Using silicone technology to maintain healthy skin in stoma care

Maddie White

Abstract
The use of silicone in stoma care has grown in recent years and may be considered the next step in the revolutionary development of stoma care products. Clinical nurse specialists aim to provide evidence-based care at all times, and the same is true for stoma care nurses. Preventing harm by choosing products which have a sound research base provides the patients with up-to-date, quality care which enables them to adapt to life with a stoma and return to ‘normal’ functioning. This article explores the issue of peristomal skin problems and the development of silicone products, and highlights scenarios where it could be an advantage to choose a silicone product.

Key words: Silicons ■ Quality of life ■ Surgical stomas ■ Adhesives

Silicon exists in its unrefined state—in sand, for example—but when refined, it is used in products in industry, electronics, building, kitchen appliances and personal materials. Examples include kitchen utensils, silicone chips in computers, and in the cosmetic industry such as in breast implants.

Skin
It is essential to understand the anatomy and physiology of skin. Skin is the largest organ of the body and provides a waterproof, protective layer as well as being a thermoregulator. It comprises several layers—the dermis, the epidermis and the hypodermis—which differ in thickness, structure and function (Stephen-Haynes, 2014).

Skin has several functions, which include absorption, excretion, protection and immunity as well as permitting the sensations of touch, heat and cold and the synthesis of vitamin D (Denyer, 2011). Its protection is paramount to prevent infection and systemic illnesses.

Skin types vary from one individual to another and can be oily, normal, sensitive or fragile or dry (Thompson et al, 2011), which implies the need for assessment before choosing a suitable appliance.

For stoma patients, the skin surrounding the stoma is vulnerable to faecal material or urine, both of which can be harmful and cause breakdown of skin very easily. The resulting physical and psychological distress can have a huge impact upon a patient’s quality of life (Nichols and Riemer 2011). Care of the peristomal skin area is therefore essential to maintain its integrity and prevent problems with adherence of products, as well as maintaining the patient’s comfort.

Peristomal skin integrity
The skin around the stoma should be clean, intact and dry and not differ in any way to the remainder of the abdominal skin (Stephen-Haynes, 2014). Assessment of the peristomal skin should be undertaken to assess this as well as the effects of the adhesive and the potential effects of the effluent on the skin. Tools do exist to assist the nurse in assessing skin integrity and can be useful for newly qualified health professionals who do not have the experience to assess independently. The Ostomy Skin Tool (Martins et al, 2008), for example, provides the clinician with a formula to measure the discoloration, excoriation and tissue overgrowth of peristomal skin and use a scoring system to evaluate progress. Peristomal excoriation can, understandably, be a huge challenge to patients and nurses alike (Lowther and Osborne, 2013).

Excoriation of the skin is the destruction and removal of the surface of the skin and is common in ileostomates and...
urostomates because of the nature of the effluent produced (Burch, 2008). Ileostomy effluent contains digestive enzymes which can cause skin breakdown (Richards, 2005). Urine can dissolve or erode the stomal skin barrier and macerate the epidermis (Rolstad et al, 2012).

It is important to document findings and include details such as the size of the excoriated area, the depth of excoriation and the extent to which this affects adhesion of the appliance. Assessment using a recognised skin tool gives the nurse the opportunity to record the exact details of the excoriation and use as a comparison each time the appliance is changed in order to measure progress. Photographic evidence can also be used in order to record episodes of skin damage. Local trust guidelines will determine how these measurements are recorded, such as on a care plan or wound management document. Other factors to consider are the size and type of stoma, its position, whether spouted or not and the patient’s management of the stoma. Poor-fitting appliances can, for example, lead to leakage, which in turn leads to excoriation. Frequent appliance changes can also cause the peristomal skin to become broken and sore with psychological factors affecting the patient’s perception of ‘normal management’. In a study by Nichols and Riemer (2011), it was demonstrated that a negative body image occurs more frequently when the ostomy patient has non-normal peristomal skin.

‘Skin stripping’ is mentioned frequently throughout the literature and refers to skin damage caused when appliances are removed, frequently resulting in damage to the peristomal skin. Removing the skin barrier will pull off a layer of cells each time (Thompson et al, 2011) so the choice of appliance is of paramount importance.

Some patients will have existing skin problems such as psoriasis or eczema which need to be taken into consideration when selecting appropriate management systems and adhesives. Treatment for the skin condition may affect the range of choice of appliances being considered. Oil-based creams will undermine adhesion of the pouch and a multidisciplinary approach may be needed with input from dermatology and the SCN, particularly for severe problems such as pyoderma granulosum. Pyoderma is a rare inflammatory skin disorder which can be associated with inflammatory bowel disease. Peristomal skin appears to be uniquely predisposed, it begins as an extremely painful nodule which rapidly ulcerates appearing bluish in colour and ragged (Williams and Lyon, 2010).

Any infection, such as fungal or bacterial infections, should be adequately treated. These are more frequent in patients who are immunocompromised such as transplant patients or those undergoing chemotherapy or radiotherapy (Rudoni, 2011).

**Causes of peristomal skin damage**

**Leakage**
The most common cause of peristomal skin damage is leakage (Herlufsen et al, 2006). Leakage from an appliance will inevitably cause a breakdown of the peristomal skin, owing to the corrosive nature of the effluent, particularly if this is a repeated occurrence. The aim is to correct the underlying cause for the leak and not just treat the sore skin. Figure 1 gives some suggestions for frequent causes of leakage leading to sore peristomal skin.

<table>
<thead>
<tr>
<th>Problem</th>
<th>Evidence</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poor-fitting appliance or flush stoma</td>
<td>Exposed sore skin or trauma to stoma from ill-fitting appliance</td>
<td>Re-measure and ensure correct hole to fit stoma. Add protective barrier wipe. Add seal under appliance for added protection.</td>
</tr>
<tr>
<td>Stomal retraction or ‘moat’ around stoma</td>
<td>Sore skin from contact with effluent</td>
<td>Consider and assess for convexity to fill moat or allow spout to protrude. Convex seal underneath existing appliance.</td>
</tr>
<tr>
<td>Skin creases</td>
<td>Assess depth of crease with patient sitting; does effluent leak along channel created?</td>
<td>Fill crease with filler, paste or seal to improve pouch adherence. Soft or firm convex pouch with or without belt.</td>
</tr>
<tr>
<td>Pancaking</td>
<td>Faeces ‘sit’ on stoma and cause sore skin and leaks</td>
<td>Advise re-measures to prevent pancaking such as Vaseline/oil in bag, filter cover etc.</td>
</tr>
<tr>
<td>Altered stool i.e. diarrhoea</td>
<td>Liquid/watery stool on base of flange</td>
<td>Treat diarrhoea and return function to normal i.e. stool thickeners. Add solidifying agent to the inside of pouch.</td>
</tr>
<tr>
<td>Hernia</td>
<td>Reduced area of adhesive after cutting flange</td>
<td>Alternative appliance with flexible, large area of adhesive. Re-measure the expanding stoma. Consider support belt.</td>
</tr>
</tbody>
</table>

![Figure 1. Table identifying causes of leakage](image)
Dermatitis and allergy

Peristomal skin provides an ideal situation for developing either allergy or irritation (Williams and Lyon, 2010). Irritation is caused by removing appliances frequently and this, coupled with exposure to effluent and a warm, moist environment, fuels the risk of sensitisation. Protection of the skin becomes paramount; therefore removing the irritant or an adjustment to stoma management should correct the problem. If, however, the problem persists, referral to a dermatologist may become necessary to rule out allergic causes, although, in the author’s experience, true allergies are rare.

Silicone in stoma products

So why is silicone used in stoma care? Voegeli (2008) states that silicone is ideal for use in skin care products because it is non-toxic, able to repel water and chemical attack and is non-alcohol based and therefore non-irritant. These properties make it particularly suitable for use in peristomal skin care. Black (2007) advocates routine use of silicone in the form of an adhesive remover as it penetrates the adhesive skin bond by spreading effectively and rapidly on the peristomal-skin surface. This aids removal of the adhesive flange as opposed to skin stripping occurring if a silicone-based remover is not used. Skin stripping alters the barrier property of the skin and exposes deeper skin cells susceptible to attack from effluent and bacteria. This may be more evident in patients who are elderly, as their skin can be thin and friable (Burch, 2014). Once the barrier function is compromised, desquamation occurs owing to an increased transdermal water loss (Rudoni, 2011).

Other silicone stoma accessory products such as barrier wipes, seals and flange extenders have been developed to help patients better manage their stomal complications and skin care (Rudoni, 2011) but these are not necessarily used routinely. Stomas are not always in an ideal position or have a perfect spout and it may be necessary to use an accessory to achieve a good seal and prevent leakage, which in turn leads to peristomal skin damage. Cottam (2005) describes her audit findings in which it was revealed that 34% of patients developed an early post-operative complication resulting in a problematic stoma. A follow-up to this study in 2011 revealed little had changed (Cottam and Richards, 2011).

Many studies have been undertaken to show the increased benefit of silicone products (Cutting, 2006; Rudoni, 2011). There is certainly more emphasis and awareness now around the increasing costs to the NHS of stoma products and accessories (Martins et al, 2012) and a cost-effective solution such as a silicone product will help to promote an economically effective approach to care. This is evident from using silicone remover sprays because they prevent skin stripping, thereby reducing the need for further product use. Other silicone products need to be formally assessed for cost effectiveness as their use increases. Factors such as increased wear time compared to other products such as hydrocolloids which breakdown more readily are appealing to GPs who may question the use of an accessory product when added to a prescription. For example, it would appear that in some situations these silicone-based products have an advantage over more conventional products, by offering greater protection against repeated moisture exposure, thereby prolonging wear time (Voegeli, 2013). The SCN should be able to explain the rationale of choice of product to justify its use.

The advantages of silicone products

Silicone products offer an alternative to other accessories. They can be beneficial because they:

- Are hydrophobic as opposed to hydrophilic traditional hydrocolloid products—silicone does not absorb faeces or urine, therefore it does not break down (Voegeli, 2008)
- Allow the skin to breathe (Gabe and Slater, 2013)
- Reduce the risk of leakage—silicone can extend the wear time of the stoma appliance because of an improved adherence and less breakdown from effluent (Voegeli, 2008)
- Are easily removable and leave no residue on the skin (Cutting, 2006).
- Allow for atraumatic removal—there is less skin irritation and therefore this provides more comfortable stoma care (Grove et al, 1993, cited in Rudoni, 2011)

Trio Siltac® and Silvex® Silicone Ostomy Seals

These silicone rings conform to the shape of the stoma, forming a secure seal around the base. Usually pre-cut or cut-to-fit skin barriers are measured 2-3 mm (minimum) larger than the stoma to allow peristalsis. As a result, there is always skin that is exposed, which is prone to irritation. With both of these seals, the exposed skin is protected by the silicone.

Additional benefits are that they remove clean and in one piece, they reduce wastage due to the nature of the silicone, which returns to its natural size and shape. They do not absorb effluent and therefore do not break down. Ostomates find them easy to handle and they are quite ‘forgiving’, which gives the ostomates more control.

Silvex can also be a support for a convex flange as well as a flat; it can fill difficult contours on the skin around the stoma while protecting from the convexity itself. This seal can be used both ways making it versatile.

The sizes are generous and often it is worth trying the smaller seal for a firmer fit. Both seals can be used alone or in conjunction with Silken® stoma gel.
Silken® Silicone Stoma Gel
Silken silicone stoma gel can be used to fill difficult contours, creases and channels that allow liquid to escape. The gel can be applied directly from the tube to the area and an appliance added without the need to spread it. The catalyst for silicone to cure is moisture or humidity. This process is known as ‘room temperature vulcanisation’ (RTV). When occluded, the gel will cure over a longer period, if at all. As a result, it will not harden in the tube but will start to skin over within 20 minutes on the body under a flange.

Silex® Silicone Flange Extender
This ultra-thin flange extender enables longer wear times for ostomates. It is flexible and removes easily without stripping the skin and without the need for adhesive removers. It is especially beneficial for abdomens with challenging contours such as hernias.

Trio has developed a new customer silicone formulation designed to specifically overcome problems associated with hydrocolloids. This is specific to these products and makes them breathable and avoids maceration of the skin by allowing good rates of moisture vapour transfer (MVTR). A commonly asked question is whether they will stick to wet skin? Skin should be prepared as per usual practice then the seal or gel can be applied as normal.

As SCNs, it is a benefit when ostomates can be kept on the stoma management system they are accustomed to by providing them with a solution that is compatible with all current systems available. This can avoid adoption of a new system and minimise anxiety for the ostomates, and reduce clinic time too.

Case studies
The following case studies and patient perspective (Box 1) describe incidents where silicone products have been used successfully.

Patient 1 (VB)
VB was born in 2011 at 24+4 weeks gestation, weighing just 675 grams. He developed neonatal necrotising enterocolitis and had formation of an end ileostomy and mucous fistula. He underwent closure of his stoma, but subsequently developed an enterocutaneous fistula. Repair of the fistula was unsuccessful and he developed multiple enterocutaneous fistulae with repeated failed attempts at repairing the fistulae. He was left with a well-established gastrocutaneous fistula which produced copious amounts of acidic gastric fluids. VB had complex needs and multiple comorbidities. It was no longer possible to apply a stoma bag over the fistula owing to a severe abdominal defect, excoriated skin and the restriction of movement that resulted from the presence of a stoma bag and the application of multiple accessories. It was necessary to find a solution which allowed management of the corrosive output and enabled VB to develop and reach the milestones for his age and socialise with others.

VB received enteral nutrition via a gastroduodenal feeding tube and long-term parenteral nutrition via a Hickmann line. Unfortunately, both tubes had been sited very close to the gastrocutaneous fistula and there was a risk of contamination and infection developing at both tube sites. It was not possible to apply a stoma bag, so Trio Silken silicone stoma gel was applied in the creases around the fistula to even out VB’s skin contours and to create a barrier to prevent contamination of the tube sites. Skin protection products were applied to the surrounding skin and absorbent gauze was applied with bandages to secure the gauze. The combination of skin protection, Trio Silken silicone stoma gel applied in the creases and absorbent gauze provided a satisfactory fistula management system. VB’S mother was delighted with the Trio Silken silicone stoma gel and described it as being ‘very good, easy to apply, easy to remove and it stops the spread of the fistula output’.

Patient 2 (PN)
PN has Crohn’s disease and had an emergency defunctioning loop ileostomy and small bowel resection for a perforation. He was initially managing his stoma care without any problems, but he had recently lost a large amount of weight owing to ongoing problems with his Crohn’s disease and a high-stoma output, despite employing strategies to reduce the output, including high doses of Loperamide. His stoma is situated in several deep creases, which had become more prominent and problematic since his increased weight loss. PN enjoys an active lifestyle, so needed an appliance that was secure. Unfortunately, because of the prominent creases and skin folds, PN’s stoma was completely obscured. In addition, a high stoma output was causing distressing leaks and increasing peristomal excoriation. PN had tried a variety of bags and accessories to try to overcome the frequent leaks, but we were running out of solutions as his weight loss continued and his output increased. We offered PN Trio Silken silicone stoma gel to try, as hydrocolloid paste had been unsuccessful in filling the multiple creases around his stoma and we wondered if an alternative product would improve the situation. After a trial period, PN contacted us to say he was delighted with the outcome. He was pleased to report that the wear time for his
The cost-effectiveness of silicone accessories needs to be formally evaluated. Silicone is flexible, easily applied and does not leave a residue on peristomal skin. Silicone technology has led to the development of new products for use in peristomal skin care. Peristomal skin is vulnerable to excoriation and must be protected.


© 2014 MA Healthcare Ltd

KEY POINTS

- Peristomal skin is vulnerable to excoriation and must be protected
- Silicone technology has led to the development of new products for use in stoma care
- Silicone is flexible, easily applied and does not leave a residue on peristomal skin
- Silicone products provide an alternative for the stoma care nurse
- The cost-effectiveness of silicone accessories needs to be formally evaluated

Box 1. Patient perspective

My name is Anne Howie and on 2 July 2014 I had my bladder removed owing to a vaginal melanoma and because of this had a urostomy. As a result of complications I also had a colostomy so I have two stomas to deal with, but it is my urostomy that I have had most difficulties with.

Like most people who have stomas I had a few problems at first until I got a bag that suited my urostomy. I was quite happy until my wound healed and caused a dip in my skin right up to the stoma. This caused me lots of leaks and, because of the leaks and the fact I needed to change clothes and bag so regularly, I didn’t want to go out. My stoma nurse was great, visiting me regularly and giving me things to try as a solution. I tried paste, rings and lots of different bags without a solution. I was having to change clothes and bag up to six times a day, which was not only inconvenient but made me down and depressed and not wanting to go out or see people.

Then on my stoma nurse’s next visit she brought a sample of a new product she had seen at a conference; it was Siliken silicone stoma gel. She had seen the demonstration and thought of me straight away. It’s not like any other product as urine does not affect it so it stays where it needs to be. Suddenly my bag was back to lasting 24–48 hours, I didn’t need to change clothes as often and was able to go out without fear of it leaking. There is nothing worse than the constant worry of a leak or the sudden feeling you are wet while away from home.

Siliken silicone stoma gel has changed my life. I no longer worry each time I go out. I no longer have mountains of washing and have to change my clothes several times each day. It has given me my freedom back and helped me to feel more like myself again.

stoma bags had increased to 48 hours and his peristomal skin was improving. He found the gel ‘easy to apply, like a cream, it doesn’t stick all over the fingers, easy to remove—just have to peel it off.’

Conclusion

The literature, case studies and patient perspective suggest that silicone products are of benefit to patients. Therefore, SCNs should have an increased awareness of the properties within silicone to understand the advantages of silicone products in order to make an appropriate appliance or accessory choice. Making the correct choice for and with the patient affects the patient’s physical and emotional wellbeing, as well as having an economic benefit. It is the SCN’s responsibility to give evidenced-based advice in order to ensure that quality care is delivered within an appropriate, individualised care plan.

Conflict of interest: