



Original Article

Effects of biofeedback in the treatment of female fecal incontinence



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ABSTRACT

Introduction: Fecal incontinence is the involuntary loss of stools and gases, characterized by the inability to keep physiological control of bowel contents. It can negatively affect patients' quality of life. Biofeedback is a therapeutic tool used in the treatment, through the training of the pelvic floor muscles from visual and sound stimuli.

Objective: To evaluate the effects of biofeedback in the treatment of female fecal incontinence.

Methods: Twenty-three patients with fecal incontinence, diagnosed by clinical evaluation and manometry, and referred for biofeedback treatment, participated responding to the Cleveland Clinic Incontinence Assessment scale, and the Fecal Incontinence Quality of Life Questionnaire to obtain personal data, clinical complaints and incontinence characteristics. Four biofeedback sessions were held once a week. After the protocol, they were reevaluated with anorectal manometry and questionnaires, and they were instructed to daily perform the sphincteric contraction exercises at home.

Results: The comparison of the Cleveland Clinic Florida Scoring System and FIQL scores before and after the biofeedback protocol showed a significant decrease ($p=0.0001$) in fecal incontinence. The mean anal pressure at rest was 33.3 mmHg before and 49.65 mmHg after biofeedback, while the mean anal pressure of maximal voluntary contraction was 85 mmHg before treatment and 136.65 mmHg after it.

Conclusion: Biofeedback is an effective method for the treatment of fecal incontinence, with increased sphincter strength and improved quality of life.

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Efeitos do biofeedback no tratamento da incontinência anal feminina**R E S U M O****Palavras-chave:**

Biofeedback

Fisioterapia

Incontinência fecal

Introdução: A incontinência anal é a perda involuntária de fezes e gases, caracterizada pela incapacidade de manter o controle fisiológico do conteúdo intestinal. Pode interferir negativamente na qualidade de vida dos pacientes. *Biofeedback* é uma ferramenta terapêutica utilizada no tratamento, através do treinamento dos músculos do assoalho pélvico, a partir de estímulo visual e sonoro.

Objetivo: Avaliar os efeitos do *biofeedback* no tratamento da incontinência anal feminina.

Metódos: Participaram 23 pacientes portadoras de incontinência anal, diagnosticadas pela avaliação clínica, manométrica e encaminhadas para tratamento com *biofeedback*, responderam um questionário para obtenção dos dados pessoais, queixas clínicas e características da incontinência, a escala de Avaliação da Incontinência da *Cleveland Clinic* e o questionário *Fecal Incontinence Quality of life*. Foram realizadas quatro sessões de *biofeedback*, uma vez por semana. Após o protocolo foram novamente reavaliadas com exame de manometria anorretal e questionários, foram orientadas a realizar os exercícios de contração esfinteriana diariamente em casa.

Resultados: Na comparação dos escores dos questionários *Cleveland Clinic Florida Scoring System* e *FIQL* antes e após o protocolo de *biofeedback* pode-se observar diminuição significativa ($p = 0,0001$) da incontinência anal. As medias de pressão anal de repouso foi de 33,3 mmHg antes e 49,65 mmHg após o *biofeedback*, enquanto que a média da pressão anal de contração voluntária máxima foi de 85 mmHg antes do tratamento e 136,65 mmHg após o mesmo.

Conclusão: O *biofeedback* é um método efetivo no tratamento da Incontinência anal, com aumento da força esfinteriana e melhora da qualidade de vida.

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Introduction

Fecal incontinence (AI) is defined by the involuntary loss of feces and gases, and is characterized by the inability to keep the physiological control of the intestinal contents.¹ The symptoms lead to embarrassing situations to the patients, and to social and professional isolation.²

It is estimated that AI affects 1.9% to 21.3% of the population, and its prevalence varies according to the sample investigated, but the actual prevalence is not fully estimated due to the embarrassment patients feel for presenting such conditions.^{3,4}

Anal continence control physiology is complex, and relies on the integrated action of several events, such as the action of the sphincter muscles and pelvic floor muscles, presence of the rectal-anal inhibitory reflex, rectal-anal angle, rectal capacity, sensory-motor function of the anorectal anatomical region, patient's neurologic status, stool consistency, and intestinal transit time.^{5,6}

Several factors contribute to the appearance of female fecal incontinence, with predominance of obstetric trauma; a sphincteric lesion may occur in 35% of women who had normal deliveries, which can progress to incontinence or not, along with diabetes mellitus, multiple sclerosis and dementia.⁷ Inflammatory bowel diseases, postoperative hemorrhoidal disease, and resection of colon and rectum are also conditions associated with AI.⁸

It can negatively interfere with patients' quality of life, causing social and familial concomitant disorders, being considered a public health issue. Individuals who suffer from the disease delay seek for care, or do not seek it, thus worsening the symptoms presented and having a negative impact on their lives.⁹

Several complementary exams are currently used to aid in the understanding of the etiology, detection and classification of AI, such as endoanal ultrasound, pudendal nerve latency time, perineometry, and anorectal manometry. The latter consists of a study that allows the measurement of resting and contraction pressures, the size of the anal canal, the synchronization of sensory and motor components of this channel, as well as the recto-anal capacity, compliance and inhibitory reflex.^{10,11}

The treatment for fecal incontinence can be conservative or surgical, and even the combination of both. The conservative treatment, when indicated, involves the multidisciplinary team with dietary and pharmacological actions, psychological support, and physical therapy through resources for awareness and strengthening of the pelvic floor muscles. Following it, whether a surgical approach is necessary is evaluated.¹²

Biofeedback is an important therapeutic tool used in the treatment of this condition, through the training of the pelvic floor muscles, from visual and/or sound stimulation, in order to obtain a more adequate, less invasive, and less costly response.¹³

Thus, this study aimed to evaluate the effects of biofeedback in the treatment of female fecal incontinence.

Patients and methods

Twenty-three patients with fecal incontinence diagnosed by clinical and manometric evaluation by the Coloproctology team, and referred for physical therapy with biofeedback at the Coloproctological Physiotherapy Clinic of a University Hospital participated in the study. They answered a questionnaire that was previously developed for obtaining personal data, clinical complaints, and characteristics of incontinence, the Cleveland Clinic Incontinence Rating Scale, and the Fecal Incontinence Quality of Life questionnaire, validated for the Portuguese language.

Patients who refused to participate, those with neurological conditions, or who for any reason did not understand the biofeedback treatment, patients who missed a treatment session, or who did not attend manometry were excluded from the study.

The selected patients underwent four consecutive biofeedback sessions once a week and were instructed to daily perform the sphincteric contraction exercises at home. After the four sessions, they underwent anorectal manometry again for evaluation and comparison of the pressure values, and answered the questionnaires of clinical evaluation and quality of life again.

Data were descriptively analyzed, and presented in averages, standard deviations, percentages, absolute and relative frequencies. Inferential statistics was also performed using the Shapiro-Wilk test to check data normality and the paired t test or Wilcoxon test to compare the outcomes analyzed before and after treatment with biofeedback, depending on the normality of data. The level of significance was considered as $p \leq 0.0001$. Statistical analysis was conducted by GraphPad Instat software, version 3.0.

Results

The mean age of the patients was 68 years (SD=8), with 73.90% being married and working with general services. Regarding the period of onset of incontinence symptoms, most (30.4%) patients reported that the symptoms started 1 to 2 years before; 26%, 2 to 5 years before; and 17.4%, 5 years before.

Although there are several causes for the appearance of fecal incontinence, 52% of the patients report no apparent reason for the onset of symptoms, and 26% report a surgical procedure.

In 23 patients, the number of vaginal deliveries ranged from none to six with a mean of 2.69 births (SD=2.20), while cesarean sections ranged from none to two with a mean of 0.56 (SD=0.84).

Regarding the characteristics of fecal incontinence, 57% reported evacuation urgency, 57% reported feeling loss of feces, 78% had fecal leakage during the day, and 61% reported loss of a small amount of feces (Table 1).

Table 2 presents data comparing the scores of the Cleveland Clinic Florida Scoring System before and after the

Table 1 – Distribution of patients regarding the characteristics of fecal incontinence.

	n	%
<i>Characteristics</i>		
Evacuating urgency	13	57%
Feeling of stools loss	13	57%
Presence of UI	10	44%
<i>Periods of fecal leakage</i>		
Only during the day	18	78%
During the day and night	5	22%
Only at night	0	0%
<i>Amount of stools lost</i>		
Small	14	61%
Moderate	5	22%
Large	4	17%

Table 2 – Level of incontinence according to the Cleveland Clinic Florida Scoring System (IICCF) questionnaire before and after treatment with Biofeedback.

Variable	Before	After	p value ^a
IICCF Score	14.56 ± 4.02	6.82 ± 2.81	<0.0001 ^b

^a Paired t test.
^b $p \leq 0.0001$.

Table 3 – Quality of life according to the Fecal Incontinence Quality of Life questionnaire.

Variable	Before	After	p value ^a
Life style	21.30 ± 7.59	33.04 ± 8.48	<0.0001 ^b
Behavior	15.39 ± 7.54	25.13 ± 7.77	<0.0001
Depression	18.60 ± 5.06	23.91 ± 4.35	<0.0001
Embarrassment	5.43 ± 2.55	9.65 ± 2.85	<0.0001

^a Paired t test.
^b Wilcoxon test.

Table 4 – Comparison of anal pressures at rest and pre- and posttreatment maximum contraction.

	Pre (mean ± SD)	Post (mean ± SD)	p value ^a
PAR	33.30 ± 14.19	49.65 ± 18.68	0.0001 ^b
PACVM	85 ± 24.87	136.65 ± 25.40	0.0001 ^b

^a Paired t test.
^b $p \leq 0.0001$.

application of biofeedback sessions. A statistically significant decrease ($p=0.0001$) in fecal incontinence can be observed.

In the comparison of Fecal Incontinence Quality of Life scores, before and after the application of biofeedback, a statistically significant increase was observed in all domains evaluated ($p \leq 0.0001$) (Table 3).

There was a significant increase ($p \leq 0.0001$) in mean anal resting pressures and maximal voluntary contraction after the end of treatment (Table 4).

Discussion

The prevalence of fecal incontinence in Brazil has been scarce up to the present moment, but it is known that the problem affects the individual's personal and professional life, causing social isolation, embarrassment, and worsening of the quality of life.⁴

The defecation process at the appropriate time and place demands a balance between the muscles of the pelvic floor and the nervous system. Any irregularity in these systems can lead to anorectal dysfunction and fecal incontinence.¹⁴ Several factors contribute to fecal incontinence, such as age, overweight, depression, chronic diarrhea and urinary incontinence.¹⁰ However, in the present study, most reported no specific reason for the onset of symptoms.

In the present study, most women had vaginal delivery, which is considered to be another risk factor for AI due to sphincter injury,¹⁵ and 3% of women may have fecal incontinence after normal delivery.

When it comes to the amount of feces lost, a survey showed that 76% of the patients described it as small, and 24% as moderate or large, possibly due to the type of stools.³ In the present study, most patients described that fecal leakage occurred in a small amount during the day, and the observed characteristic was defecation urgency, which could directly affect productivity at work and thus quality of life.

In a study carried out in Porto Alegre, in 2017, a microprocessor-controlled device capable of recording the anal pressure waves consistent with the exercises performed by the patient at home was developed. Participants were female patients, older than 30 years, presenting AI and no previous treatment history; an evaluation was performed, and the Wexner scale, and FIQL questionnaires were applied. The patients performed 28 sessions at home, and after treatment showed significant improvement in symptomatology, parameters of manometry, and quality of life. The author points out that the patients had no difficulty in handling the device or performing the treatment at home, and although the method was considered new, it obtained satisfactory results,¹⁶ corroborating with the present study, which reached indices with significant improvement.

Biofeedback treatment showed to be effective because it improves the awareness and motor response of the external anal sphincter and the pelvic floor muscles. However, it is a method that requires a qualified professional for its execution, and time and commitment of the individual to be successful.^{16,17} In the present study, significant improvement was observed in comparison to the manometric values before and after treatment ($p=0.0001$).

In contrast, a randomized controlled study was conducted from 2011 to 2012 at the Shahi Faghihi Hospital in Iran, where 27 women with fecal incontinence complaints after delivery were evaluated. The patients were submitted to surgical treatment and were divided into three groups. In the first group, women underwent biofeedback treatment 3 months before surgery and 6 months after surgery. In the second group, biofeedback treatment was performed 6 months after surgery, and in the third group only the surgical treatment was performed. Wexner's questionnaire and manometry

examination were used to compare preoperative and postoperative results. There was a significant difference in the incontinence scores assessed by the Wexner questionnaire in all groups, but the third group presented worse results. No difference was observed between the three groups regarding the results obtained in manometry. The study did not show significant results in manometry, however Wexner's questionnaire was an indicator of satisfaction after treatment with biofeedback.¹⁸

In another study, the results obtained in 52 patients with fecal incontinence who received biofeedback treatment were analyzed; questionnaires for evaluating the level of fecal incontinence, such as FISI (Fecal Incontinence Severity Index), and the quality of life related to fecal incontinence (FIQL – Fecal Incontinence Quality of life Scale) were used. There was a significant improvement in the FIQL questionnaire, mainly in the domains of behavior and embarrassment ($p=0.008$) after treatment with biofeedback.¹⁹

Similarly, in the present study, using the FIQL questionnaire, it was observed that, in the presence of fecal incontinence, the patients felt embarrassed, and had low self-esteem, which causes a great change in the quality of life and in the social scenario. After the treatment, a new evaluation showed great improvement in patients' social life and well-being, with a significant increase of the scores in all domains evaluated being achieved.

Conclusion

Biofeedback is an effective method for treating fecal incontinence, with increase of sphincter contraction strength, and improvement of quality of life.

Conflicts of interest

The authors declare no conflicts of interest.

REFERENCES

- Rodrigues BDS, Reis IGN, Coelho FMO, Buzatti KCLR. Fecal incontinence and quality of life assessment through questionnaires. *J Coloproctol*. 2017;37:341-8.
- Zaslavsky C, Loureiro RG, Jurach MT, Meneses U, Alrecht GJ, Araujo TQ, et al. Entrevista motivacional no tratamento dos pacientes com incontinência anal. *Revista AMRIGS*. 2013;57:180-4.
- Zaslavsky C, Jurach MT, Coronel AL. Incontinência anal: tratamento clínico em serviço de saúde pública de Porto Alegre, Brasil. *Revista AMRIGS*. 2014;58: 220-4.
- Zaslavsky C, Jurach MT, Barros CP, Saute L, Carvalho ME, Alves R, et al. Epidemiologia da incontinência anal em população assistida em serviços de saúde de Porto Alegre/RS, Brasil. *Revista AMRIGS*. 2012;56:289-94.
- Buzatti KCLR, Petroianu A. Aspectos fisiopatológicos da síndrome pós-ressecção anterior do reto para o tratamento de câncer retal. *Rev Col Bras Cir*. 2017;44: 397-402.

6. Kadam-halani KP, Andy L. Clinical anatomy of fecal incontinence in women. *Clin Anat.* 2017;30:901-11.
7. de Souza Santos CR, Santos VL. Prevalência da incontinência anal na população urbana de Pouso Alegre – Minas Gerais. *Rev Esc Enferm USP.* 2011;45:180-6.
8. Hirano HKM, Seid VE, Galvão FHF, Dialbuqualque LA. Anorectal transplantation and a therapeutic proposal for the treatment of fecal incontinence and definitive colostomy. *Rev Med.* 2013;92:34.
9. Bedard K, Heymen S, Palsos OS, Bharucha AE, Whitehead WE. Relationship between symptoms and quality of life in fecal incontinence. *Neurogastroenterol Motil.* 2018;30.
10. Zizzi PT, Trevisan FT, Ceister N, Cruz CS, Reisco GLM. Força muscular perineal e incontinência urinária e anal em mulheres após o parto: estudo transversal. *Rev Esc Enferm USP.* 2017, <http://dx.doi.org/10.1590/S1980-220X2016209903214> [Epub ahead of print].
11. Zaslavsky C, Nunes OA. Estudo descritivo de exames de manometria anorretal utilizados no laboratório de motilidade digestiva da Santa Casa de Misericórdia, Porto Alegre, Brasil. *Revista AMRIGS.* 2016;60:279-99.
12. Torres JCM, Adams EMR, Acosta DD, Delgado JAG. Tratamiento de la incontinencia anal mediante rehabilitacion integral del suelo pelvico: presentacion de caso. *Rev Cub Med Fis Rehab.* 2017;8(S1).
13. Ferreira LL, Marino LHC, Cavenaghi S. Intervenção fisioterapêutica na incontinência fecal no idoso. *Arq Bras Ciênc Saúde.* 2013;37:168-72.
14. Leite J, Poças F. Tratamento de incontinência fecal. *Rev Port Coloproct.* 2010;7:68-72.
15. James-Stevenson T, Xu H, Heit M, Shin A. Age and dyssynergia subtypes associated with normal sphincter pressures in women with fecal incontinence. *Female Pelvic Med Reconstr Surg.* 2017, <http://dx.doi.org/10.1097/SPV.0000000000000415> [Epub ahead of print].
16. Damin DC, Hommerding F, Schirmer D, Sanches PRS, Silva Junior DP, Müller AF, et al. Patient-controlled biofeedback device for the treatment of fecal incontinence: a pilot study. *Appl Psychophysiol Biofeedbck.* 2017;42:133-7.
17. Forte ML, Andrade K, Butler M, Lowry AC, Bliss DZ, Slavin JL, et al. Treatments for fecal incontinence, vol. 15. Agency for Healthcare Research and Quality; 2016.
18. Gharamani L, Mohammadipour M, Roshanravan R, Hajihosseini F, Bananzadeh A, Izadpanah A, et al. Efficacy of biofeedback therapy before and after fecal incontinence sphincteroplasty due to obstetric injury: a randomized controlled trial. *Iran J Med Sci.* 2016;41:126-31.
19. Leite FR, Lima MJR, Lacerda-Filho A. Early functional results of biofeedback and its impact on quality of life of patients with fecal incontinence. *Arq Gastroenterol.* 2013;50:163-9.