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RESEARCH ARTICLE

Controversies in the Management of Pilonidal Disease: Expert Recommendations from a Modified Delphi Survey and Review of the Literature

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ABSTRACT

Aim: This study aimed to identify key controversies in the management of pilonidal disease (PD) and to develop expert-based recommendations using a modified Delphi process, highlighting critical areas for future research.

Method: A working group established by the Turkish Society of Colon and Rectal Surgery conducted a systematic literature review and invited national and international experts with relevant publication records to participate in a Delphi survey. A four-round Delphi process was conducted between July 2023 and February 2024. Statements that reached ≥70% consensus (agree/strongly agree) were accepted.

Results: Of the 172 experts invited, 98 agreed to participate, and 52 completed at least two rounds. Expert opinions were evaluated across nine key aspects of PD management: classification, diagnosis, acute abscess, minimally invasive and excisional treatments, recurrence, hair removal, perioperative care, and postoperative management.

Conclusion: This Delphi study presents expert consensus on unresolved clinical questions in the management of PD. The findings provide practical recommendations for surgeons and emphasize the need for prospective, high-quality studies to establish standardized treatment pathways.

Keywords: Consensus, Delphi, pilonidal disease, expert opinion, minimally invasive, excisional procedures

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Introduction

Pilonidal disease (PD) is a prevalent condition among young individuals that considerably affects their quality of life. Despite its benign nature, the wide range of both operative and non-operative treatment options, along with a lack of standardization -even within the same approach- complicates the development of universally accepted management algorithms.

The current literature highlights several areas of PD management that lack high-quality evidence. These include classification, disease complexity, management of acute abscesses, the long-term efficacy of minimally invasive treatments, regional care practices, hair removal strategies, and antibiotic use. Existing guidelines provide limited direction on contentious topics such as the ideal classification system, the precise definition of complex disease, and the distinction between recurrent and non-healing disease.[1-4] Although prospective studies are needed to address these knowledge gaps, surgeons require practical guidance to support decision-making in the meantime.

To address this need, a consensus process was initiated to promote consistency in the management of PD and to support clinical decision-making in areas where high-level evidence is lacking. The outcomes of this expert-based consensus process aim to help surgeons navigate controversial aspects of PD and serve as a foundation for future research. This study seeks to reach expert consensus on unresolved and frequently debated issues in the management of PD using a modified Delphi method.

Materials and Methods

Steering Committee

The steering committee comprised a group of surgeons practicing in Türkiye, certified by the Turkish Society of Colon and Rectal Surgery or the European Board of Surgical Qualification (Appendix 1). As a first step, the group conducted a nationwide survey to assess clinical attitudes toward PD.[5] This survey revealed a lack of uniformity among surgeons regarding certain aspects of treatment. To address these uncertainties, a comprehensive literature review was conducted to identify controversial issues in PD that are either not explicitly covered in the current guidelines or that require further exploration.

The committee was responsible for defining the research objectives and timelines, developing the initial survey items based on the literature review, analyzing voting outcomes and related data, documenting the findings, preparing the manuscript, and promoting the dissemination of results through publication and presentations at conferences and other events, in accordance with the Accurate Consensus Reporting Document guidelines.[6]

Literature Review and Invitation of Experts

The search strategy included the Medline, PubMed, Cochrane Review Library, CINAHL, and Embase databases. Searches were conducted using the keyword "pilonidal". All articles published in the last 10 years (2013-2023) with English abstracts were reviewed. Articles related to the pediatric population (under 16 years) and those concerning PD located outside the natal cleft (e.g., umbilical, interdigital) were excluded. A total of 459 articles were analyzed to inform the survey questions.

Following the comprehensive literature review, colorectal surgeons with two or more publications (excluding case reports) in the Science Citation Index (SCI) or SCI-Expanded databases between 2013 and 2023 were identified as PD experts. These experts were invited to participate in the Delphi study through two email invitations sent 1 week apart. In total, 172 experts were contacted, 98 agreed to participate, and 52 successfully completed at least two rounds of the Delphi process (Appendix 2). One expert voluntarily withdrew after reporting a perceived conflict of interest with another participant. Those who did not proceed to subsequent rounds failed to respond to follow-up email invitations and did not provide a reason for their discontinuation. The geographical distribution of experts is presented in the graph (Figure 1).

To maintain the integrity and neutrality of the process, all participants were asked to declare any potential conflicts of interest. All, except for the one who withdrew, reported no conflicts.

Preparation of the Survey and the Delphi Method

The steering committee initially developed 38 questions, organized into the following main topics: 1) classification, severity, and complexity; 2) diagnosis and mapping; 3) acute abscess; 4) minimally invasive treatments; 5) excisional treatments; 6) recurrent/persistent PD; 7) regional care and hair removal; 8) perioperative care and antibiotics;

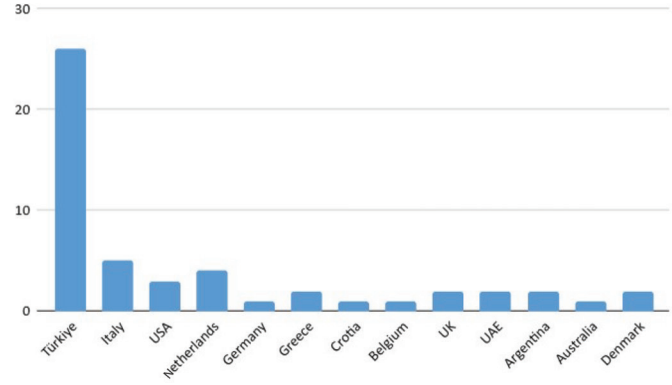

Figure 1. The geographical distribution of experts

and 9) postoperative care. These questions were sent to the experts as the first round of the Delphi survey (Appendix 3).

The Delphi survey was conducted in four rounds. The first round aimed to gather expert opinions to clarify definitions and refine the questions. Following this round, an online meeting was held with all participating experts, and additional feedback received via email was considered in finalizing the survey. Ultimately, 28 questions were agreed upon in the first round and were subsequently voted on in the second and third rounds, using a Likert-scale threshold for acceptance. Responses with at least 70% "agree" or "strongly agree" ratings were advanced to the next round. The fourth round involved voting on statements developed by the steering committee and participating experts based on the results from the previous rounds.

In the first round, open-ended comments were allowed for each question. Based on the qualitative feedback collected, revised versions of the questions were drafted for the second round. These draft questions were shared via email with all participants, and further suggestions were collected. Before launching the second round, a Zoom meeting was held with all participants to finalize the questions. Similarly, before round three, draft statements were circulated via email, and a follow-up Zoom meeting was held to collaboratively confirm and finalize the statements.

Statistical Analysis

Basic descriptive statistics were performed. The mean value was used to represent the general opinion of the participants, whereas the standard deviation indicated the variability of their responses. The mode identified the most frequent response. A coherence measure was used to analyze the alignment of participants' answers in each round. Qualitative data were reviewed and categorized into groups by one researcher (ÇA). Statistical analyses were performed using SPSS version 26.0 (IBM Corp., Armonk, NY, USA).

Results

Classification, Severity, and Complexity

Expert recommendation: A classification system should be implemented for the documentation and grading of PD (consensus, 83.3%).

Expert recommendation: Current classification systems for PD are inadequate. Either a new system needs to be developed or existing ones need to be validated through large prospective studies (consensus, 76.2%).

The integration of a valid classification system would enhance healthcare delivery by supporting evidence-based treatment decisions and providing reliable outcome predictions. Although numerous classification systems have been described in the literature, none have been validated in studies with sufficient levels of evidence or adequately compared with each other.[7]

Expert statement: An ideal PD classification should include the following components: the number of secondary orifices; extension in relation to the midline (lateral, unilateral, or bilateral spread); extension below coccyx level; distance to the anal margin; and presentation (acute abscess, recurrent, or unhealing) (consensus, 92.7%).

In the only meta-analysis on PD classification, Beal et al.[7] identified that the main components of classification systems were the location and number of sinuses, the degree of secondary extent, extension below the level of the coccyx, and treatment failure. Treatment failure, defined as recurrence and non-healing, was addressed in seven of the classification systems. However, the presence of an acute abscess was considered in only three. Additionally, patient-related factors such as hirsutism, obesity, and gender were generally not taken into account.[7] All components reported in this meta-analysis were voted on in the Delphi survey, and the following components reached the threshold for acceptance: the number of secondary orifices, lateral extension in relation to the midline, the unilateral or bilateral spread of the lateral extension, extension below coccyx level, distance to the anal margin, presence of an acute abscess, and recurrent or unhealing presentation (Appendix 4).

None of these classifications currently has sufficient evidence to be incorporated into guidelines. Nevertheless, treatment recommendations are provided in the guidelines and consensus statements, generally categorizing PD into two broad categories: simple and complex.[1-3,8]

Expert statement: There is no clear consensus on the definition of the term "complex PD". It can be broadly defined as disease extending beyond the midline, and/or a cyst size greater than 5 cm, and/or a distance to the anal margin <3 cm, and/or recurrent or unhealing presentation, and/or accompanying inflammatory diseases (consensus, 90.3%).

There is often confusion between staging and severity (complexity) in disease classification. Patient-related factors are largely omitted from classification systems. However, in chronic conditions, disease complexity can be influenced by factors beyond anatomical features. Among the participating experts, cyst size and accompanying inflammatory disease were identified as complexity factors, despite the lack of consensus for their inclusion in classification systems. Factors such as age, gender, obesity, and hair density were not found to be influential. In clinical practice, most surgeons choose treatment based on a simple-versus-complex distinction, as recommended in the guidelines.[1-3,8] If a new classification system is developed, complexity could potentially serve as one of its components.

Diagnosis and Mapping

Expert statement: Routine preoperative and/or intraoperative mapping methods (imaging, dye, endoscopic tract identification) of the tracts are not recommended (no consensus, 56%).

The diagnosis of PD is based on clinical symptoms and physical examination. The presence of pits observed in the natal cleft and/or lateral areas during physical examination is sufficient for diagnosis.[2] Laboratory investigations are generally unnecessary, except in cases involving complicated abscesses or systemic disease.[9]

The results for mapping and imaging are controversial. In a randomized trial analyzing patients who underwent the Karydakis procedure, it was concluded that methylene blue might be associated with lower rates of wound infection.[10] There is limited data supporting the benefit of preoperative or intraoperative imaging or other mapping methods. In clinically suspicious cases, particularly those near the anal canal, studies suggest that anorectal examination, proctoscopy, transrectal ultrasound, or other diagnostic imaging techniques may help differentiate PD from other perianal conditions, such as perianal fistula or hidradenitis suppurativa.[11-14] In selected patients with clinical suspicion, mapping of the extent can be selectively performed.

Acute Abscess

Expert statement: Pilonidal abscess should be drained using an off-midline incision at the site with the greatest fluctuation (consensus, 90%).

Expert statement: The shape of the incision (vertical, horizontal, cruciate, unroofing) is not critical. The incision should allow simultaneous curettage (consensus, 90%).

Expert statement: Needle aspiration is not recommended (consensus, 90%).

Currently, systematic reviews or meta-analyses examining treatment approaches for acute pilonidal abscesses are lacking. In a study involving 242 patients, Webb and Wysocki[15] compared midline incisions with lateral incisions and found that midline incisions took an average of 3 weeks longer to heal. Conversely, some surgeons suggest that a midline incision directly targets the primary area, whereas others prefer enlarging the existing pit or connecting it with other pits. Additionally, some recommend draining through the area with the greatest fluctuation.[5] In another study, 100 patients with acute abscesses were treated with needle aspiration and antibiotic therapy, and 10% required incision and drainage during a 29-month follow-up.[16] However, this study lacked a control group and did not provide long-term results regarding the need for definitive surgery. The method of drainage remains a focus for future research; however, the general recommendation is adequate drainage through a lateral incision, which also allows simultaneous curettage of the cavity.

Expert statement: There is no consensus on the necessity or optimal timing for definitive treatment following drainage of a pilonidal abscess (consensus, 85%).

Expert statement: Abscess drainage combined with simultaneous debridement of the cavity [curettage, unroofing, excision, phenol, laser, endoscopic pilonidal sinus treatment (EPSIT), etc.] can be a standalone curative approach (consensus, 85%).

There are two randomized and very few retrospective studies[17,18] that compare simultaneous curative approaches during pilonidal abscess drainage. Mahjoubi et al.[17] reported a 19% recurrence rate for excision of the abscess compared with 54% for incision-drainage ($p=0.02$). Girgin and Kanat[18] compared unroofing-curettage with incision-drainage and a delayed Karydakis procedure and reported similar recurrence rates at 14 months (3.5% vs. 4%). A randomized controlled trial (RCT) by Hosseini et al.[19] investigated the outcomes of excision and laying open compared with incision-drainage and delayed excision-closure. They found that the incision-drainage and delayed closure group experienced more wound infections (5.6% vs. 2.5%) and recurrence (14% vs. 0%) than the excision and laying open group. Another randomized trial by Vahedian et al.[20] involved 150 patients with acute pilonidal abscesses randomized to either incision and drainage or unroofing and curettage. The results indicated that the curettage group had significantly lower recurrence rates after 65 months of follow-up (11% vs. 42%, $p<0.001$) than the other group. A recent survey indicated a significant tendency among Turkish surgeons to apply treatments such as irrigation, curettage, phenol application, EPSIT, or laser to the abscess cavity, with 40% expressing an intent for curative one-stage surgery.[5]

Although Stauffer et al.'s[21] meta-analysis reported that 40% of patients who underwent abscess drainage experienced recurrence within a 60-month follow-up period, more recent data challenge this finding. In a Dutch audit published by Huurman et al.,[22] simple incision and drainage resulted in recurrence-free healing in 91% of patients. Although recurrence rates may increase with longer follow-up periods, the data suggest that at least half the patients achieve complete disease resolution through simple incision and drainage. This approach merits consideration, at least until the patient becomes symptomatic again, highlighting the value of giving abscess drainage a chance as a viable initial treatment option.

Treatment of Pilonidal Disease

Expert statement: Patients' preferences should be taken into consideration when choosing a treatment method (consensus, 100%).

PD primarily affects young, working adults who have high expectations for quick recovery and good cosmetic outcomes. A patient survey conducted by the Pilonidal Sinus Treatment – Studying the Options group found that the risk of infection or persistence was the strongest predictor of treatment choice, followed by shorter recovery time.[23] However, patients reported a willingness to trade off between recovery time and the risk of infection or persistence. In two survey studies by the same group, decision regret was mainly due to the unexpected burden of wound care and the recovery time being longer than they expected.[23,24] These surveys also showed that although younger patients prioritized more guaranteed outcomes, patients over 30 were more willing to accept higher risks of infection or persistence in exchange for a quicker return to work.[23,24]

Minimally invasive procedures allow patients to resume daily activities sooner and result in smaller scars. However, they often carry higher recurrence rates and may require more treatments than traditional excisional methods.[25] Therefore, treatment decisions should be made collaboratively between doctors and patients. This shared decision-making approach has been shown to improve treatment outcomes, optimize healthcare resource use, and increase patient satisfaction.[26]

Minimally Invasive Treatments

Expert statement: Initial treatment for simple PD should be a minimally invasive method (consensus, 95%).

Expert statement: Minimally invasive treatments can be used in combination with each other (consensus, 87.5%).

Minimally invasive methods such as pit picking, phenol application, endoscopic treatments, and laser procedures primarily involve the evacuation of hair and debris from the cavity, debridement, and destruction of the inner border of the sinus without wide tissue excision. All these procedures are fundamental variations of pit picking. An initial study by Gips et al.,[27] which included 1,358 patients, reported postoperative infection, secondary bleeding, and early failure rates of less than 5%, with a mean complete healing time of 3.4±1.9 weeks. In another series involving 2,347 consecutive patients, Di Castro et al.[28] reported a median operative time of 28 minutes (range: 21-75) and a median hospital stay of 6 hours (range: 2-36). Moreover, 77% of patients were able to resume daily activities within 2 days after treatment, and the median time for complete healing was 4 weeks (range: 2-21).[13] Although these functional outcomes are promising, a recent meta-analysis showed a recurrence rate of 38.2% when the follow-up period exceeded 2 years,[29] with some studies reporting even higher recurrence rates of 50-60%.[30,31]

EPSIT is a relatively new approach based on direct visualization of sinus tracts using a fistuloscope or endocamera, mechanical cleaning of the tracts with forceps, irrigation, and ablation via electrocautery.[32,33] Gulcu and Ozturk[34] reported a median return to activity of 1 day (range: 1-4) and return to work of 3 days (range: 1-11), with no wound complications and an incomplete healing rate of only 4.6%. Another study from Gulcu's group compared conventional EPSIT with laser-assisted EPSIT and found that the addition of laser enhances wound healing, patient comfort, and return to work; however, the success rates remained similar.[35] Recently, they compared EPSIT and pit picking without video assistance in another study, reporting similar success rates but higher costs for EPSIT.[36] A randomized trial comparing EPSIT with Bascom's cleft lift revealed similar recurrence rates (1 year: 3.9% vs. 5.8%; 5 years: 24.3% vs. 23.8%, p=0.03) but considerably less time off work, better cosmetic results, and higher patient satisfaction with EPSIT.[18] These results highlight the known advantages of minimally invasive treatments; however, further evidence is needed to demonstrate the specific contribution of adding an endoscopic technique to pit picking and to evaluate its cost-effectiveness.

Another method, laser treatment, also requires evidence-based validation. In one study, the addition of laser to pit picking showed no significant impact on recurrence rates during a 36-month follow-up; however, laser demonstrated advantages in terms of postoperative complications, pain, and return to work. The recurrence rate was approximately 10% in both groups.[37] Conversely, another study comparing pit picking with or without laser reported a reduced recurrence rate for the laser group (8.2% vs. 32.9%), although the follow-up for the pit picking-only group was longer.[38] A systematic review including 10 studies reported a 94.6% healing rate after laser treatment for primary PD; for non-healing wounds or recurrences, repeated applications resulted in an overall healing rate of 96.6%.[39] The recurrence rate was 4.7%, with a median follow-up of 12 months (range: 8-25). Additional small studies with short follow-ups favor laser treatment over excisional and flap procedures in terms of hospital stay, return to normal activities, pain, and patient satisfaction.[40,41]

Phenol is a widely accessible and inexpensive chemical agent that has antiseptic, sclerosing, and caustic effects, causing tissue protein denaturation. Several studies comparing excisional methods with phenol application favor phenol in terms of procedural time, hospital stay, and time to return to work or daily activities.[42-46] A recent meta-analysis by Gan et al.[47] reported fewer wound-related complications, shorter operation time, and shorter recovery periods for phenol treatments than for surgical excision. Phenol can be combined with other procedures; Gecim et al.[48] reported no recurrence after EPSIT with crystallized phenol over a follow-up period of 22 months.

Expert statement: Among the minimally invasive therapies, no single option stands out as the preferred choice of management (no consensus, 60%).

All minimally invasive treatments primarily consist of ablative methods combined with pit picking. Although this might suggest that pit picking alone could serve as a first-line treatment, the literature lacks high-quality evidence to allow a comprehensive comparison of all minimally invasive methods and to identify the superior approach. A recent systematic review including 3,780 non-excisional procedures revealed recurrence rates of 5.8-16.2% over follow-up periods ranging from 12 to 120 months.[49] However, Doll et al.[30] reported a 50% recurrence rate over 5 years, whereas Koskinen et al.[31] reported a 60% recurrence rate over 9.3 years with pit picking alone. Nevertheless, pit picking alone or in combination with additional techniques should be considered the first-line treatment, particularly in cases of simple disease.[1-3,8]

Expert statement: Minimally invasive treatments can be repeated in case of failure after the initial application (consensus, 87.5%).

Among minimally invasive treatments, phenol treatment is the one most frequently reported to require repeated application. Studies indicate that 11-70% of patients needed repeated applications, resulting in complete healing rates of 93-95%.[50,51] Additionally, repeated applications of EPSIT[52,53] and laser[54,55] are also associated with increased healing rates.

Expert statement: There is no consensus on the safety of phenol application (no consensus, 67.5%).

Phenol is a monohydroxy derivative of benzene that denatures cell membrane proteins, leading to tissue damage. It denatures keratin, which is a component of hair structure. Additionally, phenol has antimicrobial, sclerosing, antiseptic, and anesthetic properties. Since its initial use in PD in 1964, various forms (liquid, crystallized) and concentrations have been widely used as an effective minimally invasive treatment, either alone or in combination with other techniques.[18,42-48,50,51,56-60] Although the local complications of phenol treatment, such as skin irritation, abscess, and cellulitis, are well established, there is limited understanding of potential systemic effects related to its application site and dosage in PD. This uncertainty has led some countries to consider phenol treatment unsafe for PD. Although there is no consensus on the safety of phenol, there is also no clear evidence of systemic effects in the treatment of PD. The latest European guideline states that phenol application can be offered as a treatment option in PD.[8]

Excisional Treatments

Expert statement: Excision and advancement flap closure methods (Karydakis, Bascom) can be offered as the first choice among invasive methods (no consensus, 67.5%).

Expert statement: Initial treatment for complex PD is controversial. Minimally invasive and excisional methods can be performed selectively (no consensus, 67.5%).

The literature indicates a considerable gap in the systematic evaluation of surgical techniques specifically for complex PD. The definition of complex disease remains inconsistent, generally encompassing recurrent disease, failed healing, or extensive primary presentations, including bilateral involvement, perianal extension, or substantial wound size.[8] Evidence suggests that recurrent PD in both adult and pediatric populations can be treated with minimally invasive methods; hence, excisional surgery should not be the sole option for complex PD.[23,53,61] Minimally invasive treatments, incisional procedures, and excisional surgeries with laying open or off-midline closure should be discussed individually in the context of shared decision-making. However, midline closure techniques should be avoided.[62]

Surgical approaches typically fall into two categories: primary closure techniques (including midline, off-midline, and various flap procedures) and open healing by secondary intention. Notable off-midline techniques include Bascom's cleft lift, the Karydakis procedure (advancement flaps), and the Limberg and Dufourmental methods (which use rotational flaps). A large-scale analysis of 89,583 patients revealed significant differences in long-term outcomes. Primary midline closure showed higher recurrence rates (up to 32% by 120 months) compared with off-midline techniques such as Karydakis or Bascom's procedures (2.7% recurrence) and Limberg or Dufourmental flaps (11.4% recurrence).[21]

Excision and laying open, with or without marsupialization, can be considered for selected patients.[8] A meta-analysis examining 343 patients demonstrated recurrence rates of 1.8% at 12 months and 5.6% at 24 months following laying-open surgery.[21] However, these favorable recurrence rates should be weighed against prolonged healing times and delayed return to work.

Current evidence supports off-midline closure as the optimal approach following excisional surgery, although no single technique has been proven to be clearly superior. The selection of a specific surgical approach should take into account the surgeon's expertise and individual patient factors, whereas midline closure should be avoided.

Expert statement: Routine histopathologic examination of the specimen is not recommended, but it can be offered based on individual surgeon preference (no consensus, 60%).

The role of histopathological examination in PD specimens lacks evidence from systematic reviews or RCTs. However, a key retrospective cohort analysis conducted by Akin et al.,[63] which evaluated surgical specimens from 2,486 patients,

found no evidence of malignant transformation in any of the specimens. Despite the absence of supporting evidence, insurance reimbursement requirements and medicolegal concerns-particularly in Türkiye-explain the continued practice of routine pathological examination by some surgeons.

Recurrent/Persistent Pilonidal Disease

Expert statement: In cases of recurrent or persistent disease, treatment decisions should be based on the severity of the condition (simple or complex) rather than on the type of previous intervention (minimally invasive or non-minimally invasive) (consensus, 92.5%).

Despite limited evidence specifically for recurrent cases, treatment principles often mirror those for initial presentations. A comprehensive review by Stauffer et al.[21] indicates a progressive increase in recurrence over time, with an initial rate of 2.0% at 12 months post-treatment, rising to 4.4% by 24 months. A more substantial increase is observed at 60 months (10.8%), continuing to 16.9% at 120 months. These findings emphasize the chronic and recurrent nature of PD, suggesting that many patients may require multiple interventions over time and highlighting the importance of long-term follow-up.

Most surgeons favor excisional methods for persistent or recurrent disease following initial treatment. Similarly, when the primary intervention was an excisional/flap procedure, there is often hesitation to use minimally invasive techniques in cases of recurrence or non-healing. However, evidence suggests that minimally invasive procedures can still play a role in treating recurrent PD, even after prior excisional surgery. Meinero et al.[53] enrolled 122 consecutive patients with recurrent PD in a prospective study on EPSIT and reported 95% complete wound healing, with a mean healing time of 29±12 days. The recurrence rate was only 5.1%. In recurrent cases with multiple tracts, EPSIT provides direct visualization of the entire sinus and offers a promising minimally invasive approach.[32,53] Another commonly used minimally invasive method, phenol treatment, has demonstrated success rates of up to 91% and failure rates of 8% in treating recurrent PD, with minimal side effects.[50,64,65]

It is worth noting that although some primary cases present as highly complex, with multiple fistula openings and infection, some recurrences may manifest as simple midline disease with only 1-2 pits. Unfortunately, the literature lacks studies that define and compare these scenarios, and no classification system currently exists. Regardless of whether the disease is recurrent or the type of initial treatment received, the severity of the current presentation should be the primary factor guiding the choice of treatment.

Expert statement: Among excisional techniques, methods such as Karydakis and Bascom advancement flap closure can be considered initial treatment options for complex recurrent or persistent disease (consensus, 75%).

Several flap techniques have been described in the literature, suggesting that advancement flap closures offer superior outcomes. Reported benefits include lower infection rates, fewer recurrences, shorter hospital stays, earlier return to work, and improved quality of life[4,66-73]. In a study on Bascom's cleft lift for complex or recurrent PD, Ojo et al.[4] reported a treatment failure rate of only 3% and a recurrence rate of 5.3% over 12 months of follow-up.

Regional Care and Hair Removal

Expert statement: Regional care in the natal cleft (showering, cleaning, keeping the area free of debris or shed/occipital hair) and hair removal should be recommended routinely, regardless of the treatment method (consensus, 87.5%).

Expert statement: There is no consensus on the optimal timing for initiating and terminating hair removal. Hair removal can be performed using either temporary (razor, blade, depilatory cream) or permanent methods (laser depilation, intense pulsed light, needle epilation) (consensus, 77.5%).

The exact cause of PD remains unclear. Earlier theories, such as folliculitis, ingrown gluteal hair, or local hair penetration, have largely been dismissed due to insufficient evidence. Recent research by Doll's team has revealed that sharp hair fragments, particularly from the occipital region, are the primary components found within pilonidal sinus cavities.[74,75] Additionally, individuals with a hairy intergluteal sulcus tend to retain hair in this area for longer periods, which may explain the higher risk of PD among those with more body hair.[75] As a result, hair removal and regional care, including keeping the intergluteal area free of shed hair, have become standard recommendations.

Given this evidence, it is more important to emphasize consistent hygiene of the intergluteal region rather than focusing solely on hair removal immediately before surgery. Practices such as showering after a haircut or regularly cleaning the area may play a more valuable role in preventing the recurrence or development of pilonidal sinus disease. Halleran et al.[76] examined the use of laser depilation in the postoperative period by reviewing 35 studies (including two RCTs) and found reduced recurrence rates with laser compared with other methods. Similarly, Pronk et al.[77] analyzed 14 studies (including two RCTs) involving 963 patients and found that laser hair removal was associated with a recurrence rate of 9%, which was lower than that observed with no hair removal (19%) or shaving/depilation (23%).

In summary, although depilation is not a definitive treatment, keeping the intergluteal sulcus free from debris and hair is a feasible and practical approach to preventing PD and reducing the risk of recurrence. Currently, there is no consensus on when this practice should be initiated or how long it should be maintained, highlighting the need for further research to establish clear guidelines.

Perioperative Care and Antibiotics

Expert statement: Antibiotics should be used for perioperative prophylaxis in excision and flap procedures (consensus, 87.5%).

Expert statement: Antibiotic use in abscess drainage and in procedures other than excision and flap procedures-whether perioperative, intraoperative, or postoperative-is controversial (consensus, 87.5%).

There is no evidence supporting the positive effects of antibiotics in the treatment of PD. A systematic review by Mavros et al.,[78] which included seven studies and 690 patients, found no difference in outcomes between long-course antibiotics and single-dose prophylaxis. Unfortunately, current guidelines do not provide clear recommendations regarding antibiotic use. In this survey study, experts indicated that antibiotics have a prophylactic role in flap surgeries; however, their benefit in other applications remains uncertain. In cases of severe cellulitis, immunosuppression, or associated comorbidities, antibiotic therapy should be considered selectively.

Expert statement: Drains can be selectively placed after excision and flap closure (consensus, 82.5%).

Although a meta-analysis by Milone et al.,[79] which included seven studies and 1,252 patients, found that drainage did not significantly reduce postoperative infection or recurrence rates compared with no drainage, drains may still be placed at the surgeon's discretion following wide excision and flap closures to remove excess fluid from the surgical site.

Expert statement: Intraoperative use of antibiotics or topical antimicrobial solutions (e.g., zinc oxide, cinchona tree powder) on the wound is not necessary (consensus, 75%).

Expert statement: Irrigation of the surgical site with saline or antimicrobial solutions (e.g., hydrogen peroxide, chlorhexidine gluconate) is controversial (no consensus, 60%).

Expert statement: The use of wound-healing adjuncts, such as vacuum-assisted closure (VAC), platelet-rich plasma (PRP), hemoglobin spray, fibrin glue, and autologous fat transplantation, remains controversial. However, VAC may be considered in the management of large pilonidal wounds (no consensus, 60%).

The intraoperative use of irrigation solutions,[80] antibiotics, or dressings,[81] as well as coated sutures[82] to prevent wound infection, remains a topic of debate. A systematic review by Nguyen et al.[83] found no significant benefit of gentamicin collagen sponges in reducing healing time or recurrence rates in pilonidal surgery. Current evidence does not support the use of intraoperative adjuncts to improve outcomes.

A Cochrane review conducted by Herrod et al.[81] found no evidence that VAC reduced healing time in PD cases. Their findings also indicated no benefit from other agents aimed at accelerating wound healing. However, some retrospective and prospective case series have suggested that VAC may be beneficial for managing large and complex pilonidal wounds, particularly in cases of wound breakdown.[8]

Postoperative Care

Expert statement: After laying-open procedures, it is recommended that patients shower daily and manage dressing/packing of the surgical site on their own (consensus, 92.5%).

Expert statement: After minimally invasive procedures, it is recommended that patients shower daily and manage dressing/packing of the surgical site on their own. Additionally, depilation or inspection for new hair insertions should be recommended (consensus, 90%).

Expert statement: After excision and closure procedures, there is no consensus on the necessity of daily showering (no consensus, 66%) or dressing/packing of the surgical site (no consensus, 65%). However, depilation or inspection for new hair insertions should be recommended (consensus, 75%). The literature does not provide evidence that dressing reduces the healing time for open wounds. Meta-analyses published in 2015[81] and 2019[84] indicated that the use of dressings and other topical agents does not shorten the healing period. However, one randomized trial showed that PRP may accelerate wound healing compared with traditional dressing.[85] Practices regarding dressing application after PD treatment vary considerably among surgeons. In our survey, some surgeons preferred to perform all dressing changes themselves, whereas others considered dressings unnecessary. Due to the limited data on this topic, this statement is based entirely on expert opinion. Most experts appear to support the idea that patients can wash their wounds and manage self-dressing in cases of open wounds and minimally invasive procedures, showing more caution following flap surgeries. There is a substantial need for prospective studies addressing this issue.

Expert statement: After excision and cleft lift/flap procedures, patients should avoid squatting, riding a bicycle, and participating in activities that increase the risk of falls (e.g., football, basketball). No other physical restrictions (e.g., lying supine or prone, or sitting) are recommended (consensus, 82.5%).

There is no literature providing data on patients' physical activities or sitting positions following excision and cleft lift/flap procedures. No recommendation can be derived from the literature. Expert opinion suggests only minimal restrictions.

Discussion

Several guidelines and consensus statements have been published regarding the management of pilonidal sinus disease, notably from German (1), Italian (2), and American (3) groups. However, considerable gaps remain in the classification systems and treatment algorithms currently

available. The primary aim of this study is to provide a more comprehensive framework for the classification of pilonidal sinus disease. We specifically discussed which elements should be included in a more robust classification and how complex disease should be defined. Additionally, we have addressed perioperative mapping and elaborated on postoperative abscess management-areas that have been either insufficiently addressed or not explored in depth in previous guidelines and studies. All expert opinions have been compiled and presented in a comprehensive flowchart to clearly illustrate the consensus and decision-making pathways (Table 1).

The existing guidelines primarily rely on expert opinion and lack high-level evidence from clinical studies. Therefore, the classification and management model presented here is intended to facilitate clinical use by surgeons and to promote a more standardized approach. This is designed to support decision-making in the management of heterogeneous disease presentations.

Table 1. Questions and responses

Questionnaire	Agreement
Q1. A classification system should be used for the documentation and grading of PD.	Agree: 83.3% Disagree: 16.7%
Q2. Current classification systems for PD are deficient. There is a need for either the development of a new system or the comprehensive validation of existing ones through large prospective series.	Agree: 76.2% Disagree: 23.8%
Q3. An ideal PD classification should include the following components: the number of secondary orifices, extension in relation to the midline (lateral, unilateral, or bilateral spread), extension below coccyx level, distance to the anal margin, and presentation (acute abscess, recurrent, or unhealing).	Agree: 92.7% Disagree: 7.3%
Q4. There is no clear consensus on the definition of the term complex pilonidal disease. It can be broadly defined as disease extending beyond the midline and/or with a maximum cyst diameter >5 cm and/or a distance to the anal margin <3 cm and/or a recurrent/unhealing presentation and/or the presence of accompanying inflammatory diseases.	Agree: 90.3% Disagree: 9.7%
Q5. Preoperative and/or intraoperative mapping methods (imaging, dye, endoscopic tract identification) of the tracts are not routinely recommended.	Agree: 56% Disagree: 44%
Q6. Pilonidal abscesses should be drained through an off-midline incision at the site of maximum fluctuation.	Agree: 90% Disagree: 10%
Q7. The shape of the incision (vertical, horizontal, cruciate, unroofing) is not important. The incision should allow for simultaneous curettage.	Agree: 90% Disagree: 10%
Q8. Needle aspiration is not recommended.	Agree: 90% Disagree: 10%
Q9. There is no consensus on the necessity or optimal timing of definitive treatment after draining a pilonidal abscess.	Agree: 85% Disagree: 15%
Q10. Abscess drainage with simultaneous debridement of the cavity (curettage, unroofing, excision, phenol, laser, endoscopic pilonidal sinus treatment, etc.) can be a standalone curative approach.	Agree: 85% Disagree: 15%
Q11. Patient preferences should be considered when choosing treatment methods.	Agree: 100%
Q12. Initial treatment should be a minimally invasive method for simple pilonidal disease.	Agree: 95% Disagree: 5%
Q13. Minimally invasive treatments can be used in combination with each other.	Agree: 87.5% Disagree: 12.5%
Q14. Among the minimally invasive therapies, no single option stands out as the preferred choice of management.	Agree: 60% Disagree: 40%
Q15. Minimally invasive treatments can be repeated in case of failure after the initial application.	Agree: 87.5% Disagree: 12.5%
Q16. There is no consensus on the safety of phenol application.	Agree: 67.5% Disagree: 32.5%
Q17. Excision and advancement flap closure methods (Karydakis, Bascom) can be offered as the first choice among invasive methods.	Agree: 67.5% Disagree: 32.5%

Table 1. Continued

Questionnaire	Agreement
Q18. Initial treatment for complex PD is controversial. Minimally invasive and excisional methods can be performed selectively.	Agree: 67.5% Disagree: 32.5%
Q19. Routine histopathologic examination of the specimen is not recommended. It can be offered based on individual surgeon preference.	Agree: 60% Disagree: 40%
Q20. In cases of recurrent or persistent disease, treatment decisions should be based on the severity of the condition (simple or complex) rather than on the type of previous intervention (minimally invasive or non-minimally invasive).	Agree: 92.5% Disagree: 7.5%
Q21. Among excisional techniques, methods such as Karydakis and Bascom advancement flap closure can be considered initial treatment options for complex recurrent or persistent disease.	Agree: 75% Disagree: 25%
Q22. Regional care in the natal cleft (showering, cleaning, keeping clear of debris or shed/occipital hair) and hair removal should be recommended routinely regardless of the treatment.	Agree: 87.5% Disagree: 12.5%
Q23. There is no consensus on the optimal timing for initiating and terminating hair removal. Hair removal can be performed by either temporary methods (razor, blade, depilatory cream) or permanent methods (laser depilation, IPL, needle epilation).	Agree: 77.5% Disagree: 22.5%
Q24. Antibiotics should be used for perioperative prophylaxis in excision and flap procedures.	Agree: 87.5% Disagree: 12.5%
Q25. Antibiotic use in abscess drainage and procedures other than excision and flap procedures, in any setting (perioperative, intraoperative, postoperative), is controversial.	Agree: 87.5% Disagree: 12.5%
Q26. Drains can be selectively placed after excision and flap closure.	Agree: 82.5% Disagree: 17.5%
Q27. Intraoperative application of antibiotics or topical antimicrobial solutions (zinc oxide, cinchona tree powder) to the wound is not necessary.	Agree: 75% Disagree: 25%
Q28. Irrigation of the surgical site with saline or antimicrobial solutions (hydrogen peroxide, chlorhexidine gluconate) is controversial.	Agree: 60% Disagree: 40%
Q29. The use of wound-healing adjuncts such as vacuum-assisted closure (VAC), platelet-rich plasma, hemoglobin spray, fibrin glue, and autologous fat transplantation remains controversial. However, VAC may be considered in the management of large pilonidal wounds.	Agree: 60% Disagree: 40%
Q30. After laying-open procedures, daily showering and dressing/packing of the surgical site by the patient are recommended.	Agree: 92.5% Disagree: 7.5%
Q31. After minimally invasive procedures, daily showering and dressing/packing of the surgical site by the patient are recommended. Depilation or inspection of new hair insertions should also be recommended.	Agree: 90% Disagree: 10%
Q32. After excision and closure procedures, there is no consensus on daily showering.	Agree: 66% Disagree: 34%
Q33. After excision and closure procedures, there is no consensus on daily dressing/packing of the surgical site.	Agree: 65% Disagree: 35%
Q34. After excision and closure procedures, depilation or inspection of new hair insertions should be performed.	Agree: 75% Disagree: 25%
Q35. After excision and cleft lift/flap procedures, patients should avoid squatting, riding a bicycle, and activities prone to falls (e.g., football, basketball). No other physical restrictions (lying in supine or prone position or sitting) are recommended.	Agree: 82.5% Disagree: 17.5%

PD: Pilonidal disease, IPL: Intense pulsed light, VAC: Vacuum-assisted closure

Ethics

Ethics Committee Approval: This study was approved by Institutional Ethics Committee of Medipol University International Faculty of Medicine (approval number: E-10840098-202.3.02-5416, dated: 09.09.2024).

Informed Consent: Retrospective study.

Footnotes

Authorship Contributions

Surgical and Medical Practices: Ç.A., C.T., T.E., T.B., R.K., Concept: Ç.A., C.T., T.E., Design: Ç.A., C.T., T.E., T.B., Data Collection or Processing: Ç.A., C.T., T.E., Analysis or Interpretation: Ç.A., C.T., T.E., R.S., S.C.I., P.W., B.B.T., B.C., Y.Y., T.B., R.K., Y.M., M.A.A., Literature Search: Ç.A., C.T., T.E., T.B., R.K., Y.M., Writing: Ç.A., C.T., T.E., T.B.

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Appendix 1. Pilonidal disease study group
https://d2v96fxpocvxx.cloudfront.net/b0c0ce94-e611-46f7-a5ae-a55f60622a67/documents/1-2025.2025-2-2-Appendix%201%20.docx

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Appendix 2. Experts
https://d2v96fxpocvxx.cloudfront.net/b0c0ce94-e611-46f7-a5ae-a55f60622a67/documents/1-2025.2025-2-2-Appendix%202.docx

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Appendix 3. The survey draft
https://d2v96fxpocvxx.cloudfront.net/b0c0ce94-e611-46f7-a5ae-a55f60622a67/documents/1-2025.2025-2-2-Appendix%203.docx

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Appendix 4. Raund 1 and 2 results
https://d2v96fxpocvxx.cloudfront.net/b0c0ce94-e611-46f7-a5ae-a55f60622a67/documents/1-2025.2025-2-2-Appendix%204%20.docx