Pelvic floor symptoms after gynaecological surgery
Lakeman, M.M.E.

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General discussion
Hysterectomy and pelvic floor symptoms

Vaginal and abdominal hysterectomy are both equally effective in treating symptoms of abnormal uterine bleeding, dysmenorrhea or abdominal pain. The decision of the optimal surgical route is therefore mainly based on the possible adverse effects related to surgery. Until now, vaginal hysterectomy is preferred considering its favouring results on short term outcomes such as hospital stay, post-operative complications and lower costs. We compared the long-term effects of vaginal and abdominal hysterectomy on micturition and defecation symptoms to evaluate if these effects should be incorporated in the decision of surgical route.

We performed a prospective study, including women scheduled for vaginal and abdominal hysterectomy for benign indications, excluding prolapse surgery. We evaluated pelvic floor symptoms before surgery, six months, three years and ten years after surgery using validated disease specific questionnaires. This study led to three observations: First, three years after surgery the risk of having any bothersome micturition symptom was twice as high after vaginal hysterectomy than after abdominal hysterectomy (OR 2.2, 95% CI 1.3-4.0). Second, ten years after surgery, patients who were operated vaginally had an almost four times increased risk of being treated for micturition symptoms, as compared to patients who were operated abdominally (18% vs 8% p=0.02, adjusted OR 3.8 95% CI 1.2-11.6). Third, ten years after surgery the prevalence of defecatory symptoms did not significantly differ between the two surgical routes (58% vs 46%, p=0.08).

We acknowledge that our study may be limited by the observational design, our findings may therefore be biased due to confounders such as uterine descent, uterine size, age, parity and possibly also unknown confounders. By careful documentation of the known potential cofounders we corrected for these factors during statistical analysis. Ideally we would have performed a randomized controlled trial, however, too few gynecologists were willing to participate. Since until now, still no randomized controlled trials comparing vaginal and abdominal hysterectomy have been performed, our prospective study currently is the best available evidence.

Micturition symptoms after hysterectomy

Our study led to the conclusion that women were more at risk to develop micturition symptoms and undergo treatment for these symptoms after vaginal hysterectomy. One could argue that this might be caused by the fact that women in the vaginal hysterectomy group had more uterine descent and might therefore already be more prone to micturition symptoms. In our study group we found no evidence for this theory as the prevalence of micturition symptoms before surgery was the same in both groups. Furthermore, we corrected for statistically significant differences in patient characteristics such as uterine descent, parity and uterine size during statistical analysis. Stress urinary incontinence (SUI) was the most prevalent micturition symptom patients were treated for. In a study in which we constructed a prediction rule to calculate the individual risk of SUI after hysterectomy, we identified vaginal approach of hysterectomy as an independent risk factor for de novo SUI after surgery.

A possible explanation for the increased risk to develop micturition symptoms and undergo
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treatment for these symptoms after vaginal hysterectomy is that during vaginal hysterectomy a larger amount of downwards traction is applied to the cervix and its surrounding tissue. This large amount of traction, especially in difficult cases, could contribute to irreversible damage of the pelvic innervation. The pudendal nerve, which innervates the urethral sphincter, might be at risk for damage due to overstretching related to downwards traction of the cervix. The downward traction applied to tissue might also cause more supportive tissue damage and hypermobility of the urethra. Furthermore, during vaginal hysterectomy the paravaginal tissue might be more dissected, thereby disrupting the pelvic neurons passing from the lateral aspect of the vagina and along the anterior wall.

An interesting observation of our study was that this difference in micturition symptoms between vaginal and abdominal hysterectomy appeared only three years after surgery. This finding stresses the importance of long-term follow-up, especially in studies evaluating pelvic floor symptoms. We therefore also evaluated the prevalence of micturition symptoms ten years after surgery. At that time we no longer found a difference in the prevalence of micturition symptoms. However, women who were operated vaginally reported an almost four times increased risk of being treated for micturition symptoms and were therefore no longer symptomatic. Most women were treated for SUI. This stresses the importance of evaluating received treatment, as ten years after surgery, we would have missed the difference in micturition symptoms if we wouldn’t have asked women if they had received any treatment for pelvic floor symptoms.

An explanation for the fact that a difference in micturition symptoms was only found several years after surgery and not six months postoperative might be that hysterectomy is an acute trauma causing damage to the innervation and supportive tissue. The chronic progressive effects of this damage, in combination with other risk factors such as BMI or ageing, might induce micturition symptoms many years after the trauma itself. The same effect has been described after other traumas to the pelvic floor such as vaginal delivery. Naturally, ageing itself has adverse effects on pelvic floor function. After trauma to the pelvic floor, such as induced by surgery, these effects of ageing may be overshadowed by the greater traumatic effects of hysterectomy.

Another explanation for the fact that we only found a difference in micturition symptoms several years after surgery might be that the positive impact of removing the symptoms which indicated for hysterectomy gradually subside over the years, revealing the possible negative impact of hysterectomy on micturition symptoms.

Designs of previous studies evaluating micturition symptoms after vaginal and abdominal hysterectomy were mostly cross-sectional. In studies with cross-sectional designs the ability to correct for pre-operative differences in the prevalence of micturition symptoms is limited. Some of these studies reported that the incidence of stress urinary incontinence was increased after vaginal hysterectomy compared with after abdominal hysterectomy, whereas other studies found no difference.

In our study we did find vaginal hysterectomy to be associated with an increased prevalence of urinary symptoms. Since our study is the first study to prospectively compare the long-term effects of vaginal and abdominal hysterectomy on urinary symptoms, this study adds important knowledge which should be used during counselling for the preferred route of surgery. However,
considering the limitations of our observational design and the relatively large advantages of vaginal hysterectomy on short term outcomes such as hospital stay and return to daily activity, we consider the findings of our study insufficient to prefer abdominal hysterectomy in women in whom vaginal hysterectomy is technically feasible.

Defecation symptoms after hysterectomy
With respect to defecation symptoms, we observed that ten years after hysterectomy the prevalence of any defecation symptom did not differ from the prevalence before surgery. This is in line with what Thakar et al. concluded after reviewing the literature for bowel function after hysterectomy15.

We compared the effects of abdominal and vaginal hysterectomy on defecation symptoms, and found no statistical significant differences. We did find a trend towards an increased risk of fecal incontinence after vaginal hysterectomy (OR 2.1 95% CI 1.0-4.4 p=0.06, adjusted OR 2.9, 95% CI 0.9-8.9). The finding of an increased prevalence of fecal incontinence after hysterectomy is in line with one previous prospective study which performed a three year follow up after vaginal and abdominal hysterectomy16. This study found an increase in fecal incontinence after both surgical routes and did not directly compare vaginal and abdominal hysterectomy. The pathophysiologic explanation for this finding might be that the pudendal nerve, which supplies motor and sensory innervation to the anal sphincter, is damaged during traction applied to the cervix or during the dissection of the cervix from the posterior vaginal wall17. As the traction applied to the cervix and the posterior vaginal wall is more extensive during vaginal hysterectomy, women might be more at risk for developing fecal incontinence after this route of surgery. With our prospective study we only found a trend, indicating that this finding has to be confirmed in other prospective or randomized studies.

Adjustment in surgical technique to prevent pelvic floor symptoms
Since the main hypothesis for the development of micturition and defecation symptoms after hysterectomy was damage to the innervation of the pelvic floor, we also aimed to evaluate whether adjustment of surgical technique could reduce hysterectomy-related adverse effects on micturition and defecation symptoms. The adjustment in the technique was made by using electrosurgical bipolar vessel sealing to enable the surgeon to cut the surrounding tissues closer to the uterus. Furthermore, since no sutures are needed, less traction to the tissue is needed to enable adequate visualization.

We performed two randomized controlled trials comparing vessel sealing with conventional clamping. One in women undergoing vaginal hysterectomy and one in women undergoing abdominal hysterectomy. We found that six months after vaginal as well as abdominal hysterectomy the prevalence of micturition and defecation symptoms did not differ between women operated using vessel sealing or conventional technique. An explanation for this finding might be that even though vessel sealing techniques do limit innervational damage, this reduction in damage is too small to cause clinically relevant differences in micturition and defecation symptoms. Or maybe the manipulation of the uterus, and the traction applied to the uterus
and ligaments during vaginal as well as abdominal hysterectomy already causes innervational damage. If innervational damage is done during manipulation alone, vessel sealing techniques may not help limit innervational damage. Another explanation for the absence of a difference in pelvic floor symptoms between the two surgical techniques, might be the short follow-up period of only six months. Other previous studies with a short follow-up were also not able to demonstrate an increase in urinary symptoms after hysterectomy\textsuperscript{18-21}, whereas studies with at least two year follow-up did find increased urinary incontinence and voiding difficulties\textsuperscript{9,11,22,23}.

An interesting finding of the RCT in women who underwent abdominal hysterectomy was that vessel sealing seemed to cause less pain during the first five days after surgery (repeated measurement analysis: \( p < 0.01 \)). These women also seemed to return to daily activities sooner (on average 8 days earlier as compared to the conventional group (log-rank test, \( p = 0.07 \))). We explained this finding by the shorter operation duration and the less extensive traction applied to the tissue. Therefore we also expected to find this difference in women who underwent vaginal hysterectomy. In this study the women only reported less pain during the evening following vessel sealing surgery, but did not report less pain in subsequent postoperative days. This is probably explained by the overall low pain scores found in this study, after the first post-operative day. Pain scores after abdominal hysterectomy are probably higher as a result of the added pain of the abdominal incision which adds to the pain of hysterectomy itself\textsuperscript{24}.

**Recommendation for clinical practice and further research**

Current gynecological practice dictates that, when feasible, vaginal hysterectomy is the surgical route of choice for benign hysterectomy\textsuperscript{1,25}. This is based on numerous studies showing vaginal hysterectomy to be associated with earlier return to normal activities, shorter duration of hospital stay and reduced infective morbidity compared with abdominal hysterectomy\textsuperscript{1,25,26}.

Since pelvic floor symptoms are known to have a negative effect on patient’s quality of life\textsuperscript{27,28}, the observed increased risk of needing treatment for micturition symptoms after vaginal hysterectomy should be added to the counseling for route of hysterectomy. The current available evidence does not justify the conclusion that the increased risk of developing micturition symptoms after vaginal hysterectomy outweighs the advantages of vaginal hysterectomy on short term outcomes such as faster return to normal daily activities, shorter duration of hospital stay and fewer febrile episodes\textsuperscript{25}. In our observational design we did correct for all known confounders, but unknown confounders such as possibly pre-operative tissue characteristics could not be accounted for. If our findings are confirmed by more prospective studies or, preferably, by an RCT, we need to change current practice and advice patients to have abdominal surgery instead of vaginal surgery.

The search for a way to limit surgical damage, and hereby limit the risk of developing micturition symptoms, should continue. In this thesis we tried to limit surgical damage by using electrosurgical bipolar vessel sealing. This technique proved to have some advantages with regard to operation duration and post-operative pain, but it did not reduce the risk on micturition symptoms.

Another option to limit surgical trauma might be by performing laparoscopic hysterectomy. Several studies have shown that this technique causes less tissue trauma as compared to abdominal hysterectomy\textsuperscript{29,30}. Whether a reduction in tissue trauma with laparoscopic hysterectomy also leads
to a reduction in micturition symptoms requires further study. Only one RCT compared pelvic floor symptoms one year after abdominal hysterectomy with one year after total laparoscopic hysterectomy. This study showed promising results favoring total laparoscopic hysterectomy over abdominal hysterectomy with respect to post-operative micturition symptoms. Two prospective observational studies on micturition symptoms after hysterectomy also included patients who underwent laparoscopic hysterectomy. One study reported laparoscopic hysterectomy to be associated with an increased risk of urinary incontinence, whereas the other study reported no differences between the various surgical techniques. Unfortunately in our prospective study no laparoscopic hysterectomies were included, as ten years ago when we included women for this study, laparoscopic hysterectomy was not commonly performed in the participating centers.

Future studies should concentrate on a randomized comparison of vaginal and laparoscopic hysterectomy, evaluating micturition symptoms after surgery. Whereas vaginal hysterectomy still has clear benefits over abdominal hysterectomy with regard to peri-operative outcomes, the difference in surgery-related morbidity between vaginal hysterectomy and laparoscopic hysterectomy is quite small. The most recent meta-analysis comparing vaginal and laparoscopic hysterectomy has shown that laparoscopic hysterectomy is associated with reduced postoperative pain scores and reduced hospital stay, but takes longer to perform. If total laparoscopic hysterectomy, compared to vaginal hysterectomy, proves to be beneficial with respect to post-operative pelvic floor function, this should change clinical practice such that for some categories of patients in whom vaginal hysterectomy is technically feasible, a laparoscopic approach is preferred.

In conclusion, when scheduling a hysterectomy, vaginal hysterectomy is still the surgical route of choice considering its advantages on short term outcomes. One should realize that this route of surgery does increase the risk of developing micturition symptoms. As these symptoms are known to negatively affect the quality of life, we recommend that the search for a less traumatic operative technique should continue.

Gynaecological surgery and sexual function

The aim of the second part of this thesis was to evaluate the effect of gynaecological surgery on vaginal innervation and vasocongestion and the association between changes in these physiological parameters and changes in sexual function. The ultimate goal of better understanding the physiologic effects of vaginal prolapse surgery is to modify surgical treatment in such a way that damage is reduced without compromising functional outcome.

First method to measure vaginal wall sensibility
We first aimed to develop and validate a reproducible technique to objectively quantify vaginal wall sensibility in different areas of the vaginal wall. The method we developed consisted of a pulse-generating electrode which was attached to the gloved index finger of the investigator.
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Measurements were performed by holding the pulse-generating electrode to four different target areas in the vaginal wall (distal and proximal, posterior and anterior). A validation study to evaluate the reproducibility of this method showed an almost excellent intra-observer reproducibility (pearson's-rho correlation coefficient 0.77-0.96 p < 0.001), but a moderate inter-observer agreement (pearson's-rho correlation coefficient 0.39-0.49). This moderate inter-observer agreement is probably best explained by the variance in the force the researchers exerted, during the measurements, to the vaginal wall. Therefore this method can only be used if all measurements are performed by the same researcher.

**Second method to measure vaginal wall sensibility and vasocongestion**

In the second method we developed to measure vaginal wall sensibility, the pulse-generating electrodes were attached to a vaginal combi-probe, hereby avoiding the influence of the researcher on the measurement. The vaginal combi-probe also included measurements of vaginal vasocongestion using Vaginal Pulse Amplitude (VPA). We originally intended to also include measurements of pelvic floor muscle activity, but unfortunately this appeared not to be technically feasible at the time of study start.

The vaginal combi-probe was sized and shaped as a menstrual tampon and could be inserted by the patient herself, eliminating investigator factors from the measurements. Depth and orientation of the probe is controlled by a 9 x 2-cm acrylic plate. The probe remains positioned in an unaltered fashion during measurements, as such avoiding variation in force as a function of pressure.

**Studies evaluating the effects of gynaecological surgery on vaginal innervation and vasocongestion**

We performed three studies using these methods to measure vaginal innervation and vasocongestion. In the first study, measurements of vaginal wall sensibility using the older method of the pulse-generating electrode attached to the investigator's finger, were performed as part of an RCT comparing recurrence of prolapse following vaginal and abdominal prolapse surgery. The second and third study were prospective observational studies evaluating the effect of surgery (prolapse surgery and hysterectomy, respectively) on vaginal wall sensibility and vaginal vasocongestion using the newer vaginal combi-probe. In all three studies, vaginal wall sensibility was measured on 4 locations: three and six centimetres from the introitus in the midline on the anterior and posterior vaginal wall.

The first study yielded two main observations: first, vaginal prolapse surgery resulted in decreased vaginal wall sensibility in the distal posterior vaginal wall whereas abdominal prolapse surgery did not (median difference, between before and after surgery, in sensation threshold: after vaginal surgery -3mA, after abdominal surgery 5mA, p=0.02); second, if abdominal prolapse surgery was combined with incontinence surgery, it resulted in decreased vaginal wall sensibility in the distal anterior vaginal wall (median difference, between before and after surgery, in sensation threshold: with incontinence surgery -4mA, without incontinence surgery 2mA, p=0.01). The second and third study yielded three observations: [1] vaginal wall sensibility in the proximal posterior vaginal wall was decreased after vaginal prolapse surgery (pre-op 13.3mA vs post-op 17.5mA, p<0.05), after vaginal hysterectomy a trend was observed towards decreased vaginal wall sensibility in this same location.
area (pre-op 10.4mA vs post-op 14.7mA, p=0.08). On the other locations vaginal wall sensibility was not affected by surgery. After abdominal hysterectomy no decrease in vaginal wall sensibility at any location was found. [2] Vaginal prolapse surgery negatively impacted vaginal vasocongestion (pre-op 2.4 mV (SD 2.5) vs post-op 1.7mV (SD 2.4), p=0.05), whereas vaginal vasocongestion was unaffected after hysterectomy. [3] We could not demonstrate a direct impact of these changes in vaginal physiology on sexual function as assessed with questionnaires.

A drawback of all studies mentioned here was the small sample size and the large subject refusal rate. Apparently, prospective studies with psychophysiological measures and sexual stimuli are very challenging for women who are about to undergo surgery. Yet, these studies are among the first to assess the effects of prolapse surgery and hysterectomy on vaginal innervation and vasocongestion, and the first to simultaneously measure vaginal wall sensibility and vaginal vasocongestion. As such, these studies offer interesting findings that deserve replication and extension.

The effects of gynaecological surgery on vaginal wall sensibility

When summarizing our finding regarding vaginal wall sensibility, we observed that vaginal wall sensibility was affected by vaginal prolapse surgery, abdominal prolapse surgery with incontinence surgery and by vaginal hysterectomy. Initially, we explained this decrease in vaginal wall sensibility by the extensive vaginal wall dissection during surgery, resulting in damage of the free nerve endings located in and near the vaginal epithelium and around the small blood vessels. This seemed plausible as after vaginal prolapse surgery the main decrease in vaginal wall sensibility was found in the proximal posterior vaginal wall after sacro-spinous ligament fixation, and after colposuspension the largest decrease in vaginal wall sensibility was found in the distal anterior vaginal wall. Both of these locations correspond with the area in which the main part of the procedure was performed. However, direct surgical trauma could not explain the decrease in vaginal wall sensibility that was found in the proximal posterior vaginal wall after simple vaginal hysterectomy without concomitant surgery. During vaginal hysterectomy the only incision made is around the cervix, and not in the posterior vaginal wall. We hypothesize that the decrease in vaginal wall sensibility may be related to continuous downwards traction exerted to the vaginal tissue during vaginal surgery. This second hypothesis is an important one, as during any vaginal surgery, traction must be applied to the tissue to enable visualization during the procedure. The conclusion that this traction is an important cause of damage to vaginal innervation might make the vaginal approach less attractive. Before making any definite recommendations, however, our findings have to be confirmed in studies with larger sample sizes.

Another explanation for the decrease in vaginal wall sensibility, especially in the proximal posterior vaginal wall after vaginal hysterectomy and sacro-spinous ligament fixation, might be overstrecthing of the vagina. Fixation of the vagina in an overstretched fashion might induce a constant stimulation of afferent nerves, resulting in less sensibility to different stimuli, such as the stimuli applied by the test-stimulator.

The effects of gynaecological surgery on vaginal vasocongestion

Regarding vaginal vasocongestion after gynaecological surgery we observed that vaginal
vasocongestion did seem to be negatively affected by vaginal prolapse surgery, whereas it was unaltered after hysterectomy. This finding may be explained by the area in which the operation is performed. During vaginal prolapse surgery the free nerve endings in and near the vaginal epithelium might be affected due to trauma during dissection of the vaginal epithelium. The afferent impulses from these nerves are important in enhancing vaginal vasocongestion through activation of spinal autonomic pathways. Furthermore, VPA mainly assesses vaginal vasocongestion in the total peripheral microcirculation. Vaginal prolapse surgery might cause damage to this peripheral microcirculation as a result of direct trauma during the dissection. During hysterectomy the only incision made in the vagina, is the one circulating the cervix during the start of the procedure. The rest of the vaginal wall is left untouched, thus theoretically not altering the status of vaginal vasocongestion.

It was hypothesized that occlusion of the uterine artery during hysterectomy might also alter vaginal vasocongestion. However, the human vagina receives arterial blood supply not only from uterine artery, but also from the vaginal artery, the internal pudendal artery and the vaginal branch of the middle rectal artery. All of the mentioned arteries form a network of anastomoses located in the adventitia. The absence of blood supply from one of the arteries is probably compensated by blood supply from the other arteries.

The effect of changes in vaginal wall sensibility and vasocongestion on sexual function

With our studies we could not show an apparent impact of the changes in vaginal innervation and vasocongestion on sexual function. This contrasts the findings in male patients after non-nerve sparing radical prostatectomy, in whom regaining erectile function is not expected. Five explanations are offered that may clarify this absent relationship. The first is the small number of included women in these studies. These small numbers of included women are also possibly biased as it is known that patients willing to participate in a sexuality study have a more positive attitude towards sexuality and are more sexually active. Secondly, changes in vaginal wall sensibility may be too small to be noticed subjectively. Also, changes in vaginal wall sensibility may be relatively unimportant for sexual feelings, given that the vaginal wall seems relatively unimportant for sexual pleasure. For the latter, the clitoris is much more important. Fourthly, the FSFI may be too insensitive to pick up changes related to surgery-induced damage to the genitalia. Finally, and probably most importantly, the absence of an effect of these changes in vaginal innervations and vasocongestion on sexual function may be related to the multidimensional nature of sexual function, consisting of biological, physiological, psychological and interpersonal determinants. For example, before surgery sexual dysfunction might be caused by the pelvic organ prolapse itself, which affects psychological and interpersonal determinants such as women’s confidence and body image, whereas after surgery the procedure itself and possible damage to vaginal vasocongestion and vaginal wall sensibility might be the cause of sexual dysfunction. Changes in psychological and contextual factors are not accounted for in the used questionnaires and may well compensate for the negative effects of changes in vaginal innervation and vasocongestion. Previous studies evaluating the influence of psychological factors on post-operative sexual well being have reported preoperative psychiatric morbidity, depression and unsatisfactory
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preoperative sexual function to be associated with poor outcome\textsuperscript{44,45}, whereas education about possible negative outcomes, the decrease in chronic pelvic pain and pain during intercourse, the elimination of menstrual pain and dysfunctional uterine bleeding enhanced post-hysterectomy sexual function\textsuperscript{44,46}. In future studies, these factors should ideally all be independently assessed. Only then firm conclusions about the impact of changes in vaginal wall sensibility and vasocongestion on sexual function can be drawn.

	extit{Recommendations for clinical practice and future research}

With our studies we provided support for the hypothesis that vaginal prolapse surgery and vaginal hysterectomy affect vaginal wall sensibility in the proximal posterior vaginal wall and that vaginal prolapse surgery affects vaginal vasocongestion. As both of these physiological parameters seem relevant for optimal sexual function, one could expect to find a decrease in sexual function after surgery. Interestingly enough, we could not show a deteriorated sexual function. As sexual function is still the main outcome for patients, it is not possible to give recommendations for the clinical practice based on our studies. But, as it is known that sexual problems are still more common after hysterectomy and after prolapse surgery than in a non-surgical population, our findings should encourage other researchers to also objectify vaginal physiology when analyzing effects of surgery on sexual function. A better insight into these parameters helps explaining why, despite an improvement in gynaecological symptoms, women still have dysfunctional sexual function scores after surgery.

Especially with the development of new surgical techniques in prolapse surgery, allowing more operations to be performed by vaginal approach, our finding that vaginal surgery negatively affects vaginal vasocongestion and innervation, deserves attention. New surgical techniques mainly focus on the use of mesh materials. The effect of mesh materials on vaginal innervation and vasocongestion was not the focus of this thesis. Nevertheless, it is important to briefly consider these, because when using these techniques, a synthetic, mostly polypropylene, mesh is implanted in the vaginal wall. As the synthetic mesh is implanted behind the vaginal mucosa, the risk of direct surgical trauma to vaginal vessels and nerves may even be more extensive as compared to conventional surgery. These synthetic meshes have already been associated with an increase in sexual dysfunction\textsuperscript{47-50}. The first studies mainly showed an increase in dyspareunia, and more recent studies also reported an increase in anorgasmia and lubrication problems\textsuperscript{47-50}. This now is often explained by shrinkage and stiffening of the mesh material, resulting in a less pliable vagina\textsuperscript{51}. Decrease in vaginal wall sensibility and vasocongestion could also be an important factor. We now have the settings to evaluate if changes in vaginal innervation and vasocongestion contribute to the development of such symptoms after surgery.

The aim of future studies should therefore be, first, to evaluate damage to vaginal innervation and vasocongestion after different types of surgical procedures, and second, to evaluate these findings within the multidimensional framework of female sexual dysfunction. If these studies indeed show that damage to vaginal innervation and vasocongestion are important in the development of female sexual dysfunction, the performed surgical techniques should be adjusted accordingly.
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