

Longitudinal changes in ejaculatory latency following penile fracture surgery: A retrospective cohort study

Penil fraktür cerrahisi sonrası ejakülatuar latens süresindeki değişiklikler: Retrospektif kohort çalışması

Çağatay Özsoy¹, Mustafa Tıprıdamaz¹, Hakan Görkem Kazıcı², Erhan Ateş¹

ABSTRACT

Objectives: To evaluate longitudinal changes in intravaginal ejaculatory latency time (IELT) following surgical repair of penile fracture and to identify clinical and intraoperative factors associated with long-term postoperative IELT.

Material and Methods: This retrospective cohort study included 38 patients who underwent surgical repair for penile fracture at a single tertiary center. Patient-reported IELT values were recorded preoperatively and at 6, 12, and 24 months postoperatively. Temporal changes in IELT were analyzed using the Friedman test with post-hoc Wilcoxon signed-rank tests and Bonferroni correction. Multivariable gamma regression analysis was performed to identify independent predictors of IELT at 24 months, including demographic variables, fracture characteristics, perioperative factors, and preoperative IELT.

Results: Median IELT increased progressively from 255 seconds preoperatively to 265, 280, and 280 seconds at 6, 12, and 24 months, respectively (overall $p < 0.001$). Postoperative IELT was not significantly different from baseline at 6 months but was significantly prolonged at 12 and 24 months compared with preoperative values. Multivariable analysis revealed that greater tear length (Exp[B]=1.016, 95% CI 1.001-1.031; $p=0.043$) and higher preoperative IELT (Exp[B]=1.006, 95% CI 1.005-1.007; $p < 0.001$) were independently associated with longer IELT at 24 months. Proximal fracture localization showed a borderline association with IELT prolongation, while age, diabetes mellitus, fracture orientation, and time to surgery were not significant predictors.

Conclusion: Surgical repair of penile fracture is associated with a delayed but sustained prolongation of ejaculatory latency. The extent of tunical injury and baseline ejaculatory function are key determinants of long-term postoperative IELT. These findings suggest that ejaculatory outcomes should be considered alongside erectile function in the evaluation and counseling of patients following penile fracture repair.

Keywords: penile fracture, tunica albuginea, intravaginal ejaculatory latency time, surgical repair

ÖZ

Amaç: Penil fraktür cerrahisi sonrası intravajinal ejakülatuar latens süresindeki (IELT) değişiklikleri değerlendirmek ve uzun dönem postoperatif IELT ile ilişkili klinik ve intraoperatif faktörleri belirlemek.

Gereç ve Yöntem: Bu retrospektif kohort çalışmasına, tek bir üçüncü basamak merkezde penil fraktür nedeniyle cerrahi onarım uygulanan 38 hasta dâhil edildi. Hastaların kendi bildirimlerine dayanan IELT değerleri preoperatif dönemde ve postoperatif 6., 12. ve 24. aylarda kaydedildi. Zaman içindeki IELT değişiklikleri Friedman testi ile, ikili karşılaştırmalar ise Bonferroni düzeltilmeli Wilcoxon testi ile analiz edildi. Yirmi dördüncü aydaki IELT'nin bağımsız belirleyicilerini saptamak amacıyla; demografik değişkenler, fraktür özellikleri, perioperatif faktörler ve preoperatif IELT'yi içeren çok değişkenli gama regresyon analizi yapıldı.

Bulgular: Medyan IELT'nin, preoperatif dönemde 255 saniye iken postoperatif 6., 12. ve 24. aylarda sırasıyla 265, 280 ve 280 saniyeye progresif olarak arttığı gözlemlendi ($p < 0,001$). Postoperatif 6. ayda IELT, başlangıç değerleriyle anlamlı farklılık göstermezken, 12. ve 24. aylarda preoperatif değerlere kıyasla anlamlı uzama saptandı. Çok değişkenli analizde, daha uzun yırtık uzunluğu (Exp[B]=1,016; %95 GA 1,001-1,031; $p=0,043$) ve daha yüksek preoperatif IELT (Exp[B]=1,006; %95 GA 1,005-1,007; $p < 0,001$) 24. aydaki IELT uzaması ile bağımsız olarak ilişkili bulundu. Proksimal fraktür lokalizasyonu IELT uzaması ile sınırdaki ilişki gösterirken; yaş, diabetes mellitus, fraktür yönelimi ve cerrahiye kadar geçen süre anlamlı belirleyiciler değildi.

Sonuç: Penil fraktürün cerrahi onarımı, ejakülatuar latens süresinde gecikmiş ancak kalıcı bir uzama ile ilişkilidir. Tunikal hasarın boyutu ve başlangıç ejakülatuar fonksiyon, uzun dönem postoperatif IELT'nin temel belirleyicileridir. Bu bulgular, penil fraktür onarımı sonrası hasta değerlendirme ve danışmanlığında erektil fonksiyonun yanı sıra ejakülatuar sonuçların da dikkate alınması gerektiğini düşündürmektedir.

Anahtar Kelimeler: penil fraktür, tunika albuginea, intravajinal ejakülatuar latens süresi, cerrahi onarım

INTRODUCTION

Penile fracture is a rare urological emergency characterized by disruption of the tunica albuginea of the corpus cavernosum. In the United States and Europe, the most common etiology is blunt penile trauma occurring during sexual intercourse.^[1] In the majority of cases, the diagnosis can be established based solely on a detailed clinical history and physical examination. Patients typically report a

¹Department of Urology, Aydın Adnan Menderes University School of Medicine, Aydın, Türkiye

²Department of Urology, Aydın Public Hospital, Aydın, Türkiye

Yazışma Adresi/ Correspondence:

Assoc. Prof. Dr. Erhan Ateş
Department of Urology, Aydın Adnan Menderes University School of Medicine,
Aydın, Türkiye
Tel: +90 506 532 31 43
E-mail: drerhanates@yahoo.com; erhan.ates@adu.edu.tr

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sudden blunt impact during intercourse, often accompanied by an audible “pop,” followed by immediate pain and rapid detumescence.^[2] Physical examination frequently reveals penile edema, ecchymosis, and deformity, classically described as the “eggplant deformity”.^[3]

According to previous studies, early surgical repair of the tunica albuginea represents the cornerstone of penile fracture management, as it enables anatomical restoration and minimizes the risk of long-term functional complications.^[4,5] Nevertheless, despite prompt and adequate surgical intervention, a variety of postoperative sequelae may still develop. These include erectile dysfunction (ED), penile curvature, painful erections, tunical scarring, and re-fracture, all of which have been well documented in the literature.^[5]

More recently, attention has expanded beyond erectile outcomes to include ejaculatory function following penile fracture. In a contemporary study, investigators assessed both erectile function and ejaculatory parameters, including intravaginal ejaculatory latency time (IELT), in patients with unilateral or bilateral cavernosal rupture.^[6] Notably, the presence of unilateral versus bilateral cavernosal injury did not significantly affect IELT. However, when compared with preoperative values, postoperative IELT was significantly prolonged at 3, 6, and 12 months after surgical repair, suggesting that penile fracture and its treatment may exert a measurable influence on ejaculatory dynamics.

Building on these findings, the present study aimed to evaluate longitudinal changes in IELT among patients treated surgically for penile fracture at our institution. Specifically, preoperative IELT values were compared with those obtained at 6, 12, and 24 months postoperatively. Furthermore, we sought to explore potential underlying mechanisms that may account for IELT prolongation.

MATERIAL and METHODS

This retrospective cohort study included patients who underwent surgical repair for penile fracture between 2015 and 2024 at a single tertiary referral center. A total of 45 patients were initially assessed for eligibility. Inclusion criteria were age ≥ 18 years and a confirmed diagnosis of penile fracture, established based on clinical presentation and intraoperative findings. Exclusion criteria included incomplete follow-up data, missing intraoperative details, and use of postoperative phosphodiesterase type 5 inhibitors or psychiatric medications that could affect erectile function or ejaculatory latency. Based on these criteria, 7 patients

were excluded, and 38 patients were ultimately included in the final analysis. The study protocol was approved by the local institutional ethics committee (date: March 3, 2025; protocol no.: 2025/54).

Demographic, clinical, fracture-related, and perioperative data were obtained from the hospital medical record system. Collected variables included age, presence of diabetes mellitus, fracture characteristics (fracture localization: ventral, dorsal, lateral, distal/midshaft or proximal; anatomical fracture level; tear length in millimeters), time from fracture to surgery (hours), operative duration (minutes), and total follow-up duration (months). Tear length and fracture localization were recorded intraoperatively by the operating surgeon.

All patients underwent surgical repair using a standardized degloving approach. Following circumferential subcoronal incision and penile degloving, the tunica albuginea was exposed, and the corporal tear was identified. The defect was repaired with primary suturing using absorbable interrupted sutures. No additional grafting procedures were performed.

Intravaginal ejaculatory latency time was evaluated preoperatively and at 6, 12, and 24 months postoperatively and recorded as patient-reported IELT in seconds. Intravaginal ejaculatory latency time was not measured using a stopwatch; instead, it was assessed based on patient self-report, which represents a commonly used and accepted approach in routine clinical practice.

Continuous variables were assessed for normality using the Shapiro-Wilk test and are presented as mean \pm standard deviation or median with interquartile range (IQR), as appropriate. Categorical variables are expressed as frequencies and percentages. Changes in IELT over time were evaluated using the Friedman test for repeated measures. When a significant overall difference was detected, post-hoc pairwise comparisons were performed using the Wilcoxon signed-rank test. Statistical significance for pairwise comparisons was defined as $p < 0.008$ to account for multiple comparisons (Bonferroni correction). To identify independent factors associated with IELT at 24 months, a multivariable gamma regression analysis with a log-link function was performed. Gamma regression was selected due to the positively skewed and strictly positive distribution of IELT values. The multivariable model included age, diabetes mellitus, anatomical fracture level (distal/midshaft vs proximal), fracture location (ventral, dorsal, lateral), tear length, time from fracture to surgery, and preoperative IELT. Results are reported as exponentiated regression coefficients (Exp[B]) with corresponding 95% confidence

intervals. A two-sided p value <0.05 was considered statistically significant for regression analyses. All statistical analyses were conducted using IBM Statistical Package for Social Sciences (SPSS) program version 31.0 (IBM Corp., Armonk, NY, USA).

RESULTS

Baseline demographic and perioperative characteristics are summarized in Table 1. A total of 38 patients who underwent surgical repair for penile fracture were included in the analysis. The mean age of the cohort was 45.0±17.0 years, and diabetes mellitus was present in 3 patients (7.9%). Fracture localization was most commonly lateral (71.1%), followed by ventral (23.7%) and dorsal (5.3%). Anatomically, fractures were more frequently located at the proximal shaft (71.1%) compared with the distal/midshaft region (28.9%). The median tear length was 14.5 mm (IQR 10.75). Median time from fracture to surgery was 10 hours (IQR 3), and median operative duration was 60 minutes (IQR 15). The median follow-up duration was 36 months (IQR 21).

Table 1. Baseline demographic, fracture characteristics, perioperative variables, and Intravaginal ejaculatory latency time values of the study cohort

Variable	Overall cohort (n=38)
Age (years), mean ± SD	45.0 ± 17.0
DM	
No, n (%)	35 (92.1)
Yes, n (%)	3 (7.9)
Fracture orientation	
Ventral, n (%)	9 (23.7)
Dorsal, n (%)	2 (5.3)
Lateral, n (%)	27 (71.1)
Anatomical fracture level	
Distal/midshaft, n (%)	11 (28.9)
Proximal, n (%)	27 (71.1)
Tear length (mm), median (IQR)	14.5 (10.75)
Time from fracture to surgery (hours), median (IQR)	10 (3)
Surgery duration (minutes), median (IQR)	60 (15)
Follow-up (months), median (IQR)	36 (21)
IELT (seconds)	
Preoperative, median (IQR)	255 (87.5)
Postoperative 6th month, median (IQR)	265 (145)
Postoperative 12th month, median (IQR)	280 (135)
Postoperative 24th month, median (IQR)	280 (122.5)

DM: diabetes mellitus; IELT: intravaginal ejaculatory latency time; IQR: interquartile range; SD: standard deviation.

Temporal changes in IELT before and after surgical repair of penile fracture are presented in Figure 1. Median IELT increased progressively over time from a preoperative value of 255 seconds (IQR 87.5) to 265 seconds (IQR 145) at 6 months, 280 seconds (IQR 135) at 12 months, and 280 seconds (IQR 122.5) at 24 months. Overall comparison demonstrated a significant change in IELT across follow-up time points (Friedman test, p <0.001).

Post-hoc pairwise comparisons using the Wilcoxon signed-rank test were performed to identify the specific time points between which statistically significant differences in IELT (Table 2). The increase in IELT compared with preoperative values did not reach statistical significance at the 6-month follow-up. However, IELT at 12 months was significantly higher than both preoperative and 6-month values, and IELT at 24 months was significantly higher than preoperative, 6-month, and 12-month values.

Multivariable gamma regression analysis was performed to identify factors independently associated with IELT at 24 months (Table 3). Tear length was significantly associated with higher IELT at 24 months (Exp[B]=1.016, 95% CI

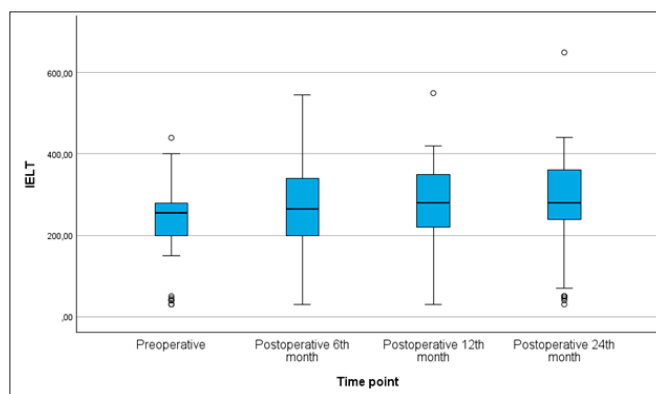


Figure 1. Temporal changes in intravaginal ejaculatory latency time after surgical repair of penile fracture measured preoperatively and at 6, 12, and 24 months postoperatively. Data are presented as median (IQR).

Table 2. Pairwise comparisons of intravaginal ejaculatory latency time during follow-up

	<i>p</i> value (IELT comparison)
Overall cohort	
Preop. vs 6. months	0.01
Preop. vs 12. months	<0.001
Preop. vs 24. months	<0.001
6. vs 12. months	<0.001
6. vs 24. months	<0.001
12. vs 24. months	<0.001

IELT: Intravaginal ejaculatory latency time; pairwise comparisons were performed using the Wilcoxon signed-rank test; due to Bonferroni correction for multiple comparisons; p values < 0.008 were considered statistically significant.

Table 3. Multivariable gamma regression analysis of factors associated with intravaginal ejaculatory latency time at 24 months

Variable	Exp(B)	95% CI	p value
Age (year)	0.996	0.989–1.003	0.297
Diabetes mellitus			
No	Reference		
Yes	0.750	0.450–1.260	0.280
Anatomical fracture level			
Distal/midshaft	Reference		
Proximal	1.190	0.980–1.440	0.072
Fracture orientation			
Ventral	Reference		
Dorsal	0.950	0.780–1.150	0.586
Lateral	0.750	0.410–1.350	0.334
Tear length (mm)	1.016	1.001–1.031	0.043
Time from fracture to surgery (hours)	0.998	0.992–1.004	0.510
Preoperative IELT (seconds)	1.006	1.005–1.007	<0.001

CI: confidence interval; DM: diabetes mellitus; Exp(B): exponentiated regression coefficient; IELT: intravaginal ejaculatory latency time.

1.001–1.031, $p=0.043$), indicating a multiplicative increase in IELT with increasing tear length. Preoperative IELT was also a strong independent predictor of IELT at 24 months ($\text{Exp}[B]=1.006$, 95% CI 1.005–1.007, $p < 0.001$). Age, diabetes mellitus, fracture localization (ventral vs. dorsal and lateral), and time from fracture to surgery were not significantly associated with IELT at 24 months. However, anatomical fracture level demonstrated a borderline association with IELT at 24 months, with proximal fractures tending to be associated with higher IELT values compared with distal/midshaft fractures, although this did not reach conventional statistical significance ($\text{Exp}[B]=1.190$, 95% CI 0.980–1.440, $p=0.072$).

DISCUSSION

The present study found that IELT undergoes a gradual and significant prolongation following surgical repair of penile fracture, becoming statistically evident at 12 months and persisting through 24 months of follow-up. Although early postoperative changes at the 6-month follow-up did not reach statistical significance, a clear temporal pattern emerged thereafter, suggesting that changes in ejaculatory function may be related to delayed or progressive processes rather than immediate postoperative effects. As expected, preoperative IELT emerged as the strongest predictor of postoperative IELT. Notably, increasing tear length was independently associated with a greater degree of postoperative IELT prolongation, indicating that the extent of tunical disruption may be related

to changes in ejaculatory timing after surgical repair. Although not statistically significant, proximal fracture localization also demonstrated a trend toward an association with IELT prolongation.

Several pathophysiological mechanisms may account for the observed postoperative prolongation of intravaginal ejaculatory latency time following penile fracture repair. First, disruption of the tunica albuginea and adjacent corporal tissue may lead to localized fibrosis and scar formation^[7], which may alter penile sensory input and cavernosal compliance over time. Cavernosal nerves or perineural fibrosis can influence erectile function and may also impact ejaculatory parameters, even in the absence of overt ED.^[8–10] Reduced penile sensitivity secondary to structural injury or postoperative scarring may therefore delay the sensory threshold required to trigger ejaculation, resulting in prolonged IELT. Psychological factors, including postoperative anxiety, altered sexual confidence, and adaptive changes in sexual behavior following a traumatic event, may also play a contributory role, particularly in the late postoperative period.

Notably, the association between greater tear length and increased IELT at 24 months observed in the present study is consistent with a possible relationship between the extent of corporal injury and long-term ejaculatory timing modulation. Larger tunical defects may result in more pronounced tissue remodeling, neural alteration, and sensory attenuation, thereby amplifying ejaculatory delay.

The absence of a significant increase in IELT at 6 months, with a clear and sustained prolongation emerging after 12 months, suggests that ejaculatory changes following penile fracture repair may be partly mediated by delayed tissue remodeling and gradual neurofunctional adaptation rather than immediate postoperative effects. Wound healing of the tunica albuginea and corporal tissue is a prolonged process, in which collagen reorganization, fibrosis maturation, and perineural scarring continue for several months beyond the initial inflammatory phase.^[3] Alterations in penile afferent sensory transmission, particularly involving pathways such as the dorsal penile nerve, may play a contributory role in the modulation of ejaculatory latency control.^[8,11] Central regulation of ejaculation, including modulation at the spinal ejaculation generator and supraspinal centers, has been shown to exhibit delayed adaptive responses following peripheral neural injury.^[12] Psychosexual adaptation may further contribute to this delay, as improved sexual confidence and behavioral control tend to develop progressively rather than in the early postoperative period.^[13]

The tendency toward greater IELT prolongation observed in patients with proximal penile fractures may be explained by the anatomical and neurophysiological characteristics of the proximal corporal segment. Proximal fractures are more likely to involve deeper cavernosal tissue, the crural region, and adjacent neurovascular structures, including branches of the cavernous nerves and periprostatic plexus, which play a central role in the modulation of ejaculatory reflexes.^[14] Experimental and clinical studies have demonstrated that ejaculatory control is not solely dependent on distal penile sensory input but is also influenced by integrated signaling from proximal corporal afferents and autonomic pathways.^[11,15] Injury or postoperative remodeling in these regions may therefore disrupt the fine balance between excitatory and inhibitory neural inputs governing ejaculation, resulting in delayed ejaculatory response.

Furthermore, given the anatomical characteristics of the proximal corpora and crural region, injuries in this area may predispose to more pronounced structural remodeling, including tunical scarring, although direct comparative data are lacking. Such structural changes can modify intracavernosal pressure dynamics and penile rigidity patterns during sexual activity, which have been shown to influence ejaculatory timing through mechanoreceptor-mediated feedback mechanisms.^[11] In addition, the proximal penile shaft is anatomically characterized by its close proximity to autonomic nerve fibers originating from the pelvic plexus, which are known to contribute to the neural regulation of emission and ejaculation phases.^[9,11,16] Collectively, these anatomical and neurofunctional considerations may help

to explain the observed trend toward greater IELT prolongation in proximal penile fractures, even when statistical significance is not consistently reached.

Several limitations of this study should be considered when interpreting the present findings. The retrospective design may introduce selection bias and limits control over potential confounding variables, despite the use of a standardized surgical approach and uniform follow-up schedule. Intravaginal ejaculatory latency time was assessed using patient-reported estimates rather than objective stopwatch measurements, which may be subject to recall bias and intra-individual variability. In addition, the relatively small sample size may have reduced the statistical power to detect modest but clinically relevant differences, including those between proximal and distal fracture locations. Baseline ejaculatory function was assessed retrospectively, which may not fully capture pre-injury variability. Furthermore, psychosexual factors, partner-related influences, and other functional parameters that may affect ejaculatory latency were not systematically evaluated. These limitations underscore the need for future prospective studies with larger cohorts, objective IELT assessment, and comprehensive functional evaluation to confirm and extend the present results.

In conclusion, surgical repair of penile fracture is associated with a delayed but sustained prolongation of intravaginal ejaculatory latency time, becoming significant after 12 months of follow-up. Preoperative IELT and greater tunical tear length were independent predictors of long-term postoperative IELT, suggesting that both baseline ejaculatory function and injury severity influence ejaculatory outcomes. These findings indicate that ejaculatory function may be affected independently of early postoperative recovery and should be considered during patient counseling and long-term follow-up after penile fracture repair.

Ethics Committee Approval

The study was approved by Aydın Adnan Menderes University Non-Interventional Clinical Research Ethics Committee. (date and number of approval: 06.03.2025/2025/54).

Peer-review

Externally peer-reviewed.

Conflict of Interest

No conflict of interest was declared by the authors.

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