Webinar title: Incontinence is not an option: Solutions for Bladder Management

Presenter/presenters:

**Kimberly Anderson-Erisman, PhD**
Director of Education
University of Miami & Miami Project to Cure Paralysis

**Jennifer French, MBA**
Executive Director
Neurotech Network
Jennifer French, MBA
Want to Ask a Question?
The Miami Project is dedicated to finding more effective treatments and, ultimately, a cure for paralysis resulting from spinal cord injury.

www.themiamiproject.org

Helping people regain life through neurotechnology

www.NeurotechNetwork.org

Focusing on education of and advocacy to access neurotechnology devices, therapies and treatments for people living with impairments, their care-givers and medical professionals.
Disclaimer

The information presented in this webinar is not meant to replace the advice from a medical professional. You should consult a health care professional familiar with your specific case, concerns and condition.

Neurotech Network and its representatives do not endorse, rate, sell, distribute, prescribe, administer or recommend any products, procedures or services. We highly suggest for you to take information to a trained medical professional familiar with your case to discuss options that are best for you.
Webinar Agenda

- Introduction of urinary tract anatomy
- Complications from Poor Bladder Management
- Review options for people living with SCI/D
  - Catheterization/voiding techniques
  - Pharmaceuticals
  - Medical Devices
- Investigational & Clinical Trial options
- Resources to get for you to learn more
Bladder function consistently ranks as one of the most important items to regain function in people with SCI.

Other Studies

  Pain, bowel, **bladder**, sexual, walking
  Functional mobility (transfers, wheelchair use), dressing, grooming
Furlan et al (review 2006)
  Motor, **bladder**, bowel, sexual, pain
  Bowel, **bladder**, walking,
Simpson et al (2012; SCIRE systematic review)
  Motor (arm/hand, mobility), bowel, **bladder**, sexual
The Bladder & SCI/D

- Overview
  - Brief overview of urinary anatomy and physiology
  - Types of voiding dysfunction
  - Classification of bladder management methods
Brief overview of urinary anatomy and physiology

Slide provided by Melissa Schmitt, Cleveland FES Center
Control of the Bladder

www.niddkh.nih.gov
Voiding Dysfunctions after SCI

Hypertrophy

Slide provided by Melissa Schmitt, Cleveland FES Center

http://ajprenal.physiology.org/content/304/7/F1020
Dyssynergia

Neurogenic Detrusor Overactivity

Bladder - Overactive

Sphincter - Underactive
Complications from Poor Bladder Management

- Source of infection, UTI
- Renal injury or failure
- Urinary tract damage
- Autonomic dysreflexia*
- Loss of Independence
- A smelly, stinky mess
Autonomic Dysreflexia
(Hyper-reflexia)

- **Sympathetic Nervous System**
  - thoraco-lumbar (T5-L2 major splanchnic outflow)
  - “fight or flight” (release epinephrine & norepinephrine)
  - vasoconstriction
  - Increase heart rate

- **Parasympathetic Nervous System**
  - Cranio-sacral
  - Vasodilation
  - Decrease heart rate

- Negative feedback loop
Noxious stimulus below the level of injury

Signal cannot reach brain

Afferent input to SC, however, triggers a sympathetic splanchnic response, which induces vasoconstriction – BP increases rapidly. Also triggers release of adrenal catecholamines.

Intact carotid & aortic baroreceptors detect rising BP

Brain responds to high BP:
1. Slows heart rate via vagal nerve
2. Triggers sympathetic inhibitory outflow, which induces vasodilation, but signal only reaches areas above level of lesion
3. Thus, continued vasoconstriction below level of lesion

Leads to an uncontrollable cycle of continually increasing BP and decreasing HR, which could result in stroke, hemorrhage, or death.
Treating AD

- Sitting position to reduce ICP.
- Identify noxious stimulus and eliminate it
- If stimulus cannot be identified and/or eliminated, go to Emergency Room immediately.
- Monitor BP (>160 systolic)
- Careful administration of Nifedipine, nitro paste, or other anti-hypertensives
- Must make sure BP does not bottom out
Goals of Bladder Management

1. Preserve upper tract
2. Minimize lower tract complications
3. Compatibility with the person’s lifestyle
Bladder Management Methods

Intermittent Catheterization

Crede/Valsalva Maneuver

Indwelling Catheterization

External/Condom Catheter

Slide provided by Melissa Schmitt, Cleveland FES Center
Bladder Management Methods

**Medications**
- Alpha-blockers (reduce urethral resistance)
- Botulinum toxin (Botox)

**Reflex Voiding**

**Surgical Interventions**
- Endourethral stents
- Transurethral sphincterotomy
- Bladder augmentation
- Continent urinary diversion
- Cutaneous ileovesicostomy

Slide provided by Melissa Schmitt, [Cleveland FES Center](https://www.clevelandfescenter.com)
Strategies under development

http://www.spinalsingularity.com/

- Semi-permanent
- Fully internal
- Smart catheter – pressure sensor
Medical device: Finetech-Brindley and VOCARE

- FDA & CE Mark approved
- Requires surgery and dorsal rhizotomy
- Provides 3 functions — bowel, bladder, erection.
- On-demand function – user could activate and shut down stimulation
- **Finetech Medical**
Medical device: Sacral Nerve Stimulation

- Simple implantation
- Commercially available for overactive bladder management
- Also can be implanted for fecal incontinence
- Before permanent implantation, a trial lead can be implanted
- Medtronic Interstim®
- Axonics Sacral Neuromodulation
Medical Device - Tibial Nerve Stimulation

- Congentix, Urgent PC
- Nuviant Medical
- Medtronic, NURO
- StimGuard
- BlueWind Medical

Uses percutaneous electrodes to control the bladder by stimulating the tibial nerve in the lower leg.
Medical Device: Pelvic Floor Stimulation

- Liberty® from Utah Medical Products
- Minnova® from Empi, Inc
- evadri from Biomation
- Pelvic Muscle Traine® from Athena
- NeoControl® from Kitalpha
- InWave Zynex Medical
- Stiwell med4 from Otto Bock

Provides stimulation to the pelvic floor muscles to improve the opening and closing of the urethral
Investigational

- Epidural Stimulation
- Urethral stimulation, CWRU
- Sphincter sensory stimulation, CWRU
- Dermatome Stimulation, CWRU
- Pudendal Nerve Block stimulation
- FemPulse
Investigational: Genital Nerve Stimulation

- Clinical Trials
- 20 participants
- Bladder inhibition can be obtained at lower stimulation amplitudes than typically used

Reflexively inhibits the bladder by stimulating the dorsal penile or dorsal clitoral nerve – a very superficial nerve easily accessed through surface stimulation
Resources

• You may find devices in development at Clinical Trials.
  • There are many clinical trials being conducted in this area, including sacral, pudendal and tibial nerve stimulation to name a few. Visit Clinical Trials.gov.

• Cleveland FES Center: www.FEScenter.org

• Neurotech Network Fact Sheet for Bladder Management
  http://www.neurotechnetwork.org/factsheets/factsheet_urinary.html

• Neurotech Network Fact Sheet for Spinal Cord Injury
  http://www.neurotechnetwork.org/factsheets/factsheet_spinalinjury.html
Bowel Webinar Preview – May 5, 2016

• How does the bowel work?
• What happens after SCI?
• Importance of nutrition
• Medications that may help
• Technology to help you
• Complications to be aware of
• Resources to learn more
Kim Anderson-Erisman PhD, Director of Education, University Of Miami, Miami Project To Cure Paralysis

kanderson3@med.miami.edu

Jennifer French, MBA, Executive Director, Neurotech Network

jfrench@neurotechnetwork.org