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Comparative Assessment of Laser Destruction in Combination with Pit-Picking and Excision with Bascom II Flap Reconstruction in the Treatment of Pilonidal Sinus: Preliminary Results of a Multicenter Randomized Study

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Aim: to assess the interim results of a prospective multicenter randomized study comparing laser destruction in combination with pit-picking and excision with Bascom II flap reconstruction in the treatment of pilonidal sinus.
Materials and methods. Patient recruitment was conducted from November 2022 to April 2024. The study included 62 patients (31 patients in each group): the first group underwent surgical excision of pilonidal cyst with Bascom II flap reconstruction, while the second group underwent laser destruction (LD) in combination with pit-picking. An interim analysis of the results was performed after half of the sample size was reached. The primary endpoint of the study was incidence of disease recurrence after surgical treatment. Secondary endpoints were: the severity of pain on days 1, 3, 5, 7, 10, 14, and 21 of the postoperative period; the quality of life of patients before surgery and 1, 3, and 6 months after surgery according to the SF-12 questionnaire (The 12-Item Short Form Survey); the frequency and nature of intraoperative complications; the frequency and nature of postoperative complications; complete postoperative wound healing, defined as full epithelialization and scar formation.
Results. Both groups were comparable in terms of gender, age, and body mass index. Surgery duration and blood loss were statistically significantly lower in the LD + pit-picking group ($p < 0.001$). The number of postoperative bed days was statistically significantly higher in the Bascom II group ($p < 0.01$). The visual analogue scale scores were statistically significantly higher in the Bascom II group on days 1–10 after surgery ($p < 0.05$). Postoperative wound healing with complete epithelialization occurred statistically significantly faster in the Bascom II group compared to the LD + pit-picking group — in 24 (16–33) and 35 (28–45) days, respectively ($p = 0.002$). The number of visits was statistically significantly lower in the Bascom II group ($p < 0.001$). Patients returned to daily physical activity after 14 (11–16) and 4 (3–4) days in the Bascom II and LD + pit-picking groups, respectively ($p < 0.001$). According to SF-12, one month after surgery, the LD + pit-picking group showed better results in physical and mental health indicators ($p < 0.001$). Six months after surgery, the Bascom II group showed better results in both indicators ($p < 0.001$). The recurrence rate requiring repeat surgery was higher in the LD + pit-picking group — 0 vs. 5 (16.1 %) cases in the Bascom II group ($p = 0.053$).
Conclusions. Laser destruction combined with pit-picking demonstrates advantages in the form of a lower rate of early postoperative complications and faster recovery of physical activity in patients. However, this method is associated with prolonged outpatient follow-up and a higher recurrence rate compared to the Bascom II flap reconstruction.
Keywords: epithelial coccygeal passage, pilonidal cyst, Bascom procedure, SiLaC
Conflict of interest: the authors declare no conflicts of interest.

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Сравнительная оценка лазерной деструкции в комбинации с pit-picking и иссечения с пластикой по Bascom II в лечении эпителиального копчикового хода: предварительные результаты мультицентрового рандомизированного исследования

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Цель исследования: оценить промежуточные результаты проспективного многоцентрового рандомизированного исследования сравнительной оценки лазерной деструкции в комбинации с pit-picking и иссечения с пластикой по Bascom II в лечении эпителиального копчикового хода.
Материалы и методы. Набор пациентов проводился с ноября 2022 г. по апрель 2024 г. Исследование включало 62 пациента (по 31 пациенту в каждой группе): первая группа была оперирована в объеме иссечения пилонидальной кисты с пластикой по Bascom II, во второй группе была выполнена лазерная деструкция (ЛД) в комбинации с pit-picking. При достижении половины выборки принято решение провести промежуточный анализ результатов. Первичная конечная точка исследования — частота рецидивов заболевания после оперативного лечения. Вторичными конечными точками исследования являются: выраженность болевого синдрома на 1, 3, 5, 7, 10, 14 и 21-е сутки послеоперационного периода; качество жизни больных до операции и спустя 1, 3 и 6 месяцев после операции согласно опроснику SF-12 (The 12-item Short Form Survey); частота и характер интраоперационных осложнений; частота характер послеоперационных осложнений; заживление послеоперационной раны с ее полной эпителизацией, формированием рубца.
Результаты. Обе группы были сопоставимы по полу, возрасту, индексу массы тела. Продолжительность операции и объем кровопотери были статистически значимо меньше в группе ЛД + pit-picking ($p < 0,001$). Число послеоперационных койко-дней было статистически значимо выше в группе Bascom II ($p < 0,01$). Баллы по визуально-аналоговой шкале оказались статистически значимо выше в группе Bascom II на 1–10-е сутки после операции ($p < 0,05$). Заживление послеоперационной раны с полной эпителизацией произошло статистически значимо быстрее в группе Bascom II по сравнению с группой ЛД + pit-picking — через 24 (16–33) и 35 (28–45) дней соответственно ($p = 0,002$). Количество визитов было статистически значимо меньше в группе Bascom II ($p < 0,001$). Возвращение пациентов к ежедневной физической активности в группах Bascom II и ЛД + pit-picking произошло через 14 (11–16) и 4 (3–4) дня соответственно ($p < 0,001$). Согласно SF-12 через месяц после операции группа ЛД + pit-picking показала лучшие результаты по физическим и ментальным показателям ($p < 0,001$). Спустя 6 месяцев после операции уже в группе Bascom II были зарегистрированы лучшие результаты по обоим показателям ($p < 0,001$). Рецидив заболевания, потребовавший повторного оперативного вмешательства, оказался выше в группе ЛД + pit-picking: 0 vs 5 случаев (16,1%), $p = 0,053$.
Выводы. Лазерная деструкция в комбинации с pit-picking демонстрирует преимущества в виде меньшей частоты ранних послеоперационных осложнений и более быстрого восстановления физической активности пациентов. Однако данный метод ассоциирован с пролонгированным амбулаторным наблюдением и более высокой частотой рецидивов по сравнению с техникой Bascom II.
Ключевые слова: эпителиальный копчиковый ход, пилонидальная киста, операция Bascom, SiLaC
Конфликт интересов: авторы заявляют об отсутствии конфликта интересов.

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Introduction

Pilonidal sinus disease (pilonidal cyst) is a common condition in coloproctology, predominantly affecting young individuals. However, there is currently no universally accepted standard for surgical treatment. Treatment methods range from wide excision of the affected tissue with various options for wound closure in the sacrococcygeal region to minimally invasive techniques. While the Limberg flap repair is considered the gold standard in the East, the West prefers a less invasive excisional method — wound closure using a subcutaneous adipose tissue flap with lateralization of the intergluteal cleft. This technique is characterized by a low complication

rate and a recurrence rate not exceeding 10 % within 60 months after surgery [1–4].

Indeed, the Bascom II operation (the Bascom cleft lift procedure), first described as early as 1987, does not require extensive tissue mobilization. It can be used both for primary pilonidal disease and for disease recurrence, featuring a low complication rate of up to 14 % and a recurrence rate of up to 8 % compared to midline closure [5–7]. Furthermore, an advantage of this technique is the minimal deformation of the gluteal region, resulting in favorable cosmetic outcomes compared to the Limberg flap procedure [8].

Minimally invasive techniques are currently gaining increasing popularity, among which laser treatment for pilonidal disease (PD) stands out. The SiLaC (sinus laser closure) procedure offers the following advantages: minimal postoperative pain and a rapid return to daily physical activity. The recurrence rate with this treatment method ranges from 10.2 to 26 % [4, 9]. According to retrospective single-center publications, combining laser destruction of the pilonidal sinus with the pit-picking procedure (local excision) may reduce the disease recurrence rate to 3–8 % [10–12].

Currently, literature lacks publications dedicated to the immediate results of a direct comparison between the Bascom II procedure and laser destruction combined with pit-picking in the treatment of sacrococcygeal pilonidal sinus. Both methods have their advantages and disadvantages, and each is acceptable for use in treating pilonidal disease.

The aim of this study is to compare their efficacy. The interim analysis presented in this work allows for an assessment of the preliminary results of the ongoing study.

Materials and methods

Patient recruitment took place from November 2022 to April 2024. The study was approved by the local ethics committee of the I.M. Sechenov First Moscow State Medical University (Sechenov University) in accordance with extract No. 10–22 dated October 23, 2022. When half of the sample, which included 62 patients, was reached, it was decided to conduct preliminary analysis of the treatment results obtained to assess possible negative consequences or identify a clear advantage of one of the methods used at this stage, which would be a reason to stop the study.

The study is being conducted at the following participating centers: University Clinical Hospital No. 2, Clinic of Coloproctology and Minimally Invasive Surgery of the I.M. Sechenov First Moscow State Medical University (Moscow); Regional Clinical Hospital (Krasnoyarsk); Pyataya Tochka Medical Center (Artem); Global Clinic Medical Center (Nizhny Novgorod).

Inclusion criteria:

1. The distance between the closest primary pits should be at least 1 cm to preserve the skin bridge after local excision in cases randomized to laser treatment.

2. The secondary pits should be located no more than 3 cm from the intergluteal cleft.

3. The length of the cavity in its greatest dimension, according to the ultrasound examination of the soft tissues of the sacrococcygeal region, should not exceed 10 cm.

4. The diameter of the cavity (width) at its largest measurement, according to the ultrasound examination of the soft tissues of the sacrococcygeal region, should not exceed 3 cm.

Patients who were lost to follow-up, who refused to participate in the study, and patients who could not undergo the planned surgery were excluded from the study.

All patients underwent an ultrasound examination of the sacrococcygeal region prior to surgery. All patients signed written informed consent and were able to withdraw from the study at any time, for any reason.

Patients were randomized in a 1:1 ratio using a computer-generated allocation sequence concealed from the investigators until enrollment.

After obtaining informed consent, patients were assigned a unique identification number. An independent statistician prepared the envelopes in advance, each containing information about group distribution.

All stages of the study complied with Russian legislation, international ethical standards, and the research organization's regulatory documents.

The primary endpoint of the study was the incidence of disease recurrence after surgical treatment.

Secondary endpoints:

1. Severity of pain syndrome on postoperative days 1, 3, 5, 7, 10, 14, and 21.

2. Patient quality of life before surgery and at 1, 3, and 6 months after surgery, evaluated using the SF-12 questionnaire.

3. Incidence and type of intraoperative complications.

4. Incidence and type of postoperative complications.

5. Complete epithelialization and scar formation of the postoperative wound.

Surgical techniques

If a patient presented to the clinic with an abscess, initial management consisted of abscess incision and drainage. This was followed by wound dressings with water-soluble ointments containing

antibacterial components for 1–2 weeks until the purulent process was resolved. The definitive surgery was performed after 2–3 weeks, with the operative intervention not exceeding 1 month from the completion of the initial sanitation measures. The procedure was performed while the patient was lying face down under local or spinal anesthesia.

The Bascom II procedure was performed according to the standardized technique described by J.U. Bascom in 1987 [5]. Following the injection of a brilliant green solution with 3 % hydrogen peroxide (2 mL) into the primary pits, a skin incision encompassing the primary and/or secondary pits was made, lateralized 2 cm away from the intergluteal cleft. Subsequently, a bloc excision of the skin, subcutaneous fat, and the pilonidal cyst was performed. A flap consisting of skin and subcutaneous adipose tissue was raised on the side contralateral to the planned excision, with a thickness of at least 7 mm. A 10 Fr drain was placed into the wound through a counter-incision in the superior corner of the wound. The wound was closed in two layers: the first layer involved approximating the subcutaneous adipose tissue with interrupted sutures that incorporated the wound bed; the second layer involved suturing the remaining subcutaneous adipose tissue up to the skin level (using Polysorb 2/0 suture). The skin was closed with Donati sutures (using Vicryl 2/0 suture). A drainage system with a 100 mL corrugated reservoir for active suction was connected to the drain (Fig. 1).

During the LD + pit-picking procedure, the initial step involved similar cavity staining. Then, using a dermatological punch with a diameter of 0.8–1.0 cm, the surgeon excised the primary and secondary pits. Following this, curettage of the cavity was performed using a Volkmann spoon. For laser destruction, the FiberLaseS radial diode laser with a wavelength of 1.56 um, power of 10 W, and continuous mode was used. Starting from the most distally located primary pit, the fiber was advanced through the entire cavity and then withdrawn at a speed of approximately 1 mm per second. The fiber was re-passed through secondary pits when present. The total energy delivered directly depended on the cavity size, approximately 400–1000 J. After laser treatment, the wound was additionally irrigated with a 0.5 % aqueous chlorhexidine solution. A dressing with an antiseptic is applied to the wound (Fig. 2).

In the Bascom II group, the drain was not removed until the daily output was less than 5 mL. Patients who underwent the LD + pit-picking procedure were discharged from the hospital on the first postoperative day. In the Bascom II group, patients were discharged after drain removal and a follow-up ultrasound. Follow-up visits for both groups were conducted once a week until complete healing, and then at 3, 6, and 12 months postoperatively.

The following data were analyzed during the study: demographic indicators – age, gender of patients, BMI; presence of concomitant follicular occlusion syndrome (FOS) in patients; Intraoperative data: duration of surgery, blood loss; postoperative indicators: pain intensity on a visual analog scale (VAS), frequency of complications, time to return to daily physical activity, postoperative wound healing, frequency of recurrence after surgery. Physical and mental health were also assessed using the SF-12 questionnaire during the preoperative preparation stage and 1, 3, and 6 months after surgery.

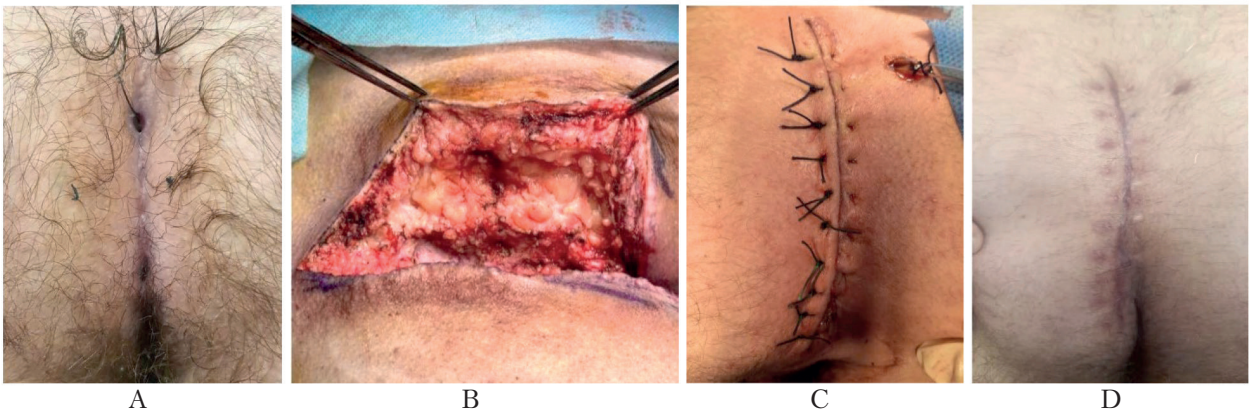

Figure 1. Bascom II flap reconstruction (clinical case No. 1): A – before surgery; B – mobilized skin-fat flap after excision of pilonidal cyst; C – application of Donati sutures to the skin; D – in 21 days after surgery

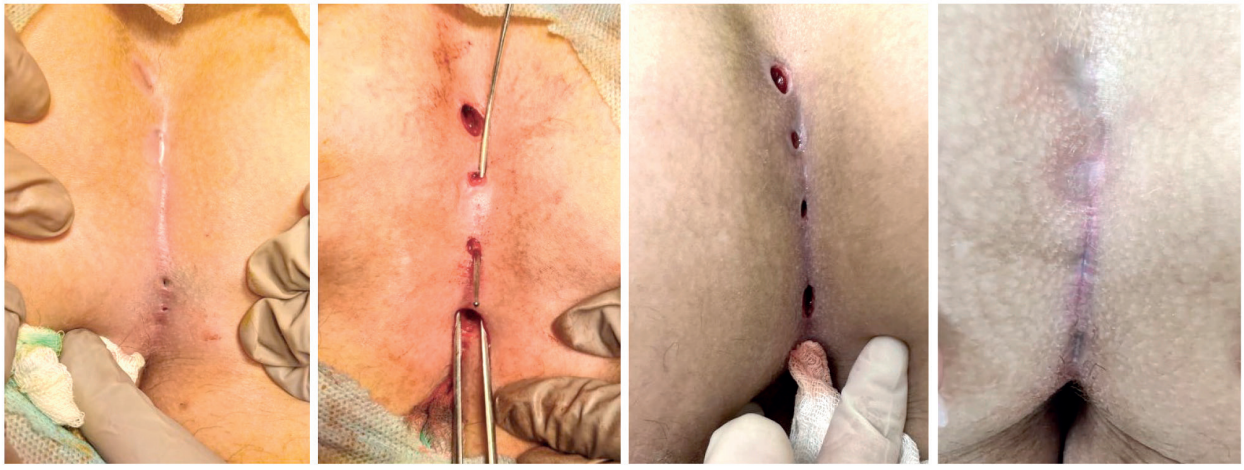

Figure 2. Laser destruction + pit-picking (clinical example No. 2): A — before surgery; B — probing of primary and secondary sinus openings; C — 10 days after surgery; D — 28 days after surgery

Statistical analysis

The sample size was calculated using a calculator https://www.sealedenvelope.com/power/binary-superiority [13].

To ensure sufficient statistical power, a preliminary calculation of the sample size was performed. During the study, it was determined that 62 patients in each group would allow a 13.5 % difference in disease recurrence to be detected with 80 % power and a 5 % confidence level. This determination was made considering that the disease recurrence reaches 15 % after laser destruction [14] and 1,5 % after Bascom II [4] based on the literature date. Patients who met the criteria were divided into two groups: Bascom II and LD + pit-picking. Surgical treatment was performed in an inpatient setting.

The statistical analysis was conducted using IBM SPSS Statistics for Windows, version 26.0 (IBM Corp., Armonk, NY). The Shapiro — Wilk test was employed to assess the normality of the distribution. Categorical variables were compared using Fisher's exact test. The quantitative data were analyzed using Student's *t*-test for two independent normally distributed variables and Mann — Whitney *U* test for two independent variables with abnormal distribution. The following descriptive statistics were employed to characterize the data: mean ± standard deviation (SD), median (Q1—Q3), and percentages (%), when applicable. A *p*-value of less than 0.05 was considered to be statistically significant.

Results

From November 2022 to April 2024, 87 patients diagnosed with pilonidal sinus disease were hospitalized for surgical treatment and screened for the inclusion criteria. Of these patients, 62 were included in the final analysis (Fig. 3). Two patients were lost to follow-up.

The average age of patients was 28 (24—34) years. Among them, there were 48 (77.4 %) men and 14 (22.6 %) women. Both groups were comparable in terms of gender, age, and BMI ($p > 0.05$). Concomitant follicular occlusion syndrome was observed in 5 (16.1 %) cases in the Bascom II group and in 4 (12.9 %) cases in the LD + pit-picking group ($p = 1.0$). Demographic indicators and intraoperative data are presented in Table 1.

When analyzing intraoperative data between the Bascom II and LD + pit-picking groups, statistically significant differences were found in the duration of surgery (50 (25—70) vs. 15 (10—40) minutes, respectively) and blood loss (5 (2—10) vs. 2 (1—5) mL, respectively) ($p < 0.001$). No intraoperative complications were recorded.

Postoperative data

The postoperative length of hospital stay was statistically significantly longer in the Bascom II group compared to the LD + pit-picking group 7 (5—10) vs. 1 (1—1) day ($p < 0.01$). Complications were more common in the Bascom II group than in the LD + pit-picking group, 10 (32.3 %) vs. 3 (9.7 %). The differences were not statistically significant ($p = 0.059$), although they tended

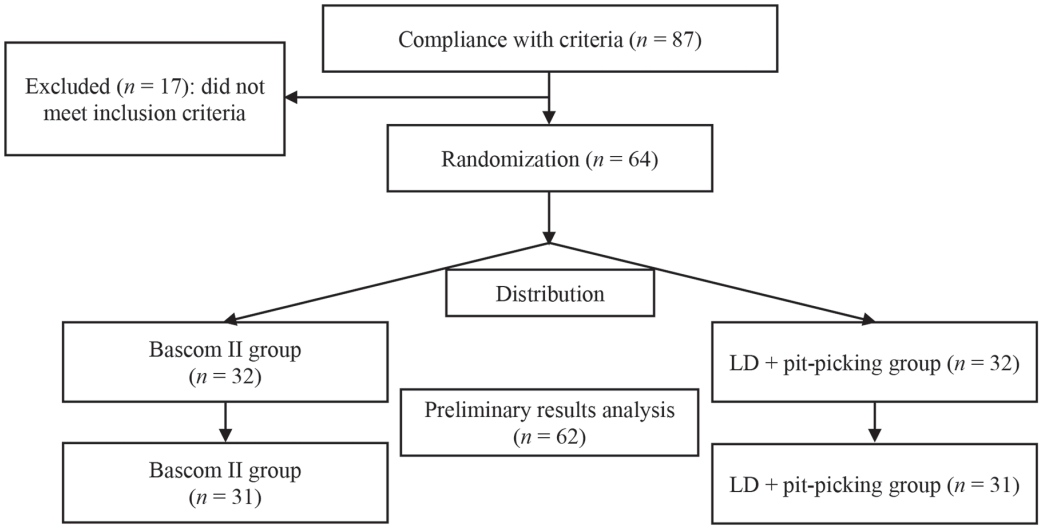

Figure 3. Study design. LD — laser destruction

Table 1. Demographic and intraoperative indicators

Indicators	Bascom II (*n* = 31)	LD + pit-picking (*n* = 31)	*p*
Age, years, Me (Q3–Q5)	27 (22–31)	31 (26–35)	0.092[a]
Sex, *n* (%)			0.762[b]
male	25 (80.6 %)	23 (74.2 %)	
female	6 (19.4 %)	8 (25.8 %)	
Body mass index, kg/m^2	26.6 ± 4.8	25.6 ± 4.7	0.432[c]
Follicular occlusion syndrome	5 (16.1 %)	4 (12.9 %)	1.0
Surgery time, min	50 (25–70)	15 (10–40)	< 0.001[a]
Blood loss volume, mL	5 (2–10)	2 (1–5)	< 0.001[a]

Note: *LD — laser destruction; the values highlighted in bold indicate statistical significance ($p < 0.05$); [a] — Mann — Whitney U-test; [b] — Fisher's exact test; [c] — Student's t-test.*

toward borderline values. The main type of complication in the Bascom II group was wound edge separation ($n = 6$). All 3 (9.7 %) cases of complications in the LD + pit-picking group were associated with hematoma formation (Table 2).

VAS scores were significantly higher in the Bascom II group during the first ten days after surgery (Fig. 4). Postoperative wound healing with complete epithelialization occurred significantly faster in the Bascom II group than in the LD + pit-picking group: 24 (16–33) days vs. 35 (28–45) days, respectively ($p = 0.002$). However, patients in the LD + pit-picking group returned to daily physical activity faster ($p < 0.001$). The number of visits after surgery was statistically significantly higher in the LD + pit-picking group ($p < 0.001$).

In terms of disease recurrence requiring reoperation, a trend toward statistical significance was observed in the LD + pit-picking group compared to the Bascom II group: 0 vs. 5 (16.1 %) cases ($p = 0.053$). The mean time to recurrence was 4.6 ± 0.8 months.

According to the SF-12 questionnaire, one month after surgery, the LD + pit-picking group showed better results in physical and mental indicators ($p < 0.001$). In contrast, six months after surgery, the Bascom II group showed better results on both indicators ($p < 0.001$). The SF-12 questionnaire data in dynamics by group are presented in Table 3. The Bascom II group showed statistically significant improvements in physical and mental health indicators 1, 3, and 6 months after surgical treatment ($p < 0.001$).

Table 2. Postoperative indicators

Indicators	Bascom II (n = 31)	LD + pit-picking (n = 31)	p
Length of hospitalization, bed days	7 (5–10)	1 (1–1)	<0.01[a]
Complications, n (%)	10 (32.3 %)	3 (9.7 %)	0.059[b]
hematoma	1 (3.2 %)	3 (9.7 %)	0.612[b]
seroma	2 (6.4 %)	–	–
wound edge separation	5 (19.2 %)	–	–
surgical site infection	1 (3.2 %)	–	–
Visual analogue scale, scores			
day 1	3 (2–4)	1 (1–2)	<0.001[a]
day 3	2 (0.5–3)	1 (0–1)	0.006[a]
day 5	1 (0–2)	0 (0–1)	0.042[a]
day 7	0 (0–2)	0 (0–0.5)	0.083
day 10	0 (0–1)	0 (0–0)	0.047[a]
day 14	0 (0–0)	0 (0–0)	0.079
day 21	0 (0–0)	0 (0–0)	1.000
Wound healing, days	24 (16–33)	35 (28–45)	0.002[a]
Number of visits, n	4 (3–5)	7 (7–8)	<0.001[a]
Return to daily physical activity, days	14 (11–16)	4 (3–4)	<0.001[a]
SF-12 before surgery, scores			
physical health	46.7 (44.0–48.3)	43.7 (40.1–48.2)	0.137[a]
mental health	46.2 (43.3–48.0)	45.4 (40.2–48.3)	0.607[a]
SF-12 1 month after surgery, scores			
physical health	41.3 (41.0–41.9)	44.8 (44.3–45.3)	<0.001[a]
mental health	42.0 (41.7–42.2)	44.8 (44.4–45.2)	
SF-12 3 months after surgery, scores			
physical health	45.6 (44.8–46.2)	45.5 (44.9–46.1)	1.000[a]
mental health	45.4 (44.9–46.1)	45.5 (45.1–46.0)	0.905[a]
SF-12 6 months after surgery, scores			
physical health	46.0 (45.8–46.2)	43.9 (43.7–44.1)	<0.001[a]
mental health	46.0 (45.8–46.2)	43.8 (43.7–44.0)	
Recurrence, n (%)	0	5 (16.1 %)	0.053[b]
Average follow-up period, months, M ± SD	13.0 ± 8.0	15.6 ± 5.3	0.178[a]
Time to recurrence, months, M ± SD	–	4.6 ± 0.8	–

Note: *LD — laser destruction; SF-12 — The 12-item Short Form Survey; M — mean; SD — standard deviation; the values highlighted in bold indicate statistical significance ($p < 0.05$); [a] – Mann — Whitney U-test; b — Fisher's exact test.*

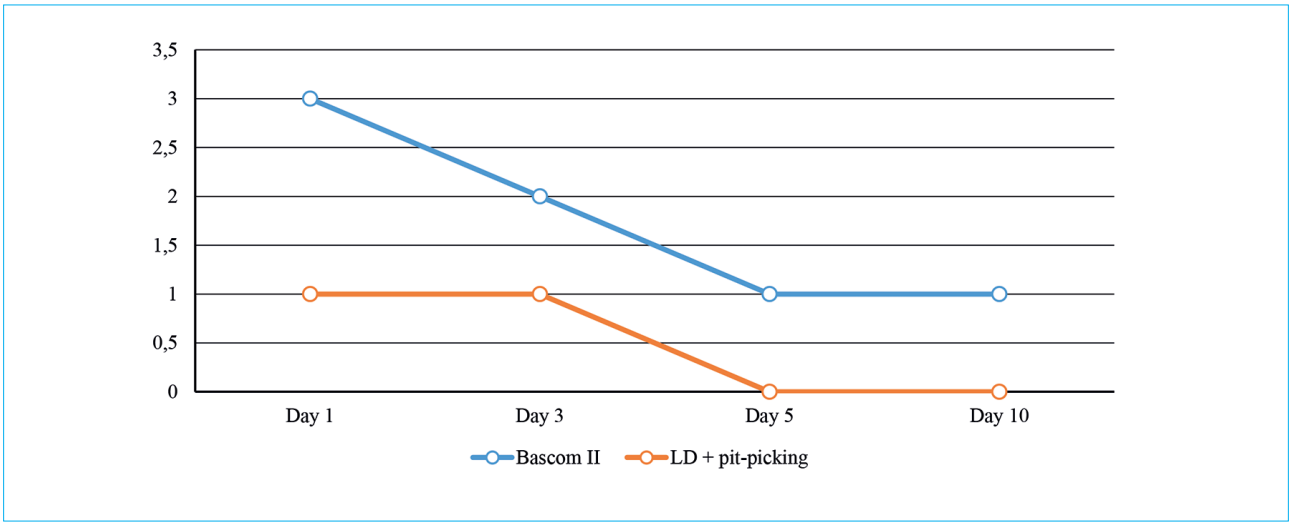

Figure 4. Visual analogue scale scores in the studied groups on days 1–10 of the postoperative period. LD — laser destruction

Table 3. Results of the SF-12 questionnaire over time by group

Groups	Indicators	Stages of observation				*p*
		before surgery	in 1 month	in 3 months	in 6 months	
Bascom II (n = 31)	SFpcs	46.7 (44.0–48.3)	41.3 (41.0–41.9)	45.6 (44.8–46.2)	46.0 (45.8–46.2)	$p < 0.001$ $p_{before-1} < 0.001^a$ $p_{1-3} < 0.001^a$ $p_{1-6} < 0.001^a$
	SFmcs	46.2 (43.3–48.0)	42.0 (41.7–42.2)	45.4 (44.9–46.1)	46.0 (45.8–46.2)	$p < 0.001$ $p_{before-1} < 0.001^a$ $p_{1-3} < 0.001^a$ $p_{1-6} < 0.001^a$
LD + pit-picking (n = 31)	SFpcs	43.7 (40.1–48.2)	44.8 (44.3–45.3)	45.5 (44.9–46.1)	43.9 (43.7–44.1)	$p < 0.001$ $p_{1-6} < 0.001^a$ $p_{before-3} = 0.026^a$ $p_{3-6} < 0.001^a$
	SFmcs	45.4 (40.2–48.3)	44.8 (44.4–45.2)	45.5 (45.1–46.0)	43.8 (43.7–44.0)	$p < 0.001$ $p_{1-6} < 0.001^a$ $p_{before-6} < 0.001^a$ $p_{3-6} < 0.001^a$

Note: *SF-12 — The 12-item Short Form Survey; SFpcs — SF-12 physical component summary; SFmcs — SF-12 mental component summary; LD — laser destruction;* [a] *– Friedman test.*

In the LD + pit-picking group, patients also reported improvements in physical and mental health indicators 6 months after treatment ($p < 0.001$). The average follow-up time was 13.0 ± 8.0 months in the Bascom II group and 15.6 ± 5.3 months in the LD + pit-picking group ($p = 0.178$).

Discussion

Currently, there is no generally accepted gold standard for the treatment of patients with pilonidal cysts in clinical practice. Traditional surgical methods, such as excision with open wound management, marsupialization, and primary midline closure, have historically formed the basis of surgical strategy and continue to do so today. Of these procedures, excision of pilonidal cysts with lateralization of the intergluteal cleft is the least traumatic and produces the most satisfactory results. According to the literature, the frequency of complications when using this approach does not exceed 14 %, and the probability of recurrence is less than 10 % [5–7]. However, these methods are associated with prolonged postoperative wound healing and significant limitations in patients' daily activities.

Over the past decade, minimally invasive surgical techniques have become increasingly popular. Using laser technology to treat pilonidal sinus disease has several advantages over traditional excisional surgery, including an earlier return to physical activity, less pain during the early postoperative period, and fewer postoperative complications. However, this treatment method requires careful wound care during the postoperative period, which involves the patient's doctor or trained relatives. The relatively high recurrence rate is a key factor limiting the use of this method, as it does not allow for its recommendation as routine practice for all patients with this condition.From 2022 to 2023, European researchers published papers presenting the outcomes of treating patients with classic SiLaC technology. M. Dessily et al. reported that the healing rate and average healing time were 94 % and 19.5 ± 14.4 days, respectively. The recurrence rate was 15.2 %, comparable to our results, with an average time to recurrence of 193 ± 87 days [15]. In a multicenter study published by T. Sluckin et al., the overall success rate (wound healing and no recurrence) after the first laser destruction procedure was reported to be 66.2 %. Results comparable to ours in terms of the recurrence rate (LD + pit-picking group) after one SiLaC procedure were 26 %. Additionally, 7.4 % of patients experienced incomplete wound healing.

After the second and third procedures, the success rate increased to 98 % [9].

In a 2021 systematic review by I. Romic et al., 87 studies involving 971 patients undergoing laser treatment for pilonidal cysts were analyzed. The average procedure duration was 26 (6–65) minutes. The weighted average complication rate was 10 %, comparable to the results of our study. At a median follow-up period of 12 (7–25) months, primary healing was achieved in 917 (94.4 %) patients, and the weighted mean recurrence rate was 3.8 %. The authors note that the retrospective nature of the studies and the short follow-up period preclude an adequate meta-regression analysis [15].

Studies comparing the traditional Limberg and Karydakis flaps with the SiLaC technique produced results that did not align with our interim analysis findings. Contradictions with our data lie in the fact that the SiLaC method demonstrates results comparable to those of Limberg's plastic surgery in terms of postoperative wound healing, recurrence rate (8.3 vs. 4.3 %, respectively), and number of complications (20.83 vs. 12.8 %, respectively). Furthermore, the second study also found no statistically significant differences in complication and recurrence rates, which were observed only in the Karydakis flap group (6.3 vs. 3.2 %, respectively). The advantages of the SiLaC technique, consistent with our findings, included shorter operation time, reduced postoperative length of hospital stay, lower VAS pain scores, and an earlier return to daily physical activity [16, 17].

The surgical marsupialization of sinuses (pit-picking), described by M. Gips in 2008, is rarely used today as a standalone procedure despite its technical simplicity, as it requires careful patient selection [18]. I. Iesalnieks et al. analyzed a cohort of 157 patients who underwent pit-picking surgery alone between 2007 and 2010, finding a disease recurrence rate of 17 % within 7 months [11]. However, combining this method with laser ablation demonstrates high clinical efficacy and improved long-term outcomes. For instance, a 2023 retrospective study by N. Horesh et al. found a statistically significant difference in recurrence rates between patients who underwent trephine punch excision (n = 130) and those who underwent the same procedure combined with laser ablation ($p < 0.001$). Furthermore, logistic regression analysis confirmed that the addition of laser was significantly associated with a lower risk of recurrence (odds ratio — 0.23) [12].

In a Turkish study published in 2020, V.H. Yardimci compared patients with uncomplicated pilonidal sinus disease (with a median follow-up of 25 months) who underwent either the Karydakis flap procedure (n = 28) or pit excision combined with sinus tract laser ablation (n = 30) using a 1,470 nm diode laser. Similar to our results, the pit excision combined with sinus tract laser ablation group experienced shorter surgery duration (15.1 vs. 36.4 min), less severe postoperative pain (mean VAS score of 2.1 vs. 4.4), and an earlier return to daily physical activity (2.6 vs. 12.8 days) compared to the Karydakis flap group. However, the recurrence rates were comparable between the two methods (3.3 % in the PE + LAT group and 3.6 % in the Karydakis flap group), which differs from the data obtained in our study [10].

The results of our study are consistent with literature data regarding the duration of surgery, postoperative bed days, frequency of complications, level of postoperative pain, and return to daily physical activity. The main difference in our study is the high recurrence rate (16.1 %) in the LD + pit-picking group. Additionally, a negative consequence was recorded for the first time in the laser destruction group: the need for longer medical observation and wound care. This is in contrast to the group that underwent Bascom II plastic surgery (7 vs. 4; $p < 0.001$). These findings are consistent with the SF-12 questionnaire results: the LD + pit-picking group showed statistically higher scores (in both physical and psychological components) in the early postoperative period (1 month). However, during long-term follow-up (6 months), a significant advantage in these parameters was observed in the Bascom II group. Although we found no significant difference in recurrence rates, a trend towards statistical significance was noted, indicating the need for further research to verify these data.

Conclusions

Laser ablation combined with pit-picking for pilonidal sinus disease demonstrates advantages in terms of a lower incidence of early postoperative complications and a faster recovery of patients' physical activity. However, this method is associated with prolonged outpatient care and a higher recurrence rate compared to the Bascom II technique. Further investigation of this technique in large-scale prospective randomized studies is warranted to substantiate the use of either method in the treatment of pilonidal disease.

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