2026 Supplementary online material

3.2 Classification systems

Table S.1: Definitions useful in clinical practice

Autonomic dysreflexia (AD)	Autonomic dysreflexia is a sudden and exaggerated autonomic response to various stimuli in patients with SCI or spinal dysfunction at or above level Th 6. It is defined as an increase in SBP > 20 mmHg from baseline [1]. Autonomic dysreflexia may be symptomatic (headache, blurred vision, stuffy nose, piloerection, flushing, sweating above the lesion level (vasodilatation), pale and cold skin (vasoconstriction) below the lesion level or asymptomatic (silent).
Bladder expression	Various manoeuvres aimed at increasing intravesical pressure in order to facilitate bladder emptying (abdominal straining, Valsalva's manoeuvre and Crede´s manoeuvre) [2].
Bladder reflex triggering	Various manoeuvres performed by the patient or the therapist in order to elicit reflex detrusor contraction by exteroceptive stimuli (suprapubic tapping, thigh scratching and anal/rectal manipulation) [3].
Bladder sensation, absent	*During history taking*, the patient reports no sensation of bladder filling or desire to void [3]. *During filling cystometry*, the patient has no bladder sensation [3].
Bladder sensation, normal	*During history taking*, the patient is aware of bladder filling and increasing sensation up to a strong desire to void [3]. During filling cystometry, can be judged by three defined points (first sensation of bladder filling, first desire to void and strong desire to void) and evaluated in relation to the bladder volume at that moment and in relation to the patient's symptomatic complaints [3].
First sensation of bladder filling	The feeling, during filling cystometry, when the patient first becomes aware of the bladder filling [3].
First desire to void	The feeling, during filling cystometry, that would lead the patient to pass urine at the next convenient moment, but voiding can be delayed if necessary [3].
Strong desire to void	Persistent desire to void, during filling cystometry, without the fear of Leakage [3].
Bladder sensation, increased	*During history taking*, the patient feels an early and persistent desire to void [3]. *During filling cystometry*, an early first sensation of bladder filling (or an early desire to void) and/or an early strong desire to void,

	which occurs at low bladder volume and which persists. It is a subjective assessment, not possible to quantify [3].
Bladder sensation, non-specific	*During history taking*, the patient reports no specific bladder sensation but may perceive bladder filling as abdominal fullness, vegetative symptoms, or spasticity [3]. *During filling cystometry*, may make the patient aware of bladder filling, for example, abdominal fullness or vegetative symptoms [3].
Bladder sensation, reduced	*During history taking*, the patient is aware of bladder filling but does not feel a definite desire to void [3]. *During filling cystometry*, a diminished sensation throughout bladder filling [3].
Catheterisation	Technique for bladder emptying employing a catheter to drain the bladder or a urinary reservoir [3].
Catheterisation, indwelling	An indwelling catheter remains in the bladder, urinary reservoir or urinary conduit for a period of time longer than one emptying [3].
Catheterisation, intermittent (IC)	Drainage or aspiration of the bladder or a urinary reservoir with subsequent removal of the catheter [3]. When not specified "self", it is performed by an attendant (e.g. doctor, nurse or relative).
Aseptic IC	Use of a sterile technique. This implies genital disinfection and the use of sterile catheters and instruments/gloves [2].
Clean IC	Use of a clean technique. This implies ordinary washing techniques and use of disposable or cleansed reusable catheters [2].
Intermittent self-catheterisation	Performed by the patient him/herself [3].
Daytime frequency, increased	Complaint by the patient who considers that he/she voids too often by day. This term is equivalent to pollakiuria used in many countries [3]. Many population-based studies of OAB have defined frequency as either eight or more voids/day, or eight or more voids/24 hours [4].
Diary, bladder	Records the times of micturitions and voided volumes, incontinence episodes, pad usage and other information such as fluid intake, the degree of urgency and the degree of incontinence [3].
Frequency volume chart (FVC)	Records the volumes voided as well as the time of each micturition, day and night, for at least 24 hours [3].
Micturition time chart	Records only the times of micturitions, day and night, for at least 24 hours [3].
Enuresis	Complaint of intermittent incontinence that occurs during periods of sleep. It may be qualified with the adjective 'nocturnal' [3].

Hesitancy	Difficulty in initiating micturition resulting in a delay in the onset of voiding after the individual is ready to pass urine [3].
Intermittent stream (Intermittency)	Urine flow which stops and starts, on one or more occasions, during micturition [3].
Motor neuron lesion, lower (LMNL)	Lesion resulting from damage to motor neurons of the ventral horns or motor neuron of the cranial nerve nuclei or resulting from interruption of the final common pathway connecting the neuron via its axon with the muscle fibres it innervates (the motor unit) [3].
Motor neuron lesion, upper (UMNL)	Lesion resulting from damage to cortical neurons that give rise to corticospinal and corticobulbar tracts. It may occur at all levels of the neuraxis from the cerebral cortex to the spinal cord. When rostral to the pyramidal decussation of the caudal medulla, they result in deficits below the lesion, on the contralateral side. When caudal to the pyramidal decussation, they result in deficits below the lesion, on the ipsilateral side [5].
Neurogenic shock	Loss of vascular tone in part of the body deprived of supraspinal control. It commonly occurs during the acute period following spinal cord injury (SCI) and is associated with failure of the sympathetic nervous system. In this condition, systolic blood pressure < 90 mmHg in the supine posture is not the result of low intravascular volume (e.g. blood loss, dehydration, sepsis, cardiac disorders) [1].
Spinal shock	Characterised by marked reductions in spinal reflex activity below the level of injury [2].
Nocturia	The number of times urine is passed during the main sleep period. Having woken to pass urine, each void must be followed by sleep or the intention to sleep [6].
Nocturnal polyuria	Excessive production of urine during the main sleep period. The nocturnal urine volume excludes the last void before sleep but includes the first void after the main sleep period [6].
Neurogenic lower urinary tract dysfunction (NLUTD)	Lower urinary tract dysfunction (LUTD) in the context of a clinically confirmed neurological disorder [2].
Orthostatic hypotension	Symptomatic (dizziness, headache or nec k ache, fatigue) or asymptomatic decrease in blood pressure defined as a drop of at least 20 mmHg systolic or 10 mmHg diastolic within 3 minutes of moving from the supine to an upright position [7, 8].
Overactive bladder syndrome	Urgency, with or without urge urinary incontinence, usually with increased daily frequency and nocturia, in the absence of urinary tract infection or other obvious pathology [9].

Pain, genital and lower urinary tract	Abnormal sensations felt by the individual as pain, discomfort and pressure. Should be characterised by type, frequency, duration, precipitating and relieving factors and by location [3].
Bladder pain	*During history taking*, pain that is felt suprapubically or retropubically and usually increases with bladder filling, it may persist after voiding [3]. *During filling cystometry* is an abnormal finding [3].
Pelvic pain	Less well-defined than, for example, bladder, urethral, or perineal pain and is less clearly related to the micturition cycle or to bowel function and is not localised to any single pelvic organ [3].
Perineal pain	In females, between the posterior fourchette (posterior lip of the introitus) and the anus. In males, between the scrotum and the anus [3].
Scrotal pain	May or may not be localised, for example to the testis, epididymis, cord structures or scrotal skin [3].
Urethral pain	Pain that is felt in the urethra and the individual indicates the urethra as the site [3].
Vaginal pain	Is felt internally, above the introitus [3].
Vulvar pain	Is felt in and around the external genitalia [3].
Pelvic organ prolapse	Descent of one or more of the anterior vaginal wall, the posterior vaginal wall, and the apex of the vagina (cervix/uterus) or vault (cuff) after hysterectomy. Absence of prolapse is defined as stage 0 support; prolapse can be staged from stage I to stage IV [3].
Slow stream	Perception of reduced urine flow, usually compared to previous performance or in comparison to others [3].
Spinal cord injury	***Incomplete*:** if partial preservation of sensory and/or motor functions is found below the neurological level and includes the lowest sacral segments (S4–S5). ***Complete:*** when there is an absence of sensory and motor function in the lowest sacral segments (S4–S5) [10].
Cauda equina	Injuries affecting the cauda equina and generally causing an acontractile or lower motor neuron picture affecting the LUT, distal bowel, and sexual function [2].
Conal	Injuries affecting the conus medullaris of the spinal cord and often causing a mixed lesion to the LUT, distal bowel, and sexual functions with a resultant either overactive or acontractile picture [2].

Supraconal	Injuries occurring above the conus medullaris. In general, supraconal injuries cause an overactive or upper motor neuron pattern of damage affecting the LUT, distal bowel, and sexual functions [2].
Straining to void	Muscular effort used to either initiate, maintain, or improve the urinary stream [3].
Terminal dribble	Prolonged final part of micturition, when the flow has slowed to a trickle/dribble [3].
Urgency	The complaint of a sudden compelling desire to pass urine which is difficult to defer [3].
Urinary incontinence (UI)	Complaint of any involuntary leakage of urine [3].
Stress urinary incontinence (SUI)	Complaint of involuntary leakage on effort or exertion, or on sneezing or coughing [3].
Urgency urinary incontinence (UUI)	Complaint of involuntary leakage associated with urgency [9].
Mixed urinary incontinence	Complaint of involuntary leakage associated with urgency and also with exertion, effort, sneezing or coughing [3].
Continuous urinary incontinence	Complaint of continuous leakage [3].
Voided volume, maximum	The largest volume of urine voided during a single micturition which is determined either from the frequency/volume chart or bladder diary [3].

Table S.2: Definitions useful when interpreting urodynamic studies.

Bladder compliance	Relationship between change in bladder volume and change in detrusor pressure. Compliance is calculated by dividing the volume change (ΔV) by the associated change in detrusor pressure ($\Delta pdet$) during the change in bladder volume ($C=\Delta V/\Delta pdet$). *Bladder compliance* is expressed in mL/cm H_2O [3].
Bladder filling, artificial	Filling the bladder, via a catheter, with a specified liquid at a specified rate [3].
Bladder filling, natural	The bladder is filled by the production of urine rather than by an artificial medium [3].
Bladder outlet obstruction (BOO)	Generic term for obstruction during voiding, characterised by increased detrusor pressure and reduced urine flow rate. It is usually diagnosed by studying the synchronous values of flow rate and detrusor pressure [3].
Cystometric capacity	The bladder volume at the end of the filling cystometrogram, when 'permission to void' is usually given. The volume voided together with any residual urine [3].

Maximum anaesthetic bladder capacity	The volume to which the bladder can be filled under deep general or spinal anaesthetic and should be qualified according to the type of anaesthesia used, the speed, the length of time, and the pressure at which the bladder is filled [3].
Maximum cystometric capacity	In patients with normal sensation, the volume at which the patient feels they can no longer delay micturition (has a strong desire to void) [3].
Detrusor function, normal	Allows bladder filling with little or no change in pressure. No involuntary phasic contractions occur despite provocation [3]. Normal voiding is achieved by a voluntarily initiated continuous detrusor contraction that leads to complete bladder emptying within a normal time span, and in the absence of obstruction. For a given detrusor contraction, the magnitude of the recorded pressure rise will depend on the degree of outlet resistance [3].
Detrusor overactivity	Urodynamic observation characterised by involuntary detrusor contractions during the filling phase which may be spontaneous or provoked [3].
Detrusor overactivity incontinence	Incontinence due to an involuntary detrusor contraction [3].
Idiopathic detrusor overactivity	When there is no defined cause [3].
Phasic detrusor overactivity	Is defined by a characteristic wave form and may or may not lead to UI [3].
Neurogenic detrusor overactivity	When there is a relevant neurological condition present [2].
Terminal detrusor overactivity	A single, involuntary detrusor contraction, occurring at cystometric capacity, which cannot be suppressed and results in incontinence usually resulting in bladder emptying (voiding) [3].
Detrusor sphincter dyssynergia (DSD)	A detrusor contraction concurrent with an involuntary contraction of the urethral and/or periurethral striated muscle. Occasionally, flow may be prevented altogether [3]. This term is specific to patients with a neurological diagnosis [2].
Detrusor underactivity	Contraction of reduced strength and/or duration, resulting in prolonged bladder emptying and/or a failure to achieve complete bladder emptying within a normal time span [3].
Acontractile detrusor	Detrusor that cannot be demonstrated to contract during urodynamic studies [11].
Dysfunctional voiding	Intermittent and/or fluctuating flow rate due to involuntary intermittent contractions of the peri-urethral striated muscle during voiding in neurologically normal individuals [3].

Filling cystometry	Method by which the pressure/volume relationship of the bladder is measured during bladder filling [3].
Filling rate, physiological	Filling rate less than the predicted maximum - body weight (kg)/4 in mL/min [3].
Filling rate, non-physiological	Filling rate greater than the predicted maximum filling rate [3].
Leak point pressure, abdominal (ALPP)	The intravesical pressure at which urine leakage occurs due to increased abdominal pressure in the absence of a detrusor contraction [2].
Leak point pressure, detrusor (DLPP)	The lowest detrusor pressure at which urine leakage occurs in the absence of either a detrusor contraction or increased abdominal pressure [3].
Non-relaxing urethral sphincter obstruction	Characterised by a non-relaxing, obstructing urethra resulting in reduced urine flow. Usually occurs in individuals with a neurological lesion [3].
Post void residual (PVR)	The volume of urine left in the bladder at the end of micturition [3].
Pressure flow study	Method by which the relationship between pressure in the bladder and urine flow rate is measured during bladder emptying [3].
Provocative manoeuvres	Techniques used during urodynamics in an effort to provoke detrusor overactivity, for example, rapid filling, use of cooled or acid medium, postural changes, and hand washing [3].
Urethral closure mechanism, incompetent	Allows leakage of urine in the absence of a detrusor contraction [3].
Urethral relaxation incontinence	Leakage due to urethral relaxation in the absence of raised abdominal pressure or detrusor overactivity [3].
Urethral closure mechanism, normal	Maintains a positive urethral closure pressure during bladder filling even in the presence of increased abdominal pressure, although it may be overcome by detrusor overactivity [3].
Urethral pressure	The fluid pressure needed to just open a closed urethra [3].
Urethral pressure, maximum	The maximum pressure of the measured profile [3].
Urethral pressure profile	A graph indicating the intraluminal pressure along the length of the urethra [3].
Urethral closure pressure profile	Is given by the subtraction of intravesical pressure from urethral pressure [3].
Urethral closure pressure, maximum (MUCP)	The maximum difference between the urethral pressure and the intravesical pressure [3].

Urethral functional profile length	The length of the urethra along which the urethral pressure exceeds intravesical pressure in women [3].
Urethral pressure "transmission" ratio	The increment in urethral pressure on stress as a percentage of the simultaneously recorded increment in intravesical pressure [3].
Urodynamic stress incontinence	The involuntary leakage of urine during increased abdominal pressure in the absence of a detrusor contraction [3].
Urodynamic study, ambulatory	Functional test of the lower urinary tract, utilising natural filling, and reproducing the subject's everyday activities [3].
Urodynamic study, conventional	Normally takes place in the urodynamic laboratory and usually involve artificial bladder filling [3].

References

1. Wecht, J.M.*, et al.* International Standards to document Autonomic Function following SCI (ISAFSCI): Second Edition. Top Spinal Cord Inj Rehabil, 2021. 27: 23. https://www.ncbi.nlm.nih.gov/pubmed/34108833
2. Gajewski, J.B.*, et al.* An International Continence Society (ICS) report on the terminology for adult neurogenic lower urinary tract dysfunction (ANLUTD). Neurourol Urodyn, 2018. 37: 1152. https://www.ncbi.nlm.nih.gov/pubmed/29149505
3. Abrams, P.*, et al.* The standardisation of terminology of lower urinary tract function: report from the Standardisation Sub-committee of the International Continence Society. Neurourol Urodyn, 2002. 21: 167.
4. Irwin, D.E.*, et al.* Understanding the elements of overactive bladder: questions raised by the EPIC study. BJU Int, 2008. 101: 1381.
5. Fix, J.D., Neuroanatomy. 4th ed. 2008, Philadelphia, Pennsylvania, USA.
6. Hashim, H.*, et al.* International Continence Society (ICS) report on the terminology for nocturia and nocturnal lower urinary tract function. Neurourol Urodyn, 2019. 38: 499. https://www.ncbi.nlm.nih.gov/pubmed/30644584
7. Freeman R Fau - Wieling, W.*, et al.* Consensus statement on the definition of orthostatic hypotension, neurally mediated syncope and the postural tachycardia syndrome. 2011.
8. Irwin, D.E.*, et al.* Understanding the elements of overactive bladder: questions raised by the EPIC study. BJU Int, 2008. 101: 1381. https://www.ncbi.nlm.nih.gov/pubmed/18336602
9. D'Ancona, C.*, et al.* The International Continence Society (ICS) report on the terminology for adult male lower urinary tract and pelvic floor symptoms and dysfunction. Neurourol Urodyn, 2019. 38: 433. https://www.ncbi.nlm.nih.gov/pubmed/30681183
10. Rupp R Fau - Biering-Sørensen, F.*, et al.* International Standards for Neurological Classification of Spinal Cord Injury: Revised 2019. 2021.
11. Rosier, P.*, et al.* ICS-SUFU standard: Theory, terms, and recommendations for pressure-flow studies performance, analysis, and reporting. Part 2: Analysis of PFS, reporting, and diagnosis. Neurourol Urodyn, 2023. 42: 1603. https://www.ncbi.nlm.nih.gov/pubmed/37139677