



# Ejaculation

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**Ejaculation** is the discharge of semen (normally containing sperm) from the male reproductive tract, usually accompanied by orgasm. It is the final stage and natural objective of male sexual stimulation, and an essential component of natural conception. In rare cases, ejaculation occurs because of prostatic disease. Ejaculation may also occur spontaneously during sleep (a nocturnal emission or "wet dream"). *Anejaculation* is the condition of being unable to ejaculate. *Dysejaculation* is an ejaculation that is painful or uncomfortable.



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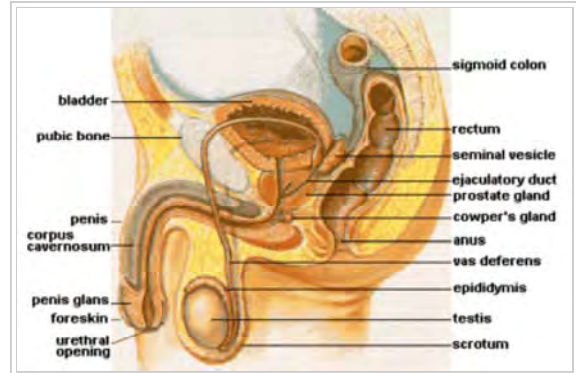


Diagram of the male pelvic and reproductive organs

## Phases

### Stimulation

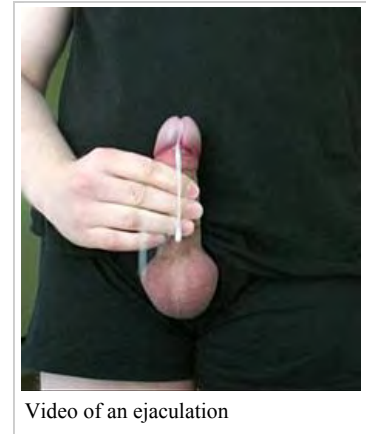
A usual precursor to ejaculation is the sexual arousal of the male, leading to the erection of the penis, though not every arousal nor erection leads to ejaculation. Penile sexual stimulation during masturbation or vaginal, anal, oral, or non-penetrative sexual activity may provide the necessary stimulus for a man to achieve orgasm and ejaculation. With regard to intravaginal ejaculation latency time, men typically reach orgasm 5–7 minutes after the start of penile-vaginal intercourse, taking into account their desires and those of their partners, but 10 minutes is also a common intravaginal ejaculation latency time.<sup>[1][2]</sup> A prolonged stimulation either through foreplay (kissing, petting and direct stimulation of erogenous zones before penetration during intercourse) or stroking (during masturbation) leads to an adequate amount of arousal and production of pre-ejaculatory fluid. While the presence of sperm in pre-ejaculatory fluid is thought to be rare, sperm from an earlier ejaculation, still present in the urethra, may be picked up by pre-ejaculatory fluid. In addition, infectious agents (including HIV) often can be present in pre-ejaculate.

Premature ejaculation is when ejaculation occurs before the desired time. If a man is unable to ejaculate in a timely manner after prolonged sexual stimulation, in spite of his desire to do so, it is called delayed ejaculation or anorgasmia. An orgasm that is not accompanied by ejaculation is known as a dry orgasm.

When a man has achieved a sufficient level of stimulation, the orgasm and ejaculation begins. At that point, under the control of the sympathetic nervous system, semen containing sperm is produced (emission).<sup>[3]</sup> The semen is ejected through the urethra with rhythmic contractions.<sup>[4]</sup> These rhythmic contractions are part of the male orgasm. They are generated by the bulbospongiosus and pubococcygeus muscles<sup>[5]</sup> under the control of a spinal reflex at the level of the spinal nerves S2-4 via the pudendal nerve. The typical male orgasm lasts several seconds.

After the start of orgasm, pulses of semen begin to flow from the urethra, reach a peak discharge and then diminish in flow. The typical orgasm consists of 10 to 15 contractions, although the man is unlikely to be consciously aware of that many. Once the first contraction has taken place, ejaculation will continue to completion as an involuntary process. At this stage, ejaculation cannot be stopped. The rate of contractions gradually slows during the orgasm. Initial contractions occur at an average interval of 0.6 seconds with an increasing increment of 0.1 seconds per contraction. Contractions of most men proceed at regular rhythmic intervals for the duration of the orgasm. Many men also experience additional irregular contractions at the conclusion of the orgasm.<sup>[6]</sup>

Ejaculation begins during the first or second contraction of orgasm. For most men the first spurt occurs during the second contraction. The first or second spurt is typically the largest and can contain 40 percent or more of the total ejaculate volume. After this peak the flow of each pulse diminishes. When the flow ends, the muscle contractions of the orgasm continue with no additional semen discharge. A small sample study of seven men showed an average of 7 spurts of semen (range between 5 and 10) followed by an average of 10 more contractions with no semen expelled (range between 5 and 23). This study also found a high correlation between number of spurts of semen and total ejaculate volume, i.e., larger semen volumes resulted from additional pulses of semen rather than larger individual spurts.<sup>[7]</sup>



Video of an ejaculation

Alfred Kinsey measured the distance of ejaculation, in "some hundred" of men. In three-quarters of men, the semen exuded from the penis, "In other males the semen may be propelled from a matter of some inches to a foot or two, or even as far as five or six and (rarely) eight feet".<sup>[8]</sup> Masters and Johnson report ejaculation distance to be not greater than 30–60 cm.<sup>[9]</sup> During the series of contractions that accompany ejaculation, semen is propelled from the urethra at 500 cm/s (200inches/s), close to 11 miles per hour.<sup>[5]</sup>

## Refractory period

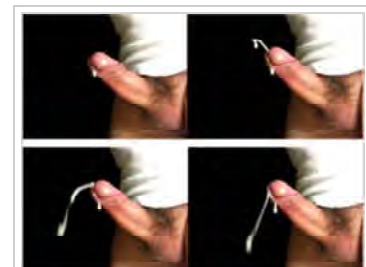
Most men experience a refractory period immediately following an orgasm, during which time they are unable to achieve another erection, and a longer period again before they are capable of achieving another ejaculation. During this time a male feels a deep and often pleasurable sense of relaxation, usually felt in the groin and thighs. The duration of the refractory period varies considerably, even for a given individual. Age affects the recovery time, with younger men typically recovering faster than older men, though not universally so.<sup>[9]</sup>

However, some men are able to achieve sufficient sexual arousal immediately after ejaculation, and others may have refractory periods of fewer than 15 minutes. A short recovery period may allow them to seamlessly continue sexual play from one ejaculation to sexual stimulation in preparation for the next. However, other men are averse to stimulation during the early part of the refractory period.

There are men who are able to achieve multiple orgasms, with or without the typical sequence of ejaculation and refractory period. Some of those men report not noticing refractory periods, or are able to maintain erection by "sustaining sexual activity with a full erection until they passed their refractory time for orgasm when they proceeded to have a second or third orgasm".<sup>[10]</sup>

## Volume

The force and amount of semen that will be ejected during an ejaculation will vary widely between men and may contain between 0.1 and 10 milliliters<sup>[11]</sup> (by way of comparison, note that a teaspoon is 5 ml and a tablespoon holds 15 ml). Adult semen volume is affected by the time that has passed since the previous ejaculation; larger semen volumes are seen with greater durations of abstinence. The duration of the stimulation leading up to the ejaculation can affect the volume.<sup>[12]</sup> Abnormally low semen volume is known as hypospermia. One of the possible underlying causes of low volume or complete lack of semen is ejaculatory duct obstruction. It is normal for the amount of semen to diminish with age.



Ejaculation example

## Quality

The number of sperm in an ejaculation also varies widely, depending on many factors, including the time since the last ejaculation,<sup>[13]</sup> age, stress levels,<sup>[14]</sup> and testosterone. Greater lengths of sexual stimulation immediately preceding ejaculation can result in higher concentrations of sperm.<sup>[12]</sup> An unusually low sperm count, not the same as low semen volume, is known as oligospermia, and the absence of any sperm from the semen is termed azospermia.

## Development

### During puberty

The first ejaculation in males often occurs about 12 months after the onset of puberty, generally through masturbation or nocturnal emission (wet dreams). This first semen volume is small. The typical ejaculation over the following three months produces less than 1 ml of semen. The semen produced during early puberty is also typically clear. After ejaculation this early semen remains jellylike and, unlike semen from mature males, fails to liquefy. A summary of semen development is shown in Table 1.

Most first ejaculations (90 percent) lack sperm. Of the few early ejaculations that do contain sperm, the majority of sperm (97%) lack motion. The remaining sperm (3%) have abnormal motion.<sup>[15]</sup>

As the male proceeds through puberty, the semen develops mature characteristics with increasing quantities of normal sperm. Semen produced 12 to 14 months after the first ejaculation liquefies after a short period of time. Within 24 months of the first ejaculation, the semen volume and the quantity and characteristics of the sperm match that of adult male semen.<sup>[15]</sup>

**Semen development during puberty**

Time after first ejaculation (months)	Average volume (milliliter)	Liquefaction	Average sperm concentration (million sperm/milliliter)
0	0.5	No <sup>a</sup>	0
6	1.0	No <sup>a</sup>	20
12	2.5	No/Yes <sup>b</sup>	50
18	3.0	Yes <sup>c</sup>	70
24	3.5	Yes <sup>c</sup>	300

<sup>a</sup>Ejaculate is jellylike and fails to liquefy.

<sup>b</sup>Most samples liquefy. Some remain jellylike.

<sup>c</sup>Ejaculate liquefies within an hour.

### Control from the central nervous system

To map the neuronal activation of the brain during the ejaculatory response, researchers have studied the expression of c-fos, a proto-oncogene expressed in neurons in response to stimulation by hormones and neurotransmitters.<sup>[16]</sup> Expression of c-fos in the following areas has been observed:<sup>[17][18]</sup>

- medial preoptic area (MPOA)
- lateral septum, bed nucleus of the stria terminalis
- paraventricular nucleus of the hypothalamus (PVN)
- ventromedial hypothalamus, medial amygdala
- ventral premammillary nuclei
- ventral tegmentum
- central tegmental field
- mesencephalic central gray
- peripeduncular nuclei
- parvocellular subparafascicular nucleus (SPF) within the posterior thalamus

### Hands-free ejaculation

Although uncommon, some men can achieve ejaculations during masturbation without any manual stimulation. Such men usually do it by tensing and flexing their abdominal and buttocks muscles along with vigorous fantasising. Some men do it by relaxing the area around the penis, which may result in harder erections especially when hyperaroused.<sup>[19]</sup>

### Perineum pressing and retrograde ejaculation

Perineum pressing results in an ejaculation which is purposefully held back by pressing on either the perineum or the urethra to force the seminal fluid to stay inside. In such a scenario, the seminal fluid stays inside the body and goes to the bladder. Some people do this to avoid making a mess by keeping all the semen inside.<sup>[20]</sup> As a medical condition it is called retrograde ejaculation.<sup>[21]</sup>

## Health issues

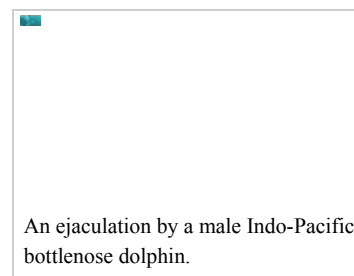
For most men, no detrimental health effects have been determined from ejaculation itself or from frequent ejaculations, though sexual activity in general can have health or psychological consequences. A small percentage of men have a disease called postorgasmic illness syndrome (POIS), which causes severe muscle pain throughout the body and other symptoms immediately following ejaculation. The symptoms last for up to a week.<sup>[22][23][24]</sup> Some doctors speculate that the frequency of POIS "in the population may be greater than has been reported in the academic literature",<sup>[25]</sup> and that many POIS sufferers are undiagnosed.<sup>[26]</sup>

It is not clear whether frequent ejaculation increases,<sup>[27]</sup> reduces<sup>[28]</sup> or has no effect<sup>[29]</sup> on the risk of prostate cancer. Two large studies:<sup>[30][31][32]</sup> "Ejaculation Frequency and Subsequent Risk of Prostate Cancer"<sup>[33]</sup> and "Sexual Factors and Prostate Cancer"<sup>[34]</sup> suggest that frequent ejaculation over a lifetime offers some protection against prostate cancer. The US study involving "29 342 US men aged 46 to 81 years"<sup>[33]</sup> suggest that "high ejaculation frequency was related to decreased risk of total prostate cancer".<sup>[33]</sup> An Australian study involving "1079 men with prostate cancer and 1259 healthy men" found that "there is evidence that the more frequently men ejaculate between the ages of 20 and 50, the less likely they are to develop prostate cancer":

[T]he protective effect of ejaculation is greatest when men in their twenties ejaculated on average seven or more times a week. This group were one-third less likely to develop aggressive prostate cancer when compared with men who ejaculated less than three times a week at this age.<sup>[35]</sup>

## Other animals

In mammals and birds, multiple ejaculation is commonplace.<sup>[36][37]</sup> During copulation, each side of a short-beaked echidna's penis is used alternately, with the other half being shut down between ejaculations.<sup>[38]</sup> In stallions, ejaculation is accompanied by a motion of the tail known as "tail flagging".<sup>[39]</sup> When a male wolf ejaculates, his final pelvic thrust may be slightly prolonged.<sup>[40]</sup> A male rhesus monkey usually ejaculates less than 15 seconds after sexual penetration.<sup>[41]</sup> The first report and footage of spontaneous ejaculation in an aquatic mammal was recorded in a wild Indo-Pacific bottlenose dolphin near Mikura Island, Japan in 2012.<sup>[42]</sup>



An ejaculation by a male Indo-Pacific bottlenose dolphin.

In horses, sheep, and cattle, ejaculation lasts for several seconds or fractions of a second, but in boars, it can last for 10 – 30 minutes<sup>[43]</sup> or 5–10 minutes.<sup>[44]</sup> Ejaculation in boars is stimulated when the spiral-shaped glans penis interlocks with the female's cervix.<sup>[45]</sup> A mature boar can produce 250-300 ml of semen during one ejaculation.<sup>[44]</sup> In llamas and alpacas, ejaculation occurs continuously during copulation.<sup>[46]</sup>

The semen of male dogs is ejaculated in 3 separate fractions.<sup>[47]</sup> The 3rd fraction is produced during the copulatory tie, and consists mainly of prostatic fluid.<sup>[48]</sup>

## See also

- Insemination
- Aspermia
- Coitus interruptus
- Coitus reservatus
- Cum shot
- Fertilization
- Spermatorrhea
- Testicle

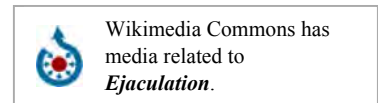
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