Original Article

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Pelvic Floor Muscle Exercise for Paediatric Functional Constipation

Paediatrics Section

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ABSTRACT

Introduction: Functional constipation (FC) is one of the most common gastrointestinal problems among children. This study was designed to investigate the effectiveness of pelvic floor muscle exercise on treatment of FC.

Materials and Methods: In this study which was conducted in Children's Medical Center, children with a diagnosis of FC (aged 4-18 y) who did not respond to medical treatment, performed sessions of pelvic floor muscle exercise at home twice a day for 8 wk. Frequency of defecation, overall improvement of constipation, stool withholding, painful defecation and stool consistency were measured at the final week of the intervention compared to baseline.

Results: Forty children (16 males, 24 females mean age 5.6±1.03 y) completed the 8-wk exercise program. Subjective overall improvement of the symptoms was present in 36 patients (90%). The changes in stool frequency, stool diameter and consistency were statistically significant. However, there were no statistically significant differences in the stool withholding, fecal impaction, fecal incontinence and painful defecation.

Conclusion: Pelvic floor muscle exercise is an effective non-pharmacologic treatment for Paediatric FC.

Keywords: Defecation frequency, Gastrointestinal problems, Non-pharmacologic treatment

INTRODUCTION

Functional constipation (FC) is one of the most common gastrointestinal conditions in Paediatric practice with an estimated prevalence ranging from 0.7% to as high as 29.6% [1]. It is responsible for 3-5% of outpatient visits and nearly 25% of all referrals to Paediatric gastroenterologist clinics [2,3]. It is a debilitating condition associated with a variety of physical and emotional problems, resulting in negative effects on quality of life of affected children [4].

FC has a multi-factorial pathophysiology mainly consisting of stool withholding (SW) and delayed colonic transit [5]. However, the exact mechanism still remains unknown. It has been hypothesized that SW may play a central role in the pathophysiology of FC. It is supported by the fact that a vast majority of constipated children who are refractory to standard medical interventions show SW maneuvers [6]. Hence, interventions aiming to cease SW are potential treatments for FC.

There are several treatment options available for FC, including a combination of laxative administration and behavioral modifications. However, 30% of patients remain symptomatic despite aggressive medical treatment [7].

Constipated children are usually advised to increase their daily physical activity. However, to the best of our knowledge, the use of physical exercise as a therapeutic strategy has not been studied. The present study was designed to evaluate the effectiveness of a physical exercise program for the pelvic floor in constipated children refractory to standard medical treatment.

MATERIALS AND METHODS

Children with chronic constipation aged 4 to 18 y referred to Children's Medical Center (affiliated hospital of Tehran university of medical sciences) from January 2012 to January 2013 were eligible for enrollment if they had a diagnosis of FC and had previously tried and failed adequate treatment for constipation, including toilet training and laxative therapy. The diagnosis of FC was confirmed using The Rome III Criteria for Functional Constipation in Children and Adolescents [8] [Table/Fig-1]. Children with gross motor deficits and those with organic or metabolic causes of constipation were excluded.

After obtaining verbal assent from children and written informed consent from parents or legal guardians, we instructed the patients to perform sessions of pelvic muscle exercise at home twice a day for 8 wk. The exercise consisted of walking in a semi-sitting (squatting) position for 5 min under supervision of parents. Exercise duration was increased 5 min per week, for two consecutive weeks and remained the same for the next six weeks. In order to motivate the patients and increase adherence to treatment, they were allowed to carry the toy of their choice in a playful manner during the exercise. Finally, patients were re-evaluated for the symptoms of constipation by a blinded physician in a follow up visit. Our primary outcome measure was the change in defecation frequency at the final week of intervention compared to the baseline. Secondary outcomes were subjective and included overall improvement of constipation, stool withholding, painful defecation and stool consistency.

STATISTICAL ANALYSIS

Data analysis was performed using SPSS version 18 (SPSS Inc., Chicago, IL, USA). The independent sample t-test used for assessment of continuous variables, as well as Chi-square (X^2) test and Fisher's exact test for assessment of categorical variables. p-value < 0.05 was considered statistically significant.

RESULTS

Forty-four constipated children (19 male, 25 female) were enrolled in this study. Forty patients (16 male, 24 female) completed the 8 wk exercise program successfully. The mean age was 5.6±1.03 y. Thirty six patients (90%) reported an overall improvement of symptoms. Stool frequency less than three times per week was present in 2

Stool frequency equal to or fewer than two or fewer per week
History of hard stool or painful defecation
History of very large stool passage
History of retentive posturing at least once a week
History of large fecal mass in rectum
History of fecal soiling at least once a week

[Table/Fig-1]: The Rome III Criteria for Paediatric Functional Constipation*
Two or more of the following criteria in a child aged ≥4 years who does not meet the criteria for irritable bowel syndrome
*Criteria fulfilled ≥1 per week for ≥2 months prior to diagnosis

patients (5%) after participation in the exercise program, compared to 39 patients (97.5%) in the baseline evaluation (p<0.01). Twenty one patients (52.5%) reported hard or very hard stool in the baseline evaluation but stool consistency was soft in all of the patients after 8 wk exercise program (p<0.001). Twenty patients (50%) had a huge stool diameter before treatment and it was present in only one patient (2.5%) after the treatment (p<0.05). The number of patients who had SW, fecal impaction, fecal incontinence and painful defecation decreased after participating in the exercise program. However, the changes were not statistically significant. An overview of the baseline characteristics and outcomes is presented in [Table/Fig-2].

Symptom	Baseline	After	p-value
	n (%)	n (%)	
Defecation frequency <3 times per week	39 (97.5%)	2 (5%)	<0.01
Fecal incontinency	24 (60%)	4 (10%)	0.136
Hard Stool	21 (52.5%)	0	<0.001
Huge diameter with clogging	20 (50%)	1 (2.5%)	<0.05
Painful defecation	35 (87.5%)	1 (2.5%)	1
Fecal impaction	35 (87.5%)	1 (2.5%)	1
Stool withholding	28 (70%)	3 (7.5%)	0.541

[Table/Fig-2]: Symptoms at base line and after 8-week physical exercise

DISCUSSION

This study showed that pelvic physical exercise is an effective treatment for Paediatric FC with subjective overall improvement in 90% of the patients. In addition, patients reported significant improvement of defecation frequency, fecal consistency and decrease in fecal diameter. In outpatient clinics, constipated children are usually advised to increase their physical activity. It is indeed surprising that the use of a standard physical exercise as a non-pharmacologic treatment for FC has been ignored. In addition, studies evaluating the relationship between physical activity and FC have shown controversial results.

A recent cohort study evaluated the relationship between physical activity and FC in preschool children. This study showed that 2 years old children with top tertiles of mild, moderate and total physical activity were at lower risk of developing FC at the age of four. Accordingly, authors concluded that physical activity is associated with a decreased risk of functional constipation in the preschool-aged children and suggested a time dependent effect [9].

Moreover, another study in Hong Kong showed that insufficient physical activity is associated with a higher risk of constipation in adolescents and increasing physical activity may relieve the symptoms in patients [10].

In contrast, in a study conducted by Jennings et al., the association between physical activity, diet, fluid consumption and FC in Pre-adolescent children was evaluated and showed that physical activity is significantly higher in children diagnosed with FC [10]. These controversies may be explained partly by the fact that above mentioned studies used different diagnostic criteria, and that participants differed in age group. The goal of this exercise program was to treat FC through strengthening the pelvic floor muscles and promoting daily physical activity of the patients. Long exercise durations were avoided since it has been proposed that vigorous activity may aggravate constipation through consequent dehydration [11]. We chose semi-sitting (squatting) position for the exercise since it is the ideal position for defecation and the opposite of the withholding maneuvers [12]. In addition, this position is compatible with the toilet training in Iranian culture. However, the changes in SW and fecal impaction after 8 wk of exercise were not statistically significant compared to the baseline. The mechanism involved in SW seems to be far more complicated than it can be stopped by a physical exercise alone. Moreover, fecal impaction is accompanied by severe rectal dilation, reversal of which is gradual.

LIMITATIONS

First of all, the study design was non-controlled and the number of patients involved was relatively small. The short duration of the study was another limitation which must be addressed.

CONCLUSION

Pelvic floor muscle exercise is an effective non-pharmacologic treatment for Paediatric FC. Randomized controlled trials are needed to confirm our findings.

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