

# Sexual function and vaginal surgery

## Abstract

Urinary incontinence and pelvic organ prolapse are common problems in elderly women. Corrective surgery for pelvic organ prolapse and stress urinary incontinence are performed through multiple surgical approaches, using native tissues, alloplastic implants or biological grafts. Female sexual dysfunction is a multifactorial problem and involves physical, social, and psychological dimensions. Pelvic organ prolapse and stress urinary incontinence had been associated with female sexual dysfunction. The aim of our study was to investigate the effect of vaginal surgery on sexual function. We conducted a literature review and selected representative studies that assessed sexual function following vaginal surgery. Vaginal mesh surgery for pelvic organ prolapse and stress urinary incontinence successfully restores the anatomy, but individual domains of sexual function sometimes may be impaired. Study results are contradictory, therefore further research are required in order to determine vaginal surgery impact on sexual function.

**Keywords:** pelvic organ prolapse, urinary incontinence, sexual function

## Introduction

Pelvic organ prolapse (POP) is a common problem in elderly women with an estimated prevalence of 50% in parous women older than 50 years<sup>(1)</sup>. Symptomatic prolapse prevalence ranges between 2.9% and 8%<sup>(2-4)</sup>. More than 300.000 POP surgical procedures are performed annually in the United States of America<sup>(5)</sup>.

A woman's lifetime risk of being subjected to a surgical intervention to correct POP or stress urinary incontinence (SUI) is between 11% and 19%<sup>(6)</sup>. Sexual function assessment in women with POP or SUI showed low rates of sexual activity and high rates of sexual dysfunction<sup>(7)</sup>. Corrective surgery for POP is performed using multiple surgical approaches. Because POP can be considered as a hernia through the genital hiatus, the use of synthetic mesh (similar to abdominal wall repair surgery) has been proposed for pelvic floor reconstruction. Besides uterine-sparing procedures, vaginal hysterectomy (with or without colporrhaphy) is often performed as treatment of POP.

Female sexual dysfunction (FSD) is a multifactorial problem and involves physical, social, and psychological dimensions. FSD affects approximately 40% of women in the United States of America<sup>(8)</sup>. FSD includes disorders of sexual desire, arousal, orgasm and pain. Various causes could affect sexual function in women, such as age, ethnicity, education, history of sexual abuse or sexually transmitted disease, emotional or stress-related problems, health status, multiparity or menopause<sup>(8,9)</sup>. Additionally, POP and SUI have been associated with FSD<sup>(10)</sup>. SUI might cause FSD because of psychological distress, embarrassment or simply distress caused by urine leakage during intercourse<sup>(11)</sup>.

The autonomic innervation of the cervix and upper vagina is considered to play an essential role in having an orgasm<sup>(12)</sup>. Vaginal blood flow increases during

sexual stimulation and has an important impact on sexual performance<sup>(13)</sup>. Therefore, vaginal architecture modifications (i.e. shortening and narrowing) along with neurogenic and vascular injuries caused by vaginal surgery may interfere with a woman's sexual life.

POP surgical treatment corrects the pathologic process, but it might also alter sexual function. Studies assessing sexual function following vaginal surgery revealed conflicting results. The aim of this paper was to investigate the effect of vaginal surgery on sexual function.

## Methods

Sexual function evaluation following vaginal surgery is a difficult challenge. There is a paucity of studies to assess and many of these are small, retrospective and have not used a validated questionnaire.

We have selected from the literature 12 studies that assessed sexual function following vaginal surgery, divided in 10 prospective studies like Pauls<sup>(14)</sup>, Çayan<sup>(15)</sup>, Occhino<sup>(16)</sup>, Feldner<sup>(17)</sup>, Kokanalı<sup>(18)</sup>, Hoda<sup>(19)</sup>, Ulrich<sup>(20)</sup>, Lakeman<sup>(21)</sup>, Long<sup>(22)</sup>, Vollebregt<sup>(23)</sup>, one retrospective study - Wang<sup>(24)</sup> and one review - Neill<sup>(25)</sup>.

## Results

Different questionnaires are used for the assessment of female sexual function and the impact of vaginal surgery on women's sexual lives. The most widely used questionnaires are the Female Sexual Function Index (FSFI)<sup>(26)</sup> and the Pelvic Organ Prolapse/Urinary Incontinence Sexual Questionnaire (PISQ)<sup>(27)</sup>.

The FSFI is a 19-item questionnaire which assesses six domains of sexual function: desire, arousal, lubrication, orgasm, satisfaction and pain<sup>(26)</sup>. Each item has a score that ranges from 0 or 1 to 5 (0 - not sexually active; 1 - rarely or occasionally; 2 - less than one half of the time; 3 - sometimes or one half of the time; 4 - more

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than one half of the time; 5 - almost always). Each domain score is calculated by adding together the score of the related items and the result is multiplied by a certain coefficient. The total FSFI score is calculated by adding together the mean score of all six domains. The minimum possible score is 2 and the maximum is 36.

The PISQ is a 31-item questionnaire with responses measured on a five-point Likert scale that evaluates three distinct domains of sexual function: behavioural emotive, physical and partner related<sup>(27)</sup>. The physical domain assesses the effect of POP and/or SUI on women's sexual function. The behavioural emotive domain evaluates their sexual desire, frequency of sexual activity and associated orgasms. The partner domain assesses, from the woman's perspective, her partner's views of the effect of her pelvic floor disorder on their sexual life. Scores are calculated by totalling the scores for each question (ranging from 0 - always to 4/5 - never). The PISQ-31 questionnaire can be analysed as a total score, individual domains or per-item analysis. There is also a short form of this questionnaire (PISQ-12)<sup>(28)</sup>, but can only be analysed as total score or per item. It is important to note that there are no normative values for the PISQ.

## Discussion

The study conducted by Pauls et al.<sup>(14)</sup> assessed post-operative impact on sexual function following vaginal surgery (for POP and SUI). About 51 patients were enrolled in the study, 25 underwent an antiincontinence procedure and 26 did not. Only 92% of the patients that underwent an antiincontinence surgery had a synthetic sling procedure. Significant differences were noted in postoperative prolapse stage and in postoperative measurement of genital hiatus. There were no differences in FSFI domain or total scores between the pre- and post-operative period. Sexual frequency was also not significantly different. The most higher problems regarding sexual activity before surgery was vaginal bulging; postoperatively it was the vaginal pain. About 25% of the patients commented on the negative impact of vaginal pain postoperatively. Graft material may have an impact on pliability of the vagina which lead to dyspareunia<sup>(28,29)</sup>. Dyspareunia was also associated to the posterior colporrhaphy, with levator plication leading to worsening of this symptom<sup>(30)</sup>. However, in this study was not noticed an association with posterior repair. Authors concluded that sexual function was unchanged following vaginal reconstructive surgery despite anatomic and functional improvements.

In their prospective series of 94 patients, Çayan et al.<sup>(15)</sup> investigated sexual function after SUI surgery through 2 procedures: vaginal sling and Burch colposuspension. Study results showed that in all women, total sexual function score, including desire, arousal, lubrication, orgasm, and satisfaction scores, significantly decreased after SUI surgery. Based on total score, postoperative sexual function improved in 24.5% of women in the vaginal sling group and in 12.2% of

women in the Burch colposuspension group; sexual function remained unchanged in 28.3% of patients and in 24.4% of patients, respectively. Authors revealed that although sexual functions in women may be impaired after SUI surgery, Burch colposuspension may deteriorate sexual functions much more than vaginal sling surgery. Vaginal innervation seems to be concentrated on the anterior part of the vaginal wall<sup>(31)</sup>. The vagina has only a single blood vessel plexus innervated by nerves. These autonomic nerves originate from the inferior hypogastric plexus with fibers from lumbar levels two and three and sacral levels two to four<sup>(32)</sup>. Sexual function deterioration after vaginal surgery may be caused by disturbance of vaginal nerve and blood supply of the vaginal wall, resulting in impaired sexual arousal and lubrication<sup>(33)</sup>. Abdominopelvic surgeries may deteriorate sexual function following the disruption of autonomic nerves at the proximal level.

Occhino et al.<sup>(16)</sup> studied changes in vaginal length and caliber after vaginal surgery and tried to correlate changes with sexual function in a 92 patient's series. The three most common surgical procedures performed on study patients were Mayo-McCall culdoplasty (92.4% of patients), vaginal hysterectomy (81.5% of patients), and combined anterior and posterior colporrhaphy (77.2% of patients). About 15.2% of patients (elderly women, sexually inactive) had intentional vaginal shortening and narrowing (coning). Vaginal measurements were obtained with medical graded acrylic vaginal dilators. Sexual function was assessed using PISQ-12 test. Study results revealed a decrease in the mean vaginal length (from 10.4 cm preoperatively to 8.7 cm postoperatively) and in the mean vaginal caliber (from 3.2 to 2.8 cm). Sexual function following vaginal surgery was unchanged, but sexual function scores could not be correlated with vaginal dimensions. These results were similar to those of Pauls et al.<sup>(14)</sup>.

Female sexual function after vaginal mesh surgery for POP was assessed by Wang et al. in their 27 patients retrospective study<sup>(24)</sup>. Following surgery, the scores for the dyspareunia and for the lubrication domains of FSFI worsened significantly. There was no significant change in other domains of FSFI (desire, arousal, orgasm and satisfaction). Two-thirds (66.7%) of all participants had a lower total FSFI score postoperatively. Authors pointed out that vaginal mesh surgery significantly improved the anatomic correction of POP, but individual domains of sexual function sometimes worsened.

Feldner et al.<sup>(17)</sup> investigated sexual function following surgical treatment of anterior vaginal prolapse with either traditional colporrhaphy or small intestine submucosa grafting. In the traditional colporrhaphy group, the total mean FSFI score increased from 15.3 to 24.2 ( $p=0.001$ ). In the small intestine submucosa group, the total mean FSFI score increased from 15.5 to 24.4 ( $p=0.001$ ). Improvements were noted in the domains of desire, arousal, lubrication, orgasm, satisfaction and pain. There were no differences between the two groups after 12 month of follow-up.

Postoperative vaginal length and sexual function in postmenopausal women were assessed after vaginal hysterectomy with McCall culdoplasty or sacrospinous ligament fixation in a 58 patients prospective study conducted by Kokanali et al.<sup>(18)</sup>. Study results revealed that McCall culdoplasty and sacrospinous ligament fixation adjunct to vaginal hysterectomy shortened vaginal length significantly. Vaginal length decrease was greater in McCall culdoplasty group compared to sacrospinous ligament fixation group. PISQ-12 scores were significantly higher in preoperative period compared to postoperative period for both groups, but these scores were not correlated with vaginal lengths. The results reported by Kokanali et al. were similar to those of Occhino et al.<sup>(16)</sup>.

The study conducted by Hoda et al.<sup>(19)</sup> analyzed the the impact of transobturator mesh procedure (for POP) on sexual function. Surgical procedures included transvaginal anterior or posterior wall repair using transobturator mesh implants with or without concomitant transobturator sling procedure. Sexual function initially decrease during the first 3 months, as healing process was in progress. At two years of follow-up, the total mean FSFI and pain-free intercourse significantly improved compared to preoperative period. An excellent anatomical corection was also noticed.

Ulrich et al. evaluated sexual function following vaginal POP surgery in a 93 patients prospective study<sup>(20)</sup>. Their results revealed an improved vaginal- and sexual-symptom score at 6 and 12 months postoperatively. Poorer results were recorded in women who had additional levator plication sutures during posterior vaginal repair compared to those without. Levator plication group was also associated with a significant increase in postoperative dyspareunia, similar to Kahn findings<sup>(30)</sup>.

Vaginal vasocongestion, vaginal wall sensibility and sexual function following vaginal prolapse surgery were investigated by Lakeman et al. in a 29 women prospective study<sup>(21)</sup>. Using a vaginal combi-probe, vaginal pulse amplitude (representing vaginal vasocongestion) was assessed by vaginal photoplethysmography; vaginal wall sensibility (representing vaginal innervation) was evaluated using a four pulse-generating electrodes. Authors noticed a significant reduction in vaginal vasocongestion during sexual stimulation post-operatively. Vaginal wall sensibility in the cranial

posterior vaginal wall was significantly reduced after surgery. Sexual function following surgery was not significantly affected.

Sexual function in women and men after vaginal prolapse repair with or without mesh were assessed by Vollebregt et al. in a multicenter randomized controlled trial<sup>(23)</sup>. Authors reported a significantly improvement of their sexual functioning after an anterior colporrhaphy. This improvement was not observed in the mesh group. Their results are similar to those obtained by Wang et al.<sup>(24)</sup>, but in contradiction with Hoda et al.<sup>(19)</sup> results. Long et al. reported similar results, but noted that total transvaginal mesh surgery group determined a greater sexual impairment on lubrication compared to the anterior transvaginal mesh surgery group<sup>(22)</sup>.

The comprehensive review published by Neill et al. reported sexual function evaluation following different types of vaginal surgery<sup>(25)</sup>. After SUI surgery, an improvement or no change was noticed. An improvement in coital incontinence appears to have a positive influence on sexual function. Insertion of mesh in POP surgery is generally associated with improvement in sexual function. Posterior compartment repair is associated with dyspareunia. Vaginal hysterectomy alone appears to improve sexual function. Sacrospinous fixation alone appears to have little or no effect on sexual function.

## Conclusions

Vaginal mesh surgery for POP and SUI successfully restores the anatomy, but individual domains of sexual function sometimes may be impaired. Vaginal shortening and narrowing occurred after vaginal surgery (including McCall culdoplasty or sacrospinous ligament fixation adjunct to vaginal hysterectomy) but sexual function remained unchanged. Small intestine submucosa repair and traditional anterior colporrhaphy both improved sexual function postoperatively, with no difference between the two techniques. Levator plication additionally to posterior vaginal repair is associated with an increase in postoperative dyspareunia rates and with decreased sexual function. Prolapse surgery negatively affected levels of vaginal vasocongestion as well as vaginal wall sensibility in the cranial posterior wall. However, study results are much contradictory. Therefore further ressearch are required in order to determine vaginal surgery impact on sexual function. ■

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