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Matric number: 18/MHS02/015

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Urination is the release of urine from the urinary bladder through the urethra to the outside of the body. It is the urinary system's form of excretion. It is also known medically as **micturition, voiding, uresis, or, rarely, emiction**, and known colloquially by various names including **peeing, weeing, and pissing**.

In healthy humans (and many other animals) the process of urination is under voluntary control. In infants, some elderly individuals, and those with neurological injury, urination may occur as a reflex. It is normal for adult humans to urinate up to seven times during the day.

In some animals, in addition to expelling waste material, urination can mark territory or express submissiveness. Physiologically, urination involves coordination between the central, autonomic, and somatic nervous systems. Brain centres that regulate urination include the pontine micturition centre, periaqueductal gray, and the cerebral cortex. In placental mammals, urine is drained through the urinary meatus, a urethral opening in the male penis or female vulval vestibule.

The main organs involved in urination are the urinary bladder and the urethra. The smooth muscle of the bladder, known as the detrusor, is innervated by sympathetic nervous system fibers from the lumbar spinal cord and parasympathetic fibers from the sacral spinal cord. Fibers in the pelvic nerves constitute the main afferent limb of the voiding reflex; the parasympathetic fibers to the bladder that constitute the excitatory efferent limb also travel in these nerves. Part of the urethra is surrounded by the male or

female external urethral sphincter, which is innervated by the somatic pudendal nerve originating in the cord, in an area termed Onuf's nucleus. Smooth muscle bundles pass on either side of the urethra, and these fibers are sometimes called the internal urethral sphincter, although they do not encircle the urethra. Further along the urethra is a sphincter of skeletal muscle, the sphincter of the membranous urethra (external urethral sphincter). The bladder's epithelium is termed transitional epithelium which contains a superficial layer of dome-like cells and multiple layers of stratified cuboidal cells underneath when evacuated. When the bladder is fully distended the superficial cells become squamous (flat) and the stratification of the cuboidal cells is reduced in order to provide lateral stretching.

The physiology of micturition and the physiologic basis of its disorders are subjects about which there is much confusion, especially at the supraspinal level. Micturition is fundamentally a spinobulbospinal reflex facilitated and inhibited by higher brain centers such as the pontine micturition center and, like defecation, subject to voluntary facilitation and inhibition. In healthy individuals, the lower urinary tract has two discrete phases of activity: the storage (or guarding) phase, when urine is stored in the bladder; and the voiding phase, when urine is released through the urethra. At low bladder volumes, afferent firing is low, resulting in excitation of the outlet (the sphincter and urethra), and relaxation of the bladder. At high bladder volumes, afferent firing increases, causing a conscious sensation of urinary urge. When the individual is ready to urinate, he or she consciously initiates voiding, causing the bladder to contract and the outlet to relax. Voiding continues until the bladder empties completely, at which point the bladder relaxes and the outlet contracts to re-

initiate storage.[6] The muscles controlling micturition are controlled by the autonomic and somatic nervous systems. During the storage phase the internal urethral sphincter remains tense and the detrusor muscle relaxed by sympathetic stimulation. During micturition, parasympathetic stimulation causes the detrusor muscle to contract and the internal urethral sphincter to relax. The external urethral sphincter (sphincter urethrae) is under somatic control and is consciously relaxed during micturition. In infants, voiding occurs involuntarily (as a reflex). The ability to voluntarily inhibit micturition develops by the age of 2–3 years, as control at higher levels of the central nervous system develops. In the adult, the volume of urine in the bladder that normally initiates a reflex contraction is about 300–400 millilitres (11–14 imp fl oz; 10–14 US fl oz)

Clinical conditions

Many clinical conditions can cause disturbances to normal urination, including:

Urinary incontinence, the inability to hold urine

Stress incontinence, incontinence as a result of external mechanical disturbances.

Urge incontinence, incontinence that occurs as a result of the uncontrollable urge to urinate

Mixed incontinence, a combination of the two types of incontinence

Urinary retention, the inability to initiate urination

Overactive bladder, a strong urge to urinate, usually accompanied by detrusor overactivity

Interstitial cystitis, a condition characterized by urinary frequency,
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