

The Association of Penile Fracture and Female Sexual Abnormalities

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Purpose: To study the effect of female sexual abnormalities on the etiology of penile fracture, which is an important urological emergency.

Materials and Methods: The sexual function of the partners of patients with penile fracture (study group, n = 90) treated at our clinic and healthy women (control group, n = 90) were evaluated on a voluntary basis. In both groups, sexual function was evaluated with the Female Sexual Function Index (FSFI). Each substance of the FSFI was evaluated separately by comparing both groups and the effect on the development of penile fracture was investigated.

Results: There was no difference in demographic and clinical characteristics between the study and control groups. Evaluation of sexual function with FSFI revealed that the scores of vaginal lubrication, orgasm, satisfaction, and pain subscales were lower in the study group ($p < .001$). Among these subscales, anorgasmia was determined as the factor with the largest effect on the development of penile fracture ($OR = 7.333$, 95% CI = 2.666–20.166, $p < .001$). No correlation was found between the largest dimension of penile fracture and FSFI total and subscale scores in the study group.

Conclusion: We believe that female vaginal dryness and dyspareunia in particular are factors which could cause the development of penile fracture during sexual intercourse. The treatment could prevent the development of penile fracture in the male.

Keywords: penile fracture; sexual dysfunction; FSFI; vagina dryness; dyspareunia

INTRODUCTION

Penile fracture (PF) is a rare urological trauma defined as the rupture of the tunica albuginea of the corpus cavernosum after exposure of erected or semi-rigid penis to blunt trauma.^(1,2) A sudden increase in intracorporeal pressure causes excessive strain on the tunica albuginea, thereby resulting in a fracture. In addition, involvement of or injury to the corpus spongiosum, urethra, and dorsal nerves and vessels can occur.⁽³⁾ The etiology of PF is generally related to blunt trauma and sexual intercourse is the most common cause of PF. Studies have shown that PF occurs more frequently in “man-on-top” and “doggy style” positions during sexual intercourse.⁽¹⁾ There is also data indicating that the “woman-on-top” position poses a significant risk of developing PF.⁽⁴⁾ Masturbation injuries and falls landing on an erect penis are other notable causes of penile fracture.⁽⁵⁾

Female sexual dysfunction (FSD) is a group of psychosexual disorders that disrupt the quality of life and includes all sexual problems related to arousal, orgasm, and dyspareunia, at the center of which lies sexual desire disorder. Sexual dysfunction is seen at higher rates

and there is a negative correlation between sexual dysfunction and quality of life scores. Menopausal women experience discomfort in expressing their sexual problems such as vaginal dryness and dyspareunia to their spouses.

Accordingly, we predicted that there are partner-related factors that can facilitate the development of PF during sexual intercourse. Therefore, we aimed to investigate the presence of sexual abnormalities in the sexual partners of patients who developed PF and their effects on the development of PF.

MATERIALS AND METHODS

Participants

The study was performed under the ethical principles of the Declaration of Helsinki, and approved by the local Ethics Committee of the institution. The patients who underwent surgical treatment with the diagnosis of penile fracture in the Urology Clinic of Dişkapı Yıldırım Beyazıt Training and Research Hospital between 2007 and 2018 and their sexual partners were evaluated prospectively. The participants were divided into two groups, i.e., study and control. The study

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Table 1. Comparisons of the sociodemographic characteristics of the study and control groups

	Control group (n = 90)	Study group (n = 90)	p-value
Age of partner (years)	40.9 ± 10.9	40.8 ± 11.6	.991†
Education level			.682‡
Primary school	15 (16.7%)	15 (16.7%)	
High school	42 (46.7%)	51 (56.7%)	
University	33 (36.7%)	24 (26.7%)	
Duration of marriage (years)	15.7 ± 10.4	15.4 ± 10.0	.890†
Employment status			.606‡
Unemployed	48 (53.3%)	42 (46.7%)	
Employed	42 (46.7%)	48 (53.3%)	

† Student's t-test, ‡ Pearson's chi-square test

group comprised partners of patients who developed PF during sexual intercourse. All penile fracture patients in the study group were diagnosed with penile fracture by physical examination and penile Doppler ultrasonography. Doppler ultrasonography was applied to all patients with a suspected penile fracture on physical examination. Tunica albuginea defect was detected in penile Doppler ultrasonography. Surgical exploration and penile fracture repair were performed on all patients in the study group. The control group included healthy women with matched demographic characteristics (age, education status, duration of marriage, and employment status) (**Table 1**). All of the patients in the control group were randomly selected among the patients who applied to the urology outpatient clinic. All of the selected patients had a single sexual partner and the patients whose initial complaint was about sexual dysfunction were not included in the control group. It was questioned whether the sexual partners of the patients included in the control group had penile fracture surgery. Sexual partners of patients who had undergone penile surgery for any reason were not included in the control group. After being informed about the study, all participants were included in the study on a voluntary basis. In both groups, patients who had previously undergone hysterectomy and oophorectomy,

who received chemotherapy and radiotherapy, and who were diagnosed with lichen sclerosus and Sjögren's syndrome were not included in the study because they did not meet the inclusion criteria. Furthermore, participants with concomitant sexually transmitted disease, history of malignancy, neurological and psychiatric diseases (depression, schizophrenia, or mental disability), thyroid dysfunction, liver dysfunction, unstable coronary heart disease, psychoactive substance dependence, use of drugs affecting sexual function (antipsychotics, antidepressants, antihistamines, or benzodiazepines), and those who were pregnant or in the first 3 months after birth were excluded from the study.

The inclusion day of women in the study group was the day when surgical treatment of their partners was completed and their partners applied to the outpatient clinic for follow-up. All participants in both groups were evaluated with the Female Sexual Function Index (FSFI).⁷ The FSFI is a 19-item questionnaire in 6 subscales for the evaluation of female sexual function: desire (items 1, 2), arousal (items 3, 4, 5, 6), lubrication (items 7, 8, 9, 10), orgasm (items 11, 12, 13), satisfaction (items 14, 15, 16) and pain (items 17, 18, 19). The FSFI evaluates sexual function throughout the last 4 weeks. In the subscale points, items 1, 2, 15 and 16 are scored between 1 and 5. All the other items are scored between 0 and 5 with the added option of "no sexual activity". Total points can range from 2-36 with higher points indicating a less severe degree of sexual function disorder.^{8,9} All participants were evaluated and compared individually for all items of FSFI and in terms of total FSFI score. Statistical analyses were performed to determine the relationship between FSFI and etiology of PF.

Statistical analysis

The distribution of continuous variables was determined by Shapiro-Wilk test. Levene's test was performed to evaluate the homogeneity of variance. Descriptive statistics for continuous variables are shown as mean ± standard deviation (min-max) and for categorical data as number and percentage.

Intergroup comparisons were performed using Student's t-test. Mann-Whitney U-test was applied when parametric assumptions were not met. Categorical data were analyzed by Pearson's chi-square test. Degrees of association between continuous variables were evaluated by Spearman's rank-order correlation analyses.

Univariate logistic regression analyses were performed to determine whether subscale and total FSFI score had an effect on the likelihood of PF. Odds ratio, 95% confidence interval, and Wald statistics for FSFI total and each subscale scores were also calculated.

Data analysis was performed using IBM SPSS Sta-

Table 2. Demographic and clinical characteristics of the study group

	n = 90
History of penile fracture	3 (3.3%)
Laterality	
Right	54 (60.0%)
Left	27 (30.0%)
Bilateral	9 (10.0%)
Fracture location 1	
Ventral	57 (63.3%)
Ventral+Lateral	15 (16.7%)
Lateral	9 (10.0%)
Dorsal	6 (6.7%)
Dorsal+Lateral	3 (3.3%)
Fracture location 2	
Mid	48 (53.3%)
Proximal	24 (26.7%)
Distal	18 (20.0%)
Largest dimension of penile fracture (mm)	7.38 ± 3.73
Range of the largest dimension of penile fracture (mm)	0-15
Hematuria	6 (6.7%)
Urethral trauma	6 (6.7%)
History of urethral surgery	6 (6.7%)
Aubergine sign	87 (96.7%)
Rolling sign	72 (80.0%)
Additional trauma	9 (10.0%)

Table 3. Female Sexual Function Index total and subscale scores of the control and study groups

	Control group (n = 90)	Study group (n = 90)	p-value †
Desire	4.04 ± 1.29 (1.8–6.0)	4.08 ± 1.22 (1.2–6.0)	.893
Arousal	3.76 ± 1.29 (1.2–5.7)	3.71 ± 1.13 (1.2–5.4)	.935
Vaginal lubrication	4.07 ± 1.43 (1.2–6.0)	2.72 ± 1.11 (1.2–5.1)	<.001
Orgasm	4.21 ± 1.48 (1.2–6.0)	1.67 ± .78 (1.2–3.6)	<.001
Satisfaction	4.48 ± 1.35 (1.2–6.0)	2.37 ± .89 (1.2–5.6)	<.001
Pain	3.53 ± 1.49 (1.2–6.0)	2.27 ± 1.02 (1.2–4.8)	<.001
Total	24.10 ± 7.79 (7.8–35.1)	16.82 ± 5.19 (7.6–28.3)	<.001

Data are expressed as mean ± standard deviation (minimum–maximum), † Mann–Whitney U-test.

tistics (version 17.0; IBM Corporation, Armonk, NY, USA). A *p*-value of <.05 was considered statistically significant.

RESULTS

The demographic and clinical characteristics of the study group are summarized in **Table 2**.

Among the FSFI subscales, there was no significant difference between the study and control groups in terms of the scores of desire and arousal subscales (*p* = .893 and *p* = .935, respectively), whereas the scores of vaginal lubrication, orgasm, satisfaction, and pain subscales were significantly lower in the study group than in the control group (*p* < .001). Similarly, total FSFI score was significantly lower in the study group than in the control group (*p* < .001; **Table 3**).

There was no significant association between the scores of desire and arousal subscales and the development of PF. Each 1-point decrease in the score of the vaginal lubrication subscale resulted in a 2.221-fold increase in the likelihood of developing PF (95% CI = 1.389–3.552; *p* < .001). The likelihood of developing PF increased significantly as the score of the orgasm subscale decreased (OR = 7.333, 95% CI = 2.666–20.166, *p* < .001). Each 1-point decrease in the score of the satisfaction subscale resulted in a 5.946-fold increase in the likelihood of developing PF (95% CI = 2.198–16.087; *p* < .001). The likelihood of developing PF increased significantly as the score of the pain subscale decreased (OR = 2.218, 95% CI = 1.350–3.644, *p* = .002). Likelihood of developing PF increased significantly as total FSFI score decreased (OR = 1.177, 95% CI = 1.071–1.294, *p* < .001; **Table 4**).

Correlation coefficients and significance levels between age and the largest dimension of PF as well as FSFI total and subscale scores were examined in the study group. As age increased, total FSFI score and desire, arousal, vaginal lubrication, orgasm, and pain subscale scores decreased significantly (*p* < .05, all). However, no significant correlation was found between the larg-

est dimension of PF and FSFI total and subscale scores (**Table 5**).

DISCUSSION

PF is a rare urological emergency. Its incidence can be lower than expected because some patients are reluctant to disclose this condition. Globally, many studies have investigated the causes of PF in various regions of the world. While its most common etiology in Western countries is sexual intercourse, the most common cause in Eastern countries is penile manipulation during the practice of taghaandan.^(10,11) The practice of taghaandan involves bending the distal part of the penis shaft by force while maintaining the proximal part in place to obtain penile detumescence. This can be associated with a lack of scientific knowledge about genital anatomy in that.^(12,13) In an Iranian study conducted by Zargooshi, 76.4% of PF cases have been shown to be originating due to the practice of taghaandan.¹⁴ In addition, other causes such as masturbation, falling on an erect penis, and rolling over in bed have been reported in the etiology of PF.^(15,16)

The relationship between sexual position and PF has also been investigated. In a retrospective study, the “woman-on-top” position has been reported to be associated with a high risk of developing PF because movements are usually controlled by the female partner in that position. It has been shown that in the event that the penis slips out accidentally, full weight of the female body falls on the erect penis, causing fracture.⁽⁴⁾

Considering the physical characteristics of sexual intercourse, we believe that sexual dysfunction plays an equally important role as sexual position. In fact, FSFI-based comparisons clearly demonstrated this effect. It is now recognized worldwide that sexual health is important for general health and well-being.^(17,18,19) From the perspective of women, the National Health and Social Life Survey using FSFI reported that 43% of American women aged 18–59 years have sexual dysfunction. It has been determined that women frequently experi-

Table 4. Effect of total Female Sexual Function Index and subscale scores on penile fracture examined using univariate logistic regression analysis

	Odds ratio †	95% Confidence interval Lower limit	Upper limit	Wald statistic	p-value
Desire	.974	.647	1.467	.016	.900
Arousal	1.036	.677	1.584	.026	.871
Vaginal lubrication	2.221	1.389	3.552	11.098	<.001
Orgasm	7.333	2.666	20.166	14.898	<.001
Satisfaction	5.946	2.198	16.087	12.322	<.001
Pain	2.218	1.350	3.644	9.895	.002
Total	1.177	1.071	1.294	11.403	<.001

† Effect of a 1-point reduction in total Female Sexual Function Index and subscale scores on penile fracture

Table 5. Significance levels and correlation coefficients between total Female Sexual Function Index and subscale scores and age and the largest dimension of penile fracture in the study group

	Age Correlation coefficient	p-value †	Largest dimension of penile fracture Correlation coefficient	p-value †
Desire	-.808	<.001	-.070	.739
Arousal	-.843	<.001	-.111	.598
Vaginal lubrication	-.660	<.001	.097	.646
Orgasm	-.392	.032	-.030	.887
Satisfaction	-.349	.059	.091	.664
Pain	-.644	<.001	-.044	.833
Total	-.758	<.001	.028	.894

† Spearman's rank-order correlation analysis

ence sexual problems including those related to lack of desire, arousal, vaginal wetness, orgasm, satisfaction, and pain.⁽²⁰⁾

Differences in PF rates and etiology across countries are due to cultural differences and differences in patient behavior when applying to healthcare professionals. A large number of menopausal women with sexual problems are reluctant to undergo treatment. Some patients believe that medical treatment is ineffective.⁽²¹⁾ It has also been found that menopausal women experience discomfort in expressing their sexual problems such as vaginal dryness and dyspareunia to their spouses.⁽²²⁾ During the transition to menopause, women were found to experience a significant increase in vaginal dryness and dyspareunia as well as decreased sexual desire, sexual arousal, orgasm, sexual activity, and partner affection.⁽²³⁾

To the best of our knowledge, there is no study in the literature examining the relationship between FSD and PF. It is observed that women with vaginal dryness and dyspareunia have difficulty in expressing these problems to their spouses and physicians. As a result, difficulties in vaginal penetration due to vaginal dryness and dyspareunia, particularly during sexual intercourse, are very common. Male partners generally desire to continue sexual intercourse despite this condition, particularly in the "man-on-top" position, wherein a larger thrust is applied to ensure vaginal penetration. Similarly, in the "woman-on-top" position, with the desire of the female partner to continue sexual intercourse, high energy facilitates the development of PF, particularly in patients without full penile tumescence. In the present study, it was found that vaginal dryness and orgasm problems of the spouses of patients who developed PF during sexual intercourse were significant in terms of being a facilitating factor in PF development. Anorgasmia may cause prolonged and violent intercourse and eventually fractures, which may be a confounding factor. Furthermore, we observed that dyspareunia complaints were significantly more common in their spouses.

There are certain limitations to this study. The sample size was relatively small, and the relationship between sexual position and PF could not be assessed because the patients avoided providing information about sexual position.

CONCLUSIONS

Sexual activity is vital for male quality of life. This can be severely affected after PF. In this respect, all factors that can facilitate PF development should be taken into consideration. Vaginal dryness and dyspareunia in women are among the factors that can cause PF, par-

ticularly during sexual intercourse. We believe that increasing awareness about treatability among women with these complaints and increasing treatment rates will prevent the development of PF.

CONFLICT OF INTEREST

The authors have declared no conflict of interest.

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