

An investigation into the effect of biofeedback on urinary and fecal incontinence in patients with anal sphincter dysfunction

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ABSTRACT

Introduction: Fecal incontinence refers to the inability to control bowel movements, causing feces to leak unexpectedly from the rectum. People suffering from this disorder are emotionally distressed. This problem causes social degradation, anxiety, fear, and social isolation. The present study aimed to evaluate the effect of biofeedback (BFB) on fecal incontinence in patients with anal sphincter abnormalities in 2017. **Methods:** This quasi-experimental study was performed on 30 patients with fecal incontinence, referring to the gastroenterology clinic of Taleghani and Mehrad hospitals. Patients were first evaluated by Wexner criteria and then, with the aid of a manometer, information was obtained on the amount of sphincter muscle tone, squeeze pressure, and rectal sensation. Manometric results and Waxner's questionnaire were compared before and after BFB. Data were analyzed using SPSS (version 20). **Findings:** In this study, 18 women and 12 men were studied. There was no significant relationship between fluid intake, fiber, exercise, sex, and incontinence ($P < 0.05$). According to Wuxner's components, the sphincter muscle tone increased significantly after BFB in patients. The total score of the squeeze pressure increased significantly after the BFB application ($P < 0.05$). The mean total score of rectal sensation (individual awareness of rectal contents) decreased after the BFB application. **Conclusion:** In addition to the fact that it can improve incontinence in patients with anal sphincter abnormalities, BFB is also helpful for patients whose sphincter and rectum are not seriously affected and only show incontinence symptoms.

Keywords: Biofeedback, fecal incontinence, manometry, pelvic floor muscle, Waxner questionnaire

Introduction

Fecal incontinence refers to the inability to control bowel movements, causing feces to leak unexpectedly from the rectum.^[1] It is a particularly embarrassing and distressing condition with significant medical, social, and economic implications. Anal sphincter exercises (pelvic floor muscle training) and biofeedback (BFB) therapy have been used to treat the symptoms of people with fecal incontinence. However, standards of treatment are still lacking and the magnitude of alleged benefits has yet to be established. People usually refrain from talking about this condition. People suffering from this

disorder are emotionally distressed. This problem causes social degradation, anxiety, fear, and social isolation.^[1-3] The incidence of incontinence in people is much higher than what figures report because most people are not talking about it. However, in other cases, people are willing to talk with friends and acquaintances. The incidence of fecal incontinence in different societies varies from 17% to 11%. Out of every 3 people, 2 are under the age of 60, and out of every 3 people, 2 are females.^[3,4] The severity of fecal incontinence varies from person to person. A small or high amount of solid feces or liquid or even gas is excreted every day occasionally.^[5] It does not matter to many people how much leakage occurs during a day, but their concern is that they do not know where it may happen. Therefore, they are not feeling secure. In particular, in people with important occupations, gas incontinence can disrupt their quality of life.^[6]

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Often anal incontinence occurs with urinary incontinence, which is called double incontinence. It has a much greater effect on the quality of life, causing anxiety and depression and social isolation.^[7] Fecal incontinence is one of the common problems of aging. In the process of aging, the intestinal wall is atrophic. Some factors reduce the blood flow and some internal neural changes occur.^[8] However, no significant functional changes occur. However, environmental factors such as cognitive disorders and diseases (such as diabetes) affect fecal control. Inappropriate diet can cause some problems in elderly women. Accordingly, certain medications also affect the pressure of sphincter control. Generally, the anal function decreases in elderly people.^[1] It costs over US\$400 million annually to buy diapers every year. Generally, fecal incontinence is a debilitating condition, which has an economic burden for the patient and the community. As mentioned earlier, the prevalence of fecal incontinence is not precisely reported, as most individuals refuse to talk about it.^[8,9]

In addition, the cost of treatment, hospitalization, nursing, and the use of absorbent diapers are all economic damage caused by incontinence. Various factors are involved in fecal control. The internal anal sphincter, the smooth rectal muscle, maintains muscle tone pressure during anal relaxation and prevents spontaneous excretion.^[2] Given the importance of this issue and the health and social problems caused by it, the present study aimed to investigate the effect of BFB on fecal incontinence in patients suffering from anal sphincter disorders referring to selected hospitals of Shahid Beheshti University of Medical Sciences in 2017. BFB therapy may be used to treat a variety of bowel disorders including incontinence, constipation, painful spasms of the pelvic floor muscles, and symptoms associated with the irritable bowel syndrome. BFB is a safe and reasonably priced method.

Materials and Methods

This quasi-experimental study consisted of 30 patients with fecal incontinence who referred to Taleghani Hospital and Mehrad Hospital. They were all eligible to participate in this study. Sampling lasted for 5 months. To confirm the diagnosis, patients were visited by a gastroenterologist. It should also be pointed out that patients underwent colonoscopy and endosonography. Then, they also underwent manometry. The anal muscle tone, rectal sensation, appendicitis, skysis, rectal anxiety, and cough reflex were evaluated and recorded. Before starting the BFB, patients were evaluated by the Wexner scale. The incontinence

was evaluated in patients. Then, with the help of the BFB, the rectal and pelvic floor muscles were strengthened. After the BFB, patients were again evaluated by the Wexner scale and manometry. The components of the Wexner scale include solid or diluted feces, gas, and impact on the quality of life. These criteria were evaluated and compared before and after BFB. Data were analyzed using SPSS (version 20), The χ^2 test and *t*-test. The significance level was $P < 0/05$.

Inclusion criteria

- Patients with fecal incontinence whose disease is diagnosed by a gastroenterologist
- Patients in the age group of over 15 with any gender
- The cause of incontinence is associated with sphincter defects, rather than neurological disorders
- No acute or inflammatory intestinal disease
- Willingness to participate in research
- Not using other methods for treatment.

Exclusion criteria

- Unwillingness of patient and family to continue cooperation.
- Patient death.
- Any disease affecting the process of BFB or home exercise.

Data analysis

In this study, a paired *t*-test was used to investigate the effect of patient education and BFB on quality of life in patients with fecal incontinence.

Data were analyzed using SPSS (version 20), χ^2 , and *t*-test. The significance level was $P < 0.05$.

Findings

Given the demographic characteristics, independent *t*-test, χ^2 , and paired *t*-test showed that there was no significant difference between patients with incontinence in terms of gender, marital status, education, age, weight, occupation, income, fiber consumption, and water consumption per day. Table 1 shows Wexner components in patients with incontinence before and after BFB. According to the results, there was a significant difference between the patients in terms of the quality of life before and after training.

Table 2 shows the level of muscle tone and internal and external sphincter pressure in patients. According to the results, sphincter muscle tone increased significantly after BFB ($P < 0.001$).

Table 1: Wexner components in patients with incontinence before and after the biofeedback

Wexner components	Mean before the intervention	SD before the intervention	Mean after the intervention	SD after the intervention	T	P
Solid feces	44.26	29.44	76.45	21.41	-8.25	<0.001
Diluted feces	30.46	30.93	76.85	29.70	-8.02	<0.001
Gas	36.45	41.78	72.04	34.53	-5.48	<0.001
Impact on quality of life	22.45	11.89	31.78	11.31	-11.38	<0.001
Using the pad	20.18	10.13	27.93	10.19	-12.05	<0.001

The comparison of the mean changes in the total score of the rectal sensation before and after the BFB is shown in Table 3. Accordingly, the rectal sensation score decreased significantly after the BFB ($P < 0.001$).

Moreover, the comparison of the mean changes in the total score of the squeeze pressure before and after the BFB is in Table 4. Accordingly, the squeeze score increased significantly after the BFB ($P < 0.001$).

Discussion

Fecal incontinence refers to the inability to control bowel movements, causing feces to leak unexpectedly from the rectum, with a prevalence of 7%–15%. People often refuse to talk about it.^[1] This has negative impacts on people and decreases their self-confidence.^[9]

Some of the main causes of fecal incontinence include congenital abnormalities, radiotherapy of anal surgery, hemorrhoidal fistula, and infertility. Although rectal disorders can be attributed to rectal prolapse, decreased rectal capacity, and decreased rectal sensation. Sometimes incontinence may be the result of pelvic floor muscle weakness or pelvic floor muscle dysfunction. Many patients have sphincter injuries, but they remain asymptomatic. The symptoms are indicated with aging and hormonal changes.^[2] BFB depends upon operant conditioning. By using an instrument capable of providing auditory, visual, and verbal feedback, patients can manage an unconscious physiologic function. This instrument can have positive effects.^[10–12] Numerous studies have aimed to investigate the efficacy of BFB in the treatment of anismus. For instance, Gilliland *et al.*^[13] argued that patients who completed the training programs experienced a success rate of 63%. Moreover, Rhee *et al.*^[14] concluded that once they completed the BFB training program, patients with anismus indicated a complete response. Unfortunately, most of these studies had short follow-ups. Researchers conducted randomized controlled trials^[15] to investigate the BFB in the treatment of pelvic floor disorders. They found that anismus provided a 6-fold relief after BFB. In addition, the symptoms were improved 7 times higher than after EMG-BFB, after non-EMG-BFB.

Surgical myotomy of the puborectalis muscle has obtained optimal results since the 1960s.^[16] However, subsequent trials failed to obtain better results and higher rates were reported for fecal incontinence (FI).^[17,18] Researchers developed a modified semi-closed technique for dividing puborectalis muscle. They argued that 75% of the patients experienced improved symptoms with no subsequent side effects. However, they recommended that it was necessary to conduct further studies. Although there is a suggestion that some elements of BFB therapy and sphincter exercises may have a therapeutic effect, this is not certain. Larger well-designed trials are needed to enable safe conclusions. There is a critical need for properly designed and adequately powered studies that compare conservative therapy (with or without BFB) versus surgical therapy for the treatment of fecal incontinence

Table 2: A paired *t*-test to investigate the difference between the mean sphincter muscle tone in patients with fecal incontinence before and after the biofeedback

Group	Mean	SD	T	P
Before biofeedback	80.04	41.83	3.01	<0.001
After biofeedback	106.06	43.38		

Table 3: Comparison of mean rectal score changes in patients with fecal incontinence before and after the biofeedback

Group	Mean	SD	T	P
Before biofeedback	128.16	19.86	5.36	<0.001
After biofeedback	106.70	19.04		

Table 4: Comparison of the mean changes in the score of the squeeze pressure in patients with fecal incontinence before and after the biofeedback

Group	Mean	SD	T	P
Before biofeedback	118.17	19.79	5.64	<0.001
After biofeedback	135.72	20.05		

in patients with anal sphincter defects. Various studies have confirmed the efficacy of BFB. Murad-Regadas *et al.* carried out a study on 116 patients with anismus to investigate the effect of BFB and diet on the recovery of patients. According to the results, 59% of patients reported that the results of the treatment were satisfactory.^[19] Similar results were obtained by other studies.^[20,21] The patients' visual analog scale score improved significantly after the BFB, suggesting the positive effects of BFB on the recovery process.

It can be concluded that BFB therapy is particularly useful for dyssynergic defecation. Therefore, patients can be trained on how to relax the pelvic floor and anal muscles. Given the fact that BFB therapy is a time-consuming process, it is necessary to have access to professional personnel. Accordingly, drug treatments are reasonably priced and can be easily found. The results showed that BFB was more effective than laxatives or placebo. Several controlled studies indicated that BFB can effectively be used to treat functional defecation disorder, one of the most frequent and disabling subtypes of adult constipation. It was also more effective than laxatives or placebo, without any adverse side effects. The limited number of identified trials together with methodological weaknesses of many does not allow a definitive assessment of the role of anal sphincter exercises and BFB therapy in the management of people with fecal incontinence. We found some evidence that BFB and electrical stimulation may enhance the outcome of treatment compared with electrical stimulation alone or exercises alone. It can be concluded that BFB is an efficient treatment for functional defecation disorder.

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Conflicts of interest

There are no conflicts of interest.

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