

## Biofeedback-guided pelvic floor exercise therapy for obstructive defecation: An effective alternative

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### Abstract

**AIM:** To compare biofeedback-guided pelvic floor exercise therapy (BFT) with the use of oral polyethylene glycol (PEG) for the treatment of obstructive

defecation.

**METHODS:** A total of 88 subjects were assigned to treatment with either BFT ( $n = 44$ ) or oral PEG ( $n = 44$ ). Constipation symptoms (including difficult evacuation, hard stool, digitation necessity, incomplete emptying sensation, laxative dependence, perianal pain at defecation, and constipation satisfaction), Wexner Scores, and quality of life scores were assessed after 1, 3, and 6 mo.

**RESULTS:** At the 6 mo follow-up, the symptoms of the BFT group patients showed significantly greater improvements compared with the PEG group regarding difficult evacuation, hard stools, digitation necessity, laxative dependence, perianal pain at defecation, constipation satisfaction, Wexner Constipation Score, and quality of life score ( $P < 0.05$ ). The quality of life score of the BFT group at the final follow-up time (6 mo) was  $80 \pm 2.2$ . After a complete course of training, improvements in the clinical symptoms of the BFT group were markedly improved ( $P < 0.05$ ), and the Wexner Constipation Scores were greatly decreased compared with the oral PEG group ( $P < 0.05$ ).

**CONCLUSION:** We concluded that manometric biofeedback-guided pelvic floor exercise training is superior to oral polyethylene glycol therapy for obstructive defecation.

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**Key words:** Obstructive defecation; Biofeedback; Polyethylene glycol

**Core tip:** Until now, there have been no standard treatment methods for obstructed defecation. Although we believe biofeedback is more beneficial for obstructive defecation, recent controlled studies indicate that the efficacy of manometric biofeedback treatment for ob-

structive defecation remains controversial. The main purpose of this research was to assess and compare the quality of life scores of patients diagnosed with obstructive defecation following treatment with biofeedback therapy or oral polyethylene glycol management. Biofeedback had the clear effect of teaching patients how to squeeze and relax their anorectal and pelvic floor muscles during defecation. The data in this study show a clear superiority of biofeedback related to oral polyethylene glycol for the treatment of this subtype of constipation. If this research was extended to large multicenter randomized trials and its efficiency proven, biofeedback could become the standard treatment method for obstructive defecation.

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## INTRODUCTION

Constipation in adults is a common disorder of the gastrointestinal area. It affects nearly everyone in the general population at different points in their lifetime. Currently, constipation has a profound impact on adult patients' quality of life and has been considered a major social and psychological disability. Chronic functional constipation influences 2%-30% of individuals in Western countries<sup>[1]</sup>. Although some of these patients can be managed with conservative treatments such as a high fiber diet, laxatives, suppositories, or oral polyethylene glycol, others are not sensitive to these options. According to large scale epidemiological research by Talley *et al.*<sup>[2]</sup>, medical treatment is ineffective in 39% of adult patients with chronic functional constipation. Levitt<sup>[3]</sup> reported that a significant number of patients with a single treatment failure instead seek, and subsequently receive, a surgical alternative. Primary constipation can be further classified into slow-transit constipation (STC), normal-transit constipation (NTC), and obstructed defecation (OD). Among the subtypes of chronic functional constipation, OD seems particularly common, occurring in 7%-35% of the adult population<sup>[4]</sup>. Traditional treatment is well-established and safe for OD; however, it does not provide satisfying improvement for many patients, prompting interest in other therapeutic strategies<sup>[5,6]</sup>. Treatment with high dietary fiber and anti-constipation drugs for many OD patients is usually ineffective. OD patients who do not respond to regular medication seek further medical treatment; however, there have been no worldwide standard treatment methods until now. OD is commonly considered to be a form of maladaptive behavior, as there is no clear anatomical problem around

the anorectum and it can be solved by behavioral action, anorectal squeezing, or relaxative training<sup>[7]</sup>. Although PEG has shown certain effects on adult OD, it can have diverse effects in patients from different countries or areas. Biofeedback-guided pelvic floor exercise training is an alternative treatment where physiologic process information can be converted into a visual signal, which ultimately should allow patients to learn to control their impaired defecation process. Compared with the results of previous clinical studies on biofeedback therapy in functional pelvic floor disorders, which have yielded conflicting results with efficacy rates ranging from 18% to 100%<sup>[8-15]</sup>, biofeedback has been shown to be rather effective in treating OD in recent clinical studies<sup>[1,16-19]</sup>. Although these randomized controlled trials were performed to clarify the actual efficiency of BFT for OD, considering the methodological diversity of the research, the actual efficiency of BFT for OD still requires clarification. Although some studies show contrary results regarding the use of biofeedback in patients with normal transit during straining, the biofeedback technique has a clear therapeutic benefit for OD, including patients with STC<sup>[20]</sup>.

Although BFT is more beneficial for OD, recent controlled studies have indicated that the efficacy of manometric biofeedback treatment for different types of OD remains controversial and has been associated with pathogenesis or learning obstacles. Our present study should hopefully solve the difficult dilemma of OD management and offer significant accordance to anorectal surgeons. In patients with OD, the role of manometric biofeedback-guided pelvic floor training is to teach patients to relax their pelvic and anorectal muscles while simultaneously applying downward intra-abdominal pressure to generate a propulsive force toward the anus. The primary purpose of this research was to compare the quality of life scores of patients diagnosed with OD after BFT or oral polyethylene glycol management. The other aims of the study were to determine whether BFT training affects the pelvic physiologic mechanism and to try to establish a new alternative management method for OD.

## MATERIALS AND METHODS

### *Patients and study design*

Eighty-eight consecutive patients, referred to the General Surgical Department of the First Affiliated Hospital in Xinjiang Medical University during the period from September 2011 to June 2013, were included in the trial. The diagnoses of all participants were confirmed by history, general medical examination, anorectal testing, and biochemical techniques. All research subjects received the same standard medication (*e.g.*, suppositories), treatment strategies, and necessary behavioral education before biofeedback exercise or polyethylene glycol (PEG) treatment. The patients were clinically assessed using Wexner Constipation and quality of life scores by a specialist

**Table 1** Clinical, physiologic, and psychological characteristics of biofeedback pelvic floor training and polyethylene glycol groups

Baseline	BFT	PEG
<i>n</i>	44	44
Age (yr)	54	57
Symptoms	6.4	6.6
Physician visits (past six months)	3.1	3.3
Mean duration of disease (yr)	3.5	3.6
Previous treatment Times (yr)	2.3	2.6
First sensation (mL)	19.3	18.7
Rest pressure (mm Hg)	38	40
Squeeze pressure (mm Hg)	63	61
Wexner constipation score	29 ± 3.9	30 ± 4.3
Quality of life score	42 ± 2.9	43 ± 3.2

BFT: Biofeedback pelvic floor training; PEG: Polyethylene glycol.

who was blinded to treatment assignment; the information collected included constipation onset age, bowel frequency, precipitation factors, laxative use, family history, gynecologic history, and other relevant disease history. A protocol synopsis for this study was used as supporting information. A total of 88 patients who satisfied the inclusion criteria were distributed by computerized randomization into the BFT (biofeedback) group (*n* = 44) or the oral PEG group (*n* = 44). The sample calculation of this research was performed based on SPSS statistical software (version 15.0)<sup>[21]</sup>. The investigators and biofeedback operators were not able to anticipate the patients' informed consent assignments. The sample size calculation was completed at the Medical Statistical Center, First Affiliated Hospital of Xinjiang Medical University. Demographic data (*i.e.*, age and gender), constipation grade, constipation status, mean disease duration, and previous treatment times were recorded for each patient (Table 1). To assess the post-treatment efficiency of each group, the Wexner Scores (Table 2), followed by the Patient Assessment of Constipation Quality of Life questionnaire (PACQOL) of the patients were completed. PACQOL is a validated 28-item questionnaire<sup>[22,23]</sup> used to assess the severity of chronic functional constipation on the quality of the patient's life. The PACQOL is scored for four domains: Worries and Concerns, Satisfaction, Psychosocial Discomfort, and Physical Discomfort. One of the researchers who were unaware of the patients' treatment assignments collected the patient satisfaction, Wexner Constipation Score, and quality of life score results. There were no significant differences between the two groups in terms of demographics (Baseline data, Table 1). After the management of the two compared methods had been completed, assessment of the Wexner Scores and quality of life scores were performed. The anorectal resting pressure and squeeze pressure of the patients were measured after each treatment.

**Medical research ethics and patient informed consent**

This research was performed according to the principles of the Declaration of Helsinki<sup>[24]</sup>, the Guidelines for

**Table 2** Wexner Constipation Score system<sup>[23]</sup> (Minimum score 0; maximum score 30)<sup>[24]</sup>

Frequency of bowel movements	Score
1-2 times per 1-2 d	0
2 times per week	1
Once per week	2
Less than once per week	3
Less than once per month	4
Difficulty: painful evacuation effort	Score
Never	0
Rarely	1
Sometimes	2
Usually	3
Always	4
Completeness: (feeling incomplete evacuation)	Score
Never	0
Rarely	1
Sometimes	2
Usually	3
Always	4
Failure: (unsuccessful attempts at evacuation per 24 h)	Score
Never	0
1-3	1
3-6	2
6-9	3
More than 9	4
Pain: abdominal	Score
Never	0
Rarely	1
Sometimes	2
Usually	3
Always	4
Time: minutes in lavatory per attempt	Score
Less than 5	0
5-10	1
10-20	2
20-30	3
More than 30	4
History: duration of constipation (yr)	Score
0	0
1-5	1
5-10	2
10-20	3
More than 20	4
Assistance: type of assistance	Score
Without assistance	0
Stimulant laxatives	1
Digital assistance/enema	2

Good Clinical Practice (GCP) for trials on pharmaceutical products<sup>[25]</sup>, and the local regulations of Xinjiang Uygur Autonomous Region. The research protocol was approved by the Medical Ethics Committee of the First Affiliated Hospital of Xinjiang Medical University. Because the research was conducted as an investigational study, a strict policy of informed consent was followed and obtained from each of the patients before the study began. The research consisted of three periods of observation (1, 3, and 6 mo after treatment). The last visit was to be completed 180 d after either of the two treatment arms. There were no missing data during the 6-mo follow-up period. The analysis was based on the intention-to-treat principle. All patients were informed that two alternative managements were being compared: manomet-

ric biofeedback-guided pelvic floor training vs oral polyethylene glycol. The patients assigned to the biofeedback group received a detailed interpretation of the principle for biofeedback exercises, while patients assigned to the oral PEG group additionally received related information about the advantages of PEG treatment.

### Research support

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### Inclusion/exclusion criteria

The patients were included in the study if they fulfilled the Rome III criteria, consensus statement<sup>[26]</sup>, and underwent standard anorectal testing. Anorectal manometry (resting pressure and maximum squeeze pressure), balloon expulsion test, electromyography, anoscope, and anorectal digital examination were evaluated to verify the diagnoses, according to the recommended guidelines, from face-to-face interviews performed by the treating physician. All patients were required to have experienced constipation symptoms for more than 6 mo. In addition to satisfying the Rome III criterion of functional constipation, patients also had to meet these inclusion criteria: (1) report of < 3 bowel movements per week by patient history; (2) failure of treatment with a high-fiber diet; (3) history of excessive straining on defecation with normal bowel frequency; (4) absence of secondary causes of constipation; and (5) absence of a surgically treatable cause. Patients were excluded from the trial if they had the following underlying conditions: (1) previous abdominal surgery or trauma of the pelvic area; (2) megacolon or megarectum; (3) symptom resolution upon conservative medical management; or (4) systemic disease.

### Sample size and power

Before research was initiated, the sample size was calculated using SPSS software version 15.0. The total number of patients needed to show a 30% success rate difference from the previously established success rate of approximately 50% was determined in order to detect a clinically significant difference. A sample of at least 44 patients in each group was judged necessary to demonstrate such a difference ( $P < 0.05$ ), with a power of 90%.

### Biofeedback pelvic floor training

All 44 patients in the biofeedback-guided pelvic floor exercise therapy (BFT) group were explained that their constipation may be related to a certain degree of defecation disorders. Patients were told the possible respective advantages of biofeedback and oral PEG. All patients in the BFT group underwent 5-wk manometric (Medtronic Med Ltd)-guided biofeedback training sessions that lasted 30 min each in the outpatient manometric unit. The physiology of the anorectal and pelvic floor

were interpreted to the attenders using their own testing results. The main purpose and possible results of biofeedback and oral PEG were explained to the attenders. All biofeedback training was performed by one of the researchers. Another researcher who was unaware of the management style collected the data. Biofeedback-guided anorectal training consisted of three different parts. In the first phase of training, the participants were guided to squeeze the pelvic muscles according to their breathing rate. In the second part, electromyographic detection was performed and biofeedback was undertaken according to researchers' guidance. In the final part, patients practiced defecating a water balloon catheter. One of the researchers recorded all patient data using a computer-video system. All patients were trained to finish biofeedback pelvic floor exercises by verbal instructions. As this skill developed, the participants were instructed to practice pelvic floor exercises during their usual daily activities and while standing. All participants were required to continue on a high-fiber diet as much as possible during the biofeedback training.

### Oral PEG treatment

Oral polyethylene glycol treatment was administered according to a previously reported method<sup>[27]</sup>. The Wexner Constipation Score and quality of life score of patients were collected before and after treatment. Oral polyethylene glycol (PEG) is a large polymer that is poorly absorbed and not easily degraded by microorganisms. The PEG laxative was given to all PEG group patients, who were instructed to take 17 g of the laxative orally, with water, 3 times a day. The patients in the PEG group participated in a 14-d treatment period according to the method used in a previous report of a PEG trial<sup>[28]</sup>. All of the PEG group participants were required to continue on a high-fiber diet as much as possible during the treatment.

### Follow-up

The constipation symptom relief, Wexner score, and quality of life score were investigated at 1, 3, and 6 mo after each type of treatment. The follow-up dates ranged from June 2013 to December 2013. All patients finished the related questionnaire at 1, 3, and 6 mo after each type of treatment. The patients accepted 6-mo follow-up evaluations regardless of their symptomatic improvement. During the follow-up evaluation, anorectal manometry, post-treatment symptom evaluation, Wexner Score, and quality of life score were completed. Each of the patients was contacted by telephone within 6 mo by an investigator and asked whether they had experienced adequate constipation relief. All patients were scheduled for 6-mo follow-up evaluations.

### Statistical analysis

The statistical analysis was performed using SPSS software version 15.0. The intention-to-treat principle was

**Table 3 Comparison of biofeedback pelvic floor training and polyethylene glycol groups at each follow-up time after treatment *n* (%)**

Symptoms	PEG	BFT	Statistic value	<i>P</i> value
Difficult evacuation				
1-mo follow-up	39 (88.64)	31 (70.45)	4.4698	0.0345
3-mo follow-up	31 (70.45)	18 (40.90)	8.0173	0.0046
6-mo follow-up	24 (54.54)	11 (25.00)	8.0173	0.0046
Hard stools				
1-mo follow-up	34 (77.27)	28 (63.64)	1.9653	0.1610
3-mo follow-up	29 (65.91)	10 (22.73)	16.6238	0.0000
6-mo follow-up	21 (47.73)	7 (15.91)	10.2667	0.0014
Need for digitation				
1-mo follow-up	31 (70.45)	7 (15.55)	26.6779	0.0000
3-mo follow-up	25 (56.82)	5 (11.36)	20.2299	0.0000
6-mo follow-up	20 (45.45)	3 (6.82)	17.0114	0.0000
Sensation of incomplete emptying				
1-mo follow-up	28 (63.64)	15 (34.09)	7.6858	0.0056
3-mo follow-up	21 (47.73)	18 (40.90)	6.4144	0.5197
6-mo follow-up	14 (31.82)	10 (22.73)	0.9167	0.3384
Laxative dependence				
1-mo follow-up	37 (84.09)	25 (56.82)	7.8610	0.0051
3-mo follow-up	31 (70.45)	19 (43.18)	6.6695	0.0098
6-mo follow-up	28 (63.64)	10 (22.73)	15.0063	0.0001
Perianal pain at defecation				
1-mo follow-up	28 (63.64)	12 (27.27)	11.7333	0.0006
3-mo follow-up	24 (54.54)	15 (34.09)	3.7300	0.0534
6-mo follow-up	18 (40.91)	9 (20.45)	4.3279	0.0375
Satisfaction				
1-mo follow-up	8 (18.18)	19 (42.22)	6.4651	0.0110
3-mo follow-up	11 (25.00)	25 (56.81)	9.2137	0.0024
6-mo follow-up	9 (20.45)	35 (79.54)	7.0625	0.0010

PEG: Polyethylene glycol; BFT: Biofeedback-guided pelvic floor exercise therapy.

**Table 4 Comparison of biofeedback pelvic floor training and polyethylene glycol groups wexner scores and quality of life scores**

Symptoms (mo)	PEG	BFT	Statistic value	<i>P</i> value	
Wexner scores	1	16 ± 4.1	22 ± 4.2	14.518	0
	3	18 ± 3.9	23 ± 3.2	29.3749	0
	6	19 ± 3.4	25 ± 3.1	68.2902	0
Quality of life scores	1	50 ± 2.5	62 ± 3.8	16.4269	0
	3	57 ± 2.1	71 ± 3.2	22.5295	0
	6	64 ± 1.9	80 ± 2.2	36.5105	0

BFT: Biofeedback pelvic floor training; PEG: Polyethylene glycol.

applied in this study. Non-normal data were expressed as medians and full ranges. Normal data were expressed as the mean ± SD. Student's *t*-test was used to compare the treatment results, and the  $\chi^2$  test was used for the comparison of proportions. *P* < 0.05 was considered statistically significant.

## RESULTS

At the concluding times of the 1, 3, and 6 mo follow-up periods, the symptoms of the BFT group patients,

compared with the oral PEG group, showed significantly greater improvements in the aspects of difficult evacuation, digitation necessity, laxative dependence, and constipation satisfaction. At the time of the 1-mo follow-up, the symptom of hard stool showed no significant improvement. At the time of the 3-mo follow-up, the sensation of incomplete emptying and perianal pain at defecation showed no significant improvements. At the 6-mo follow-up, the sensation of incomplete emptying also showed no significant improvement. (Table 3).

At the time of each follow-up, the Wexner Score data of the BFT group patients were significantly higher than the PEG group (Table 4). The quality of life score of the BFT group at the final follow-up time was 80 ± 2.2. The quality of life scores of the BFT group were also significantly improved (Table 4). At the final follow-up time, the BFT group's average quality of life score was 80 ± 2.2. There was a clear and significant difference between the two groups in anorectal resting and squeeze pressure after the BFT treatment.

## DISCUSSION

Obstructed defecation is a common disorder that clearly influences the life quality of patients. Although Ellis CN<sup>[29]</sup> concluded that there were multiple treatment methods for OD, such as botulinum toxin, transvaginal repair, transrectal repair, transperineal repair, and rectal intussusception, there was no standard treatment method up to now. OD is frequently related to other disorders of anorectal and pelvic function. Any therapy that does not address all components will result in less than optimal outcomes and quality of life both before and after treatment<sup>[29]</sup>. The primary purpose of our study was to improve the quality of life score after BFT in patients diagnosed with OD. The final result of this research shows that, in contrast to recently reported views, biofeedback training is more effective for the treatment of OD compared with oral PEG administration. In the three month and final follow-up evaluations, difficult evacuation, hard stools, digitation necessity, laxative dependence, perianal pain at defecation, and bowel satisfaction results of the BFT group were significantly superior to those of the PEG group. In all follow-up evaluations, BFT demonstrated superior results to the oral PEG group. The average Wexner Constipation Score of the BFT group in the final visit was 25 ± 3.1, and the quality of life score was 80 ± 2.2. This result indicates that BFT can produce a clearer effect in the management of OD than PEG treatment.

In this study, 79.54% of patients in the BFT group resolved their constipation symptoms, compared with 20.45% in the PEG group. The results also show that patients in the BFT group have a clearer significance than patients in the PEG group in terms of difficult evacuation, hard stool, and sensation of incomplete emptying. The main purpose of biofeedback exercise is guiding patients to perform normal defecation activity

and improve their quality of life. The average Wexner Score of the BFT group was  $22 \pm 4.2$ ,  $23 \pm 3.2$ , and  $25 \pm 3.1$  in 1-mo, 3-mo, and 6-mo follow-up time, respectively. This result was closely associated with the biofeedback resolution of OD. The improvement was seen in the improved ability to defecate and in the increases in anorectal pressure that were measured in the rectum when patients performed defecation. Our results indicate that biofeedback-guided pelvic exercise training was helpful in improving the life quality of pelvic floor dysfunction patients. The results show that constipation improvement of the OD group may correlate with the frequency of biofeedback training.

We considered that the effectiveness of biofeedback-guided anorectal training depends on the skills of the biofeedback performer. Therefore, we strongly suggest that all performers should receive the standard biofeedback guidance course. Considering the diversity of biofeedback in different countries or areas, we consider that biofeedback-guided pelvic floor exercise training techniques should be standardized. Moreover, all participants in the BFT group were guided by one highly-experienced performer. Recent studies in some countries show that clinical benefits can still be obtained despite any diversity in performers' skill.

The comparison of hard stool and incomplete emptying sensation did not demonstrate statistical significance. A possible reason for this result may be associated with a difference in the patients' recognition of either a hard stool or an incomplete emptying sensation in the questionnaire. We propose that anorectal researchers should design a more practical questionnaire and formulate it based on patients' characteristics.

There are at least 8 randomized placebo-controlled trials of PEG compounds. There are two randomized control trials comparing PEG with lactulose. PEG was superior to placebo in increasing stool frequency and stool consistency<sup>[27]</sup>. A study reported relief of constipation in 52% of patients on PEG-3350 compared with 11% of patients on placebo<sup>[27]</sup>. In our study, the patients' quality of life score was  $64 \pm 1.9$ . We considered that PEG was beneficial to some portion of the OD patients. The actual efficiency of PEG for OD requires further investigation and larger controlled trials.

Battaglia *et al.*<sup>[30]</sup> indicated the clear benefits of biofeedback for OD patients. They found no differences in the patients' satisfaction ratings with the treatment. Our data indicate that biofeedback does provide a specific benefit to this subtype of constipation. The final quality of life score of the BFT group was significantly improved compared with the PEG group. We consider that further large, multicenter, double blind, randomized controlled trials will demonstrate the actual efficiency of BFT for OD.

The data in our study indicate clear advantages of biofeedback related to PEG for the treatment of this subtype of constipation. Some aspects of our results were similar to previous studies<sup>[31,32]</sup>. Five sessions train-

ing led to a major improvement for 79.54% of patients. According to our findings, biofeedback training should be applied as effective treatment for patients with this form of constipation. By contrast, PEG treatment was relatively ineffective, poorly-tolerated, and required continuous treatment.

Chiarioni *et al.*<sup>[33]</sup> performed 14.6 g of PEG with five weekly biofeedback sessions in patients who did not respond to conservative therapy. At the 6-mo follow-up, major improvements were reported by the patients enrolled in the biofeedback arm (80%) compared with those in the PEG arm. They reported that biofeedback also produced greater reductions in straining, incomplete evacuation sensation, enema use, and abdominal pain ( $P < 0.01$ ). Rao *et al.*<sup>[34]</sup> compared biofeedback with sham biofeedback or a standard therapy of diet, exercise, and laxatives in 77 randomly assigned patients. In their study, dyssynergia of 79% patients was solved using biofeedback training. The overall defecation satisfaction was also improved in the biofeedback group. These findings were contrary to the results of our study. Therefore, whether biofeedback can be established as the first line treatment for obstructed defecation still requires further multicenter, large, randomized controlled trials.

## COMMENTS

### Background

Chronic constipation has a clear impact on the quality of life of adult patients, and has been considered a major social and psychological disability. Although obstructive defecation patients who do not respond to regular medications can seek further medical treatment, there have been no worldwide standard treatment methods for this type of condition until now. Although the authors consider biofeedback to be a more beneficial treatment for obstructive defecation, recent controlled studies have indicated that the efficiency of manometric biofeedback treatment for different types of obstructive defecation remains controversial and may be associated with pathogenesis or learning obstacles.

### Research frontiers

Biofeedback had a clear effect on obstructed defecation. The main purpose of this research was to assess the quality of life scores of patients diagnosed with obstructive defecation after treatment comparing biofeedback training with oral polyethylene glycol management. The purpose of this study was also to determine whether biofeedback training affects the pelvic physiologic mechanism and to establish a new alternative management method.

### Innovation and breakthroughs

Biofeedback-guided pelvic floor exercise training is an alternative treatment where physiologic process information can be converted into a visual signal. In most studies, simple visual, auditory EMG, or pressure signals of sphincter activity provide feedback to the patients. Most techniques used were based on the method of simulated evacuation, such as the expulsion of a balloon to demonstrate to the patient normal coordination for successful expulsion. Previous studies on biofeedback therapy in obstructive defecation have yielded conflicting results, with efficacy rates that range from 18% to 100%. Based on these reports, biofeedback training requires further research to elucidate the actual efficiency for patients with this form of constipation.

### Applications

The data in this study show a clear superiority for biofeedback relative to oral polyethylene glycol for the treatment of this subtype of constipation. If this research was extended to large multicenter randomized trials and its efficiency proven, biofeedback could become the standard treatment method for obstructive defecation.

### Terminology

Obstructive defecation: Obstructive defecation is a state of impaired inhibition

of the pelvic floor while straining to defecate. Biofeedback: Biofeedback-guided pelvic floor exercise training is an alternative treatment where physiologic process information can be converted into a visual signal.

### Peer review

This is an interesting study. If biofeedback therapy could be added as another treatment in further research, new findings for functional obstructive defecation may arise.

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