

# TEN TOP FACTS ABOUT MANAGING SINUS WOUNDS

The management of sinus wounds can be challenging and complex and requires a level of knowledge and skill to ensure all aspects of the pathology, management and psychological support is achieved. This article gives an overview of sinus wounds and covers formation, risk factors, complications and management options.

*“Infection is one of the most common causes of sinus track formation.”*

A sinus wound is defined as a discharging blind-ended track that extends from the surface of an organ to an underlying area or abscess cavity (Everett, 1985). Sinus tracks arise as a result of conditions such as hidradenitis suppurativa, pressure ulcers, abdominal surgery in the morbidly obese and pilonidal disease.

A fistula, however, is an abnormal passage between a hollow organ and the skin surface (Romanelli and Galatioto, 1997). A sinus is only open on one end, whereas a fistula is a communicating channel. The word derives from the Latin word meaning ‘pipe’ (El-Tawil, 2011). A common example is anal fistulas, which are often associated with Crohn’s disease.

Both a sinus track and a fistula can be lined with granulation tissue, however, when the wound becomes chronic the track is overlaid with epithelial tissue.

The following ten facts will cover the causes of wound sinuses and fistula formation and will identify risk factors and describe how to assess and manage them. The psychological impact on the patient will also be discussed.

## 1 HOW IS A SINUS WOUND FORMED?

Davis et al (1992) suggested that there are three basic mechanisms involved in the formation of sinus tracks: infection, liquefaction and foreign bodies.

### *Infection*

Infection is one of the most common causes of sinus track formation. As cutaneous bacteria increase within the tissues, an abscess cavity can form. They can also arise from deeper infection within structures such as bone (Butcher, 2002). An example of a cutaneous infection leading to sinus track formation is hidradenitis suppurativa, also known as acne inversa, which is an abnormality of the apocrine sweat glands. The ducts become blocked and dilate, and bacteria become trapped and then multiply forming boil-like lumps under the skin, becoming abscesses that then lead to the development of a sinus track (Parks and Parks, 1997). Key sites of formation include the axilla, groin and perineum. It is often a chronic disorder with frequent recurrences often found in people who are otherwise healthy.

### *Liquefaction*

Liquefaction occurs as a result of

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the natural breakdown of dead tissue after blunt trauma or tissue ischaemia (Butcher, 2002). This can occur as a result of abdominal surgery in the morbidly obese, and following abdominoplasty and breast reduction in high-risk patients, such as those with multiple comorbidities, which increases their risk of infection.

### Foreign bodies

Pilonidal sinus disease is characterised by an abscess in the natal cleft with sinus formation often resulting from blocked hair follicles (Timmons, 2007) and ingrowing hairs (Stephen-Haynes, 2008). The hair acts like a foreign body in the base of the abscess (*Figure 1*).

The majority of anal fistulas result from an infection in the anal glands (El-Tawil, 2011). This infection results in perirectal abscess formation, which occurs during the acute inflammatory phase. As the abscess becomes chronic, a fistula is more likely to develop (Poggio, 2015). Primary anal fistulas consist of a single track from the skin to the anal canal, but some will pass through the external sphincter and these will be more complex wounds to manage (El-Tawill, 2011). Gastrointestinal fistula can develop after abdominal surgery as a result of a leakage of intestinal juices leading to localised infection and abscesses (Falconi and Pederzoli, 2001).

## 2 WHO IS AT RISK OF SINUS WOUND DEVELOPMENT

Sinus wounds can develop in people who have a higher risk of infection, especially those with a weak immune system (Stephen-Haynes, 2008). Obesity, site of previous surgery, diabetes and sedentary lifestyles can also increase the risk.

Pilonidal sinus disease is thought to peak at the age of 19 years in women and 22 in men, with primary lesions rarely presenting after the age of 40 years (Bradley, 2006) because hair follicles are more susceptible to hormonal influences at a younger

age. It is 2.2 times more common in men than women (Miller and Harding, 2003).

Pilonidal disease can also be congenital where a dimple in the natal cleft can predispose to sinus development — or it can be acquired. In the case of hidradenitis suppurativa, the condition starts in puberty and is most active between the ages of 20 and 40 years. It is three times more common in women than men and is linked to obesity, smoking, family history and Crohn's disease (Harlak et al, 2010).

Gastrointestinal fistulas most frequently occur as a result of a complication of abdominal surgery where the bowel has been manipulated, although they can occur spontaneously in patients with inflammatory bowel disease (Falconi and Pederzoli, 2001).

## 3 ASSESSMENT OF A SINUS WOUND

The majority of sinus wounds can be difficult to visualise because of their location and the fact that they are a blind-ended track.

In the early stages of pilonidal sinus development, the patient may complain of moderate to severe pain depending on the size of the abscess and swelling in the natal cleft. They can be asymptomatic where a hair-containing cyst is found by the patient or on routine examination. More acutely, a large sacrococcygeal abscess with sinus formation presents as a painful swollen area that may have purulent discharge and signs of cellulitis (Timmons, 2007). Where the skin surface has broken and the wound becomes chronic, the tissue may become hypergranulated, friable and bleed easily.

The granulation tissue can become pronounced (hyper-granulated) and take on a dull dusky appearance in the presence of infection. An odour



**Figure 1. Pilonidal sinus — early stages of development.**

may also be present and wound exudate levels may increase. A wound swab should be taken to identify the causative organisms to determine appropriate antibiotic therapy.

## 4 WHAT ARE THE COMPLICATIONS ASSOCIATED WITH SINUS WOUNDS?

Infection is the main complication of sinus wounds because of the position of the wound and the presence of moisture and aerobic bacteria which, in turn, delays healing (Timmons, 2007) (*Figure 2*). Recurrence of the causative disease is also a major complication that has an impact on healing and quality of life.

The presence of red friable granulation tissue, which bleeds easily and creates mesh-like bridges across the tissue, is a sign that the tissue is unhealthy and is unlikely to heal (Harris et al, 2012).

Ineffective wound management and failure to adhere to robust cleansing regimens can also complicate the healing process.

## 5 HOW SHOULD A SINUS WOUND BE MANAGED?

The management of a sinus wound depends on the underlying cause. The cause of sinus wounds can be complex and multifactorial, and the chosen regimen must consider all of the factors associated with the cause (Leak et al, 2011).

Pain management is important in the early stages of the condition,



**Figure 2. Pilonidal sinus wound — note fragility of tissue.**

particularly for postoperative wounds.

In the case of a pilonidal sinus wound, there are a number of treatment options ranging from conservative for those without severe symptoms, curettage (scraping out the tissue) for smaller non-infected sinuses, to a wide local surgical excision where the sinus track is laid open.

The natal cleft requires specific attention regarding cleansing and hair removal by weekly shaving or use of hair removal cream as part of the treatment (Griffin, 2015). This, in turn, reduces the risk of infection and recurrent disease.

In the case of fistulas associated with an inflammatory bowel condition, such as Crohn's disease, medical management with antibiotics and immunosuppressive therapy can be effective, however, if an acute abscess occurs, incision and drainage of the area will be required. Patients with multiple and recurrent Crohn's fistulas require careful surgical management. Extensive removal of the diseased glands with pan-proctocolectomy (removal of colon, rectum and anus) will be performed in extreme cases.

Hidradenitis suppurativa is managed in one of two ways. First conservative management where patients are asked to perform good hygiene using plain or antiseptic wipes, stop smoking, lose weight and wear loose-fitting clothing. Antibiotics are commonly used, as are corticosteroids, immune-



**Figure 3. Pilonidal sinus wound following surgical excision.**

suppressive therapy and retinoids, such as isotretinoin.

Surgical treatment is used for chronic recurrent disease. Wide surgical excisions remove the affected tissues, however for some this does not prevent recurrence (Bradley, 2006).

## 6 SURGICAL MANAGEMENT OF SINUS WOUNDS

Laying open the sinus track is a surgical option when the track is narrow and difficult to manage with conventional wound dressings. Occasionally the use of skin grafts or advancement flaps are required to permanently close the wound. The flap retains its own blood supply so it can 'take' readily and reduce the likelihood of recurrence (Timmons, 2007).

Primary surgical excision of a pilonidal sinus or hidradenitis suppurativa produces an essentially clean wound (Stephens-Haynes, 2008) (Figure 3). However, their location and underlying pathology can predispose the patient to further infection. Where the disease recurs, a wider excision with margins beyond the borders of the infection is required.

A multidisciplinary approach is essential, especially where the condition is chronic and is affecting the patient's quality of life. Many patients, especially those with pilonidal disease, are young and the impact of recurrent surgery can cause pain and distress with often no

assurance that the condition will be cured. Surgery to remove abnormal tissue alone may not be enough, but combined with effective and aggressive wound management there will be more chance of healing and less risk of recurrence.

## 7 CLEANSING THE SINUS TRACK WOUND

Cleansing the sinus wound track is essential in order to prevent the accumulation of exudate and pus (Butcher, 2002; Vowden et al, 2011). Indications for wound cleansing can be found in *Box 1*.

Choosing an appropriate cleansing solution is important and Sardina (2013) suggested that the ideal wound cleanser should be hypoallergenic, non-toxic to viable tissue, readily available, cost effective and stable. Current literature favours the use of Normal Saline in an isotonic solution, (Gabriel and Schraga 2015), however, normal saline has a low toxicity value and as a result may not effectively cleanse dirty wounds (Cutting, 2010). The role of antimicrobial cleansers remains the subject of debate with Cutting (2010) and Leaper et al (2012) suggested that non-antiseptic cleansing does not remove harmful bacteria or support wound bed preparation when biofilms are present. It is recommended, therefore, that antimicrobial solutions can be used to manage wound colonisation, biofilms and infection, however, non-toxic agents should be considered when possible (Wolcott and Fletcher, 2014).

Wound irrigation is the steady flow of a solution across an open wound surface to achieve hydration, to remove deeper debris and to assist in visual examination of the wound (Gabriel and Schraga, 2015). Wounds should be irrigated at every dressing change until the visible debris is removed, however, in the case of sinus wounds, it may be difficult to

visualise the whole of the wound bed. That said, Gabriel and Schraga (2015) suggested that wound irrigation can aid healing from the inside tissue layers outward to the skin surface and may prevent premature surface healing in the case of an abscess pocket or an infected sinus tract.

There has been a lot of debate about the appropriateness of equipment and the amount of pressure required to irrigate a wound without causing trauma (Towler, 2001), however, there are spray cans and irrigating pods available that can deliver the appropriate pressure and negate the need for additional equipment.

## 8 PACKING THE SINUS WOUND

Prior to packing a sinus wound it is important to determine the extent of the wound, both in depth and direction in order to establish a baseline on which to monitor healing outcomes. If there are difficulties in finding the end of the track an ultrasound scan may be required to determine the true extent and where it is leading to.

There are a number of commercially available sterile probes designed for this use and many are supplied with the wound packing products. Using a probe should be undertaken with caution and when the tip of the probe comes into contact with tissue inside of the sinus wound and you can feel light pressure, this determines the wound edge. Further pressure should not be applied (Cooper, 2006).

One of the aims of managing a sinus wound is to prevent premature closure of the wound entrance before the track has had a chance to heal. If the track is not infected, an alginate, hydrofibre or hydro-desloughing absorbent rope or ribbon dressing can be placed into the sinus to absorb the exudate. Alternatively, capillary-action dressings, which have an absorbent core of hydrophilic fibres

sandwiched between two layers of low-adherent contact layers, can be used to wick away the exudate.

Dressings should be laid gently into the wound and not packed tightly as this can cause discomfort. Always leave enough length outside to enable removal. If more than one piece is used this must be documented to ensure nothing gets retained in the sinus. They should be easy to remove and residual fibres on the wound surface should be avoided.

A secondary dressing such as adhesive foam or non-adherent dressing and absorbent pad are often required due to the increased levels of moisture produced. Despite being used for many years, ribbon gauze no longer has a place in the management of sinus wounds as it prevents free drainage of exudate and forms a hard adherent mass making dressing changes long and painful (Dinah and Adhikari, 2006).

Where a sinus wound is contaminated or infected, an antimicrobial dressing is advocated. Silver, iodine and honey dressings can all be used. Reassessment is indicated to ensure the effectiveness of the antimicrobial dressing in reducing the bacterial load. Vowden et al (2011) suggested that a failure to respond will indicate the need for a full reassessment to exclude contributory causes. Antimicrobial dressings should be continued for 14-21 days for wounds that are improving, at which time the need for further antimicrobial therapy should be reassessed (Wounds UK, 2011).

The management of anal fistula and pilonidal sinus tracks is more challenging. Often, wound dressings do not stay in place due to the location of the wound, and it can become contaminated when patients open their bowels. After surgery, the wound should be clean and ongoing

### Box 1. The goals of wound cleansing for a sinus wound (Main 2008).

The key goals for wound cleansing are:

- ▶▶ To remove contaminants
- ▶▶ To remove debris and foreign bodies
- ▶▶ To remove micro-organisms from infected wounds
- ▶▶ To remove superficial slough
- ▶▶ To remove dressing materials
- ▶▶ To remove excess exudate
- ▶▶ To aid personal comfort.

wound cleansing is essential.

An absorbent rope or ribbon dressing can be loosely inserted, which can easily be removed by irrigation or showering. The aim of management is to reduce infection risk, reduce the risk of recurrence, promote healing from the base of the wound and produce quick re-epithelialisation for the best cosmetic result (Timmons, 2007).

## 9 OTHER WOUND MANAGEMENT OPTIONS

In addition to standard wound dressings, negative pressure wound therapy (NPWT) devices can be used to manage sinus tracks. The sub atmospheric pressure that these devices create causes vasodilation which improves blood flow to the wound area (Banwell and Musgrave, 2004). Depending on the size of the track the cavity can be filled with a gauze or foam dressing, however clinicians must be mindful of the pain that may be associated with dressing changes and the ability of the dressing to fill the cavity. Alternatively, a single-use NPWT device can be applied to the wound surface following insertion of a suitable wound filler to stimulate healing at a faster rate (Murphy and Powell, 2013).

## 10 PSYCHOLOGICAL IMPACT

The psychological impact of sinus disease and the associated wound

can be significant, especially if the condition is a recurrent one. The patient may be in constant pain and find it difficult to sit for long periods in one position, especially in the case of pilonidal disease or anal fistulas. The management of the wellbeing of the patient is important and it relies on the clinician having an in-depth knowledge of the underlying cause of the disease and not just the wound management practices. Early reassessment and identification of infection together with early corrective treatments can prevent wound breakdown and instil confidence and trust between the patient and the healthcare professional which is a vital component of successful care.

### Conclusion

The management of sinus wounds can be challenging and complex and requires a level of knowledge and skill to ensure all aspects of the pathology, management and psychological support is achieved. It is important that a team approach is adopted to ensure there is consistency in the management approach at all stages.

The importance of the reassessment of the wound and the effect of the wound dressing regimen cannot be underestimated. Ensuring the right plan is in place at the right time will encourage timely healing.

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