

THE IMPORTANCE OF THE PELVIC FLOOR MUSCLES

A loss of the support function in the pelvic floor muscles is common in females and can lead to debilitating urinary symptoms. Problems with the pelvic floor can also effect the sexual function of both male and females. This article will clearly explain where the pelvic floor muscles are, what they do, what can go wrong and how they should be exercised.

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The first time many women hear the pelvic floor muscles mentioned is when they are pregnant and attend an ante-natal class. Even then, most do not really understand the significance of these muscles and do not realise the consequences if they are weakened or damaged by the pregnancy or delivery.

Most men do not even realise that they have pelvic floor muscles until they are much older and run into problems with their prostate gland.

This article will clearly explain where the pelvic floor muscles are, what they do, what can go wrong and how they should be exercised.

WHERE IS THE PELVIC FLOOR?

The pelvic floor is actually a 'complex' made up of the pelvic floor muscles, the nerves that make them work and the pelvic fascia, which consists of fibrous tissue (similar to ligaments) that

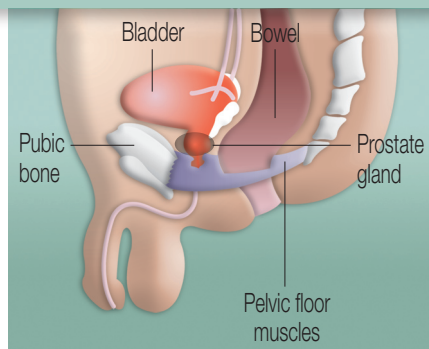


Figure 1: The male pelvic floor muscles.

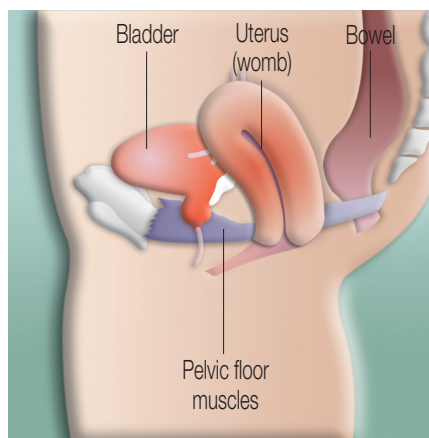


Figure 2: The female pelvic floor muscles.

'The pelvic floor is actually a "complex" made up of the pelvic floor muscles, the nerves that make them work and the pelvic fascia.'

helps to support the muscles and attaches them to the pelvic bones (Figures 1 and 2).

The main attachments of the pelvic floor muscles are at the front of the pubic bone and at the back of the coccyx. The muscles are also attached by the fascia to the sidewalls of the pelvic bones. This forms a large supportive sheet of muscle often described as a 'bowl'.

There are two layers of muscle that make up the pelvic floor muscles – superficial and deep. The deep layer is also called the levator ani, which lifts and pulls the anus forward towards the bladder. The superficial layer is thought to have an important role in sexual function.

Part of the posterior pelvic floor muscles includes the external anal sphincter. This is different to the anterior pelvic floor muscles and is not a flat sheet of muscle but rather a circular arrangement of muscle that surrounds the smooth muscle of the internal anal sphincter.

The nerve that makes the pelvic floor muscles work is called the pudendal nerve and is supplied from the nerve roots S2–S4.

The pelvic floor muscles are comprised of two different types

of muscle fibre. Most of the muscle fibres within the pelvic floor (about 70%) are the type that have properties of endurance and can work for long periods of time without fatigue. These muscle fibres are sometimes likened to those that you would find in a marathon runner.

There are also a smaller number (about 30%) of muscle fibres within the pelvic floor muscle that work very quickly and have power but poor endurance. These muscle fibres are likened to those you would find in a sprinter. To function well the pelvic floor muscle needs to have a correct balance of both of these muscle fibre types.

WHAT DO THE PELVIC FLOOR MUSCLES DO?

The pelvic floor muscles have three main functions:

- ▶▶ Support
- ▶▶ Continence
- ▶▶ Sexual function.

Support

A loss of the support function in these muscles is common in females and can lead to symptoms of genito-urinary prolapse. This is when one or more of the female pelvic organs, the bladder, womb or bowel, starts to move downwards and pushes against the vaginal walls.

There can be a mild or moderate degree of prolapse but without care of the pelvic floor muscles and advice on how to avoid further damage, a mild or moderate problem can increase and start to cause symptoms.

Commonly reported symptoms of prolapse include:

- ▶▶ Difficulty inserting a tampon
- ▶▶ Experiencing discomfort during intercourse
- ▶▶ Experiencing a heavy dragging sensation, particularly following activity.

Severe prolapse can result in the vaginal walls bulging at the vaginal opening and the woman feeling a lump in the vagina. Usually, if a prolapse has descended to this degree it will require surgical intervention to relieve the symptoms.

A prolapse may or may not be associated with urinary symptoms. Some women, if the bladder prolapses sufficiently, may begin to experience difficulty in passing urine and may even develop urinary retention, where they are completely unable to pass urine.

Continence

The supportive role of the pelvic floor muscles also assists with closing the bladder outlet tube – the urethra – whenever there is a sustained increase in intra-abdominal pressure, such as during jogging or running.

The fast-acting fibres of the pelvic floor are also important during sudden rises in intra-abdominal pressure such as sneezing or coughing. The pelvic floor muscle should contract just before the cough or sneeze, pulling upwards and forwards from the coccyx towards the bladder.

This allows the urethra to be squashed closed between the downward force of the

increased intra-abdominal pressure and the flat sheet of contracted pelvic floor muscle – like the filling in the middle of a sandwich. This action prevents urine leaking out of the urethra.

A failure of the pelvic floor in this activity can result in urine leaking from the bladder – a condition called urinary stress incontinence.

The pelvic floor muscles also help to control how often and how quickly the bladder needs to be emptied. The slow acting pelvic floor muscles can be contracted when an urge to empty the bladder is felt. If they are held at a below maximal contraction for at least 10–15 seconds a reflex is triggered that can help to prevent the bladder muscle – the detrusor – from contracting.

This reflex is called the ‘perineo-detrusor inhibitory’ reflex (Mahoney et al, 1980). A failure of this reflex may result in urine leaking before the toilet is reached a condition called ‘urinary urge incontinence’.

The posterior fibres of the deep layer of the pelvic floor muscles are called the puborectalis. These muscle fibres form a loop of muscle that wraps around the junction between the anal canal and the rectum – the ano-rectal junction. In a healthy pelvic floor muscle they will hold this junction towards the bladder, creating an ano-rectal angle. This should normally be about 90°.

This action creates a continence mechanism for the bowels as the 90° ano-rectal angle acts as a type of ‘flap-valve’ trapping

rectal contents above the anal canal and preventing any unwanted leakage.

The posterior pelvic floor muscles also contain the circular striated muscle fibres of the external anal sphincter. This is under voluntary control and also assists in preventing loss of bowel contents. The external anal sphincter is particularly important during 'sampling' of rectal contents.

Sampling occurs an average of up to 20 times each day and is the process that occurs when stool enters the rectum. This triggers a reflex response of the inner muscles of the anal canal (the internal anal sphincter), which relaxes allowing the rectal contents to be sampled and the person to decide on what action to take (i.e. whether the contents are flatus or stool).

During this sampling mechanism it is essential that the external anal sphincter is both intact and has an intact nerve supply, enabling it to hold the contents and prevent any accidental leakage. This is an even more difficult task for the external anal sphincter if the rectal contents consist of flatus. Leakage of gas is called 'flatal incontinence', whereas leakage of liquid or formed rectal contents is called 'faecal incontinence'.

Sexual function

The pelvic floor muscles play an important role in both men and women in maintaining good sexual function. In females, the superficial pelvic floor muscles surround the vaginal opening

– the introitus – and through their attachment into the clitoris assist with the woman reaching orgasm during penetrative intercourse.

In the male, these superficial muscles insert into the base of the penis and assist in the maintenance of erection by stopping venous blood escaping from the erect penis.

Studies comparing pelvic floor exercises with conventional therapy for erectile dysfunction conclude that exercises are an effective method of treatment for this condition (Dorey, 2005).

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WHAT CAN GO WRONG?

The female pelvic floor muscle is inherently more likely to develop problems than the male pelvic floor. This is because most female pelvic bones have a greater gap between the pelvic sidewalls, the pubic bone and the coccyx than the male pelvis – this means the females muscles have further to span. Also, the female pelvic floor has a larger opening at the front to allow the vagina to pass through it.

The support structures of the pelvic floor are also more influenced by fluctuating female hormones both during the menstrual cycle and pregnancy. Pregnancy also places a much

greater load on the pelvic floor muscles as the weight of the baby and mother increases and there is evidence that the changes that occur during pregnancy can cause pelvic floor muscle dysfunction even before the mother gives birth (Lal et al, 2003). This means that women who give birth by caesarean section still need to take care of their pelvic floor muscles after the baby is born.

Women having a vaginal delivery are even more at risk of developing pelvic floor muscle dysfunction, particularly if they have a large baby (>4kg), have a very quick (< 15 minutes) or very long (>1 hour) 'pushing' stage of labour, or have a forceps delivery. It is essential that after childbirth, all women carry out a regular daily programme of pelvic floor muscle exercises for at least three months following delivery.

However, exercises are often not carried out as the pelvic floor muscles are not visible and women often only realise there is a problem when they start to develop a prolapse or start losing control over the bladder or bowels.

Once weakened, because the female pelvic floor muscles are under the influence of the woman's hormones, symptoms may appear in association with the menstrual cycle, often appearing to worsen mid-cycle or just before menstruation.

Many women notice a significant deterioration in symptoms around the time of

the menopause – this is often the trigger for them to finally seek help.

The function of the pelvic floor muscles, bladder and bowel may also be affected by chronic constipation, chronic cough or abdominal surgery, for example, following a cholecystectomy (gall bladder removal) or hysterectomy.

It is uncommon to find pelvic floor muscle problems in young men, although surgery to the anus or chronic constipation can cause problems. It is more common to find problems associated with prostate gland surgery and men can sometimes experience urinary stress incontinence after surgery – usually associated with activity, for example, walking, lifting or gardening.

PELVIC FLOOR MUSCLE EXERCISES

The National Institute for Health and Clinical Excellence (NICE) guidelines for the management of urinary incontinence in women (NICE, 2006) reviewed the available evidence from randomised controlled trials with regard to pelvic muscle exercises and concluded that at present, the minimum successful regimens included at least eight pelvic floor muscle contractions repeated three times per day.

It is important, however, to remember the job that these muscles are designed for – a combination of endurance, co-ordination and power. Any training programme for skeletal

muscles should, therefore, adhere to the principles of muscle training:

- » Specificity – the muscle should be worked in the way that it is required to work
- » Overload – the muscle needs to be worked to its fatigue point
- » Maintenance – once trained, exercises need to be continued to keep the muscle fit.

Ideally, pelvic floor muscle exercises should be tailored to the individual. Patients should be encouraged to train the endurance of the muscles by performing slow sustained contractions and holding them for as long as possible can (target – 10 seconds), and as many times as possible (target – 10 repetitions).

The programme should also include exercises to improve coordination and power by including up to 10 short maximal contractions aiming to pull upwards and forwards from the anal sphincter towards the bladder and pubic bone.

These exercises should be performed three times each day for at least three months – it may take up to six months or longer to reach the optimum fitness.

CONCLUSION

The pelvic floor muscles are crucial to the maintenance of sexual health and continence in both men and women. As such, it is crucial that healthcare workers have a working

Key Points

- » The pelvic floor is actually a 'complex' made up of the pelvic floor muscles, the nerves that make them work and the pelvic fascia, which consists of fibrous tissue.
- » The supportive role of the pelvic floor muscles also assists with closing the bladder outlet tube – the urethra – whenever there is a sustained increase in intra-abdominal pressure.
- » The pelvic floor muscles also help to control how often and how quickly the bladder needs to be emptied.
- » The pelvic floor muscles have three main functions, support, continence and sexual function.

knowledge of the importance of these muscles, their effect on sexual health and continence, and the exercises that can be performed to maintain them. **CE**

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