

CHAPTER ONE

Introduction

If you mention the prostate to men you are likely to get one of several reactions. There are those men who really aren't sure what the prostate is; there are those for whom the word conjures visions of embarrassing digital rectal exams by their GP; and there are those who immediately think cancer.

As men age, problems having a pee become increasingly common and it is usually the prostate gland that is the cause. However, just because these problems are common and a typical consequence of aging, it doesn't mean that you should put up with them. There are many ways to treat or manage them and things that you can do to help yourself.

If you do a search online, the most frequent information to come up is about cancer of the prostate. Although prostate cancer is a major concern for New Zealand men, benign prostate conditions are far more common, and as many as 90% of men over the age of 70 have developed age-related benign prostate disease. Usually from the 50s onwards, increasing numbers of men will experience problems with urination, and as many as 10% of men in their 30s will have asymptomatic* prostate enlargement.

Some 90 out of 100 men will experience the discomfort and inconvenience of prostate symptoms during their lifetime, while only about one in 13 men will develop prostate cancer before the age of 75 and one in nine men will develop prostate cancer in their lifetime.

* no symptoms

So, in terms of the impact on your quality of life, benign - or non-cancerous - prostate problems are a major issue for many men, one that many men put up with for quite a while before deciding to do something.

This booklet is about your prostate and your health. It will explain what the prostate is, what it does and the different conditions that affect it. Importantly, it will tell you how you can keep your prostate healthy and what you can do to help yourself if you have symptoms of prostate disease. This booklet will also explain about conventional medical treatment for prostate conditions, complementary or alternative treatment, and dietary and lifestyle choices that you can make that will help keep you and your prostate in good health.

CHAPTER TWO

The Prostate Gland

WHAT IS THE PROSTATE GLAND?

The healthy adult human prostate is a walnut sized gland of about 20 grams in weight, that sits directly below the bladder, about 2.5 centimetres (cm) from the pubic bone and just in front of the rectum (see Figure 1). While the prostate is found in the male of most mammalian species it can differ markedly between species in terms of its anatomy and physiology.

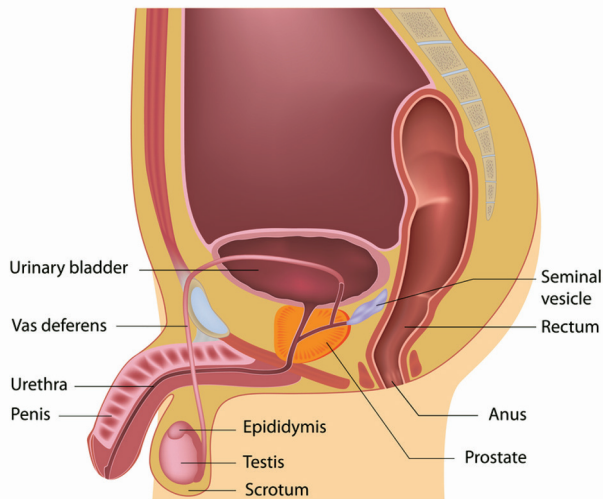


Figure 1 The prostate gland sits just below the bladder and in front of the rectum.

The prostate gland surrounds the urethra - the tube that carries urine from the bladder out through the penis - and is made up of glandular tissue

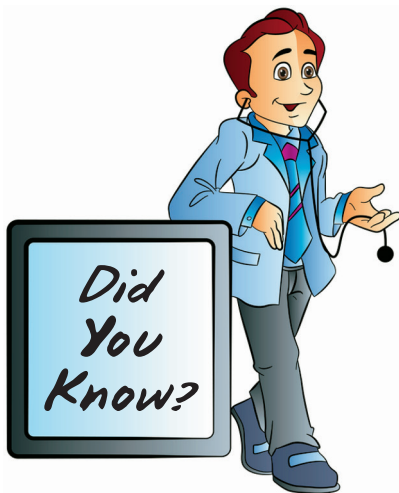
(glandular tissue secretes fluid and chemical substances for use in the body) and fibromuscular tissue. It has three lobes, and has ducts that open into the urethra.

The fibromuscular portion and the glandular portion are both enclosed by the outer sac or capsule.

The fibromuscular portion of the prostate is the smaller of the two types of tissue and is located in front of the urethra. This prostatic tissue regulates that part of the urethra that passes through the prostate, allowing dilation of the urethra so that urine and seminal fluid can pass through it.

The glandular tissue lies behind the urethra and makes up the greater volume of the prostate. The primary role of the glandular tissue is to produce and secrete prostatic fluid (see below - What Does the Prostate Do?).

The name prostate comes from the Greek *prostates*, literally meaning “one who stands before”, “protector” or “guardian”.



Most people think of the prostate as something that only men have. However, women have glands that are analogous to the prostate gland in men. Originally called Skene's Glands, named for Alexander Skene a gynaecologist who described them in 1880, they are now often referred to as the Female Prostate. These glands are thought to have the same structural components as the male prostate, although they are much smaller, and they even produce prostate specific antigen, or PSA. They produce a fluid that helps lubricate the urethral opening and may have antimicrobial properties that protect the urinary tract from infections.

WHAT DOES THE PROSTATE DO?

Although it is small, the prostate gland performs a vital role in the male reproductive system. The glandular tissue in the prostate makes about 30% of the fluid found in semen - the fluid that is ejaculated from the penis at orgasm (sexual climax). Prostatic fluid is milky white, rich in zinc, citric acid, choline, and various proteins and hormones. It helps to protect and feed the sperm, and carry them through the penis to the urethral opening.

Semen is alkaline which helps to neutralise the hostile and acidic conditions in the female vagina, prolonging the lifespan of sperm.

Fluid from the prostate is expelled in the first part of the ejaculate together with most of the sperm. These sperm have better motility (they swim faster), survive longer and are generally better protected than the sperm that are expelled later in ejaculation with the fluid mainly from the seminal vesicles (see the section on the male urinary and reproductive system below).

During ejaculation the dense muscular tissue of the capsule contracts, forcing prostatic fluid into the urethra, where it mixes with the sperm and other fluids that make up the semen, before being propelled down the urethra and out of the penis.

The prostate also produces prostate specific antigen or PSA. PSA is an enzyme (a protein that acts as a catalyst that causes biochemical reactions) and once inside a woman's vagina, the PSA fluid liquefies the semen, so that the sperm can swim off to fertilise the egg. It is also believed that PSA may help to dissolve cervical mucus, where the woman's uterus meets the vagina, so that the sperm can access the uterus, and therefore the egg.

It is pretty clear that the prostate is vital for healthy sexual intercourse and creating babies, helping to transfer sperm from the man to the woman in a healthy and mobile state. To understand the wider importance of the prostate to male urinary and sexual health, it is important to understand how the male urinary and reproductive system works, and how the prostate is impacted by the hormones that control the function of the reproductive system.

THE MALE URINARY AND REPRODUCTIVE SYSTEMS

The male urinary and reproductive systems are very closely linked and as a result are sometimes referred to jointly as the genitourinary system (refer to Figure 2 and 2a).

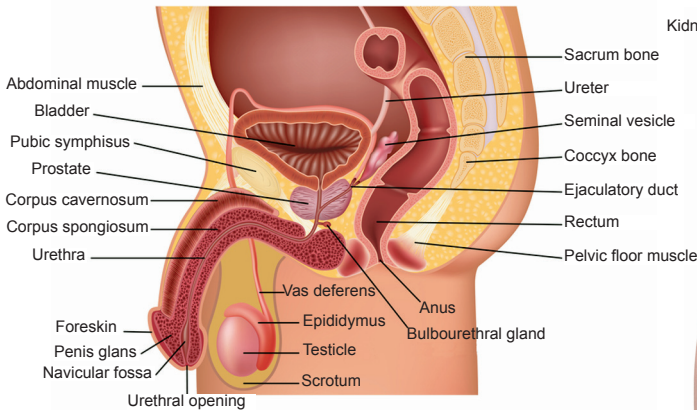


Figure 2 The male genitourinary system

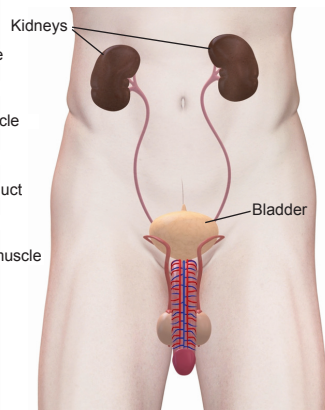


Figure 2a The kidneys relative to the bladder.

The Male Urinary System

The urinary system is the group of organs and structures, which remove waste from the blood and pass it out of the body as urine, through the penis. This system comprises:

- the kidneys, which filter waste from the blood
- the ureters - two tubes that take the urine from the kidneys to the bladder
- the bladder, which stores the urine
- the urethra - the tube which passes urine out of the body from the bladder, via the penis.

The bladder has two parts; the upper, larger part where the urine collects and the lower neck of the bladder. The muscle of the bladder functions so as to allow the bladder to expand and contract, allowing it to hold 350 to 430 ml of urine. The muscle at the neck of the bladder prevents urine

from leaving the bladder until the pressure in the bladder reaches a certain threshold.

When that threshold is reached the bladder expels urine into the urethra. Between the bladder and urethra is the internal urethral sphincter, an involuntary sphincter muscle that keeps the urethra closed when urine is not being passed, and prevents urine leakage.

The male urethra is divided into four parts:

- the pre-prostatic urethra, which is between 0.5 and 1.5 cm depending on how full the bladder is;
- the prostatic urethra, which is about 2.5 cm long and passes through the prostate;
- the membranous urethra, which is about 1 to 2 cm long; and
- the spongy or penile urethra which is about 15 cm long and passes through the corpus spongiosum of the penis, ending at the external urethral orifice (Meatus).

The membranous urethra passes through the external urethral sphincter which allows voluntary control over urination.

The Male Reproductive System

The main function of the male reproductive system is to produce sperm and ensure that it leaves the body and reaches the female egg so that fertilisation can occur. The male reproductive organs can be divided into three groups:

- Sperm production and storage:
 - ◊ the testes (testicles), where the sperm is produced, are contained in the scrotum;
 - ◊ the epididymus, where immature sperm are held for development and storage.
- ejaculatory fluid producing glands:
 - ◊ the seminal vesicles which secrete a significant proportion of the fluid that makes up semen;
 - ◊ the prostate (see the section on the prostate, page 5);

- ◊ the bulbourethral glands (also called Cowper's glands) which are located behind the urethra at the base of the penis, and produce a pre-ejaculate fluid which lubricates the urethra for the sperm to pass through (see urethra below), and neutralises traces of urine, which might compromise the health of the sperm.
- Organs and structures for copulation and deposition of sperm:
 - ◊ the vas deferens are ducts that carry the sperm from the epididymus to the urethra;
 - ◊ the urethra, which carries the sperm and rest of the seminal fluid through the penis during ejaculation.

Another Look at the Prostate

While we have already had a brief look at the prostate and how it functions, in order to get the most out of the rest of this book, it would be helpful to look at its structure in a bit more detail.

As we know, the prostate is divided into two types of tissue - fibromuscular and glandular. The glandular tissue can be further divided into four zones (See Figure 3):

- peripheral,
- central,
- transitional,
- periurethral.

Comprising 75% of the glandular tissue, the peripheral zone is the largest and it is in this zone that most prostate cancers develop. The central zone is located just inside the peripheral zone, and comprises almost 25% of the prostate's glandular portion. The two smallest areas of the prostate's glandular portion are the transitional and periurethral zones. The transitional zone is located between the central and periurethral zones, and together they comprise less than 5% of the glandular portion of the prostate; the periurethral zone is less than 1% of the glandular tissue of the prostate and surrounds the urethra. For all their small size, these two zones are the ones we are most interested in, as this is where benign prostatic hyperplasia (BPH) almost exclusively occurs.

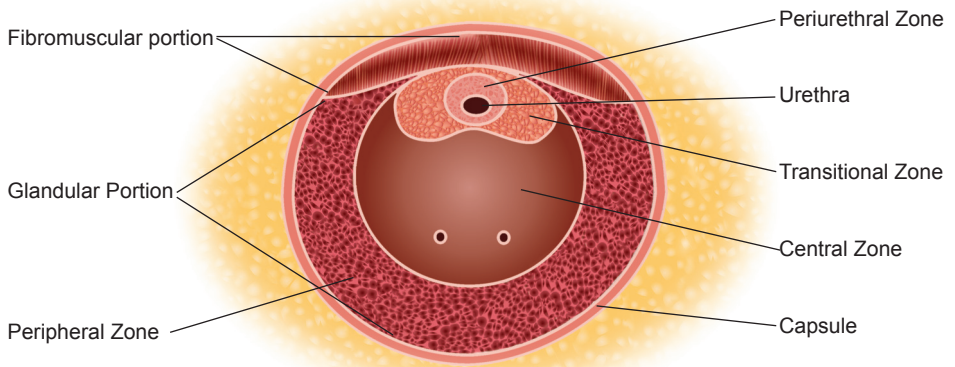


Figure 3 The structure of the prostate gland.

CHAPTER THREE

The Role of Hormones

You might be wondering why there is a whole chapter on hormones. After all, isn't this book about the prostate?

Hormones control a lot of what goes on inside your body and have quite an impact on the health of your prostate. It is something you should have some understanding of, especially if all is not 100% with your prostate, or if it is 100% and you want it to stay that way.

You are probably familiar with at least some hormones - as a man you will have heard of the male sex hormone, testosterone, and you've probably heard of the female sex hormones, oestrogen (sometimes written as estrogen) and progesterone. Hormones are not just about sex and reproduction though.

WHAT DO HORMONES DO?

Throughout your body you have endocrine glands that produce and secrete hormones. In the simplest sense, hormones are chemical messengers that travel around your body in your bloodstream, and tell your cells, and therefore tissue and organs, what to do and how to behave. They control:

- growth and development,
- metabolism - how your body gets energy from the food you eat,
- sexual function,
- reproduction, and
- mood.

Some of the endocrine glands and hormones that you are most likely to have heard of are:

- the thyroid gland, which produces thyroid hormones which control your metabolism;
- the adrenal glands found on top of your kidneys, which produce the stress hormone cortisol;
- the pancreas, which produces insulin in the islet cells to control blood sugar and glucose, and regulate fat metabolism;
- the testes, which produce most of the testosterone in men;
- the ovaries, which produce most of the oestrogen and progesterone in women.

Hormones are extremely powerful chemicals and very small amounts can cause big changes in your cells and your whole body. Just think about the massive changes to your body at puberty when boys' bodies respond to an increased production of testosterone and girls' bodies respond to more oestrogen.

How do Hormones Work?

Each hormone has a very specific structure. Every cell in your body has receptors on the outside of the cell membrane. These receptors are a bit like the lock on the front door of your house. Only particular hormones - or keys - will fit each receptor. When the right hormone fits into a receptor it sends a message inside the cell telling it how to change or behave. The hormone can switch certain cell processes on or off and modulate the activity of numerous genes.

TESTOSTERONE

Testosterone is mostly produced in the testes, and by the adrenal glands in small amounts. Women's ovaries also produce very small amounts of testosterone.

Testosterone is an anabolic steroid from the androgen group, and is the principal male sex hormone. Testosterone itself is an inactive hormone. It is converted in various tissues, including the prostate, into 5-alpha-dihydrotestosterone (usually just referred to as dihydrotestosterone or DHT)

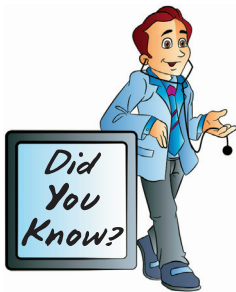
by an enzyme. When we talk about testosterone in this book we are actually referring to DHT, but we will use the term testosterone because that is what most people are more familiar with.

At puberty, testosterone stimulates the development of the testes and the prostate and is also responsible for secondary sex characteristics, such as the development of body, facial and pubic hair, and deepening the voice. It also increases bone and muscle mass, and is generally important for health and well-being.

When a baby boy is forming in the womb, testosterone is responsible for the development of male reproductive organs and also influences male behaviour after birth.

In adult males, testosterone is necessary for the production of healthy sperm and there is a complex relationship between sexual arousal, sexual behaviour, exposure to fertile women and male testosterone levels.

Testosterone causes the prostate to grow, although there is quite a bit of discussion in the medical community as to exactly what the role of testosterone is in prostate health, as most prostate problems occur in older men as their testosterone production is decreasing.



The levels of testosterone in a man's blood are seven to eight times greater than those found in a woman's blood. However, because testosterone is used by men in a variety of metabolic processes, the daily production of testosterone in men is about 20 times greater than in women - it just gets used up.

WHAT ABOUT OESTROGEN?

Just as women produce small amounts of testosterone, men produce small amounts of oestrogen. In fact, if you look at the structure of oestrogen, it is very similar to testosterone (see Figure 4). It is thought that oestrogen in men has a role in the production and maturation of sperm, healthy libido, bone strength and cholesterol metabolism. Many cells in the male body have oestrogen receptors just as they have receptors for other hormones such as testosterone.

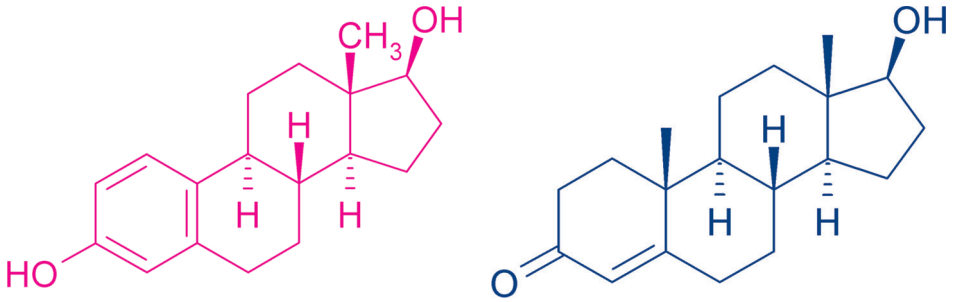


Figure 4 The structure of oestrogen (on the left) and testosterone (right).

In men, oestrogen is made from testosterone by the enzyme aromatase. As men age, they tend to make more oestrogen, particularly if they are overweight. As with women, oestrogen can be made in the fat cells where most of the aromatase enzyme is found, so if there are more fat cells there is the potential for making more oestrogen. This increase in the production of oestrogen occurs around the time that there is a natural decrease in the production of testosterone, and some of the testosterone that is produced is being converted to oestrogen.

The problem may not be so much the decrease in testosterone, but the overall balance of testosterone and oestrogen, that causes health problems in men.

Oestrogen and the Prostate

Just as oestrogen can stimulate the growth of cancer cells in women's breasts (oestrogen receptor positive breast cancer), recent research has found that high levels of oestrogen can do the same with cancerous cells in a man's prostate. For a long time testosterone has been blamed for causing prostate cancer, and now increasingly doctors and researchers believe that an imbalance of oestrogen may be involved.

In fact, there are strong links between breast cancer and prostate cancer, particularly in families that have what is called familial breast cancer or a family history of breast cancer. Some people carry mutations on their BRCA1 and BRCA2 genes, which significantly raise their risk of breast and ovarian cancer. Men who have these gene mutations have an increased risk

of prostate cancer, particularly men with BRCA2. These gene mutations are passed on by both men and women to their children, although only 5 to 10% of all breast cancer occurs in women with the BRCA1 and 2 gene mutations.

It's Not Just Your Own Hormones

If it was just a matter of what hormones your own body produced, then the testosterone:oestrogen balance may be a lot easier to understand and manage. Unfortunately, there is more to worry about than just the oestrogen that your own body is producing, especially your fat cells which you do have some control over.

Every day we are exposed to chemicals in the environment that mimic the effect of oestrogen. As a group these chemicals are known as endocrine disrupting chemicals (EDCs) or xenoestrogens (xeno meaning foreign, in this case from outside the body). Many xenoestrogens have a molecular structure that is very similar to oestrogen, and can fit into the oestrogen receptors on the cell membrane just as real oestrogen does, thus communicating with the cell about what to do and how to behave.

Xenoestrogens are implicated in everything from precocious (early) puberty to breast cancer, obesity and the feminising of baby boys *in utero*. Yes, the effects of these chemicals start as early as in the womb as they cross the placenta into the baby's blood stream. In baby boys, they can interfere with the testosterone pathways important in the development of the genitorurinary system and *in utero* exposure to too much oestrogen can have lasting effects on the health and behaviour of boys after birth.

In girls they are believed to increase later risk of developing breast cancer, and researchers have found that mice and rats given xenoestrogens while pregnant have offspring that have a higher risk of developing mammary tumours.

While women between puberty and menopause are not very sensitive to extra oestrogen, because they produce so much of it already, prepubescent girls, post-menopausal women and men are very sensitive to even small amounts of xenoestrogens that they are exposed to, because they have such low levels of their own oestrogen.

The potential for xenoestrogens to impact on the health of the prostate has been demonstrated by a number of studies. In 2002, Dr Yelena Wetherill and colleagues from the University of Cincinnati College of Medicine reported that very low parts-per-trillion doses of BPA cause proliferation of human prostate cancer. These cancer cells were also less responsive to the standard hormone treatment used to put prostate cancer into remission.

In 2006 scientists from the universities of Cincinnati and Illinois published research in the journal *Cancer Research* in which newborn rats exposed to low doses of BPA had permanently altered gene structure in their prostate cells, a process of reprogramming in early life that promotes cancer in adulthood. As the rats aged they were more likely to develop pre-cancerous lesions in the prostate that, in humans, has been known for years to lead to prostate cancer.

The researchers said that the study's "findings provide the first evidence of a direct link between developmental low-dose bisphenol A... and carcinogenesis of the prostate gland."

Xenoestrogens are found in a wide range of everyday items, including:

- bisphenol-A in polycarbonate plastic, the liners of tin cans, medical equipment;
- parabens as a preservative in cosmetics and personal products;
- phthalates in vinyl flooring, detergents, automotive plastics, soap, shampoo, deodorants, fragrances, hair spray, nail polish, plastic bags, food packaging, garden hoses, inflatable toys, blood-storage bags, and intravenous medical tubing;
- perfluorooctanoic acid (PFOA) in grease and water resistant coatings, such as Teflon® and Goretex®;
- dieldrin, endosulfan and DDT in insecticides;
- methoxychlor in pesticides;
- polychlorinated biphenyls in lubricants, adhesives, paints.

The good news is that you can make decisions to avoid or reduce your exposure to many endocrine disrupting chemicals and reduce the burden of oestrogen in your body - more about that in Chapter Five.

CHAPTER FOUR

Prostate Health

INTRODUCTION TO PROSTATE HEALTH

For a small gland that many men have little understanding or knowledge of, the prostate certainly causes a lot of grief and anxiety. While benign prostate conditions will eventually affect almost all men, it is the much smaller incidence of prostate cancer that causes the greatest concern. However, it is probably the prospect of a digital rectal examination that strikes the most fear into men and is possibly the biggest reason men put off seeing their doctors when issues arise.

The Harvard Medical School *2013 Annual Report on Prostate Diseases* says that to explain the “trouble” that the prostate causes “one must look at its position in the body... its position near urinary and sexual organs means that certain prostate problems (and treatment of those problems) can affect urination and sexual function.”

The most common conditions that affect the prostate are:

- an enlarged prostate: either Benign Prostatic Hyperplasia (BPH) or Benign Prostatic Hypertrophy;
- prostatitis; and
- prostate cancer.

In terms of numbers of men affected, benign prostatic enlargement is the most common problem, especially after the age of fifty. Approximately 40% of men over the age of 50 have an enlarged prostate, as do as many as 90% of men over 70.

To assess the health of the prostate, doctors employ a number of approaches depending on symptoms and the results of previous tests: a digital rectal examination, a prostate specific antigen (PSA) test, ultrasound, magnetic resonance imaging, and biopsies.

How Do I Know if There is a Problem?

Diseases and conditions of the prostate are more likely as you get older. Like many diseases, prostate problems, especially benign conditions, such as prostatic hyperplasia or prostatic hypertrophy, are annoying age-related problems. That is not to say there is nothing you can do - there is plenty you can do - but the risk increases as you age.

Likewise, the risk of developing most cancers, including prostate cancer, increases as you age because of the inherent DNA damage that occurs as a function of aging, and increased exposure to things that can cause that damage (e.g. radiation, tobacco smoke, etc.).

So, what should you look for and be concerned about?

The main indicator that something may be wrong with your prostate is problems with peeing. However, early prostate cancer doesn't usually cause urination problems, so you can take some comfort from the fact that if you have these sorts of issues they are less likely to be associated with prostate cancer. The most common symptoms are:

- needing to go for a pee more often, especially at night - for example, if you often need to go again two hours after urinating;
- difficulty starting to urinate; hesitancy or a longer than usual wait for the stream of urine to begin;
- straining or taking a long time to finish urinating;
- a weak flow when you urinate;
- a feeling that your bladder has not emptied properly;
- needing to rush to the toilet - you may occasionally leak before you get there; and
- dribbling urine after you finish peeing.

Less common symptoms include:

- pain when urinating,
- pain when ejaculating,
- problems getting or keeping an erection*,
- blood in your urine or semen.

However, you need to keep in mind that problems with peeing are not always to do with your prostate, and may be caused by another condition such as diabetes, or by medicines you are already taking for something else, such as anti-depressants. If you drink excessive amounts of fluid, or drinks that can irritate the bladder (caffeine, alcohol and fizzy drinks), you can find yourself needing to pee more than normal, even when your prostate is in tip top condition.

The Digital Rectal Exam

Because of where the prostate sits - just below the bladder and up against the front wall of the rectum - a digital rectal exam (DRE) is an easy and convenient way for a doctor to get a good idea of what sort of shape at least part of the prostate is in. For those who haven't experienced this procedure, the doctor inserts a lubricated, gloved finger into the rectum (see Figure 5) and assesses how the prostate feels - whether it feels smooth and rubbery as it should, or if there is, lumps, firm knots, or abnormally textured areas, any of which may indicate prostate cancer or another condition.

Men variously describe the DRE as unpleasant but not painful, or as pressure, like wiping yourself after defecating but deeper. Some men find the DRE uncomfortable and embarrassing, but it is over very quickly, sometimes within seconds. However it should be done slowly enough that the doctor can assess the size of the prostate, feel its lobes, and detect bumps, hardness, or changes in consistency from one side to the other. If you do feel any pain, you should let your doctor know, as it could be indicative of a problem.

* Erection problems are not common symptoms of a prostate problem and are more often caused by other health conditions.

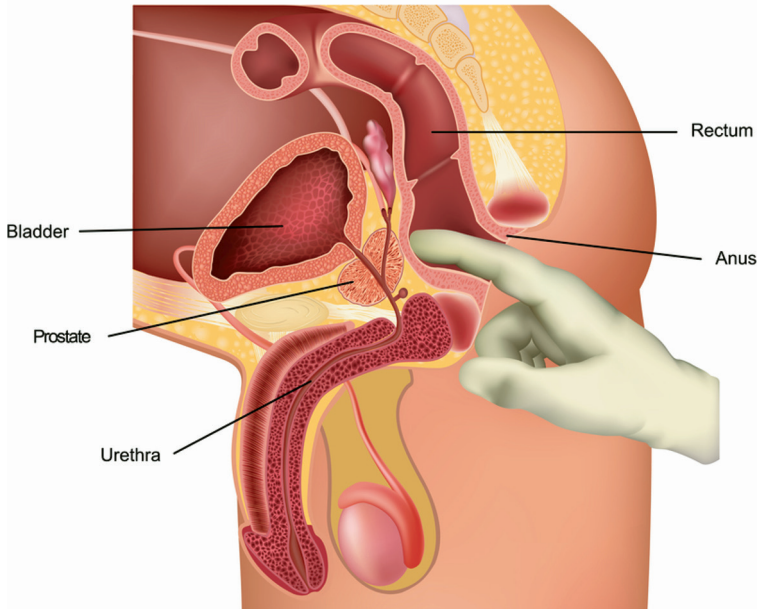
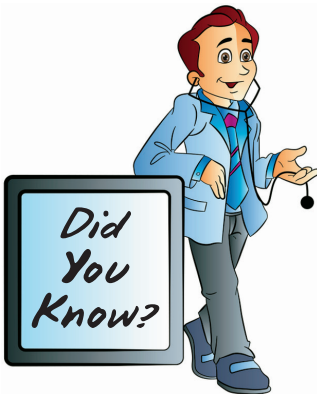


Figure 5 The Digital Rectal Exam.



It's not always about your prostate.

Other organs, such as the bladder, can also be felt during a DRE. While we think of the DRE as a men-only zone, women can also have DREs during gynaecological investigations, in which the doctor checks the uterus and ovaries. DREs are also used to investigate belly or pelvic pain, a change in urination, or a change in bowel habits in both men and women.

The Prostate-Specific Antigen Blood Test

You might have heard of the prostate specific antigen, or PSA, blood test. As we found out back in the section on What Does the Prostate Do? PSA is produced by the prostate. Levels of this protein in the blood can rise when you have cancer, so an elevated PSA blood test may indicate that you have prostate cancer. However, the problem is that other conditions such as BPH and prostatitis can also raise PSA levels without the presence of cancer (see

Table 1 for a list of things that can also raise the PSA level). Additionally, while PSA testing can detect early-stage cancers that a digital rectal examination would miss, a normal level of PSA doesn't necessarily mean you don't have cancer - in other words you get a false negative result. In about 15% of men with a "normal" PSA test result of 4 nanograms (ng) per millilitre of blood, a subsequent biopsy will reveal cancer.

The PSA test is becoming increasingly controversial so we will revisit this when we discuss prostate cancer in more detail.

Table 1 Factors that can increase PSA levels in the blood.

Factors that typically produce a substantial or sustained rise in PSA	Factors that sometimes produce a small or temporary rise in PSA
Benign prostatic hyperplasia (BPH)	Ejaculation
Prostatitis	A digital rectal examination (DRE)
Urinary tract infections	A urinary catheter and bladder examination
Prostate biopsies	Vigorous bike riding
Prostate cancer	Warm climates
Prostate surgery	Changes in labs or testing methods
	Hepatitis
	Bypass surgery

BENIGN PROSTATIC HYPERPLASIA (BPH)

What is It?

Benign prostatic hyperplasia (BPH) is the most common prostate condition affecting men from middle-age onwards. Prostatic hyperplasia is essentially an increase in the number of glandular cells in the prostate, confined to the periurethral and transition zones (see Figure 3 and Figure 6), causing enlargement of the prostate gland. Around his mid twenties a man's prostate begins to grow and virtually all men, if they live long enough, will

experience BPH. It is a benign (non-cancerous) condition, although men can have both BPH and cancer. However, BPH is not cancer.

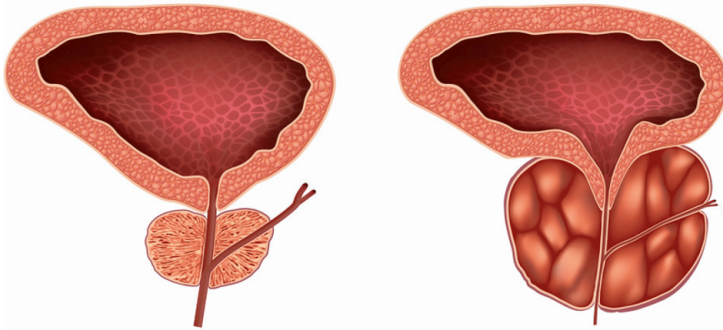


Figure 6 A normal prostate on the left, compared with prostate enlargement caused by benign prostatic hyperplasia on the right. Note the narrowing of the prostatic urethra.

What are the Symptoms?

As the prostate begins to grow it gradually constricts the urethra as it passes through the prostate, resulting in a number of associated symptoms that we listed in the section entitled “How Do I Know if There is a Problem?” on pages 18 and 19.

Your bladder should be able to hold about 430 ml of urine and depending on how much you drink, most people go for a pee about four to seven times a day. If you suddenly need to pee more often you should first consider what you are drinking; are you drinking more than usual? If you are only drinking a normal amount it may be that constriction of your urethra means you can’t empty your bladder properly.

A healthy bladder will send signals when it is full and you should have plenty of time to find a toilet and empty it, if you respond to the initial signals that you need to go. If every thing is normal and working as it should, you shouldn’t leak urine.

You should also be able to sleep for six to eight hours at night without having to get up for a pee, depending on how much and what you have had to drink just before bed. Caffeine and alcohol, in particular, can

interfere with an uninterrupted night's sleep. During sleep the production of urine decreases compared with during waking hours, but as you age the amount of urine you produce overnight increases compared with your younger self. As a result, from middle age on there is an increasing likelihood that you will wake needing to have a pee in the early hours of the morning.

Again, if you can't empty your bladder properly you may be going to bed with it half full, meaning less time will pass before you get the signal that you need to pee.

Some of the symptoms of BPH can lead to other problems. The bladder is a muscle, and like any muscle that has to work harder, it thickens. If you are having to

strain to empty your bladder your bladder muscle has to work harder than it should. Ultimately your bladder muscle loses its elasticity and can no longer contract forcefully enough to push urine through the narrowed urethra. If you cannot empty your bladder properly, and you retain urine you are more likely to develop bladder infections and bladder stones. In addition, straining to pee may worsen haemorrhoids and hernias.

Finally the ureters and kidneys can be damaged by the retention of urine in the bladder, leading to a decrease in kidney function, and ultimately kidney failure. Fortunately most men go to their doctor before the damage becomes that great.

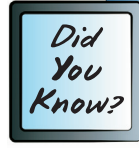
Interestingly, not all men with BPH suffer from symptoms and there is no direct correlation between the degree of prostate enlargement and the severity of the symptoms suffered.

SYMPTOMS

- needing to go for a pee more often;
- difficulty starting to urinate;
- straining or taking a long time to finish urinating;
- a weak flow when you urinate;
- a feeling that your bladder has not emptied properly;
- needing to rush to the toilet;
- leak urine before you get to the toilet; and
- dribbling urine.

What Causes It?

While there are some good theories, no-one is entirely sure why BPH happens. Originally it was thought that growth was stimulated by testosterone alone, and certainly testosterone does



With BPH, the prostate can grow from 20 to 25 grams up to more than 100 grams!

cause the glandular tissue to grow. Men who have been castrated and do not produce testosterone don't develop BPH.

However, the theory that currently has more support is that BPH is caused by changes in the testosterone:oestrogen balance; testosterone production declines with age, and where once the testosterone level was very high compared with the very low levels of oestrogen produced in a man's body, that balance shifts in favour of the oestrogen. Add into the mix a burgeoning obesity problem - more oestrogen is converted from testosterone by aromatase in the fat cells - and an increasing burden of xenoestrogens in the environment, and this could explain the problem. Research has shown that oestrogens can cause cell hyperplasia and increase the life-span of cells.

Studies involving animals have shown that the change in hormone balance may start a chain reaction causing the prostate cells to rapidly multiply. Yet other studies find that the accumulation of the testosterone metabolite DHT (dihydrotestosterone) in the prostatic glandular tissue may be responsible for the rapid cell division.

Some research has indicated that there may be a link between western diets and BPH. In 2002, researchers investigating the health of more than 50,000 men participating in the Health Professionals Follow-up Study, found that men with a "higher intake of calories, protein, and some specific forms of polyunsaturated fats were more likely to develop an enlarged prostate than those who ate less of these nutrients." A 2007 analysis of those same men found that those who ate the fewest vegetables had the highest risk of developing an enlarged prostate. Another study in 2008 obtained similar results: the risk increased with a diet low in vegetables and high in total fat, polyunsaturated fat, and red meat, although it found that protein in general reduced the risk of prostatic enlargement.

How is it Diagnosed?

Initially your doctor will ask you about your symptoms and you might be asked to complete a urinary symptom score sheet (the International Prostate Symptom Score or IPSS). This questionnaire asks you about the frequency and severity of your symptoms, such as how often you have the sensation of not having emptied your bladder when you pee, or how often you have had to pee again less than two hours after you last went to the toilet.

You will have a digital rectal exam (see pages 19 and 20), and your doctor will probably feel your abdomen to check on your bladder. You may also have a PSA blood test and a blood test for kidney function. Your doctor might ask you to keep a diary of your symptoms for a few days, in which you will measure how much you drink, what you drink and how much urine you pass and how often. Then you might be asked to have a urine flow test and an ultrasound scan.

The urine flow test involves urinating into a machine that measures the speed of your urine flow. An ultrasound scan can show if your bladder is emptying properly when you pee, and will be able to determine how much urine is left in your bladder.

Depending on the results of these tests, or if you are considering surgery to fix the problem, you might have a bladder pressure test (urodynamics test) which will show how well your bladder is working. Another test is flexible cystoscopy which can determine if there are any blockages or abnormal tissue in your urethra or bladder. This test might be offered if you have a history of urine infection, if you have blood in your urine, if your symptoms are severe, or if you are experiencing pain.

How is it Treated?

There are three main approaches to treating BPH:

- lifestyle changes,
- medication/drugs, and
- surgery.

Generally medical treatment is not advised for men with mild symptoms because the side-effects of the drugs and/or surgery used to treat BPH outweigh the benefits. This is often called watchful waiting; your doctor will see you regularly to check that your symptoms are not getting any worse. If your symptoms worsen and your quality of life is affected, your doctor should offer a range of options depending on what your symptoms are and how severe they are.

Initially your doctor might recommend lifestyle changes rather than medication or surgery:

- Avoid drinking fluids in the evening, particularly caffeinated and alcoholic beverages. Both can affect the muscle tone of the bladder, and both stimulate the kidneys to produce urine, leading to night-time urination.
- When you go to the toilet, take the time to empty your bladder completely. This will reduce the need for subsequent trips to the toilet.
- Double-voiding - this involves waiting a few moments after you have finished passing urine before trying to go again. It can help you to empty your bladder properly, but you must take care not to strain or push.
- Talk with your doctor about all prescription and over-the-counter medications you take; some, such as antihistamines and decongestants, may affect urination. Your doctor may be able to adjust dosages or change your schedule for taking these drugs, or he or she may prescribe different medications that cause fewer urinary problems.
- Reduce stress by exercising regularly and practicing relaxation techniques such as meditation. Some men who are nervous and tense urinate more frequently.
- Eating more fruit and fibre, or taking magnesium will help you avoid constipation, which can put pressure on the bladder and worsen symptoms of an enlarged prostate.

Another self-help option that the Harvard Medical School annual report on prostate diseases suggests is intermittent self catheterisation. A catheter is a thin flexible tube that is gently inserted into the urethra from the urethral opening in the penis, and pushed up into the bladder to drain the urine. While many men may not want to consider this, men with severe symptoms that interfere with their normal everyday activities might find it

worthwhile, particularly as a stop-gap measure if they have decided to have surgery and have to wait.

Medication

There are two main types of medication prescribed for BPH: alpha-blockers and 5-alpha-reductase inhibitors.

Alpha-blockers, such as tamsulosin (Flomaxtra) and terazosin (Hytrin), relax muscles in the prostate urethra and bladder, increasing the flow of urine. They don't cure or reduce prostate enlargement but help alleviate some of the symptoms.

The 5-alpha-reductase inhibitors, such as finasteride (Proscar) and dutasteride (Avodart), block production of DHT and work by reducing the size of the prostate by as much as one-third, thus actually reversing BPH.

Both of these types of drugs have side-effects and do not work for everyone. The 5-alpha-reductase inhibitors can take several months to work and as long as six months to a year to get the maximum benefit. Improvements in symptoms and in urine flow-rates are only modest and only in a relatively small number of men - as few as 20%. Although side-effects are rare, they can include decreased libido, decreased ejaculate volume, and impotence. While these drugs can lower PSA levels in the blood masking abnormal PSA levels in the prostate, they may also increase the risk of aggressive prostate cancer, so it is important to monitor PSA levels carefully while on these drugs.

Alpha-blockers work much faster and are better at relieving urinary symptoms. A modest improvement in symptoms is experienced by nearly half the patients who take alpha-blockers. Side-effects are experienced by 10 to 20% of men on these drugs and can include dizziness, headaches, fatigue, nasal congestion, dry mouth, and swelling in the ankles. Men on terazosin (Hytrin) can also experience lowered blood pressure (hypotension).

Some men are prescribed both types of drug in combination, and if your symptoms don't improve your doctor may suggest surgery.

Surgical Treatment for BPH

Up to one quarter of men have surgery for BPH because the symptoms have such a significant effect on their quality of life.

The most common procedure in New Zealand is the transurethral resection of the prostate. There are other newer and less invasive procedures but the long term outcomes of these procedures are not yet known.

Transurethral Resection of the Prostate (TURP) is done by a specialist urologist, using either a general anaesthetic or a spinal block. The procedure, colloquially known as “roto-rooter”, is incision-free and uses a resectoscope (a thin tube-like telescope with a light at its tip) that is inserted into the urethra and up into the prostate. The urologist can view the prostate gland and bladder, either through the resectoscope or on a television monitor, and then uses a heated wire loop to cut away excess prostate tissue. The wire also seals blood vessels to help minimise bleeding.

It relieves urinary obstruction in at least 85 to 90% of men, and the improvement is usually long-lasting, although the prostate tissue can grow back and younger men may require another treatment as they age. Side-effects include retrograde ejaculation, in which the semen flows back into the bladder rather than being propelled out of the penis. Although this can alter the sensation for men at the point of orgasm, it is not harmful to the health although it does make fathering children more difficult.

Laser resection is a variation on the TURP technique and is carried out in a similar way to TURP, except that a laser beam is used to cut away the prostate tissue rather than a heated wire loop. This technique tends to produce less bleeding, with men significantly less likely to need a blood transfusion than with TURP, and recovery time tends to be quicker.

Transurethral Incision of the Prostate (TUIP) is similar to TURP except that no prostate tissue is removed. Instead, one to three cuts, or incisions, are made into the prostate at the site of the urethral constriction, opening the urethral passage and improving urine flow. Like the TURP procedure, TUIP is performed under general anaesthetic or with a spinal block. TUIP is more suitable for men with smaller prostates. While there are fewer complications with TUIP compared with TURP, the benefits are not quite as long-lasting.

Compared with TURP, fewer men experience retrograde ejaculation with TUIP, and as a consequence this procedure is chosen by men with only moderately enlarged prostates who still wish to have children.

Open prostatectomy is used where the prostate is too large for TURP. The procedure involves an incision in the lower abdomen or the perineum (the area between the scrotum and anus), and removal of part, or all, of the prostate. A catheter is inserted and remains in place for at least a week. Open prostatectomy usually has very good results with marked improvement in flow-rates and other symptoms in the majority of patients.

Immediate side-effects of an open prostatectomy include pain on peeing and blood in the urine, as well as the need to pee frequently. These symptoms can last from a few days to several weeks, and it is not uncommon to also have minor temporary incontinence for several days and sometimes weeks. Most patients also experience retrograde ejaculation. Studies have found that erectile dysfunction following open prostatectomy occurs in five to ten percent of men.

There are some other procedures that are becoming more widely available in New Zealand and Australia, including Transurethral Microwave Thermotherapy (TUMT) and Transurethral Needle Ablation of the prostate (TUNA), which are more effective than medication but not as effective as TURP.

BENIGN PROSTATIC HYPERTROPHY

In many cases people - including many doctors - use the terms benign prostatic hyperplasia and benign prostatic hypertrophy interchangeably. While they sound the same, and cause the same problem - enlargement of the prostate - they are, in fact, two different conditions. Hyperplasia refers to an increase in the number of cells in the prostate tissue, while hypertrophy refers to an increase in the size of individual cells. As you would expect, any increase in either the number of cells or the size of cells, will lead to an enlargement of the prostate gland itself. Most prostate enlargement is caused by hyperplasia (increase in numbers of cells) rather than hypertrophy (increase in cell size).

The symptoms and treatment are the same for both.