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452

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EMG BIOFEEDBACK OR PARASACRAL TRANSCUTANEOUS ELECTRICAL NERVE STIMULATION IN CHILDREN WITH LOWER URINARY TRACT DYSFUNCTION: A PROSPECTIVE AND RANDOMIZED TRIAL

Hypothesis / aims of study
Electromyography (EMG) biofeedback is an effective treatment for children with lower urinary tract dysfunction (LUTD) especially those with bladder-sphincter dysfunctional voiding (1, 2). Similarly parasacral transcutaneous electrical nerve stimulation (PTENS) is a well established treatment option for overactive bladder in children (3). However there is a lack of controlled studies comparing these treatments for different voiding dysfunction in children.

Study design, materials and methods
A prospective and randomized study to evaluate the efficacy of EMG biofeedback and PTENS for the treatment of children with non-neurogenic dysfunction voiding. The study involved 64 children, 43 girls and 21 boys, average age of 9.39 years. Initial evaluation consisted in history, physical examination, urine analyses, voiding diary, uroflowmetry and ultrasound. It also included incontinence and quality of life questionnaires. The children were divided into two treatment groups independent of the predominant type of dysfunction voiding (dysfunctional or overactive bladder): biofeedback group and PTENS group. The criteria for assessing the effectiveness of techniques were resolution of daytime and nighttime symptoms including urinary leakage, improvements in voiding diary and changes in uroflowmetry. The assessment also included pre and post treatment questionnaires (DVSS - Dysfunction voiding symptom score), quality of life (QOL). We also analyzed the presence of constipation and number of episodes of urinary tract infection (UTI) before and after treatment.

Results
The study based only in non-invasive tests we observed a prevalence of overactive bladder (OAB) in 64.1% , dysfunctional voiding in 21.9% and 14% in combination. Regarding daytime symptoms 54.9% of children treated by EMG biofeedback had a complete response and 60.6% in the PTENS group. The results were similar between the two groups (p = 0.483). The same have been observed in the night time incontinence with complete resolutions in 29.6% and 25% respectively (p = 0.461) (table 1). Analyzing the voiding diary, uroflowmetry and DVSS questionnaires both groups had significant improvement (p = 0.001) after treatment. However the QOL questionnaire did not show differences in both groups before and after treatment (p = 0.959 and p = 0.065) (table 2). In the evaluation of constipation, after treatment we observed a decrease from 61.3% to 19.4% (p = 0.002) in EMG biofeedback group and from 33.3% to 6.2% (p = 0.013) group in PTENS group. The number of sessions to obtian such results was lower in the biofeedback group if compared to PTENS group (p< 0,05)

Interpretation of results
In our study there was a prevalence of overactive bladder, and the PTENS group had a complete response when compared to the biofeedback group but no significant difference between groups. Physical therapy has been the first line of choice for children with LUTD, with great scientific support to the effectiveness of the main techniques available Biofeedback requires participation and collaboration of children to the appropriate relearning and PTENS does not require participation in its application. Both techniques show great results on the treatment of the symptoms of LUTD. PTENS can also be applied in some non collaborative children with attention deficit

Concluding message
Both techniques EMG biofeedback and the PTENS are effective for treating LUTD. EMG biofeedback seems to require a lower number of sessions in order to obtain similar results of the PTENS.

Table 1: Response treatment

Variables	Biofeedback n (%)	PTENS n (%)	p-valor
Daytime improves			
Complete response	17 (54,9)	20 (60,6)	0,483 *
Partial response	13 (41,9)	10 (30,3)	
No response	1 (3,2)	3 (9,1)	
Nighttime improves			
Complete response	8 (29,6)	6 (25,0)	0,461 *
Partial response	10 (37,1)	6 (25,0)	
No response	9 (33,3)	12 (50,0)	

(*)Chi-square test(**)Fisher 's exact test

Table 2: pre and post treatment groups

Variables	Biofeedback			PTENS		
	Pre	Post	p-valor	Pre	Post	p-value
	Média ± DP	Média ± DP		Média ± DP	Média ±DP	
Flow maximum (ml/s)	20,49 ± 7,27	26,77 ± 7,60	**<0,001***	23,34 ± 12,11	23,73±8,43	0,844*
Bladder capacity %	59,23 ± 17,22	67,43 ± 21,43	**0,020***	59,52 ± 20,09	72,06±20,29	**<0,001***
Maximum capacity %	179,84 ± 59,40	219,38 ± 75,70	**0,005****	183,94 ± 66,00	235,15±90,45	**<0,001***
Frequency	7,47 ± 2,38	6,22 ± 1,23	**0,049****	8,27 ± 2,66	6,39±1,34	**<0,001****
Urgency	2,94 ± 1,78	0,25 ± 0,69	**<0,001****	2,85 ± 1,72	0,18±0,46	**<0,001****
Diurnal incontinence	1,94 ± 1,50	0,14 ± 0,39	**<0,001****	1,85 ± 1,48	0,12±0,33	**<0,001****
DVSS	10,20 ± 3,16	2,22 ± 2,60	**<0,001***	10,18 ± 3,31	2,03±2,53	**<0,001***
QoL	53,58 ± 8,90	54,74 ± 7,38	0,959*	50,38 ± 10,82	53,85±8,61	0,065*

(*)Paired Student t test(**) Wilcoxon

References

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Disclosures

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