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ORIGINAL ARTICLE

An international survey exploring the management of pilonidal disease

Gaetano Gallo[1] | Marta Goglia[2] | Asha Senapati[3] | Francesco Pata[4,5] | Luigi Basso[1] | Ugo Grossi[6,7] | 2022 European Society of Coloproctology (ESCP) collaborating group†

[1]Department of Surgery, Sapienza University of Rome, Rome, Italy

[2]General Surgery Unit, Department of Medical and Surgical Sciences and Translational Medicine, St Andrea University Hospital, Sapienza University of Rome, Rome, Italy

[3]St Mark's Hospital, London, UK

[4]Department of Pharmacy, Health and Nutritional Sciences, University of Calabria, Rende, Italy

[5]General Surgery Unit, Department of Surgery, Cosenza, Italy

[6]Department of Surgery, Oncology and Gastroenterology—DISCOG, University of Padua, Padua, Italy

[7]Surgery Unit 2, Regional Hospital Treviso, AULSS2 Marca Trevigiana, Treviso, Italy

Correspondence
Gaetano Gallo, Department of Surgery, Sapienza University of Rome, Rome, Italy.
Email: ga.gallo@uniroma1.it

Abstract

Aim: Pilonidal disease (PD) is a common debilitating condition frequently seen in surgical practice. Several available treatments carry different benefit/risk balances. The aim of this study was to snapshot the current management of PD across European countries.

Method: Members affiliated to the European Society of Coloproctology were invited to join the survey. An invitation was extended to others via social media. The predictive power of respondents' and hospitals' demographics on the change of therapeutic approach was explored.

Results: Respondents ($n = 452$) were mostly men (77%), aged 26–60 years, practising in both academic and public hospitals and with fair distribution between colorectal (51%) and general (48%) surgeons. A total of 331 (73%) respondents recommended surgery at first presentation of the disease. Up to 80% of them recommended antibiotic therapy and 95% did not use any classification of PD. A primary closure technique was the preferred procedure (29%), followed by open technique (22%), flap creation (7%), sinusectomy (7%) and marsupialization (7%). Approximately 27% of subjects would choose the same surgical technique even after a failure. Almost half (46%) perform surgery as office based. A conservative approach was negatively associated with acutely presenting PD ($p < 0.001$). Respondents who were not considering tailored surgery based on patient presentation tended to change their approach in the case of a failed procedure.

Conclusion: With the caveat of a heterogeneous number of respondents across countries, the results of our snapshot survey may inform the development of future guidelines.

KEYWORDS
minimally invasive procedure, patient perspectives, pilonidal disease, recurrence rates, surgical techniques

†ESCP Cohort Studies and Audits committee, Statistical analysis and data management, ESCP Guidelines Committee, ESCP Research Committee and collaborators (Appendix S3) are part of the 2022 ESCP collaborating group and should be indexed.

INTRODUCTION

Pilonidal disease (PD) is a common condition encountered by clinicians in medical practice. Typically, the doctor examining a patient with PD may have little interest in this condition, with their knowledge of PD often limited to general surgery textbooks that sometimes convey wrong or obsolete information on the disease. Studies since the 1980s marked a turning point in the debate on the congenital versus acquired nature of PD, strongly supporting the theory that PD arises from ingrown hairs [1]. Some physicians may take for granted that wide excision with or without primary suturing is the only way to treat PD, thereby discrediting the less invasive therapeutic approaches proposed since the 1960s and which later surged in popularity [2–4].

In the attempt to minimize confusion and false myths on PD, guidelines grounded in evidence-based medicine and consensus statements have been developed by dedicated national scientific societies in the United States [5] and Europe [6–8]. However, it remains difficult to establish the 'on the floor' impact of these guidelines over the years, matched to a parallel increase in knowledge and the launch of newer technologies. In other words, it is still unclear who is treating who, what and how. Similar 'snapshot' have already been taken at a national level. For instance, 983 studies from the literature on the management of PD were the object of a recent mapping review by Kumar et al. [9], summarizing eight decades of research on the topic. A total of 36 studies were systematic reviews with/without meta-analyses, 121 randomized controlled trials and 826 observational studies.

A recent national survey from the Netherlands on the surgical treatment of PD concluded that traditional excision techniques are still the most frequently performed in that country, but the majority of surgeons and surgical residents remain unsatisfied with the current treatments [10].

It was therefore decided to launch a survey at a continental level and under the auspices of the European Society of Coloproctology (ESCP) to snapshot the current management of PD across Europe.

What does this paper add to the literature?

This is the first international survey to explore the management of pilonidal disease. It shows that newer minimally invasive procedures have not yet achieved widespread distribution. Although increasingly discredited, excision and leave open techniques are still supported by a fifth of respondents as first-line therapy.

METHOD

Survey

A 24-item survey (Appendix S1) was designed and developed by the authors using an online platform ['Online survey' (formerly BOS—Bristol Online Survey), developed by the University of Bristol] in accordance with the Consolidated Criteria for Reporting Qualitative Research (COREQ) and the Checklist for Reporting Results of Internet E-Surveys (the CHERRIES statement; Appendix S2) [11]. The questionnaire was constructed with careful consideration of the areas of open debate in various published guidelines on pilonidal disease. Each question was included to address specific aspects related to the condition and treatment. Proprietary survey software and local servers were used to ensure data protection. The fully deidentified dataset was kept on password-protected computers. The authors piloted the survey, assessed the design and checked the feasibility and validity of the questions. The estimated mean time required to complete the survey was 6 min. The finalized online survey was made available for 6 weeks, from 10 February to 24 March 2022, and disseminated among members of the ESCP. Participants could be identified only via their valid email address; no other identifying information was collected. A link to the survey was posted on social media (i.e. LinkedIn and Twitter) to capture further potential respondents. Participation was entirely voluntary, with no compensation offered. Informed consent was obtained from all those agreeing to complete a survey.

The survey aimed to capture the current treatments for PD and was structured in the following two sections:

1. Demographics (Q1–Q7): including respondents' gender, age range, city and country of clinical practice, type of hospital, speciality and affiliation to coloproctological societies.
2. Treatments for PD (Q8–Q24): including yearly case volume, first-choice treatment, use of antibiotics, reasons for changing the original therapeutic plan, time interval from acute presentation to definitive treatment, rate of partial or complete dehiscence after closed approaches, operative setting, recurrence rate, time to recover, use of advanced dressings or postoperative permanent laser epilation, follow-up modalities and usefulness of patient reported outcome measures (PROMs).

All questions were set as mandatory fields with real-time validation and automated skip logic to prevent missing data and avoid illogical or incompatible responses. No randomization of items was used. Quantitative data were automatically collected by the software and exported to a tabulated format. All those who completed the survey were included as collaborators (Appendix S3).

Statistical analysis

Continuous variables were summarized by means and standard deviations (SDs), while categorical variables were assessed by proportions. Comparisons of categorical variables across groups were made using Pearson's chi-square test.

The data were statistically described according to sociodemographic traits and variables related to the question answers. Response percentages for items were calculated according to the number of respondents per response out of the total responses for that item. Starting from the raw qualitative recorded data, after applying a data transformation in order to obtain dummy variables, we applied a logistic regression based on a stepwise procedure for variable selection [12, 13]. Thus, the associations between responses related to the question '*Suggested type of elective treatment of PD (first presentation)*', i.e. 'Surgical' or 'Conservative'; '*Do you change your therapeutic approach in case of failure/recurrence after the first treatment?*', i.e. 'Yes' or 'No'; '*Do you think that the use of patient reported outcome measures (PROMs) could be useful in the evaluation of a patient with PD?*', i.e. 'Yes' or 'No'; sociodemographic characteristics and all the other responses were evaluated. The data were used to estimate six models, one for each of the above-mentioned question answers. All the variables included in the databases, including the dependent variables, were qualitative and hence treated as dummy variables [12]. The categories within each variable were grouped to obtain a sufficient sample size. Because the grouping procedure dichotomized the dependent variables, a logistic regression model was used with a stepwise procedure to select the explanatory variables based on the Akaike information criterion [12, 13]. The denominator of the percentages of respondents was the total number of respondents who eventually completed the survey. Adjustment to the *p*-values was not performed. However, considering the number of tests performed, *p*-values of <0.05 were critically appraised to consider the risk of false positives. Statistical analysis was performed using MATLAB R2019a (The MathWorks Inc.).

TABLE 1 Sociodemographic variables and question related to setting activity.

	n	%
Gender		
Female	104	23.0
Male	348	77.0
Age (years)		
26–40	222	49.1
41–60	194	42.9
>60	36	8.0
Speciality		
Colorectal surgery	232	51.3
General surgery	215	47.6
Other	5	1.1
Setting		
Private hospital	57	12.6
Private hospital, rooms/office only (no hospital/private clinic activity)	2	0.4
Private hospital, university hospital	14	3.1
Public hospital	176	38.9
Public hospital, private hospital	13	2.9
Public hospital, private hospital, university hospital	5	1.1
Public hospital, university hospital	35	7.7
Rooms/office only (no hospital/private clinic activity)	4	0.9
University hospital	145	32.1
University hospital, rooms/office only (no hospital/private clinic activity)	1	0.2

RESULTS

Four hundred and fifty-two subjects located in 48 different countries answered the questionnaire (Appendix S4). Most of them [121 (24.8%)] came from Italy, with 13.9% and 13.5% from Spain and Turkey, respectively, and 6.4% from the United Kingdom. Their main sociodemographic characteristics are shown in Table 1.

More than a third [170 (38%)] were exclusively affiliated to the ESCP, with a fair representation of other coloproctological scientific societies, especially the Italian Society of Colorectal Surgery and the Turkish Society of Colon and Rectal Surgery, accounting for 12% of respondents (Figure 1).

Respondents were mostly men (77%), age range 26–60 years, practising in both academic and public hospitals, with a heterogeneous experience in the treatment of PD. Over a third of respondents [175 (39%)] declared that they generally treated between 11 and 100 cases per year; 3% dealt with more than 100 cases per year. Almost all the respondents were surgeons, with an even distribution between colorectal (51%) and general (48%) surgeons.

More than two-thirds [331 (73%)] of respondents preferred surgical treatment even at first presentation of the disease, whereas 141 (31%) opted for first-line conservative treatment. Up to 80% of these recommended antibiotic therapy, irrespective of the type of presentation and 95% did not use any disease classification.

A primary closure technique was the most preferred procedure among respondents (29%), followed by the open technique (22%), flap (7%), sinusectomy (7%), marsupialization (7%) and others (less than 6% each, reported in Table 2). Most respondents stated their willingness to change their therapeutic approach according to the presentation of the disease, number and side of pits and type/extension of PD (limited or extensive).

Approximately 27% of subjects would recommend the same surgical technique even after a failure. Almost half of respondents (46%) performed office-based treatments, with 27% adopting 1-day surgery (overnight stay) and 21% an outpatient (walk in/walk out) setting. About two-thirds (66%) of respondents routinely scheduled surgery 4–8 weeks after an acute episode (Table 3). Most respondents (40%) reported recurrences of less than 5%, followed by 30% reporting a recurrence rate of 5%–10%.

The vast majority (74%) declared that they perform direct physical examination on follow-up visits, in 35% of cases at 1 year from

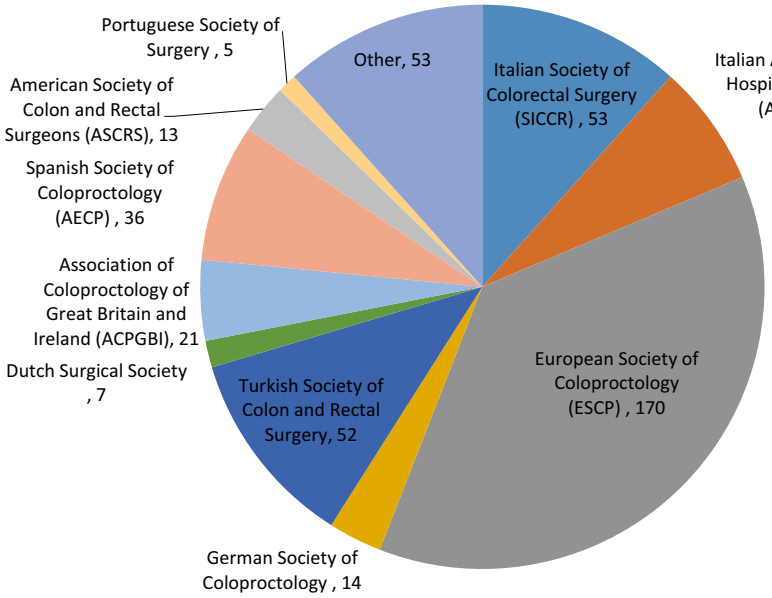

FIGURE 1 Distribution of participants based on national and international scientific society.

surgery. Generally, participants stated that their patients took 1 month to achieve complete recovery from surgery (36% of cases); this was longer (i.e. 1–2 months) in 27% of cases (Table 3). Fifty-seven per cent of subjects routinely recommended laser epilation after surgery. Lastly, most participants (66%) did not routinely use PROMs.

A stepwise regression model yielded significant results on the following questions/answers: '*Suggested type of elective treatment of PD (first presentation)*'/Conservative; '*Do you change your therapeutic approach in case of failure/recurrence after the first treatment?*'/No; '*Do you think that the use of PROMs could be useful in the evaluation of a patient with PD?*'/Yes. Partial correlation coefficients are shown in Tables 4–6. No significant associations were found between the other questions and answers and all the other predictors.

A conservative approach was negatively associated with acute presentation of PD (e.g. pilonidal abscess). On the contrary, it was associated with surgeons aged between 41 and 60 years working in public, private and university hospitals (Table 4).

For those respondents who were unwilling to change their practice in case of failure (27%), the negative associations found in Table 5 show that respondents were less prone to not change their therapeutic approach when the recurrence rate was about 11%–15% and when PD presented with acute abscess, number and site of pits and in the presence of limited or extensive PD. On the other hand, positive associations found between the same item and flap and open techniques as first-line treatment strategies, with respondents shown to be more prone to not change their therapeutic approach in such situations (Table 5).

Finally, PROMs were rarely evaluated as useful by surgeons in cases of a low PD recurrence rate (<5%), when patients were followed-up with physical examination and when the speciality of the respondent was general surgery (Table 6). No significant associations were found between the other questions and answers and all the other predictors and evidence related to other factors (e.g. geographical variation, case volume, further demographic aspects, healing times) (Table 6).

DISCUSSION AND CONCLUSION

This is the first international survey to evaluate trends in the management and treatment of PD. One of the most representative findings of this study is that 95% of the respondents did not use any classification system for PD [14]. Indeed, even though PD is a common disorder that every surgeon faces at least once in his or her career, only a tiny minority follow a classification system. This involves both those who do not usually deal with PD and those who perform a large number of procedures each year. Classifications have the potential role of predicting prognosis, guiding treatment and making outcomes comparable for research purposes. Without a universally acceptable classification system, comparative trials carry unacceptable selection and outcome-reporting bias. A standardization of the diagnosis and classification based on location and severity might be helpful for comparing techniques and results, and therefore in the identification of the most effective kind of assessment. This is likely to apply to the subgroup of patients with advanced disease who may be poor candidates for a given intervention and at the same time respond differently to different surgical strategies [14, 15]. On the other hand, as acknowledged by national guidelines, no validated classification of PD exists even if sinus characteristics may modify surgical decision-making and postoperative outcomes. Features to be considered before recommending conservative treatment or surgery should cover the number of pits, their location in relation to the midline, the distance of the most caudal pits from the anal verge and the presence of previous incisions or scars [8]. Therefore, it would be desirable to collect data and create a classification applicable to all professionals who encounter PD, both for clinical-therapeutic and research reasons.

TABLE 2 Clinical and surgical approaches.

	n	%
How many cases of PD do you examine/treat each year		
≤10	83	18.4
11–30	175	38.7
31–50	120	26.6
51–100	62	13.7
>100	12	2.7
Suggested type of elective treatment of PD (first presentation)		
Conservative	141	31.2
Surgical	311	68.8
Do you recommend antibiotics in PD?		
Acute disease	365	80.8
Chronic disease	15	3.3
Both chronic and acute	35	7.7
Neither	37	8.2
Do you employ any classification for PD?		
Yes	24	5.3
No	428	94.7
What type of surgery is your first-line treatment for PD?		
Bascom	28	6.2
Closed technique (primary closure)	133	29.4
EPSiT, VAAPS or other endoscopic procedure	25	5.5
Fibrin glue + curettage	4	0.9
Flap	39	8.6
Gips	5	1.1
Laser (FiLaC)	22	4.9
Marsupialization	32	7.1
Open technique	97	21.5
Other	17	3.8
Sinotomy	16	3.5
Sinusectomy	34	7.5
Do you change your therapeutic approach according to		
Limited or extensive PD	40	8.8
Number and site of pits	19	4.2
Presentation of PD (e.g. acute abscess)	102	22.6
Two or more of the above	285	63.1
I never change my therapeutic approach	6	1.3
When you plan surgery after acute presentation (abscess), how long would you at least wait for?		
<4 weeks	57	12.6
4–6 weeks	193	42.7
6–8 weeks	107	23.7
>8 weeks	95	21.0
Do you ever perform a closed technique (primary closure)?		
Yes	304	67.3
No	148	32.7

Abbreviations: EPSiT, endoscopic pilonidal sinus treatment; FiLaC, fistula laser closure; PD, pilonidal disease; VAAPS, video-assisted ablation of pilonidal sinus.

TABLE 3 Setting, failure and follow-up.

	n	%
Surgery setting		
Outpatient (walk in, walk out)	99	21.9
Day case	209	46.2
One-day surgery (overnight stay)	122	26.7
More than one night admission	22	4.9
What is your observed recurrence rate?		
<5%	181	40.0
5%–10%	137	30.3
11%–15%	73	16.2
16%–20%	41	9.1
21%–30%	12	2.7
>30%	8	1.8
At what follow-up?		
3 months	51	11.3
6 months	75	16.6
1 year	162	35.8
2 years	57	12.6
3 years	24	5.3
4 years	4	0.9
5 years	18	4.0
>5 years	17	3.8
I do not perform any follow-up	36	7.8
Other	8	1.8
Typically, how long does it take to your patients to achieve 'wellbeing' or full recovery (excluding failures)?		
<1 week	18	4.0
2 weeks	83	18.4
3–4 weeks	164	36.3
1–2 months	125	27.7
>2 months	29	6.4
Do you change your therapeutic approach in case of failure/recurrence after the first treatment?		
Yes	328	72.6
No	124	27.4
Do you employ or have you ever employed any 'advanced dressing'?		
Yes	282	62.4
No	170	37.6
Do you routinely recommend permanent laser epilation after surgery?		
Yes	258	57.1
No	194	42.9
How do you perform follow-up?		
Physical examination (directly)	338	74.8
Physical examination (general practitioner)	11	2.4
Photographs from remote	1	0.2
Telephone interviews	7	1.5
Two or more of the above	95	21.0
Do you think that the use of patient reported outcome measures (PROMs) could be useful in the evaluation of a patient with pilonidal disease?		
Yes	155	34.3
No	297	65.7

TABLE 4 Stepwise regression model of 'Conservative approach' response as the suggested type of elective treatment of pilonidal disease in relation to significant variable answers in 452 respondents.

	Partial regression coefficient	SE	*t*	*p*-value	CL, −95.00%	CL, +95.00%	Partial correlation coefficient (β)	SE β	CL, −95.00%	CL +95.00%
Intercept	0.182	0.061	2.98	0.0029	0.062	0.303				
Age: 41–60 years	0.107	0.044	2.403	0.0166	0.019	0.196	0.115	0.048	0.021	0.209
Setting: private hospital, university hospital	0.373	0.13	2.87	0.0043	0.117	0.629	0.139	0.048	0.044	0.235
Setting: public hospital	0.179	0.058	3.058	0.0023	0.064	0.294	0.188	0.061	0.067	0.310
Setting: university hospital	0.237	0.060	3.924	0.0001	0.118	0.356	0.239	0.060	0.119	0.358
Do you change your therapeutic approach according to: presentation of PD (e.g. acute abscess)	**−0.177**	**0.051**	**−3.442**	**0.0006**	**−0.278**	**−0.076**	**−0.16**	**0.046**	**−0.251**	**−0.068**

Note: Table depicting stepwise regression model of 'conservative approach' response as suggested type of elective treatment for PD in relation to significant variable answers in 452 respondents. Positive and negative associations are reported in normal and bold type, respectively.

Abbreviations: CL, confidence limit; PD, pilonidal disease; SE, standard error.

However, recurrence of disease and the correct choice of surgical technique remain crucial topics in the management of PD. In an Australian survey conducted in 2018 [16], the authors registered 64% of respondents who reported recurrence rates above 5% and 37% surgeons with rates exceeding 10%. Six per cent reported no recurrences at all. Five per cent reported recurrence rates over 20%, but 24% stated that over one-fifth of their practice consisted of recurrent disease. In our survey, none of the respondents registered 'no recurrences', while the vast majority (40%) reported a recurrence rate of less than 5%, 30% had recurrence rates of 5%–10% and 16% of the surgeons acknowledged recurrence rates of 11%–15%. The fact that more than 50% of participants were dedicated colorectal surgeons may partly explain this finding. Given that the Karydakis procedure was the most frequently performed operation in the Australian study, this indicates that the recurrence rate outside of clinical trials and published series may be substantially higher than previously assumed.

Most respondents in our study reported using an open or a closed technique (with a primary closure). Even though recently numerous publications have demonstrated the technical feasibility and favourable short-term results of endoscopic and laser techniques [17], these procedures respectively accounted for just 5.5% and 4.9% of choices in our survey, implying that they have not yet fully entered the surgeon's armamentarium. The endoscopic method has the advantage of treating the tracts under vision in contrast to pit picking or laser treatment. In their mapping review on PD, Kumar et al. claimed the need for trials comparing minimally invasive procedures with standard care [9]. The authors also confirmed and highlighted the absence of clear, front-running surgical interventions for PD and the presence in the literature of a great heterogeneity in the definition, measurements and clinical outcomes, as pointed out in a recent systematic review [17].

Overall, more than 10 different techniques were considered in our survey (Table 2). Interestingly, almost 6% and 1% of surgeons would perform a pit picking technique (Bascom technique) or Gips procedure, respectively, as a first line of treatment. Most studies recommend the use of pit picking and its variations in previously untreated patients with minimal disease. In some case series it is evident that once the learning curve has been accomplished, indications can be also extended to recurrent disease, but reliable long-term results are lacking [18, 19]. One of the substantial advantages could be the low cost of these procedures and the resulting high cost-effectiveness [18].

Notably, procedures requiring intensive postoperative healthcare involvement (e.g. regular dressings or packing) will have significant healthcare staff and consumable costs in addition to societal costs, including time off work, in a young, active working patient population. Increased equipment costs for interventions such as endoscopic pilonidal sinus treatment and laser therapy or consumable costs such as fibrin glue must be also be included in the cost-effectiveness calculations [20].

In our cohort of respondents, 31% would recommend a conservative approach at first presentation of PD. The German guidelines

TABLE 5 Stepwise regression model of 'No change of therapeutic approach' response in case of failure/recurrence after the first treatment in relation to significant variable answers in 452 respondents.

	Partial regression coefficient	SE	*t*	*p*-value	CL, −95.00%	CL, +95.00%	Partial correlation coefficient (β)	SE β	CL, −95.00%	CL, +95.00%
Intercept	0.836	0.242	3.445	0.0006	0.358	1.313				
What type of surgery is your first line treatment for PD: flap	0.184	0.079	2.322	0.0207	0.028	0.340	0.116	0.05	0.017	0.214
What type of surgery is your first line treatment for PD: open technique	0.140	0.056	2.498	0.0129	0.029	0.251	0.129	0.051	0.027	0.231
Do you change your therapeutic approach according to: limited or extensive PD	**−0.458**	**0.103**	**−4.418**	**0.0001**	**−0.662**	**−0.254**	**−0.291**	**0.066**	**−0.421**	**−0.162**
Do you change your therapeutic approach according to: limited or extensive PD, other	**−0.942**	**0.310**	**−3.032**	**0.0025**	**−1.554**	**−0.331**	**−0.140**	**0.046**	**−0.231**	**−0.049**
Do you change your therapeutic approach according to: Number and site of pits	**−0.545**	**0.127**	**−4.289**	**0.0001**	**−0.796**	**−0.295**	**−0.245**	**0.057**	**−0.35**	**−0.132**
Do you change your therapeutic approach according to: number and site of pits, limited or extensive PD	**−0.640**	**0.119**	**−5.361**	**0.0001**	**−0.875**	**−0.405**	**−0.328**	**0.061**	**−0.448**	**−0.207**
Do you change your therapeutic approach according to: presentation of PD (e.g. acute abscess)	**−0.422**	**0.091**	**−4.642**	**0.0001**	**−0.601**	**−0.243**	**−0.395**	**0.085**	**−0.563**	**−0.228**
Do you change your therapeutic approach according to: Presentation of PD (e.g. acute abscess), Limited or extensive PD	**−0.5699**	**0.098**	**−5.815**	**0.0001**	**−0.762**	**−0.377**	**−0.462**	**0.079**	**−0.618**	**−0.305**
Do you change your therapeutic approach according to: presentation of PD (e.g. acute abscess), Number and site of pits	**−0.666**	**0.121**	**−5.509**	**0.0001**	**−0.904**	**−0.428**	**−0.360**	**0.065**	**−0.488**	**−0.231**
Do you change your therapeutic approach according to: Presentation of PD (e.g. acute abscess), number and site of pits, limited or extensive PD	**−0.713**	**0.092**	**−7.732**	**0.0001**	**−0.894**	**−0.531**	**−0.721**	**0.093**	**−0.905**	**−0.538**
Do you change your therapeutic approach according to: presentation of PD (e.g. acute abscess), number and site of pits, limited or extensive PD, other	**−0.803**	**0.331**	**−2.426**	**0.0157**	**−1.454**	**−0.152**	**−0.119**	**0.049**	**−0.216**	**−0.022**
Do you change your therapeutic approach according to: presentation of PD (e.g. acute abscess), other	**−1.061**	**0.478**	**−2.218**	**0.027**	**−2.001**	**−0.120**	**−0.111**	**0.050**	**−0.210**	**−0.012**
What is your observed recurrence rate?: 11%–15%	**−0.152**	**0.063**	**−2.395**	**0.017**	**−0.277**	**−0.027**	**−0.125**	**0.052**	**−0.228**	**−0.022**

Note: Table depicting stepwise regression model of 'No change of therapeutic approach' response in case of failure/recurrence after the first treatment in relation to significant variable answers in 452 respondents. Positive and negative associations are reported in normal and bold type, respectively.

Abbreviations: CL, confidence limit; PD, pilonidal disease; SE, standard error.

TABLE 6 Stepwise regression model of 'Yes' response for the usefulness of patient reported outcome measures in the evaluation of a patient with pilonidal disease in relation to significant variable answers in 452 respondents.

	Partial regression coefficient	SE	*t*	*p*-Value	CL, −95.00%	CL, +95.00%	Partial correlation coefficient (β)	SE β	CL, −95.00%	CL, +95.00%
Intercept	1.034	0.317	3.259	0.0012	0.410	1.659				
Speciality: general surgery	**−0.167**	**0.049**	**−3.354**	**0.0008**	**−0.265**	**−0.069**	**−0.176**	**0.052**	**−0.279**	**−0.072**
What is your observed recurrence rate?: <5%	**−0.131**	**0.059**	**−2.213**	**0.0274**	**−0.248**	**−0.014**	**−0.135**	**0.061**	**−0.256**	**−0.015**
Do you routinely recommend permanent laser epilation after surgery?: No	0.139	0.050	2.742	0.0063	0.039	0.239	0.145	0.05	0.041	0.249
How do you perform follow-up?: physical examination (GP)	**−0.756**	**0.286**	**−2.644**	**0.0085**	**−1.319**	**−0.194**	**−0.245**	**0.092**	**−0.428**	**−0.063**

Note: Table depicting stepwise regression model of 'Yes' response for the usefulness of patient reported outcome measures in the evaluation of a patient with pilonidal disease in relation to significant variable answers in 452 respondents. Positive and negative associations are reported in normal and bold type, respectively.

Abbreviations: CL, confidence limit; GP, general practitioner; SE, standard error.

published in 2021 recommend no treatment in the case of asymptomatic disease. In most patients with pilonidal abscess, incision and drainage is recommended, followed by elective surgery after resolution of the acute inflammation [6].

Despite the slow spread in the use of minimally invasive and off-midline procedures, the open healing technique is still one of the most frequently used methods worldwide. Around 22% of respondents would choose this procedure for surgical treatment of PD. Prolonged wound healing and time out of work, as well as nonnegligible recurrence rates, are the main drawbacks of this approach. The Italian guidelines stated that open healing should be limited to complex cases, since the benefits concerning recurrence are not clear and postoperative recovery may be longer [8].

Interestingly, even if not supported by international recommendations, 29% of respondents preferred a primary closure of the wound after excision. There is a strong consensus against midline wound closure as it correlates to a high incidence of dehiscence and an increased recurrence rate. German guidelines recommend Karydakis or Limberg flaps as off-midline procedures; however, their use instead of open healing is still not advocated [6].

Another relevant consideration regarding PD concerns the category of patients most affected by the disease, i.e. young adults at an age where body image is more important than at other stages of life, when relationships are formed and attendance at study or work is crucial to progression in life. How, if at all, were patients involved in designing these guidelines and their perspectives? In the study by Strong et al. [21] investigating patient decision-making and regret after surgery, the burden of wound care and the disparity between anticipated and actual recovery times were the main reasons for decisional regret.

Long-term healing may not be compatible with a young adult daily life, especially not at the cost of disfiguring scaring, packing or time away from normal activities. According to 36% of our respondents, patients needed 3–4 weeks to recover, 28% of them considered 1–2 months as the recovery time, while 18% of the surgeons considered 2 weeks enough for recovery. Of course, this depends on the technique chosen and the severity of PD at presentation. Attention should be paid to counselling patients, especially regarding the burden of wound care and the risks of recurrence associated with different surgical approaches.

Several studies have demonstrated a lower postoperative recurrence rate with hair removal after complete wound healing, and the superiority of permanent laser compared with razor/cream epilation has been demonstrated in terms of recurrence. More than half (57%) of respondents to our survey would recommend permanent laser epilation after surgery.

Interestingly, in a recent publication about the role of telemedicine in proctology, teleconsultation was deemed appropriate only for the diagnosis and management of PD [22]. Indeed, the study highlighted poor acceptability of telemedicine as first-line assessment

for the majority of proctological disorders except for the diagnosis and management of PD and ostomy patients.

The heterogeneity of the respondents, mainly represented by the different experience and origin of the participants, is the major weakness. Due to dissemination of the questionnaire by social networks, we cannot calculate the response rate, and experienced colorectal surgeons with limited online activity might not have been involved, thus introducing a selection bias. However, the wide range of the respondents with different experiences and origins provides a real picture of the current practice and trends, helping to inform future initiatives for improvement in the light of the best evidence from the literature and guidelines.

In conclusion, our study highlighted several important findings, including the dominance of traditional excision techniques as the most frequently performed operations despite emerging minimally invasive and off-midline procedures. Additionally, we noted that the lack of a universally accepted classification system for PD might contribute to variations in treatment approaches and outcomes. Furthermore, the study shed light on the importance of patient perspectives, particularly in a population of young adults, where considerations of body image, social relationships and work commitments play a significant role in decision-making. We hope that this research will serve as a steppingstone for further investigations and the development of evidence-based guidelines to enhance the management of PD.

AUTHOR CONTRIBUTIONS

Gaetano Gallo: Conceptualization; writing – original draft; methodology; validation; writing – review and editing; project administration; supervision; data curation; formal analysis; visualization; investigation. **Marta Goglia:** Writing – original draft; validation; writing – review and editing. **Asha Senapati:** Supervision; project administration; conceptualization. **Francesco Pata:** Validation; writing – review and editing. **Luigi Basso:** Conceptualization; investigation; supervision; writing – review and editing. **Ugo Grossi:** Conceptualization; investigation; validation; visualization; supervision; writing – review and editing; writing – original draft; project administration.

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CONFLICT OF INTEREST STATEMENT

The authors declare no conflicts of interest.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

ORCID

Francesco Pata https://orcid.org/0000-0003-2634-1199

REFERENCES

1. Bascom J. Pilonidal disease: long-term results of follicle removal. Dis Colon Rectum. 1983;26(12):800–7.
2. Lord PH, Millar DM. Pilonidal sinus: a simple treatment. Br J Surg. 1965;52:298–300.
3. Bascom J. Pilonidal disease: origin from follicles of hairs and results of follicle removal as treatment. Surgery. 1980;87(5):567–72.
4. Gips M, Melki Y, Salem L, Weil R, Sulkes J. Minimal surgery for pilonidal disease using trephines: description of a new technique and long-term outcomes in 1,358 patients. Dis Colon Rectum. 2008;51(11):1656–62. discussion 1662–1663.
5. Johnson EK, Vogel JD, Cowan ML, Feingold DL, Steele SR, Clinical Practice Guidelines Committee of the American Society of Colon and Rectal Surgeons. The American Society of Colon and Rectal Surgeons' clinical practice guidelines for the management of pilonidal disease. Dis Colon Rectum. 2019;62(2):146–57.
6. Iesalnieks I, Ommer A, Herold A, Doll D. German national guideline on the management of pilonidal disease: update 2020. Langenbeck's Arch Surg. 2021;406(8):2569–80.
7. Iesalnieks I, Ommer A, Petersen S, Doll D, Herold A. German national guideline on the management of pilonidal disease. Langenbeck's Arch Surg. 2016;401(5):599–609.
8. Milone M, Basso L, Manigrasso M, Pietroletti R, Bondurri A, la Torre M, et al. Consensus statement of the Italian Society of Colorectal Surgery (SICCR): management and treatment of pilonidal disease. Tech Coloproctol. 2021;25(12):1269–80.
9. Kumar M, Clay WH, Lee MJ, Brown SR, Hind D. A mapping review of sacrococcygeal pilonidal sinus disease. Tech Coloproctol. 2021;25(6):675–82.
10. Huurman EA, Galema HA, de Raaff C, Toorenvliet B, Smeenk R. Assessment of surgical strategies for pilonidal sinus disease in The Netherlands. Cureus. 2022;14(5):e25050.
11. Eysenbach G. Improving the quality of web surveys: the checklist for reporting results of internet E-surveys (CHERRIES). J Med Internet Res. 2004;6(3):e34.
12. Cohen A. Dummy variables in stepwise regression. Am Stat. 1991;45(3):226–8.
13. Micarelli A, Granito I, Carlino P, Micarelli B, Alessandrini M. Self-perceived general and ear-nose-throat symptoms related to the COVID-19 outbreak: a survey study during quarantine in Italy. J Int Med Res. 2020;48(10):300060520961276.
14. Beal EM, Lee MJ, Hind D, Wysocki AP, Yang F, Brown SR. A systematic review of classification systems for pilonidal sinus. Tech Coloproctol. 2019;23(5):435–43.
15. Irkorucu O, Erdem H, Reyhan E. The best therapy for pilonidal disease: which management for which type? World J Surg. 2012;36(3):691–2.
16. Burnett D, Smith SR, Young CJ. The surgical management of pilonidal disease is uncertain because of high recurrence rates. Cureus. 2018;10(5):e2625.
17. Milone M, Gallo G, Grossi U, Pelizzo P, D'Amore A, Manigrasso M, et al. Endoscopic sinusectomy: 'a rose by any other name'. A systematic review of different endoscopic procedures to treat pilonidal disease. Color Dis. 2023;25(2):177–90.
18. Basso L, Pietroletti R, Micarelli A, Bicaj A, Costi U, Crocetti D, et al. The impact of experience on recurrence rates after biopsy punch excision for pilonidal disease. Color Dis. 2022;24(8):984–91.
19. Di Castro A, Guerra F, Sandri GB, Ettorre GM. Minimally invasive surgery for the treatment of pilonidal disease. The Gips procedure on 2347 patients. Int J Surg. 2016;36(Pt A):201–5.
20. Brown SR, Lund JN. The evidence base for pilonidal sinus surgery is the pits. Tech Coloproctol. 2019;23(12):1173–5.

21. Strong E, Callaghan T, Beal E, Moffatt C, Wickramasekera N, Brown S, et al. Patient decision-making and regret in pilonidal sinus surgery: a mixed-methods study. Color Dis. 2021;23(6):1487–98.
22. Gallo G, Grossi U, Sturiale A, di Tanna GL, Picciariello A, Pillon S, et al. E-consensus on telemedicine in proctology: a RAND/UCLA-modified study. Surgery. 2021;170(2):405–11.

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SUPPORTING INFORMATION

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