W33: Supporting Self-Management of the Neurogenic Bladder

Workshop Chair: Doreen McClurg, United Kingdom

09 October 2015 11:00 - 12:30

Start	End	Topic	Speakers
11:00	11:05	Introduction	Doreen McClurg
11:05	11:20	Neurogenic bladder	Jalesh N. Panicker
11:20	11:40	PFMT	Doreen McClurg
11:40	12:10	TPTNs, self-management	Jo Booth
12:10	12:20	PFMT practical	Doreen McClurg
12:20	12:30	Discussion	All

Aims of course/workshop

The complex picture of lower urinary tract dysfunction (LUTD) in the neurological population is sometimes sited as a reason for not using common conservative treatment modalities advised in the non-neurological population. There is a need to extend the current range of options to support people to self-manage neurological bladder conditions in the longer term. This workshop will cover applied neuro-urology and present an overview of the literature around the efficacy of PFMT, bladder training and transcutaneous tibial nerve stimulation, all of which can be part of a self-management package. Participation will be expected in a practical session.

Learning Objectives

1. Understand the basic physiological complexities of the neurogenic bladder

2. Identify conservative management treatments that have been used in people with a neurogenic bladder

3. Apply a self-management strategy for their patients with varying symptoms of a neurogenic bladder

Workshop 554
Supporting self-management of the Neurogenic Bladder

Doreen McClurg, Jalesh Panicker, Jo Booth

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National Hospital for Neurology and Neurosurgery,
School Life and Health Sciences, Glasgow Caledonian University

Talk Outline

- Introduction – Doreen McClurg
- Neurological Disease and bladder function – Jalesh Panickar
- Pelvic Floor Muscle Training in Neurological conditions + practical – Doreen McClurg
- Bladder training and PTNS = Case studies – Jo Booth
- Discussion time

Neurological conditions and the Pelvic Floor – self management

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Continence is a learned skill!

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Development of Urinary Continence

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Sufficient strength in the pelvic floor muscles and external urethral sphincter

The development of frontal areas of the brain to appreciate the signals o bladder fullness

Ability to link the inhibition of voiding to voluntary/involuntary contraction of the external urethral sphincter

Self-management – what do we mean?

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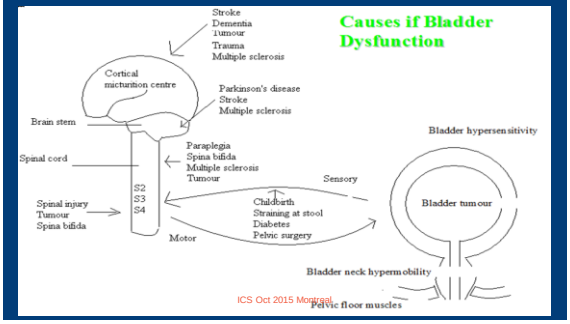
- The patient is left to their own devices?

Causes of Bladder Dysfunction



Self-management

- Self-management is the ability of the patient to deal with all that a chronic disease entails, including symptoms, treatment, physical and social consequences, and lifestyle changes

Self-management support

- Self-management support is what health care practitioners provide to assist a person with their self-management practices, and to support their self efficacy and ability to effectively self-manage.

The Pelvic Floor Muscles

There is no considerable muscle in the body whose form and function are more difficult to understand than those of the levator ani, and about which such nebulous impressions prevail'

Dickinson 1889

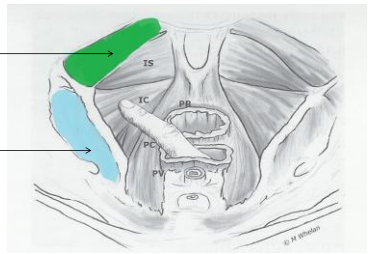
- The pelvic floor muscles are unique, somatically controlled muscles that are active throughout life, 24 hours a day
- They form a dynamic platform which functions like a trampoline at the base of the pelvis to contain the pelvic and abdominal organs, preventing prolapse and assisting in the maintenance of continence
- Type 1 fibres approximately 70%
- Type 2 fibres approximately 30%

Gilpin *et al,* 1989

Functions of the pelvic floor

- Support
  - abdominal and pelvic organs
- Strength / Sphincters
  - occlusion of passages
- Sexual
- Birth [Rotation of baby's head]

Pelvic floor muscles digital assessment



PFMT

'Repetitive selective voluntary contraction and relaxation of specific pelvic floor muscles'

Aims to

- Prevent stress urinary incontinence by increasing the power of the pelvic floor muscles
- Control urgency, urge incontinence and control frequency by inducing reflex bladder relaxation

Stress urinary incontinence

A contraction of PC elevates the bladder neck into an area of transmitted abdominal pressure, so that closure pressure at the proximal urethra will equal the increased bladder pressure, preventing urine loss.

DeLancey 1986

A sudden rise in intra-abdominal pressure will close the passages, as long as the hammock below remains firm and does not descend

DeLancey 1992

Urgency urinary incontinence

- Perineo-detrusor inhibitory reflex: a contraction of the PFM inhibits a detrusor contraction → voluntary suppression of micturition

Mahoney et al, 1977

PFM exercise

There is no evidence base for prescription of PFM exercises. We therefore need to:

- Relate anatomy of the pelvic floor and muscle physiology
- Develop individualised programme by considering:
  - Specificity
  - Overload
  - Reversibility
  - Maintenance

Adherence to PFM Exercises

- Self-efficacy
  - Correct technique
  - Feedback/biofeedback/EMG Biofeedback
  - Electrical stimulation

Multiple Sclerosis and Bladder Dysfunction

- Most common progressive neurological condition in young adults.
- Unpredictable in rate of progression and disability produced
- Urinary symptoms – up to 90%; average onset 6 years after diagnosis; 1:10 may present with urinary symptoms at the time of clinical diagnosis
- Symptoms dependent on where the plaques are

Guideline recommendations for PFM training in MS

Fowler CJ, et al. A UK consensus on the management of the bladder in multiple sclerosis. J Neurol Neurosurg Psychiatry 2009;80:470-477. Grade B

Cetinel B, et al. Management of lower urinary tract dysfunction in multiple sclerosis; a systematic review and Turkish consensus report *Neurourol Urodyn* 2013;32:1047-10 Grade A

Pannek J, et al. European Association of Urology. Guidelines on lower urinary tract dysfunction 2013. 57. - No grade given

NICE Guideline 148 - Urinary Incontinence in Neurological Disease 2012

Block . V Do Physical Therapy Interventions Affect UI and QoL in People with MS? An evidence based review. International Journal of MS Care DOI 10.7224/1537-2073.2014-031

Study	Design	N° (T/C)	Duration of Intervention (months)	Intervention Type	Outcomes QoL	Outcomes Incontinence
De Seze et al. 2011	Cohort	66	3	TPTNS	QQ	Severe urgency
Amri et al. 2011	RCT	37 (13/14)		PFMT w/ AP	QQ, IIQ7,	Hesitancy, Urgency
Khan et al. 2010	RCT	58 (34/24)	12	Individual bladder rehabilitation	UDI6 UDI	
McClurg et al. 2008	RCT	74 (37/37)	1.2	EMG, NMES and PFME		EMG (work /relax), 24hr
McClurg et al. 2006 Vahtera et al. 1997	RPS OCRS	30 (10/10/10)** 50 (25/25)α 30 (15/15)ε	1.2 21 days (φ) 6 (λ)	EMG, PFME and NMES PFM stimulation	IIQ	Uroflowmetry, 24hr Function of PFM - Relaxation

Abbreviations: **(T/C)**: treatment/ control groups, **RCT**: Randomized Control Trial, **RPS**: Random pilot study, **OCRS**: Open controlled Randomized study, **TPTNS**: Transcutaneous Posterior Tibial Nerve Stimulation, **w/ AP**: with assistance of perineometer, **PFM**: Pelvic Floor Muscle, **IIQ**: Incontinence Impact Questionnaire, **IIQ7**: Incontinence Impact Questionnaire 7, **UDI**: Urogenital Distress Inventory, **UDI6**: Urogenital Distress Inventory 6, **QQ**: Qualiveen Questionnaire, **24hr**: 24 hour pad test
** Contained three groups: 1: Pelvic floor Muscle Training and Advice (**PFMA**), Electromyography (**EMG**) biofeedback, and Neuromuscular Electrical Stimulation (**NMES**), 2: PFMA and EMG biofeedback, and 3: PFTA only (control).

α = Female group, ∂= Male group
φ = Intervention in clinical setting, λ = asked to do daily exercises at home

Bladder Dysfunction and QoL for people with MS (Browne et al, 2015, Disability and Rehabilitation On line)

- Each individual's experience of bladder dysfunction is unique.
- Healthcare professionals must be prepared to discuss all disruptions and losses associated with bladder dysfunction for people with MS.
- People with MS have a vast range of knowledge in relation to their own bladder symptoms and healthcare professionals need to explore their existing self-management strategies during assessment.
- People with MS and healthcare professionals need to be educated on the wider health implications relating to bladder dysfunction.

Stroke and pelvic floor

Tibaek 2005 Tibaek 2004 N=24	2 group study 40 and 85 yrs Time since stroke 13 mths SF-36 IIQ	Pelvic floor muscle training One per week for 12 weeks N=12	Untreated group N=12	12 Weeks treatment
Sample was too small to detect effect and the IIQ was potentially insensitive to UUI				
Shin et al 2014 N=31	2 groups, mean age 62 years, all female. Time since stroke 6 years PFM activity, vaginal squeeze pressure, Bristol Female Urinary symptoms	PFMT + general rehabilitation N=16	General rehabilitation N=15	6 weeks of treat-ment
These findings suggest that PFMT is beneficial for the management of urinary incontinence in female stroke patients				

Thomas L et al. Treatment of urinary incontinence after stroke in adults (Review) 2009 The Cochrane Collaboration. Published by John Wiley & Sons, Ltd.

Pelvic Floor Muscle Training and its Impact on Neurogenic Detrusor Overactivity in Incomplete Spinal Cord Injury: Proof of Principle Study

N Vásquez, P Ellaway, R Hamid, J Susser, S Knight, M Craggs.
London Spinal Cord Injuries Centre, RNOH, Stanmore,
& University College London and Imperial College London, UK

AIM: To determine whether residual voluntary pathways after incomplete spinal cord injury (iSCI) can be boosted by Pelvic Floor Muscle Training (PFMT) to improve continence and quality of life (QoL).

Conclusions

- PFM can be trained for strength and endurance using residual pathways after SCI and thus promote continence
- PFM contractions can modulate and suppress aberrant reflexes of the bladder (NDO) in iSCI
- Improved continence can lead to better QoL in this population
- The preliminary results may represent plasticity potential for the surviving sensory and motor pathways to effect functional recovery of continence in iSCI through PFMP

Long term goal: To determine whether elements of cerebro-spinal control of continence can be restored in iSCI by activity-based therapies through manipulation of inherent neuro-plasticity of the CSN.

This preliminary results support a larger cohort study incorporating 16 weeks of PFMT, described in recent literature/

Thank You

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Summary - PFM Exercises and Self-management

Not easy to know if you are doing them right,
USE THEM OR LOSE THEM

Improvement in symptoms not immediate –
POSSIBLE MAINTENANCE EFFECT
Downtraining and uptraining

Long-term adherence is required

Neural control of the lower urinary tract in health and disease

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Workshop554ICSMontrealOct2015

UCL

The lower urinary tract..... is unique

- Dependence on the central nervous system
- Element of voluntary control
- Functions depend upon learned behaviour
- Neural circuitry: phasic vs tonic activity

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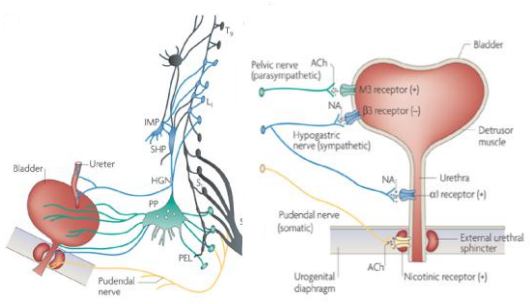

Fowler, Griffiths, de Groat Nat Rev Neurosc 2008

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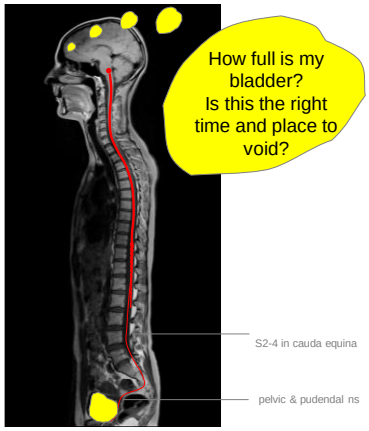
Spinal control

Storage

- *Bladder-to-urethra* procontinence guarding reflex
- Sympathetic mediated detrusor relaxation

Full bladder

- *Bladder-to-urethra* inhibitory reflex
- *Bladder-to-bladder* excitatory reflex
- These form part of the spinobulbospinal reflex which allows higher centres to exert control over voiding



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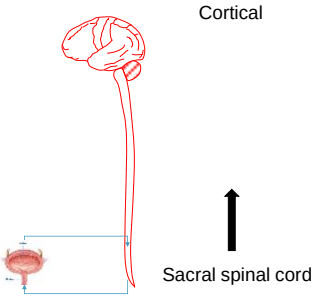
Emergence of central reflexes controlling LUT functions



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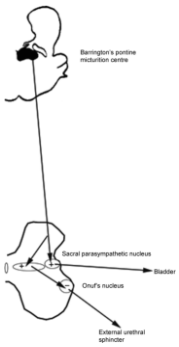

THE EFFECT OF LESIONS OF THE HIND- AND MID-BRAIN ON MICTURITION IN THE CAT.[1] By F. J. F. Barrington. From the laboratories of the Surgical Unit, University College Hospital Medical School, London. (With six figures in the text.)

(Received for publication 12th October 1924.)

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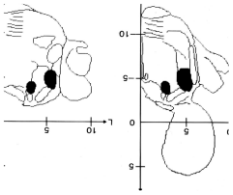
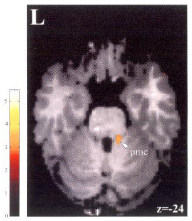
Pontine micturition centre = "Barrington's nucleus"

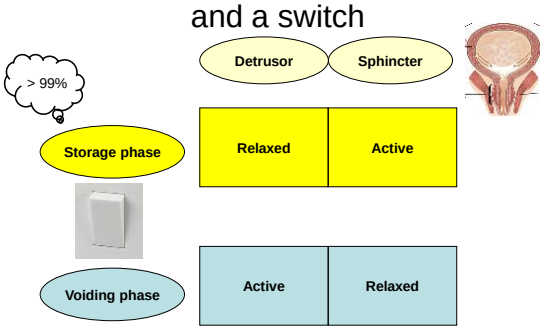


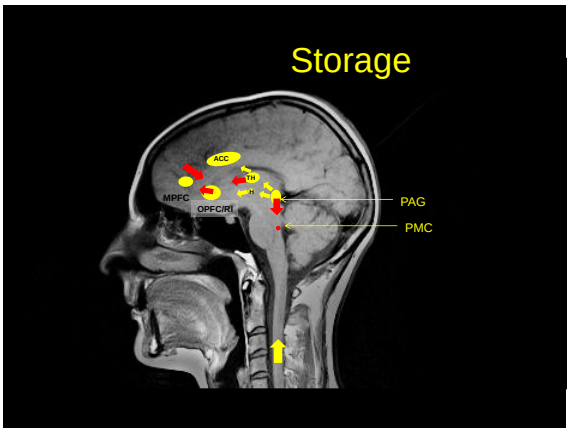
Griffiths, Holstege et al., 1990 in cat

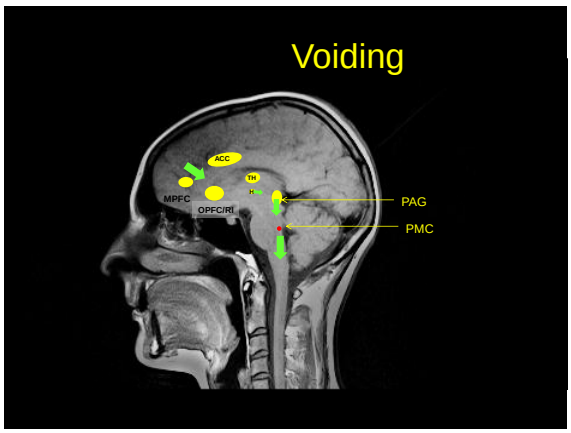


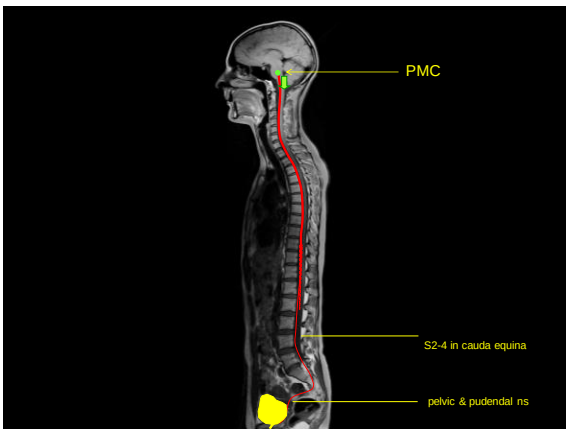
Blok et al, 1997

LUT control: two neural programs and a switch









Suprapontine
- Stroke
- Parkinson's Disease
- Tumours
- Trauma
- Dementias

Spinal
- Multiple Sclerosis
- Trauma
- Tumour

Sacral / Infrasacral
- Disc prolapse
- Tumour
- Pelvic nerve injury
- Small fibre neuropathy

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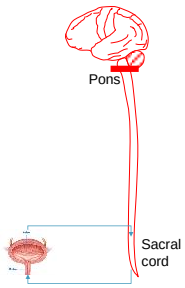
Suprapontine lesion



- Detrusor overactivity
- Intact neural programs ➔ synergic contraction of the detrusor and urethral sphincter muscles

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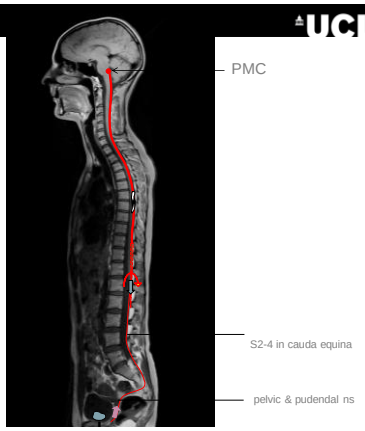
Spinal lesion



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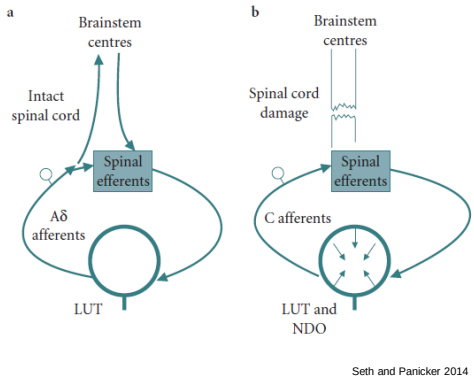

Seth and Panicker 2014

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Spinal lesion

- Involuntary bladder contractions
- Small capacity
- Incomplete bladder emptying

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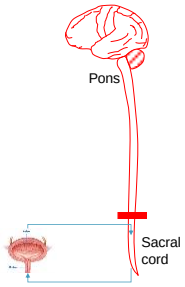
Detrusor sphincter dyssynergia

- Disrupted neural programs
- Detrusor muscle contracts concurrent with sphincter contraction

Sacral/Infrasacral lesion

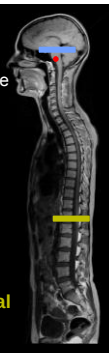


- Voiding difficulties
- Chronic retention
- Variable loss of bladder sensations

Suprapontine
Stroke
Parkinson's Disease
Tumours
Trauma
Dementias

Spinal
Multiple Sclerosis
Trauma
Tumour

Sacral / Infrasacral
Disc prolapse
Tumour
Pelvic nerve injury
Small fibre neuropathy

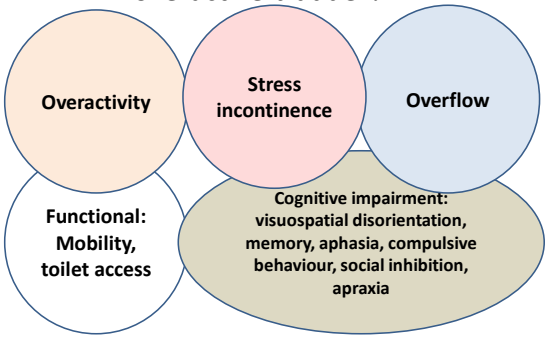


•Storage symptoms
•PVR: < 100mL
•Detrusor overactivity

•Storage / voiding symptoms
•PVR: usually elevated
•Detrusor overactivity, detrusor sphincter dyssynergia

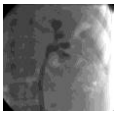
•Predominantly voiding symptoms
•PVR: elevated
•Often acontractile detrusor

Incontinence: is it always due to an overactive bladder?



The risk for upper urinary tract damage

	Upper tract dilatation	Risk for renal failure compared to general population
MS	8%	Same risk
Traumatic paraplegia	23%	5x
Neural tube defects	68%	8x



de Seze et al., 2007
Lawrenson et al., 2001

Neurological patients suffer from other problems as well!

Table 1 Respondents reporting symptomatic problems

Symptomatic problem	Respondents experiencing the problem ($n=2265$)	Respondents classifying impact of the problem as 'moderate' or 'high' ($n=2265$)	Respondents reporting symptom improvement on disease-modifying therapy ($n=266$)
Fatigue	96%	88%	41%
Balance and dizziness problems	92%	74%	27%
Loss of mobility	91%	79%	52%
Sensory problems	88%	54%	28%
Bladder problems	87%	70%	39%
Loss of memory and concentration	87%	52%	17%
Spasticity	82%	54%	34%
Vision problems	82%	41%	21%
Pain	81%	50%	50%
Bowel problems	74%	45%	36%
Sexual problems	70%	42%	33%
Tremor	68%	30%	35%
Speech and swallowing problems	68%	26%	42%

T L. Hemmett et al., QJM 2004

Conclusion

- The neural control of the bladder is widely distributed throughout the nervous system
- The processing of bladder sensation and the switching on of co-ordinated voiding requires the CNS to be intact
- "Neurogenic bladder"- one size *does not* fit all
- Suprapontine lesions- do not usually produce incomplete emptying
- Spinal lesions do
- Pattern of bladder dysfunction and outcome depends upon: site of lesion, nature of disease

Supporting self management of neurogenic bladder dysfunction - bladder training & transcutaneous posterior tibial nerve stimulation

Joanne Booth, PhD RN
Professor of Rehabilitation Nursing
Institute for Applied Health Research
Glasgow Caledonian University

Neurogenic bladder management

- Primarily conservative
  - ➢Timed bladder emptying by whatever means
  - ➢Controlled fluid intake
  - ➢Avoidance of UTIs

5th International Consultation on Incontinence, 2013, p 958

Self-management of neurogenic bladder dysfunction

Most common model of continence care:

- Less than 50% people consult formal health services
- Awareness and recognition of symptoms may be poor
- Not seen as major problem requiring treatment
- Avoid bothering doctor
- Poor knowledge of available options & where to seek help
- Fear of treatment, especially surgery
- Embarrassment
- Condition to be coped with not cured

Booth et al Dis & Rehab 2010, Hannestad et al European Urology2002, Stoddart et al Br J Gen Pract 2001.

What is self-management?

A decision-making process, which involves self-observation, symptom perception and labelling, judgement of severity and choice and assessment of treatment options *(Levin, 1977)*

Self-Monitoring

- Part of self-management process involving self-observation and interpreting findings.
- Predicated on awareness and perception of symptoms and deducing their meaning.

Supported self-management

- Alternative to patient trial and error.
- Patients helped to identify problems, make decisions, set goals, take appropriate actions and modify these actions as circumstances change.
- Self-management can increase patients' awareness of physical symptoms, empower patients to monitor the effects of behavioural changes aimed at improving chronic conditions, and help them feel better equipped to cope with illness.
- Success of self-management depends on development of self-efficacy—patients' belief in their ability to perform specific self-care activities and produce the desired result. ***Wilde et al. Self-Management of Urinary and Fecal Incontinence.* American Journal of Nursing, *2014, 114 (1), 38-45***
- Self-management interventions are most successful when patients are internally driven to participate in a collaborative process of care, and where the patient and nurse share responsibility for the outcomes
  - **Bodenheimer et al., 2002; Lorig & Holman, 2003.**

Successful self-management of chronic illness

3 processes:

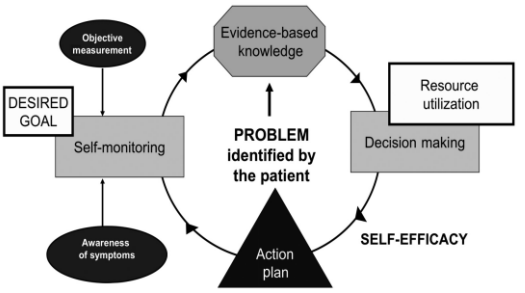
- *focusing on illness needs* by learning about the illness and taking responsibility for meeting related health care needs
- *making use of resources* for health care, as well as psychological, spiritual, social, and environmental support
- *living with the chronic illness* by processing emotions, adjusting to the illness and the "new normal," making practical lifestyle modifications, and striving for personal growth and satisfaction.

Schulman-Green, D., Jaser, S., Martin, F., Alonzo, A., Grey, M., McCorkle, R., et al. (2012). Processes of self-management in chronic illness. *Journal of Nursing Scholarship : An Official Publication of Sigma Theta Tau International Honor Society of Nursing / Sigma Theta Tau, 44*(2), 136-144.

Six self-management behaviours:

- identifying the problem
- seeking evidence-based knowledge
- making decisions about resource use and interventions
- developing and implementing an action plan
- self-monitoring
- setting and attaining goals

- Self-efficacy supports self-management behaviours and each behaviour, in turn, promotes self-efficacy



Developed by Tannenbaum, 2013

Does self-management of UI work?

In general population, not specifically those with neurogenic bladder or bowel dysfunction:

Decreased urine leakage	*Kincade 2007, Williams 2006, Dougherty 2002,*
Fewer episodes urine leakage	*Holroyd-Leduc 2011, Williams 2006, Diokno 2004, Dougherty et al 2002*
Improved urinary symptoms	*Brown 2007, Wagg 2007, Diokno 2004*
Improved quality of life	*Holroyd-Leduc et al 2011, Kincade et al 2007, Boyington et al 2005,*
Reduced symptom distress	*Boyington et al 2005*
Initiated self-treatment	*Tannenbaum et al 2010, Fransen et al 2008*
Increased help seeking behaviour	*Tannenbaum et al 2010, Milne 2000*
Decreased caffeine intake	*Kincade et al 2007, Dougherty et al 2000*
Increased fluid intake	*Dougherty et al 2002*

Supporting self-management of neurogenic bladder dysfunction

- Lifestyle changes
  - Fluid management – type, amount, timing,
  - Bowel/constipation avoidance
- Behavioural therapies
  - Voiding programmes
  - Bladder training
  - PFME
- Pharmacological
  - Anticholinergics
- Electrical stimulation

Scheduled voiding interventions

- Bladder training
- Prompted voiding
- Habit training/retraining
- Timed voiding

Common feature – schedule of voiding

Differences:
- Patient role – active or passive
- Voiding schedule adjustments – fixed, responsive, progressive
- Nature of patient education eg strategies to control urge, defer voiding, prevent stress leaks, goal setting, reinforcement techniques

Scheduled voiding

Voiding programme	Procedure	Target group
Timed voiding	Regular fixed-interval toilet use eg 3 hourly Passive patient Caregiver- initiated Aims to avoid incontinence	Cognitively impaired, physically impaired
Habit training/ retraining	Individualised toileting schedule developed from patient's natural voiding pattern, goal to pre-empt incontinence episodes. Passive patient Caregiver- initiated Aims to avoid incontinence	Cognitively impaired, Physically impaired
Prompted voiding	Active intervention with 3 stages: at fixed time points i) Person is asked if they wish to use toilet ii) Assistance to use toilet provided iii) Positive reinforcement /social approval for appropriate use of toilet given Active participation by patient Patient-initiated Aims to restore continence/normal bladder function	Cognitively impaired

Bladder training

- Training (activity/behaviour) to increase between-void intervals and increase bladder capacity
  - education about bladder function
  - urge suppression and urge control techniques
  - distraction exercises
  - pre-set voiding times with progressively increasing inter-void interval
  - may be fixed or responsive eg every hour regardless of desire to void; or defer once urge to void felt
  - self-monitoring and feedback

Evidence for BT/scheduled voiding programmes

- Limited and poor quality
- At best level B/C
- No consensus on choosing a voiding programme, patient suitability, methods, supportive care, bladder emptying intervals, reinforcement techniques, length of programme, outcome measures etc

Evidence on bladder training

- No trials investigating BT in neurological conditions/neurogenic bladders
- Seventeen trials on BT in women, not frail elderly. Total of 2462 women.
- Six trials provided no or minimal details about specific BT protocol used.
- Few trials, are small and of variable quality, providing minimal Level 1 evidence that BT may be effective for women with UUI, SUI, and MUI.
- Not enough evidence to determine if BT more effective than anticholinergics for UUI or DO.

BT programme variations

- Initial voiding interval varied between 30 minutes and two hours, with one hour being the most common interval.
- Adjustments to the voiding interval varied from 15 to 30 minutes, with 30 minutes the most common interval.
- Increases were made:
  - daily for inpatient regimens
  - after 48 hours of dryness
  - every four to five days
  - weekly if schedule was well-tolerated.
- Goals for optimal voiding interval varied from three to four hours.
- Voiding was
  - 'mandatory' with restriction of voiding in between assigned toileting times even if UI occurred
  - a scheduled voiding regimen with interruptions if urgency became unbearable
  - self-scheduling of voiding with a target goal to reach

BT programme variation (2)

- Use of distraction and relaxation urge control strategies
- Use of 'the knack' or pelvic floor muscle contraction
- Feedback techniques included self-monitoring, goal setting with feedback on progress and positive reinforcement
- Adjunctive fluid and caffeine adjustments
- Fluid restriction
- Advice on constipation prevention and management
- Healthcare professional supervision
- Length of BT programme

Transcutaneous posterior tibial nerve stimulation (TPTNS)

- **Neuromodulation**: Any medical intervention which acts on nerves to alter the neurotransmission processes of other nerves and alter the function of an organ – the bladder
- Stimulation can be electrical, magnetic, chemical
- Recent advances in technology and improved knowledge of micturition physiology have coincided with the growth of neuromodulation for the treatment of **urinary urgency**, **urge incontinence** and **non-obstructive urinary retention.**

TPTNS – how does it work?

- TPTNS modulates the sacral nerve plexus indirectly via the posterior tibial nerve, a mixed nerve branch of the sciatic nerve that originates from the same spinal segments as the nerves controlling the bladder and pelvic floor (S2-S4).
- TPTNS is a technique of peripheral electrical neuromodulation involving indirect stimulation of afferent neural pathways affecting detrusor function. Stimulation of afferent sacral nerves in either the pelvis or lower extremities increases the inhibitory stimuli to the efferent pelvic nerve and reduces detrusor contractility.
- Thought to have its effect via somatic afferent nerves which modulate efferent outflow to detrusor and reduce the sensation of urgency and detrusor overactivity.
- Exact mechanism of action has yet to be fully understood.
- Urodynamically increases in cystometric capacity shown and reduced detrusor contractility.

Evidence base for transcutaneous posterior tibial nerve stimulation for bladder dysfunction

- Nine studies, of variable quality
- Six RCTs involving 202 adults (183 women) with OAB.
- 3 case series involving 170 adults (158 neurogenic OAB)
- 48% – 68% reported cure or improvement

Suitable for?

Neuromodulation intervention only suitable for urgency-related bladder dysfunction

- Overactive bladder – neurogenic or idiopathic
- Urge UI
- Mixed UI
- Incomplete emptying/retention – evidence unclear but potentially positive
- NOT suitable for stress UI – Focus for electrical stimulation for stress UI is musculoskeletal – aims to increase muscle bulk to enhance power, speed and duration of pelvic floor contractions

Percutaneous posterior tibial nerve stimulation

- Effective therapy for OAB and lower urinary tract dysfunction
- Recommended by NICE for OAB treatment, as effective in short and medium term (Oct 2010)
- No safety concerns
- Second line treatment – after conservative approaches
- Requires significant time commitment by patient
- Cost implications – equipment, secondary care, specialist delivery time implications

Transcutaneous posterior tibial nerve stimulation

- Indications that it may be effective for bladder dysfunction (small trials)
- No safety concerns
- Could be first-line treatment – alternative to drugs
- Time commitment needed but can be self-managed at home
- Low cost and accessible
- Need definitive evidence of effect and application eg in stroke-related bladder and bowel dysfunction, Parkinson's, MS

TPTNS example protocol used in Treat-UI study

- Stimulation sessions delivered via two surface electrodes:
  - -negative electrode placed behind the medial malleolus
  - positive electrode 10cm proximal.
- Correct positioning determined by halux reaction.
- Stimulation protocol:
  - -fixed frequency of 10 Hz
  - -pulse width of 200ms
  - -continuous mode delivery
- Stimulation intensity determined by hallux reaction and participant comfort level (range 1-90mA).

TPTNS and self-management

TPTNS suitable for supported self-management:

- Demonstrate use with first session
- Patient self-administer under guidance and supervision
- Can lock stimulator
- Automatic switch off
- Recommend follow-up at 1 or 2 weeks and telephone contact to promote adherence

Brighter futures begin with GCU

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Thank you

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Notes