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## Pelvic Organ Prolapse and Incontinence

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### INTRODUCTION

Pelvic organ prolapse (POP) and urinary and fecal incontinence are frequently referred to as pelvic floor dysfunction (PFD) because the pelvic floor is considered to be the combined denominator in these complaints. It is also referred to as urogynecology and in the developed world urogynecology is now an established sub-specialty of general gynecology. Next to prolapse and incontinence problems like overactive bladder, vaginal atrophy, sexual dysfunction and pelvic pain are also considered as part of urogynecology.

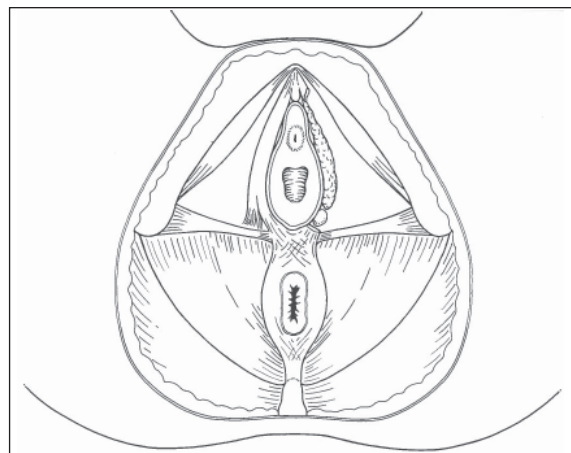
PFD is highly prevalent in the western world. It is estimated that one in every five to nine women will be operated on at least once in her life for one of these symptoms and, of these, at least one in three will need a second, or next, operation. Due to increasing aging the demand for care of these women is steadily increasing. Prevalence studies on urinary incontinence have shown that involuntary urine loss occurs in >50% of middle-aged women; however only some of these will seek help and the majority is not seriously bothered by the incontinence. POP is diagnosed in 40% of women when performing a physical examination but only 10–12% will have the typical symptoms of experiencing a vaginal bulge. Fecal incontinence is less frequent but is highly prevalent in the very old age group and especially in nursing homes.

Prevalence on data of symptoms of PFD in the developing world is scarce. However POP is known to be highly prevalent in certain countries. Data are available, amongst others countries, from Gambia, Ghana, Nepal, Nigeria and Pakistan, with a mean prevalence for prolapse of 19.7%, and 28.7% for urinary incontinence<sup>1</sup>.

### FUNCTIONAL ANATOMY

The pelvic floor consists of muscles and connective tissue which together function as a barrier to prevent downward movement of the pelvic organs like the bladder, uterus and rectum (Figure 1). The most important muscle is the levator ani muscle which runs from the inner side of the pubic bone to the ischial spine and tendinous arch and coccyx. The two halves of the muscles convert in the mid-line with openings for the rectum, vagina and urethra. When the levator ani contracts the muscle becomes more horizontal and lifts up the pelvic organs into a more cranial position. A good functioning levator ani is essential for the proper function of vagina, rectum and bladder.

The bladder is a hollow muscular organ which lies anteriorly above the pelvic floor. It is highly distensible and can contain, normally, 500cc of urine. The muscle of the bladder is called the



**Figure 1** The muscles of the pelvic floor as seen from below. From anterior to posterior there are openings for the urethra, the vagina and the rectum

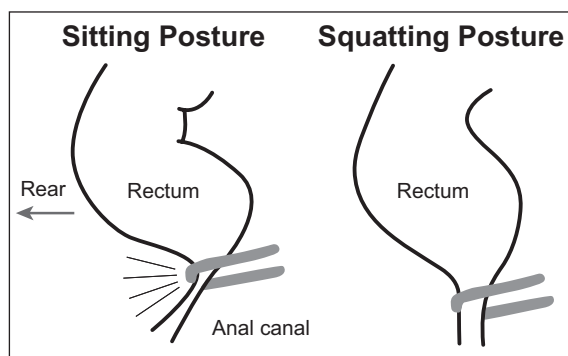
detrusor muscle. The urethra is roughly 3 cm long and passing through the pelvic floor and is anteriorly well connected to the symphysis pubis by two pubo-urethral ligaments. The proper anterior position of the urethra is crucial for a normal continence mechanism.

The anal sphincter complex consists of an internal and external anal sphincter muscle. The internal sphincter is a circular involuntary muscle structure and a continuation of the smooth muscle of the rectum. The external anal sphincter is a voluntary circular muscle well connected to the levator ani. A special loop of the levator ani, the puborectal muscle, forms a sling behind the rectum which keeps the anal canal in a position at a 90° angle to the rectum which helps to obtain fecal continence (Figure 2).

The area between the anus and the vagina is called the perineum and the perineal body supports the lower part of the vagina. It is frequently damaged during childbirth.

The uterus is kept in an anterior and cranial position by several ligaments of which the sacro-uterine ligaments which run from the cervix to the sacrum are the most important to prevent a descensus of the uterus. Anteriorly and cranially the round ligaments run from the uterine corpus to the inguinal canal into the labia majora. They are relatively elastic and not important to prevent uterine descensus.

For a proper functioning of the pelvic floor and all the pelvic organs a normal innervation is also required. Usually nerve damage occurs in the



**Figure 2** Left, the anal canal in the normal (sitting) position; the anal canal is kept at a 90° angle to the rectum by the contracted puborectalis muscle. The puborectalis muscle 'chokes' the rectum to maintain continence. Right, the puborectalis muscle is relaxed during defecation and there is no angle between the anal canal and the rectum

smaller end branches of the nerves most commonly during delivery. The pudendal nerve is the crucial nerve for pelvic floor innervation. Innervation of the bladder is complex because it is autonomously innervated by both the sympathetic and parasympathetic system. Micturition is mostly a parasympathetic or cholinergic action with acetylcholine as the most important neurotransmitter in the bladder wall. The adrenergic or sympathetic system is mostly present in the urethra and can relax the urethral muscles. The delicate balance between the adrenergic and cholinergic system, which is also under the influence of somatic voluntary nerves, can easily be disrupted. In many neurological illnesses such as multiple sclerosis and spinal cord injury this balance is disturbed with either incontinence or retention, or a combination, as result.

#### PATHOPHYSIOLOGY OF PELVIC FLOOR DYSFUNCTION

The pelvic floor in women is a vulnerable structure. The upright posture of humans facilitates POP, in contrast with most other mammals which walk on four feet. The pelvic floor has contradicting functions. It is supposed to control for downward falling of the pelvic organs but also at the same time has to allow for a normal defecation and micturition.

The ultimate threat to the pelvic floor is vaginal childbirth when a large baby has to pass the pelvic floor. With a vaginal delivery it can be easily envisaged that damage may occur to muscles, connective tissue and innervation in various combinations. Large babies, forceps delivery, long lasting labor all have the potential of causing additional damage. But also, old age, heavy physical work, smoking, overweight, pushing for constipation and loss of estrogens are important factors in the development of PFD. Next to these environmental circumstances there is a genetic background risk which also differs from woman to woman and is influenced by ethnic differences. It is known for instance that women of African origin are less prone to stress incontinence than Caucasian women.

#### URINARY INCONTINENCE

There are several forms of urinary incontinence:

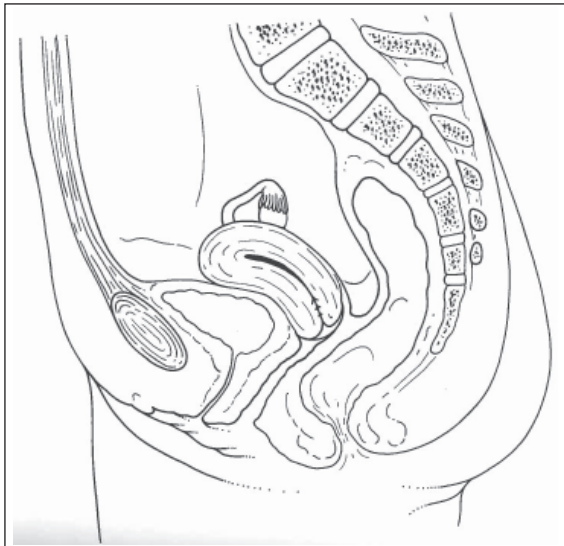
- *Stress incontinence* occurs when urine is lost during moments of increased abdominal pressure

such as coughing or heavy lifting. It is usually not accompanied by an urge to void and the amounts lost are in general relatively small.

- *Urge incontinence* describes the involuntary loss of urine with a strong sensation to void; the patient does not make it to the toilet in time. In severe cases whole bladder content can be lost.
- *Mixed incontinence* means the presence of both types of incontinence in one patient.
- *Overactive bladder (OAB) syndrome* refers to a combination of frequency of micturition (>8/day), urgency (impossible to postpone micturition) with or without urge incontinence and nocturia (nightly voids).
- *Overflow incontinence* happens when the bladder is not at all or insufficiently emptied.
- When there is a *vesico-vaginal fistula (VVF)* (see Chapter 21) there is a constant loss of urine without any characteristic pattern.
- It is not always possible to determine the type on the basis of the history alone; in that case the term *atypical incontinence* is used.

### Pathophysiology of urinary incontinence

Stress incontinence is in essence a problem of the urethra in which the closure function does not work properly. The most common form is urethral



**Figure 3** Normal position of the urethra above the pelvic floor. In this situation the pelvic floor helps to keep the urethra closed during intra-abdominal pressure rise. If the urethra lies below the pelvic floor (hypermobile urethra) this is not possible

hypermobility which can be considered as a prolapse of the urethra and urethral part of the vaginal wall. Normally, the position of the urethra in relation to the pelvic floor helps to prevent incontinence at moments of increased abdominal pressure even if the abdominal pressure far exceeds the pressure in the urethra (Figure 3).

This phenomenon is called pressure transmission where the pressure produced in the abdomen also helps to close the urethra. Correct pressure transmission can occur only if the urethra is fixed in a correct position through its ligaments. When the urethra is lowered, or hypermobile under the influence of abdominal pressure, pressure transmission will be inadequate and the urethra won't be closed properly. Therefore operations or devices which restore or fix the urethra in a normal position will be able to cure stress incontinence.

Urge incontinence is a problem of the storage capacity of the bladder itself. When a normal bladder fills, its pressure is constant at a very low level until it is full and micturition can start. Then the muscle surrounding the bladder contracts, pressure in the bladder increases, the urethra relaxes and the flow of urine begins. When there is detrusor overactivity (DO) the bladder starts to contract before its capacity is reached with involuntary leakage and urge incontinence as a consequence. DO can only be diagnosed during a urodynamic study. Schistosomiasis and bladder cancer may be associated with urge incontinence because of bladder irritation which can lead to involuntary contractions of the detrusor muscle.

### History taking

First start with asking about the type of incontinence: is it urine loss during coughing, sneezing or lifting suggestive for stress incontinence or is it urine loss with a strong urge to void and she doesn't make it to the toilet in time which is suggestive for urge incontinence? Next to the type of incontinence it is important to determine the impact of the incontinence on the woman's life. How much is she bothered by the problem? Obviously this is also dependent on the amount of urine lost. The most troublesome is incontinence on the basis of a VVF when usually all urine produced is lost (see Chapter 21). Incontinence can have severe social repercussions due to smelling and staining of clothes. Often sexual relations suffer heavily.

Important in history taking is also the past surgical and obstetric history. A VVF usually occurs after delivery but can also occur after a cesarean section or hysterectomy. Don't forget to ask about recurrent urinary tract infections (UTIs) which can hint towards overflow bladder, and any medication.

**Physical examination**

You need to perform a vaginal examination to determine the type of incontinence a woman has (see how to do that in Chapter 1 on gynecological examination). During speculum examination you should look for signs of chronic urine leakage with irritation of the vulvar skin.

When stress incontinence is suspected the woman is asked to cough vigorously for confirmation. Do remember to ask the patient whether her bladder is empty. If you have a strong suspicion for stress incontinence and no urine is leaking while the patient is coughing, you might try again with a full bladder or in prone position while standing.

A VVF can usually be seen during physical examination as a hole in the vaginal wall with constant dribbling of urine (see further investigations to diagnose a VVF in Chapter 21).

Ask the patient to push down as during delivery or voiding to check for prolapse (see below). A special form of prolapse is called urethral hyper-

mobility which refers to the sign that, on pushing, the urethra is moving towards you during pushing.

A vaginal examination is performed to check for large intra-abdominal masses such as large uterine fibroids or ovarian cysts which can also provoke incontinence through increased intra-abdominal pressure. You can check the strength of the pelvic floor by asking the woman to squeeze her buttocks as if holding her urine while you do the digital examination. This can also be used to teach the woman how to perform pelvic floor exercises.

**Additional testing**

When frequency or urgency are present a mid-stream urine sample should be checked for UTI, schistosomiasis or hematuria. UTI can cause dysuria but also OAB symptoms and urge incontinence.

A urinary or bladder diary can be very helpful to gain more insight into the nature of the problem (Figure 4). The woman is asked to write on a piece of paper the time of her voids and the amounts of urine produced. In addition the moments when incontinence occurs can be recorded. A bladder diary can be of great value to determine the frequency of micturition, the bladder capacity and the total volume of urine produced in 24h. It is usually recorded for 48h. The woman, however, will need a measuring device, usually a can like that used in the kitchen, and she must be able to write, which can

Fluid volume chart				
Date _____		Name _____		
TIME	AMOUNT VOIDED	LEAKAGE? (Yes or no)	LIQUID INTAKE	COMMENTS
6-8 AM				
8-10 AM				
10-12 AM				
12-2 PM				
2-4 PM				
4-6 PM				
6-8 PM				
8-10 PM				
10-12 PM				
Overnight*				
Total in 24 h	No. of voids	No. of wet pads	Fluid intake	

\* Just make a check mark for night-time voids; no need to measure.

**Figure 4** Example of a bladder diary also called fluid volume chart

be a barrier to using this test in the developing world.

Measuring the post-void residual volume (the volume that is left in the bladder after the patient urinated) to diagnose overflow bladder can be done by bimanual estimation but this is difficult and needs considerable experience. When ultrasound is available it is simple. One measures the bladder in three directions, height (H), width (W) and length (L), and the residual volume is calculated by the formula:  $H \times W \times L$  (in cm)  $\times 0.6 =$  residual volume (in ml). Ultrasound can also be used to detect bladder cancer or bladder polyps (cauliflower-like growths in the bladder wall).

Urodynamic studies in which the flow rate, the post-void residual volume, the bladder capacity and the stability of the detrusor muscle are studied are of great value but are seldom if ever available in developing countries and are therefore outside the scope of this book.

## **Treatment**

### ***Non-surgical***

On the basis of history, physical examination and additional testing a diagnosis is made. The most common form is stress incontinence. Pelvic floor exercises (PFE) should always be initiated before any other form of, operative, therapy. By restoring the strength of the pelvic floor the woman gets better control of her urine loss. One can teach PFE by instructing her to squeeze her pelvic floor in at least two or three sessions per day. Each session should consist of at least 10–20 maximal squeezes. One can teach the woman to use the right muscles during a vaginal examination: insert two fingers in the vagina and ask the woman to squeeze, a firm contraction can be easily felt if the exercise is performed correctly. However quite often a woman pushes instead of squeezes or uses her abdominal muscles instead which can be easily corrected during the examination. PFE are very useful but the patients must be encouraged and the effect will in general only be seen after 1–2 months of hard training.

PFE are also useful in women with urge incontinence or OAB syndrome. However in these cases, in addition to the exercises bladder re-training should also be given. The woman must postpone her voiding by trying to resist her urgency. In the beginning this is difficult and frustrating and can lead to more episodes of urge incontinence.

When successful, however, the bladder capacity will increase, her frequency will diminish and her urge incontinence will improve.

A vaginal pessary, mostly used in vaginal prolapse (see below), can also be used in cases of stress incontinence. It restores the normal position of the urethra with less hypermobility and better functioning of the urethra.

For stress incontinence there is no useful medication available. For urge incontinence anticholinergic drugs can be prescribed. By blocking the cholinergic receptors the bladder becomes less excitable and DO can be cured. However anticholinergics do not specifically work on the bladder only, although sometimes claimed, but on all cholinergic innervated organ, in particular eyes, salivary glands and bowel, explaining the most important side-effects of dry mouth, poor accommodation and constipation. There are several anticholinergics available on the market which do not differ very much in effectiveness or side-effects. Most of them are very expensive. Only oxybutynin is available as a generic. It is prescribed in a dose of 2.5–5 mg three times which must be titrated on effects against side-effects.

When a case of overflow incontinence is diagnosed effective therapy is mandatory since this can have severe repercussions for the kidney function and can lead to kidney failure in the long run. The only available therapy is clean intermittent (self?) catheterization (CIC). In the western world this is performed with disposable catheters but it can also be done with small steel catheters which can be cleaned and cooked for sterilization. It should be performed usually four to six times daily but this can be changed on the basis of the volumes generated. A complication of CIC can be recurrent UTIs. Sometimes this can only be treated by continuous low-dose antibiotics.

### ***Surgery for urinary incontinence***

Stress incontinence is often operated on with a tension-free tape like the tension-free vaginal tape (TVT) or trans-obturator tape (TOT). The tape is polypropylene of 1 cm width which is inserted under the middle of the urethra. The TVT passes just behind the bladder while the TOT goes through the obturator foramen. They are both equally effective with success rates of 85–90%. The technique works by stabilizing the urethra and thus

preventing hypermobility. It is only a small operation but can have severe consequences if performed incorrectly or for the wrong indication. The most bothersome complication is retention which cannot always be cured by tape removal or cutting the tape. TVT or TOT should only be performed in experienced hands in developing countries.

An older operation to cure stress incontinence is the Burch colposuspension. This is a major abdominal procedure in which the vaginal wall is elevated and fixed with permanent sutures to the ligaments posterior to the symphysis pubis (Cooper's ligament). It is an effective but complex and difficult operation (success rates of 80% are reported) but in the western world has been completely replaced by the TVT/TOT.

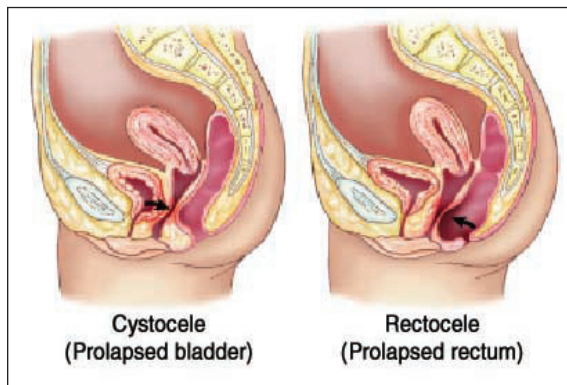
An anterior repair (for technique see below), mostly performed for repairing a cystocele, can also be effective for curing stress incontinence. It is not as effective as the earlier mentioned procedures but can certainly have a place in circumstances when these operations are not possible or available.

VVFs can only be cured surgically (see Chapter 21).

**PELVIC ORGAN PROLAPSE**

POP refers to the condition in which the uterus and/or the vaginal walls protrude in or through the vaginal opening. Several anatomical forms and compartments are differentiated (Figures 5 and 6):

- Anterior vaginal wall prolapse called urethrocele or cystocele (anterior compartment).
- Posterior vaginal wall prolapse called rectocele (posterior compartment).

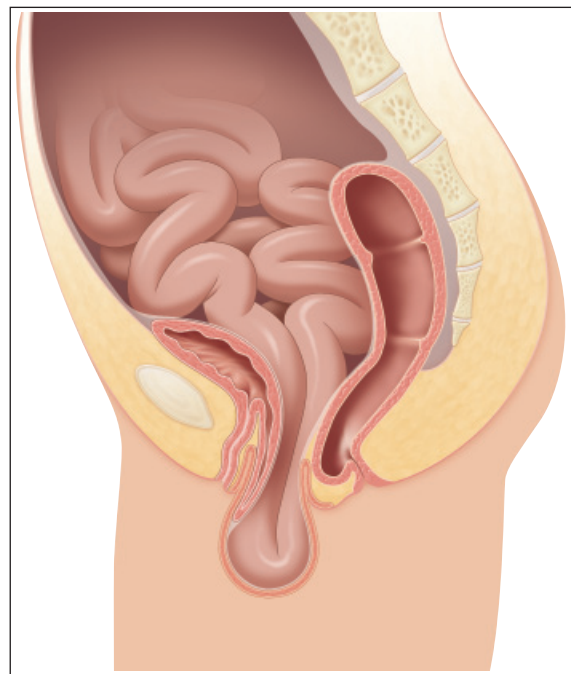


**Figure 5** Example of a cystocele (left) and a rectocele (right). From MDGuidelines.com with permission of Reed Group

- Uterine descensus (central compartment).
- Enterocele when the pouch of Douglas is prolapsing (central or posterior compartment).
- Vaginal vault prolapse in cases where the uterus has been removed (central compartment).
- One specific type of prolapse seldom occurs in isolation but usually in combination, in which one of the compartments is dominant but the other compartments are also involved.

**History taking**

Women with prolapse usually complain of a sense of bulging: 'Something comes out of the vagina'. Usually complaints start relatively mildly in the morning but become worse during the day when gravity and time take their toll. Sometimes the surface of the prolapsing part becomes damaged due to contact with clothing and ulcers or bleeding can occur. Pain is only seldom present. Urinary incontinence is infrequent because the prolapse acts as an obstruction for a normal urine flow. Micturition can be disturbed with usually a difficult obstructed micturition with need to void several times to empty the bladder, or manual correction of the



**Figure 6** Example of an enterocele after removal of the uterus. Illustration ©2008–2012 Tim Peters and Company, Inc., Peapack, NJ USA 07977. Developed in consultation with Patrick Culligan, MD. Morristown, NJ

bladder prolapse to be able to void. Due to a chronic residual volume bladder infections can occur. Defecation can also be obstructed in case of a rectocele. The woman cannot empty her bowels in a normal way and has to push and perform manual correction by holding the vagina or the perineum. A large prolapse can interfere with a normal sex life and give pain and difficulties during intercourse. However, even women with large prolapses can sometimes have a satisfying sex life!

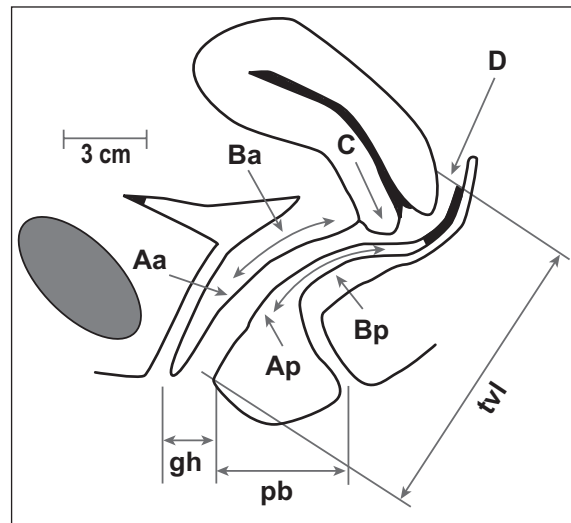
### Physical examination

During speculum examination the woman is asked to push as hard as she can in order to observe the maximum degree of the prolapse. The examination can be done in a supine position. It is crucial to examine all compartments of the prolapse. Therefore one often has to redress the most prominent compartment (usually anterior) and the other compartments are observed also during maximal pushing. Redressing can be done with fingers but often a single bladed speculum is preferred. The degree of prolapse is usually noted in stages 0–4 by the POP-Q staging system. This is a sophisticated and rather complex system and a simplified system can be used. For more information about the POP-Q system see: <http://www.youtube.com/user/BSCWomensHealth#p/c/780EF3BFB716F958/0/LplpznhdMmU>

*Simplified POP-Q* All measurements are done during maximal pushing and three landmarks are determined in relation to the remnants of the hymen (Figure 7).

- Ba the most descending point from the anterior vaginal wall.
- C the cervix or vaginal vault.
- Bp the most descending point of the posterior vaginal wall.

Each point is measured in relation to the hymen and expressed in centimeters. A certain point is positive if it reaches below the hymen and negative if it does not reach the hymen. If it just reaches the hymen it is 0. So a certain patient can have a prolapse with: Ba, +4; C, -3 and Bp, 0. In this case the cystocele is the most dominant and reaches 4 cm below the hymen, the cervix is at 3 cm cranially (higher than) to the hymen and the rectocele just reaches the hymen. On the basis of these findings one can also divide the prolapse into stages:



**Figure 7** POP-Q schedule. For daily practice the points Ba, C and Bp are important

- Stage 0: no prolapse at all.
- Stage 1: prolapse but no point more than 1 cm below the hymen.
- Stage 2: prolapse with the most descending part not more than 1 cm below the hymen.
- Stage 3: prolapse with the most descending part more than 1 cm below the hymen.
- Stage 4: prolapse is total with (hardly) any vagina inside the body.

When examining a woman for a vaginal prolapse it is important to do a proper pelvic examination (and when available ultrasound) because sometimes a large uterus or ovarian cyst can be found which is the cause of the prolapse.

### Treatment

#### Non-surgical

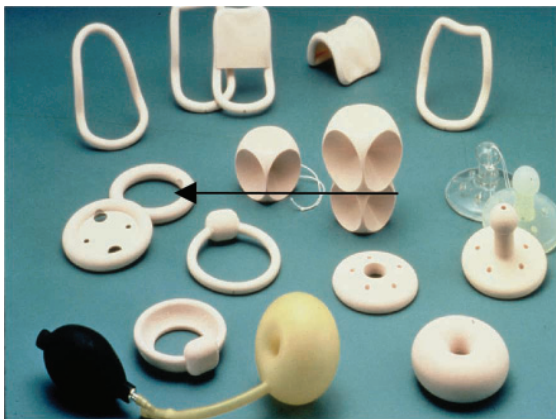
PFE have only a modest role in treating POP but can sometimes prevent a small prolapse from becoming worse. Since no disadvantages are known it is often advised and certainly when there is also urinary incontinence. Local estrogens such as estriol cream can improve the quality of the vaginal epithelium in the postmenopausal patient and can prevent and heal vaginal ulcers and certainly has a role in combination with the use of a vaginal pessary. It is usually given two to three times weekly.

Pessaries are intravaginal devices and come in various forms and sizes. The most commonly used

and which can almost always be used is the round ring pessary usually of 6–8 cm width (Figure 8). It is of great value in developing countries since it is a cheap and safe solution for many women.

Fitting a pessary is usually simple and often takes a little bit of trial and error. The woman should lie in the lithotomy position and the pessary should be lubricated. Many pessaries can be inserted folded. Usually one can start with a 6-, 7- or 8-cm size pessary and insert this. It is better to try a somewhat smaller pessary first. This might fall out but a pessary that is too big can cause pain and discomfort and prevent the woman from continuing with this therapy. After insertion you should check whether it fits well in the vagina. One finger should easily be inserted between the vaginal walls and the pessary and it should never be too big. However a pessary that is too small will not correct the prolapse and will fall out. The ‘ideal’ patient is one with a cystocele or uterine descensus and not too big a vaginal opening. In women with insufficient support from the pelvic floor (vaginal opening is too big) the pessary may fall out. However it is always worthwhile trying to fit a pessary.

When a pessary is fitted successfully the follow-up is only minimal. Quite often it is possible to teach the woman to remove her pessary herself, clean it and re-insert it again after a night left out. Cleaning should only be done with water and you must refrain from soap since this can irritate the vagina. It can be done with an interval of anywhere between 1 week up to 1 month. Leaving out the pessary from time to time prevents the vaginal skin



**Figure 8** Various types of vaginal pessaries. The round ring pessary with and without membrane is marked with an arrow

from becoming too irritated. Alternatively you can ask the woman to go to a clinic or health post for check-up and cleaning. You will have to make sure of course that the health provider knows what to do! Usually this is done every 3–6 months. Combination with estriol cream two to three times a week can prevent vaginal irritation in older women. If bothersome vaginal ulceration does occur the pessary must be left out for a couple of weeks and can be re-inserted when the vagina is sufficiently healed.

Sexual intercourse is possible with a pessary intravaginally, but some worries are present about transmission of HIV in women with a pessary who have a vaginal ulcer caused by pressure necrosis.

### **Surgery for pelvic organ prolapse**

See also [www.atlasofpelvicsurgery.com](http://www.atlasofpelvicsurgery.com).

Before embarking on surgery it is important to realize that POP is not a lethal condition. One should always balance the pros and cons of surgery in a given situation and for the individual patient. The simple fact that there is a prolapse is never enough to justify surgery. The complaints of the woman must lead the decision.

Surgery should almost never only be in one compartment. In general all compartments must be restored otherwise the apparently normally positioned compartments will become more prolapsed after correction of only the dominant compartment. Surgery is not 100% successful. New or recurrent prolapses will occur in a significant percentage of up to 50% and can be difficult to repair. This will mostly depend on the severity of the prolapse and the experience of the surgeon. The most common is recurrence of an anterior compartment prolapse.

The vast majority of surgery for POP can be done through a vaginal procedure. The elements described below can be part of the surgery.

### **Vaginal hysterectomy**

See Chapter 20 for a description of the technique. Also: <http://www.atlasofpelvicsurgery.com/5Uterus/9TotalVaginalHysterectomy/chap5sec9.html>.

The essence of vaginal hysterectomy for POP is not so much the removal of the uterus but restoring the normal position of the vault of the vagina after removal of the uterus. This can be done by fixing the vaginal vault to the remnants of the uterosacral ligaments. This procedure is also known as McCall procedure or high uterosacral plication (HUSP).



### Manchester procedure

This consists of cervical amputation and plication of the uterosacral ligaments. The originally described transposition of the cardinal ligaments to the anterior side of the cervix is left. The technique is as follows:

1. *Amputation of the cervix* Amputate the cervix over 1–2 cm and coagulate all the small bleeding.
2. *Posterior and anterior Sturmdorf suture including the sacro-uterine (SU) ligaments* Put a tenaculum on the cervix again. You can usually palpate the SU ligaments on the posterior side of the cervix where they run at 4 o'clock (left side) and 8 o'clock (right side). Use a strong and big needle for this suture with preferably Vicryl 1 or 2, or comparable, stitch. The posterior stitch goes deep from outside left at 4 o'clock to the cervical canal, then superficially at 6 o'clock it goes only through the vaginal skin and then again a deep stitch from inside to outside from the cervical canal and comes out at 8 o'clock. Do not tie the stitch yet. A similar stitch is performed anteriorly from 2 o'clock deep outside to inside, taking the anterior vaginal wall at 12 o'clock and again a deep stitch from inside to outside from the cervical canal to 10 o'clock. Tie both sutures which is a challenge because they can be under tension. This simple technique plicates and shortens the SU ligaments and covers the amputated cervix. Do not panic if the cervix is still low after the procedure. The uterus will be in a high and fixed position after several weeks. You can do a vaginal posterior repair depending on your preoperative findings. After the operation put an indwelling transurethral catheter for 24 h and a vaginal pack. For a more detailed description of the technique see reference 2.

### Sacrospinous fixation

The cervix or vaginal vault is fixed to the sacrospinous ligaments. It can also be combined with a vaginal hysterectomy. The procedure is relatively difficult and dangerous because the ligament is difficult to reach and the pudendal and ischial nerve can be damaged with disastrous consequences. See reference 3.

### Anterior repair

The anterior vaginal wall is dissected from the bladder and plicated in the midline so a firm layer

between the bladder is created. The superfluous vaginal wall is excised and the vaginal wall is closed again (Figure 9). See reference 4.

### Posterior repair

This is similar to the anterior repair but is between the rectum and the vaginal wall. See reference 5.

### Levator plasty

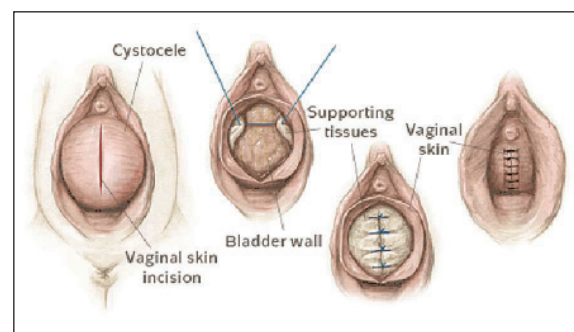
A vaginal opening that is too wide is diminished by plicating the medial borders of the levator muscles. This procedure can create severe pain and narrowing during intercourse. When only done very superficially it is called introital plasty.

### Sacropexy

This is an abdominal approach by laparotomy where the uterus, cervix or vault is fixed to the sacrum with an artificial mesh. This procedure should only be performed by an experienced surgeon and in most low-resource settings artificial mesh is not available. See reference 6.

## FECAL INCONTINENCE

Fecal incontinence is a devastating condition in its serious forms. It originates very often in a non-recognized third or fourth degree tear during delivery. The damaged sphincter is easily overlooked and because women in their younger years



**Figure 9** Four essential steps in anterior vaginal wall repair. (Left to right) Incision in the vaginal skin from 2 cm from the urethra until close to the cervix or vaginal vault. After dissecting the vaginal skin from the underlying bladder the remnants of the fascia that lies between the bladder and vaginal wall are located. The fascia is sutured together in the midline with a series of interrupted resolvable stitches preferably Vicryl 2-0. The vaginal wall is closed again after removal of superfluous tissue

can compensate with strong pelvic floor muscles, the fecal incontinence is only mild and no help is sought yet. However, with increasing age the strength of the pelvic floor diminishes and the complaints get worse. Repairing such an overlooked total rupture requires special skills but can still be successful in experienced hands.

Another possibility is the existence of a recto-vaginal fistula but this will always produce severe complaints directly after delivery (see Chapter 21). Repair by an experienced fistula surgeon can give excellent results.

Fecal incontinence without an overt sphincter damage is difficult to cure. Prescribing anti-diarrheal medication can help in certain cases.

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