 2011a).</li> <li>o Schedule routine changes of the pouching system.                   <ul style="list-style-type: none"> <li>• Assess the stoma and pouch fit.</li> <li>o If the stoma is budded, fit the skin barrier/wafer as close as possible to the stoma.</li> <li>o If the stoma is flat or retracted, add convexity (WOCN, 2011a).</li> <li>o Consider extended-wear barriers; may have to use an adult pouch because there are not any pediatric, extended-wear options.</li> <li>o Consider use of an ostomy belt (Bafford &amp; Irani, 2013; WOCN, 2011a).</li> <li>o Assess the peristomal skin and abdominal contours, and use products to protect the peristomal skin.</li> <li>o Use pectin powder and an alcohol-free skin barrier/sealant for skin breakdown (AWHONN, 2013).</li> <li>o Use alcohol-free paste or moldable rings and strip paste if skin breakdown is present or to fill creases (AWHONN, 2013).</li> <li>• Assess clothing options.                       <ul style="list-style-type: none"> <li>o Onesies for infants and toddlers can prevent the child from pulling at the pouch.</li> <li>o Tubular netting can be made into a bodysuit to help secure the pouch and prevent the child from pulling and dislodging the pouching system.</li> </ul> </li> </ul> </li> </ul> </li> </ul>

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## Appendix A

### Images of Pediatric Ostomy Complications (WOCN, 2008)



Figure 1. Stomal prolapse: Distal end prolapse.



Figure 2. Prolapse with color changes



Figure 3. Radial slits in skin barrier / wafer



Figure 4. Stomal laceration



Figure 5. Stomal laceration



Figure 6. Stomal retraction and stenosis

## Appendix A (continued)

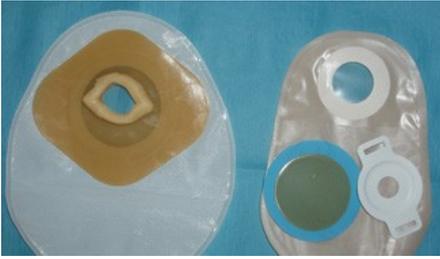


Figure 7. Creating convexity for a retracted stoma



Figure 8. Multiple stomas



Figure 9. Peristomal allergic contact dermatitis



Figure 10. Peristomal candidiasis/fungal infection



Figure 11. Peristomal hernia



Figure 12. Mucocutaneous separation



Figure 13. Umbilical stump adjacent to a stoma.



Figure 14. Pouching of stoma adduct to the umbilicus



Figure 15. Wound or incision adjacent to a stoma.



Figure 16. Perianal incontinence-association dermatitis/skin breakdown after fecal ostomy closure.



Figure 17. Perianal incontinence-associated dermatitis/skin breakdown after fecal ostomy closure.



Figure 18. Stoma with a retention ring.



Figure 19. Stoma with retention rod.



Figure 20. Central lines near stoma.

## Appendix B

### Examples of Low-Fiber/Low-Residue Foods

*Table. Examples of Recommended Low-Fiber/Low-Residue Foods to Choose and Foods to Avoid (CAET, 2007; UPMC, 2013, 2014).*

Food Category	Low-Fiber/Low-Residue Foods to Choose	Foods to Avoid
Breads and Cereal	<ul style="list-style-type: none"> <li>• Refined breads, crackers, cereals, pancakes, and waffles.</li> <li>• Pasta.</li> <li>• White rice.</li> <li>• Strained sweet and white potatoes.</li> </ul>	<ul style="list-style-type: none"> <li>• Whole grains in breads, cereals, and crackers/ graham crackers.</li> <li>• Breads with seeds, nuts, and dried fruits.</li> <li>• Whole grain pasta and brown rice.</li> </ul>
Vegetables	<ul style="list-style-type: none"> <li>• Well-cooked or canned vegetables without skin or seeds (e.g., carrots, beets, pumpkin, squash, tomato juice).</li> </ul>	<ul style="list-style-type: none"> <li>• Raw, coarse vegetables (e.g., broccoli, dried beans, cabbage, corn, onions, peas).</li> <li>• Vegetable skins.</li> </ul>
Fruits/Fruit Juice	<ul style="list-style-type: none"> <li>• Canned or cooked fruit (except pineapple).</li> <li>• Applesauce.</li> <li>• Peaches.</li> <li>• Pears.</li> <li>• Ripe bananas.</li> <li>• Fruit juices without pulp.</li> </ul>	<ul style="list-style-type: none"> <li>• Raw or dried fruit; coconut.</li> <li>• Fruit peels.</li> <li>• Canned pineapple.</li> <li>• Berries; raisins.</li> </ul>
Milk	<ul style="list-style-type: none"> <li>• Milk: buttermilk, skim or low fat, soy, almond, rice, or lactose-free, formula and breast milk.</li> <li>• Yogurt.</li> <li>• Cheese; cottage cheese.</li> <li>• Low fat ice cream and sherbet.</li> </ul>	<ul style="list-style-type: none"> <li>• Yogurt or ice cream with nuts or seeds.</li> </ul>
Meats, Fish and Poultry	<ul style="list-style-type: none"> <li>• Well-cooked and tender meat, fish, and poultry.</li> </ul>	<ul style="list-style-type: none"> <li>• Tough or fried meat, fish, or poultry.</li> <li>• Meats with casings.</li> </ul>
Fats and Sweets	<ul style="list-style-type: none"> <li>• Butter, margarine, and cream.</li> <li>• Custard.</li> <li>• Rice or bread pudding.</li> <li>• Tapioca.</li> <li>• Angel food cake.</li> <li>• Frozen gelatin deserts with pureed fruit or juice.</li> <li>• Clear jelly, honey, and syrup.</li> </ul>	<ul style="list-style-type: none"> <li>• Cakes, cookies made with whole grains, seeds, nuts, coconut, or dried fruit.</li> <li>• Jams and preserves.</li> </ul>
Other	<ul style="list-style-type: none"> <li>• Eggs.</li> <li>• Smooth nut butters.</li> </ul>	<ul style="list-style-type: none"> <li>• Nuts, popcorn, and seeds.</li> <li>• Chunky nut butters.</li> <li>• Pickles, olives, and relishes.</li> </ul>

## **Acknowledgment about Content Validation**

This document was reviewed in the consensus-building process of the Wound, Ostomy and Continence Nurses Society known as Content Validation, which was managed by the Center for Clinical Investigation.