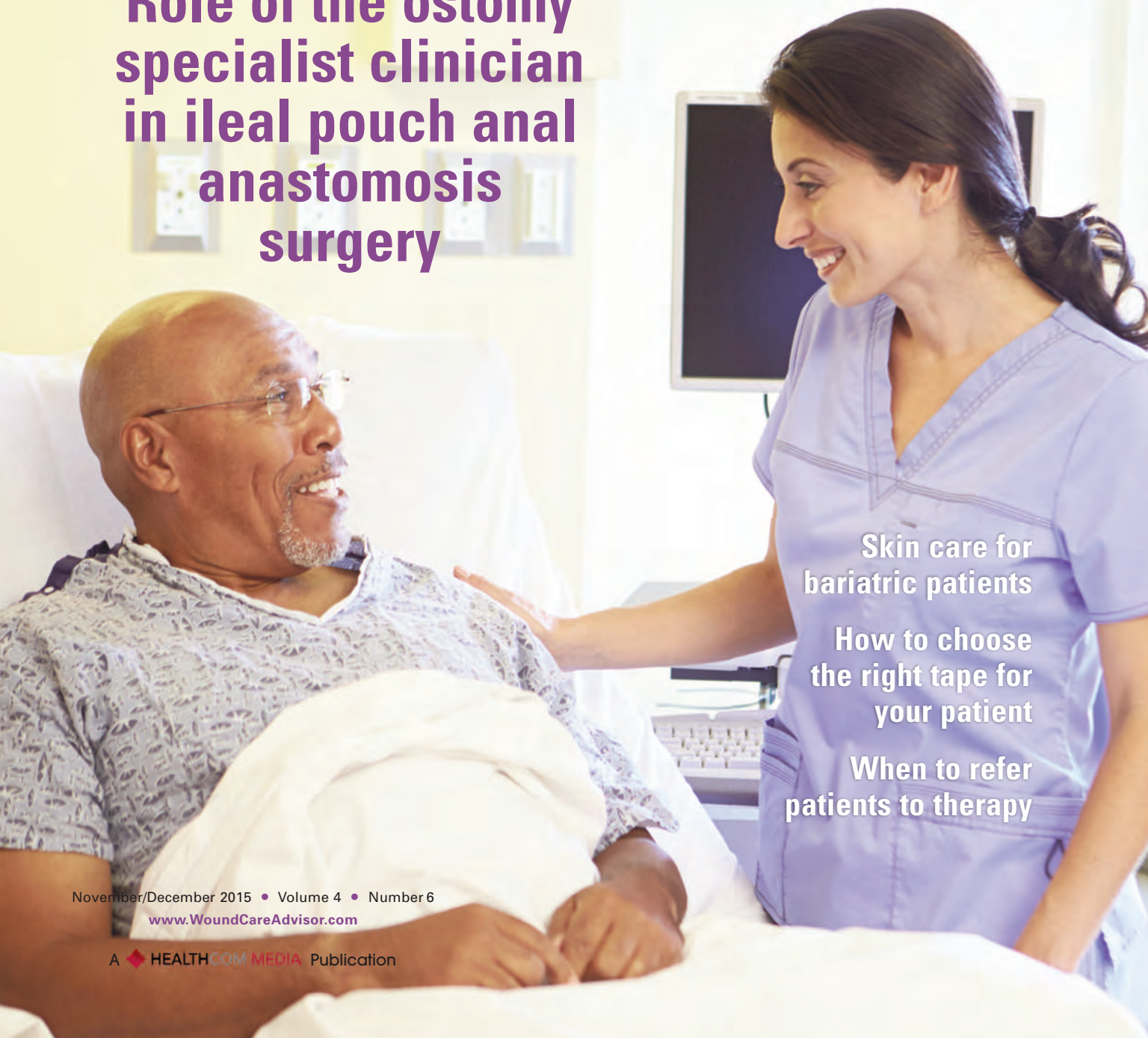
Wound Care ADVISOR

PRACTICAL ISSUES IN WOUND, SKIN, AND OSTOMY MANAGEMENT

Official journal of National Alliance of Wound Care and Ostomy®

Role of the ostomy specialist clinician in ileal pouch anal anastomosis surgery



Skin care for bariatric patients

How to choose the right tape for your patient

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Wound Care Advisor is written by skin and wound care experts and presented in a reader-friendly electronic format. Clinical content is peer reviewed.

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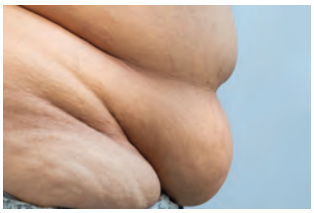

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Clears the way for healthy tissue

Collagenase SANTYL® Ointment 250 units/g is the only FDA-approved enzymatic debrider that selectively removes necrotic tissue without harming granulation tissue

Collagenase SANTYL® Ointment is indicated for debriding chronic dermal ulcers and severely burned areas.

Occasional slight transient erythema has been noted in surrounding tissue when applied outside the wound. One case of systemic hypersensitivity has been reported after 1 year of treatment with collagenase and cortisone. Use of Collagenase SANTYL® Ointment should be terminated when debridement is complete and granulation tissue is well established.

Please see complete prescribing information on adjacent page.

For more information, please visit **www.santyl.com**.

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DESCRIPTION: Collagenase SANTYL® Ointment is a sterile enzymatic debriding ointment which contains 250 collagenase units per gram of white petrolatum USP. The enzyme collagenase is derived from the fermentation by *Clostridium histolyticum*. It possesses the unique ability to digest collagen in necrotic tissue.

CLINICAL PHARMACOLOGY: Since collagen accounts for 75% of the dry weight of skin tissue, the ability of collagenase to digest collagen in the physiological pH and temperature range makes it particularly effective in the removal of detritus.[1] Collagenase thus contributes towards the formation of granulation tissue and subsequent epithelization of dermal ulcers and severely burned areas. [2, 3, 4, 5, 6] Collagen in healthy tissue or in newly formed granulation tissue is not attacked. [2, 3, 4, 5, 6, 7, 8] There is no information available on collagenase absorption through skin or its concentration in body fluids associated with therapeutic and/or toxic effects, degree of binding to plasma proteins, degree of uptake by a particular organ or in the fetus, and passage across the blood brain barrier.

INDICATIONS AND USAGE: Collagenase SANTYL® Ointment is indicated for debriding chronic dermal ulcers [2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18] and severely burned areas. [3, 4, 5, 7, 16, 19, 20, 21]

CONTRAINDICATIONS: Collagenase SANTYL® Ointment is contraindicated in patients who have shown local or systemic hypersensitivity to collagenase.

PRECAUTIONS: The optimal pH range of collagenase is 6 to 8. Higher or lower pH conditions will decrease the enzyme's activity and appropriate precautions should be taken. The enzymatic activity is also adversely affected by certain detergents, and heavy metal ions such as mercury and silver which are used in some antiseptics. When it is suspected such materials have been used, the site should be carefully cleansed by repeated washings with normal saline before Collagenase SANTYL® Ointment is applied. Soaks containing metal ions or acidic solutions should be avoided because of the metal ion and low pH. Cleansing materials such as Dakin's solution and normal saline are compatible with Collagenase SANTYL® Ointment.

Debilitated patients should be closely monitored for systemic bacterial infections because of the theoretical possibility that debriding enzymes may increase the risk of bacteremia.

A slight transient erythema has been noted occasionally in the surrounding tissue, particularly when Collagenase SANTYL® Ointment was not confined to the wound. Therefore, the ointment should be applied carefully within the area of the wound. Safety and effectiveness in pediatric patients have not been established.

ADVERSE REACTIONS: No allergic sensitivity or toxic reactions have been noted in clinical use when used as directed. However, one case of systemic manifestations of hypersensitivity to collagenase in a patient treated for more than one year with a combination of collagenase and cortisone has been reported.

OVERDOSAGE: No systemic or local reaction attributed to overdose has been observed in clinical investigations and clinical use. If deemed necessary the enzyme may be inactivated by washing the area with povidone iodine.

DOSAGE AND ADMINISTRATION: Collagenase SANTYL® Ointment should be applied once daily (or more frequently if the dressing becomes soiled, as from incontinence). When clinically indicated, crosshatching thick eschar with a #10 blade allows Collagenase SANTYL® Ointment more surface contact with necrotic debris. It is also desirable to remove, with forceps and scissors, as much loosened detritus as can be done readily. Use Collagenase SANTYL® Ointment in the following manner:

1 – Prior to application the wound should be cleansed of debris and digested material by gently rubbing with a gauze pad saturated with normal saline solution, or with the desired cleansing agent compatible with Collagenase SANTYL® Ointment (See **PRECAUTIONS**), followed by a normal saline solution rinse.

2 – Whenever infection is present, it is desirable to use an appropriate topical antibiotic powder. The antibiotic should be applied to the wound prior to the application of Collagenase SANTYL® Ointment. Should the infection not respond, therapy with Collagenase SANTYL® Ointment should be discontinued until remission of the infection.

3 – Collagenase SANTYL® Ointment may be applied directly to the wound or to a sterile gauze pad which is then applied to the wound and properly secured.

4 – Use of Collagenase SANTYL® Ointment should be terminated when debridement of necrotic tissue is complete and granulation tissue is well established.

HOW SUPPLIED: Collagenase SANTYL® Ointment contains 250 units of collagenase enzyme per gram of white petrolatum USP.

Do not store above 25°C (77°F). Sterility guaranteed until tube is opened.

Collagenase SANTYL® Ointment is available in 15 gram, 30 gram, and 90 gram tubes.

REFERENCES: 1. Mandl, I., Adv Enzymol. 23:163, 1961. **2.** Boxer, A.M., Gottesman, N., Bernstein, H., & Mandl, I., Geriatrics. 24:75, 1969. **3.** Mazurek, I., Med. Welt. 22:150, 1971. **4.** Zimmermann, WE., in "Collagenase," Mandl, I., ed., Gordon & Breach, Science Publishers, New York, 1971, p. 131, p. 185. **5.** Vetra, H., & Whittaker, D., Geriatrics. 30:53, 1975. **6.** Rao, D.B., Sane, P.G., & Georgiev, E.L., J. Am. Geriatrics Soc. 23:22, 1975. **7.** Vrabec, R., Moserova, J., Konickova, Z., Behounkova, E., & Blaha, J., J. Hyg. Epidemiol. Microbiol. Immunol. 18:496, 1974. **8.** Lippmann, H.I., Arch. Phys. Med. Rehabil. 54:588, 1973. **9.** German, F. M., in "Collagenase," Mandl, I., ed., Gordon & Breach, Science Publishers, New York, 1971, p. 165. **10.** Haimovici, H. & Strauch, B., in "Collagenase," Mandl, I., ed., Gordon & Breach, Science Publishers, New York, 1971, p. 177. **11.** Lee, L.K., & Ambrus, J. L., Geriatrics. 30:91, 1975. **12.** Locke, R.K., & Heifitz, N.M., J. Am. Pod. Assoc. 65:242, 1975. **13.** Varma, A.O., Bugatch, E., & German, F.M., Surg. Gynecol. Obstet. 136:281, 1973. **14.** Barrett, D., Jr., & Klibanski, A., Am. J. Nurs. 73:849, 1973. **15.** Bardfeld, L.A., J. Pod. Ed. 1:41, 1970. **16.** Blum, G., Schweiz, Rundschau Med Praxis. 62:820, 1973. Abstr. in Dermatology Digest, Feb. 1974, p. 36. **17.** Zaruba, F., Lettl, A., Brozkova, L., Skrdlantova, H., & Krs, V., J. Hyg. Epidemiol. Microbiol. Immunol. 18:499, 1974. **18.** Altman, M.I., Goldstein, L., & Horwitz, S., J. Am. Pod. Assoc. 68:11, 1978. **19.** Rehn, V.J., Med. Klin. 58:799, 1963. **20.** Krauss, H., Koslowski, L., & Zimmermann, W.E., Langenbecks Arch. Klin. Chir. 303:23, 1963. **21.** Gruenagel, H.H., Med. Klin. 58:442, 1963.

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Seeing healthcare from a new perspective

As healthcare clinicians, our world is full of tasks to be completed. Some are new, but many are tasks we repeat every day and thus have become routine—things we could almost do in our sleep.

But what's routine for us may not be routine for our patients. For some patients, these routine tasks of ours may be their first encounter with a healthcare situation.

When a member of my family needed health care recently, I observed as a family member, not a clinician, and learned what it's like to be on the other side of the clinician's routine. What follows are some shareworthy observations.

- **Read health record notes in the computer before talking with the patient.** Asking patients about the care they've already received or what medications they've been given doesn't build their confidence in your care.
- **Keep the patient updated.** If you're waiting for an order, lab result, or callback from X-ray, tell the patient this—if possible, more often than once a shift. Think how powerless and vulnerable you would feel lying in a strange bed away from home with no control.
- **Don't be too cheery and giggly.** Remember—the patient is sick and may not be feeling well. Also, you may have great coworkers and a great job, but when you're conducting the patient assess-

ment, the patient and family don't want to hear a 20-minute description of the fun you have in your department. This could make them think you're so busy chatting that you're not paying attention to detail. Focus on the patient and your assessment instead of trying to become the patient's buddy.

- **Check bandages at least every shift, even if you're not going to change them.** If you're checking them with a casual glance or combining this with another task, make sure the patient knows you're checking.
- **Inspect surgical drains or collection devices at least once every shift, and empty them as indicated.** Surgical drains can be extremely scary to patients, who may feel as if their guts or blood are draining from their body.
- **If the patient's skin is hairy, shave or trim the hair before applying tape or a transparent film dressing.** If you don't feel comfortable removing the hair, ask another clinician for help. Always explain to the patient the reason for hair removal. (Most patients prefer hair removal to the alternative of hair-pulling pain.) A self-adherent elastic wrap is a great alternative to tape for securing bandages on hairy skin, although you still need to use caution when removing it.
- **Before changing a surgical or wound dressing, find out if the patient has seen the incision or wound; if not, ask if he or she wants to see it.** When appropriate, it's best for patients to understand what's under the bandage. They may be relieved to find out that what they'd been envisioning as a fist-sized wound is much smaller—or, if it's a large wound, they may be surprised by its size.
- **Don't complain about the computer or tell patients you have poor computer skills as you're typing information into their health record.**
- **If the patient is required to use a computer stylus to sign something in the health record, make sure to clean it before handing it to him or her.** Do this even if the stylus has already been disinfected, because the patient doesn't know that.
- **Ask visitors to leave the room before you provide care or discuss the patient's health condition.** This way, you spare the patient the burden of having to ask friends or family to leave.
- **Don't rush discharge.** Make sure you've reviewed everything, including post-care follow-up and whom to contact for help. Verify that transfer arrangements are in place. Most important, ensure that the patient and family members have received and understand patient and caregiver education. (The teach-back method is a great way to determine their understanding. For more information, visit **http://www.teachbacktraining.org**.)

As clinicians, we should strive to make every patient encounter special, not routine. Remember—it's *always* about the patient.

Donna Sardina, RN, MHA, WCC, CWCMS, DWC, OMS
Editor-in-Chief
Wound Care Advisor
Cofounder, Wound Care Education Institute
Plainfield, Illinois

Modified Braden risk score proposed

A study in *Ostomy Wound Management* states the risk classification of patients using Braden Scale scores should comprise three (rather than five) levels: high risk, with a total score ≤11; moderate risk, with a total score of 12 to 16; and mild risk, with a total score ≥17.

The retrospective analysis of consecutively admitted patients at risk for pressure ulcer to an acute-care facility included 2,625 patients, with an age range from 1 month to 98 years; 3.1% developed a pressure ulcer.

The authors of "**A retrospective analysis of pressure ulcer incidence and modified Braden Scale score risk classifications**[A]" conclude that the modified Braden Scale "may be more convenient and feasible in clinical practice."

Amputations and foot-related hospitalization in dialysis patients

"**Amputations and foot-related hospitalisations disproportionately affect dialysis patients**[B]," even though the incidence of foot ulcers is the same in dialysis patients and patients with an ulcer history.

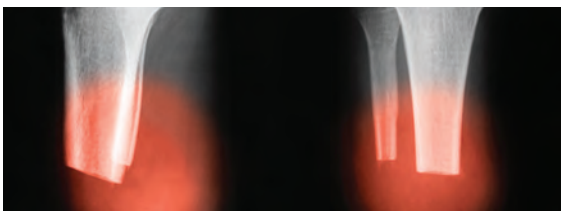
The study in *International Wound Journal* included 150 consecutive patients with diabetes who were on dialysis and 150 patients with a history of foot ulceration. Each patient was followed for 30 months.

Plantar shear plays important role in foot ulcers

Considering both plantar shear and pressure, as opposed to pressure alone, is more effective in preventing foot ulcers, according to a study in *Diabetes Care*.

"**Peak plantar shear and pressure and foot ulcer locations: A call to revisit ulceration pathomechanics**[C]" notes that pressure is a poor predictor of foot ulcer in patients with diabetes, and pressure-reducing therapeutic footwear has minimal effect in preventing recurrent ulceration.

The authors write that their findings indicate that plantar shear has a "clinically significant role in ulceration" and that ulcers at different sites may have different pathologies. They also call for more research on plantar shear.



Lower extremity amputation in patients with diabetes

A longitudinal study in *Diabetes Care* re-

ports that people with diabetes who have undergone lower-extremity amputation "are more likely to die at any given point in time" compared to those who have not experienced amputation.

"**Diabetes, lower-extremity amputation, and death[D]**" notes that complications from diabetes account for only some of the variation.

AHA releases new CPR guidelines

The American Heart Association has published the "2015 **Guidelines[E]** Update for Cardiopulmonary Resuscitation (CPR) and Emergency Cardiovascular Care (ECC)" in the journal ***Circulation[F]***. The guidelines recommend chest compressions at a rate of 100 to 120 per minute and to a depth of at least 2 inches (avoiding depths greater than 2.4 inches). Other recommendations include having clinicians perform steps simultaneously to reduce the time to the first chest compression.

Bystanders should use mobile phones to immediately call 911, placing the phones on speaker, so the dispatcher can offer assistance. Untrained bystanders should provide Hands-Only CPR, and bystanders who are trained in CPR should add breaths in a 30:2 compressions-to-breath ratio.

Diabetes increases risk of fracture

"**Type 1 diabetes is associated with an increased risk of fracture across the life span:**

A population-based cohort study using The Health Improvement Network (THIN)[G]" included patients with and without diabetes, who were matched on parameters such as age and sex.

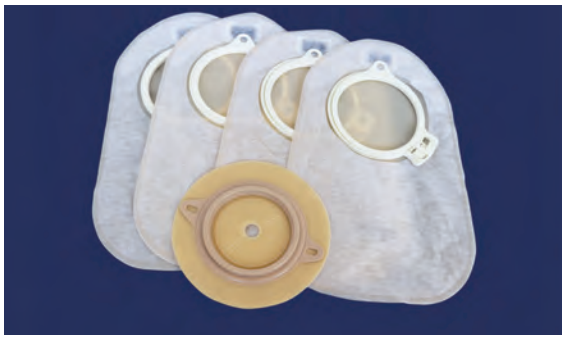
The risk of fracture was lowest in males and females younger than 20 years and highest in men ages 60 to 69, according to the study, which was published in *Diabetes Care*. Lower extremity fractures accounted for a higher proportion of incident fractures in participants with diabetes compared to those without. Secondary analyses for incident hip fractures identified the highest hazard ratio of 5.64 in men ages 60 to 69 and the highest hazard ratio of 5.63 in women ages 30 to 39.

Nurses play important role in quality of life for ostomy patients

"**Analysing the role of support wear, clothing and accessories in maintaining ostomates' quality of life[H]**," published in *Gastrointestinal Nursing*, notes that nurses with expertise in stoma care can help patients with ostomies achieve optimal quality of life by using their expertise to guide patients in making decisions that will help them return to the activities, sports, hobbies, and lifestyle they enjoyed before surgery.

Liposuction may be helpful for lymphedema

"**Complete reduction of arm lymphoma follow-**



ing breast cancer—A prospective twenty-one years' study[I]" concludes that liposuction is effective for treating chronic, nonpitting leg lymphedema in patients who don't respond to conservative treatment.

The study, published in *Plastic and Reconstructive Surgery*, included 146 women, with a mean age of 63 and a mean duration of arm swelling of 9 years. It notes that reduced volume is maintained through constant use of compression garments.

Online Resources

A. http://www.o-wm.com/article/retrospective-analysis-pressure-ulcer-incidence-and-modified-braden-scale-score-risk

B. http://onlinelibrary.wiley.com/doi/10.1111/iwj.12146/abstract

C. http://care.diabetesjournals.org/content/early/2015/09/13/dc15-1596.full.pdf+html

D. http://care.diabetesjournals.org/content/38/10/1852.abstract

E. http://newsroom.heart.org/news/american-heart-association-cpr-guidelines:-quick-action-more-teamwork-key-to-saving-more-lives?preview=2b8e

F. http://circ.ahajournals.org/content/132/18_suppl_2.toc

G. http://care.diabetesjournals.org/content/38/10/1913.abstract

H. http://www.magonlinelibrary.com/doi/10.12968/gasn.2015.13.7.23

I. http://journals.lww.com/plasreconsurg/Citation/2015/10001/Complete_Reduction_of_Arm_Lymphedema_Following.183.aspx

Role of the ostomy specialist clinician in ileal pouch anal anastomosis surgery

Providing education about this procedure can help restore patients to wellness.

By Leanne Richbourg, MSN, RN, APRN-BC, CWON-AP, CCCN, GCNS-BC

Restorative proctocolectomy with ileal pouch anal anastomosis (IPAA) is the gold standard for surgical treatment of ulcerative colitis (UC) or familial adenomatous polyposis (FAP). It's also done to treat colon and rectal cancers, such as those caused by Lynch syndrome (LS). IPAA allows the patient to maintain fecal continence and evacuate stool from the anus after colon and rectum removal. A temporary ileostomy may be part of the overall process, but there's no need for a permanent stoma. (See *Understanding ulcerative colitis, FAP, and Lynch syndrome.*)

Contraindications for IPAA include:

- Crohn's disease, which can recur at any point along the GI tract
- incompetent anal sphincter tone (most common in older adults)
- diseases of the distal rectum or anal canal.

Preoperative education

You can help improve your patient's quality of life and health status by providing education about IPAA. When preparing the patient for surgery, explain the procedure and discuss how it will change GI tract anatomy. Because the patient is likely to have a stoma, describe what the stoma will look like, how to care for it, how to use pouches to contain stoma output, what lifestyle adjustments to expect, and psychological preparation.

Explain that by the 12th postoperative month, the patient's physical and psychological health, independence level, and general overall quality of life is likely to improve significantly over preoperative levels. By 3 years, quality of life scores most likely will match those of the healthy population in terms of physical health, independence, spirituality, and environment. Psychological health and social relationships scores also typically improve, although not quite to the extent as the healthy population.

Understanding ulcerative colitis, FAP, and Lynch syndrome

Restorative proctocolectomy with ileal pouch anal anastomosis may be used to treat ulcerative colitis (UC), familial adenomatous polyposis (FAP), and Lynch syndrome.

Ulcerative colitis

The cause of this inflammatory bowel disease remains unknown, but current research points to a possible combination of genetic, immunologic, and environmental factors (such as bacteria or viruses). The disease affects approximately 700,000 people in the United States. Surgery may be required in patients with fulminant colitis, toxic megacolon, dysplasia, cancer, or extraintestinal manifestations—or if other therapy fails.

To help you remember extraintestinal manifestations of UC, use the mnemonic *A Pie Sac*:

A: Aphthous ulcers
P: Pyoderma gangrenosum
I: Iritis
E: Erythema nodosum
S: Sclerosing cholangitis
A: Arthritis
C: Clubbing of fingers

FAP

FAP stems from an autosomal dominant-inherited gene mutation involving adenomatous polyposis coli, which cause hundreds to thousands of polyps in the GI tract. Polyps are most common in the colon (adenomas are colon polyps) and rectum, but they also can arise in the stomach and small bowel. A child of a parent with FAP has a 50% chance of inheriting the defective gene.

Once multiple precancerous polyps are detected, colectomy is the treatment of choice. FAP patients have a 90% chance of developing colorectal cancer by age 45. The National Comprehensive Cancer Network (NCCN) recommends people at risk for FAP start surveillance between ages 10 and 15, to include APC gene testing and annual flexible sigmoidoscopy or colonoscopy.

Lynch syndrome

People with Lynch syndrome (the preferred term for hereditary nonpolyposis colorectal cancer, an autosomal dominant-inherited genetic mutation disorder) also may have polyps. The genetic mutation involves DNA mismatch repair genes.

Lynch syndrome is more common in the right colon, but also can develop in other sections of the GI tract, as well as the ovaries and endometrial lining of the uterus. NCCN recommends people with a family history of Lynch syndrome start surveillance between ages 20 and 25 (or 2 to 5 years before the age at diagnosis of the youngest affected family member, if younger than age 25). Evaluation should include testing for genetic abnormalities and colonoscopy every 1 to 2 years.

Patients may need help in understanding these various conditions. Online resources may be helpful. Examples include "**What is Lynch syndrome[A]**", **Familial adenomatous polyposis[B]**", and "**What is ulcerative colitis[C]**". Of course, you should always first screen videos for accuracy before recommending them to patients.

Surgical technique

Proctocolectomy with IPAA can be done as a one-, two- or three-stage procedure. (See *Comparing types of proctocolectomies*).

Taking care to preserve the pelvic nerves, the surgeon creates a reservoir from 30 cm to 40 cm of distal ileum and connects it to the anal canal at or just above the dentate line (where columnar epithelium transitions to squamous epithelium). The most common pouch configuration is the two-limbed pouch, called the J-pouch.

Although two-stage surgery with a diverting loop ileostomy is the most common, a three-stage procedure is optimal for patients who are markedly debilitated by disease due to severe exacerbations, nutritional compromise, and high-dose steroid therapy. For those with indeterminate colitis and suspected Crohn's disease, step one of the three-stage procedure allows for further testing before ileal pouch creation. The one-stage procedure without a diverting ileostomy is linked to increased risk of pouch leakage, pelvic infection, and subsequent pouch failure.

Proctocolectomy with IPAA may be performed through an open abdominal inci-

Comparing one-, two-, and three-stage proctocolectomies

One-stage procedure: proctocolectomy with ileal pouch creation and restoration of bowel continuity

Two-stage procedure:
Stage 1: proctocolectomy, ileal pouch creation, diverting loop ileostomy
Stage 2: radiologic evaluation of pouch healing, ileostomy closure, restoration of bowel continuity

Three-stage procedure:
Stage 1: colectomy, preservation of rectum or rectosigmoid stump, end ileostomy
Stage 2: proctectomy completion, ileal pouch creation, diverting loop ileostomy
Stage 3: radiologic evaluation of pouch healing, ileostomy closure, restoration of bowel continuity

Note: See an example of proctocolectomy surgery, access the video at "**Laparoscopic assisted restorative proctocolectomy with ileal j-pouch-anal anastomosis**[0]."

sion or a laparoscopic approach. Laparoscopic surgery takes an average of 80 minutes longer and requires more I.V. fluids. However, it's associated with shorter hospital stays, shorter time to ostomy closure, shorter operating-room times, shorter stays for ostomy reversal surgery, less adhesion formation, and lower infertility rates. The two methods don't differ in blood loss, need for postoperative opioids, return of bowel function, or hospital readmission rates. An open abdominal approach usually is done in patients with fulminant colitis or acute colitis complicated by colonic perforation or toxic megacolon.

Complications

During the first postoperative month, symptomatic portal-vein thrombosis occurs in up to 6% of patients; asymptomatic clots may arise in up to 40%. The cause is unknown but may relate to traction on the superior mesenteric vein when the small bowel moves down into the pelvis in patients with systemic inflammation from ulcerative colitis. Signs and symptoms may mimic those of an acute abdomen, including nausea, vomiting, fever, abdominal distention, and pain. Computed tomography is used to identify thrombi. Treatment involves 3 to 6 months of anticoagulation.

Postoperative management after ileostomy creation

Initially, your main role is to provide education about ileostomy self-care. Teach your patient how to apply, empty, and replace the ostomy pouch. (See *Providing education to the new ostomate.*)

After surgery, high stool output from the diverting ileostomy is a common problem. Although definitions of high output differ somewhat, I tell patients that high output means more than 1,200 mL in 24 hours. This condition is most common within the first 2 to 3 postoperative weeks and usually resolves.

Readmission for dehydration typically occurs during the second postop week. To help prevent dehydration, instruct patients to drink eight to ten 8-oz glasses of fluid daily, preferably avoiding fruit juice, soft drinks containing sugar, caffeinated drinks, and alcohol.

Measuring stool output

Advise the patient to keep track of how much stool he or she is passing in 24 hours. I usually advise patients to empty the pouch when it's one-third to one-half full, four to six times daily. This equates to about 1,200 mL of output. If the pouch requires more frequent emptying, the patient needs to quantify the output further.

I've found some discharged patients don't comply with measuring stool output using a urinal or "potty hat." So I give patients a photograph of three pouches containing colored water in quantities of 100 mL, 200 mL, and 300 mL. This helps them visually judge how much output is in the

Understanding potential complications

Ileoanal pouch surgery can cause various complications.

Pouchitis, an acute inflammation of the ileoanal pouch, can lead to diarrhea, urgency, fever, malaise, lethargy, and abdominal pain. Most experts believe it stems from an imbalance of intestinal bacteria within the pouch. Incidence is 20% in the first year, 40% in the first decade, and 70% in the second decade. A 2010 systematic review of the literature found that the probiotic VSL#3, a cocktail of eight different strains of intestinal bacterial, helped prevent pouchitis. For treatment of acute pouchitis, ciprofloxacin was more effective than metronidazole, although both are considered mainstays of therapy.

Topical steroids, such as budesonide, can be given by enema to reduce inflammation during the acute stage. If pouchitis doesn't respond to therapy, the patient should be screened for cytomegalovirus and *Clostridium difficile*. Cytomegalovirus is treated with an antiviral drug, such as ganciclovir; *C. difficile*, with vancomycin.

About 15% of ileoanal pouch patients develop a ***pouch-anal stricture***, typically 6 to 9 months after surgery. Usual causes include cuff abscess leading to dense scarring, mesenteric tension, and partial anastomotic separation. Signs and symptoms of stricture include tenesmus (uncomfortable frequency and urgency, with a feeling of incomplete evacuation) and watery stools. Patients can be taught to dilate the stricture using Hegar stainless steel dilators or their own gloved and lubricated finger, starting with the smallest finger. Adequate dilation is achieved when the anal opening allows insertion of the index finger up to the interphalangeal joint. Refractory strictures require surgical intervention.

pouch. Antidiarrheal medications, such as loperamide, can be titrated to keep output within the normal range.

About 6 weeks after surgery, instruct the patient to practice pelvic floor muscle exercises three times daily, if the surgeon approves. This strengthens the muscles needed for fecal continence once the stoma is closed.

Postoperative management after ileostomy closure

After ileostomy closure, patients with an ileoanal pouch must begin training their new reservoir—a process that can take up to a year. Initially, they may have up to 20 small bowel movements daily and may need to get out of bed multiple times at night to pass stool. Eventually, this decreases to six bowel movements in 24 hours, including overnight. At 1 year postop, about 95% of patients who've had ileoanal pouch surgery report being very satisfied with their decision. For the remaining 5%, long-term functional results are poor.

To slowly increase pouch holding capacity, teach patients not to respond to every urge to move the bowels. Initially, advise them to wait 5 minutes after sitting on the toilet before responding. When that's accomplished, tell them to increase the wait time by another 5 minutes, and then 10 minutes, and to continue increasing it in this manner. Also advise them to begin to move further and further away from the toilet during wait time. The goal is to gain confidence in the ability to withhold stool and avoid accidents.

Complications of ileal pouch surgery include pouchitis; pouch-anal anastomotic strictures; small-bowel obstruction; and intra-abdominal, peri-pouch, and anastomotic cuff abscesses. (See *Understanding potential complications*.)

Perianal skin care

Stool leakage is common at first, along with trouble differentiating between flatus and stool. Teach patients how to perform meticulous perianal skin care. Tell them to wash the area thoroughly at least once daily using a pH-balanced skin cleanser and warm water. To clean up after each bowel movement, advise them to use al-

Providing education to the new ostomate

Be sure to cover the following points when providing patient education:

- how to purchase ostomy supplies
- signs and symptoms of dehydration
- adequate fluid intake to prevent dehydration
- appropriate food choices to promote healing and prevent food blockage
- what to do if a food blockage occurs
- how to recognize and treat peristomal skin complications, such as irritant contact and allergic dermatitis
- stomal complications, such as prolapse or ischemia
- decreased absorption of sustained-release medications
- how to prevent peristomal hernia
- appropriate clothing choices
- appropriate recreational pursuits
- how to maintain intimate and sexual relationships
- when and how to contact the surgeon and ostomy clinician.

cohol-free moist wipes, which are less abrasive than toilet paper.

Encourage patients to protect perianal skin by applying an ointment containing petrolatum, dimethicone, or zinc oxide after each bowel movement. Alternatively, they may use an alcohol-free liquid skin-barrier film wipe once daily. Aloe vera gel is an effective treatment for skin irritation, providing antimicrobial action, reducing pain, and shortening healing times. Depending on leakage amounts, advise patients to protect underclothes with a panty liner or incontinence-containment product. Encourage them to continue regular pelvic floor muscle exercises, as strong muscles are crucial for preventing leakage.

Dietary guidelines

Advise patients to eat a low-fiber diet for about 4 weeks after ostomy closure, until bowel swelling resolves. Then instruct them to start increasing fiber intake until stools become firmer. Inform them that foods that can contribute to anal irritation include spicy foods and foods high in insoluble fiber, such as stringy fruits and vegetables (oranges, coleslaw, celery, corn, nuts, popcorn, coconut, and Chinese vegetables). Teach patients that stool with a thicker consistency is less likely to leak. (See *Foods that thicken stool.*)

When stool is thin and frequent, urge patients to eat potassium-rich foods, such as meat, banana, apricots, tomatoes, milk, and potatoes. Tell them they may need to add salt to their food to replace potassium and sodium lost through diarrhea and other fluid losses.

Explain that foods and beverages high in sugar or caffeine can worsen diarrhea. Tell patients to limit fruit juice, caffeinated tea and coffee, honey, candy, sugary and caffeinated soft drinks, chocolate, and baked goods high in sugar.

Teach patients to add 1 tsp of soluble fiber, such as psyllium husks (Metamucil), to 1 cup of fluid one or more times per day, titrated to maintain a more solid stool consistency. To prevent dehydration, encourage them to continue to drink eight to ten 8-oz cups of fluid daily.

For patients who continue to have large quantities of thin stool, recommend an antidiarrheal medication, such as loperamide (Imodium), if the surgeon permits. Instruct them to start with one 2-mg dose 30 minutes before breakfast, lunch, and dinner and another dose at bedtime. If this isn't effective, tell them they may double the dose, not to exceed 16 mg per 24 hours.

Know that some patients will have to stay on this medication for a long time.

You can improve patient outcomes

As the ostomy specialist clinician, your role is to assist patients along the continuum from illness to heath. Providing thorough patient education throughout this process is crucial to helping them achieve their ultimate goal of wellness. ■

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Foods that thicken stool

Tell patients that the following foods make stool firmer and less frequent:

- Applesauce
- Bananas
- Boiled white rice
- Cheese
- Crackers
- Creamy peanut butter
- Pretzels
- Tapioca pudding
- White pasta
- White potatoes

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Online Resources

A. https://www.youtube.com/watch?v=zDXS0QBGoKY

B. https://www.youtube.com/watch?v=F6pqpLRGneE

C. https://www.youtube.com/watch?v=JMApMBY0CfQ

D. https://www.youtube.com/watch?v=rEYzh8VKqEE

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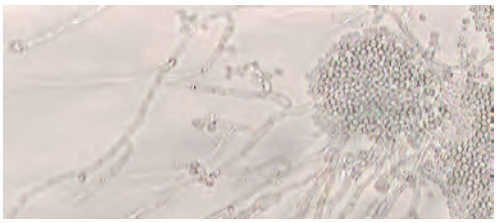
Cutaneous candidiasis

By Nancy Morgan, RN, BSN, MBA, WOC, WCC, DWC, OMS

Each issue, *Apple Bites* brings you a tool you can apply in your daily practice. Here's an overview of cutaneous candidiasis.

Cutaneous candidiasis is an infection of the skin caused by the yeast *Candida albicans* or other *Candida* species. Here's a snapshot of this condition.



Wikimedia Commons, Y tambe

Cause

Yeast fungi, which include the *Candida* species, are normal flora found throughout the human GI tract. These fungi thrive in a warm, moist environment, so certain conditions, such as poor hygiene, tight clothing, moist skin under surgical or wound dressings, high humidity, and constantly moist skin can result in overgrowth. When the overgrowth occurs on skin, it's called cutaneous candidiasis. Other conditions that can contribute to cutaneous candidiasis include compromised immunity, antibiotics, stress, and diabetes.

Characteristics

- **Location**—most commonly found in intertriginous areas, such as in the axillae, groin, body folds, gluteal folds, digital web spaces, and glans penis, as well as beneath the breasts
- **Appearance**—in people with light skin tones: bright- to dull-red central area with peripheral red vesicles (satellite lesions); in people with dark skin tones: darker than surrounding skin, color may vary from dark-red to purple, purple-blue, violet, or eggplant
- **Distribution**—consolidated or patchy
- **Shape**—diffuse differential areas; small round erythematous papules, pustules, plaques, and/or satellite lesions
- **Depth**—partial thickness; superficial epidermal infection
- **Wound bed**—pink or beefy red; associated crusting or scaling with cheesy white exudate
- **Margins**—Diffuse and irregular edges; satellite lesions (outside the advancing edge of candidiasis) are the most important diagnostic feature
- **Key diagnostic indicator**—itching and/or burning.

Management

The first strategy is to remove moisture:

- Place absorptive fabric in skin folds.
- Teach the patient and caregiver(s) meticulous skin care.

- Change linen and gowns as frequently as needed to keep dry.
- Minimize friction and shear to the skin when cleansing, and use a pH-based, skin-friendly cleanser. No-rinse cleansers are particularly useful.
- Dry the skin well, especially in the skin folds.

At the first sign of redness, itching, or discomfort, apply an over-the-counter (OTC) or prescription antifungal powder or a silver powder/cream to the area daily per package instructions. **Examples** include:

- Nystatin
- Clotrimazole (Lotrimin, OTC)
- Miconazole (Micatin, OTC)
- Econazole (Spectazole)
- Ketoconazole (Nizoral)
- Oxiconazole (Oxistat).

If, after 10 to 14 days of treatment with an antifungal product, the rash is not resolving, consider switching to another preparation because *Candida* resistance can occur. ■

Nancy Morgan, cofounder of the Wound Care Education Institute, combines her expertise as a Certified Wound Care Nurse with an extensive background in wound care education and program development as a nurse entrepreneur.

Online Resources

A. http://www.woundsource.com/product-category/skin-care/antimicrobialsantifungals

B. http://www.wcei.net/

Time to select a support surface

By Donna Sardina, RN, MHA, WCC, CWCMS, DWC, OMS

Having the proper support surface for beds and wheelchairs is imperative in preventing pressure ulcers. "Pressure" ulcers are named that for a reason—pressure is the primary cause of interruption of blood flow to the tissue. Unfortunately, guidelines for support surface selection tend to make recommendations for the type of surface to use *after* a pressure ulcer has developed. Another factor that complicates matters is the development of deep-tissue injuries. These injuries start at the bone level, which means that often, tissue damage is extensive before we see visible signs and realize that the support surface we chose might not have been effective enough.

Being proactive in preventing pressure ulcers requires that a pressure redistribution surface is provided for the bed and wheelchair when the patient is admitted. Even when you decide to apply a support surface early, choosing the specific surface can be difficult.

Choosing a support surface

What makes support surface selection so challenging is that we are all different in body weight, size, distribution of weight, and sensitivity to pressure, humidity, and temperature. What might be cool and comfortable (and prevent a pressure ulcer) for one patient might be too firm and hot for another. Of course, it's not possible to have every type of support surface in stock. Clinicians and administrators should consider the following characteristics when working with manufacturers to determine the options to provide. The products that best fit the following areas should be considered:

- **Microclimate**: Does the product diffuse heat and prevent humidity?
- **Immersion**: What is the immersion capability? Immersion is the ability to "sink" into a support surface. The more a patient can sink into the surface without bottoming out (there should be at least 1" of space between the buttock and the bed frame), the less likely there will be pressure points.
- **Envelopment**: What is the envelopment degree of the surface? Envelopment is the ability of the support surface to conform to body contours. The more the surface can conform to body contours, the more effective it will be in preventing pressure.
- **Shear and friction**: Does the cover of the support surface help reduce shear and friction?

Another important question is, "For up to what stage ulcer is the mattress recommended?"

Following up

Your responsibility doesn't end with the initial application of the support surface on

admission. You need to re-evaluate the choice of support surface every time you conduct a risk assessment of skin integrity and when any of the following occurs:

- decline in mobility status
- decline in activity level. This factor is often overlooked in patients who are independent in their mobility. Even though they are independent, they may choose to sit for prolonged periods or prefer to stay in the same positon.
- acute illness or injury that may render patients bedbound or decrease their activity level
- change in weight; weight loss may accentuate a bony prominence or weight gain can affect the ability to move.
- development of a pressure ulcer.

Taking prompt action

Support surfaces can be expensive, but selecting the right support surface early and changing it as needed is more cost effective in the long run if pressure ulcers are prevented or a current pressure ulcer heals more quickly. You also need to consider that to prove a pressure ulcer was unavoidable, the care setting needs to show that interventions were in place before its development. Choosing—and documenting—appropriate support surfaces will help provide that proof.

For more information on support surface selection, refer to the National Pressure Ulcer Advisory Panel's "Prevention and Treatment of Pressure Ulcers: Clinical Practice Guideline." You can **order the guidelines online**[A] and **download a copy**[B] of the Quick Reference Guide. Another resource is the **evidence-based support surface algorithm**[C] available from the Wound, Ostomy and Continence Nurses Society. ■

Donna Sardina is editor-in-chief for *Wound Care Advisor*.

Staying out of sticky situations: How to choose the right tape for your patient

By Ann-Marie Taroc, MSN, RN, CPN

Are you using the wrong kind of medical tape on your patients? Although we strive to provide the safest care possible, some nurses may not realize that medical tape used to secure tubes and dressings can cause harm. The harm may stem from using the wrong product or using a product incorrectly, which can cause adhesive failure or skin injury.

Many different medical tapes are available. To prevent injury, you need to choose the right tape for each patient. But knowing which tape is right can be challenging even for experienced nurses. To choose and use tape successfully, you need to understand the components of medical tape and base tape selection on your patient assessment findings.

Medical tape has three jobs—to provide an initial stick, increase adhesion, and remain intact. The initial stick isn't sufficient for the tape to stay in place. To improve

Comparing medical tapes

This table summarizes the qualities of acrylate and silicone tapes, helping you choose the most appropriate tape for each patient. Adhesion ratings range from high (1) to low (7), although this rating isn't entirely linear. A blank cell indicates no information on the feature in question is available.

Type of tape	Water resistance	Breathability	stretchability	Long-term adhesion to dry skin	Initial adhesion to damp skin	Initial adhesion to dry skin	Bidirectional tear
			Acrylate tape				
Cloth			N	4	1	1	
Nonwoven soft cloth*	Y	Y	Y	1	4	3	
Silk*	Y		N	2	6	2	Y
Paper/ plastic blend	Y	Y		3	3	4	Y
Clear plastic	Y			6	5	5	Y
Paper*		Y		5	2	6	N
Foam	Y		Y	7	7	7	N
Silicone tape	Y	Y		4	2	4	Y

*Product performance may vary by manufacturer and condition of patient's skin. Content courtesy of 3M

adhesion, you must apply pressure. Tape must stay intact, but oil and emollients can separate the adhesive from the backing or from the patient's skin. Using an emollient product, such as an adhesive remover or lotion, can help you remove tape without injuring the skin.

For tape to serve its purpose, the product you choose must suit ambient conditions. For example, moisture can prevent the adhesive from securing to the skin; oil from sebaceous glands may cause tape to fail and peel off.

Tape-related injury

Medical adhesive-related skin injury (MARSI) occurs when tape causes stripping, separation, or tearing of the epidermal layers. Erythema can occur when you remove tape from the skin. Stripping may occur when the tape is stronger than the skin layers, causing removal of superficial dermal layers on tape removal. Blisters may form if you apply tape with tension and the product restores its shape but pulls apart epidermal layers. Tears can occur when you apply or remove tape with tension or if friction arises, causing skin layers to separate.

Tape components

Although not all medical tapes are alike, all of them are pressure-sensitive adhesives. Tape is a combination of backing and adhesive; we activate the adhesive by applying pressure—for instance, when we rub the tape on the patient's skin. Warmth promotes contact of the tape to the skin's irregular surface.

The combination of backing and adhesive determine a tape's qualities. The variety of adhesives and backings available offers an array of products designed to excel under specific conditions.

Managing tape-related problems

Cause	Corrections	Considerations
Improper tape selection: tape is not matched to clinical need (eg, too aggressive, does not stretch)	Select tape based on the clinical need/indication	See *Comparing medical tapes.*
Skin is not adequately prepared: hair is not removed; skin is soiled, wet/moist or residue is left on the skin; preps are not allowed to dry; adhesion promoters (tackifiers) are indiscriminately used	Proper skin preparation before tape application	• Clip/trim hair • Clean and dry the skin to remove soil and residue • Apply barrier film for skin to protect at-risk skin • Allow barrier film to dry completely before applying tape • Avoid routine use of tackifiers
Tape is applied incorrectly: tape is stretched or applied with tension; applied in wrong direction	Proper application technique	• Tape strip should be long enough to extend at least one-half inch beyond the dressing or device • Orient tape to allow stretch (ie, in the direction of expected swelling or movement • Apply tape without stretch or tension: replace acrylate tape or reposition silicone tape if swelling/distention occurs • Apply gentle firm pressure after application, stroking the tape in place
Tape is removed incorrectly: tape is removed rapidly or pulled vertically; underlying skin is not supported during removal	Proper removal technique	• Remove tape slowly keeping tape horizontal and close to the skin • Remove in the direction of hair growth • Support exposed skin at the peel line as tape is removed

Table and content courtesy of 3M

Backing

Tape backing can be paper, cloth, foam, or another material. These materials vary in strength, water resistance, breathability, and stretch. (See *Comparing medical tapes.*)

Adhesive

Adhesive is the glue that enables the backing to stick and do its job. Medical tapes have acrylate or silicone adhesives.

- **Acrylate** is a low-sensitizing adhesive and works with a variety of backings. Incorrect use can result in MARSI. Not all acrylate tapes are the same; some have a higher initial adhesion on damp skin, whereas others have increased adhesion over time.
- **Silicone**, a newer adhesive, is gentle and conforms easily to the skin's surface. Its gentleness allows for easy removal but not the strength needed to secure critical tubing.

Assessing the patient

To choose the right tape for your patient, start by assessing your patient. First, examine the skin at the site where you'll secure the tape. Look for hair and sebaceous and sweat glands there, as these may impair tape adhesion.

Next, determine if your patient has moist, dry, or fragile skin. The skin's con-

Factors that increase MARSI risk

Intrinsic factors	Extrinsic factors
Extremes of age (neonate/premature infant and the elderly	Drying of the skin due to harsh skin cleansers, excessive bathing, low humidity, etc.
Race/ethnicity	Prolonged exposure to moisture
Dermatologic conditions (ie, eczema, dermatitis, chronic exudative ulcers, epidermolysis bullosa)	Certain medications (ie, anti-inflammatory agents, anticoagulants, chemotherapeutic agents, long-term corticosteroid use)
Underlying medical conditions (ie, diabetes, infection, renal insufficiency, immunosuppression, venous insufficiency, venous hypertension, peristomal varices)	Radiation therapy
Malnutrition	Photodamage
Dehydration	Tape/dressing/device removal
	Repeated taping

Source: McNichol L, Lund C, Rosen T, Gray M. Medical adhesives and patient safety: state of the science: consensus statements for the assessment, prevention, and treatment of adhesive-related skin injuries. *J Wound Ostomy Continence Nurs.* 2013;40(4):365-80. Used with permission.

dition helps you decide if you must use a tape that breathes, removes gently, or secures firmly.

Consider the tape's purpose. For example, if you need to secure an endotracheal tube on a moist face, the tape must be able to stay intact and secure; in this case, cloth tape might be best. In contrast, a dressing on a moving joint needs a tape that stretches and accommodates for movement, such as a foam or soft cloth tape. Your assessment findings help you decide whether to use a tape that stretches, breathes, or repels moisture.

Next, evaluate for potential stressors, such as tension, flexion, friction, and movement. These influence product selection because you want to avoid separation of the epidermal layers, peeling of dressings, and tube dislodgement.

In some situations, a patient may have fragile skin but require a strong tape; examples include neonates, older adults, and patients with edematous skin. See *Managing tape-related problems* for tips on how to manage problems commonly encountered when using medical tape.

Evaluating MARSI risk

Tape should stick to the skin without causing injury. Selecting tape for a particular purpose goes beyond assessing the tape location and ambient conditions. You also must consider the patient's underlying diagnosis and overall health. Screen for factors that increase the patient's MARSI risk. Age can be a major risk factor.

- Neonates have thinner skin than adults. This means the epidermal layers may peel away easily during tape removal.
- Elderly patients are at risk for skin tears from moisture and loss of elasticity and strength.

Other risk factors include certain underlying diagnoses, medications, and other aspects of the patient's current health status. Is your patient's skin fragile or insensate?

Such medications as corticosteroids can alter skin strength and elasticity, making it susceptible to tearing on tape removal. A patient with altered sensation, as from neuropathy or stroke, may not feel pain when the tape tears or strips the skin. (See *Factors that increase MARSI risk.*)

Case studies

Your knowledge of medical tapes and the patient's needs can help you avoid feeling overwhelmed by the large selection of tapes available—or from being surprised when a tape fails. The case studies below describe how to choose the right tape based on its purpose and location, ambient conditions, and patient assessment findings.

Mr. M

Mr. M, age 67, is hospitalized for an abdominal incision dehiscence; he has type 1 diabetes. You need to secure his abdominal dressing, which will have to be changed more than once daily because of the large amount of drainage. The goal is to protect his skin while ensuring the dressing stays in place so Mr. M can continue to get out of bed.

You determine he needs a tape that will stick to a surface that moves. Mr. M's skin is dry but the wound produces moisture that may compromise tape adhesion. His dry skin and age put him at risk for skin tearing from loss of elasticity and moisture. Also, he's at risk for compromised healing due to diabetes.

Considering the tape's purpose and location and ambient conditions, you select a tape that secures the dressing without causing injury—one that's both gentle to remove and provides sufficient adhesion to secure the dressing. For Mr. M, appropriate tape choices include both silicone and paper. Paper tape (with acrylate adhesive) is nearly as gentle as silicone. Acrylate paper tape causes trace amounts of skin stripping, while silicone tape offers greater initial and long-term adhesion than paper tape. Mr. M needs to stay mobile, so the preferred choice is silicone tape, which offers better initial adhesion. By incorporating your assessment findings and knowledge of the features of pressure-sensitive adhesives, you were able to determine which tape would best suit his needs.

The goal is to protect his skin while ensuring the dressing stays in place so Mr. M can continue to get out of bed.

J.R.

J.R., age 27, has a nasogastric (NG) tube in place for gastric decompression after removal of a perforated appendix. You note that he has oily, moist facial skin, which may cause the tape adhesive to fail, resulting in the NG tube falling out. J.R. is distressed when he learns the tube may have to be replaced if it falls out, so you decide to choose a tape that will help prevent dislodgement. The tape should be able to secure a relatively heavy tube while maintaining adhesion over time.

Considering the tape's purpose and location and ambient conditions, you know you should pick a tape with high initial and long-term adhesion. Silk tape provides high initial adhesion to dry skin, but cloth tape offers better initial adhesion to both dry and moist skin. Washing J.R's skin would create an ideal environment for a silk-like tape. But J.R. needs a tape that also provides adhesion over time; the moist, oily environment of his face can cause adhesive to fail. So the preferred choice for him is cloth tape, due to its increased initial adhesion on damp skin. Of course, J.R. will need ongoing evaluation to prevent tube dislodgement.

In an attempt to minimize injury, you might have chosen a gentle tape with insufficient adhesion instead of cloth tape. But tape that doesn't secure sufficiently may allow dislodgment of critical tubing; adhesive failure occurs when tape doesn't remain secured to the skin, tubing, or device.

As these case studies show, the condition of your patient's skin and overall health influences tape selection. For both Mr. M and J.R., understanding the tape's purpose and location and the ambient conditions was the launching point for tape selection. With improved knowledge of pressure-sensitive adhesives, you can evaluate tape products and select an appropriate product based on the patient's individual needs. Your knowledge guides product selection and helps reduce the potential for injury. ■

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Online Resources

A. http://www.npuap.org/resources/educational-and-clinical-resources/prevention-and-treatment-of-pressure-ulcers-clinical-practice-guideline/

B. http://www.npuap.org/wp-content/uploads/2014/08/Updated-10-16-14-Quick-Reference-Guide-DIGITAL-NPUAP-EPUAP-PPPIA-16Oct2014.pdf

C. http://algorithm.wocn.org/#home

Providing skin care for bariatric patients

Specialized knowledge of common conditions and their treatments can help clinicians meet this challenge.

By Gail R. Hebert, MS, RN CWCN, DWC, WCC, OMS

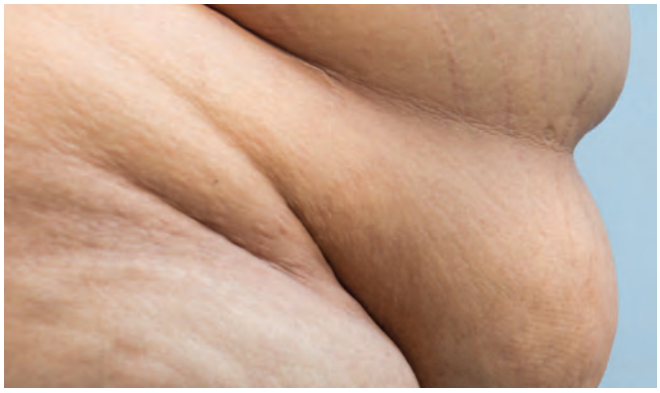
How would you react if you heard a 600-lb patient was being admitted to your unit? Some healthcare professionals would feel anxious—perhaps because they've heard bariatric patients are challenging to care for, or they feel unprepared to provide their care.

With the obesity epidemic showing no signs of abating, you're likely to encounter bariatric patients at some point. How can you care for them with the dignity and respect they deserve? If we expect to conduct "business as usual" on our units, we'll be caught off guard without the tools and knowledge we need to make the experience a positive one for the patient, family, and staff. This article reviews how to prepare for and manage one of the most challenging aspects of caring for bariatric patients—providing skin care.

Skinfolds: A special focus of care

Bariatrics is the branch of health care that specializes in treating people with obesity and associated conditions. Defined as a body mass index (BMI) over 30, obesity reflects how a person's weight relates to height. Bariatric patients have an excessively large size, with excess adipose tissue under the skin and throughout the body.

Skinfolds may develop in various locations—including behind the neck; under the arms, breasts, and abdomen; between the inner thighs; and under the pannus (an overlapping tissue flap formed from the abdomen that extends downward like an apron). Complications commonly arise in skinfolds and include intertriginous dermatitis, candidiasis, and pressure ulcers. (See *Understanding skinfold complications in bariatric patients.*)



OBESE: An apt mnemonic

Use the word OBESE as a mnemonic tool to help you remember key clinical issues in bariatric skin management.

O: Observe for atypical pressure ulcer development.

B: Be knowledgeable about common skin conditions.

E: Eliminate moisture on skin and in skinfolds.

S: Be sensitive to the patient's emotional distress.

E: Use equipment to protect the skin and for safe patient handling.

Observe for atypical pressure ulcer development.

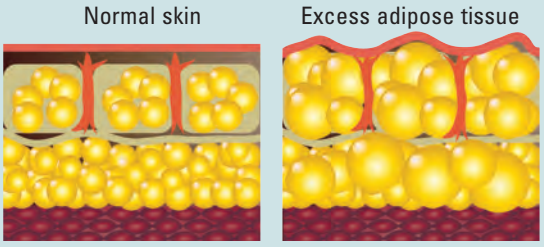
Bariatric patients are at higher risk for pressure ulcers, as their extra padding doesn't necessarily protect them from the forces of pressure and shear. Although the

Understanding skinfold complications in bariatric patients

Obese patients have increased body mass, which generates more heat. In an effort to restore a normal internal temperature, the body sweats. As a person's weight increases, the ratio of skin surface to internal body mass decreases, impeding the body's ability to cool itself. Skin stays moist with perspiration as the body continues to use this cooling method, which is only partially effective.

Because bariatric patients commonly have excessive moisture on the skin, their skinfolds are highly susceptible to such complications as dermatitis, candidiasis, and pressure ulcers. Poor tissue oxygenation in these patients contributes to the problem. Buildup of adipose tissue in the abdomen impedes the diaphragm's ability to flatten during inspiration, which can cause shallow breathing and impaired tissue and blood oxygenation.

Adipose buildup around the rib cage also poses an obstacle to chest expansion. Adipose tissue itself is poorly vascularized with fewer blood vessels, making it more likely to break down and heal slowly. Poorly oxygenated skin is more susceptible to infection and injury.



data supporting higher risk for this population aren't cut and dried, most expert clinicians believe the risk is higher, so be sure everyone knows that fat pads don't provide protection.

Also, bariatric patients commonly are malnourished and less mobile than others, making it hard for them to avoid excess pressure on the skin. Many have multiple comorbidities, such as diabetes, that further increase their pressure ulcer risk. We lack a risk assessment instrument specifically designed for this population, so we must use our clinical skills and experience to anticipate risk.

In this population, pressure ulcers can develop in atypical and unique locations—hips, lower back, buttocks, in skinfolds, and in areas with medical devices, such as tubes. Also, foreign objects, such as medicine cups and TV remote controls, can get lost in the bed and lead to pressure areas. Bariatric patients require frequent turning and repositioning to help prevent breakdown from pressure and shear forces.

Be knowledgeable about common skin conditions.

Intertriginous dermatitis is an inflammatory skin condition commonly seen in the skinfolds of bariatric patients. It results from the weight of skin, which creates skin-on-skin contact coupled with friction forces and trapped moisture from perspiration. Dermatitis most often occurs in skinfolds behind the neck, under the arms and breasts, under the abdomen or pannus, on the side, and on the inner thigh.

Intertriginous dermatitis is partial thickness and typically presents in a mirror-image pattern on each side of the skinfold. Initially, the involved area of the skin shows mild redness, which may progress to more intense inflammation with erosion, oozing, drainage, maceration, and crusting. Associated findings include pain, itching, burning, and odor. As clinicians, we should anticipate this problem and not wait for intertriginous dermatitis to develop. To help prevent and intervene for intertriginous dermatitis, read "Eliminate moisture on skin and in skinfolds" below. (For information on other common skin conditions in bariatric patients, see *Candidiasis, acanthosis nigricans, and chafing.*)

Eliminate moisture on skin and in skinfolds.

Many barriers to healthy skin in bariatric patients can be eliminated by reducing moisture on the skin, avoiding skin-to-skin contact, minimizing heat build-up on these tissues, and keeping the skin clean. Using absorbent materials can accomplish these goals. For instance, Interdry AG®

Candidiasis, acanthosis nigricans, and chafing

Candidiasis on the skin of bariatric patients results from *Candida albicans*, which loves the moist, dark, warm environment of skinfolds. Poor hygiene (due to difficulty washing because of excessive body size), hot weather, and tight clothing predispose bariatric patients to this problem.

Typically, candidiasis presents as a consolidated or patchy area of redness with small round papules, pustules, or plaques; in some cases, satellite lesions arise away from the central red area. Patients usually complain of burning, itching, or both.

To prevent candidiasis, keep the skin dry and clean. At the first sign of a problem, take prompt action. Start by applying an over-the-counter or prescription antifungal powder or a silver powder or cream, according to manufacturer's recommendations.

Be aware that *C. albicans* may become resistant to antifungal agents. If your patient's rash doesn't resolve after 2 weeks of treatment, consider switching to another preparation. Keep the option of oral medication in mind if the rash persists and fails to respond to local treatment.

Acanthosis nigricans is the most common skin manifestation in obese patients. It may be confused with poor hygiene, causing what may look like dirt in skinfolds. This skin condition results from insulin resistance that leads to insulin spillover into the skin.

Lesions are hyperpigmented, thickened, velvety textured macules and patches that may itch and appear warty or leathery. They can arise anywhere but most often show up on intertriginous areas of the axilla, groin, and posterior neck.

No cure for acanthosis nigricans exists, but controlling blood glucose levels can improve symptoms. For cosmetic treatment, preparations with tretinoin, metformin, octreotide, or topical calcipotriol can be used; laser therapy may be an option, too.

Chafing is caused by skin irritation from repetitive friction, usually caused by skin-to-skin contact or contact between tight fabric and skin. The most susceptible areas are the inner thighs, under the breasts, and skinfolds, armpits, and nipples. The skin injury is partial thickness and red, with edema; in many cases, it causes bleeding and pain.

For prevention, advise patients to wear clothing made of moisture-wicking fabrics (for instance, bike shorts) and to use lubricants on the affected skin, such as petroleum-based products or moisture barrier ointments, skin sealants, or specialty athletic items. Instruct them to cover affected areas with zinc-based ointments or no-sting skin sealants. Inform them not to use normal saline solution on chafed areas as it could cause burning and pain.

Textile (from Coloplast, Inc.) is impregnated with ionic silver, which provides broad-spectrum antibacterial and antifungal action for up to 5 days. It's designed to wick away moisture and reduce skin-to-skin friction.

Clean the patient's skin frequently with a pH-balanced cleanser, using gentle strokes to avoiding harming fragile tissues. Avoid scrubbing. Handheld showers and no-rinse cleansers can simplify this process. Advise patients to wear loose-fitting clothing made of absorbent fibers.

Be sensitive to the patient's emotional distress.

Everyone involved in caring for bariatric patients should receive sensitivity training to increase their awareness and compassion. Many of us hold an unconscious negative view of these patients, which can manifest in our interactions with them. Bariatric patients have reported many incidents of unprofessional treatment by staff who are otherwise excellent caregivers but lack empathy and understanding.

To make matters worse, bariatric patients frequently suffer from depression, altered self-esteem, and social isolation. Take care not to demonstrate prejudice through your actions and words, or to show reluctance to render care due to fear of injury, inadequate equipment, inadequate staffing, or a misunderstanding of obesity.

Be aware of possible obesity bias. View: "Weight bias in healthcare," from Yale Rudd Center.[A]

Use equipment to protect the skin and for safe patient handling.

Equipment must be the proper size and

construction to prevent rubbing and creating pressure points against the skin (for example, from the side panels of a too-small wheelchair). Reposition patients frequently to prevent skin breakdown; also, reposition any tubes and tube fixation devices. Use support surfaces of the appropriate weight limit to prevent bottoming out. With skin moisture a common concern, most bariatric patients should use a low-air-loss mattress.

Transferring and moving patients presents a hazard to both staff and patients. Ideally, healthcare facilities should have the proper equipment on hand and ready for use when the patient reaches the unit. The best way to ensure the right type and amount of equipment is to work with companies that specialize in safe patient-handling programs. They can conduct a needs analysis and provide evidence-based recommendations that can be reviewed before equipment purchase or rental. Although facility administrators may believe they lack the budget for equipment purchase, I would advise them they don't have the budget *not* to purchase it. A single lawsuit or injury claim by a patient or a workers compensation claim by staff can cost considerably more than the investment in proper patient-handling equipment.

Meeting the challenge

Specialized knowledge of common conditions and appropriate treatments can help us meet the challenge of caring for bariatric patients' skin. That knowledge must be coupled with planning activities to address such issues as required staff, devices, and lifting and repositioning equipment. Accomplishing these goals long before you hear of a 600-lb patient on the way to your floor will greatly enhance the chance of a successful outcome. ■

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Online Resource

A. http://www.uconnruddcenter.org/weight-bias-stigma-videos-exposing-weight-bias

Prove the Value Program

A program to objectively demonstrate the clinical and financial outcomes of advanced surface technologies for pressure ulcer patients.

The following Case Study is a continuation of the *Prove the Value* information published in the September/October 2015 issue of *Wound Care Advisor*, available at here[A]. The Hill-Rom *Prove the Value* program is based on collecting and analyzing information on individuals who have recently used or are current using a Clinitron bed or P500 wound surface and helps demonstrate the value of advanced wound care solutions through local assessments within facilities. Contact your local Hill-Rom representative for more information, click here[B].

Enhancing outcomes for patients and their caregivers: Hill-Rom

Content and funding provided by Hill-Rom

Prove the Value Program Case Study

A clinical assessment on the outcomes and key findings of complete pressure ulcer healing while on the Clinitron® Air-Fluidized Therapy System

Facility

South Mountain Healthcare and Rehabilitation Center Skilled Nursing Facility – Vauxhall, NJ

Overview

A 67 year old female resident with multiple Stage IV and one Stage II pressure ulcers experienced positive wound healing while using the Hill-Rom® Clinitron® Air Fluidized Therapy System. The healing occurred over 4 months.

Patient History/Background

Mrs. Smith* is a 67 year old resident at South Mountain Healthcare and Rehabilitation Center. She presents with a history of Multiple Sclerosis and as a result of this condition, she suffers from abnormal posture and contracture of the lower legs, ankles, feet, upper arms, and hands. Her subsequent diagnoses also include pneumonia and septicemia. As a result of her comorbidities, Mrs. Smith developed multiple debcubitus ulcers that she had acquired prior to arriving at South Mountain. These were in the form of multiple Stage IV's (sacrum, ischium, left and right trochanter) and one Stage II (left proximal buttock). Her condition and health comorbidities gives her a high risk score of 10 on the Braden Scale. This score signifies Mrs. Smith's high susceptibility to skin breakdown.

Early Clinical Intervention

Mrs. Smith was admitted to South Mountain with Stage IV pressure ulcers at the sacral, ischial, and left trochanter region. She was placed on a facility owned low air loss mattress for prevention and treatment measures.

In efforts to prevent additional wounds from developing and stop current ones from regressing, a Group 2 Titan Integrated Low Air Loss Bed System was ordered for Mrs. Smith on September 24, 2013. Furthermore, Mrs. Smith's wounds were treated with Dakins solution to control odor, Collagenase SANTYL® Ointment, calcium alginate dressing, and border gauze applied twice per day. As the wounds improved, Calcium Alginate was no longer needed but Collagenase SANTYL® Ointment continued. This wound dressing method was done throughout the entirety of Mrs. Smith's wound care treatment.

While Mrs. Smith was on the Group 2 Titan Integrated Low Air Loss Bed System, varying degrees of wound regression and healing were observed. Some wounds appeared to have decreased in volume but had turned necrotic or developed slough and eschar. It was also documented that while the size of the wound decreased (length and width), the depth increased in some cases exposing underlying muscle, tendons, and bones.

On November 11, 2013, Mrs. Smith was admitted to the hospital for complications related to pneumonia and septicemia. She received treatment for the admitting diagnosis and her Stage IV sacral wound was debrided by a clinician in the hospital. The hospital ordered for a negative-pressure wound therapy for Mrs. Smith upon her return to South Mountain.

Mrs. Smith was discharged from the hospital 11 days later on November 21, 2013 and readmitted to South Mountain. Her readmission diagnoses included metabolic encephalopathy, hypernatremia, functional quadriplegia, plural effusion and sepsis. On that same day, a wound VAC was placed on Mrs. Smith's sacral wound—which had become infected with Methicillin-resistant Staphylococcus aureus. The wound VAC was used for five days and wet to dry dressings were changed three times during that period. Mrs. Smith had returned back on the Titan Integrated Low Air Loss Bed System.

Mrs. Smith remained on the Titan Integrated Low Air Loss Bed System for 157 days after her hospital episode; however, her wounds were not steadily progressing. Furthermore, Mrs. Smith had developed two more pressure ulcers. On January, 23, 2014, a wound measuring 4.2 cm^3 (2 cm x 2 cm x 0.05 cm) was identified on the right trochanter and on February 18, 2014, a clinician at a wound clinic documented a wound that measured 0.144 cm^3 (0.9 cm x 0.4 cm x. 04 cm) on the left proximal buttock. Care providers at South Mountain recognized that it was necessary for Mrs. Smith to be upgraded to a more aggressive intervention and turned to the option of using a Group 3 Clinitron® Air Fluidized Therapy System.

Hill-Rom Clinical Solution

The Hill-Rom® Clinitron® Air Fluidized Therapy was ordered for Mrs. Smith and placed on February 28, 2014. Within the first few weeks, Mrs. Smith's wounds showed considerable signs of healing and continued to steadily improve over a course of four months. Care providers at South Mountain assessed that the Clinitron® Air Fluidized Therapy System facilitated the healing process, as the wounds responded favorably after being upgraded.

On June, 30 2014, Mrs. Smith was removed from the Clinitron® Air Fluidized Therapy System after a total of 122 days. Her pressure wounds had either completely healed or were progressing adequately and contracting. She was stepped down to a Group 2 surface and has remained on it since.

*Due to HIPPA regulations, name of the resident has been changed to preserve privacy.

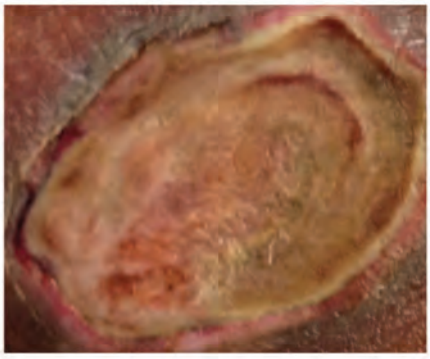
Wound Healing Outcomes:

Wound site: Right Trochanter - Stage IV

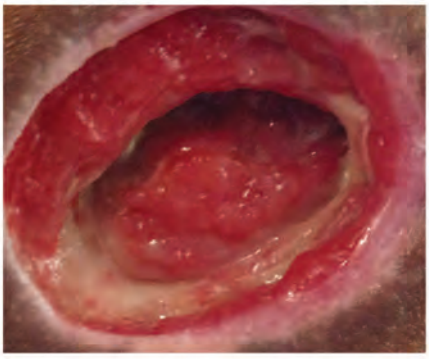
The most notable wound healing occurred at the Stage IV right trochanter site. Mrs. Smith visited a wound clinic on February 18, 2014, and the wound was documented as unstagable due to the development of slough and eschar. The wound was debrided exposing underlying muscle and bone. 10 days after her visit to the clinic, Mrs. Smith was transfered on to the Clinitron® Air Fluidized Therapy System.

On March 4, 2014, the first measurements collected since Mrs. Smith started using the Clinitron® Air Fluidized Therapy System, muscle and bone were still exposed at the wound site. However, over a few months, the wound bed had 100% red granulation tissue indicating that it was properly healing. On June 26, 2014, a few days before Mrs. Smith stepped down from the Clinitron® Air Fluidized Therapy, the wound volume decreased to 0.6 cm^3.

A wound with full thickness tissue loss experienced a substantial healing rate of 98.5% in four months.



Taken on 2/14/14 prior to Clinitron® Air Fluidized Therapy System



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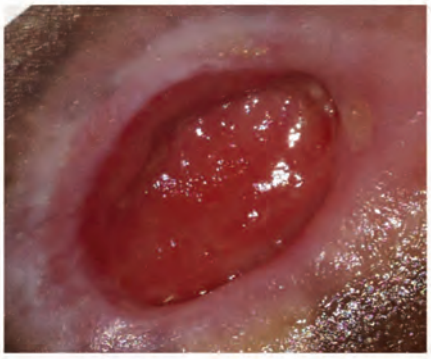
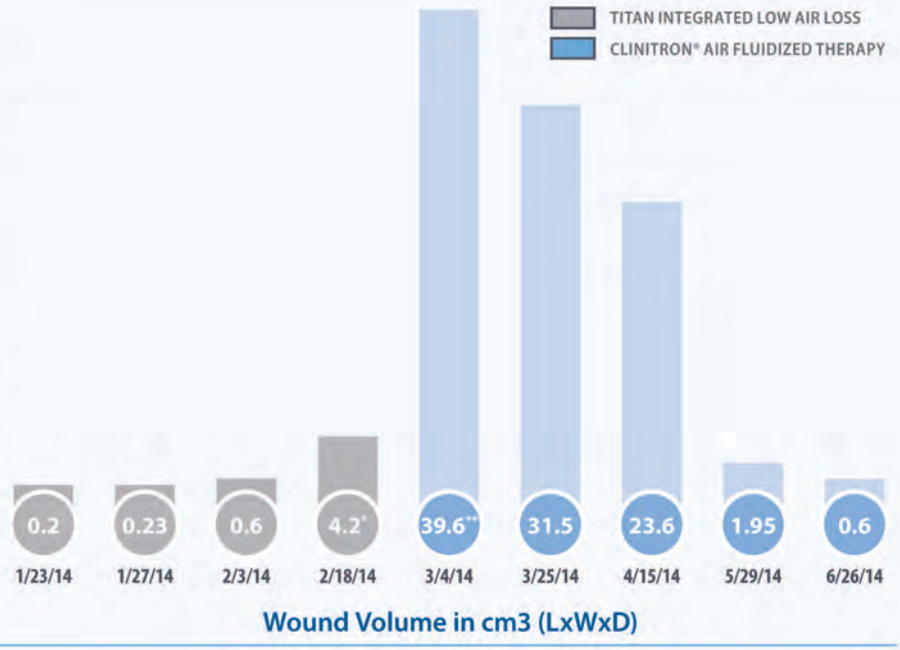


Taken on 5/21/14 during Clinitron® Air Fluidized Therapy System

Pressure Ulcer Healing Rate

Date	Length (cm)	Width (cm)	Depth (cm)
1/23/14	2	2	0.05
1/27/14	2.3	2	0.05
2/3/14	4	3	0.05
2/18/14*	5	4.2	0.2
3/4/14**	4.8	5.5	1.5
3/25/14	5	4.2	1.5
4/15/14	3.5	4.5	1.5
5/29/14	1.3	3	0.5
6/26/14	2	1.5	0.2



*Immediately after debridement
**Wound volume increased as a result of debridement on 2/18

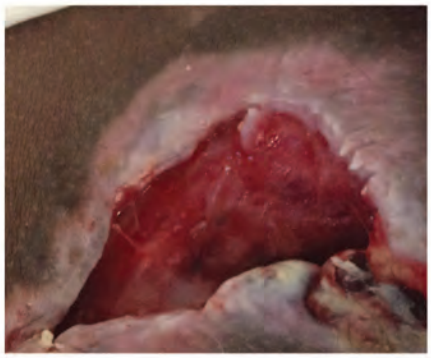
Wound Healing Outcomes:

Wound site: Right Ischium - Stage IV

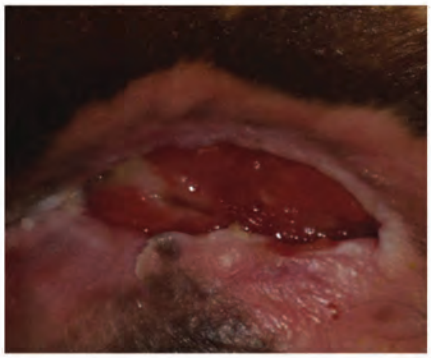
Another significant wound healing occurred at the Stage IV right ischium site. Prior to the Clinitron® Air Fluidized Therapy, the wound was drastically failing to heal. This is evident by the upward trend in the graph from September 24, 2013 to February 18, 2014. However, after Mrs. Smith was upgraded, the wound began to improve.

On March 4, 2014, the wound volume measured 30.8 cm^3. Three weeks later, the wound improved 63% and the volume had decreased to 11.34 cm^3. The wound continued to heal and in three months, the wound bed had 100% granulation tissue growth and measured 0.3 cm^3.

From the time Mrs. Smith began using the Clinitron® Air Fluidized Therapy, the ischium wound had an overall healing rate of 99.03%.



Taken on 2/14/14 prior to Clinitron® Air Fluidized Therapy System



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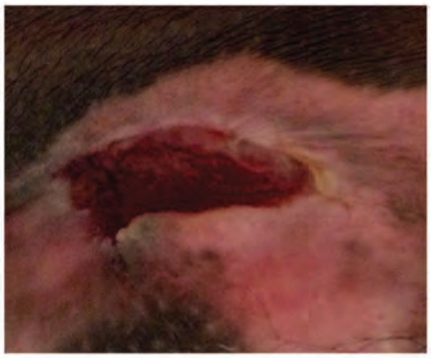
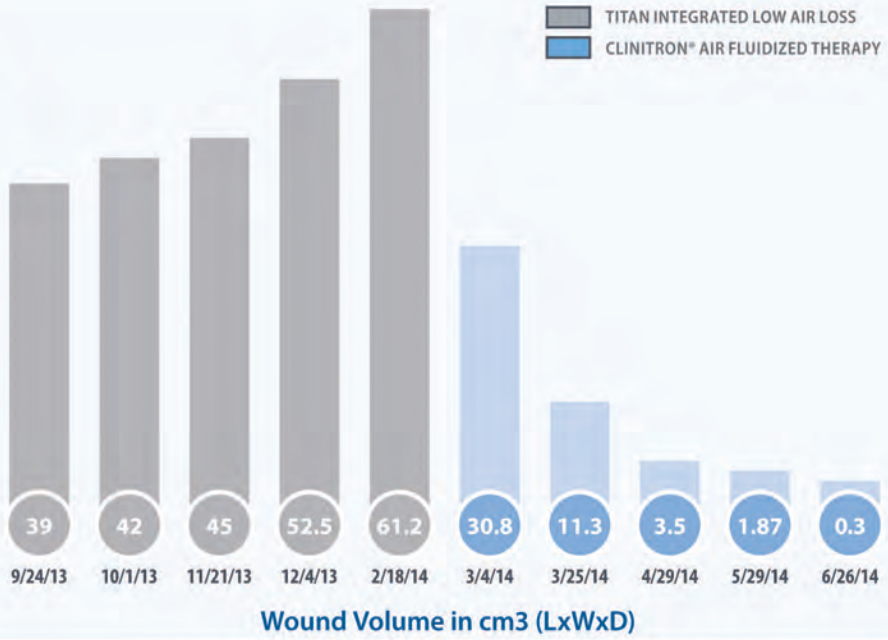


Taken on 5/21/14 during Clinitron® Air Fluidized Therapy System

Pressure Ulcer Healing Rate

Date	Length (cm)	Width (cm)	Depth (cm)
9/21/13	6.5	4	1.5
10/1/13	7	4	1.5
11/21/13	6	5	1.5
12/4/13	7	5	1.5
2/18/14	9	4	1.7
3/4/14	5.5	2.8	2
3/25/14	4.5	1.8	1.4
4/29/14	3.5	2	0.5
5/29/14	2.5	1.5	0.5
6/26/14	0.5	1	0.6



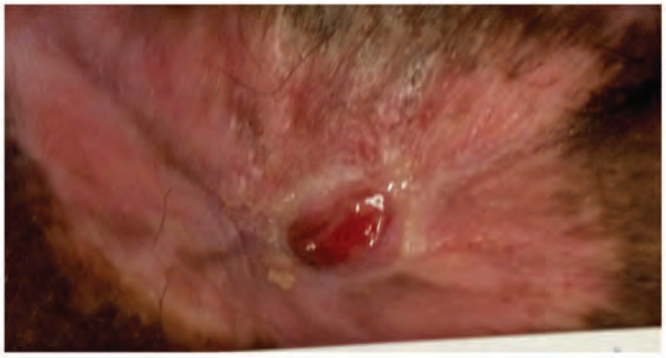
Wound Healing Outcomes:

Wound site: Left proximal buttock - Stage II

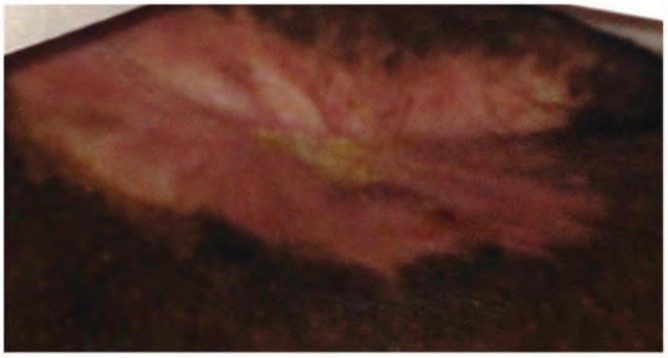
A Stage II wound on the left proximal buttock was discovered during Mrs. Smith's visit to a wound clinic on February 18, 2014. This was one of the factors that influenced South Mountain to upgrade Mrs. Smith to a Group 3 Clinitron® Air Fluidized Therapy System support surface.

Within two months of using the Clinitron® Air Fluidized Therapy, the wound achieved complete healing and has remained closed.

The Stage II wound had a large amount of scar tissue surrounding the open area. The wound bed was red with slough around the perimeter and bled easily. Bacitracin was initially used to treat the wound, but when slough developed, it required Collagenase SANTYL® Ointment with border gauze dressing once daily. The volume noted by the wound center clinician was 0.144 cm^3.



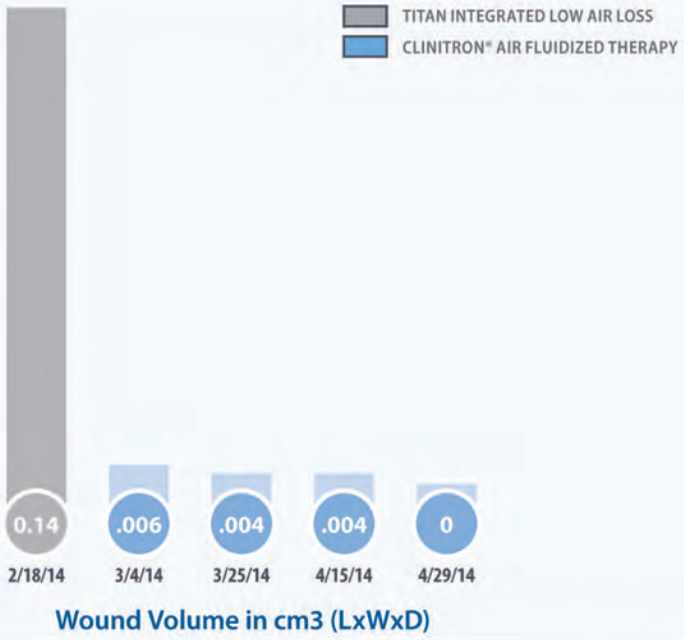
Taken on 2/14/14 prior to Clinitron® Air Fluidized Therapy System



Taken on 4/28/14 during Clinitron® Air Fluidized Therapy System

Pressure Ulcer Healing Rate

Date	Length (cm)	Width (cm)	Depth (cm)
2/18/14	0.9	0.4	0.4
3/4/14	0.2	0.1	0.3
3/25/14	0.2	0.2	0.1
4/15/14	0.2	0.2	0.1
4/29/14	0	0	0



Please note scale change due to smaller measurements for this wound site

Wound Healing Outcomes:

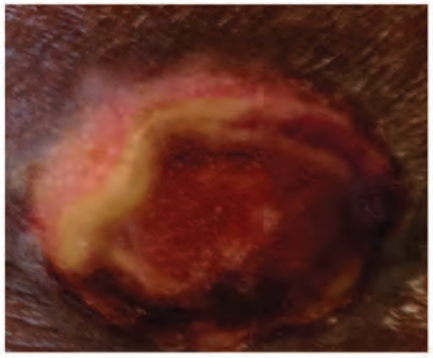
Wound site: Left Trochanter - Stage IV

The Stage IV left trochanter wound proved to be complex and difficult to heal. The graph indicated that the wound progressed, but then regressed before it started to properly heal for a second time.

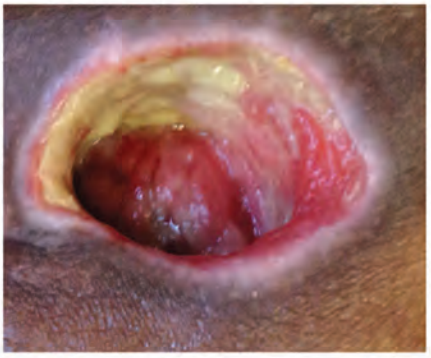
A week after Mrs. Smith went on the Titan Low Air Loss on October 1, 2013, the wound began to develop tunneling and slough. The tunneling increased for the next two weeks up until October 15, 2014. The wound had improved to some degree between November 2013 and February 2014. However, on February 18, 2014, a clinician at the wound center documented necrotic tissue at the wound site. The necrotic base of the wound was scored by a physician on that same day.

On March 25, 2014, a few weeks after using the Clinitron® Air Fluidized Therapy System, the wound volume increased to 27 cm^3 due to debridement of necrotic tissue. It was also documented that tendons and muscles were exposed. The following week, the wound bed had 50% granulation tissue and decreased in size. The wound continued to progress over the next couple of months.

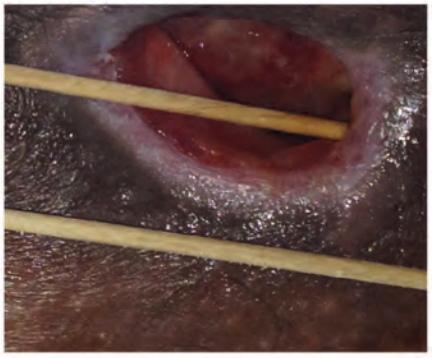
On June 26, 2014, a few days before stepping off the Clinitron® Air Fluidized Therapy, the wound had decreased by 78% and had 100% pink granulation tissue indicating continuation of wound contraction.



Taken on 2/14/14 prior to Clinitron® Air Fluidized Therapy System



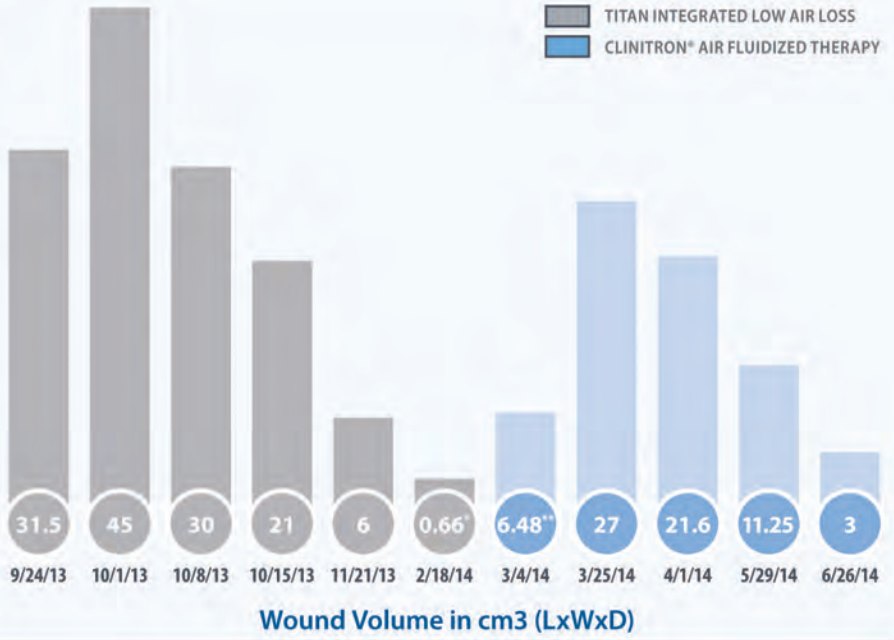
Taken on 3/27/14 during Clinitron® Air Fluidized Therapy System



Taken on 5/21/14 during Clinitron® Air Fluidized Therapy System

Pressure Ulcer Healing Rate

Date	Length (cm)	Width (cm)	Depth (cm)
9/24/13	6	3.5	1.5
10/1/13	6	5	1.5
10/8/13	5	4	1.5
10/15/13	4	3.5	1.5
11/21/13	3	2	1
2/18/14	3.3	2	0.1
3/4/14	4	2.7	0.6
3/25/14	4.5	3	2
4/1/14	4	3	1.8
5/29/14	3	2.5	1.5
6/26/14	2	1.5	1



*Necrotic tissue noted at wound base
**Wound volume increased as a result of debridement on 2/18

Wound Healing Outcomes:

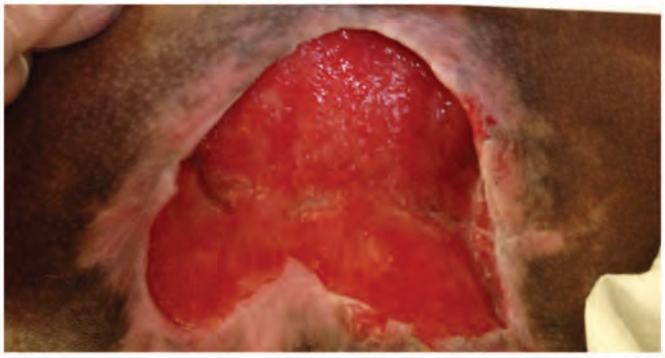
Wound site: Sacrum Stage IV

The Stage IV sacral site experienced similar wound healing to the Stage IV left trochanter site. Prior to the Clinitron® Air Fluidized Therapy System, the wound had varying degrees of healing.

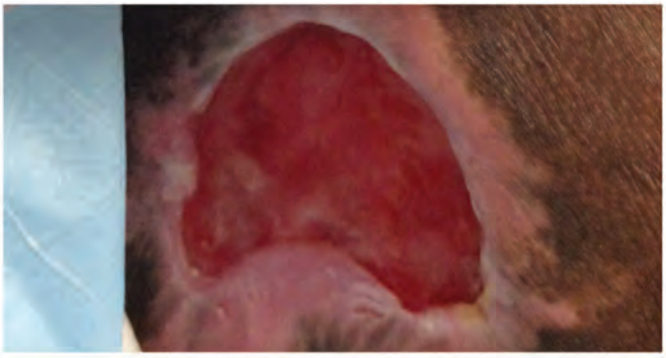
The most significant regression was from October 1, 2013 to November 21, 2013 when the wound increased by 300% to 200 cm^3. On February 18, 2014, measurements indicated that the wound was regressing once more. On March 4, 2014, a few days after using the Clinitron® Air Fluidized Therapy, the wound decreased to by 40% from the prior month.

The volume increased slightly a few weeks later but returned to normal healing progression over the next two months.

On May 29, 2014, the wound measured 20.4 cm^3. This was the smallest that the wound had ever been throughout Mrs. Smith's stay at South Mountain.



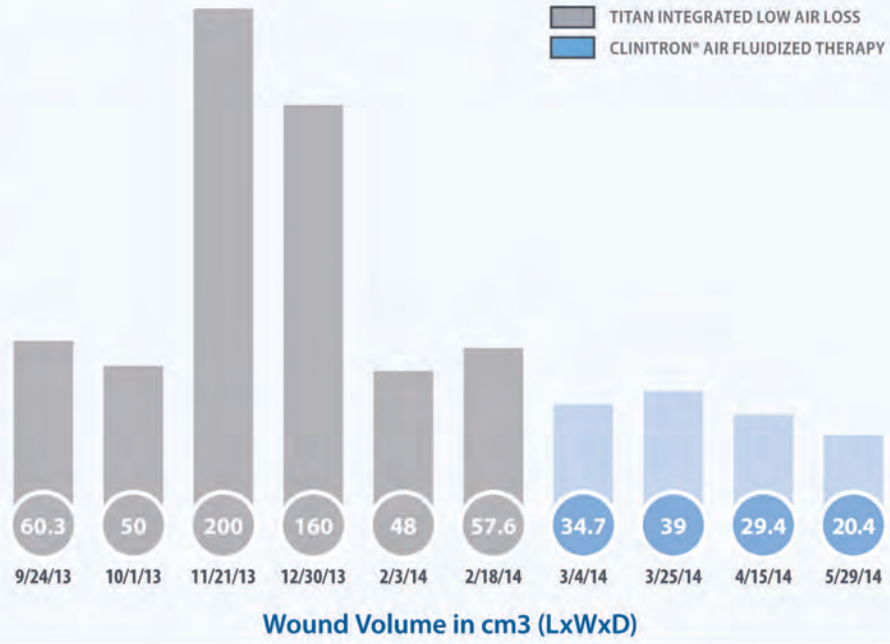
Taken on 2/14/14 prior to Clinitron® Air Fluidized Therapy System



Taken on 4/28/14 during Clinitron® Air Fluidized Therapy System

Pressure Ulcer Healing Rate

Date	Length (cm)	Width (cm)	Depth (cm)
9/24/13	11.5	10.5	0.5
10/1/13	10	10	0.5
11/21/13	8	10	2.5
12/30/13	8	10	2
2/3/14	8	6	1
2/18/14	7.2	8	1
3/4/14	6.2	8	0.7
3/25/14	6.5	7.5	0.8
4/15/14	6	7	0.7
5/29/14	6	6.8	0.5



Financial Considerations

There are a variety of factors that influence costs associated with healing complex pressure ulcers. These factors include the age and physical condition of the resident, type and number of comorbidities, treatments and dressings, and medical options such as Group 2* support surfaces, Group 3* Air Fluidized Therapy, and Negative Pressure Wound Treatment devices. Labor costs associated with wound treatments also need to be considered.

While every situation is unique, favorable results have been achieved when advanced wound care products have been used to treat pressure wounds. Research indicates these products have helped facilitate faster healing rates, can have a favorable impact on nursing care, and can promote increased resident satisfaction – all have a direct or indirect impact on costs.

Clinitron® Air Fluidized Therapy System reduced pressure ulcer incidence in extremely high risk patients, which resulted in an estimated 88% reduction in cost to treat.[1]

Nursing home residents who had a Stage III/IV pressure ulcer, and were treated with a Group 3 surface, healed 4.4 times faster and had 2.6 fewer hospitalizations or ER visits compared to residents on Group 2 surfaces.[2]

Residents who have been placed on the Clinitron® Air Fluidized Therapy System often acknowledge they are comfortable and experience less pain caused by pressure ulcers.[3]

Hill-Rom is pleased to partner with facilities like South Mountain Healthcare and Rehabilitation Center in Vauxhall, NJ to better evaluate and understand outcomes and costs associated with effective wound care management.

South Mountain Healthcare and Rehabilitation Center is a 195 Bed and CMS 5-Star facility for most of the years since its inception. The facility is accredited by The Joint Commission since 1998, and received the Post-Acute Care Certification in 2013. South Mountain is also a six time recipient of National Circle of Excellence through National Association of The Directors of Nursing Administration (NADONA), and most recently in 2015, the recipient of National Embracing Quality Award 2015 from Providigm (ABAQIS).

*According to the Healthcare Common Procedure Coding System (HCPCS), Group 2 support surfaces include powered air flotation beds, powered pressure reducing air mattresses, and non-powered advanced pressure reducing mattresses. Group 3 support surfaces are complete bed systems called air-fluidized beds. This product category uses circulation of filtered air through silicone beads, creating the characteristic of fluid.

1. Jackson, et al. Pressure Ulcer Prevention in High-Risk Postoperative Cardiovascular Patients. Critical Care Nurse 2011;31:44
2. Ochs R. et al. Comparison of Air-Fluidized Therapy with Other Support Surfaces Used to Treat Pressure Ulcers in Nursing Home Residents. Ostomy/Wound Management 2005;51(2) 28-46.
3. VanGilder C., Lachenbruch CA. Air-Fluidized Therapy - Physical Properties and Clinical Uses. Annals of Plastic Surgery 2010; 65(3):366-368.

Online Resources

A. http://woundcareadvisor.epubxp.com/i/566063-september-october-2015/32

B. http://www.hill-rom.com/usa/

Is your therapy department on board with your wound care team?

By Cheryl Robillard, PT, WCC, CLT, DWC

Patients in your clinical practice who develop wounds should prompt a call for "all hands on deck" to manage the situation, but some personnel may be missing the boat. Physical therapists (PTs), occupational therapists (OTs), and speech-language pathologists (SLPs) should be on board your wound care ship so patients can receive care they need. But unfortunately, sometimes they aren't.

Several reasons can account for the lack of therapy involvement in some facilities. They include a knowledge deficit of what PTs, OTs, and SLPs can do to help heal wounds, or misinformation such as the myth that therapy can't get involved until a wound has been present for 30 days. Another reason may be lack of therapist's knowledge or desire to treat wounds and their complications. Lastly, it could be a "turf" issue when several members of the team could perform a similar intervention.

Let's take a closer look at some of these areas.

Therapy services

An understanding of the services therapists can provide helps you know when to make referrals.

Cognition assessment

SLPs are experts in assessing a patient's cognition. The assessment includes learn-

ing ability, so they can help the team determine effective strategies for teaching.

Consider the nonadherent patient with diabetes who has a foot wound. Diabetes is a risk factor for cognitive impairment, but how many of your patients with diabetes have been tested for this impairment so they—and you—know how to compensate?

Another problem is that patients with mild cognitive impairment can often "talk the talk, but not walk the walk": They may say they understand but not truly "get it." This is especially true with written information. Too much money has been wasted on literature given to patients who might be able to read it but don't comprehend the information or can't make the connection between the information and what specifically they need to do.

You can use a simple screening test such as the SLUMS (St. Louis University Mental Status exam) or the MoCA (Montreal Cognitive Assessment) for an initial assessment and refer patients to an SLP if the results are positive.

Nutrition

SLPs and OTs, working closely with dietitians, can assess and treat swallowing and feeding issues that can impair the ability of patients to receive the nutrition they need for wound healing. SLPs and OTs also can educate staff and patients in good oral care to help prevent such complications as pneumonia that can derail healing.

Skin care

General skin care isn't only the function of nursing—OTs and PTs can help. Ensuring that patients and caregivers have the knowledge and capability to inspect, cleanse, and moisturize the skin should be part of a complete activities-of-daily-living program, a specialty of OTs.

Urinary and bowel continence management, which is within the scope of practice for PTs and OTs, can make a significant difference in avoiding contamination of truncal wounds.

Pressure reduction and off-loading is another reason for referral to PTs and OTs. Splinting and contracture management can prevent some wounds and help in healing others. PTs can assess sensation and examine footwear, then teach patients and make recommendations to prevent excessive pressure. They also can provide specialty shoes or total contact casts. Decisions about pressure redistribution in seating systems and beds should involve PTs or OTs.

Edema management

Edema management, which may include manual lymphatic drainage, compression, and exercise, is a good reason to refer patients to PTs and OTs. Although some of these methods require additional training beyond entry-level education, therapists should be able to provide them.

Psychosocial issues

OTs also address psychosocial issues pertinent to wound healing. For example, a patient confined to bed or home for extended periods of time may experience social isolation, learned helplessness, and depression. A patient with a vascular wound who is at risk for amputation may experience extreme stress. Or a patient may not be able to return to his or her previous profession because of wound issues. OTs are trained to provide psychotherapeutic interventions aimed at improving and maintaining the highest quality of life.

Types of biophysical agents

Several types of biophysical agents are available, including low- and high-frequency ultrasound (US), electrical stimulation (e-stim), short-wave diathermy (SWD), cold laser/infrared light, pulsed electromagnetic field (PEMF), and pulsed radio frequency stimulation (PRFS).

Low-frequency US can be noncontact, as in MIST™ therapy, or contact, as in the Arobella Qoustic™, Soring Sonica,™ and Misonix SonicOne™. These machines use sound waves to disrupt necrotic tissue and biofilms. The sound waves also cause acoustic streaming that can stimulate healing. Unfortunately, these devices are relatively expensive and not consistently covered for reimbursement, so they may not be accessible by all organizations.

Pulsed high-frequency US can be used to increase circulation, decrease edema, and soften necrotic tissue. Available research has not consistently demonstrated its efficacy, so not all payers reimburse for it. The machine for providing this therapy is commonly found in most therapy departments.

E-stim and *SWD* have been extensively studied, and research has shown them to be effective in facilitating wound healing. E-stim, using electrical currents, and SWD, using magnetic currents, both facilitate healing at the cellular level.

Centers for Medicare & Medicaid Services (CMS) developed a National Coverage Decision (NCD) for e-stim and SWD. This means that all insurance companies managing Medicare reimbursement (Medicare Area Contractors), must cover these treatments if these two conditions are met:

- The wound is a chronic stage III or IV pressure ulcer or an arterial, diabetic, venous stasis ulcer. Chronic is defined as not healed within 30 days.
- The wound shows no measurable signs of healing with at least 30 days of standard wound care.

The 30-day requirement, known as the "30-day rule" has caused confusion about when patients are referred for therapy. It's important to understand that the 30-day rule applies only to e-stim and SWD, not to other interventions discussed in this article.

Cold laser/infrared light (for example, Anodyne), *PEMF*, and *PRFS* have not been covered by most payers because of inadequate research support, but may be available in your area.

Note: The information contained herein is not intended as coding advice. The information contained in this document is provided for informational purposes only and represents no statement, promise, or guarantee by the author concerning levels of reimbursement, payment, eligibility, charges or that these policies and codes will be appropriate for specific services or products provided or that reimbursement will be made. It is always the providers' responsibility to determine and submit appropriate codes, charges, modifiers, and bills for the services that were rendered. Consult your local CMS, MAC, or other applicable payer organization with regard to specific reimbursement policies, coverage, documentation, and payment.

Debridement

Debridement of nonviable tissue, including both necrotic tissue and epiboly, is part of clinical practice for PTs and specially trained OTs. These therapists can use scalpels, forceps, curettes, and scissors for conservative sharp debridement. Sterile instruments are used in a clean environment to remove only nonviable tissue. This differs from surgical debridement, which is completed by physicians in a sterile surgical environment and may also include removal of viable tissue to effectively create a new wound. Debridement may also be nonspecific, such as using pulsed lavage, a high-pressure saline jet with suction.

Please note that all of the interventions discussed so far may be provided when needed, regardless of the length of time a wound has been present.

Biophysical agents

Biophysical agents, also commonly known as modalities, use various forms of energy to facilitate healing by decreasing inflammation, increasing circulation, decreasing edema, decreasing pain, and removing or

softening necrotic tissue. PTs and specially trained OTs can provide these modalities. Each modality has specific contraindications and may have payer-specific limitations on provision. (See *Types of biophysical agents.*)

Bringing therapists onboard

Now that you know what therapists should be able to do for your wound patients, what if your clinicians aren't trained in some of these areas? Discuss the problem with the department manager because there are many continuing education courses available, as well as the Wound Care Education Institute certification program.

An excellent way to increase involvement of therapists in wound care is to have them participate in wound rounds with nurses. This is a great way for you to share your knowledge with them, allow them to see various wounds and wound dressings, and have them determine with you what wounds might need the therapy interventions discussed in this article.

Mowing down turf issues

Eliminating turf issues begins with knowing each discipline's scope of practice. You also may need to take financial issues into consideration. Depending on your setting, if the PT can debride and be separately reimbursed, freeing up nurses to focus on other medical issues, wouldn't that be the most expedient course?

Another potential problem may be coordination of services. For example, although applying a dressing is not a billable therapy service, does it make sense to have a therapist undress the wound for a modality then leave the wound uncovered until a nurse has time to apply the dressing?

Resolving turf issues requires a collaborative spirit from all team members to negotiate what makes the most sense in your setting and determine what would be best for the patient's healing.

Setting sail

Having therapists as active members of your wound care team will ensure you're providing the best state-of-the-art care for patients' wounds. Knowing what the different therapies can do will help you determine which wounds require a therapist's direct involvement. Lastly, navigating barriers to getting your therapists on board your wound care ship will help you reach top speed in sailing to healing! ■

Selected references

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Tariq SH, Tumosa N, Chibnall JT, et al. Comparison of the Saint Louis University mental status examination and the mini-mental state examination for detecting dementia and mild neurocognitive disorder—a pilot study. *Am J Geriatr Psychiatry.* 2006;14(11):900-10.

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Cheryl Robillard is a clinical specialist for Aegis Therapies in Milwaukee, Wisconsin.

Clinician RESOURCES

End your year by checking out these resources for your practice.

Sentinel event alert for falls

As part of its sentinel event alert "**Preventing falls and fall-related injuries in health care facilities**[A]," The Joint Commission has assembled information and multiple resources, including:

- analysis of contributing factors for falls
- evidence-based suggestions for improvement
- Joint Commission requirements relevant to falls
- links to toolkits and protocols
- an infographic on preventing falls.

Falls with serious injury are consistently among the top 10 sentinel events reported to The Joint Commission Sentinel Event Database.

Position statements for NPUAP

The National Pressure Ulcer Advisory Panel publishes several **position statements**[B] of interest to wound care clinicians, including:

- Hand check method: Is it an effective method to monitor for bottoming out?
- Pressure ulcers with exposed cartilage are stage IV pressure ulcers

- Staging pressure ulcers
- Mucosal pressure ulcers
- Reverse staging.

The statements recap a topic or delineate NPUAP's opinion on a specific issue.

Patient safety primer on high reliability

The Agency for Healthcare Research and Quality has released a **Patient Safety Primer**[C] on high reliability. High-reliability organizations operate in complex, high-hazard domains for extended periods without serious accidents or catastrophic failures.

The primer describes characteristics of high reliability and links to resources that can help organizations foster an environment conducive to high reliability.

Civility resources

The American Nurses Association offers **resources**[D] on incivility, bullying, and workplace violence, including:

- two **infographics**[E]: "Bullying prevention strategies for nurses" and "Civility best practices for nurses"
- the position statement "Incivility, Bullying, and Workplace Violence"
- links to other resources, such as a National Institute for Occupational Safety and Health training program on **occupational violence**[F].

Guideline synthesis on prevention of pressure ulcers

Access a **comparison**[G] of two guidelines for the prevention of pressure ulcers. The comparison was done by the National Guideline Clearinghouse, part of the Agency for Healthcare Research and Quality.

Online Resources

A. http://www.jointcommission.org/sea_issue_55/?j=2664045&e=marypat.aust@aacn.org&l=9552_HTML&u=55549862&mid=1064717&jb=0

B. http://www.npuap.org/resources/position-statements/

C. http://psnet.ahrq.gov/primer.aspx?primerID=31

D. http://www.nursingworld.org/MainMenuCategories/WorkplaceSafety/Healthy-Nurse/bullyingworkplaceviolence/default.aspx

E. http://www.nursingworld.org/MainMenuCategories/WorkplaceSafety/Healthy-Nurse/bullyingworkplaceviolence/Preventing-Bullying-and-Civility-Best-Practices.html

F. http://www.cdc.gov/niosh/topics/violence/training_nurses.html

G. http://www.guideline.gov/syntheses/synthesis.aspx?id=47794&search=ostomy

Note from Executive Director

By Cindy Broadus, RN, BSHA, LNHA, CLNC, CLNI, CHCRM, WCC, DWC, OMS

National Alliance of Wound Care and Ostomy®

WOW! WOW! WOW! That sums up the feeling generated at the 12th Annual Wild on Wounds Conference, held September 2-5 in Las Vegas. What an exciting 4 days! With more than 1,100 attendees, the conference was busy, bustling, and full of nonstop activity. Sessions were available for all levels of clinicians, from beginners to advanced, and were based on 2014 participant feedback. This year, we added something new: Clinicians could watch webinars in a dedicated room and obtain continuing education credit. We received a great deal of positive feedback about the different learning options.

Once again, NAWCO had a question/answer area set up in the middle of the action. I'd like to thank our board of directors and certification committee members for volunteering their time to staff the area and answer inquiries from attendees.

Each year NAWCO gives three awards to deserving clinicians who go above and beyond the daily routine to provide exceptional care to their patients with wounds. It's such a rewarding experience for the awards committee to receive and read the many nominations. As always, there were many outstanding submissions, but only three could be chosen, making the selection process difficult.

In the previous issue, I reintroduced all of the award winners since the inception of the awards program in 2007 through 2014. The 2015 winners were announced and recognized during the closing session, titled "Pay it Forward." Board of directors President Debbie Dvorachek and Vice President Katie Pieper presented the awards to the winners.

Here are just some of the impressive comments that were made about the award winners.

Outstanding Work in Diabetic Wounds: Margarita Joni Rose Villar, BSN, RN, WCC

- "Consistently displays high ethical standards and maintains integrity with patients as well as hospital staff."
- "Volunteers to see clinic patients, educates staff on total contact casting and its effects on healing the diabetic wound."
- "Recruits/mentors other wound care professionals in the prevention and treatment of diabetic wounds."

Outstanding Research in Wound Care: Candice Curtin, BSN, RN, WCC, DWC, OMS

- "Presented a poster at the 2015 VNAA (Visiting Nurse Associations of America) conference."
- "Received first-place poster award for a case study series done on Diabetic Foot Ulcer Management at the Desert Foot Podiatry Conference in 2012."
- "Working on validating a pressure ulcer staging tool that will help clinicians stage appropriately."

Outstanding WCC of the Year: Marissa Richardson, RN, CRRN, WCC

- "Provides the leadership role with

wounds in the HealthSouth hospital in Jonesboro, Arkansas.

- "Able to articulate proper technique at all levels of licensure."
- "Provides wound care training and conducts one-on-one education with patients on how to take care of their wounds at home after discharge."

NAWCO is proud and honored to have been able to recognize the achievements of such a dedicated group of wound care clinicians. All of us at NAWCO congratulate the 2015 Award Winners.

Look for my introductions of the remaining board of director members in the next issue of *Wound Care Advisor*.

New certificants

Below are WCC, DWC, and OMS certificants who were certified from August to September 2015.

Ariel Ackerman
Howard Aguada
Audrey Akinlotan
Ekaette Akpabio
Vickie Allen
Heather Alnwick
Noori Al-Waili, MD
Wendee Amero
Kelly Anderson
Maria Anoche
Angela Arcuri
Anne Ashton
Rhonda Babineaux
Jennifer Baecker
Linda Bailey
Sandra Baldwin
Rebecca Barker
Natalee Barnett
April Barrera
Bonnafe Baticados
Christine Beebe
Jessica Bennett
Arlene Berdijo
Karen Berger
Indira Bhagwandin
Jennifer Bohrtz
Susan Bourbon
Cherie Brawner
Colleen Brennan
Jorge Bringas
Jennifer Brokaw
Deborah Brown
Teresa Buckley
Jeanne Buckman
Kimberly Burk
Kimberly Burton
Lisa Campbell
Linda Carrigan
Sarah Casavant
Stephanie Cassell
Adriana Castellanos
Liane Chambers
Neferteria Chatman
Ana Chavalo Campos
Volha Chernik
Young Kyung Cho
Cynthia Clare
Kimberly Clemens
Donna Cleveland
Kristin Cohen
Lori Cole
Marilyn Collins Rocha
Janessa Copenhafer
Tiffany Crawford
Mary Creger
Kimberly Curry
Paige Danielson
Jessica Davidson
Teresa Davis
Matthew Decker
Mary Delira
Lisa Dicken
K Slade Dietz
Karley Ditgen
Roger Dodson
Hillery Dolford
Irene Dominguez Prendes
Bertha Dowell-Smith
Robert Duscher
Rachella Early
Karla Eddins
Christine Eidson
Nilma Elias Santiago
Patricia Elmore
Heather Ezzell
Marianna Facco
Mara Fader
Jane Fernau
Donald Fillman
Christopher Finlaw
Robin Finney
Geri Fitch
Hon Fong
Angel Foster
Brandi Fowler
Ingrid Franklin
Dawn Freeman
Lilli-Ann Gallagher
Gloria Garcia
Peggy Gardner
Lynn Gehr
Jennifer Geiger
Charlene Germer
Tracy Getman
Helen Gipson
Kathleen Glasco
Koupu Goffa
Susan Gortney
Erica Gould
Elizabeth Graybill
Engle Greenwood
Joseph Grimes
Naomie Guiteau
Robyn Halley
Ashley Haltness
Sonya Haptonstall
Cara Harris
Chad Hauge
Connie Helmer-Jordan
Shelly Herron
Elizabeth Hirn
Sarah Hizon
Lisa Hobbs
Regina Hoeferlin
Lisa Holpin
Jodie Huddleston

Lynn Huett
Jenny Huff
Brenda Hughes
Janet Hull
Susan Huonder
Pauline James
Julie Jamgochian
Sheryl Jenkins
Jhoni Johnson
Juanita Jones
Anisha Kadalimattom
Roy Kain
Rupert Karl
Andrew Kastello, MD
Lori Kent
Sabrina Khor
Lizza Kister
Cassandra Klemm
Wanda Krause
Betty Kuo
Lea Lavarias
David Lehninger
Rebecca Lehtola
Evelyne Lemy
Tiffany Lollis
Larisa London
Kristina Long
Coreen Long
Beatriz Luna
Jannet Mangold
Leslie Marcelo
Georgette Mason
Marissa Masterson
Andrea Measor
Lynn Mello
Gaone Merafhe
Mai Milan
Janet Miller
Suzanne Miller
Laura Millevolte
Stephen Morgenstern
Crystal Mosley
Barbara Murphy
Stacy Newbern
Agnes Newlin
Yvonne Norris
Stephanie Novak
Caroline O'Brien
Shannon O'Brien
Mayola On
Arthur Onofre
Eugenia Overfield
Julie Oyen
Socorro Paguirigan
Malori Paplow
Sunita Patel
Dana Patton
Irene Pearson
Todd Pelton
Michelle Perkins
Tammy Perry
Lananh Phan
Suann Phillips
Ingrid Piedrahita
Justine Piper
Melanie Poole
Bethany Przybylski
Laurie Ramirez
Marta Ramos Rivera
Brenda Recker
Vivian Redmon
Jennell Reed
Tamara Retzlaff
Geraldine Rienstra
Lalaine Rivera
Kimberly Rolfson
Jisah Romero
Kondeleye Ross-Johnson
Teresa Roth
Janet Round
Paulina Ruffa
LaToya Russell
Brenda Sabata
Viviane Santos
Jennifer Schlag
Cory Scott
Judi Segbefia
Cheryl Sickles
Melissa Sivola
Terrill Skaw
Kiersha Slowter
Jamie Sparenberg
Susan Speed
Zarina Steward
Mary Stewardson
Elishia Stillwell
Michael Strickland
Wendy Sutherland
Jennifer Szalkowski
Nicholas Tan
Judy Thompson
Kelli Thornburg
Angela Tidwell
Rachel Tolar
Denise Tomerlin
Jessica Townsend
Jennifer Townsend Vera
Misty Troyan
Bernadette Truhn
Stephen Tynan
Carolina Uranga
Elaine Valbuena
Rosetta Villeneuve
Immacula Volcy-Desir
Robyn Wakeling
Cynthia Walker
Frances Ward
Sara Washa
Stephanie Washlock
Melissa Wasmund
Janette Watt
Kenneth Wearner
Amy Welch
Sarah Westra
Melanie Whimpey-Budd
Vanya Williams
Tiffany Wilson
Linda Wilson
Tina Winfrey
Susan Wirsing
Missy Wojtysiak
Angie Wopat
Michelle Wright
Rachel Yip

Recertified certificants

Below are WCC, DWC, and OMS certificants who were recertified from August to September 2015.

Ma Nida Advincula
Elsa Aguilera, MD
Jennifer Antonelli
Amber Ashbrook
Maggie Austrie
Rebekah Baldauf
Gail Baldwin
Tracy Ball
Ramon Banea
Mary Barnes
Marlene Barnett
Lizbet Basulto
Kathreen Beals
Paula Beck
Tammy Benson
Joan Berry
Renee Bigbee
Pamela Blatter
Robin Blevens
Kimberly Blitzer
Lorraine Boehm
Xzyjoy Bongat
Sarah Booth

Tara Borda
Amanda Borden
Gaynell Bowman
Denise Boyke
Stephanie Bradshaw
Trovoyum Branson
Mary Braswell
Francesca Briem
Sabrina Briggs
Lunetha Britton
Karen Brown
Amanda Burkeybile
Jimmy Buyao
Hannah Cardin
Margaret Carfi
Bonnie Caster
Marilyn Christianson
Lydia Clark
Theresa Coates
Ingrid Concepcion
Stephanie Cook
Kristen Crane
Meagan Culak
June Cunningham
Beverly Cunningham
Valerie Davidson
Rachelle Davis
Debra DeFreitas-Cook
Elverta Delahay
Barbara DeMatteis
Caterina Di Giovanna
Vicky Dooley
Rosario Druja
Janet Duff
Gabrielle Dupre
Debra Eberwein
Colleen Edson
Alice Eide-Mason
Jennifer Elledge
Kimberly Engen
Wendy England
Darlene Engles
Carletta Ernst
Filipina Escobar
Ceazar Familara
Ma Felix
Karen Fels
Chere Fenselon
Kimberly Field
Christine Finch
Nina Fincham
Ann Finn
Cassandra Foley
Priscilla Forero
Christine Fournier
Theresa Fox Reed
Barbara Francesco
Crystal Franklyn
Kathy Frodahl
Laura Fulton
Marisol Gallagher
David Galloway, Jr.
Muriel Garcia
Roberta Gasper
Polly Gillen
Anna Gillespie
Deborah Gipson
Sara Goldberg
Linda Goldenberg
Rita Gorman
Christina Graham
Stephanie Grant
Joie Griebel
Teresa Grimm
Maribel Guerrero
Viktoria Haas
Najwa Haddad
Lizette Halili
Linda Hall Payne
Linda Hanratty
Sarah Haywood
Gayle Hedeen
Miranda Henderson
Tara Hertel
Kyra Hill
Sasha Holden
Janie Hollenbach
Deborah Horner
Stephanie Houle
Marissa Hudler
Vashti Ivey
Filor Izanian
Alicia Johnson
Lynn Johnston
Kimberly Karnes
Melanie Kehmeier
Connie Kerrigan
Steven King
Anita Krumm
Danielle Kvam
Jeanelle Lao
Jeanne Lawson
Christie Leath
Dawna Lemelin
Erika Lewis-Hargrove
Kathleen Libutti
Eunice Lim
Lisa Lockwood
Darylyn Long
Richard Longley, MD
Debra Loveridge
Debbie Maas
Jennifer Mackie
Mary MacLean
Karen Magnani
Lisa Maiolie
Tracey Majernik
Amanda Malia
Kathy Malone
Rebecca Malone
Hannah Mand
Lucila Manlapaz
Dawn Marineau
Katie Markeson
Kelli McDonald
Heather McHenry
Alison Means
Mark Melton
Rebecca Mikula
Claudine Miranda
Darlyne Mitchell
Heidi Mitchell
Kelley Monroe
Michelle Moore
Jessica Morrow
Teresa Mrstik
John Muccitelli
Anita Muro
Sharon Murr
Rosemary Natale
Kimberly Nelson-Hojnacke
Eileen Novotny
Mary Oakes
Karen Oberlin
Tracie Panting
Tracy Paris
Tammy Parker
Naquita Parker-Richardson
Sonja Pennington
Jessie Peralta
Nancy Peralta
Ana Perez
Mabel Perez
Jennifer Peterson
Kimberly Petit
Teresita Pido
Carola Pisani
Debra Pizzorni
Kerri Pratt
Mary Beth Pratt Yenna
Kerry Prendergast
Judy Puletti
Karen Ray
Kasie Reed
Martha Reid
Bonny Reinhart

Joel Reitz
Bradley Renner
Darcie Rey
Helen Reyes
Jeanne Rice
Rebecca Richter Burke
Linda Rickards
LaReine Rickmon
Melonie Rieck
Claudette Robinson
Michele Robinson
Nicole Rooney
Kelley Saiz
Svetlana Sakirsky
Teresa Samsel
Angela Savage
Stacy Schiurring
Tracey Schofield
Cindy Schott
Meve Shakespeare
Elena Shur
Judy Skaggs
Kelly Skinner
Ellen Spillane
Shannon Spivey-Mayo
Becky Spray
Gemma Suh
Melanie Sutton
Naoko Takahashi
Rhonda Talbot
Connie Taylor
Mykka Taylor
Mary Thomas
Melody Thomas
Carol Thompson
Amy Thornton
Martha Thornton, DPM
Ning Tian
Cynthia Tibert
Samantha Tirrell
Beryl Tobing
Sandra Vaughan
Helen Verceles
Christina Vigil
Katherine Wade
Alan Waishkey
Karen Walker-Albright
Angela Wallis
Cynthia Watkins
Kathy Watrous
Joann Watson
Norma Wells
Barbara West
Samuel Whatley
Brenda Williams
Sharon Williams Bobo
Michele Ybarra
Franco Zauli
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1. Ochs RF, Horn SD, et al. Comparison of Air-Fluidized Therapy with Other Support Surfaces Used to Treat Pressure Ulcers in Nursing Home Residents. Ostomy Wound Management, 2005, 51(2):38-68.

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