W33: Supporting Self-Management of the Neurogenic Bladder
Workshop Chair: Doreen McClurg, United Kingdom
09 October 2015 11:00 - 12:30

<table>
<thead>
<tr>
<th>Start</th>
<th>End</th>
<th>Topic</th>
<th>Speakers</th>
</tr>
</thead>
<tbody>
<tr>
<td>11:00</td>
<td>11:05</td>
<td>Introduction</td>
<td>Doreen McClurg</td>
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<td>11:05</td>
<td>11:20</td>
<td>Neurogenic bladder</td>
<td>Jalesh N. Panicker</td>
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<td>11:20</td>
<td>11:40</td>
<td>PFMT</td>
<td>Doreen McClurg</td>
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<tr>
<td>11:40</td>
<td>12:10</td>
<td>TPTNs, self-management</td>
<td>Jo Booth</td>
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<td>12:10</td>
<td>12:20</td>
<td>PFMT practical</td>
<td>Doreen McClurg</td>
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<td>12:20</td>
<td>12:30</td>
<td>Discussion</td>
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**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

Nursing, Midwifery and Allied Health Professions Research Unit, Glasgow.
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 Panicker
- 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

Doreen McClurg PhD MCSP
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Continence is a learned skill!

Development of Urinary Continence

Sufficient strength in the pelvic floor muscles and external urethral sphincter

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

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

Self-management – what do we mean?

- 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 healthcare 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

Functions of the pelvic floor

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

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
Pelvic floor muscles digital assessment

Piriformis

Obturator internus

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.
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/

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

Thank You

Doreen.mcclurg@gcu.ac.uk
Neural control of the lower urinary tract in health and disease

Jalesh N. Panicker MD, DM, FRCP
Consultant Neurologist and Honorary Senior Lecturer
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and UCL Institute of Neurology
Queen Square, London
United Kingdom

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

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

Emergence of central reflexes controlling LUT functions

How full is my bladder? Is this the right time and place to void?

Sacral spinal cord
LUT control: two neural programs and a switch

**Storage phase**
- Detrusor: Relaxed
- Sphincter: Active

**Voiding phase**
- Detrusor: Active
- Sphincter: Relaxed

Pontine micturition centre = “Barrington’s nucleus”

Griffiths, Holstege et al., 1990 in cat

Blok et al., 1997

PAG
PMC
TH
ACC
H
OPFC/RI
MPFC
Suprapontine lesion

- Detrusor overactivity

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

Spinal lesion

- Involuntary bladder contractions
- Small capacity
- Incomplete bladder emptying

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

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Incontinence: is it always due to an overactive bladder?

- Overactivity
- Stress incontinence
- Overflow
- Functional: Mobility, toilet access

- Cognitive impairment: visuospatial disorientation, memory, aphasia, compulsive behaviour, social inhibition, apraxia

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**The risk for upper urinary tract damage**

<table>
<thead>
<tr>
<th></th>
<th>Upper tract dilatation</th>
<th>Risk for renal failure compared to general population</th>
</tr>
</thead>
<tbody>
<tr>
<td>MS</td>
<td>8%</td>
<td>Same risk</td>
</tr>
<tr>
<td>Traumatic paraplegia</td>
<td>23%</td>
<td>5x</td>
</tr>
<tr>
<td>Neural tube defects</td>
<td>68%</td>
<td>8x</td>
</tr>
</tbody>
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**Neurological patients suffer from other problems as well!**

<table>
<thead>
<tr>
<th>Symptomatic problem</th>
<th>Respondents experiencing the problem (n=226)</th>
<th>Respondents classifying impact of the problem as ‘moderate’ or ‘high’ (n=226)</th>
<th>Respondents reporting symptom improvement on disease-modifying therapy (n=206)</th>
</tr>
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<tbody>
<tr>
<td>Fatigue</td>
<td>96%</td>
<td>88%</td>
<td>41%</td>
</tr>
<tr>
<td>Balance and dizzy problems</td>
<td>92%</td>
<td>74%</td>
<td>27%</td>
</tr>
<tr>
<td>Loss of mobility</td>
<td>91%</td>
<td>79%</td>
<td>12%</td>
</tr>
<tr>
<td>Memory problems</td>
<td>89%</td>
<td>76%</td>
<td>14%</td>
</tr>
<tr>
<td>Bladder problems</td>
<td>87%</td>
<td>90%</td>
<td>35%</td>
</tr>
<tr>
<td>Loss of memory and concentration</td>
<td>87%</td>
<td>52%</td>
<td>13%</td>
</tr>
<tr>
<td>Spatiality</td>
<td>82%</td>
<td>54%</td>
<td>24%</td>
</tr>
<tr>
<td>Visual problems</td>
<td>82%</td>
<td>41%</td>
<td>21%</td>
</tr>
<tr>
<td>Pain</td>
<td>81%</td>
<td>30%</td>
<td>30%</td>
</tr>
<tr>
<td>Bowel problems</td>
<td>74%</td>
<td>45%</td>
<td>36%</td>
</tr>
<tr>
<td>Sexual problems</td>
<td>70%</td>
<td>42%</td>
<td>33%</td>
</tr>
<tr>
<td>Tampax</td>
<td>66%</td>
<td>30%</td>
<td>43%</td>
</tr>
<tr>
<td>Speech and swallowing problems</td>
<td>46%</td>
<td>30%</td>
<td>47%</td>
</tr>
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**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

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
• Embarrassment


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.


• 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

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.


Brighter Futures begin with GCU

Brighter Futures begin with GCU

Brighter Futures begin with GCU

Brighter Futures begin with GCU
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

Does self-management of UI work?

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

- Decreased urine leakage
- Fewer episodes urine leakage
- Improved urinary symptoms
  - Caine 2000, Dougherty et al 2001
- Improved quality of life
  - Diokno 2004, Boyington et al 2005
- Reduced symptom distress
  - Boyington et al 2005
  - Dougherty et al 2002
- 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 2002
- 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

<table>
<thead>
<tr>
<th>voiding programme</th>
<th>Procedure</th>
<th>Target group</th>
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<tbody>
<tr>
<td><strong>Timed voiding</strong></td>
<td>Regular fixed-interval toilet use eg 3 hourly Caregiver-initiated Aims to avoid incontinence</td>
<td>Cognitively impaired, physically impaired</td>
</tr>
<tr>
<td><strong>Habit training/retraining</strong></td>
<td>Individualised toileting schedule developed from patient’s natural voiding pattern, goal to pre-empt incontinence episodes.</td>
<td>Cognitively impaired, Physically impaired</td>
</tr>
<tr>
<td><strong>Prompted voiding</strong></td>
<td>Active intervention with 3 stages: 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. Aims to restore continence/normal bladder function</td>
<td>Cognitively impaired</td>
</tr>
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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 e.g. 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
- Urges 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 halux 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

Thank you

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