

# A comparison of pelvic organ prolapse and sexual function after abdominal and laparoscopic hysterectomy

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## ABSTRACT

**Objectives:** Hysterectomy is one of the risk factors of pelvic organ prolapse (POP). There is no consensus on whether the route of hysterectomy affects the subsequent development of POP. The aim of the study was to assess POP and sexual function 1 year after a hysterectomy when comparing total abdominal hysterectomy (TAH) with total laparoscopic hysterectomy (TLH). The study applied the pelvic organ prolapse quantification (POP-Q) as the measure of POP and a short-form of the POP/Urinary Incontinence Sexual Function Questionnaire (PISQ-12).

**Material and methods:** All patients that underwent either TAH or TLH due to benign causes between March 2016 and March 2017 at the tertiary hospital used for the study were included in our prospective cohort study. POP-Q measurements and PISQ-12 scores were assessed 1 year postoperatively.

**Results:** We included 182 patients in the clinical examinations. There were no statistically significant differences in demographic characteristics between the TAH and TLH groups. Also, there were no differences observed in the objective POP measurements between the two study groups. Results of the two groups' PISQ-12 scores were also similar. However, postoperative vaginal lengths were found to be significantly shorter in the patients who had undergone TAH compared with those who had undergone TLH.

**Conclusions:** TAH and TLH are comparable regarding short-term objective pelvic organ prolapse. Although we found statistically a significant difference in vaginal lengths between the two groups, no clinical significance was found in terms of sexual function.

**Keywords:** hysterectomy; pelvic organ prolapse; sexual function

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## INTRODUCTION

Hysterectomy is one of the most commonly performed gynaecological surgery procedures [1]. With the widespread use of endoscopic surgery, abdominal hysterectomy rates have decreased, while laparoscopic hysterectomy rates have gradually increased [2]. The incidence rates of hysterectomies using abdominal, vaginal, and laparoscopic methods are 66%, 22%, and 12%, respectively in United States [3]. Pelvic organ prolapse (POP) is an important health problem

that affects women's daily activities, social and sexual life [4]. POP is defined as a downward descent of one or more of organs, including the anterior vaginal wall, posterior vaginal wall, uterus (cervix) or vaginal apex (vaginal cuff following hysterectomy). Problems with micturition and defecation, pelvic pain and sexual dysfunction may be observed in patients as a result of this descent [5]. It is difficult to demonstrate the true prevalence of POP, as the diagnostic criteria are variable, and the severity of the complaints dif-

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fers across patients. There is also controversy about whether hysterectomies performed because of indications other than POP are a risk factor for POP [6]. In addition, there is no clear consensus on whether the type of hysterectomy is also an aetiological factor [7]. When the risk of undergoing surgery because of POP following hysterectomy, in the absence of POP during hysterectomy, was evaluated by hysterectomy type, no significant difference was found between the results for each the group. While vaginal hysterectomy results in a 1.25-fold increased risk of POP compared with the risk for total abdominal hysterectomy (TAH), a slightly increased risk of POP is present in subtotal hysterectomy compared with TAH [8]. When total laparoscopic hysterectomy (TLH) and TAH were compared, it was found that both displayed the same risk of POP [8]. In our study, we aimed to assess POP development and sexual function 1 year after hysterectomy, comparing TLH and TAH results.

## MATERIALS AND METHODS

Our prospective observational study was conducted in our clinic at the Health Sciences University Kanuni Sultan Süleyman Training and Research Hospital (Istanbul, Turkey) between March 2016 and March 2017. Ethical approval for the study was obtained from the Bakırköy Sadi Konuk Training and Research Hospital Ethics Committee.

Patients who had undergone TAH or TLH because of benign causes other than POP, and whose Pelvic Organ Prolapse Quantification (POP-Q) measurements were established in the preoperative period, were telephoned and invited to attend a 1-year follow-up examination. During the period of our study, 360 patients had undergone abdominal and laparoscopic hysterectomy. 182 of these patients were included in the study, and 178 were not included because

they either did not meet the inclusion criteria for the study, or could not be reached by phone, or did not consent to participate in the study. The exclusion criteria were as follows: patients who had undergone hysterectomy due to malignancy or POP, or who had undergone an additional surgical procedure (antero-posterior vaginal repair, mid-urethral sling, etc.), or who were sexually inactive, or who were not evaluated preoperatively using the POP-Q scoring method. All patients included in the study were sexually active.

During each patient's postoperative period, 12 months after their operation, we performed the POP-Q classification and a short-form of the POP/Urinary Incontinence Sexual Function Questionnaire (PISQ-12). The PISQ-12 is a reliable, validated and easily applicable form of questionnaire and enables an evaluation of women's sexual functions [9]. We used a Turkish translation of the PISQ-12 to assess sexual functions [10]. We applied the POP-Q scoring system as defined by the International Continence Society [11]. The assessment was carried out in the lithotomy position with the patient performing the Valsalva manoeuvre, and total vaginal length was assessed when the patient was in the resting position. We evaluated two points in the anterior compartment (Aa and Bb), two points in the posterior compartment (Ba and Bp) and two points in the apex (C and D) of the vagina; and each of their distances from the hymen were calculated in centimetres. In addition, the total vaginal length, the length of the genital hiatus and the length of the perineal body were measured in centimetres. Staging was carried out using the most distal measurement, considering the hymen as the reference point. The patients were re-examined with a full bladder. The presence of urinary incontinence was evaluated with a cough stress test during both the preoperative and postoperative periods. In addi-

**Table 1.** Clinical characteristics of patients with TAH and TLH

	<b>TAH (n = 92)</b>	<b>TLH (n = 90)</b>	<b>P-value</b>
Age [years]	46.6 ± 3.8	47.9 ± 5.0	0.066
Gravida [n]	4.1 ± 2.2	4.5 ± 2.3	0.264
Parity [n]	3.2 ± 1.8	3.4 ± 1.9	0.557
BMI [kg/m <sup>2</sup> ]	31.8 ± 6.0	31.8 ± 5.4	0.961
<b>Menopausal [n, %]</b>	<b>4 (4.3)</b>	<b>8 (8.9)</b>	<b>0.247</b>
Indications [n, %]			0.983
Myoma Uteri	48 (52,2)	45 (50)	
Endometrial hyperplasia	14 (15,2)	14 (15,6)	
Abnormal bleeding	21 (22,8)	24 (26,7)	
Cervical intraepithelial lesion	9 (9,8)	7 (7,8)	
<b>BSO [n, %]</b>	<b>38 (41)</b>	<b>41 (45)</b>	<b>0.654</b>

Data are expressed as a mean (± standard deviation) or proportions. TAH — total abdominal hysterectomy; TLH — total laparoscopic hysterectomy; BMI — body mass index; BSO — bilateral salpingo oophorectomy; P-value < .05 is considered statistically significant

tion, the presence of urethral hypermobility was evaluated via ultrasonography. All examinations were performed by the same surgeons (NK and BAC).

### Statistical analysis

Statistical analyses were performed using the Statistical Package for the Social Sciences, Version 20 (SPSS Inc.). We used Chi-square and Student's t tests for statistical comparisons.  $P < 0.05$  was considered statistically significant.

## RESULTS

126 TLHs and 234 TAHs were performed between March 2016 and March 2017. Ninety patients who had undergone TLH and 92 patients who had undergone TAH were included in the study. The two groups were similar in terms of age, gravidity, parity and body mass index (BMI) (Tab. 1). The most common indication for hysterectomy was myoma uteri, and no difference was found between the groups in terms of indications (Tab. 1). No statistically significant differences were

observed between the groups in terms of preoperative and postoperative POP-Q measurements except regarding total vaginal length (Tab. 2). While the mean total vaginal lengths of the groups were similar in the preoperative period, the postoperative vaginal length was found to be significantly shorter in the patients who had undergone TAH compared with those who had undergone TLH ( $p = 0.027$ ; Tab. 2). The difference between the preoperative and postoperative vaginal lengths was significantly greater in the TAH cases ( $p = 0.022$ ). The two groups were similar in terms of their PISQ-12 scores.

## DISCUSSION

According to the results of our study, the type of hysterectomy had no effect on the development of POP in the short term, following TAH and TLH. Although the vaginal length was found to be longer in the patients who underwent TLH, we found that this had no clinical significance in terms of sexual functions.

Table 2. Outcomes of POP-Q and PISQ-12

	TAH (n = 92)	TLH (n = 90)	P-value
<b>POP-Q measurement (preoperative)</b>			
Aa	-1 (-3-1)	-2 (-3-1)	0.463
Ba	-2 (-3-2)	-1 (-3-2)	0.685
Ap	-1 (-3-1)	-1 (-3-1)	0.903
Bp	-1 (-3-2)	-1 (-3-1)	0.909
<b>POP-Q measurement (postoperative)</b>			
Aa	-1 (-3-1)	-1 (-3-1)	0.782
Ba	-1 (-3-2)	-1 (-3-2)	0.665
Ap	-1 (-3-1)	-1 (-3-1)	0.848
Bp	-1 (-3-2)	-1 (-3-1)	0.789
Gh	5.6 ± 0.8	6.8 ± 0.3	0.102
Pb	2.6 ± 0.7	2.5 ± 0.8	0.131
<b>POP-Q difference (preoperative-postoperative)</b>			
Aa	0 (0-2)	0 (0-3)	0.661
Ba	0 (0-2)	0 (0-3)	0.605
Ap	0 (0-2)	0 (0-3)	0.538
Bp	0 (0-3)	0 (0-3)	0.869
<b>Vaginal length [cm]</b>			
Preoperative	8.8 ± 0.9	9.1 ± 1.1	0.086
Postoperative	7.9 ± 1.1	8.3 ± 1.3	0.027
Change	0.94 ± 0.80	0.73 ± 0.26	0.022
<b>Postoperative urinary incontinence</b>	<b>17 (% 18,5)</b>	<b>19 (% 21,1)</b>	<b>0.656</b>
<b>Hypermobility urethra</b>	<b>20 (% 21)</b>	<b>13 (% 14)</b>	<b>0.215</b>
<b>PISQ-12 score</b>	<b>19.9 ± 4.5</b>	<b>20.2 ± 4.6</b>	<b>0.757</b>

Data are expressed as mean (± standard deviation), median (minimum-maximum) or proportions; TAH — total abdominal hysterectomy; TLH — total laparoscopic hysterectomy; TVL — total vaginal length; POP-Q — pelvic organ prolapse quantification; P-value < .05 is considered statistically significant

For many years, there has been discussion about whether hysterectomy is a risk factor for POP. In addition, whether the type of hysterectomy has a role in POP development has not been clearly demonstrated; also, based on available data, there is no clear consensus about whether or not the type of hysterectomy is an aetiological factor [7]. Although there are studies reporting that the risks of undergoing POP surgery increases after vaginal hysterectomy, it has been found that this increased risk is in fact reduced when surgery is adjusted by preoperative POP diagnosis [6, 7]. In a study in which the long-term outcomes of subtotal and total hysterectomy were compared, no difference was found in terms of POP or urinary incontinence [12]. Similarly, a study that compared the short- and long-term outcomes of subtotal hysterectomy and total hysterectomy showed that POP stage and prolapse complaints were similar for both groups. Studies have shown that the hypothesis that removal of the cervix would lead to higher rates of sexual, urinary and intestinal dysfunction by causing greater neuroanatomical injury has been rejected, and it has even been concluded that leaving the cervix is unnecessary because of the cyclic vaginal bleeding and the necessity for smear follow up [13, 14]. In a short-term study in which all hysterectomy types were examined in terms of the risks of undergoing POP surgery, the hazard ratios (HRs) for overall POP repair for TAH, TLH and subtotal hysterectomy were found to be 1, 1.04 and 1.08 respectively [8]. This same short-term follow-up study showed no significant difference between TAH and TLH in terms of both the overall and compartmental POP-Q scores. Similarly, we found no significant difference between TAH and TLH groups in POP scores and urinary incontinence. We think that weakness in the pelvic floor and hereditary characteristics, in the presence of predisposing factors, have a greater influence on POP development than the type of hysterectomy.

In hysterectomy, the vaginal length shortens in relation to both the colpotomy incision and suturing of the vaginal cuff. When vaginal lengths are compared by hysterectomy types, it is observed that the postoperative vaginal length shortens independent of the type of hysterectomy, and it is shorter in vaginal hysterectomies compared with TAH and TLH [15, 16]. In our study, the vaginal length was found to be significantly longer in the patients who underwent TLH compared with those who underwent TAH ( $p = 0.027$ ). Less vaginal tissue was removed in the TLH group, compared with the TAH group, due to use of uterine manipulators. This is the reason for the longer vaginal length observed in TLH.

Female sexual dysfunction is a multifactorial condition in which physiological, psychological and social factors play a role. The effect of hysterectomy on sexual functions is remarkably heterogeneous [17]. Although the view that

hysterectomy has no negative effects on sexual functions predominates, reasons for potential sexual problems include vaginal contraction, injury to nerve endings in the uterovaginal plexus, and psychological factors arising, with a loss of self-confidence and a sense that femininity has been diminished [18, 19]. In addition, the effects of different hysterectomy types on sexual functions are unclear. In a study in which TAH and vaginal hysterectomy were compared, shorter vaginal length and increased dyspareunia were found in the vaginal hysterectomy group [20]. However, another study showed that hysterectomy increased sexual functions and quality of life in the postoperative period independent of the type of hysterectomy [17]. In our study group, a significant difference was present between the vaginal lengths, but the PISQ-12 scores of the groups were found to be similar. This shows that shortening of the vaginal length is not clinically significant in terms of sexual functions.

The most important limitation of the study was that the PISQ-12 questionnaire was not performed in the preoperative period. One of the other limitations was that the study was planned as a prospective, observational study, and the patients were not randomised before the surgical procedures. The low number of patients is another limitation. In a significant portion of the studies related to POP, assessments were made using questionnaires, and physical examination was not performed. However, the fact that POP was evaluated objectively with the POP-Q classification system and that our examinations were performed by two specialists (NK and BAC) who were experienced in this area increases the strength of our study. Again, in most other studies, sexual functions were evaluated with unstandardized questionnaires or questions, whereas our evaluation of sexual functions by way of the PISQ scores enabled us to obtain more objective data.

## CONCLUSIONS

We did not find a difference between TAH and TLH in terms of POP. Although vaginal length shortening was more remarkable in the TAH group, the sexual lives of both groups were similar postoperatively. However, considering the advantages of TLH, including shorter hospitalisation periods, less pain in the postoperative period and faster return to daily life, when compared with TAH, and that TLH achieves similar outcomes in terms of POP and sexual functions in the short term, it may be the preferred option. Larger scale, prospective, randomised studies evaluating long-term follow-up data are needed to demonstrate the effects of TAH and TLH on the functions of the pelvic floor.

### Conflict of interest

The authors report no conflicts of interest.

## REFERENCES

- Lethaby A, Mukhopadhyay A, Naik R. Total versus subtotal hysterectomy for benign gynaecological conditions. *Cochrane Database of Systematic Reviews*. 2012, doi: [10.1002/14651858.cd004993.pub3](https://doi.org/10.1002/14651858.cd004993.pub3).
- Turner LC, Shepherd JP, Wang Li, et al. Hysterectomy surgery trends: a more accurate depiction of the last decade? *Am J Obstet Gynecol*. 2013; 208(4): 277.e1–277.e7, doi: [10.1016/j.ajog.2013.01.022](https://doi.org/10.1016/j.ajog.2013.01.022), indexed in Pubmed: 23333543.
- Wu JM, Wechter ME, Geller EJ, et al. Hysterectomy rates in the United States, 2003. *Obstet Gynecol*. 2007; 110(5): 1091–1095, doi: [10.1097/01.AOG.0000285997.38553.4b](https://doi.org/10.1097/01.AOG.0000285997.38553.4b), indexed in Pubmed: 17978124.
- Miner PB. Economic and personal impact of fecal and urinary incontinence. *Gastroenterology*. 2004; 126(1 Suppl 1): S8–13, indexed in Pubmed: 14978633.
- Committee on Practice Bulletins—Gynecology and the American Urogynecologic Society. Practice Bulletin No. 176 Summary: Pelvic Organ Prolapse. *Obstet Gynecol*. 2017; 129(4): 763–765, doi: [10.1097/AOG.0000000000002008](https://doi.org/10.1097/AOG.0000000000002008), indexed in Pubmed: 28333810.
- Blandon RE, Bharucha AE, Melton LJ, et al. Incidence of pelvic floor repair after hysterectomy: A population-based cohort study. *Am J Obstet Gynecol*. 2007; 197(6): 664.e1–664.e7, doi: [10.1016/j.ajog.2007.08.064](https://doi.org/10.1016/j.ajog.2007.08.064), indexed in Pubmed: 18060973.
- Dällenbach P, Kaelin-Gambirasio I, Jacob S, et al. Risk factors for pelvic organ prolapse repair after hysterectomy. *Obstet Gynecol*. 2007; 110(3): 625–632, doi: [10.1097/01.AOG.0000278567.37925.4e](https://doi.org/10.1097/01.AOG.0000278567.37925.4e), indexed in Pubmed: 17766610.
- Lykke R, Løwenstein Ea, Blaakær J, et al. Hysterectomy technique and risk of pelvic organ prolapse repair: a Danish nationwide cohort study. *Arch Gynecol Obstet*. 2017; 296(3): 527–531, doi: [10.1007/s00404-017-4470-1](https://doi.org/10.1007/s00404-017-4470-1), indexed in Pubmed: 28733916.
- Rogers RG, Coates KW, Kammerer-Doak D, et al. A short form of the Pelvic Organ Prolapse/Urinary Incontinence Sexual Questionnaire (PISQ-12). *Int Urogynecol J Pelvic Floor Dysfunct*. 2003; 14(3): 164–8; discussion 168, doi: [10.1007/s00192-003-1063-2](https://doi.org/10.1007/s00192-003-1063-2), indexed in Pubmed: 12955337.
- Bilgic Celik D, Beji NK, Yalcin O. Turkish adaptation of the short form of the Pelvic Organ Prolapse/Urinary Incontinence Sexual Function Questionnaire (PISQ-12): a validation and reliability study. *Neurourol Urodyn*. 2013; 32(8): 1068–1073, doi: [10.1002/nau.22369](https://doi.org/10.1002/nau.22369), indexed in Pubmed: 23359251.
- Persu C, Chapple CR, Cauni V, et al. Pelvic Organ Prolapse Quantification System (POP-Q) - a new era in pelvic prolapse staging. *J Med Life*. 2011; 4(1): 75–81, indexed in Pubmed: 21505577.
- Andersen LL, Alling Møller LM, Gimbel HM. Objective comparison of subtotal vs. total abdominal hysterectomy regarding pelvic organ prolapse and urinary incontinence: a randomized controlled trial with 14-year follow-up. *Eur J Obstet Gynecol Reprod Biol*. 2015; 193: 40–45, doi: [10.1016/j.ejogrb.2015.06.033](https://doi.org/10.1016/j.ejogrb.2015.06.033), indexed in Pubmed: 26231437.
- Thakar R, Ayers S, Clarkson P, et al. Outcomes after total versus subtotal abdominal hysterectomy. *N Engl J Med*. 2002; 347(17): 1318–1325, doi: [10.1056/NEJMoa013336](https://doi.org/10.1056/NEJMoa013336), indexed in Pubmed: 12397189.
- Thakar R, Ayers S, Srivastava R, et al. Removing the cervix at hysterectomy: an unnecessary intervention? *Obstet Gynecol*. 2008; 112(6): 1262–1269, doi: [10.1097/AOG.0b013e31818f3bf5](https://doi.org/10.1097/AOG.0b013e31818f3bf5), indexed in Pubmed: 19037034.
- De La Cruz JF, Myers EM, Geller EJ. Vaginal versus robotic hysterectomy and concomitant pelvic support surgery: a comparison of postoperative vaginal length and sexual function. *J Minim Invasive Gynecol*. 2014; 21(6): 1010–1014, doi: [10.1016/j.jmig.2014.04.011](https://doi.org/10.1016/j.jmig.2014.04.011), indexed in Pubmed: 24780383.
- Ercan Ö, Özer A, Köstü B, et al. Comparison of postoperative vaginal length and sexual function after abdominal, vaginal, and laparoscopic hysterectomy. *Int J Gynaecol Obstet*. 2016; 132(1): 39–41, doi: [10.1016/j.ijgo.2015.07.006](https://doi.org/10.1016/j.ijgo.2015.07.006), indexed in Pubmed: 26475076.
- Radosa JC, Meyberg-Solomayer G, Kastl C, et al. Influences of different hysterectomy techniques on patients' postoperative sexual function and quality of life. *J Sex Med*. 2014; 11(9): 2342–2350, doi: [10.1111/jsm.12623](https://doi.org/10.1111/jsm.12623), indexed in Pubmed: 25042204.
- Achtari C, Dwyer PL. Sexual function and pelvic floor disorders. *Best Pract Res Clin Obstet Gynaecol*. 2005; 19(6): 993–1008; quiz A1, doi: [10.1016/j.bpobgyn.2005.08.012](https://doi.org/10.1016/j.bpobgyn.2005.08.012), indexed in Pubmed: 16185931.
- Thakar R, Sultan AH. Hysterectomy and pelvic organ dysfunction. *Best Pract Res Clin Obstet Gynaecol*. 2005; 19(3): 403–418, doi: [10.1016/j.bpobgyn.2005.01.008](https://doi.org/10.1016/j.bpobgyn.2005.01.008), indexed in Pubmed: 15985255.
- Abdelmonem AM. Vaginal length and incidence of dyspareunia after total abdominal versus vaginal hysterectomy. *Eur J Obstet Gynecol Reprod Biol*. 2010; 151(2): 190–192, doi: [10.1016/j.ejogrb.2010.03.031](https://doi.org/10.1016/j.ejogrb.2010.03.031), indexed in Pubmed: 20427116.