

# **The Prostate Gland and Male Sexual and Reproductive Function**

**By  
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The adult prostate gland is a chestnut shaped organ of variable size and weight located in the bottom of the belly, deep within the pelvis, behind the pubic bone, in front of the rectum, and just below the urinary bladder. The urine passage or urethra after leaving the bladder runs through the centre of the prostate before continuing in the penis. The nerves responsible for transmission of impulses to the erectile tissue of the penis run on either side of the prostate in very close proximity to it and are in danger of inadvertent injury during the operation radical prostatectomy performed in cases where the cancer is still confined to the prostate gland. Two ejaculatory ducts, one on either side, convey seminal fluid and sperm cells from the seminal vesicles and testicles respectively and opens into the urethra as it travels through the prostate. The prostate gland itself contributes secretions to the semen by secreting its fluid into the urethra by 60 or more ducts which drain independently directly into the urethra.

The prostate gland is considered one of the male accessory organs of sexual reproduction and plays a supporting role in sex and reproduction. The primary organs of sexual reproduction are the penis, the male organ of copulation, and the testes which produce and release the sperm cells responsible for fertilisation of the female ovum or egg. The prostate gland has two main functions - secretory and valvular. The secretions of the prostate are stimulated during sexual arousal and ejaculation and constitute 20% of the volume of semen. The remainder of the semen comes from paired organs called the seminal vesicles (70%) and the testes (10%). The secretions of the prostate (and seminal vesicles) are responsible for providing metabolic support to the sperm cells as well as creating a favourable environment during their long journey in the female reproductive tract. The valvular (or sphincteric) function of the prostate is dependent on the contraction of the muscles within (and adjacent to) the prostate gland during ejaculation, and its relation to the bladder neck and urethra. The prostate gland in effect functions as a 'gate - keeper' or valve between the urinary tract and the reproductive tract thereby preventing the mixing of urine and semen during ejaculation. The top of the prostate, which is adjacent to the bladder neck and intimately associated with it, contracts and squeezes the bladder neck shut during ejaculation thereby preventing semen from flowing in a retrograde fashion into the bladder. At the same time the lower part of the prostate (and urethral sphincter muscles) relaxes and allows semen to flow down the urethra while the muscles surrounding the latter contract in a rhythmic fashion thereby producing a pulsatile jet of seminal fluid called the ejaculate. Rhythmic contractions of the muscles of the prostate, the pelvic floor and perineum (area between the scrotum and anus) contribute to the sensations associated with orgasm in the male. Because muscular contractions of the prostate contribute to the orgasmic experience, orgasms may be qualitatively different following radical prostatectomy in which the prostate gland and seminal vesicles are completely removed. Moreover, some experts in sexual medicine have labeled the prostate gland the "male G - spot" and have suggested that prolonged and direct stimulation of the prostate via the perineum during sexual arousal can lead to a

subjectively distinct and exceptionally pleasurable orgasmic experience in the man. Clearly, this would be lost following radical prostatectomy.

During radical prostatectomy the prostate gland (and ejaculatory ducts which course through the substance of the prostate) and seminal vesicles are completely removed, the two vas deferens (which transmits sperm cells from the testes to the ejaculatory ducts) are tied off shut, and the bladder neck reconstituted and joined back to the urethra over a urinary catheter (or rubber tube) which allows urine from the bladder to drain into a bag while the area of joining heals. The catheter is typically removed at three weeks. From this description it is apparent that the conduit for sperm is obliterated and the supporting organs removed, therefore the man is no longer fertile and able to father a child naturally after surgery.

Potency or the ability to have normal erections following radical prostatectomy is dependent on a number of factors, the most important being the degree of potency prior to surgery (the greater the better), the age of the patient (the younger the better), and whether a nerve sparing radical prostatectomy (NSRP) is performed. Nerve – sparing radical prostatectomy in which the cavernous nerves (or erection nerves) are preserved is routinely performed unless the cancer is abutting on or invading into the region of the neurovascular bundle in which case it is deliberately sacrificed in order to optimize the chance of completely eradicating the cancer which is the number one priority. Even in cases of attempted NSRP however the cavernous nerves (which are not visible to the naked eye) may be inadvertently stretched, crushed, tied, cauterized, or divided. If both nerves are injured potency is severely compromised if not absent. With injury to one nerve, potency is maintained but is reduced. Depending on the reversibility of the injury potency may take anywhere from six to eighteen months to return as the nerve fibres regenerate. Recent studies have suggested that a nightly oral dose of a phosphodiesterase – 5 inhibitor such as sildenafil citrate (Viagra®) or vardenafil (Levitra®) improves the return of erectile function in those men who have had some degree of nerve – sparing. This probably works by improving oxygen delivery to the penis during nocturnal erections which occur during rapid eye movement (REM) sleep. The improved oxygen delivery maintains the health and integrity of the erectile tissue within the penis and prevents scarring from non – use. The maxim, “use it or lose it”, is therefore especially true when it comes to the penis and preservation of its function. In addition to the nightly dosing, patients may also take either of these agents approximately one hour before sexual stimulation to improve their erections. Those patients who do not respond to oral therapy may benefit from injection therapy in which they are taught to self - inject a predetermined dose of an agent directly into the side of the penis which is very effective in inducing an erection. Patients who do not like this may use the vacuum constriction device or ‘pump’ which is also able to produce an erection but not for longer than a recommended time of 30 minutes. If eighteen months have passed without the return of erections and none of the methods mentioned above have worked then an inflatable multi – component penile prosthesis may have to be implanted. Fortunately, these are rarely required as they are extremely expensive.

The predominant sex hormone in men – testosterone, is responsible for libido but is also necessary for the continued growth and spread of prostate cancer. From 1941 it was determined that removal of the testicles or suppression of their secretion of testosterone by medication could cause advanced prostate cancer to shrink and remain dormant for a variable period of time. Men with prostate cancer who have advanced disease and therefore require hormone treatment by way of tablets, injections or removal of both testicles often experience a decrease in their libido which is measured by a decline in their interest in and desire for sex as well as the frequency of sexual thoughts and fantasies. A certain background level of testosterone is usually necessary for normal erectile function, however a certain percentage of men are able to maintain their erections following castration as documented in historical accounts of eunuchs who guarded their master's harems and were sexually involved with their charge unbeknown to their masters. The vast majority of men will experience erectile dysfunction however. Those men with advanced prostate cancer who are unwilling to lose erectile function may be treated with bicalutamide (Casodex®) monotherapy which tends to preserve erectile function while providing fairly effective control of the cancer. It is expensive however and a lot of men experience breast tenderness and pain while on it.

Since prostate cancer treatment may adversely affects fertility and erectile function, prevention of prostate cancer is always better than cure and to this end evidence points to maintaining a high intake of processed tomato products (rich in lycopene), soy products, green tea, omega – 3 fatty acids ( found in salmon, sardines, mackerel, herring, and haddock), fruits and vegetables, and taking daily vitamin E and selenium supplements. Reducing the intake of saturated fats (red meat, dairy products – milk, butter, cheese, ice cream) and not habitually overeating are also important. The risk to erectile function is always less with treatment for early prostate cancer compared to advanced prostate cancer and therefore regardless of whether you lead a healthy lifestyle it is important to have a yearly digital rectal examination (DRE) and prostate specific antigen (PSA) blood test once you are forty years and over. Sexual function will also be preserved by regular aerobic exercise, avoidance of cigarette smoke and practicing stress reduction and relaxation techniques. Last but by no means least, a loving and supportive female partner, who recognises the importance of intimacy and sex to the overall health of the relationship and to the health of the male partner, will go a far way in preserving good sexual function.