

A PROSPECTIVE RANDOMIZED STUDY OF THE USE OF BIOFEEDBACK OR PARASACRAL TRANSCUTANEOUS ELECTRICAL NERVE STIMULATION IN CHILDREN WITH NON-NEUROGENIC VOIDING DYSFUNCTION

Hypothesis / aims of study

Voiding dysfunction may arise due to the onset of bladder contractions during its filling (bladder over activity) or lack of coordination between the bladder contraction and pelvic floor muscles relaxation (vesico-sphincter incoordination). As the incoordination leads to hyperactivity and vice versa, there is great interrelation between these two conditions causing similar symptoms. Treatment of voiding disorders has been replaced by training the pelvic floor muscles with surface electromyography biofeedback for proper perineal relaxation during voiding. Parasacral transcutaneous electrical stimulation is occasionally proposed for patients with urgency syndrome, by causing a reflex activation of the sympathetic system and parasympathetic inhibition (MESSELINK, 1999). Some children may have decreased urinary flow due to the inability to store urine, leading to uncoordinated flow.

The primary objective of the study was to compare the efficacy of techniques of emg biofeedback and parasacral transcutaneous electrical stimulation in children with lower urinary tract dysfunction (DTUI), and the secondary ones were to compare the efficacy of techniques for urgency urinary incontinence, urge incontinence, bedwetting, episodes of urinary infection and constipation; To assess the maximum urinary flow and the flow curve by flowmetry and post-void residual; To compare the effect of treatments on bladder capacity and voiding frequency obtained through voiding diary;

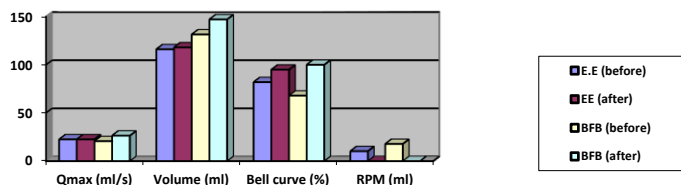
Study design, materials and methods

The study was approved by the Ethics Committee School of Medicine - São Paulo University. The study was carried out on the Voiding dysfunction center of Children's Hospital in São Paulo, with children aged 5 to 16 years old and diagnosis of voiding dysfunction. Sixty-two children were evaluated and according to the inclusion and exclusion criteria, the sample corresponded to 56, being 33 girls and 23 boys, with average age 9.2 years. Initial assessment was performed by clinical history, physical examination, voiding diary, nocturnal enuresis map, ultrasound with measurement of post void residual urine, uroflowmetry and voiding dysfunction score (DVSS).

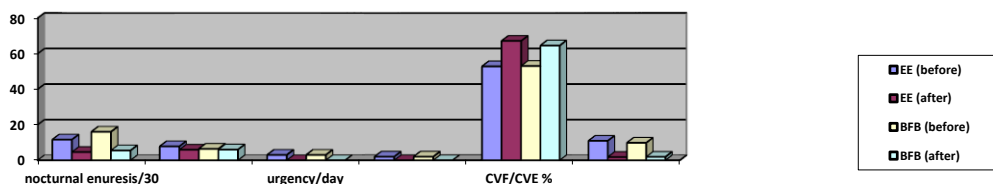
Children evaluated were randomized to G1 Biofeedback (n=28) and G2 electrical stimulation (n=28), and both groups received behavioral guidelines. Biofeedback group consisted of placement of EMG electrodes on the pelvic floor and abdomen. The rehabilitation of the pelvic floor muscles was based on short contractions and prolonged relaxation, no activity of abdominal muscles, in the sitting position, following the graph plotted on the computer screen. On parasacral transcutaneous electrical stimulation group, surface electrodes were placed in the sacral region (S2 – S4). The parameters used were 10Hz frequency, 700µs pulse width and intensity on sensory threshold, sessions were held 2x a week, 20 minutes every other day and at the end of each service uroflowmetry is carried out with the child's participation. Initial assessment was repeated after the treatment and reassessed at the end of 6 months and considered as cure, improvement higher than 50% or treatment failure.

Results

Overactive bladder type voiding dysfunction was observed in 70% of the cases, 20% corresponded to the type of vesico-sphincter incoordination and 10% were associated, but with prevalence of overactive bladder. Regarding symptoms, nocturnal enuresis was observed in 64%, constipation 43% and 34% urinary infection.



Graph 1: Variables obtained by uroflowmetry and post-void residual urine measured by ultrasound



Graph 2: Variables obtained by the map of bedwetting, voiding diary and voiding dysfunction score (DVSS)

Interpretation of results

Parameters of uroflowmetry showed better performance in the biofeedback group, whereas voiding diary variables, number of episodes of nocturnal enuresis and voiding dysfunction score (DVSS cutoff 6) had similar results in both groups. Constipation,

urinary infection and decreased post-voiding residue were resolved in both intervention groups. Regarding the number of sessions, children from biofeedback group require a smaller number (11 sessions) compared to electrical stimulation group (18 sessions).

The treatment of voiding disorders with drugs has been replaced by training the pelvic floor muscles with surface electromyography biofeedback for proper perineal relaxation during voiding. Kibar and colleagues (2007) treated 78 children with voiding dysfunction, with an average of six sessions of biofeedback and found that 82% improved nocturnal enuresis, 70% urge incontinence, 78% constipation, 76% frequency, 81% staccato flow, 82% overactive bladder and 80% urinary tract infection. Parasacral transcutaneous electrical stimulation is occasionally proposed for patients with urgency syndrome. Lôrdelo and colleagues (2009) conducted parasacral stimulation in children with overactive bladder and they achieved 62% complete symptom improvement.

Regarding the criteria for cure, children treated with parasacral transcutaneous electrical stimulation had 72% of cure whereas biofeedback group resulted in 50% of cure and 36% in improvement higher than 50%. Treatment failure was similar in both groups, corresponding to 14%.

Concluding message

Biofeedback and parasacral electrical stimulation techniques are effective for the treatment of voiding dysfunction in both cases with a prevalence of detrusor overactivity and vesico-sphincter incoordination. This efficacy translates into improvement in daytime and nighttime symptoms, constipation, episodes of urinary tract infection, improvement in uroflowmetry and decreased post-void residual. Both techniques result in optimal results, although although biofeedback requires fewer sessions.

References

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Disclosures

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