

Research proposal

Does pelvic floor muscle training using neuromuscular electrical stimulation have an effect on the incidence of urinary tract infections in females with motor complete spinal cord injuries?

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Background	Evidence gap	Method
<p>Urinary tract infections (UTIs) in the Spinal Cord Injury (SCI) population have an incidence of 2.5 per individual per year (Siroky, 2002) and are the second most common cause of hospital admissions following a SCI (Garcia-Arguello et al., 2017). SCI bladder dysfunction and UTIs has been shown to have an effect on the quality of life (QoL) (Pannek & Wöllner, 2017). Exploring strategies to decrease UTI's in SCI's was highly rated as being a priority in a recent patient and public involvement study (Van Middendorp et al., 2016). UTIs are commonly treated with antibiotics, but there is rising concern regarding antibiotic resistance.</p>  <p>Fig 1. Neurogenic bladder in SCI (amended from Panicker et al., 2015).</p>	<p>There is no published research exploring PFMT in management for UTIs in the NB population. A study 20 years ago by De Paepe et al. (1998) found that up to 6 months of PFMT (active exercise, relaxation and positioning) on 42 girls with non-neurogenic bladder found that a programme of PFMT significantly successful in managing recurrent UTI's, especially for those with DSD. However there was no control group and all participants received low dose antibiotics and if OAB detected they were started on anticholinergics.</p> <p>Research exploring the use of PFMT in the SCI population is limited. Neuromuscular electrical stimulation (NMES) is commonly used in the SCI rehabilitation in patients' UMN lesions, and most effective with absent or weak muscles. There is no published research on the use of NMES for absent pelvic floor muscles and the most effective NMES settings used to decrease DO are also unknown.</p>	<p>Participants will be randomized into parallel groups with 1:1 allocation, stratified by International Standards for Neurological Classification of Spinal Cord Injury (ISNCSCI) grade and age. Both groups will receive advice and education consisting of oral fluid type and schedule (input and timed voids) and hygiene. The parallel groups will receive 12 weeks of 20 minute daily home based vaginally delivered NMES followed by 3 months rest (see figure 2). The parallel groups will receive difference settings of pulse frequencies, group A will receive 40Hz and group B 10Hz.</p>  <p>Figure 2, NMES for the pelvic floor application (Medicalopedia, 2018)</p>
Research question	Does PFMT using NMES have an effect on the incidence of UTI's in females with complete, UMN lesion SCIs?	
Current evidence	Research aim	Outcome measures
<p>The aetiology behind UTIs is not fully understood. Garcia Leoni and Esclarin De Ruz (2003) theorized that patients with neurogenic bladder (NB) are at increased risk who have incomplete voiding, increased intravesical pressure and use catheters. Increased intravesical pressure is commonly seen in patients with detrusor sphincter dysnergia (DSD) (Vigal & Hickling, 2016). In DSD the aim of management is to decrease detrusor over activity (DO) which is a commonly seen in upper motor neuron (UMN) lesions, (see figure 1). Pelvic floor muscle training (PFMT) is an established first line treatment for overactive bladder management. Vásquez et al. (2015) performed a 2 person case study with motor incomplete SCIs, finding that 6 weeks) using unaided exercise may be beneficial to improve incontinence and decrease DO.</p>	<p>The primary aim and outcome measure of this research is to investigate whether a programme of prescribed PFMT using NMES can influence the incidence of UTIs in females with motor complete UMN lesion SCI's and what settings have greatest effect.</p> <p>A Secondary outcome measures will review the effect on QoL of the intervention and adherence to NMES.</p>	<p>Retrospective history of UTIs will be recorded for the 6 month time prior to the initial assessment.</p> <p>Baseline and prospective data as follows will be collected at 0, 3 & 6 months,</p> <ul style="list-style-type: none"> - Patient to record 3 day voiding diary, patient reported symptomatic UTIs frequency and any residual or adverse effects. - Validated Incontinence Quality of Life (I-QOL) questionnaire
References	<p>- De Paepe et al. (1998). Pelvic floor therapy in girls with recurrent urinary tract infections and dysfunctional voiding. <i>British Journal of Urology</i>, 81(3), 109–113.</p> <p>- Garcia Leoni & Esclarin De Ruz. (2003). Management of urinary tract infection in patients with spinal cord injuries. <i>Clinical Microbiology and Infection</i>, 9(8), 780-785.</p> <p>- Garcia-Arguello et al. (2017). Infections in the spinal cord-injured population: a systematic review. <i>Spinal Cord</i>, 55(6), 526–534. doi:10.1038/sc.2016.173</p> <p>- Medicalopedia. (2018). What Is Electrical Stimulation and Is It a Solution for Female Incontinence? Retrieved December, 28 2019 from https://www.medicalopedia.org</p> <p>- Panicker et al. (2015). Lower urinary tract dysfunction in the neurological patient: clinical assessment and management. <i>The Lancet Neurology</i>, 14(7), 720-732.</p> <p>- Pannek & Wöllner. (2017). Management of urinary tract infections in patients with neurogenic bladder: challenges and solutions. <i>Research and Reports in Urology</i>, 9,121–127.</p> <p>- Siroky. (2002). Pathogenesis of bacteriuria and infection in the spinal cord injured patient. <i>The American Journal of Medicine</i>, 113(1), 67-79.</p> <p>- Van Middendorp, et al. (2016). Top ten research priorities for spinal cord injury: the methodology & results of a British priority setting partnership. <i>Spinal Cord</i>, 54(5), 341–346.</p> <p>- Vásquez, el al. (2015). Pelvic floor muscle training in spinal cord injury and its impact on neurogenic detrusor over-activity and incontinence. <i>Spinal Cord</i>, 53(12), 887-9.</p> <p>- Vigil & Hickling. (2016). Urinary tract infection in the neurogenic bladder. <i>Translational Andrology and Urology</i>, 5(1), 72-87.</p>	