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RESEARCH ARTICLE

Pit-Picking with Laser Treatment Versus Pit-Picking Alone in Pilonidal Disease: Retrospective Mid-Term Results

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ABSTRACT

Aim: This study aimed to compare the 36-month recurrence rates between pit-picking alone and pit-picking with laser treatment (LT) in the management of pilonidal disease (PD).

Method: Patients with Tezel type 3, 4, and V PD who underwent pit-picking were included in the study. All the patients underwent pit-picking; LT was added for those willing to receive the treatment. Follow-up evaluations were conducted through outpatient visits on postoperative days 3 and 10 and at 1, 6, and 12 months. Recurrence was monitored through telephone calls at 24 and 36 months. The primary outcome measure was recurrence at 36 months.

Results: A total of 121 patients were included between March 2018 and October 2022; 80 underwent pit-picking only (the "pit-picking group"), and 41 were in the group that received pit-picking followed by LT (the "LT group"). The mean age was 24.5±5.9 years, and 63 (52%) patients were female. Postoperative complications were seen in 14 (11.6%) patients. Patients in the LT group had no complications, whereas the overall complication rate in the pit-picking group was 17.5% (p=0.002). The LT group had a significantly shorter return-to-work time (3.2±2.2 vs. 6.7±2.3 days, p<0.001) and "sit-pain-free time" (i.e., the time until sitting becomes painless) (5.1±2.1 vs. 7.8±3.1 days, p=0.003). The mean complete healing time was shorter in the LT group (10.1±2.3 vs. 14.1±3.8 days, p<0.001). The median follow-up was 46 (43-65) months. Thirteen (10.7%) patients had recurrence; 9 (11.3%) in the pit-picking group and 4 (9.8%) in the LT group (p=0.534). The mean time-to-recurrence was 14.7±5.6 days.

Conclusion: LT when added to pit-picking does not affect mid-term recurrence rate but significantly reduces postoperative complications, pain, and workday loss.

Keywords: Pilonidal disease, laser treatment, pit-picking, minimally invasive surgery

Introduction

Pilonidal disease (PD) is a common condition that affects the sacrococcygeal region and is characterized by the development of a cyst or sinus tract containing hair and debris. The management of PD has been a topic of debate for many years, with several surgical and non-surgical treatment options available. Although surgical excision is currently the standard treatment for chronic PD,[1] it is accompanied by a high incidence of morbidity and recurrence rates, as well as a long time away from work.[2]

Even though off-midline flap procedures demonstrated the lowest recurrence rates (10% at 5 years) and good postoperative wound healing (complication rate 8%-16%) in two meta-analyses,[3,4] there is intensive demand for outpatient treatments from both surgeons and mostly working patients.[5] Since Bascom[6] described the cleft lift technique, all minimally invasive methods have evolved based on this "focused" management with slightly modified procedures such as microsinusectomy, pit-picking, and Gips.[7,8] Several methods that share strong similarities, and sometimes even the same techniques, have been identified, although referred to by different names. Regardless of nomenclature, most minimally invasive treatments provide shorter hospital stays, decreased postoperative morbidity, and a faster return to normal daily activities.[9] The fundamental principle in all these methods is the excision or curettage of the diseased tissue and debris

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through very small incisions. Over time, new technologies, such as laser and endoscopy, and additional applications, such as phenol and fibrin glue, have been integrated into this technique to further enhance the outcomes.[10-15]

Pit-picking is a minimally invasive surgical technique that has gained popularity due to its low morbidity and short recovery time. However, it still has not yielded the expected outcomes in terms of relapse and loss of workdays. A few studies for simple pit-picking in the literature revealed a recurrence rate of 10%-51% with follow-up times of 12-83 months.[3,8,16] Laser treatment (LT) has been proposed as an adjunct to pit-picking, with potential advantages such as reduced bleeding, decreased pain, and improved healing.[17,18] In a recent review, primary healing after LT has been reported at 94.4%, and a recurrence rate with a median of 12 (7-25) months was found to be 3.8%.[19] However, the follow-up periods of published studies are too short, and it is unclear whether the observed effectiveness of this technique is due to the use of LT or the pit-picking alone.

The objective of this study was to ascertain whether the mid-term effectiveness of pit-picking with LT can be attributed to the addition of LT or solely to the pit-picking technique itself.

Materials and Methods

This study protocol was registered with clinicaltrials.gov (ID: NCT05569135) and approved by the İstanbul Medipol University Institutional Ethics Committee (approval number: 447, date: 11.05.2022). The patients were informed about the protocol and provided written consent. Prospectively collected data of patients treated for PD by a single surgeon (CA) was reviewed retrospectively. The study period started in March 2018, when LT was introduced at our institution. Patients aged >18 years who underwent pit-picking and completed at least 36 months of follow-up were included in the study. The exclusion criteria were as follows: immunosuppression, antibiotherapy and/or abscess drainage within 2 weeks before surgery, procedures other than pit-picking, and loss of follow-up for 36 months.

Study Groups

The institution uses Tezel's[20] navicular area classification to assist in decision-making (Table 1). Recommended procedures at the institution include local hair removal and careful hygiene in type 1 (asymptomatic) disease, abscess drainage in type 2 (acute abscess) disease, and pit-picking in type 3 (pits within the navicular area) and type 4 (pits outside the navicular area) disease. For patients with type 5 (recurrent) disease, pit-picking is usually preferred; however, in some patients with wide lateral extensions and chronic fistulas or in cases of accompanying hidradenitis suppurativa, off-midline flap procedures are performed. Patients with type 2 disease are recommended pit-picking following abscess drainage and antibiotics after achieving complete healing of infection. This period is ≥2 weeks.

All patients included in the study underwent pit-picking and were offered supplementary LT since its availability at the institution in 2018. Those who provided consent received additional LT, whereas those who declined were

Table 1. Demographic and clinical characteristics of the patients

	Total, (n=121)	Pit picking only, (n=80)	Pit picking + laser treatment, (n=41)	p
Age (years, mean ± SD)	24.5±5.9	24.9±5.6	23.7±6.3	0.284
Sex				
Male	58 (48)	41 (51.3)	17 (41.5)	0.204
Female	63 (52)	39 (48.8)	24 (58.5)	
BMI (kg/m^2, mean ± SD)	26.2±3.4	26.1±3.2	26.6±3.6	0.640
Duration of the symptoms (months, mean ± SD)	11 (1-18)	16.19±19.7	18.6±17.8	0.503
History of abscess drainage	41 (33.9%)	26 (32.5%)	12 (29.3%)	0.837
Family history (+)	14 (11.6)	11	3	0.232
Smoking (+)	47 (38.8)	35	12	0.088
Tezel Classification[20]				
III	71 (58.7)	44 (55)	27 (66)	0.503
IV	42 (34.7)	30 (37.5)	12 (30)	
V	8 (6.6)	6 (7.5)	2 (4)	

SD: Standard deviation, BMI: Body mass index

managed with standard pit-picking. The results of the two groups were compared. The primary outcome measure was recurrence at 36 months. The secondary outcome measures were morbidity, return-to-work time, time to complete healing, and comparison of the characteristics of patients with and without recurrence.

Surgical Technique

All the procedures were day-case surgery without any general anesthesia or sedation, except for five patients who demanded general anesthesia due to anxiety. No antibiotic prophylaxis was performed. The patients were operated upon in a prone position with local anesthesia (20 mL prilocaine 1%). Sinus openings were identified, and 1-3 sinuses-depending on the extension of the tracts and the number of sinuses-were enlarged with a no: 11 scalpel or a clamp (Figure 1). Hair and/or necrotic tissues were removed through the pits using a clamp, curette, and/or brush (Figure 2). The cavity was rinsed with saline.

For the LT group, a radial laser probe with a wavelength of 1,470 nm and operating in continuous mode was inserted through the pits, and a total of 100-110 joules of energy per 1 cm-long region was administered at 10 W by retracting the probe along with the entire tract (Figure 3). The probe was introduced to all lateral sinus extensions and tracts if present (Figure 4). In both groups, a pressure dressing was applied and advised to be kept for 3 hours after the procedure.

Follow-Up

The patients were discharged and permitted to sit and shower the area immediately after surgery. Hair removal for 1 year with depilation gel was recommended to all patients. Follow-up evaluations were conducted through outpatient visits on postoperative days 3 and 10 and at 1, 6, and 12 months. Recurrence was monitored through phone calls at 24 and 36 months after the first year. At discharge, patients were given a visual analog scale (VAS) chart and instructed to complete it on days 1, 7, and 30 post-surgery. The chart was used to assess the maximum pain level (0-10) experienced by patients at each time point. The same chart included a section for patients to record the sit-pain-free time.

Patients who reported any reappearance of the symptoms on a telephone call were invited to visit the clinic to confirm recurrence. Since treatment is not recommended for asymptomatic disease, recurrence was determined based on patient-reported symptoms. Seroma was defined as the accumulation of fluid in subcutaneous tissue without any evidence of infection. Hematoma was defined as blood or clot accumulation in subcutaneous tissue. Surgical site infection was defined as the presence of purulent drainage or incision opened by the surgeon with at least one of the following symptoms: pain, tenderness, swelling, redness, and

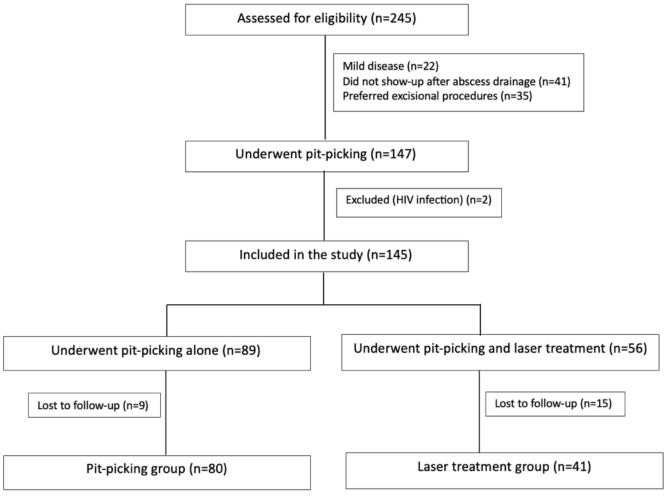

Figure 1. Flow diagram of the study

Figure 2. Enlargement of the pits with a clamp

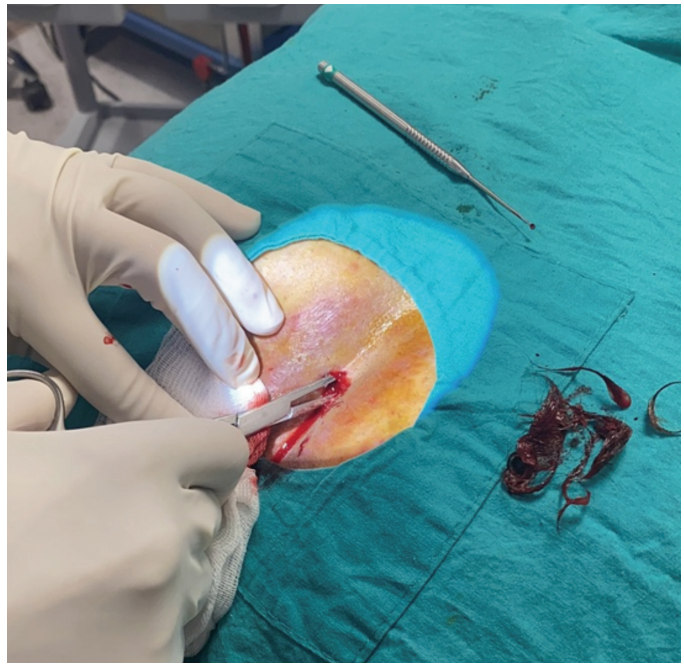

Figure 3. Removal of the hair and necrotic tissue through pits

heat, with or without culture confirmation.[21] The number of days until returning to a daily routine was recorded as the return-to-work time. The sit-pain-free time was also recorded. Complete healing was defined as complete closure of the pits without any spontaneous or provoked discharge (Figure 5). In cases where the symptoms persisted for 4 weeks after surgery, they were recorded as non-healing. If the symptoms reappeared after complete healing, this was defined as recurrence.

Statistical Analysis

Statistics were analyzed using the IBM SPSS for Windows v.26 software package. The distribution of the data was evaluated using histograms. Variables that were normally distributed were reported as mean and standard deviation, and means were compared by the independent sample t-test; skewed variables were reported as median, and range and means were compared by the Mann-Whitney U test. A p-value <0.05 was defined as statistically significant.

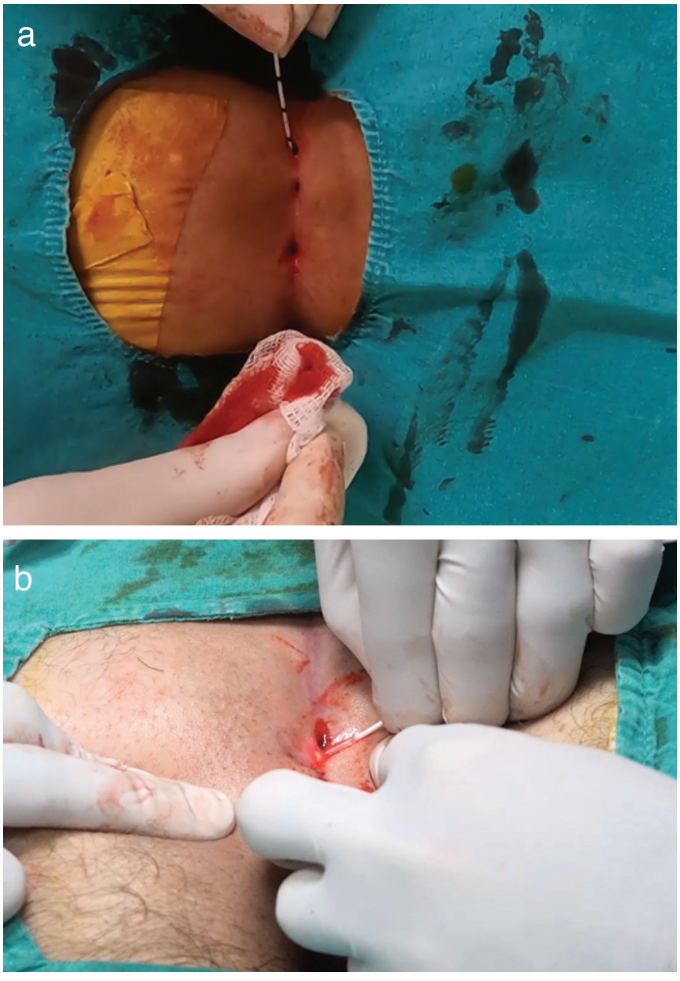

Figure 4. (a) Insertion of the laser probe through pits; (b) ablation of the lateral tracts by laser probe

Results

A total of 245 patients were treated for PD in the institution between March 2018 and October 2019. Twenty-two were advised conservative treatments for mild disease, 41 underwent abscess drainage but did not come back for definitive treatment, and 35 preferred to undergo excisional procedures. Among 147 patients who received pit-picking, 2 were excluded for HIV infection and 24 were lost to follow-up. Among 121 patients included in the final analysis, 80 were in the pit-picking group and 41 were in the LT group. A flow diagram of the study is shown in Figure 1.

The mean age was 24.5±5.9 years. Fifty-eight (48%) patients were male and 63 (52%) were female. The mean body mass index (BMI) was 26.2±3.4. The median duration of the symptoms was 11 (1-18) months, and 41 (33.9%) patients had previous abscess drainage. Seventy-one (58.7%) patients had Tezel III PD, 42 (34.7%) had Tezel IV PD, and 8 (6.6%) had recurrent (Tezel V) PD. There was no difference in demographic or clinical features between the two groups (Table 1).

The mean operative time was 25.7±5.8 minutes. Postoperative complications were seen in 14 (11.6%) patients, comprised of 10 (8.3%) seroma, 6 (5%) bleeding, and 2 (1.7%) surgical site infections; all patients were managed conservatively, and none of them required reoperation or hospitalization. Patients in the LT group had no complications, whereas

Figure 5. Healing at 1 week visit

the overall complication rate in the pit-picking group was 11.6% (n=14) (p=0.002). Seroma (12.5% vs. 0%, p=0.013), bleeding (7.5% vs. 0%, p=0.078), and surgical site infection (2.5% vs. 0%, p=0.435) rates were higher in the pit-picking group; however, the differences were not statistically significant (Table 2).

The mean return-to-work time and sit-pain-free time were 5.5±2.8 and 6.9±3.1 days, respectively. The LT group had significantly shorter durations to return to work (3.2±2.2 vs. 6.7±2.3 days, p<0.001) and sit-pain-free time (5.1±2.1 vs. 7.8±3.1 days, p=0.003). The mean complete healing was 12.7±3.8 days and significantly shorter in the LT group (10.1±2.3 vs. 14.1±3.8 days, p<0.001). The mean VAS was 2.7±1.2 at 24 hours, 1.1±0.9 on day 7, and 0.2±0.4 at 1 month. On day 7, the mean VAS score was 0.9±0.7 in the LT group and 1.3±0.9 in the pit-picking group (p=0.040) (Table 2).

The median follow-up time was 46 (43-65) months. No non-healing was recorded. Thirteen (10.7%) patients had recurrence; 9 (11.3%) in the pit-picking group and 4 (9.8%) in the LT group (p=0.534). The mean time-to-recurrence was 14.7±5.6 months (Table 2).

When recurrent and non-recurrent patients were compared, patients with recurrence had a higher mean BMI (30.1±4.2 vs. 25.8±2.9, p=0.003). Recurrence was not seen in any of the patients with Tezel III disease, whereas 8 (19%) of the patients with Tezel IV and 5 (62.5%) with Tezel V disease had recurrent disease (p<0.001). Four (28.6%) patients with postoperative complications had recurrence versus 9 (8.4%) patients without postoperative complications (p=0.044) (Table 3).

Discussion

Our results showed no significant advantage of LT on the recurrence rate, which was the primary outcome of the study. However, the return-to-work time, sit-pain-free time, and time to complete healing were shorter in the LT group. Moreover, the LT group exhibited a reduced incidence of overall complications. Risk factors for recurrence in our series were high BMI, severity of the disease, and occurrence of postoperative complications. Our mid-term results showed that the addition of LT to pit-picking provides lower complication rates, faster recovery, and lower postoperative pain scores. The early and mid-term outcomes of the overall

Table 2. Comparison of surgical characteristics and outcome

	Total, (n=121)	Pit picking only, (n=80)	Pit picking + laser ablation, (n=41)	p
Anesthesia				0.447
General	5 (4.1)	4 (5%)	1 (2.4%)	
Local	116 (95.9)	76 (95%)	40 (97.6%)	
Operative time (min, mean ± SD)	25.7±5.8	25.4±5	26.6±7	0.280
Complications	14 (11.6%)	14 (17.5%)	0	0.002
Seroma	10 (8.3%)	10 (12.5%)	0	0.013
Bleeding	6 (5%)	6 (7.5%)	0	0.078
Surgical site infection	2 (1.7%)	2 (2.5%)	0	0.435
Time to return to work (days, mean ± SD)	5.5±2.8	6.7±2.3	3.2±2.2	<0.001
Time to sit pain-free (days, mean ± SD)	6.9±3.1	7.8±3.1	5.1±2.1	0.003
Time to complete healing (days, mean ± SD)	12.7±3.8	14.1±3.8	10.1±2.3	<0.001
Pain score (VAS, mean ± SD)				
24 hours	2.7±1.2	2.7±1.25	2.7±1.1	0.974
7 days	1.1±0.9	1.3±0.9	0.9±0.7	0.040
30 days	0.2±0.4	0.1±0.3	0.2±0.4	0.309
Follow-up (months, mean ± SD)	47.6±4.5	47.3±4.1	48.1±5.1	0.367
Recurrence (n,%)	13 (10.7%)	9 (11.3%)	4 (9.8%)	0.534
Time-to-recurrence (months, mean ± SD)	14.7±5.6	16.4±5.4	10.8±4.3	0.079

SD: Standard deviation, VAS: Visual analogue scale

series were comparable with excisional methods. This result supports the utilization of minimally invasive treatments for PD.

In the past 10 years, several guidelines, results of national attitude surveys, and consensus reports have been published from America, Germany, Italy, and the Netherlands.[1,22-24] A common conclusion reached in these reports is that it is important to select treatment according to the severity of the PD. According to all guidelines, minimally invasive techniques are considered a promising treatment option for mild PD, whereas off-midline techniques are recommended for severe or recurrent disease. In alignment with this

Table 3. Comparison of the characteristics of the patients regarding recurrence

	Recurrence (-), (n=110)	Recurrence (+), (n=11)	p
Age (years, mean ± SD)	24.5±6	24.6±4.7	0.937
Sex			
Male	52 (89.7%)	7 (11.1%)	0.564
Female	56 (88.9%)	6 (10.3%)	
BMI (kg/m^2, mean ± SD)	25.8±2.9	30.1±4.2	**0.003**
Duration of the symptoms (months, median, range)	11 (1-72)	10 (3-108)	0.975
History of abscess drainage			
(-)	75 (90.4%)	8 (9.6%)	0.385
(+)	33 (86.8%)	5 (13.2%)	
Family history			
(-)	85 (88.8%)	12 (11.2%)	0.538
(+)	13 (92.9%)	1 (7.1%)	
Smoking			
(-)	66 (89.2%)	8 (10.8%)	0.613
(+)	42 (89.4%)	5 (10.6%)	
Tezel Classification[20]			
III	71 (100%)	0	
IV	34 (81%)	8 (19%)	**<0.001**
V	3 (37.5%)	5 (62.5%)	
Surgery			
Pit picking	71 (88.8%)	9 (11.3%)	0.534
Pit picking + laser ablation	37 (90.2%)	4 (9.8%)	
Overall complications			
(-)	98 (91.6%)	9 (8.4%)	**0.044**
(+)	10 (71.4%)	4 (28.6%)	
Seroma			
(-)	100 (90.1%)	11 (9.9%)	NA
(+)	8 (80%)	2 (20%)	
Bleeding			
(-)	105 (91.3%)	10 (8.7%)	NA
(+)	3 (50%)	3 (50%)	
Surgical site infection			
(-)	107 (89.9%)	12 (10.1%)	NA
(+)	1 (50%)	1 (50%)	

SD: Standard deviation, BMI: Body mass index, NA: Not available due to small numbers in groups

perspective, our series also demonstrated no recurrences in Tezel III disease. Recurrence occurred in one-fifth of patients with severe disease and two-thirds of recurrent patients.

Excisional surgery remains the standard of care, with reported 2-year recurrence rates of 1.6% and 0.6% for the Limberg and Karydakis procedures, respectively.[3] However, a meta-analysis showed that the recurrence rate increases up to approximately 11% for the Limberg and Karydakis procedures when the follow-up duration extends to 60 months. Recurrence after excision and mid-line closure is even higher-up to 21.9% at 60 months and 67.9% at 240 months.[3] The same meta-analysis reported 15.6% recurrence for pit-picking at 60 months; unfortunately, there were no data regarding LT, since no randomized trials were available at that time.[3] Another meta-analysis, which included studies with a minimum follow-up of 5 years, also reported a 10% recurrence after off-midline closure techniques.[4] For LT, there are limited data in the literature. A recent review, which included 971 patients who underwent LT, reported 3.8% recurrence with a median follow-up of 12 (7-25) months.[19] Our overall recurrence rate was 10.7%, which is comparable with excisional methods, with no difference between the pit-picking and laser groups. Considering the relatively recent dissemination of minimally invasive techniques worldwide, a 46-month median follow-up of our series may provide insights into the feasibility of minimally invasive techniques.

The results of pit-picking in the literature are very heterogeneous. A retrospective study compared simple pit-picking with cleft closure and reported that pit-picking had fewer postoperative complications (9.4% vs 36.2%, p=0.002), and had a shorter return-to-work time (14 days vs. 21 days, p<0.001) than did cleft closure; however, long-term follow-up of median 9.3 years revealed a significantly higher recurrence for pit-picking (50.9% vs. 10.3%, HR 6.65, p<0.001).[8] The authors concluded that pit-picking should be saved as an option for mild disease. A recent meta-analysis of 4,286 Gips procedures reported a 7.8% wound complication rate and 4.7 months mean wound healing period.[7] In our pit-picking group, the complication rate was 17.5% and most of the complications were seroma (10/14). The return-to-work time was 1 week, and complete healing was observed at 2 weeks.

A multicenter study of 226 laser procedures reported 8% wound infections and 41 days mean time to heal.[10] A recent study of 106 LT procedures with or without endoscopic camera use found that one-third of the patients had no pain on the first postoperative day, the mean return-to-work time was 4.5 days, and the complication rate was 10.4%. Endoscopy did not affect early postoperative outcome and recurrence.[25] Our LT group did not show any postoperative complications. The mean return-to-work time was 3.2 days and complete healing was observed after 10 days. Laser ablation added to pit-picking resulted in a significantly lower complication rate and shorter recovery time. The disparity between the results in the literature and our findings likely stems from the heterogeneity in surgical techniques. There is no standardized technique for pit-picking, and variations, particularly in the incision site and size, could contribute to the heterogeneity of healing time and complication rates.

Study Limitations

Comparatively to the literature, our series demonstrates notably superior early surgical outcomes and recurrence rates. There are several possible reasons for this. First, the higher proportion of female patient admissions may be attributed to the fact that the operating surgeon was female. Second, the surgeon's early adoption of laser technology and affiliation with a specialized healthcare institution could have led to a higher frequency of suitable patients seeking her services for minimally invasive methods. When interpreting our results, it is important to bear in mind that 52% of our patient cohort were female, and 60% had stage 3 disease. A third limitation of our study is the non-randomized design and relatively small sample sizes. Considering that all recurrences in our series occurred within the first 2 years, our follow-up period of approximately 4 years can be considered sufficient when compared with the literature.

The most important limitation of our study is the lack of cost analysis. Although we have not conducted a cost analysis, it is evident that the cost of LT would be higher. Taking into account this and the result that laser has no impact on recurrence, future studies should place greater emphasis on the financial burden associated with LT.

Conclusion

Pit-picking with or without LT for PD is safe and feasible. The addition of LT may enhance postoperative outcomes regarding complications, pain scores, and return-to-work time; however, it does not affect recurrence rates. The early and mid-term outcome of pit-picking and LT is promising in mild disease. Further randomized trials are needed for patient selection and indications.

Ethics

Ethics Committee Approval: This study protocol was registered with clinicaltrials.gov (ID: NCT05569135) and approved by the İstanbul Medipol University Institutional Ethics Committee (approval number: 447, date: 11.05.2022).

Informed Consent: The patients were informed about the protocol and provided written consent.

Peer-review: Externally peer-reviewed.

Authorship Contributions

Surgical and Medical Practices: C.A., E.D., Y.Ö., Concept: C.A., Design: C.A., Data Collection or Processing: C.A., E.D., Y.Ö., Analysis or Interpretation: C.A., E.D., Y.Ö., Literature Search: C.A., Y.Ö., Writing: C.A., Y.Ö.

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