



HEALTHY MALE
ANDROLOGY AUSTRALIA

Male Infertility



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Health information in this booklet describes MALE INFERTILITY. Diagnosis and treatment options are described to help men and their families understand the health problem, make men aware of the available treatment options, and to help make talking with their doctor easier.

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At A Glance

What is male infertility?

Reproduction (making a baby) is a simple and natural experience for most couples. However, for some couples it is very difficult to conceive.

Male infertility is diagnosed when, after testing both partners, reproductive problems have been found in the male.

How common is male infertility?

Infertility is a widespread problem. For about one in five infertile couples the problem lies solely in the male partner and in another quarter, both partners have problems.

What are the symptoms of male infertility?

In most cases, there are no obvious symptoms or signs of infertility. Intercourse, erections and ejaculation will usually happen

without difficulty. The quantity and appearance of the ejaculated semen generally appears normal to the naked eye. Medical tests are needed to find out if a man is infertile.

What causes male infertility?

Male infertility is usually caused by problems that affect either sperm production or sperm transport (blockage). Through medical testing, the doctor may be able to find the cause of the problem.

How is male infertility diagnosed?

If a couple has been trying for a pregnancy without success, they should go to their local doctor, family planning clinic or women's health clinic, and have some tests. Both partners should be tested around the same time as the problem could be in either the male or the female partner. Testing should be done even if one partner has a child from another relationship.

Diagnosis can involve a medical history from the man and a physical examination, along with a semen analysis to check the number, shape and movement of sperm in the ejaculate. Especially if there are abnormalities on the semen analysis, some simple blood tests may also help in diagnosing male infertility.

How is male infertility treated?

One in eight infertile men has a treatable condition, and after treatment couples can become pregnant naturally. In some cases, the doctor will recommend that the couple seek assisted reproductive technology (ART) treatment, such as in vitro fertilisation (IVF). ART does not cure or treat the cause of the male infertility, but these treatments may help the couple conceive, even if the man's sperm count is very low.

What is ICSI (intracytoplasmic sperm injection)?

ICSI is a form of ART where a single sperm is placed directly into each egg by piercing the outer covering of the egg. ICSI is particularly helpful for men with poor sperm production. Sperm are collected from the semen or removed carefully from the testis or epididymis.

ICSI can achieve pregnancies even when only a few sperm are produced. As with other forms of IVF, after fertilisation the resulting embryos are placed back into the woman's uterus.

Does counselling help a man cope with infertility?

Infertility can be distressing and many couples find it difficult to accept. Many men are reluctant to seek psychological counselling, fearing it is an admission of weakness. However, couples often find counselling helpful.

All infertility clinics provide psychological counselling and support, with counsellors specially trained in managing fertility problems.

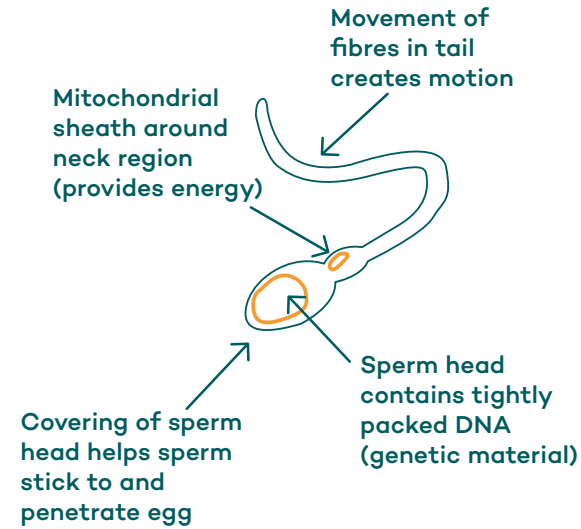
Male Reproduction

A man's fertility and sexual characteristics depend on the normal functioning of the male reproductive system

What are sperm?

Sperm are the male reproductive cells. To have a child, genetic material from the sperm must combine with the genetic material from an egg, in a process called fertilisation.

Healthy, fully developed sperm are very small (0.05 millimetres long) and cannot be seen by the human eye. Sperm are highly specialised cells and are made up of three parts: a head, neck and tail. In the head is a structure called the nucleus, which contains 23 tightly packed chromosomes (genetic material). The head is designed to bind to and then penetrate (enter) the egg. The neck of the sperm joins the head to the tail. The part of the tail nearest the neck contains the mitochondria, which provides the energy for the sperm to move. The tail moves in a whipping motion to push the sperm towards the egg.



Healthy, mature sperm

Male Reproduction

What are the testes?

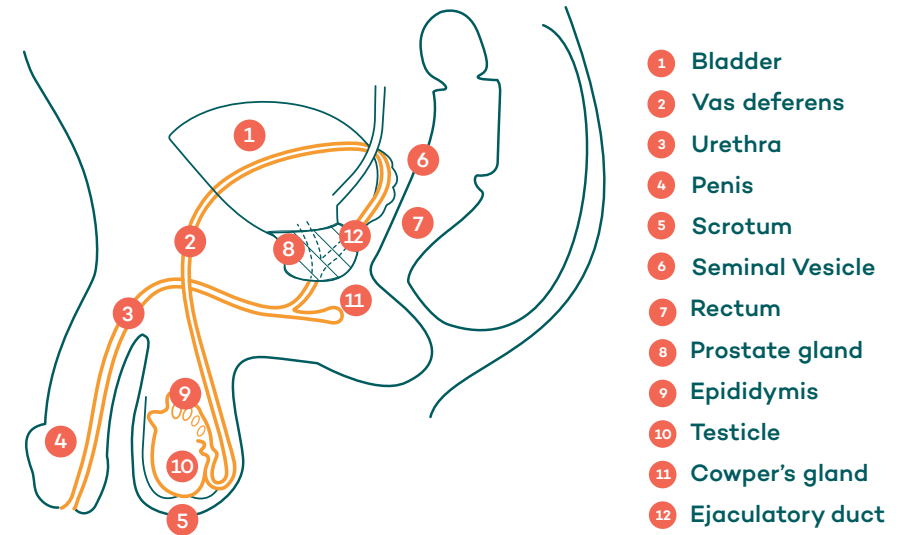
The testes (testis: singular) are a pair of egg shaped glands that sit in the scrotum next to the base of the penis on the outside of the body. In adult men each testis is normally between 15 and 35 millilitres (mL) in volume. The testes are needed for the male reproductive system to function normally.

The testes have two related but separate roles:

- to make sperm
- to make testosterone.

The testes develop inside the abdomen in the male fetus and then move down (descend) into the scrotum before or just after birth. The descent of the testes is important for fertility as a cooler temperature is needed to make sperm and for normal testicular function.

The location of the testes in the scrotum keeps the testes about 2°C below normal core body temperature. This is the reason that in cold weather the scrotum contracts and brings the testes closer to the body and in hotter weather, the scrotum relaxes.



The male reproductive system

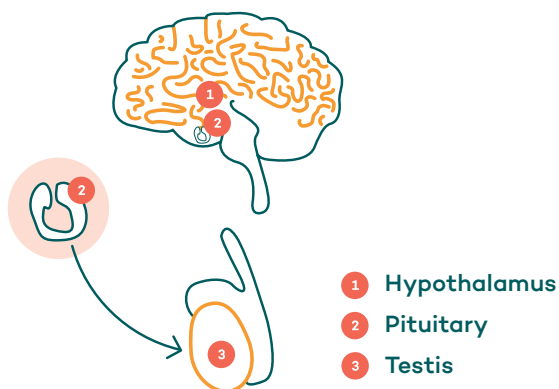
How do hormones control the testes?

The pituitary gland and the hypothalamus, located at the base of the brain, control the production of male hormones and sperm. Luteinising hormone (LH) and follicle stimulating hormone (FSH) are the two important messenger hormones made by the pituitary gland that act on the testes.

The levels of LH and FSH in the blood rise during the early stages of puberty and help the testes to grow and mature. LH is needed for the Leydig cells in the testes to make testosterone, the male sex hormone.

Male Reproduction

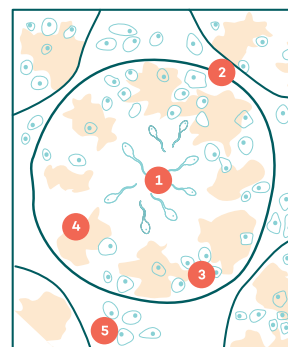
Testosterone is important for the physical changes that happen during male puberty, such as development of the penis and testes, and for the features typical of adult men such as facial and body hair and a masculine physique. Testosterone and FSH from the pituitary gland then act together on the seminiferous tubules (sperm producing tubes) in the testes to make sperm.



Hormone links between the brain and the testes

Where are sperm made?

Sperm are made in the testes in many loops of small, tightly packed tubes called seminiferous tubules. These tubules have a total length of 150 metres. Between the seminiferous tubules lies another type of cell, the Leydig cells, that make the male sex hormone testosterone.



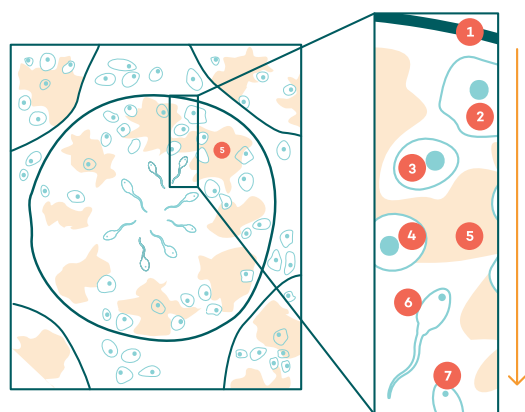
- 1 Lumen
- 2 Seminiferous tubule
- 3 Developing sperm
- 4 Supporting or nurse cell (Sertoli cell)
- 5 Leydig cells

Cross-section of a testis

Male Reproduction

How are sperm made?

Spermatogenesis (sperm production) is a continuous process with millions of sperm being made each day after puberty. Within the testis, sperm can be at different stages of development. It takes about 70 days to complete the development of sperm that are able to swim and fertilise an egg.



- | | |
|-------------------|--|
| 1 Wall of tube | 5 Sertoli cell |
| 2 Spermatogonium | 6 'Elongating' spermatid with tail |
| 3 Spermatocytes | 7 Sperm released into hollow of tube (lumen) |
| 4 Round Spermatid | |

Cross-section of sperm producing tube (seminiferous tubule) in the testis showing sperm development

The germ cells in the lining of the seminiferous tubules divide over and over again to make sperm. The process starts with the earliest germ cell, called a spermatogonium. These dividing cells pass through many stages and undergo a major change in shape, from a round cell (spermatid) to the familiar 'tadpole-like' sperm. Sperm developing in the lining of the seminiferous tubules are supported by larger cells called Sertoli cells.

When mature, sperm are released into the lumen (the space in the middle) of the seminiferous tubules to move out of the testes.

How do sperm move from the testes?

The epididymis is a highly coiled tube (duct) that lies at the back of each testis and connects the seminiferous tubules to the vas deferens, a muscular tube about 30 cm long. When released from the testis, the sperm spend two to 10 days passing through the epididymis where they gain the vital ability to swim strongly (become 'motile'), and to attach to and penetrate (enter) the egg.

What is semen?

Semen is the mixture of fluids from the testis and other glands in the male reproductive tract. In fact, the sperm and the fluid from the testes make up only about two per cent of the volume of the semen that is ejaculated.

Sperm move up the epididymis in this small amount of fluid and then mix with larger amounts of fluid from the seminal vesicles (60% of the semen), the prostate (30% of the semen) and other smaller glands (8% of the semen), before ejaculation.

Male Reproduction

What is ejaculation?

Ejaculation is the release of semen from the penis at sexual climax (orgasm). When a man is sexually stimulated, the brain sends signals to the genital area through nerves in the spinal cord to make the pelvic muscles contract.

At orgasm, waves of muscle contractions transport the sperm, with a small amount of fluid, from the epididymis through to the vas deferens. At the back of the bladder, the vas deferens becomes the ejaculatory ducts, which pass through the prostate gland to join the urethra.

The seminal vesicles and prostate contribute extra fluid (the majority of the semen) to protect the sperm. The passage of fluid along the urethra is further helped by fluid made by the Cowper's glands. This mixture of sperm and fluid from the testes and other glands (the semen) travels along the urethra to the tip of the penis where it is ejaculated (released).

The average volume of semen that is ejaculated is about 2 to 5 mL. Given that the testes only make about two per cent of the semen volume, when a man has a vasectomy (cutting the vas deferens), the change in the amount of semen ejaculated is not noticeable, even though there are no sperm present.

What is fertilisation?

For pregnancy to happen, sperm must enter the vagina at the fertile time of a woman's menstrual cycle. Sperm must then travel through the woman's uterus (sometimes called the 'womb') and into the uterine tubes where they meet the egg. Fertilisation of the egg happens when moving sperm bind (stick) to and then penetrate (enter) the egg.

How many sperm are needed to become pregnant?

The ejaculate of fertile men contains tens of millions of sperm. However, men with much lower numbers of sperm can still achieve pregnancy. Men who never have any sperm in their ejaculate are sterile and cannot cause a pregnancy without some form of treatment.

Male Reproduction

How can sperm production go wrong?

The process of making sperm can be interrupted at various stages for a number of reasons:

- absence of germ cells (called Sertoli cell-only syndrome): the testis may completely lack the germ cells that normally divide to become sperm. This is a severe problem. If every tubule shows this pattern the man will be sterile as there are no sperm in the semen or in the testes
- maturation or germ cell arrest: sometimes germ cells stop developing and do not become mature sperm
- hypospermatogenesis: when the number of sperm made in the testes is lower than normal, smaller numbers, or sometimes no sperm, make it through into the ejaculated fluid.

Some men have a mixture of patterns of sperm production in the same testis. This means that although one area of the testis is not producing sperm, another area may have normal sperm production. This is generally found during a special operation (called microsurgical testicular sperm extraction or 'micro-TESE') for men who have a condition called 'non-obstructive azoospermia'.

Male Infertility

What is male infertility?

Reproduction (making a baby) is a simple and natural experience for most couples. However, for some couples it is very difficult to conceive.

A man's fertility generally relies on the quantity and quality of his sperm. If the number of sperm a man ejaculates is low or if the sperm are of a poor quality, it will be difficult, and sometimes impossible, for him to cause a pregnancy.

Male infertility is diagnosed when, after testing both partners, reproductive problems have been found in the male.

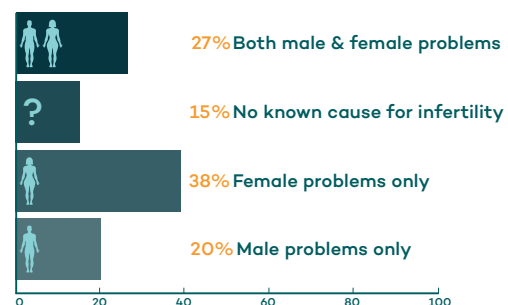
Many men will still be able to father children naturally even though they may have a lowered sperm count.

How common is male infertility?

Infertility is a widespread problem. For about one in five infertile couples the problem lies solely in the male partner and in another quarter, both partners have problems. In about one in seven infertile couples, the cause of the problem cannot be found (idiopathic infertility).

Male Infertility

This means that in almost half of infertile couples, there is a problem in the male alone or both male and female partners. It is estimated that one in 20 men has some kind of fertility problem with low numbers of sperm in his ejaculate. However, only about one in every 100 men has no sperm in his ejaculate.



Proportion of couples with infertility due to male or female problems

What are the symptoms of male infertility?

In most cases, there are no obvious symptoms or signs of infertility. Intercourse, erections and ejaculation will usually happen without difficulty. The quantity and appearance of the ejaculated semen generally appears normal to the naked eye. Medical tests are needed to find out if a man is infertile.

Male Infertility

When should we see a doctor for fertility problems?

If you and your partner are not using any form of contraception, and the woman does not become pregnant after a year of regular (at least twice weekly) sexual intercourse, you should both see a doctor and have some tests.

There are several ways to help improve the chance of successful pregnancy but the most important is for the woman to monitor her cycle and that intercourse happens regularly around the time she is ovulating. There are different ways for a woman to monitor her cycle, usually with a 'kit' that can be bought at a pharmacy.

You can ask a doctor questions about the timing of sexual intercourse and other facts about the reproductive system. Some basic answers can help couples and lower their stress and anxiety. Some couples will be worried that things are 'not working' after only a few months, and they may find it helpful to talk about their concerns with a doctor.

For couples with known reproductive problems, or if the female partner is older than 35 years, it may be best to seek medical help before 12 months of trying to conceive.

Causes

Male infertility is usually caused by problems that affect either sperm production or sperm transport

What causes male infertility?

Male infertility is usually caused by problems that affect either sperm production or sperm transport (blockage). Through medical testing, the doctor may be able to find the cause of the problem. Medical research continues to try to understand the causes of male fertility problems.

CAUSES OF MALE INFERTILITY

| | |
|---|---|
| Sperm production problems | <ul style="list-style-type: none">- Chromosomal or genetic causes- Undescended testes (failure of the testes to descend at birth)- Infections- Torsion (twisting of the testes in scrotum)- Heat- Varicocele (varicose veins in the testes)- Medicines and chemicals- Radiation damage- Unknown cause |
| Blockage of sperm transport (obstruction) | <ul style="list-style-type: none">- Infections- Prostate-related problems- Absence of vas deferens- Vasectomy |
| Sexual problems (erection and ejaculatory problems) | <ul style="list-style-type: none">- Retrograde or premature ejaculation- Failure of ejaculation- Erectile dysfunction- Infrequent intercourse- Spinal cord injury- Prostate surgery- Damage to nerves- Some medicines |
| Hormonal problems | <ul style="list-style-type: none">- Pituitary tumours- Congenital lack of LH/FSH (pituitary problems from birth)- Anabolic (androgenic) steroid abuse |
| Sperm antibodies | <ul style="list-style-type: none">- Vasectomy- Injury or infection in the epididymis- Unknown cause |

Causes

Sperm production problems: The most common cause of male infertility is a problem with making sperm in the testes. Either low numbers of sperm are made and/or the sperm that are made do not work properly.

About two-thirds of infertile men have a sperm production problem. Unfortunately, medical scientists do not yet understand all the details of healthy sperm production. Therefore, the cause cannot be found for many men with a sperm production problem.

Sperm transport problems: Blockages (often referred to as obstructions) in the tubes leading sperm away from the testes to the penis can cause a complete lack of sperm in the ejaculated semen.

This is the second most common cause of male infertility and affects about one in five infertile men, including men who have had a vasectomy but now wish to have more children. Some blockages may be related to congenital problems (that is, being born with the problem) which can be found with specialised tests. Most of the time, men who have a sperm production or transport problem show no obvious signs or symptoms.

Sexual problems: Problems with erections (erectile dysfunction) or ejaculation can affect whether semen is able to enter the woman's vagina for fertilisation to take place. About one in 100 infertile couples has trouble getting pregnant because of erection, ejaculation or other sexual problems. Problems with ejaculation that can cause infertility include:

- retrograde ejaculation, a problem where semen flows back into the bladder rather than out of the penis during orgasm
- premature ejaculation, where ejaculation occurs sooner than desired
- anorgasmia, where ejaculation does not happen at all.

Hormonal problems: In about one in 100 infertile men the problem is caused by low levels of hormones made in the pituitary gland that act on the testes. Low production of follicle stimulating hormone (FSH) and luteinising hormone (LH) can affect testosterone levels in the testes, and lead to lower sperm production.

The most common hormonal problems are pituitary tumours or problems with the development of the pituitary gland leading to a lack of FSH and LH.

Causes

Sperm antibodies: In some men, the immune system reacts to the man's own sperm. In these cases, the immune system makes sperm antibodies, which bind (attach) to the sperm. About four in five men develop sperm antibodies after having a vasectomy.

In most men sperm antibodies do not cause any problems and will not affect the chance of a pregnancy, including after having a vasectomy reversal. However, in a small number of men sperm antibodies can lower fertility in the following ways:

- by reducing the number of sperm in the semen
- by coating sperm and making sperm clump together, which reduces their motility (movement), and may stop the sperm from swimming through the fluid in a woman's cervix and reproductive tubes
- by stopping the sperm binding to and penetrating the egg during fertilisation.

Sperm antibodies do not affect a man's general health and there are not usually any signs that sperm antibodies are present. Sperm antibodies are found in about one in 16 infertile men.

Sperm Production Problems

What genetic problems affect sperm production?

Changes to chromosomes and genes can cause abnormal sperm production or blockages to sperm flow. Chromosomes are the structures in cells that carry genetic information. Each cell in the body normally has 46 chromosomes.

The most common genetic causes of infertility are chromosomal conditions that affect sperm production. These include:

- Klinefelter syndrome
- Y chromosome deletions
- other genetic problems, such as Down Syndrome.

It is likely that other genetic disorders will be found in the future (and tests for these genetic conditions developed) that will help explain other sperm production problems that currently have no known cause.

Sperm Production Problems

How are undescended testes linked with sperm production?

The testes develop inside the abdomen in the male fetus and then move down (descend) into the scrotum before or just after birth. Undescended testes (or cryptorchidism) is a condition when one or both of the testes have not descended into the scrotum at birth, but stay in the abdomen or only move part way down into the scrotum.

The location of the testes in the scrotum keeps the testes about 2°C below normal body temperature. It is believed that the warmer temperature in the abdomen damages the sperm-producing tubes in the testes. The longer the testes spend in the abdomen, the greater the effect on sperm production.

Even when undescended testes are fixed with surgery in early childhood, there is still a much higher chance that the man will be infertile as an adult. If an infant has an undescended testis, the best time to have an operation (orchidopexy) is around six to 12 months of age.

If small numbers of sperm are present, assisted reproductive technology (ART) is usually needed if the man wishes to have a family.

What infections can affect sperm production?

Orchitis (infection in the testes) can damage the sperm-producing tubes (seminiferous tubules) and stop sperm production. Although the infection is often only temporary, severe damage can leave men permanently infertile. Mumps (especially as an adult) used to be the most common infection of the testes (mumps orchitis) but is now less common due to immunisation programs. Research is continuing into whether other infections might damage the testes.

How does torsion of the testis affect sperm production?

Most common in teenagers and young men, torsion of the testis happens when the testis twists in the scrotum. The twisting of the testis cuts off the blood supply to the testis, causing damage to the tubes that produce sperm. If this problem only happens in a single testis, the other testis should continue to make sperm and natural conception can happen.

Torsion of the testis is a medical emergency and needs immediate surgery to relieve the pain and 'save' the testis. Without a blood supply, the testis will 'die' after six to eight hours. The longer the testis is without a blood supply, the lower the chance of being able to save the testis. During surgery the other testis should also be fixed in position to stop it twisting.

Sperm Production Problems

There is ongoing debate about the effect of underwear styles on sperm production

How does heat affect sperm production?

Raised body temperature for any reason (e.g. due to severe flu), and raising scrotal temperature by sitting in hot water for a long period of time, can reduce sperm production. It is generally recommended that men avoid having long spas, saunas and hot baths if trying to conceive. Sperm production will generally increase once the temperature of the scrotum stays at its normal lower level (2°C below body temperature). However, as it takes about 70 days for sperm to develop, it may take a few months of keeping the testes cooler for sperm production to improve.

There is ongoing debate about the effect of underwear styles on sperm production. Whether looser (cooler) boxer shorts are better than tighter (warmer) briefs is unclear. Some research has suggested that wearing tight underwear can decrease sperm counts, although other studies have not found this to be the case.

How does a varicocele affect sperm production?

A varicocele is a swelling of the veins (varicose veins) above the testis. It affects about three in every twenty men (15%) and is usually on the left side. Varicoceles first appear at puberty and can sometimes cause discomfort.

Men with clinically significant (large) varicoceles often have a lower than average number of sperm, poorer sperm movement and an increase in the number of abnormally shaped sperm. However, some men with varicoceles have normal sperm counts and many have fathered children.

Some research has shown that the temperature of the testis with a varicocele is higher which can damage healthy sperm production.

Can cancer affect sperm production?

Any type of cancer, especially a more aggressive cancer, can affect sperm production. Any man who needs treatment for a cancer (surgery, radiotherapy and/or chemotherapy) should think about storing sperm before the treatment starts, even if the cancer does not affect the testis directly.

For men with testicular cancer, cancer in a single testis may not affect the chance of having children. After a cancerous testis is removed, in many men the remaining testis continues to make testosterone and sperm. However, some men who have had testicular cancer may have trouble having children.

Men who are diagnosed with testicular cancer are more likely to have lower fertility before any treatment starts. Fertility can be further affected by cancer treatments such as radiotherapy and chemotherapy.

Sperm Production Problems

Cancer treatments including some types of surgery, radiotherapy and chemotherapy can reduce fertility

How does radiotherapy affect sperm production?

Radiation treatment or 'radiotherapy' uses high energy X-rays to kill cancer cells in a specific area while limiting damage to normal cells.

Radiotherapy for testicular or other cancers near the testes can damage the testis, leaving permanent problems with sperm production. During radiotherapy, the other non-affected testis is shielded from the X-rays but some exposure may happen. The effects of radiotherapy can be temporary or permanent.

Radiotherapy to the whole body (used before a bone marrow transplant) and radiation to the brain can also lower male fertility by affecting the glands that produce hormones that act on the reproductive system.

As radiation can cause genetic damage in the early development stages of sperm (germ cells), it is best to avoid attempting a pregnancy for six to 12 months (depending on the type of treatment) after radiotherapy.

How does chemotherapy affect sperm production?

Chemotherapy medicines act to stop or slow the growth of cancer cells. Chemotherapy also attacks normal cells, such as the cells in the lining of the sperm-producing tubes in the testis. Chemotherapy can temporarily or permanently destroy developing sperm cells.

Some men will return to the level of fertility they had before chemotherapy but this is highly dependent on the type and duration of chemotherapy. It can take up to five years for fertility to recover after chemotherapy and in some cases fertility is permanently reduced.

What other medical conditions or treatments may affect sperm production?

Some medical treatments or conditions can lead to infertility in some men. Men with some types of kidney or inflammatory disease may need medicines that temporarily or permanently reduce sperm production.

Men who need to take medicines for other serious health reasons and who wish to be able to start a family, should check with their doctor to make sure that the medicine does not cause infertility.

Sperm Production Problems

How do other medicines affect sperm production?

There are a number of commonly used medicines that may have a negative effect on sperm production and function.

Cyclophosphamide, a medicine used for the treatment of some cancers and kidney disorders, can cause permanent infertility if the treatment is given for a long time.

Salazopyrine[®], used to treat inflammatory bowel disease, causes short-term infertility. This medicine is often given for ulcerative colitis, Crohn's disease or problems following other conditions such as rheumatoid arthritis. These health problems can often be managed with other medicines, which allow the man to remain fertile. When salazopyrine is stopped, sperm production will usually return to normal after a few months.

Testosterone (tablets or injections), which are used to treat men with testosterone (androgen) deficiency, can cause fertility problems. Testosterone treatment stops the production of the pituitary hormones (FSH and LH), which normally act on the testes to make sperm. Testosterone reduces the size of the testes and can lower or stop sperm production.

Can recreational drugs affect sperm production?

Androgens (anabolic steroids), taken for body building or sporting purposes, shrink the testicles and lower sperm production by stopping the hormones made by the pituitary gland. High doses of androgens can also be harmful to general health in men with normal testosterone levels. These drugs should not be taken at all, particularly when trying to have a baby.

In some men who stop taking anabolic steroids, their testes never return to normal and they have permanent infertility and small testes.

Use of other illicit drugs, such as marijuana and heroin, may affect sex drive and fertility.

Sperm Transport Problems

What infections can affect sperm transport?

Non-specific epididymo-orchitis (inflammation of the epididymis and/or testis, usually due to infection) or prostate infections may sometimes cause blockages along the reproductive tract.

Sexually transmitted infections (STIs), particularly untreated gonorrhoea and chlamydia, may cause blockages in the tail of the epididymis or other parts of the male genital tract.

What genetic problems can affect sperm transport?

Congenital absence of the vas deferens is a rare genetic problem that causes infertility in about 1 in 2500 men. Many men with congenital absence of the vas deferens have a mutation (genetic change) in the cystic fibrosis (CF) gene. Several parts of the reproductive tract (including the vas deferens) are missing from birth (congenital). This stops sperm moving from the testes into the ejaculate.

Can a vasectomy be a fertility problem?

Vasectomy is a surgical operation that cuts the tubes that carry the sperm from the testes (the vas deferens or the 'vas'). The goal of a vasectomy is to make a man sterile, that is, unable to father children naturally. It is a very effective, safe and permanent form of contraception.

Why is it important to think about sperm storage before vasectomy?

Even though only a small fraction of men who undergo vasectomy want another child, some men store sperm before a vasectomy 'just in case'. This may prevent the need for a vasectomy reversal in the future. However, when using stored sperm, the female partner will still need some form of ART to fall pregnant. There are also costs involved with sperm storage.

Men who have had a vasectomy and want to father another child naturally without ART can think about having a vasectomy reversal. With an expert surgeon a vasectomy reversal can give a man a high chance of sperm returning to his ejaculate (up to 90% chance).

However, there are several other factors that are important for achieving a natural pregnancy after a vasectomy reversal, including the quality of the sperm (number and motility), the age of the female partner and the time since the vasectomy was done. If it is more than 15 years since the vasectomy, achieving a pregnancy after a reversal is much less likely.

Looking After Your Fertility

Can I do anything to prevent male infertility?

It is best to avoid cigarette smoking, excess alcohol, sexually transmitted infections, heat stress from tight fitting underwear, and anabolic steroids (taken for body building or sporting purposes) as these factors can be harmful to the production of sperm.

If you work in an occupation that may affect your fertility, it's important to wear protective clothing and follow all occupational health and safety guidelines. It is recommended that couples trying to conceive avoid exposure to any possibly harmful chemicals.

Because of the possible effects on fertility, it's important to tell your doctor if you have had hormone treatment, or had surgery as a child to move your testes into the scrotum.

Do vaginal lubricants affect fertility?

Many vaginal lubricants kill sperm. If couples are trying to conceive, vaginal lubricants should not be used during the fertile time in the female partner's menstrual cycle. Couples can ask their chemist for 'sperm friendly' lubricant advice.

Can infections that affect fertility be prevented?

Boys should be immunised against mumps to avoid infection and possible infertility in adult life.

Epididymo-orchitis, caused by viral or bacterial infections of the testes and epididymis should be treated early with antibiotics to limit damage to the testes.

It is important for men who think they may have a sexually transmitted infection (STI) to get immediate treatment from a doctor. This can stop the spread of the infection to a partner and also reduce the chance of blockages developing in the male reproductive tract.

For men not wanting a family, safe sex practices using condoms are recommended outside stable monogamous relationships. Both partners may want to be tested for STIs before trying to have a family. This may stop any disease being passed on to partners or children.

Can work environments affect fertility?

Some occupations carry a higher risk of fertility problems (e.g. farmers spraying pesticides, men handling volatile hydrocarbons). Pesticides, heavy metals, toxic chemicals and radiation may affect the quality and quantity of sperm. Little is known about other environmental threats to fertility but it is wise to avoid exposure to any possibly harmful chemicals.

Looking After Your Fertility

Can cigarettes or alcohol affect fertility?

Research on the effect of smoking on semen suggests it can damage the sperm's genetic material (DNA) and reduce sperm quality. It is recommended that men quit smoking for their long-term health. Quitting smoking is particularly important if a man is trying to have children because of the effects of passive smoking on his partner and children.

Moderate alcohol intake (one to two standard drinks per day) does not affect sperm production. However, a large amount of alcohol may cause liver damage, which could have an effect on general and reproductive health.

Can body weight affect fertility?

For both men and women, having a healthy body weight and being physically active will help fertility and give the best chance for a healthy child. In men there is ongoing research into why being obese can affect sperm production and quality. As for women, there is now research suggesting that chronic conditions in men, such as obesity and diabetes, can lead to genetic changes in the sperm (called epigenetic changes) that can affect the health of children into their adult life.

The main message is for men to be as fit as possible when producing sperm during the period when a couple is trying to conceive.

Is timing of intercourse important for pregnancy?

Infrequent sexual activity is a common reason couples do not conceive within the first few months. For the best chance of conception, sexual intercourse should take place at the time of ovulation (i.e. when an egg is released into the female reproductive tract). Ovulation usually happens about 14 days (range 12 to 16 days) after the first day of a woman's period, and is the most fertile time of the month (for women with regular 28-day cycles). Women can also monitor their menstrual cycles using a 'kit' that can be bought from the chemist.

Doctors usually suggest to couples that to improve their chances of fertility, they should have sex daily or at least every second day over this fertile period.

Can older age cause male fertility problems?

Healthy men in their 70s and beyond can still father children, however the time taken for a partner to become pregnant is longer when a man is middle-aged or older. Reasons for this may include a decrease in sexual activity, lower semen volume, changes to sperm motility (movement), a lower number of motile sperm, and possibly lower sperm function and DNA quality.

The chance of the child having a mental illness like schizophrenia, or a genetic problem is also slightly higher for older men. However, most children born to older men are healthy.

Looking After Your Fertility

Can storing sperm prevent loss of fertility?

Sperm storage (also known as sperm banking) is the collection (usually through masturbation) and freezing of semen. Men about to start any medical treatment that could make them infertile may want to think about storing sperm before starting the treatment.

Semen can be frozen, using special equipment, and stored long-term for future use. If a man wants children at a later stage, the frozen semen is thawed and used to inseminate his partner, or for ART treatments if needed.

When should a man think about storing sperm?

- All men and teenage boys who have started or passed puberty and who are about to receive chemotherapy or radiotherapy should think about storing sperm before their cancer treatment starts
- A man taking a medicine that might cause infertility, such as Salazopyrin® (used to treat inflammatory bowel disease), may also think about storing sperm before starting treatment
- Men who have taken pituitary hormone treatments to improve sperm production, but wish to stop this therapy after their first child has been born, may wish to store some sperm for possible later pregnancies
- Men planning a vasectomy should think about storing sperm before having this procedure. This may prevent the need for a vasectomy reversal in the future; however, when using stored sperm, the female partner will still need some form of ART to fall pregnant.

Where can sperm be stored?

Specialist centres providing in vitro fertilisation (IVF) and other ART often have sperm storage facilities. Sperm are frozen and kept in liquid nitrogen (-196 °C) for long-term storage. A storage fee will apply. Sperm can last for decades when stored in a frozen 'sperm bank'.

All men and teenage boys who have started or passed puberty and who are about to receive chemotherapy or radiotherapy should think about sperm storage before their cancer treatment starts

Diagnosis

How is male infertility diagnosed?

If a couple has been trying for a pregnancy without success, they should go to their local doctor, family planning clinic or women's health clinic, and have some tests. Both partners should be tested around the same time as the problem could be in either the male or the female partner. Testing should be done even if one partner has a child from another relationship.

Diagnosis can involve a medical history from the man and a physical examination along with a semen analysis to check the number, shape and movement of sperm in the ejaculate. Especially if there are abnormalities on the semen analysis, some simple blood tests may also help in diagnosing male infertility.

In many cases, both male and female problems are found to be contributing to the difficulties couples experience when trying to conceive.

What will the doctor do?

The doctor will take a medical history from the man to find out whether there are any obvious health problems that could affect fertility.

The doctor will also ask questions that include how long the couple has been trying for a pregnancy, and how often sexual intercourse happens.

A physical examination is also done. This can be the first full health check for many young men and sometimes identifies other unrelated health problems.

A doctor will refer the man to a laboratory for a semen analysis. A semen analysis will check the number, movement and shape of the sperm in the ejaculate. Blood tests may also be done to check the levels of hormones that control sperm production. Genetic investigations are sometimes needed but this is usually done by a specialist in male infertility.

What happens in a physical examination?

During the physical examination, the doctor will check:

- the position of the testes in the scrotum
- the size and feel of the testes
- the possible enlargement or lumps on the epididymis
- the presence of the vas deferens, usually felt at the neck of the scrotum just above the testes
- the presence of swollen veins above the testes (called a 'varicocele') best seen when the man is standing up
- the amount and spread of body, pubic and facial hair
- the breasts for possible swelling
- any sign of scars from surgery in the groin or scrotal areas
- the size of the penis.

Diagnosis

Semen analysis is a vital part of diagnosing male infertility

Also, in some cases, a rectal examination is done to check the prostate gland for signs of possible inflammation. Ultrasound may be used if the contents of the scrotum are difficult to feel or if there are lumps that need further testing.

What is semen analysis?

Semen analysis is the laboratory testing of freshly ejaculated semen that usually has been produced by masturbation. Under a microscope, the number, shape and movement of sperm are measured.

A semen analysis is a vital part of diagnosing male infertility. Testing should be done at a specialised laboratory that uses methods approved by the World Health Organization (WHO); special equipment and expertise are needed to do an accurate semen analysis. You should ask your doctor for a semen analysis instruction sheet as there are certain instructions that need to be followed and may be slightly different between testing laboratories.

What hormones are tested?

A morning testosterone (before 10 am) and the pituitary hormones, FSH (follicle stimulating hormone) and LH (luteinising hormone) can be easily measured in a blood test if hormonal problems are suspected. Hormone test results, combined with results from a semen analysis, can suggest possible causes of male infertility.

POSSIBLE CAUSES OF MALE INFERTILITY FROM SPERM COUNT AND HORMONE LEVELS

| SPERM NUMBERS | FSH | LH | TESTOSTERONE | |
|---------------|-----------|-----------|---------------|--|
| Low or Zero | Very Low | Very Low | Very Low | Pituitary gland problems can cause poor FSH and LH production, which lead to low testosterone and infertility |
| Low or Zero | Very High | Very High | Low to Normal | High levels of FSH and LH, together with low to normal levels of testosterone, show a problem in the testes |
| Low or Zero | Very High | Normal | Normal | In many infertile men, the testosterone producing cells (Leydig cells) in the testes are working normally and only sperm production is a problem. The body makes more FSH to try to overcome the problem |
| Zero | Normal | Normal | Normal | Possible blockage to sperm flow |

What genetic tests might be done?

Sometimes apparently healthy men with very low or zero sperm counts are found to have genetic disorders, particularly changes in chromosomes. A blood test called a karyotype may be done to examine the number and structure of chromosomes (normally there are 46 in each cell including two sex chromosomes – XY in men, or XX in women). A common disorder that causes male infertility is Klinefelter syndrome where there is an extra X chromosome (47,XXY).

Diagnosis

Another blood test is called the Y chromosome deletion test which checks if important genetic material that controls sperm production is missing on the Y chromosome (the sex chromosome only found in males). Y chromosome deletions are found in about one in 20 men with very low or zero sperm counts.

When there is an obstruction to sperm flow that cannot be explained, or for men with cystic fibrosis (CF: a serious congenital condition affecting the lungs and bowel), the man and his partner may be tested for the CF gene before ART treatment. The CF gene test will show if the couple is at risk of passing on CF to the child and the couple may need to think about pre-implantation genetic testing (where the embryo is tested for the genetic condition before it is implanted into the woman).

What test may be done to find out why there is no sperm in the ejaculate?

Men may have azoospermia (have no sperm in their ejaculate) because of a sperm production problem or a blockage in the reproductive tract. Most of the time, an experienced male fertility specialist can sort out whether the infertility is caused by a problem with sperm production or if it is a blockage problem.

Usually a comprehensive clinical history, physical examination, and blood and semen tests are all that is needed for diagnosis. Sometimes, more sophisticated tests may be needed such as an MRI or a transrectal ultrasound. If there is still doubt as to whether there is a sperm production or a blockage problem after these first and second line tests, a testicular biopsy will help work out the problem.

A testicular biopsy is an operation to remove small samples of testis for examination under a microscope. If healthy sperm production is seen, the problem is a blockage 'downstream'. If there is very few or no sperm, then there is a production problem. This test can be done on its own or together with a microsurgical testicular extraction (micro-TESE) to find sperm (see below).

What other tests may be done?

Other medical tests may be needed to identify specific medical conditions.

Urine is sometimes tested to check for retrograde ejaculation, that is when semen moves into the bladder during orgasm, rather than being ejaculated from the tip of the penis. For men with retrograde ejaculation, the sperm are washed out when they next urinate after ejaculation. This test is most commonly done if the ejaculate volume (amount of semen ejaculated, not sperm count) is low or zero.

Diagnosis

For most men with sperm production problems, the cause is not known

What if no cause is found?

For most men, test results can show if there is a hormonal problem, a blockage to sperm transport or an ejaculation problem, and treatment can then be chosen.

Unfortunately, for most men with sperm production problems, the cause is not known. For other men, everything can seem normal, including the semen test results, and there is no clear reason why pregnancy is not happening. Infertility where the cause is unknown is called 'idiopathic infertility'.

Couples with male infertility problems can seek help to conceive using ART, such as intracytoplasmic sperm injection (ICSI).

Will I need to see a specialist for male infertility?

You should first see your local doctor (GP) who can do initial testing for you and your partner. However, if the semen analysis is abnormal or other reproductive problems are present, you may be referred for assessment by a male infertility specialist (such as an endocrinologist, urologist or gynaecologist). Often the specialist will recommend more involved treatment.

Treatment

How is male infertility treated?

The results of medical tests help doctors decide whether the male infertility problem can be treated.

Treatable conditions: One in eight infertile men have a treatable condition and, after treatment, couples can become pregnant naturally.

Untreatable sub-fertility: Three quarters of infertile men have sperm present in the semen but in lower numbers than normal. The problem causing the poor production or function of their sperm is often not able to be identified and cured. These men are often referred to as being 'subfertile'; pregnancies may happen but at lower rates than usual. On average, subfertile men need to try for a longer period of time for conception to happen; however, it still may never happen. ART can help these men to become fathers.

Untreatable male sterility: About one in nine infertile men has no sperm in his semen or in his testes and usually cannot be treated. Sperm-producing cells in the testes either did not develop or have been irreversibly destroyed. For these men, there is still some hope as in about 30 to 40 per cent, sperm can be found via a specialised operation called a micro-TESE, performed by a surgeon experienced in microsurgery. This is a complex and highly technical operation which can take up to four hours. For men who are unable to have sperm harvested in this way, or choose not to, adoption and donor insemination are the only possibilities for couples in this group who wish to have a family.

Treatment

In some cases, the cause of the male infertility problem can be treated and a couple can try to become pregnant naturally

How is the best treatment chosen?

Once the doctor has decided if the infertility can be treated, possible treatments can then be explained. Doctors will also discuss the chances of becoming pregnant naturally. Many men will still be able to father children naturally even though they may have a lowered sperm count.

In some cases, the doctor will recommend that the couple seek ART to become pregnant. ART does not cure or treat the cause of the male infertility, but these treatments may help the couple conceive, even if the man's sperm count is very low.

What causes of male infertility can be treated?

In some cases, the cause of the male infertility problem can be treated and a couple can try to become pregnant naturally. In other cases, such treatments may allow or improve the chance of successful ART.

Treatable causes of male infertility include:

- blockage of sperm transport (for example, vasectomy or a cyst in the prostate)
- hormonal problems (for example, a lack of pituitary hormones production)
- some sexual problems (for example, problems with getting and keeping an erection)
- some reversible conditions (for example, use of certain drugs, anabolic steroids)
- the presence of a varicocele (in selected cases).

How are blockages caused by infection treated?

Blockages caused by infection may be corrected by surgery. Some couples become pregnant naturally after surgery; however, the chance of pregnancy depends on the amount of damage and where the blockage is located. Blockages near the testes are particularly hard to fix. Sperm antibodies may also be a problem for men with these blockages and may lower the chance of a natural pregnancy.

For men with sperm blockages caused by infection who either do not wish to have surgery or in whom surgery was unsuccessful, ICSI is an option as sperm are often present in fluid from the epididymis or in testicular biopsy tissue.

How is a varicocele managed?

Not all varicoceles need treatment. However, if there are abnormalities in semen analysis, and there is a varicocele that can be felt in the scrotum, treatment may be helpful. Very small varicoceles, especially ones that can only be seen on ultrasound (and cannot be felt in the scrotum) do not need treatment.

For couples thinking about using ART, if the man has a varicocele the doctor may recommend treating it before starting the ART. Treating the varicocele may improve the sperm production so that ART is not needed. For those who do go on to have ART, some research shows that outcomes may be better for the couple when the male partner does not have a varicocele.

Treatment

There are different options for treating a varicocele, however, many studies have shown that a microsurgical approach (using a microscope to do the surgery) gives the best results.

Other options include key-hole surgery or embolisation. Embolisation “plugs” the vein with a wire or glue and is performed by a radiologist. This procedure is usually the quickest but does have the highest recurrence rate (the varicocele comes back again) of all the options.

How are sperm antibodies treated?

ICSI can be used for infertile men with high levels of sperm antibodies who wish to have a family. By directly placing the sperm into the egg, there is no need for the sperm to move to or to bind to the egg.

How is infertility caused by vasectomy treated?

Vasectomy reversal involves re-joining the cut ends of the vas deferens usually by microsurgery (using an operating microscope). The operation is much more complex than the original vasectomy and usually, but does not always, enables couples to become pregnant naturally.

With an expert surgeon, a vasectomy reversal can give a man a high chance of sperm returning to his ejaculate (up to 90% chance). However, there are several other factors that are important for achieving a natural pregnancy after a vasectomy reversal, including the quality of the sperm (number and motility), the age of the female partner and the time since the vasectomy was done. If it is more than 15 years since the vasectomy, achieving a pregnancy after a reversal is much less likely.

Factors from the original vasectomy can affect the chances of a vasectomy reversal being successful.

Sperm antibodies are present in four in five men after a vasectomy. These can still stop pregnancy happening, even if the vas deferens is successfully joined together again but usually they do not cause a problem.

If sperm have been stored before the vasectomy, a female partner can be inseminated at the time of ovulation (the fertile time of a woman’s menstrual cycle). Alternatively, sperm can be collected from the man’s epididymis or by a testis biopsy that can be used with ART, specifically ICSI.

The choice of whether to have a surgical vasectomy reversal or ART includes thinking about the costs, the risks and benefits, and the reproductive health of the female partner. The pros and cons of a vasectomy reversal should be carefully discussed with the doctor.

Treatment

How are sexual problems treated?

For natural conception to happen, it is important that a man is able to have erections (when the penis becomes hard) and can ejaculate (release of semen from the penis during orgasm). Erections and ejaculation are controlled by different nerve pathways so that men who are unable to have an erection can still often have an orgasm and ejaculate.

If a man has a problem with either erections or ejaculation, there are effective treatments available and your doctor can discuss the options with you. Treating other health conditions such as diabetes or heart disease can sometimes help erectile dysfunction. Treatment for ejaculation problems will depend on the type and severity of the problem. In some men, sperm can be collected from the testes or from urine samples and these sperm may be used in ART.

What happens if infertility is caused by prescribed medicines?

Some medicines can leave men permanently infertile and there are no treatments that will start sperm production again. Other medicines only have a short-term effect on sperm production. Once these medicines are stopped, sperm production should return. However, because sperm take a long time to develop, it may take six to 12 months for sperm counts to reach normal levels.

Cancer specialists sometimes recommend that couples wait for six to 12 months after taking certain medicines before trying to become pregnant to make sure that possible problems with the pregnancy or the baby are avoided.

How are hormonal problems treated?

It is vital that men with hormonal (often referred to as endocrine) problems are properly diagnosed because some men can be treated. When a man's FSH or LH levels are low, such as in the case of pituitary disease, FSH and LH treatments will usually improve sperm production. Human chorionic gonadotrophin (hCG: similar to LH) injections once or twice a week can act on the Leydig cells in the testes to make testosterone. After four to six months of treatment, FSH may also be given if sperm production has not improved using just hCG.

There are very few risks associated with these hormone medicines, but breast tenderness and swelling sometimes happen.

Sperm production is a long process (about three months to make mature sperm), so hormone treatment is usually over a long period of time, sometimes two or more years. Sperm production usually stops when hormone treatments finish. Therefore, freezing some sperm at the end of treatment for later pregnancies could be useful.

Treatment

What happens if a man is infertile and has low testosterone?

Men with infertility due to poor sperm production should have a serum testosterone and LH level measured because their testes may also fail to produce normal amounts of the male sex hormone, testosterone. This results in the condition of 'androgen deficiency' with lower libido (sexual desire) and energy levels, and other symptoms.

The health of men with low testosterone can be improved through testosterone replacement therapy, but sperm production does not improve with this treatment. In fact, testosterone therapy will stop any sperm production because it turns off the hormones from the brain that drive sperm production (LH and FSH). Therefore, testosterone treatment should not be given to a man wanting to father a child; they should be referred to a specialist to talk about ways to keep their fertility (such as sperm freezing) before beginning lifelong treatment for androgen deficiency.

Other medical treatments for infertile men with low testosterone include medicines, such as clomiphene, but these do not have regulatory approval for use in male infertility and their 'off label' use needs to be discussed with a specialist.

When is male infertility not treatable?

Male infertility is completely untreatable when a man has no sperm in his semen (azoospermia) or in the testes, because the sperm-producing cells in the testes either did not develop or have been permanently destroyed.

Azoospermia may be caused by chromosomal or genetic disorders, inflammation of the testes, or certain medicines (especially cancer treatments). It may also be because the testes did not descend (lower) into the scrotum at the time of birth (undescended testes).

In 30 to 40 per cent of men with azoospermia, sperm can be retrieved by testis biopsy. This may be performed either using a needle or a simple biopsy operation, or by a highly specialised operation using a microscope, called a micro-TESE. The micro-TESE gives the highest chance of sperm recovery but is not available in all centres so if you are interested in finding out more about the procedure ask for a referral from your specialist.

For men who do not attempt, or who fail to have successful testicular sperm extraction, the only options to have a family are adoption, foster parenting or using donor sperm.

Male infertility is completely untreatable when a man has no sperm in his semen (azoospermia) or in the testes

Treatment

Can natural therapies improve sperm production?

There have been many 'natural' products marketed to improve unexplained sperm production problems, such as vitamins, antioxidants and zinc supplements, antibiotics (even when no infection is present) and various other natural therapies. At this stage, there is little good quality research showing that natural therapies improve the chance of having a child.

Men should talk to their doctor when thinking about using natural therapies that are marketed as products to improve fertility.

When is assisted reproductive technology (ART) used for male infertility?

If the chance of conceiving naturally is low, ART such as IVF and ICSI can greatly increase the couple's chance of becoming pregnant. It is important to realise that with all medical treatments, including ART, there are some risks. Even when the fertility problem relates only to the man, ART places the female partner at risk of side-effects and problems. Deciding on treatment needs careful thought and should be discussed with the doctor.

Having a Family

What are the chances of natural conception?

It can take up to a year for a woman to become pregnant, even for healthy fertile couples. In one study women who were planning families took the following times to become pregnant:

- about one third (38%) conceived in the first month of trying
- about two thirds (68%) by the third month
- more than three quarters (82%) by the sixth month
- more than nine out of every 10 couples (92%) had conceived within a year.

Men with low sperm counts may father children naturally, whether or not the fertility problem is treated, as long as there are moving sperm in their semen. For example, about one in three couples in which the man's sperm count is one to five million per mL will achieve a pregnancy over two to three years.

Unfortunately, doctors can't be sure when or if a pregnancy will happen for many couples with male infertility; it may just take longer to achieve a pregnancy, or it may never happen without treatment. It's also important to think about the female partner's age and health when making fertility treatment plans.

Having a Family

ART, particularly ICSI, is often used to help infertile men father children

What are the options if natural conception is not possible?

If infertility cannot be treated, or treatment is not successful, there are several options available to couples wishing to have a family.

These options include:

- ART such as IVF or ICSI
- donor insemination
- adoption, foster parenting or permanent care
- deciding not to have children.

What is assisted reproductive technology (ART)?

ART treatments include artificial insemination with the partner's semen, IVF and ICSI. ART does not cure or treat the cause of infertility but these treatments can help couples achieve a pregnancy.

ART is often used to help infertile men father children. Treatment is done under the care of an ART specialist and such centres are widely spread across the country. In Australia, about half of infertile couples use ART because of male infertility or problems with both partners' fertility.

Originally, IVF was developed as a medical technique to overcome female infertility. In 1993, the introduction of ICSI greatly helped men with very low sperm count that previously could not be treated by standard IVF procedures. Even men with a zero sperm count (azoospermia) may produce sperm in their testes that can be collected via an operation (e.g. a micro-TESE) and used in ICSI.

What is IVF?

IVF, developed in the late 1970s, is a form of ART where sperm collected from the male are mixed with eggs from the female partner outside the body. The female partner is given fertility drugs to produce an increased number of eggs that are removed surgically from her ovary.

Sperm are collected by masturbation (or a frozen sample) and mixed with the eggs in a dish or tube. After fertilisation, the resulting embryos are then placed back into the woman's uterus several days later.

This form of IVF works for many couples, but the pregnancy rates for couples with severe male infertility are generally quite low.

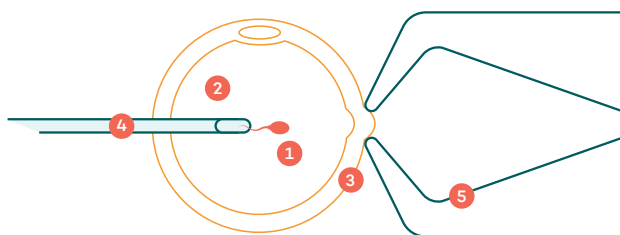
Having a Family

ICSI is a form of IVF where a single sperm is placed directly into each egg by piercing the outer covering of the egg

What is ICSI?

ICSI is a form of IVF where a single sperm is placed directly into each egg by piercing the outer covering of the egg. ICSI is particularly helpful for men with poor sperm production. Sperm are collected from the semen or removed carefully from the testis or epididymis.

ICSI can achieve a pregnancy even when only a few sperm are produced. As for IVF, after fertilisation the resulting embryos are then placed back into the woman's uterus.



- 1 Sperm
- 2 Egg cell (ovum)
- 3 Outer covering of egg (zona pellucida)
- 4 Needle
- 5 Glass instrument (micropipette) to hold the egg

ICSI procedure

Pregnancy rates for ICSI are similar to those for standard IVF with normal semen. Pregnancy success largely depends on other factors, such as the age and reproductive health of the female.

What genetic tests should a man with severe infertility think about before having ICSI?

Men with severe unexplained infertility may have a genetic problem that could affect their child. A change in the number of chromosomes in sperm (aneuploidy) can cause problems where the embryo does not develop normally or the child is born with a genetic problem.

If a man has a piece of the Y chromosome missing (Y chromosome deletion) he will pass on infertility to his sons.

A karyotype test (to examine the number and structure of chromosomes) or a Y chromosome deletion test may be done before undergoing ICSI.

What are the risks with ART?

ICSI, as well as other ART, exposes women to risk, such as the risks linked to the surgical collection of eggs, and these treatments switch the focus from the man to the woman. There is also some risk with surgery to collect sperm from the testis or epididymis.

Having a Family

Are birth defects more common in children born through ART?

Research has shown a higher rate of birth defects (congenital abnormalities) in babies born as a result of IVF or ICSI (five to six in every 100 live births) compared with birth defects in babies born in the general population (three to four in every 100 live births).

Birth defects do not appear to be due to the IVF or ICSI procedure but rather to the original problems in the infertile couple. Male infertility problems may be passed on to children born through ICSI; some adult sons of severely infertile men conceived using ICSI have been reported to have poor semen quality.

Are there other risks with ART?

Premature birth: Multiple pregnancies are common in IVF and ICSI when more than one embryo is transferred into the woman's uterus. Twin or other multiple pregnancies increase the chance of babies being born prematurely and with low birth weight. Single babies conceived through IVF or ICSI are also more likely to be premature and of lower birth weight.

Childhood development: Large studies have not found any major differences in the development or abilities of children born after IVF or ICSI, when compared to those from natural conception.

Long-term adult disease: A recent study of young Australian adults conceived by IVF showed them to have similar health and well-being as their naturally-conceived peers. Low birth weight and premature birth are linked with an increased risk of diabetes and heart disease in later life, in both babies conceived naturally and those born through IVF or ICSI.

Can men with no sperm in their ejaculate still have ICSI?

When there is an obstruction (blockage) in the reproductive tract sperm can be obtained by needle aspiration (biopsy) from the epididymis or from the testis that can be used in ICSI treatment or frozen for later use.

For men with severe sperm production problems, such as Sertoli cell-only syndrome or Klinefelter syndrome, mature sperm may be found in one third to one half of these men. There are several procedures used depending on the man's situation including needle aspiration, or an open biopsy using an operating microscope (a 'micro-TESE'), where samples are collected from several sites to increase the chance of finding sperm that can be used for ICSI.

Some couples decide that if there is only a small chance of finding sperm they will use donor sperm instead. Others, however, may wish to take every opportunity to have their own biological child.

When there is blockage in the reproductive tract sperm can be obtained by needle aspiration, open biopsy or micro-TESE from the epididymis or testis that can be used in ICSI

Having a Family

What are the risks with a testicular biopsy?

Needle biopsy has an excellent safety record. Sometimes, infection and bleeding can happen (less than one in 100 men). In some men, removal of larger biopsy samples at an operation may damage the testis and lower its ability to make the male sex hormone, testosterone.

Many infertile men undergoing these procedures are already androgen deficient. If the man has serious androgen deficiency, he will need testosterone replacement therapy after the attempted sperm extraction. If a man is partly androgen deficient, then surgery may increase the chance of him needing long-term testosterone therapy. If a man has normal testosterone levels, then the risk of needing long-term testosterone is low.

What are the options for long-term testosterone therapy?

There are different types of testosterone preparations on the market. Most of these are available under the Pharmaceutical Benefits Scheme (PBS) for those that fulfil the criteria. The most common options include daily topical therapy to the skin or three-monthly injections into a muscle.

What can you expect at an infertility clinic?

If a couple chooses to use ART, such as ICSI, the infertility clinic will explain all the procedures and success rates for the type of infertility problem. Some things couples need to think about before starting treatment include:

Review of the male partner is essential: The male partner of the infertile couple should be reviewed at the same time as the female is being assessed. Semen testing should be done, and if abnormal or there are other concerning factors in the man's medical history, he should be assessed by a specialist who is expert in both male reproductive health and modern ART practice. This person may be an endocrinologist, urologist or gynaecologist who has undertaken training in male infertility.

It is important that reversible causes of infertility are excluded and that hormonal or surgical treatment to improve natural fertility and ART success is considered. Unfortunately, male evaluation does not always happen, even though it is required under the Code of Practice that governs Australian ART programs. Evaluation of both partners, at around the same time, is recommended by the major international infertility associations, including the American Society of Reproductive Medicine and the National Institute for Healthcare and Excellence in the United Kingdom.

Having a Family

If you are concerned that male evaluation is not being offered, talk to your GP about arranging a second opinion from another ART clinic that provides this service.

Possible setbacks and failure: When making a decision to take part in an ART program, it is important to know that the chance of success depends on many factors, including: the type of male fertility problem, the age and reproductive health of the female partner, and the type of treatment used. Many couples have a number of treatment cycles before conceiving, while some may never have children.

Female focus: Most attention during assisted reproduction is given to the woman as she undergoes more medical procedures, and infertility specialists are often gynaecologists. Men are encouraged to support their partners and to have an active role in the process.

Men also have concerns such as the pressure of producing sperm when needed or undergoing the testis biopsy procedure. It is important that men ask for help or information when needed. Staff at infertility clinics recognise the importance of men's concerns and will try to provide support where they can.

How is semen collected for IVF?

For most types of IVF procedures, men need to produce a semen sample on the day of their partner's egg collection. In some men with very low numbers of sperm, semen may be frozen before treatment as a back-up in case not enough sperm are produced on the day of IVF treatment. Private rooms at infertility clinics are available for men to produce semen samples by masturbation into the sterile containers provided.

Many men have difficulty producing a semen sample under pressure. Clinics can sometimes arrange for the female partner to join the man in the room and can also provide special condoms for the collection of semen by sexual intercourse. Standard condoms cannot be used to collect semen for IVF as they usually contain lubricants and spermicides that kill sperm.

What blood tests might be needed before ART?

Both male and female partners may need to have blood tests to check for infectious diseases, such as HIV and hepatitis, before starting on an ART program.

Having a Family

What guidelines do ART clinics follow?

Most clinics offering ART operate under legislative guidelines that may differ between each state and territory. When deciding to start infertility treatment, couples will be fully informed of any legislation that may affect treatment, donation and storage procedures. The treating doctor and counsellors specially trained in infertility problems are available to discuss any legislative issues and help couples make informed decisions about their treatment.

The Reproductive Technology Accreditation Committee (RTAC), established by the Fertility Society of Australia, also provides a Code of Practice for clinics offering ART. Clinics offering ART must be accredited by RTAC.

What counselling is provided for ART?

Specialised counselling services are provided in clinics offering ART. The services of a professional counsellor may help individuals and couples at times of stress, such as at initial diagnosis, and also provide information and support at any stage of treatment. In some states in Australia, counselling is compulsory before treatment starts.

What about religious issues related to ART treatments?

All the major ART clinics have experience and understand that different religions may have certain requirements of the couple or how the egg and sperm processed. If this is important to you, please ask your ART specialist.

What are the success rates with ART?

Standard IVF provides excellent results for couples with mild forms of male infertility when enough strongly swimming sperm can be found in the semen and mixed with the eggs. However, most moderate to severe male infertility is now managed with ICSI and results in pregnancy rates similar to those of other couples using ART for female infertility, such as for blocked tubes.

A number of factors, especially the age of the female partner, affect a couple's chance of pregnancy by different ART treatments. Infertility clinics can provide more detail about pregnancy outcomes for the different treatment options.

The Fertility Society of Australia supports and funds the collection of the data used to calculate the success rates of ART throughout Australia and New Zealand. The Assisted Reproduction Database ('ANZARD') is available online via the National Perinatal Epidemiology and Statistics Unit, University of NSW, who collates the data.

Having a Family

What is donor insemination?

For men who do not produce any sperm or have been unsuccessful with ICSI, donor insemination using sperm donated by another anonymous or known male may be an option. About one in 14 infertile couples need to use donor sperm to become pregnant.

With donor insemination, the child receives half its genetic material from the mother. The donor is the biological father; however, in all other ways the male partner is the legal parent. Couples using donor insemination can still share the experience of pregnancy, birth and child-rearing.

Men who donate sperm undergo a thorough screening process before becoming a donor. Legislation about the amount of information made available about the donor varies around Australia. The National Health and Medical Research Council (NHMRC) Ethical Guidelines on Assisted Reproductive Technology stipulate that procedures must be in place to allow children born from the use of donor sperm to contact their donor when they reach 18 years of age.

What other options are available to become a father?

Some infertile couples, who have been unsuccessful when trying ART or do not want to have medical treatment, choose to adopt, foster or provide permanent care to children. Adoption is a permanent legal appointment of another person as the parent of a child, whose biological parents for some reason cannot care for them. There are very few babies available for adoption in Australia; however, there are some older children in need of families.

Adoption of babies and children from overseas is sometimes chosen by couples who are unable to conceive naturally. There are many children, especially in war-torn or developing countries, who are in need of families. State government bodies are normally responsible for adoptions. For more information contact the local community or family services department.

Foster parenting is also a legal arrangement but normally only short-term. Many babies and children are in need of families who can care for them for varying lengths of time. More information can be obtained from local government agencies.

Permanent care is a long-term arrangement where couples or single people are given legal custody and guardianship of a child unable to live with their own family. However, the child's name, birth certificate and inheritance rights do not change. More information can be obtained by contacting state community services departments.

Emotional Issues

It is not unusual for a man to experience erection difficulties when coming to terms with an infertility diagnosis

What emotions might a man experience when diagnosed with infertility?

As there are often no outward symptoms or signs of infertility, men may be shocked when they find out they are infertile. There is still a common but incorrect belief that infertility is a woman's problem. Therefore, when men are told there is a sperm problem, they are often unprepared. They may also find it difficult to talk to others about how they are feeling about the diagnosis. Men do not usually express their feelings in the same way as women, but anger, guilt or anxiety can appear in many ways.

Being told that there is a sperm problem can affect a man's sense of masculinity, sexuality and potency. Most infertile men at some time struggle with the idea that they are not able to do what other men can.

It is not unusual for men to experience erection difficulties while coming to terms with an infertility diagnosis, which can sometimes affect their relationship with their partner. This experience can also happen when the diagnosis suggests a female problem, where the man has to 'perform' more frequently than he would wish.

Most men also feel the need to understand why they are infertile. Sometimes no reason can be given, which can be frustrating. Knowing the cause can help men accept the problem, but it can also leave them with a sense of injustice. Men and women often have different responses to a diagnosis of infertility but they are all valid feelings and can be talked about.

An emotional response to infertility is normal. Talking with a doctor, a counsellor or a sexual therapist can help some men with their feelings about infertility.

Emotional Issues

How can a partner or family and friends help a man cope with infertility?

Many men rely heavily on their spouses or partners to talk through their concerns and uncertainties. It is common for men to be concerned about the effect of their infertility on their partner, as it is the women who must go through most of the often invasive treatment to have a family, even though it is not their problem.

Due to the sensitive nature of infertility problems, it is important for men to find people they can rely on to be supportive. For some men, parents or brothers and sisters can provide this support. Talking to a close male friend who is trustworthy is also very valuable in helping men come to terms with their infertility.

In many cases, talking to a trained counsellor is the best option as the man can be very open about his emotional responses and the counsellor can provide strategies to help him cope with the problem.

What strategies help men cope with infertility?

Infertile men may experience similar dilemmas and distress to women with fertility problems. It can sometimes help to talk with men in the same situation.

Acknowledging that infertility can create feelings of stress and anxiety is an important step towards coping with the health problem. A common stress management technique used by men is to look for a solution. In the case of infertility, this often means searching for available treatments and putting aside emotional responses. It is usually helpful for men to take responsibility for finding help for their infertility rather than relying on their partner to organise appointments.

Emotional Issues

Local patient support groups exist to help and support couples dealing with the emotional aspects of infertility and can be accessed usually through infertility clinics

Does understanding the problem help a man cope with infertility?

Understanding the problem and ideally finding a reason for infertility can be helpful; in some cases knowledge gives back a sense of control. Therefore, searching the Internet, reading journal articles and finding other sources of information can be quite useful.

Although information from the Internet can be helpful it should be treated with caution. Many sites are not reliable, being sites for marketing what are sometimes unproven 'cures'. If in doubt, check the information with your doctor or clinician.

Local patient support groups exist to help and support couples dealing with the emotional aspects of infertility and can be accessed usually through infertility clinics.

Does counselling help a man cope with infertility?

Men are encouraged to talk to a doctor or a counsellor about any emotional issues. Infertility can be a distressing condition, which is difficult to accept for many couples.

Many men are reluctant to seek psychological counselling, fearing it is an admission of weakness. However, couples often find counselling surprisingly helpful. All infertility clinics provide psychological counselling and support with counsellors specially trained in fertility problems.

Support

Couples unsure of any aspect of reproduction or anxious about not conceiving should talk firstly with a local doctor (GP)

This booklet gives information about male infertility and may be helpful when talking with your doctor. Couples wanting to get pregnant who are unsure about intercourse timing, any aspect of the normal reproductive system or are anxious about not conceiving, should talk firstly with a local doctor (GP). The doctor may provide a referral to a specialist for tests.

The **Your Fertility** program, provided by the Victorian Assisted Reproductive Treatment Authority (VARTA), the Jean Hailes Research Unit and the Robinson Research Institute, has excellent fertility information for both men and women (see: www.yourfertility.org.au).

Professional societies, such as the **Fertility Society of Australia (FSA)**, and national consumer-based organisations also offer men and their partners additional support and information about male infertility. Infertile men are encouraged to talk with doctors and counsellors at the many infertility clinics throughout Australia. These clinics are able to provide professional counselling and referrals to other private practitioners who also work with infertile couples.

AccessAustralia is an independent, non-profit organisation, which provides whole of life support for women and men experiencing infertility. AccessAustralia also strives to raise community awareness about the social and psychological effects of infertility.

The Fertility Society of Australia (FSA) is the peak body representing scientists, doctors, researchers, nurses, consumers and counsellors in reproductive medicine in Australia and New Zealand. It aims to determine, oversee and improve the standard of fertility service offered in Australia and New Zealand.

Infertility patient support groups are associated with many fertility clinics. Contact your nearest IVF clinic for more information.

A list of IVF clinics can be found on the FSA website at www.fertilitysociety.com.au/rtac/accredited-units.

Support

If you have any questions about the information in these or other sources please talk with your doctor

Websites

Your Fertility

www.yourfertility.org.au

AccessAustralia, the National Infertility Network

www.access.org.au

Healthy Male

www.healthymale.org.au

Fertility Society of Australia

www.fertilitysociety.com.au

Australian Donor Conception Network

www.australiandonorconceptionnetwork.org

Urological Society of Australia and New Zealand

www.usanz.org.au

Glossary

anabolic steroids-

Hormones that cause muscle and bone growth (a chemical process termed 'anabolic'). High doses of potent androgens (often called 'anabolic steroids') are sometimes used illegally by athletes competing in sports competitions or by body builders and men interested in developing larger muscles

anaesthetic (anaesthesia)-

A medicine that stops pain being felt

androgen-

A male sex hormone such as testosterone

antibodies-

Proteins made by the body's immune system in response to foreign substances; their role is to attack foreign substances and protect against infection

aspiration-

Use of a thin needle to suck out small samples of tissue from the body

azoospermia-

No sperm in the semen

biopsy-

An operation to remove a small sample of tissue or cells from a part of the body for testing and

examination under a microscope

catheter-

A thin flexible tube used to take fluids in or out of the body

chromosomes-

Structures in each cell in the body that carry genetic information. Humans normally have 46 chromosomes in each cell

congenital-

Any condition that is present at birth

cryptorchidism-

See Undescended testis

culture-

To grow cells, tissues or organisms, often in a sterile dish, for scientific purposes

cyst-

A closed sac or capsule, usually filled with fluid or semi-solid material

DNA-

Carries the genetic code of an individual

Down syndrome-

A chromosome disorder (an extra chromosome 21) that causes intellectual disability and a range of physical problems, including infertility

ejaculation-

Release of semen from the penis during orgasm (sexual climax)

ejaculatory duct-

The part of the male reproductive tract where the vas deferens joins with the seminal vesicle and passes through the prostate

embryo-

An early stage of development as a result of successful fertilisation, up to the eighth week of pregnancy

endocrine system-

The body system made up of glands (including the pituitary, thyroid, adrenals, testes) that release hormones (chemical messengers) into the blood to be carried to other organs in the body

endocrinologist-

A doctor who specialises in problems of the endocrine system (hormones and body functions controlled by hormones). A paediatric endocrinologist cares for children with problems of the endocrine system

epididymis-

A highly coiled tube at the back of the testes in which sperm are stored and mature. All sperm must pass along this tube to reach the vas deferens

fertilisation-

The sperm penetrates (gets into) the egg and their genetic material combines to create a zygote (earliest stage of development)

fertility-

Being able to conceive or reproduce

fetus-

The stage of development from the eighth week of pregnancy until birth

gynaecologist-

A doctor who specialises in the treatment of women's diseases of the reproductive organs

human chorionic gonadotropin (hCG)-

A hormone made by chorionic cells (in the fetal part of the placenta). It is a very similar hormone to LH but it has a longer time of action

hypospermatogenesis-

Low sperm production within the testis

infertility-

Failure to achieve a pregnancy within one year of regular, unprotected sexual intercourse

intracytoplasmic sperm injection (ICSI)-

A form of IVF used to treat male infertility in which a single sperm is injected directly into the cytoplasm of an egg

IVF (in vitro fertilisation)-

A form of assisted reproduction in which sperm collected from the male are mixed with the female partner's eggs outside the body

karyotype-

A blood test to check the number and structure of chromosomes in cells

LH (luteinising hormone)-

A messenger hormone made by the pituitary gland that acts on the Leydig cells in the testes to make testosterone

micro-TESE (microdissection sperm extraction)-

A specialised operation where a surgeon uses an operating microscope to collect tissue samples from several sites in the testes to look for sperm that can be used in ICSI

non-obstructive azoospermia-

No sperm in the semen due to a sperm production problem (not due to a blockage or obstruction in the reproductive tract)

oligozoospermia (or oligospermia)-

A very low number of sperm present in the semen (seminal fluid)

ovulation-

The process by which an egg is released from the ovary

pituitary gland-

A small gland that sits at the base of the hypothalamus, which is a part of the brain

puberty-

The period of development in both males and females when changes happen in reproductive organs (ovaries and testes) so that reproduction is possible

retrograde ejaculation-

A problem where semen flows backwards into the bladder rather than out of the penis during ejaculation

scrotum-

The skin pouch that holds the testes

semen (seminal fluid)-

The mixture of fluids that is ejaculated (released) from the penis at orgasm (sexual climax); semen contains sperm and other fluids from the testes, prostate and seminal vesicles

seminal vesicles-

Sac-like structures found near the prostate gland; they make fluid that is part of the semen

seminiferous tubules-

The small tubes in the testes that make sperm

Sertoli cells-

Cells in the testes that support and nurture the developing germ cells from spermatogonia through to their final release from the testis as mature elongated spermatids

sperm-

Male sex cell(s)

sperm bank-

Facility where sperm are kept frozen in liquid nitrogen for later use in artificial insemination

sperm motility-

The ability of sperm to swim or move forward. Poor motility means it is hard for the sperm to swim towards the egg

sperm retrieval-

The doctor removes sperm from a man's reproductive tract (testis or epididymis) using a fine needle, biopsy gun, or other instrument

spermatogenesis-

The process of sperm being made in the testes

spermaturia-

The release of sperm into the urine. This can happen in men with long periods of sexual abstinence. This is quite normal and is a way of discharging sperm from the body

testicular biopsy-

An operation to remove small sample(s) of testis for examination under a microscope to determine the type of sperm production problem and/or to find sperm (see micro-TESE)

testis/testicle (plural: testes)-

The male reproductive gland that makes sperm and the male sex hormone testosterone

testosterone-

Male sex hormone (androgen)

torsion-

Abnormal twisting of a testis in the scrotum

ultrasound-

Medical process using special sound waves to take images or pictures used to examine organs inside the body without making cuts or incisions

undescended testis-

A condition where the testis does not move down (descend) from the groin or abdomen into the scrotum before birth. Also known as cryptorchidism

urethra-

The tube that takes urine from the bladder out of the body via the penis

urologist-

A doctor (surgeon) who specialises in diseases of the urinary tract in men and women, and the genital organs in men

uterus-

The part of a woman in which a baby develops before birth, often referred to as the 'womb'

vagina-

The lower part of the female reproductive tract that connects the cervix to outside the body

varicocele-

A swelling of the veins (varicose veins) above the testis

vas deferens-

Duct that transports sperm from the epididymis to the ejaculatory duct

vasectomy-

A surgical operation in which the vas deferens (the tube that carries sperm) is cut to make a man unable to father children

Expert reviewers

Professor Robert McLachlan AM

MBBS (Hons) FRACP PhD

Professor Robert McLachlan is Director of Clinical Research at the Hudson Institute of Medical Research and Director of Healthy Male. Professor McLachlan specialises in the area of male reproductive endocrinology and is a practicing andrologist and endocrinologist at Monash IVF Group and Monash Medical Centre, Melbourne, Victoria.

Mr Darren Katz

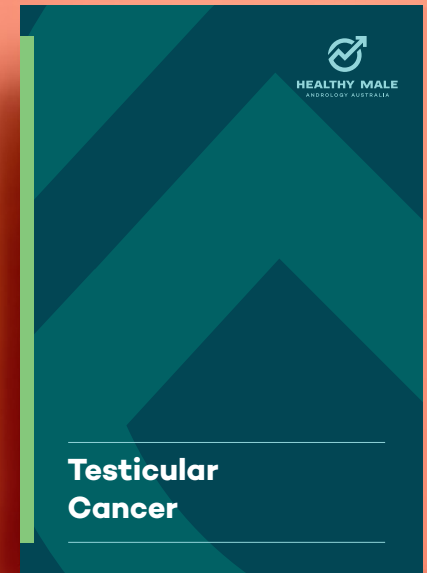
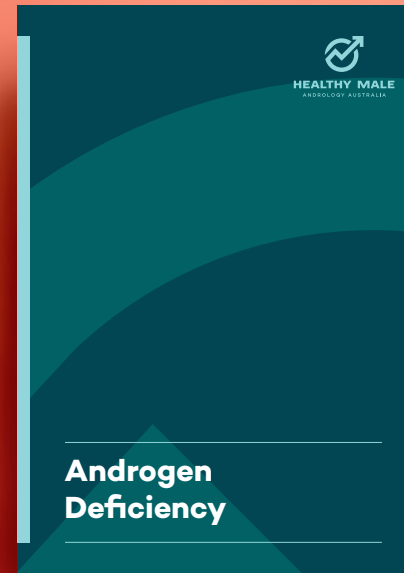
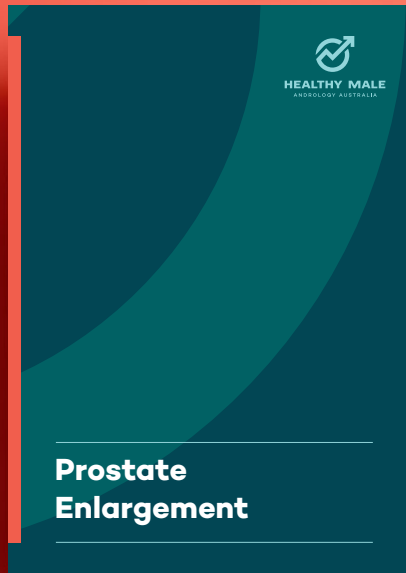
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Mr Darren Katz is a urological surgeon and male fertility microsurgeon. He serves as the Medical Director of Men's Health Melbourne and is a consultant urologist at various hospitals across Melbourne, including Western Health, Epworth, Cabrini, Holmesglen Private and Warragul Hospital.

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TPTC BSc(Hons) MEd PhD

Associate Professor Roger Cook is the Director of the Psychology Clinic at Swinburne University of Technology, Melbourne. He is a registered psychologist and family therapist, and an infertility counsellor. Roger Cook reviewed the Emotional Issues section of this guide.



If you would like more information about a range of male reproductive and sexual health issues, visit the Healthy Male website at healthymale.org.au.

You can also download or order resources on male reproductive and sexual health issues from the Healthy Male website.



For more information,
go to healthymale.org.au

To order more guides
and see our complete
range of resources, go
to healthymale.org.au
