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TITLE: Providing treatment options for rural and regional clients with dysfunctional voiding: Case study on paediatric intensive animated biofeedback.

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Author's Institution: The Mars Clinic for Children's Continence. South Brisbane.

Introduction

Paediatric dysfunctional voiding is a major problem that may result in symptoms such as wetting, urinary urge and urinary tract infections. Because dysfunctional voiding is thought to result when an overcompensating external urethral sphincter responds to inhibit the detrusor reflex¹, symptoms may also progress to compensatory detrusor hypertrophy, increased bladder pressures and vesicoureteral reflux. First-line treatment of dysfunctional voiding often involves urotherapy and retraining of pelvic floor dyssynergia². Biofeedback-based pelvic floor muscle retraining has been shown to be an effective treatment method combined with other non-invasive evaluations^{3,4}. Most treatment programs, however, are labour intensive, require a significant time commitment and are less accessible outside of tertiary centres.

The purpose of this study is to investigate whether an effective program of physiotherapy-led non-invasive urotherapy and animated biofeedback-based pelvic floor muscle retraining can be provided in a short, but intensive dosage.

Materials & Methods

Medical practitioner referral was received at the *Mars Clinic* for an 8-year-old patient with dysfunctional voiding. The patient was chosen for this case study trial because they lived in a regional centre and were unable to complete the standard protocol of one session weekly for 6-8 weeks. The patient had a long history of daytime wetting but had not undergone any previous treatment before presenting at the *Mars Clinic*.

The patient presented for an initial assessment and then returned two months later for repeat assessment and participation in an intensive regime of bi-daily sessions for 5 days. The intensive intervention included non-invasive urotherapy, Urostym™ biofeedback and Urostym Uroflow™. Urostym™ biofeedback uses surface electromyography to facilitate visualisation and control of pelvic floor muscle activity through a computer game. Urostym Uroflow™ Bluetooth technology enables simultaneous recording of surface electromyography and urine flow, with visual display of electromyography activity, flow rate and volume. Quantitative data comparisons were made between initial assessment and final treatment for post-void residual (PVR), wetting episodes, number and use of pads, pelvic floor and abdominal muscle activity during void, flow rates and voiding pattern.

Results

At baseline assessment, the patient showed similar characteristics to those of other patients with dysfunctional voiding patterns; staccato or intermittent flow pattern, reduced maximal flow rate, prolonged flow time, increased pelvic floor activity during void and high residuals. There was no difference in performance between the initial assessment and repeat assessment two months later.

Improvements from commencement of treatment to the end of treatment were demonstrated across all objective measures. PVR, which is strongly associated with dysfunctional voiding⁴, was shown to decrease from 120mls to less than 20mls (83% improvement; Graph 1). Flow time decreased from 30.9 seconds to 7.7 seconds (75% improvement).

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Flow patterns corrected from a staccato / intermittent curve to a normal bell-shaped curve (Figure 1)^{2, 4}. Pad usage progressed from frequent usage to no requirement. Incontinence episodes decreased from multiple episodes daily to only three episodes per week and no reported enuresis (Graph 2).

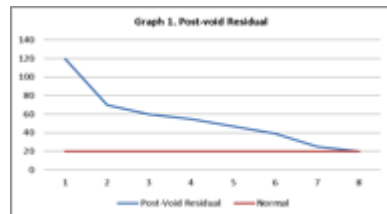
Conclusions

An intensive physiotherapy-led program of non-invasive urotherapy and animated biofeedback is effective in improving dysfunctional voiding. These outcomes are promising and, by reducing the burden of both travel and hospitalisation, may increase the accessibility of dysfunctional voiding treatment options for rural and regional patients.

Arguably, a single case study has limitations in its ability to generalise to the wider population and future research should focus on larger patient samples. We are confident of the likelihood of positive outcomes from further research investigating this intensive model of delivery. For this reason, data collection remains ongoing and additional participants are required for future analysis.

With an established link between dysfunctional voiding in children and ongoing problems in later life, research into dysfunctional voiding has large cost and public health implications. While medical management continues to improve, further research is required to refine the treatment process, investigate first-line funded conservative programs and provide treatment that can be accessed by the larger community.

Figures & Graphs



Graph 1: Post-void residual



Graph 2: Number of incontinence events

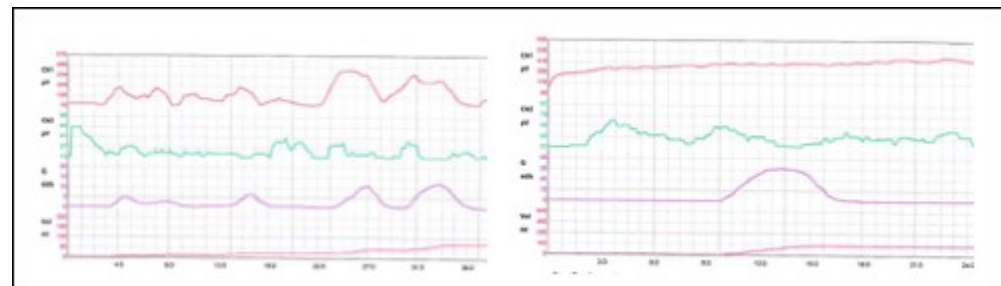


Figure 1: Comparison Uroflow™ pre- and post-intervention

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