





# Sexual Aspects of the Female Pelvic Floor

# 10

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## 10.1 Introduction

Because of its essential functions in the choreography of sexuality and childbirth, two chapters of this book deal with the pelvic floor (PF). This chapter will start with addressing the PF and its role in sexuality. Next, we will address the PF during pregnancy, childbirth, and post-partum. Childbirth and the post-partum period are crucial moments with potential PF damage. So, this chapter will also look at aspects of preventing PF disturbances with extra attention to ‘prehabilitation’ (preparing the PF for optimal functioning during childbirth and post-partum). Since most people are not very aware of the functioning of their PF, they can easily and unnoticed get outside the optimal muscle tone (between too high and too low). There is a gradual transition from optimal to significant PF disturbances.

In some countries, PF physiotherapy developed into a highly specialized profession geared to treating PF disturbances. Some of those disturbances existed before getting pregnant, whereas others originated during pregnancy or childbirth. Chapter 16 will deal with the severe PF disturbances and their implications on sexuality and quality of life.

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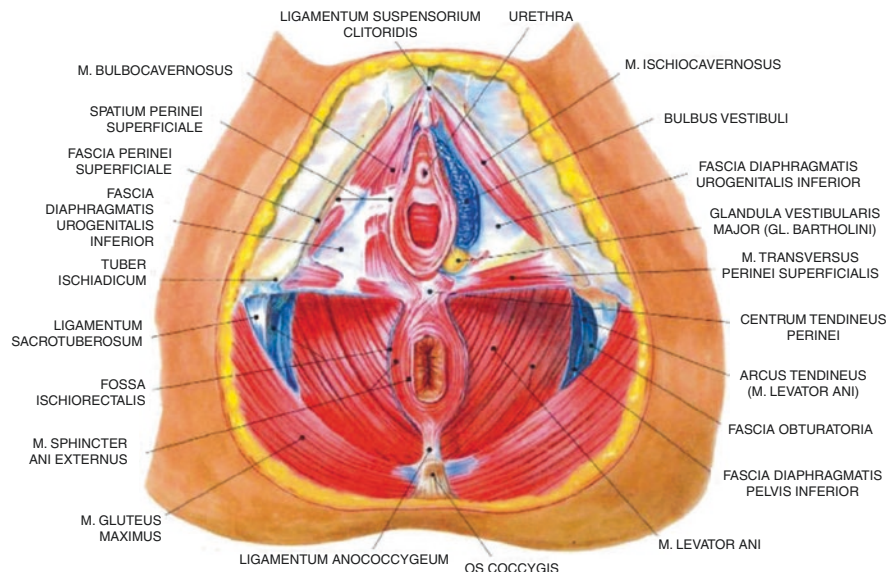
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Men can have as well PF disturbances. This chapter will only address the PF disturbances that can impair conception.

## 10.2 What Is the Pelvic Floor?

The pelvic floor, literally the floor of the pelvis, is a layer of muscles and connective tissue that spans the bottom of the pelvis (see Fig. 10.1). They are striated, voluntary muscles that, although hidden from view, can be consciously contracted (squeezed) and relaxed. The PF consists of multiple muscles which stretch from the os coccygis (tailbone) to the pubic bone and from one tuber ischiadicum (sitting bone) to the other. In women, the PF muscles surround the hiatus genitalis, the space for the passage of the urethra, vagina, and anus. Together, these muscles support the pelvic organs (bowel, uterus, and bladder) and give conscious control of the bladder and bowel. They also contribute to core stability and motor control. Together with the musculus multifidus, the abdominal muscles, and the thoracic diaphragm, the PF muscles keep the structure of the spine and pelvis stable and maintain the posture of the trunk. In addition, the pelvic floor muscles have a role in sexual function.

The PF looks like a hammock or trampoline and can move up (contraction) and down (relaxation). They can also move ventrally (from the back to the front) and inward. So during contraction, the PF muscles make a lifting, closing, and ventral movement. Therefore, contraction of the pelvic floor muscles makes the pelvic organs lift, closes the urethra, vagina, and bowel, and pulls the urethra, vagina, and bowel forward (ventral ward). That is how one can support the pelvic organs and control or delay micturition and defecation until convenient.



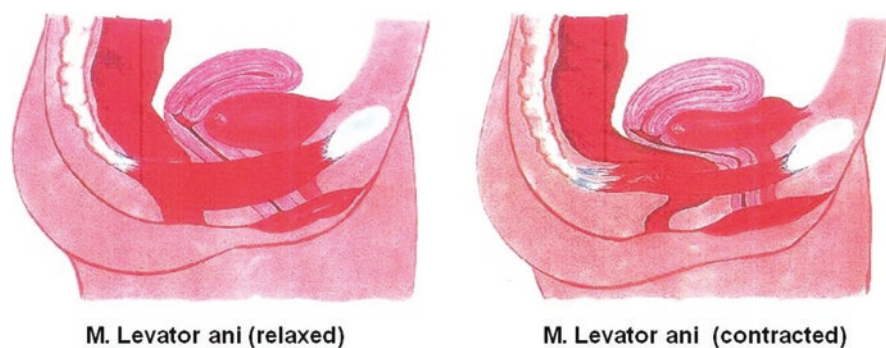
**Fig. 10.1** The female pelvic floor

The PF muscles play a role in the sexuality of men and women. In men, they are important in getting and maintaining an erection and ejaculation. In women, voluntary contractions (squeezing) of the PF contribute to sexual sensation and arousal. The pelvic floor has a different role in each sexual response phase. In everyday life, the PF muscles are relaxed. When the woman becomes sexually aroused, the blood circulation increases and the erectile bodies of the clitoris get engorged, causing thickening of the vaginal wall and creating a cushion around the vaginal entrance to allow smooth penetration. At the same time, lubrication appears. When sexual stimulation continues, the muscle tension of the PF increases. In particular, the m. bulbospongiosus and m. ischiocavernosus contract and prevent the veins from emptying. In this plateau phase, alternating contracting and relaxing the pelvic floor leads to a more intense sensation, more friction between the vaginal wall and penis, and increased sexual arousal. During orgasm, the PF muscles involuntarily and rhythmically contract, and, as a result, the hypercongestion of the veins will empty. The orgasm experience depends on the strength of the muscle contractions, so a well-trained pelvic floor contributes to a more intense sexual experience. In addition to the contraction of the pelvic floor muscles, the smooth muscles of the uterus might also contract rhythmically, thus intensifying the orgasm experience. In the resolution phase, the muscles relax, and all tissues recover to normal. About half of the women can have several orgasms in a row.

If the PF muscles are too tensed (hypertonicity) or too relaxed (hypotonicity), women's sexuality usually is disturbed.

A *hypertonic pelvic floor* can lead to painful intercourse. The sexual response cannot properly start up. The hypertonic muscles inhibit the extra blood circulation needed for the vaginal wall and the erectile tissues of the clitoris. The vaginal surface stays thin, and lubrication is insufficient, causing dyspareunia. The hypertonic PF muscles close and nod the vagina causing the feeling of a narrow and short vagina, an extra reason for pain at penetration. See Fig. 10.2.

Painful intercourse can have an overwhelming impact on women, affecting self-esteem and self-confidence. This condition can need counselling and maybe



**Fig. 10.2** The difference between relaxed and contracted levator ani muscle. On the left, the PF is relaxed, with the vagina straight and accessible. On the right, the PF muscles are squeezed. The vagina is curved and less accessible

coaching. If a woman does not understand why she feels pain during intercourse, she probably increasingly tenses her pelvic floor, reacting to the pain, and can develop a vicious cycle of ‘(expected) pain → muscle tension → pain’. Education is vital, as is re-education and relaxation of the pelvic floor. HCPs specialized in women’s health like pelvic floor physiotherapists, nurses, or midwives can give such education.

A *hypotonic pelvic floor* causes other sexual problems or inconvenience. During the excitement phase, blood circulation can increase, and the erectile bodies can fill, but the veins will deflate, and the vaginal wall might stay unlubricated because the bulbospongiosus and ischiocavernosus muscles do not contract sufficiently. Besides, the weak levator ani muscle contractions do not close the genital hiatus well, and there will be not enough friction between the vagina and the penis. Both partners will feel less, which can decrease excitement.

Furthermore, a weak pelvic floor can cause vaginal noise or vaginal flatus. Because the vagina cannot be closed sufficiently, air will be sucked in or blown out, causing noises. Most women feel ashamed and embarrassed by this phenomenon.

Squeezing the PF muscles can increase the friction and thus improve the sensation and reduce the vaginal noise. Though this condition, also called ‘vaginal laxity’, does not hurt physically, it can need counselling. With an underactive pelvic floor, women will not experience pain, but they do not have a satisfying sexual life. Proper training will strengthen the PF muscles, increasing her ability to close the hiatus, increasing the friction during intercourse, and decreasing the risk of vaginal noise.

Unfortunately, there is still a taboo on talking about the pelvic floor or pelvic floor function, particularly sexual dysfunctions. Furthermore, the pelvic floor muscles have few sensors and have just a tiny area on the motor and sensory cortex. All this leads to a low level of awareness of the pelvic floor.

Being aware of the function and properly controlling the pelvic floor muscles will lead to good bladder and bowel control and to satisfying sex. Some authors call it the ‘love muscle’. PF re-education is an essential part of the job of women’s health caregivers, such as PF physiotherapists and midwives.

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### 10.3 Prevention of Pelvic Floor Disorders

The risk factors have to be known to understand the prevention of pelvic floor disorders (PFDs). Many studies looked at the various risks. Overall risk factors after childbirth are delivery itself, instrumental delivery (forceps, vacuum), pelvic floor disorders before pregnancy, higher maternal age (>36 years), higher maternal BMI (>30), higher child weight (>4000 g), larger foetal head circumference (>35.5 cm), longer duration of the second stage of labour (>1 h), (median) episiotomy, lacerations, occiput posterior or forehead position, and shoulder dystocia. Some of these risks can be influenced, such as using forceps or vacuum or the duration of the second stage, others not.

Several authors developed flowcharts to prevent primary and secondary PFD or prediction models focusing on potential, expectable PFD.

For primiparous women, Jelovsek developed PFD-prediction models to discuss before birth the probability of developing those disorders and thus make an individual birth plan for every woman, facilitating decision-making in the prevention of incontinence [1].

‘UR-CHOICE’ is another prediction model for PFD. They fine-tuned the model with extensive long-term results [2]. See [http://riskcalc.org/UR\\_CHOICE/](http://riskcalc.org/UR_CHOICE/).

To prevent primary disorders, one should carefully observe the function of the pelvic floor, avoid the use of forceps and routine episiotomy, and limit the duration of the second stage. Under these conditions, one can indicate vaginal birth.

However, with factors such as a foetal head circumference >35.5 cm, a maternal age >35, a maternal BMI >30/35, and a family history of pelvic floor disorders, one should consider Caesarean section.

All authors report the importance of good awareness and control of the PF muscles. During expulsion, the muscles have to be relaxed and optimally stretchable. With good (realistic) and honest education, pelvic floor muscle training (including relaxation exercises) and perineal massage, one can reach this. In some centres, the Epi-No® is used (see below). Women will benefit from being coached on adequately using their PF muscles.

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## 10.4 How to Assess the PF Muscles

A woman with a well-functioning pelvic floor can consciously squeeze and relax her PF muscles. Unfortunately, correctly contracting the PF muscles is not easy. In Belgian research, 53% of post-partum women could not perform a correct PF muscle contraction [3]. So pelvic floor muscle assessment and training seem recommended. Below, we address how this can be integrated into women’s health by instructors like health-care professionals, pelvic floor physiotherapists, midwives, or nurses.

An assessment of the PF muscle function starts with an inspection followed by palpation. Specialized pelvic physiotherapists often have other diagnostic tools like biofeedback and ultrasound. These tools provide more specific, detailed information, but inspection and palpation are usually sufficient to determine the function of the PF muscles.

### 10.4.1 Inspection

During contraction, the vagina closes, and the vagina and perineum move inward. During relaxation, the vagina and perineum move back to their original position. At the Valsalva manoeuvre, the PF muscles have to relax unconsciously, and the perineum should descend a bit. Unfortunately, many women are not able to perform a Valsalva manoeuvre correctly. Instead of relaxing their PF muscles, they squeeze them and push simultaneously (‘paradoxically pushing’). Proper pushing makes stool or child pass outside. So, paradoxical pushing is a serious disadvantage. The woman must be able to squeeze, relax, and push properly. If she cannot do so, she should learn those skills.

## 10.4.2 Palpation

One must prepare carefully for palpation, including consent and a good lubricant. Gently introduce one finger (in the primipara) or two fingers (in the multipara) into the vagina. This manoeuvre should never be painful in a healthy vulva with a well-lubricated finger!

Start with determining the resting tone. With a good resting tone, the finger can be introduced easily and without any resistance, and the PF muscles softly enclose the examining finger. Ask her to contract: the finger will be firmly enclosed, pulled inward, and ventralward.

Ask her to relax: the muscles and the finger will move back to the original position. Ask her to perform the Valsalva manoeuvre: the muscles relax unconsciously and move downward, by which the enclosing of the finger decreases, and the finger partly is pushed out of the vagina.

The next part of the examination deals with coordination: the woman should be able to squeeze and relax the PF muscles with proper strength, timing, and duration.

A woman should be able to make 10–15 fast contractions in a row without losing strength and relax completely after each contraction. Furthermore, she should be able to squeeze the PF muscles for 30 s continuously at 50–70% of her maximal strength. After this endurance contraction, she should be able to relax immediately and completely. We test this in several series with different ways of squeezing and relaxing. One should always be aware that both contraction and relaxation are important. The emphasis in pelvic floor muscle training should therefore be on both actions. Only a completely relaxed pelvic floor can be stretched as much as necessary (200–300%) during vaginal birth.

*An underactive pelvic floor* has a low resting tone, weak contractions, and little endurance. The examining finger is just slightly enclosed. There is little strength and little or no endurance. The woman can not firmly close the genital hiatus. The elevation of the bladder neck is absent or weak. Here, pelvic floor muscle training should focus on gaining strength and endurance without forgetting coordination.

*An overactive pelvic floor* has a high resting tone, and the relaxation is delayed and incomplete. It firmly encloses the examining finger. Whereas contraction can vary from weak to strong, relaxation can be absent, delayed, or incomplete. Be aware that overactive is not synonymous with strong. There is often a combination of overactive PF with paradoxical pushing. Here, the training should focus on relaxation and coordination.

## 10.4.3 The PF Muscles During Pregnancy

Due to the release of the hormone relaxin, the connective tissue all over the body softens during pregnancy. Because the PF muscles contain connective tissue, the pelvic floor weakens. Furthermore, due to the growing size of the uterus, the intra-abdominal pressure increases.



Pregnancy itself can lead to disturbances in micturition and defecation, varying from just a bit of inconvenience to real disorders. Due to the imbalance between the increased intra-abdominal pressure and the decreased urethral closing pressure (decreased PF muscle function), stress urinary incontinence (SUI) may occur. Depending on the degree of imbalance, SUI may vary from just a few drops while coughing to severe loss during all activities that increase the intra-abdominal pressure.

Due to the growing uterus, there will be less and less space for the bladder, and the bladder capacity will decrease, which can cause frequency.

The stool can change during pregnancy as well. The imbalance between the intra-abdominal pressure and the anal closing pressure can cause flatal incontinence. Fortunately, there is rarely faecal loss during pregnancy. As written above, incontinence will depend on the degree of imbalance. Constipation is another inconvenience caused by the softening of the connective tissue of the smooth muscles of the colon and rectum.

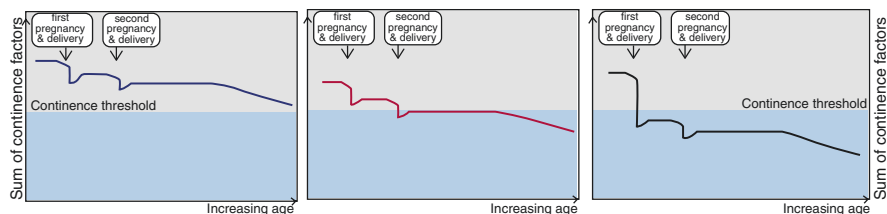
Besides the weakening of the PF muscles, pelvic floor dysfunctions can occur as a compensation strategy for these complaints. These compensation strategies often may exacerbate the original complaints. Appropriate, tailored coaching is important to cope with these inconveniences or complaints.

#### 10.4.4 The Pelvic Floor Muscles During Birth

During childbirth, the PF muscles are stretched by 200–300%. No other muscle in the human body can stretch that much. Other tissues are also stretched, including the connective tissue that supports the pelvic organs and the nerves. The more relaxed a muscle is, the more stretchable it is. So the woman must be able to relax her pelvic floor muscles and push properly. Pushing on a non-relaxed PF or pushing paradoxically might lead to more PF and perineal damage.

Several authors have described the changes in PF anatomy and function during the women's lifetime. According to DeLancey [4], physiological lifespan of the pelvic floor differs, with PF function being optimal between age 15–25, depending on the age of the first pregnancy and birth [5]. After 20–25, the pelvic floor function decreases slowly. Women (and men) need a minimal function to maintain continence and other pelvic floor functions. That is why the elderly have many pelvic floor dysfunctions like incontinence (Fig. 10.3).

Vaginal birth affects PF anatomy and function but not to the same extent in every woman. Many variables influence changes in anatomy and function. Furthermore, recovering from pelvic floor injuries varies in women. But not just the extent of damage or dysfunction makes women feel impaired. Circumstances, culture, and expectations influence the woman to experience her pelvic floor disorders just as a (temporal) inconvenience or as a real impairment.



Despite repeated damage to the continence mechanism, the woman can compensate for the damage and remains continent

The woman has less reserve and becomes incontinent during her life, though the number and magnitude of the insults are no greater than in women who remain continent.

Devastating obstetric damage can cause loss of continence early in life. Even if the woman was born with good continence factors.

Perucchini and DeLancey clarified the consequences of pregnancy and delivery and aging on the female continence mechanism. This is an adapted version of their illustration in Chapter 1.1 in 'Pelvic Floor Re-education: Principles and practice' (Springer 2008). [5]

**Fig. 10.3** How the female pelvic floor function can change over the lifetime

### 10.4.5 The Pelvic Floor in the Post-partum Period

After childbirth, all tissues of the PF have to recover. The muscles, the connective tissue, and the nerves have been overstretched and possibly injured. Full recovery usually takes 9 months in physiological conditions, with the most significant recovery occurring in the first three months. For perivaginal tissue recovery, oestrogen is important. So, breastfeeding can delay recovery.

The complaints of decreased PF function and other damage can vary from minor discomfort to serious complaints. Chapter 16 will address the severe problems.

## 10.5 Prevention and Prehabilitation

Women benefit from being well informed about their pelvic floor and its changes during pregnancy and after childbirth. Unfortunately, most nulliparous women are neither sufficiently informed nor aware of how to squeeze, relax, or push properly (even not during labour and post-partum). As long as pelvic floor awareness is not taught in schools or by mothers, the midwife could take this role and teach how to use the PF muscles to enjoy sex and optimize their function in preparation for childbirth. It seems wise to start that process early in pregnancy because already throughout pregnancy, the PF is changing.

Next to explaining anatomy with images or models, for increased awareness, it is also relevant to touch and maybe massage the PF muscles, which will optimize bladder and bowel control and improve sex life as well. Learning how and when to squeeze or relax or push will, on the one hand, benefit sexuality ('love muscles') and will, on the other hand, prepare for a better functioning PF during the birth. An easy way to increase awareness and learn relaxation might be to apply a warm compress to the perineum. The warmth will make the woman more aware of the PF muscles' localization and help her relax.



Here, we will address two prehabilitation measures: perineal massage and PF muscle training.

### 10.5.1 Perineal Massage

We recommend perineal massage during pregnancy [6]. Correctly performed massage will make the woman aware of her pelvic floor tone, teach her how to relax it, and allow passage through her vagina (penis, baby, or dildo). It can be pleasant and rewarding for both partners as a joint action. In primiparous women, it diminishes perineal trauma and episiotomy [6]. It is generally well accepted by women.

Although pregnancy softens the connective tissues and weakens the PF muscles, this does not automatically mean that they are relaxed. First, one must relax the muscles since stretching is not possible when tensed. Warmth or a gentle massage can help to achieve relaxation.

We recommended such a massage at least 1–2× per week from week 34 (see Fig. 10.4 for explanation).



1	Make sure that hands are clean and nails short
2	Choose a quiet place and posture in which legs can be bend and opened in a relaxed way
3	If nessecary lubricate thumbs and / or perineal tissues (for instance KY jelly)
4	Insert both thumbs about 3–4 cm into the vagina, press down in the direction of the anus and to both sides until a stretching sensation is felt, hold this 1–2 minutes
5	Massage the lower half of the vagina by making a U-shaped movement, stretching the vagenna wall dorsally and laterally during 2–3 minutes

**Fig. 10.4** Steps in perineal massage

One can also relax and stretch the pelvic floor with the Epi-No<sup>®</sup>. That is an inflatable balloon coupled to a pressure display hand pump for gradual stretching of the vagina and perineum in late pregnancy [7]. Applied correctly, it might teach women to relax the PF. The Epi-No<sup>®</sup> does not prevent intrapartum levator ani damage or anal sphincter and perineal trauma. The literature shows conflicting evidence about the effectiveness in preventing PF disorders. In our view, its use has to be coached by trained midwives/HCPs.

### 10.5.2 PF Muscle Training (PFMT)

PFMT can prevent the detrimental negative effect of a poorly functioning pelvic floor on women's participation in sports and physical activity. In systematic reviews, PFMT during pregnancy and after childbirth improved urinary continence because of better PF function [8, 9].

A systematic review of prenatal and postnatal PFMT showed positive effects on sexual function and female sexuality with post-partum improvements in desire, arousal, orgasm, and satisfaction [10].

#### An Example of a PFMT Schedule

Start with making an assessment, which guides the training schedule. When the woman can contract for instance for 4 s, that four-second period is the basis of the schedule (as in Table 10.1).

To improve muscle function, the woman should do this daily. After a while, she should increase the contraction and rest time gradually to 6–8 s. Once the woman can perform three series of ten contractions of 6–8 s, she can downgrade to 2–3×/week. One can do this training lying down, sitting, or standing. It is best to do it in the position in which the woman is most aware of her PF.

**Table 10.1** PFMT schedule (based on an assessment of 4 s)

4 s contraction and 4 s rest: to be done 10×
Then 6 fast contractions
Then 1½–2 min pause
This series to be repeated twice

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