

Commentary to “Animated Biofeedback: An Ideal Treatment for Children with Dysfunctional Elimination Syndrome”

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Dear Editor

According to the International Children's Continence Society guidelines, bladder and bowel dysfunction (BBD), formerly called dysfunctional elimination syndrome, is defined as concomitant bladder and bowel disturbances and parallel dysfunction of these two systems which can be subcategorized into lower urinary tract dysfunction and bowel dysfunction [1]. Bladder and bowel function are linked in many ways and both organs are innervated by the sacral nerves. Both systems have a common embryologic origin and close physical proximity to each other. Therefore, concurrent management of both systems is of a great importance. Biofeedback therapy and pelvic floor muscle (PFM) exercises are reported as unique techniques to improve the emptying of bladder and bowel through retraining the PFM and developing voluntary control of the two systems [2].

We reported our experience using animated biofeedback modality in combination with PFM exercises in the treatment of children with BBD. The study showed considerable improvements in both systems after treating the affected children. The significant improvement in post-voided residue (PVR), maximum and average urine flows as well as fecal soiling episodes and constipation after biofeedback therapy was reported in our study ($P < 0.05$) [3]. Nighttime wetting was improved in 64% of patients 1 year after biofeedback therapy. Abnormal voiding pattern were normalized to a bell-shaped in 92.5% and 85% of patients at 6 months and 1 year follow up, respectively. Constipation symptoms improved in 68% of patients in biofeedback group and 40% of patients in non-biofeedback group 6 months after the treatment ($P < 0.01$). Fecal soiling resolved in 100% of patients who had this problem in biofeedback group but only in 20% of patients in non-biofeedback group ($P < 0.05$).

Biofeedback in urology was introduced by Maizels et al. as a new approach to sphincteric dysfunction during voiding [4]. Nowadays, biofeedback is commonly used as an outpatient procedure, and a novel technique that have been introduced as an attractive treatment method for pelvic floor rehabilitation in BBD. Animated biofeedback was introduced by McKenna et al. as an interactive modality resulted in promising improvements of various voiding and bowel symptoms [5]. The relationship between vesicoureteral reflux and BBD is well known. The impact of biofeedback therapy on reflux resolution rates in patients with BBD was studied by Palmer et al. [6]. The authors found that the resolution rates of low grade reflux in children after biofeedback treatment were higher than historical resolution rates in these patients. Vasconcelos et al. [7] found that the episodes of incontinence, urinary tract infections and PVR can be reduced by biofeedback in 56 children with voiding dysfunction. Kibar et al. reported their experience on resolution of PVR in 64.5% of the patients who were treated with biofeedback [8].

Recently, we studied the effects of biofeedback therapy on improvement of non-neuropathic underactive bladder (UAB) in children [9]. UAB was defined as impaired detrusor contractility and the need to increase intra-abdominal pressure for complete voiding [1]. Children with UAB usually have low voiding frequency, episodes of

hesitancy, urge incontinence or overflow incontinence, a large-capacity bladder with incomplete emptying and high PVR [1]. The study demonstrated that mean number of voiding episodes was significantly increased after biofeedback therapy, compared to only standard urotherapy. In addition, a significant improvement in PVR, voiding time and maximum urine flow after biofeedback therapy was observed [9]. Moreover, we found that combination of animated biofeedback and PFM exercises effectively would improve sensation of bladder fullness and contractility in children with UAB due to voiding dysfunction.

Lower urinary tract dysfunction is a concern for children, their parents and pediatric urologists. The principle of biofeedback would involve collecting information about a specific biological pattern in the child and then developing voluntary control techniques to modulate the functional pattern [10].

In recent years, biofeedback therapy for PFM has been increasingly used as an established treatment method in children with different lower urinary tract dysfunction. This technique can improve urinary incontinence, urinary tract infection, PVR and constipation by increasing children's awareness of their PFM and synergetic action of abdominal muscles with PFM [6,7].

In our experience with biofeedback and PFM exercises, not only improvement of lower urinary tract dysfunction was observed, but also improvement of upper urinary tract dysfunction was found. In our newest and unpublished study, the resolution of non-refluxing and non-obstructive hydronephrosis after biofeedback therapy in children with dysfunctional voiding has been reported.

Acknowledgement

We thank Mrs. Safieh Lotfi for her precise final linguistic revision of the commentary.

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Received October 31, 2016; Accepted November 16, 2016; Published November 23, 2016

Citation: Sharifi-Rad L, Ladi-Seyedian SS, Kajbafzadeh AM (2016) Commentary to “Animated Biofeedback: An Ideal Treatment for Children with Dysfunctional Elimination Syndrome”. *Int J Neurorehabilitation* 3: 231. doi: 10.4172/2376-0281.1000231

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