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MATRIC NUMBER: 18/MHS02/029

DEPARTMENT: NURSING, MHS

COURSE CODE: PHS 212 (PHYSIOLOGY)

## ANSWER

### MICTURITION

Micturition (urination) is the process of urine excretion from the urinary bladder. Micturition is also known as the voiding phase of bladder control and it is typically a short-lasting event. Urinary flow rate in a full bladder is:

- 20-25ml/s in men
- 25-30ml/s in women

Whilst the capacity of the bladder varies from roughly 300-550ml, afferent nerves in the bladder wall signal the need to void the bladder at around 400ml of filling.

### **Regulation of Micturition**

Passing of urine is under parasympathetic control. Bladder afferents signals ascend through the spinal cord and then project to the pontine micturition centre and cerebrum. Upon the voluntary decision to urinate, neurones of the pontine micturition centre fire to excite the sacral preganglionic neurones.

There is subsequent parasympathetic stimulation to the Pelvic Nerve (S2-4) causing a release of ACh, which works on M<sub>3</sub> muscarinic ACh receptors on the detrusor muscle, causing it to contract and increase intra-vesicular pressure. The pontine micturition centre also inhibits Onuf's nucleus, with a resultant reduction in sympathetic stimulation to the internal urethral sphincter causing relaxation.

Finally, a conscious reduction in voluntary contraction of the external urethral sphincter from the cerebral cortex allows for distension of the urethra and the passing of urine. In the female, urination is assisted by gravity, while in the male, bulbospongiosus contractions and squeezing along the length of the penis helps to expel all of the urine.