

Sexual Function Primer

Prepared by

Angela C. Morck, Deborah L. McLeod, & John W. Robinson for the IODE project

Learning Themes

- The sexual response cycle of Master's and Johnson
- Alternative sexual response cycle theories

The Sexual Response Cycle

William H. Masters and Virginia E. Johnson (1966) provided one of the first models of the physiology of human sexual response. Their research culminated in 1966 with the publication of *Human Sexual Response*, which reported data observed in over 10,000 sexual cycles of arousal and orgasm. They developed a four-stage model that suggested major similarities between males and females. The four stages of their model are excitement (often cited as arousal), plateau, orgasm and resolution. Two basic physiological processes that occur during these stages are vasocongestion and myotonia.

Vasocongestion - occurs when body tissues fill up with blood and swell in size. Vasocongestion is responsible for the erection of the penis in the male, and for women's breasts to increase in size and vaginal to lubrication. It can also affect other parts of the body including the labia, testicles, clitoris, and nipples.

Myotonia - is the increased muscle tension that occurs during sexual arousal. This includes both flexing (which is voluntary) and contractions (which are involuntary). This includes the muscle contractions that occur during both male and female orgasm, as well as, facial grimaces and twitches in the hands and feet.

Arousal stage

The arousal (excitement) stage is the first portion of the sexual response cycle. Like all phases of sexual response, it varies from person to person and situation to situation. It can last anywhere from less than a minute to over several hours. Heart rate and blood pressure increase and blood flows in to the tissues of the sexual organs causing them to darken in color. The breasts enlarge, the nipples become erect and firmer to touch. A reddish flush may appear on the chest and neck.

In women, increased blood flow to the genitals results in enlargement of the clitoris. The labia majora becomes engorged which results in it becoming flattened and spreading outward. Simultaneously, the labia minora swells. The upper two thirds of the vagina grows bigger and the walls of the entire vagina thicken and secrete a fluid that facilitates penetration. For men the penis becomes erect as blood flows into the spongy tissues. The skin of the scrotum also thickens, the testicles grow bigger and the entire scrotum elevates and moves toward the body.

Plateau stage

Is a state of advanced arousal and a precursor to orgasm. This phase can be very brief, from two seconds to a few minutes. Many people find that extending the length of the plateau period can lead to more intense orgasms. This phase does not have a clear starting point in which a person obviously shifts from excitement to plateau: In the plateau phase, everything that happened in the excitement phase continues and it becomes more prominent. Blood pressure and heart rate continue to increase, and breathing becomes rapid. Some people experience involuntary facial grimaces, and the hands and feet may contract as a result of myotonia. In women, the lower third of the vagina swells (at the vaginal introitus) making the entry to the vagina tighter (presumably to grasp the penis). The upper two thirds of the vagina continues to expand and the uterus moves into an upright position. The labia minora continue to become engorged with blood and darken in color. The clitoris shortens and withdraws below the clitoral hood. The breasts continue to increase in size and the nipples appear to flatten out as the areole become engorged. In men the testicles continue to enlarge and move closer to the inside of the abdomen. The glans of the penis shows evidence of vasocongestion by changing to a deeper color. The Cowper glands secrete fluid that may become visible at the tip of the penis.

Orgasm stage

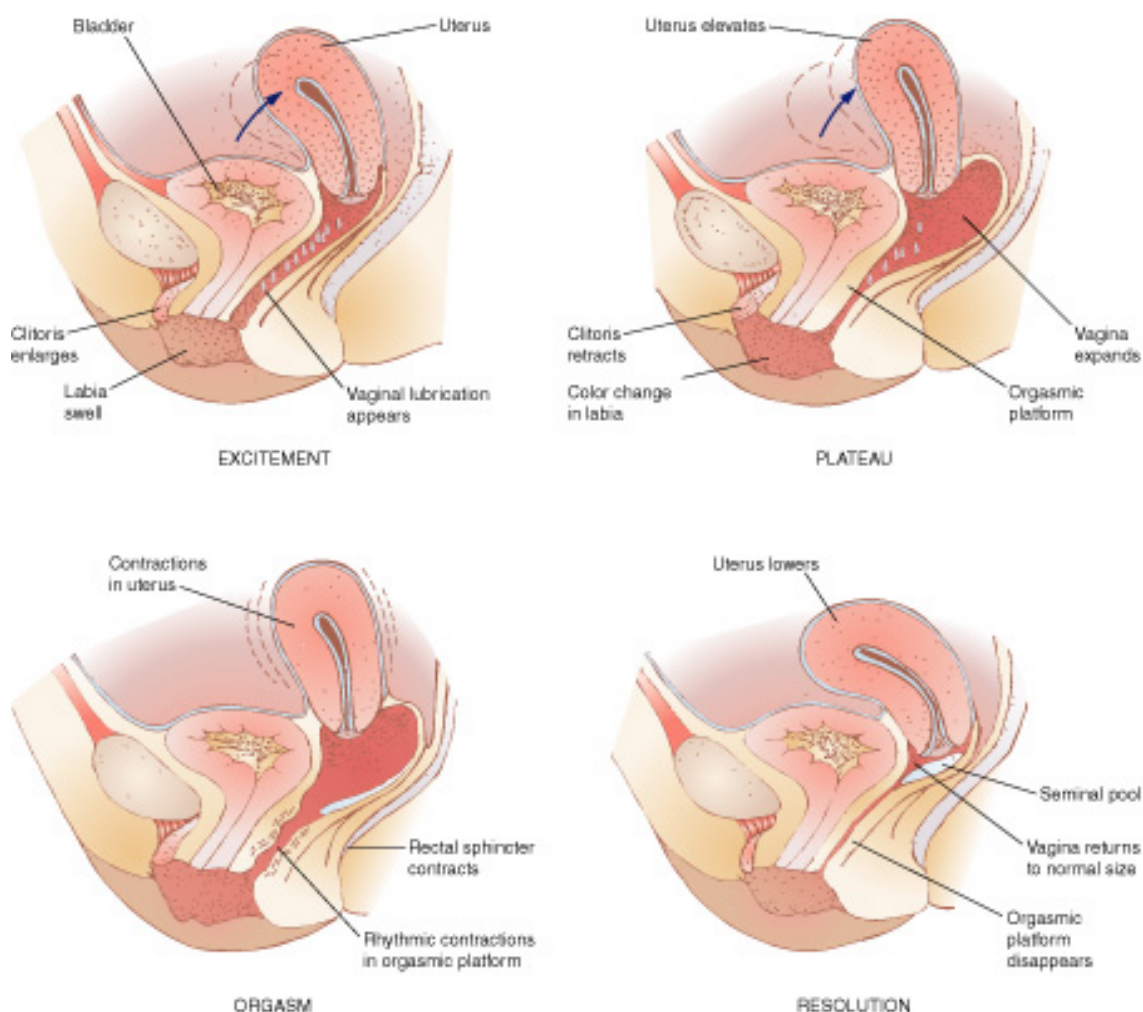
Orgasm is the shortest phase of the sexual response cycle, typically lasting only several seconds. It is a stage of maximal muscle contractions. Respiration and heart rate peak and subjective feelings of intense pleasure radiate throughout the body. Major muscles in the body contract and go into spasm.

In women, the pelvic muscles contract with the first contractions tending to be strong and closer together. These are followed by three or more slower contractions. The muscles of the anal sphincter and the uterus also contract.

In men, orgasm occurs in two stages. In the first stage seminal fluid is forced into the bulb of the penis by contractions of the vas deferens, seminal vesicles, ejaculatory duct, and prostate gland. The bladder neck sphincter also closes off to prevent urine from mixing with the semen and semen from flowing into the bladder. This produces a brief sensation (ejaculatory inevitability) when the

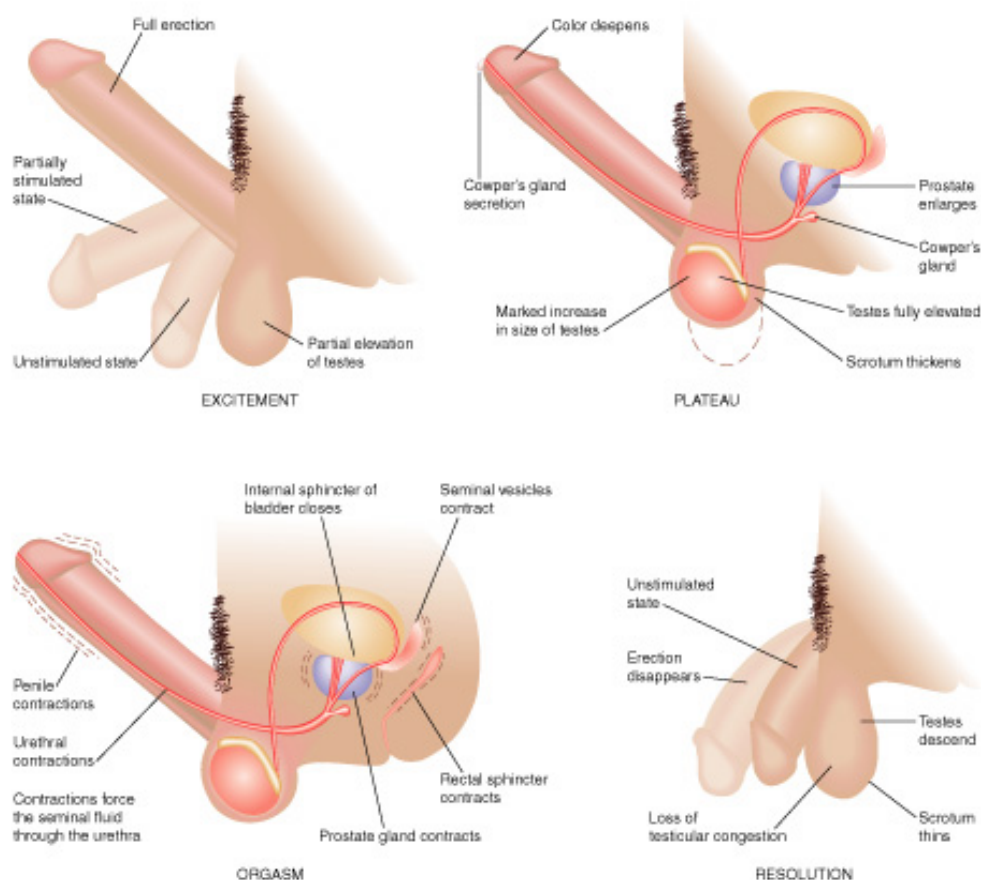
penile bulb swells to accommodate this build up of fluid. The second stage of orgasm occurs with the opening of the second sphincter lower in the urethra. The muscles around the urethra contract, and the seminal fluid is propelled along the urethra and out of the urethral meatus. As in female orgasm the first contractions are the most intense and closest together and are accompanied by feelings of intense pleasure.

The Sexual Response Cycle in Women



(McGraw-Hill Companies, Inc, 1998)

The Sexual Response Cycle in Men



(McGraw-Hill Companies, Inc, 1998)

Resolution stage

In this stage, vasoconstriction resolves and the body returns to its original non-aroused state. Some of the changes occur rapidly, whereas others take more time. The resolution phase begins immediately after orgasm if there is no additional stimulation. For both men and women, muscle tension dissipates within minutes, and heart rate, blood pressure and respirations return to normal.

In women blood moves out of the pelvic organs, the labia return to their normal size and color, the uterus goes back to its usual size and position, and the vagina and clitoris regain their usual size. The breasts also return to their normal size and skin flushing disappears.

In men the penis loses its rigidity in two phases. Initially, about half the volume is lost as blood leaves the corpus cavernosum. A few minutes later the remaining blood leaves the corpus spongiosum and the testicles and scrotum also shrink in size.

The refractory period is the one significant difference in the sexual response cycle of males and females. The refractory period occurs during the resolution phase. It is a time when a man cannot reach excitement, plateau, or orgasm through sexual stimulation. This period can last from a few minutes to days, depending on age and frequency of sexual activity. Typically as men age, this period lasts longer and older men may not be able to have another orgasm or ejaculation for hours or even days. Women do not experience a refractory period and may have multiple orgasms with continued stimulation (Hyde, DeLatamer, & Byers, 2009; Kapit, Macey, & Meisami, 2000; Katz, 2007).

Kaplan's Triphasic Model

Helen Singer Kaplan (1979) developed a triphasic model of human sexual response based on her work as a sex therapist. Rather than thinking about sexual response as having successive stages, she conceptualized three relatively independent phases or components; sexual desire, vasocongestion of the genitals and the reflex muscular contractions of the orgasm phase. The excitement and orgasm phases are similar to Masters and Johnson's physiological response. Kaplan however, believed that desire was the crucial component missing from their work.

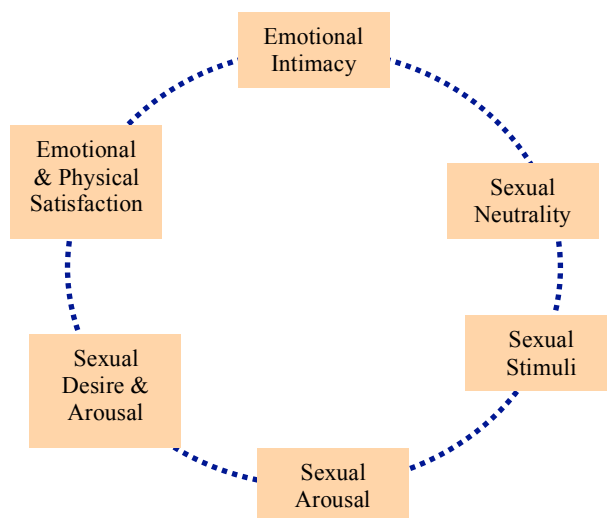
Justifications for Kaplan's approach and a retort to Masters and Johnson:

1. The 2 physiological components are controlled by different parts of the nervous system. Vasocongestion- producing erection in the male and lubrication in the female is controlled by the parasympathetic division of the autonomic nervous system.
Ejaculation and orgasm - are controlled by the sympathetic nervous system.
2. The components involve different anatomical structures – blood vessels for vasocongestion and muscles for the contractions of orgasms.
3. Vasocongestion and orgasm differ in their susceptibility to being disturbed by injury, drugs or age. An example being that the refractory period following orgasm in the male lengthens with age. Accordingly there is a decrease in the frequency of orgasm with age. In contrast for many men the capacity for erection is relatively unimpaired with age, although firm erections may take a longer amount of time. An older man may have non-orgasmic sex several times a week with a firm erection although he may have an orgasm only once a week.
4. Most men can bring the reflex of ejaculation under voluntary control. The erection response reflex generally cannot be.

5. Impairment of the vasocongestion response or of the orgasm response produces different disturbances (sexual disorders). Erection problems in men are caused by an impairment of the vasocongestion response. Whereas, rapid and delayed ejaculation are disturbances of the orgasm response. Similarly, many women show a strong arousal and vasocongestion response yet have trouble with the orgasm component of their sexual response (Hyde et al., 2009).

Basson's Intimacy Model

While Kaplan's model made changes to the Staged view of Master's and Johnson she assumed desire comes before arousal, and thus was the motivating factor toward sexual activity. Vancouver physician Rosemary Basson (2001) has developed an intimacy-based model of sexual response that breaks with this assumption. Basson (2001) argued that people in long term relationships, particularly women, may not in fact be motivated to engage in sexual activity by their experience of spontaneous sexual desire. Rather, they are motivated to engage in sexual activity in order to enhance intimacy, closeness, and commitment with their partner, to enhance their sense of attractiveness, or to share physical sexual pleasure. Sexual activity is thus begun in a sexually neutral state but they are receptive to stimuli that will arouse them. In other words, once sexual activity has begun the person becomes aroused, and this leads the experience of sexual desire and enhanced sexual arousal. According to Basson some people may begin sexual activity for intimacy reasons but continue for sexual as well as intimacy reasons. Basson, as well, acknowledged that even within long term committed relationships both men and women can and do experience spontaneous sexual desire outside of this intimacy model that may lead to sexual activity with their partner, casual sex, or self stimulation



Sexual Response Cycle

Cycle Phase	Features	Gender Differences
Desire	<p>Physiologic factors (neurotransmitters, androgens, and sensory system) and a wide variety of environmental stimuli (psychosocial and cultural factors)</p> <p>Desire causes a person to initiate or be receptive to sexual activity</p>	<p>Women: touch, verbal stimuli, and relationship of greater importance</p> <p>Men: visual stimuli of greater importance</p>
Arousal	<p>Parasympathetic nervous system and vascular system</p> <p>Breathing becomes heavier, heart rate and blood pressure increase and reflexive vasocongestion occurs</p>	<p>Women: vaginal lubrication and enlargement of clitoris</p> <p>Men: penile erection</p>
Plateau	<p>Parasympathetic nervous system and vascular system</p> <p>Vasocongestion phase is at its peak; sexual tension increases and then levels off immediately before orgasm; there are carpopedal spasms, generalized skeletal muscular tension, hyperventilation, tachycardia, and increased blood pressure (by 20 to 30 mm Hg systolic and 10 to 20 mm Hg diastolic)</p>	<p>Women: maximal vaginal lubrication and genital vasocongestion</p> <p>Men: distention of penis to its capacity</p>
Orgasm	<p>Sympathetic nervous system and muscle tone</p> <p>For both sexes there is heightened excitement to a peaking of subjective pleasure, followed by release of sexual tension; awareness of other sensual experiences is diminished and the person becomes self-focused; pelvic response consists of involuntary contractions and myotonia; tension may be felt and seen in neck and face (grimaces), buttocks, thighs, and toes; there are carpopedal spasms, contractions of arms and legs, external rectal sphincter contractions, external urethral sphincter contractions, hyperventilation (up to 40 breaths per minute), tachycardia (up to 180 beats per minute), and increased blood pressure (by 30 to 80 mm Hg systolic and 20 to 40 mm Hg diastolic)</p>	<p>Women: contraction of uterus from fundus toward lower uterine segment and contractions of orgasmic platform (5 to 12 contractions at 0.8 second intervals)</p> <p>Men: with emission, semen spurts out of fully erect penis (3 to 7 ejaculatory spurts at 0.8 second intervals); contractions of internal organs and signal of ejaculatory inevitability (roughly 1 to 3 seconds before start of ejaculation) are followed by rhythmic contractions of penile urethra and perineal muscles (experienced as orgasm proper); after orgasm the man is refractory to sexual stimuli for a period of time before he can be stimulated to orgasm again</p>
Resolution	<p>Sympathetic nervous system</p> <p>Body returns to pre-excitement phase as vasocongestion is</p>	<p>Women: ready return to orgasm with slow loss of pelvic vasocongestion</p>

	<p>relieved and hyperventilation and tachycardia decrease</p> <p>Adapted from Hyde et al., 2009 & Katz, 2007</p>	<p>Men: in very young men, a second ejaculation may occur without loss of erection; in older men, involution of penis occurs more rapidly, often within minutes.</p>
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Sexual Response Cycle and Cancer

A knowledge of the sexual response cycle - desire, arousal, plateau, orgasm, and resolution - is important to understanding the impact that chronic illness can have on sexual functioning. Desire is influenced by neurotransmitters, androgens, and the sensory system. It is also influenced by psychosocial factors such as self-esteem, body image, and the relationship with the sexual partner. Any illness or treatment that affects these factors can have a negative impact on a person's interest in initiating or being receptive to sexual activity. Arousal and plateau require intact vascular and parasympathetic nervous systems. Orgasm requires an intact sympathetic nervous system, and its intensity is affected by muscle tone (Katz, 2007).

Chronic medical illnesses such as cancer tend to disrupt the desire and arousal phases of the sexual response cycle. The diagnosis of cancer and the treatment regime can have a negative effect on a patient's body image and perception of self as a sexual being. Furthermore, neurologic sequelae can potentially affect desire, arousal, and orgasm. For instance, surgical treatments such as a prostatectomy can interfere with arousal and orgasm by disrupting delicate sympathetic and parasympathetic pathways (Katz, 2007, Krebs, 2006).

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