The micturition cycle

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The key characteristics of the two phases of the micturition cycle are (Figure 83.2): 1 Urinary storage (filling): /uni25CF low pressure (normal compliance) – dependent on viscoelastic properties of the bladder wall and lack of parasympathetic input to the detrusor; /uni25CF normal sensation (absence of pain or urgency); tivity); /uni25CF a closed bladder outlet to enable continence – depen - dent on the sympathetic reflex, which increases outlet resistance (α -adrenergic stimulation), inhibits detrusor contractility (through inhibitory e ff ect on parasym - pathetic gang lia) and reduces bladder smooth muscle tension (β -adrenergic stimulation). 3 2 Urinary emptying (voiding): /uni25CF coordinated detrusor contraction of appropriate strength and duration to enable complete bladder emptying – dependent on inhibition of the spinal sym - pathetic reflexes and activation of parasympathetic e ff erent pathways to the bladder; /uni25CF relaxation of the bladder neck and external urethral sphincter – dependent on inhibition of spinal sympa - thetic reflexes. Disorders of the LUT can therefore be related to failure to store urine (due to the bladder or the outlet) or failure to empty (due to the bladder or the outlet).

(a) Pontine storage centre (+)

- Contracts bladder outlet – Inhibits detrusor R Pelvic Bladder nerve Pudendal External nerve urethral sphincter Figure 83.2 The micturition cycle and its neurological control. system and pudendal nerve activity leads to contraction of the bladder neck and external sphincter, and relaxation of the detrusor muscle. /uni00A0 (b) Urine voiding re /f_l exes. During voiding, the pontine micturition centre stimulates detrusor contraction through activation of the parasympa thetic out /f_l ow to the bladder, with inhibition of sympathetic out /f_l ow to the bladder neck and external urethral sphincter. PAG, periaqueductal grey; R, receptor. (Reproduced with permission from Fowler CJ, Grif /f_i ths D, de Groat WC. The neural control of micturition. 2008; 9 (6): 453–66.) PAG (b) Pontine micturition centre Hypogastric nerve (–) Pelvic nerve R (+) Bladder (–) (+) (a) Urine storage re /f_l exes. During bladder /f_i lling, increased sympathetic nervous

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