

# Understanding pilonidal sinus disease

## KEY WORDS

- ▶▶ Acute abscess
- ▶▶ Natal cleft
- ▶▶ Non-healing wound
- ▶▶ Pilonidal sinus

Pilonidal sinus disease is a chronic inflammatory condition that consists of cycles of healing and wound breakdown often for many years. It is predominantly found in young males. Clinical presentation can be of an acute abscess formation or a non-healing wound in the natal cleft. The latter, chronic version of the disease significantly impacts on an individual's quality of life due to the extended need for ongoing wound care and recurrent wound infection. There is great variation in the treatment options in the chronic form of the disease such as surgical intervention and subsequent healing by secondary intention or flap formation, with the off-midline surgical closure method is recommended for the prevention of recurrence. This article gives an overview of the condition.

Pilonidal sinus disease was first described by Herbert Mayo in 1833, with 'pilus' denoting hair and 'nidus' indicating nest (Cevik et al, 2017; Erkent et al, 2018; Harries et al, 2018).

The disease affects 26 per 100,000 population, with a subsequent significant cost to the healthcare system (Beal et al, 2018; Mejsak et al, 2017). There were 13,329 reported hospital admissions for pilonidal sinus disease in the NHS 2012 hospital episode statistics (Beal et al, 2018).

Pilonidal sinus disease is an acquired, chronic, inflammatory condition of the skin and subcutaneous tissue in the sacrococcygeal region of the body (Banasiewicz et al, 2013; Ekici et al, 2018). Pilonidal sinus disease is a chronic disease that has a fluctuating trajectory over many years which includes healing with episodes of acute flare up. Nevertheless, it is a self-limiting disease that disappears with age (Cevik et al, 2017; Halleran et al, 2018).

## PATHOPHYSIOLOGY

The exact aetiology is unclear, although there is agreement that the presence of body hair in the natal cleft is involved in the disease process (Banasiewicz et al, 2013). The movement of the buttock, shape of the natal cleft, posture and clothing can facilitate the penetration of the barbed-shaped hairs into the skin and subcutaneous tissue (Cevik et al, 2017; Harries et al, 2018).

Harries et al (2018) purport that the disease is related to hormone changes leading to enlargement of the hair follicles which results in a blockage of the pilosebaceous glands in the sacrococcygeal area. The blockage consists of keratin plugs and hair remnants (Eckici et al, 2018). The distorted hair follicle is pushed into the tissue which results in rupture and the formation of epithelial tracts, sinuses and midline pits that can extend into the medial buttock tissue (Burney, 2018; Halleran et al, 2018; Beal et al, 2018).

The presence of the hair produces a foreign body reaction and is a focus for infection within the sinus and subsequent abscess formation (Cevik et al, 2017; Harries et al, 2018). As the disease progresses, a chronically inflamed cavitory network is formed in the tissue (Kuckelman, 2018).

The extent of the disease will depend upon the location and size of the affected area, hair type and previous treatments (Banasiewicz et al, 2013).

## RISK FACTORS

The disease is predominantly found in men between 20 and 40 years of age (Banasiewicz et al, 2013; Murphy and Powell, 2013; Burney, 2018). However, females commence puberty at a younger age than males and thus have earlier development of body hair (Cevik et al, 2017; Halleran et al, 2018). Halleran et al (2018) identified obesity as



**Figure 1. Non-healing pilonidal sinus disease showing midline pits, bridging epithelial tissue and hair contamination of the wound bed**

the only independently associated factor linked to disease recurrence in a paediatric population. Mediterranean ethnicity, a deep natal cleft, hairiness and poor hygiene also contribute to the development of the disease (Harries et al, 2018). It is rarely seen in the Japanese population (Ito et al, 2013).

### CLINICAL PRESENTATION

The initial presentation may be pain, discomfort, swelling and erythema in the natal cleft along with acute abscess formation (Burney, 2018; Harries et al, 2018).

Once the skin in the natal cleft is broken, the wound may contain the characteristic midline pits that represent primary openings, which communicate with subcutaneous tracts and produce a continual discharge (Kallis et al, 2018) (*Figure 1*).

Pilonidal sinus disease is also reported in the inter-digit area in occupational related groups, e.g. leather tanning industry, hairdressing, dog grooming (Yazar et al, 2018; Radotra et al, 2017; Yalcin et al, 2016; Shikowitz-behr and Freedman, 2016; Ito et al, 2013). It has been diagnosed via histological examination in an individual with Dupuytren's disease of the right hand (Browne and Carroll, 2014).

### DIFFERENTIAL DIAGNOSES

Differential diagnoses include hidradenitis suppurativa, anorectal abscess, squamous cell carcinoma, tuberculosis granuloma and sexually transmitted disease (Kuckelman, 2018; Duman et al, 2016) (*Figure 2*). Salih et al (2016b) report a patient with a basal cell carcinoma that was treated

as pilonidal sinus disease for two years before the correct diagnosis was confirmed. Conversely, Pandey et al (2012) identified squamous cell carcinoma in the wound bed in an individual with a 19-year history of pilonidal sinus disease. A similar report was presented by Eryilmaz et al (2014) who recommend a histological biopsy to confirm pilonidal sinus disease. As with all differential diagnoses, these should be queried if the wound is not responding to the recommended treatment for pilonidal disease. There is no specific time frame as each individual will heal at a different rate, however, delayed healing with no obvious cause should trigger the clinician to review the diagnosis.

### QUALITY OF LIFE

Patients with pilonidal sinus disease are burdened at their prime of life and the symptoms are lifestyle limiting (Johnson, 2018; Chetter et al, 2019). It can impact on the individual's ability to attend work and education with the complications of surgical intervention causing more problems than the primary disease (Harries et al, 2018). In non-healing pilonidal disease, the prolonged need for wound care impacts on social life and intimacy in inter-personal relationships. There is a continual fear of wound infections and wound deterioration, especially in individuals with recurrent episodes of pilonidal sinus disease (Beal et al, 2018).

A qualitative study that examined patient experiences of living with a wound healing by secondary intention and included an individual with pilonidal disease described the impact as alarm, shock disbelief, and having a negative impact on daily life, physical and psychosocial functioning and wellbeing. In addition, feelings of frustration, powerlessness and guilt were common. Patients hopes for healing were often unrealistic posing challenges for the clinicians caring for them. Furthermore, individuals expressed dissatisfaction with a perceived lack of continuity and consistency of care in relation to wound management. The individual with pilonidal disease in this study, who had an open wound for the duration of 30 months, commented on a lack of continuity for care delivery and choice of wound dressings: *"there's really not much consistency with the district nurses because everybody does it (dressing change) a different way... rarely sing from the same hymn sheet"* The patient

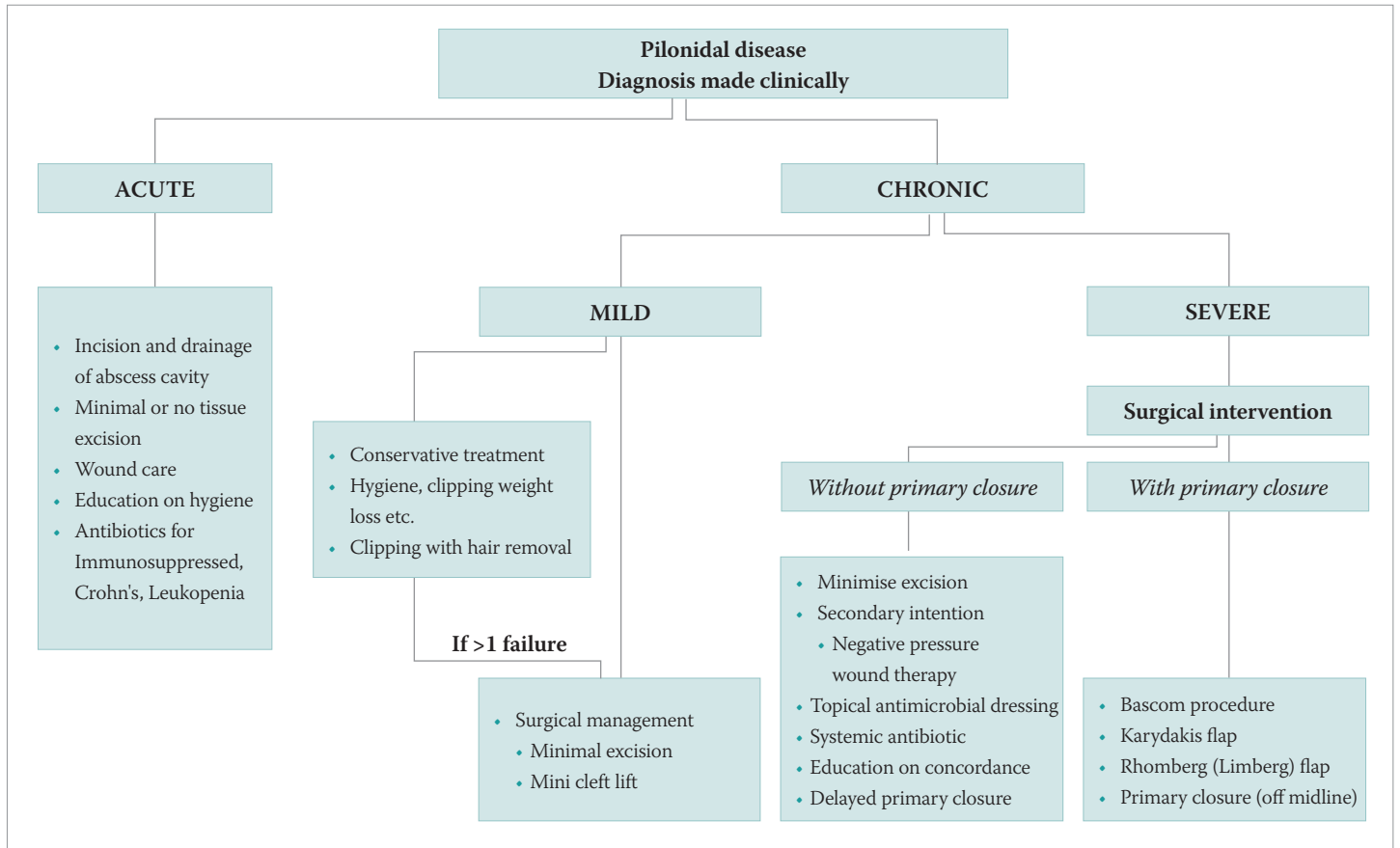


Figure 2. Evaluation and treatment algorithm (adapted from Johnson, 2018)

reported that the conflicting advice and treatment caused him anxiety (McCaughan et al, 2017).

There are support groups for individuals with pilonidal disease; one of which can be found at: <https://www.pilonidal.org/treatments/living-with-it/>

**TREATMENT**

The goals of treatment for pilonidal sinus disease are reduction in the following (Chetter et al, 2019):

- ▶▶ Time to heal
- ▶▶ Post-operative infection rates
- ▶▶ Hospital re-admissions
- ▶▶ Surgical procedures
- ▶▶ Pain.

Burney (2018) expands on the outcomes and includes eradication of the disease with the least risk, expense, discomfort and disability and lowest recurrence rate. Whilst Harries et al (2018) include quality-of-life parameters such as time to return to work and/or education.

If the diseased tissue is very near the anus, it may be difficult to treat with both conventional and surgical methods (Johnson, 2018; Tan et al, 2018).

The literature offers various surgical methods of treatment, including excision and primary or secondary closure or excision and coverage with a flap (Banasiewicz et al, 2013).

Healing by secondary intention is more susceptible to hair penetration from the surrounding skin (Ekici et al, 2018). However, flap reconstruction is said to be unnecessary and pilonidal sinus disease should be treated like any other subcutaneous abscess with incision and not excision, using curettage under local anaesthetic and left to heal by secondary intention (Garg, 2018a; 2018b; Burney, 2018). This simple method is recommended for individuals with non-symptomatic pits and acute abscess presentations (Harries et al, 2018).

EPSit is a form of endoscopic pilonidal sinus treatment that cauterises and removes diseased

tissue. It is completed under local anaesthetic and left to heal by secondary intention (Harries et al, 2018, Kallis et al, 2018).

The flap techniques include the Rhomboid flap transposition, Karydakis flap transposition, and Limberg flap transposition, the latter result in a flattening of the natal cleft without a natal cleft midline incision (Ekici et al, 2018). Various studies report different success rates for each type of flap (Prassas et al, 2018).

A Cochrane review of healing by primary versus secondary intention after surgical treatment for pilonidal sinus disease found no clear benefit for healing by secondary intention over surgical closure. However, a clear benefit was demonstrated in favour of off-midline rather than midline surgical closure and recommend that this technique should be the standard method of wound closure (Al-Khamis et al, 2010).

Bascomb's procedure is recommended as a curettage pit picking technique that avoids excision of large amounts of normal tissue and can be done under local anaesthetic (Harries et al, 2018; Kallis et al, 2018).

Phenolisation of pit tracts destroys debris within the sinuses and is less expensive than alternative surgical options (Harries et al, 2018).

Salih et al (2017a) report a technique of injection into the sinus tract with a sclerosing agent along with an herbal product Lawsonia Inermis powder, which consists of Vaseline, Henna powder and tetracycline. These are said to have healing and antimicrobial properties and can be used without anaesthetic. This approach is sometimes used in developing countries.

The use of fibrin glue as an alternative to surgery was subject to a Cochrane review in 2017; however, the reviewed evidence was of low-quality and thus unable to direct clinical practice (Lund et al, 2017).

Negative pressure wound therapy (NPWT) was found to reduce surgical complications following excision and wound closure (Biter et al, 2014; Bianchi et al; 2018). When a portable NPWT system was used, it enabled faster restoration of activities of daily living than the use of conventional wound dressings (Banasiewicz et al, 2013). Portable systems have been reported as successful in non-healing wounds due to its

ability to mould to the area and keep it free from contamination (Murphy and Powell, 2013).

Antimicrobial wound dressings have been reported as successful in treating pilonidal sinus disease albeit in a small number of patients (Patel and Cichello, 2013; Cutting and McGuire, 2015). Systemic antimicrobial therapy and topical Metronidazole have been used to treat anaerobic bacteria (Ypsilantis et al, 2016). However, there is little evidence to support the use of antimicrobial prophylaxis and gentamycin sponges and hydrocolloid dressings (Stauffer, 2018, Mavros et al, 2013).

The clinical practice in the Welsh Wound Innovation Centre is to use topical antimicrobial therapy in non-healing pilonidal sinus disease along with systemic antibiotic therapy. Premature epithelial bridging is parted, by gentle manual separation (Marks et al, 1985).

The literature in pilonidal sinus disease does not specify any secondary dressings to secure the primary antimicrobial dressing. Although conformability and ease of application and removal are key attributes as the individual may be applying the dressing themselves. The frequency of dressing change will depend upon the wear time of the chosen antimicrobial. Due to the site of the wound and the proximity to the anus daily showering and redressing are common practices and, in this situation, the antimicrobial and secondary dressing should take this short wear time into consideration.

Non-concordance with conventional wound care regimens was identified as a cause of non-healing which when addressed improved the healing rates (Burney, 2018).

Biological treatments may be of help in pilonidal sinus disease although the long-term effectiveness has yet to be established (Harries et al, 2018).

The PITSTOP (Pilonidal sinus Treatment: STudying the Options) study is a proposed prospective cohort study to determine the subtypes of pilonidal sinus disease and consequently engage with patients to determine which outcomes they value, and which interventions are preferable (Beal et al, 2018). This study should bring the patient's views into the treatment arena; an opinion that has been absent so far in the literature.

### WOUND HEALING AND COMPLICATIONS

The complications of surgical treatment for pilonidal sinus disease include surgical site infection, wound dehiscence and flap necrosis (Ekici et al, 2018; Bianchi et al, 2018). Infected tissue that is not excised provides a focus for non-healing with anaerobic bacteria thought to be the responsible microbe (Marks et al, 1985; Murphy and Powell, 2013). Systemic metronidazole has successfully been used to treat post-operative pilonidal sinus wounds that were deemed to have clinically unhealthy granulation tissue, which bleeds spontaneously on light pressure (Marks et al, 1985). Post-operative pilonidal wounds healing by secondary intention that did not receive antibiotic therapy developed pockets in the base of the wound due to islands of infection (Marks et al, 1985). Long-term complications include pain and numbness in the sacrococcygeal area (Braungart et al, 2016).

Coccygeal osteomyelitis was diagnosed via MRI scan in a young man with a history of non-healing pilonidal sinus disease for the duration of four months (Gordon and Hunt, 2016).

### RECURRENCE

Recurrence can be defined in many ways and it is thus difficult to compare recurrence rates for the plethora of treatments for pilonidal sinus disease. Halleran (2018) defines recurrence as an episode of active pilonidal disease that required medical or surgical intervention greater than 30 days from the preceding treatment

An inability to eliminate the pathophysiological process that caused the disease such as incomplete removal of the diseased tissue and/or recurrent hair follicle infection is thought to be responsible for recurrence (Ekici et al, 2018). Midline surgical procedures are more likely to result in inadequate excision of diseased tissue. However, females are said to prefer this method due to a perceived better cosmetic outcome (Erkent et al, 2018).

Stauffer (2018) completed a comprehensive meta-analysis which included over 80,000 patients over a 180-year time period, starting with the first published description of pilonidal sinus disease in 1883. The meta-analysis emphasised the importance of adequate follow up if accurate conclusions about recurrence are to be drawn, as studies with short

follow up periods may have grossly underestimated recurrence rates. It recommends a 5- to 10-year follow up period, however, this may not be a feasible option for future clinical studies due to cost and the inherent difficulties in monitoring individuals over an extended period of time. Milone et al (2018) recommend a 5-year follow-up period. The review concluded that advancement flaps were found to be associated with the lowest recurrence rates followed by rotational flaps, whereas excision with primary midline closure has the highest long-term recurrence rates (Stauffer, 2018).

The impact of hair removal in preventing recurrence is debatable. However, it does lessen the risk of irritation to the wound bed. Laser epilation has been successful in hair removal a small number of patients (Pronk, 2018; Kelati et al, 2018). In a study by Cevik et al (2017), a combination of improved perianal hygiene and wax/razor hair removal resulted in high healing rates and low recurrence rates, however, the study had a small sample size and no control group. Poor hygiene and a lack of hair removal were cited as the reason for recurrence in the adolescent population (Mutus et al, 2018).

### CONCLUSION

Pilonidal sinus disease is a chronic, debilitating condition of young adults induced by hair penetration and follicle rupture and subsequent diseased tissue in the natal cleft. Individuals can suffer for many years with a cycle of healing and recurrence which impacts significantly on their lifestyle.

There is no standard agreement as to how much tissue should be excised leading to a variation in surgical management — with current practice remaining variable and contentious (Burney, 2018; Harries et al, 2018). However, there is compelling evidence to move away from midline closure to off-midline closure following surgical intervention (Harries et al, 2018).

The clinical outcome may also be related to with the healthcare professional's level of interest in the subject and surgical preference training and background (Cevik et al, 2017; Harries et al, 2018). In many studies, inadequate follow-up results in an under-reporting of the associated complications and recurrence rates of pilonidal sinus disease (Harries et al, 2018).



## REFERENCES

- AL-Khamis A, McCallum I, King PM, Bruce J (2010) *Healing by Primary Versus Secondary Intention after Surgical Treatment for Pilonidal Sinus*. Available at: <https://www.cochranelibrary.com/cdsr/doi/10.1002/14651858.CD006213.pub3/epdf/abstract> (accessed 4.06.2019)
- Banasiewicz T, Bobkiewicz A, Borejsza-Wysocki M et al (2013) *Portable Vac Therapy Improve the Results of the Treatment of the Pilonidal Sinus – Randomized Prospective Study*. Available at: <https://www.degruyter.com/downloadpdf/j/pjs.2013.85.issue-7/pjs-2013-0056/pjs-2013-0056.pdf> (accessed 4.06.2019)
- Beal E, Hind D, Bradburn M et al (2018) #20 design and rationale of the pilonidal sinus treatment - studying the options (pitstop) study: A multicentre cohort, nested mixed-methods case study and discrete choice experiment (poster presentation). *International Journal of Surgery* 59(S1):S6
- Bianchi E, Lei J, Adegboyega T et al (2018) Negative pressure wound therapy is beneficial in the treatment of pilonidal disease. *Journal of the American College of Surgeons* 227(4):e109–10
- Biter LU, Beck GM, Mannaerts GH et al (2014) The use of negative-pressure wound therapy in pilonidal sinus disease: A randomized controlled trial comparing negative-pressure wound therapy versus standard open wound care after surgical excision. *Dis Colon Rectum* 57(12):1406–11
- Braungart S, Powis M, Sutcliffe JR, Sugarman ID (2016) Improving outcomes in pilonidal sinus disease. *J Pediatr Surg* 51(2):282–84
- Browne KM, Carroll SM (2014) 'An hairy palm': A pilonidal sinus in a dupuytren's pit. *Journal of Hand Surgery (European Volume)* 39(5):556–7
- Burney RE (2018) Treatment of pilonidal disease by minimal surgical excision under local anesthesia with healing by secondary intention: Results in over 500 patients. *Surgery* 164(6):1217–222
- Cevik M, Dörterler ME, Abbasoglu L (2018) Is conservative treatment an effective option for pilonidal sinus disease in children? *International Wound Journal* 15(5):840–44
- Chetter IC, Oswald AV, McGinnis E et al (2019) Patients with surgical wounds healing by secondary intention: A prospective, cohort study. *International Journal of Nursing Studies* 89(2019):62–71
- Cutting K, Mcguire J (2015) In vitro and clinical experience of Cutimed Sorbact: The evidence base. *J Wound Care* 24(5):S6–S30
- Duman K, Ozdemir Y, Dandin O (2016) Pilonidal sinus disease - etiological factors, pathogenesis and clinical features. *Archives of Clinical and Experimental Surgery* 5(4):228–32
- Ekici U, Kanlıöz M, Ferhatoglu MF, Kartal A (2019) A comparative analysis of four different surgical methods for treatment of sacrococcygeal pilonidal sinus. *Asian J Surg* S1015-9584(18)30741–3
- Erkent M, Şahiner İT, Bala M et al (2018) Comparison of primary midline closure, limberg flap, and karydakias flap techniques in pilonidal sinus surgery. *Med Sci Monit* 24:8959–63
- Eryilmaz R, Bilecik T, Okan I et al (2014) Recurrent squamous cell carcinoma arising in a neglected pilonidal sinus: Report of a case and literature review. *Int Clin Exp Med* 7(2):446–50
- Garg P (2018a) Achieving the maximum by doing the minimum in the treatment of pilonidal sinus: Where does evidence point? *Colorectal Disease* 20(11):1047
- Garg P (2018b) Management of pilonidal disease needs paradigm shift from more to less: Enough evidence and logic available. *Dis Colon Rectum* 61(12):e376
- Gordon KJ, Hunt TM (2016) Osteomyelitis as a complication of a pilonidal sinus. *Int J Colorectal Dis* 31(1):155–6
- Halleran DR, Lopez JJ, Lawrence AE et al (2018) Recurrence of pilonidal disease: Our best is not good enough. *J Surg Res* 232:430–6
- Harries RL, Al-Qallaf A, Torkington J, Harding KG (2018) Management of sacrococcygeal pilonidal sinus disease. *Int Wound J* 16(2):370–8
- Ito A (2013) Case of interdigital pilonidal sinus in a dog groomer. *J Dermatol* 14(12):1051–2
- Johnson KE (2018) Expert commentary on pilonidal disease. Management and definitive treatment. *Dis Colon Rectum* 61(7):777–9
- Kallis PM, Maloney MC, Lipskar MA (2018) Management of pilonidal disease. *Curr In Pediatr* 30(3):411–6
- Kelati A, Lagrange S, LeDuff E et al (2018) Laser hair removal after surgery vs. Surgery alone for the treatment of pilonidal cysts: A retrospective case-control study. *J Eur Acad Dermatol Venereol* 32(11):2031–3
- Kuckelman PJ (2018) Pilonidal disease: Management and definitive treatment. *Dis Colon Rectum* 51(7):775–7
- Lund J, Tou S, Doleman B, Williams JP (2017) *Fibrin Glue for Pilonidal Sinus Disease*. Available at: <https://www.cochranelibrary.com/cdsr/doi/10.1002/14651858.CD011923.pub2/media/CDSR/CD011923/CD011923.pdf> (4.06.2019)
- Marks J, Harding KG, Hughes LE, Ribeiro CD (1985) Pilonidal sinus excision - healing by open granulation. *Br J Surg* 72(8):637–40
- Mavros MN, Mitsikostas PK, Alexiou VG, Peppas G, Falagas M E (2013). Antimicrobials as an adjunct to pilonidal disease surgery: A systematic review of the literature. *Eur J Clin Microbiol Infect Dis* 32(7):851–8
- McCaughan D, Sheard L, Cullum N et al (2018) Patients' perceptions and experiences of living with a surgical wound healing by secondary intention: A qualitative study. *Int J Nurs Stud* 77:29–38
- Mejsak A, Decker E, Askari A, Chan S (2017) *Socioeconomic Cost of Acute Pilonidal Sinus Surgery in District General Hospital in UK*. Poster at ASGBI International Surgical Congress 2017 in Glasgow
- Milone M, Velotti N, Manigrasso M, Anoldo P et al (2018) Long-term follow-up for pilonidal sinus surgery: A review of literature with metanalysis. *Surgeon* 16(5):315–20
- Murphy S, Powell G (2013) Pilonidal sinus wounds: Successful use of the novel negative pressure wound therapy device Pico. *Wounds UK* 9(4):80–3
- Mutus HM, Aksu B, Uzun E et al (2018) Long-term analysis of surgical treatment outcomes in chronic pilonidal sinus disease. *J Pediatr Surg* 53(2):293–4
- Pandey MK, Gupta P, Khanna AK (2014). Squamous cell carcinoma arising from pilonidal sinus. *Int Wound J* 11(4):354–6
- Patel S, Cichello S (2013) Manuka honey: An emerging natural food with medicinal use. *Nat Prod Bioprospect* 3(4):121–8
- Prassas D, Rolfs TM, Schumacher FJ, Krieg A (2018). Karydakias flap reconstruction versus limberg flap transposition for pilonidal sinus disease: A meta-analysis of randomized controlled trials. *Langenbeck's Arch Surg* 403(5):547–54
- Radotra I, Tan K T, Chadwick S, Reid A (2017) Hairdressing hazards and the hand. *BMJ* 359:doi:0.1136/bmj.j5520
- Salih AM, Kakamad FH, Salih RQ et al (2018a) Nonoperative management of pilonidal sinus disease: One more step toward the ideal management therapy—a randomized controlled trial. *Surgery* 164(1):66–70
- Salih AM, Kakamad FH, Rauf GM (2016b) Basal cell carcinoma mimicking pilonidal sinus: A case report with literature review. *Int J Surg Case Rep* 28:121–3
- Shikowitz-Behr L, Freedman AM (2016) Recurrent interdigital pilonidal sinus in a dog groomer. *J Hand Microsurg* 8(02):113–14
- Stauffer VK, Luedi MM, Kauf P et al (2018). Common surgical procedures in pilonidal sinus disease: A metaanalysis, merged data analysis, and comprehensive study on recurrence. *Sci Rep* 8(1):3058
- Tan AM, Ahmad Z, Loh CY et al (2018) A useful alternative surgical technique to reconstructing large defects following excision of recurrent pilonidal sinus disease in the intergluteal region: An operative approach for the transverse lumbar artery perforator flap. *Int Wound J* 15(4):534–37
- Yalcin D, Tekin B, Sacak B et al (2016) Interdigital pilonidal sinus, report of two cases. *Int J Trichology* 8(1):38–9
- Yazar SK, Aksu EK, Leblebici C, Serin M (2018) An insight to pilonidal sinus etiology; interdigital pilonidal sinus. *Turkderm* 52(3):100–2
- Ypsilantis E, Chan S, Carapeti E (2016) The use of topical 10% metronidazole in the treatment of non-healing pilonidal sinus wounds after surgery. *Int J Colorectal Dis* 31(3):765–7