



# Physiotherapeutic Approaches to Treat Anal Incontinence in Women after Obstetric Trauma

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## Abstract

**Introduction** Anal incontinence is defined as the loss of voluntary control of fecal matter or gases with a recurrence period longer than 3 months in individuals aged  $\geq$  4 years; it has a female predominance. Among the treatment modalities is pelvic physiotherapy, the second line of treatment, which promotes the reeducation, coordination, and strengthening of the muscles of the pelvic floor to enable patients to return to their regular activities of daily living.

**Objective** To perform a systematic review on the physiotherapeutic treatments used in women between the ages of 18 and 65 years with a diagnosis of anal incontinence.

**Material and methods** Clinical studies written in Portuguese, Spanish and English were searched on the the following databases: Science Direct, Medical Literature Analysis and Retrieval System Online (Medline) via PubMed, Physiotherapy Evidence Database (PEDro), Scientific Electronic Library Online (SciELO), and Scopus.

**Results** Of the 998 articles found, only 4 studies met the inclusion criteria of the present systematic review. The physiotherapeutic approaches to treat women with anal incontinence are biofeedback, Kegel exercises, electrostimulation, and training of the pelvic floor muscles. The average score on the PEDro scale was of 6.25, which indicates that the methodological quality was good.

**Conclusion** Although pelvic physiotherapy is effective to treat anal incontinence, it must be promoted through the performance of evidence-based scientific research.

## Keywords

- ▶ fecal incontinence
- ▶ rehabilitation
- ▶ physiotherapy modalities

## Introduction

Fecal incontinence (FI) is defined as the loss of voluntary control of stool with a recurrence period longer than 3 months in individu-

als aged  $\geq$  4 years.<sup>1</sup> When there is gas leakage, associated or not with the loss of feces, the term anal incontinence (AI) is used.<sup>2,3</sup>

It is a health condition that affects  $\sim$  7% of the general population, with a female predominance<sup>4,5</sup> and a

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multifactorial etiology, including traumatic, neurological, congenital and iatrogenic factors. Among the causes mentioned, the most common are obstetric trauma and unsuccessful anorectal surgery.<sup>6</sup>

There are 3 subtypes of FI: passive incontinence, in which there is an unnoticed (involuntary) loss of feces or gas; urge incontinence, characterized by the unsuccessful attempt to retain stool, which indicates an injury to the external sphincter; and soiling, which is defined as the involuntary loss of rectal contents after evacuation due to an injury to the internal sphincter, with soiling of the perianal area and underwear.<sup>1,7,8</sup>

In the affected patients, this clinical condition triggers a series of consequences such as embarrassment, social isolation, low self-esteem, and changes in lifestyle and quality of life (QOL).<sup>9</sup> As the perception of QOL is very subjective, some scales help to measure the impact of FI on it, such as the Fecal Incontinence Quality of Life (FIQOL) index, which assesses lifestyle, coping/behavior, self-perception, and embarrassment,<sup>10</sup> and the Manchester Health Questionnaire (MHQ), which measures eight domains: impact of the incontinence, role, physical function, social function, personal relationships, emotions, sleep and energy, and the severity of the incontinence.<sup>11</sup>

There are multiple treatment modalities for AI, which can be conservative and/or surgical. Conservative therapy is usually chosen as the first-line treatment, with no initial need for invasive methods in these patients. Only when the proposed treatment is not effective patients are submitted to surgical procedures (sphincter repair, overlapping repair, muscle transposition, prosthesis implantation, sacral neuromodulation, and ostomies).<sup>12-14</sup>

Changing eating habits, controlling the diet, and drinking fluids are the first steps to help these individuals in the formation of a consistent stool, thus avoiding frequent bowel movements. In addition, constipating agents such as loperamide are also prescribed to increase the time of intestinal transit through the small intestine and colon to form more consistent stools.<sup>15</sup>

Currently, pelvic physiotherapy stands out as a possible line of treatment, since its techniques promote reeducation, coordination, and strengthening of the pelvic floor muscles (PFMs) to restore the QOL of these individuals and to enable them to return to their daily life activities (DLAs).<sup>1</sup>

Among the techniques used biofeedback is a therapeutic approach that helps to create a sensitive biological response, and, as a consequence, the patient improves their perception and voluntary contraction of the PFMs.<sup>16</sup> Training with a rectal balloon aims to improve the thresholds for sensory perception and rectal capacity.<sup>17</sup> Functional electrical stimulation is a type of excitomotor electrical current which aims to recruit nerve fibers to promote muscle strengthening and/or resistance, depending on the parameters used.<sup>18</sup> Kinesiotherapy, on the other hand, helps to increase the muscle tone of both type-I and type-II fibers to recover continence, coordination, and strength.<sup>1</sup>

These approaches, isolated or combined, can be effective in the partial or total recovery of the functional diagnosis of

these patients. Thus, the objective of the present article was to conduct a systematic review to learn about the physiotherapeutic treatments that have been used in women aged 18 to 65 years with a diagnosis of AI.

## Materials and Methods

The present is a systematic review guided by a question based on the Patient, Intervention, Comparison, Outcome, Study Design (PICO) strategy (► **Chart 1**): “What are the physiotherapeutic approaches to women aged between 18 and 65 years with a diagnosis of AI?”.

The Health Sciences Descriptors (Descritores em Ciências da Saúde, DeCS, in Portuguese) and the Medical Subject Headings (MeSH) were consulted and combined as follows: *Modalidades de Fisioterapia AND Incontinência Fecal; Fisioterapia AND Incontinência Fecal; Reabilitação AND Incontinência Fecal; Modalidades de Fisioterapia AND Incontinência Anal; Fisioterapia AND Incontinência Anal; Reabilitação AND Incontinência Anal; Modalidades de Fisioterapia AND Incontinência Fecal; Fisioterapia AND Incontinência Fecal; Reabilitación AND Incontinência Fecal; Modalidades de Fisioterapia AND Incontinência Anal; Fisioterapia AND Incontinência Anal; Reabilitación AND Incontinência Anal Physical Therapy Modalities AND Fecal Incontinence; Physical Therapy Specialty AND Fecal Incontinence; Rehabilitation AND Fecal Incontinence; Physical Therapy Modalities AND Anal Incontinence; Physical Therapy Speciality AND Anal Incontinence; Rehabilitation AND Anal Incontinence; Physiotherapy AND Fecal Incontinence: Physiotherapy AND Anal Incontinence Electricalstimulation AND Fecal Incontinence; Electrical stimulation AND Anal Incontinence; Neurostimulation AND Fecal Incontinence; Neurostimulation AND Anal Incontinence; Biofeedback AND Fecal Incontinence; Biofeedback AND Anal Incontinence; Pelvic Floor Muscle Training AND Fecal Incontinence; and Pelvic Floor Muscle Training AND Anal Incontinence.*

The search was conducted on the the following databases: Science Direct, Medical Literature Analysis and Retrieval System Online (Medline) via PubMed, Physiotherapy Evidence Database (PEDro), Scientific Electronic Library Online (SciELO), and Scopus. The search and selection of articles was conducted by two independent researchers, with a third evaluator available in case of discrepancies.

**Chart 1** Representation of the Patient, Intervention, Comparison, Outcome, Study Design (PICO) search strategy

PICO	<b>Population:</b> Women aged 18 to 65 years with anal incontinence
	<b>Intervention:</b> Biofeedback
	<b>Comparison:</b> Other physiotherapeutic interventions in anal incontinence
	<b>Outcome:</b> Physiotherapeutic interventions to treat adult women (aged 18 to 65 years) with anal incontinence
	<b>Study Design:</b> Clinical trials

**Table 1** Application form for the Relevance Tests I and II

Application form for the Relevance Test I		
Inclusion criteria	Yes	No
Does the study address the physiotherapeutic treatments for adult women with anal incontinence?		
Is the article in English, Portuguese or Spanish?		
Exclusion criteria		
Articles that did not focus primarily on physiotherapeutic treatment in women diagnosed with anal incontinence; articles not written in Portuguese, Spanish or English; studies with neurological patients and/or pregnant women; duplicates, reviews, editorials, letters, comments, dissertations, or theses.		
Application form for the Relevance Test II		
Inclusion criteria	Yes	No
Does the study describe the physiotherapeutic treatments used in adult women with anal incontinence?		
Exclusion criteria		
Does the article not focus on the physiotherapeutic treatment for adult women diagnosed with anal incontinence?		

The inclusion criteria were: clinical studies that addressed physical therapy treatments in women aged 18 to 65 years with AI. And the exclusion criteria were: articles that did not focus on physiotherapeutic treatment in female patients diagnosed with AI; articles not written in Portuguese, Spanish or English; articles with neurological patients and/or pregnant patients; and duplicates, review articles, editorials, letters, comments, dissertations or theses.

The articles were submitted to the Relevance Test I (RTI), by reading the titles and abstracts. Then, those that were selected were submitted to the Relevance Test II (RTII), in which the full texts of the articles were read (► **Table 1**).

Using the PEDro scale, two independent authors assessed the methodological quality, and any disparities were resolved through discussion, with the involvement of a third person if necessary. The results of this assessment are presented in ► **Chart 2**.

## Results

A total of 998 articles were identified, and 478 were discarded because they were duplicates. Of the 520 articles left, 472 were excluded for the following reasons: 20 did not meet the language requirements; 55 were not primary studies; 383 did not present outcomes related to the proposed topic; 13 evaluated patients with neurological diseases; and 1 study was excluded because it was on a physiotherapy treatment for AI in pregnant women (► **Fig. 1**).

Regarding the number of articles found by database, the Scopus and Science Direct databases obtained the highest percentages: 45.7% and 25% respectively (► **Table 2**). As for the combined descriptors, *Rehabilitation AND Fecal Incontinence*, *Biofeedback AND Fecal Incontinence*, and *Electrical Stimulation AND Anal Incontinence* were the most found, with percentages of 13.4%, 13.3% and 10.1% respectively (► **Table 3**).

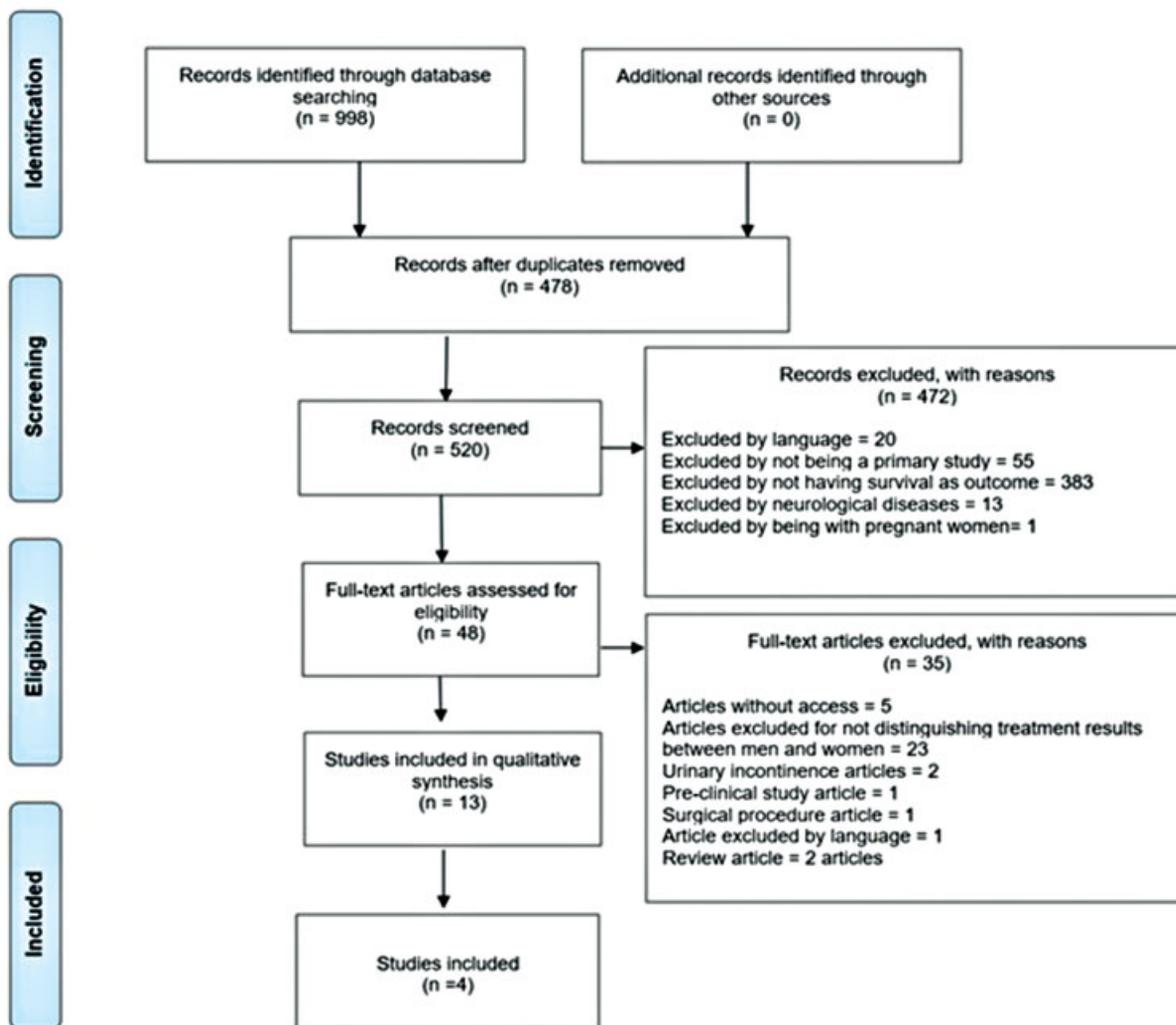
**Chart 2** Quality assessment of the included studies ( $n = 4$ ) according to the Physiotherapy Evidence Database (PEDro) scale

Evaluation criteria (items)	1	2	3	4	5	6	7	8	9	10	11	Total
Author (year)												
Fynes et al. <sup>30</sup> (1999)	1	1	1	1	0	1	0	1	0	1	1	7
Mahony et al. <sup>29</sup> (2004)	1	1	1	1	0	0	0	1	0	1	1	6
Naimy et al. <sup>28</sup> (2007)	1	1	1	1	0	0	0	1	0	1	1	6
Johannessen et al. <sup>36</sup> (2016)	1	1	1	1	0	0	0	1	0	1	1	6

Notes: Score of 0: indicates that the evaluation criteria do not meet the requirements.

Score of 1: indicates that the evaluation criteria meet the requirements.

1) Eligibility criteria and origin criteria; 2) random distribution; 3) hidden distribution; 4) comparisons to the starting point; 5) blinding of individuals; 6) blinding of therapists; 7) blinding of evaluators; 8) ratings > 85%; 9) intention-to-treat analysis; 10) intergroup comparison; 11) measures of precision and variability.



**Fig. 1** Flowchart as per the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement summarizing the selection of articles.

**Table 2** Percentage of scientific articles found in each database

SCIENCE DIRECT		PUBMED		PEDRO		SCIELO		SCOPUS	
N	%	N	%	N	%	N	%	N	%
252	25	148	14.8	83	8.3	58	5.8	457	45.7

Of the 998 articles found, only 4<sup>28-30,36</sup> studies met the inclusion criteria, and **Table 4** presents their results.

The average score of 6.25 on the PEDro scale shows that, in general, the included studies are of methodological good quality. All of them used methods of random distribution (100%); the groups were similar with regard to the most important prognostic indicators (100%); measurements of at least one key result were obtained in more than 85% of the individuals initially distributed among the groups (100%); and intergroup comparisons (100%) were performed and presented the average and variability of the data regarding the results (100%). In all studies the allocation of individuals was secret; only in 1 survey (25%) there was blinding of the

therapists, and in none of them there was blinding of individuals, blinding of the evaluators, and an analysis by intention to treat (**Chart 2**).

## Discussion

Fecal incontinence is a condition that significantly affects QOL, with high social and psychological impacts.<sup>19</sup> According to Freeman and Menees (2016),<sup>20</sup> the prevalence in women ranges from 2% to 25%, depending on age and socioeconomic status. This data often underestimate the true prevalence, as many women avoid commenting on symptoms due to embarrassment, some doctors fail to ask about this topic during

**Table 3** Percentage of articles found according to the combined descriptors searched

COMBINED DESCRIPTORS	ARTICLES FOUND	
	N	%
Modalidades de Fisioterapia AND Incontinência Fecal	2	0.002
Fisioterapia AND Incontinência Fecal	6	0.006
Reabilitação AND Incontinência Fecal	6	0.006
Modalidades de Fisioterapia AND Incontinência Anal	1	0.001
Fisioterapia AND Incontinência Anal	4	0.004
Reabilitação AND Incontinência Anal	1	0.001
Modalidades de Fisioterapia AND Incontinencia Fecal	2	0.002
Fisioterapia AND Incontinencia Fecal	6	0.006
Rehabilitación AND Incontinencia Fecal	14	0.014
Modalidades de Fisioterapia AND Incontinencia Anal	1	0.001
Fisioterapia AND Incontinencia Anal	5	0.005
Rehabilitación AND Incontinencia Anal	8	0.008
Physical Therapy Modalities AND Fecal Incontinence	57	0.057
Physical Therapy Specialty AND Fecal Incontinence	1	0.001
Rehabilitation AND Fecal Incontinence	<b>134</b>	<b>0.134</b>
Physical Therapy Modalities AND Anal Incontinence	48	0.048
Physical Therapy Specialty AND Anal Incontinence	1	0.001
Rehabilitation AND Anal Incontinence	72	0.072
Physiotherapy AND Fecal Incontinence	47	0.047
Physiotherapy AND Anal Incontinence	40	0.040
Electrical Stimulation AND Fecal Incontinence	<b>101</b>	<b>0.101</b>
Electrical Stimulation AND Anal Incontinence	78	0.078
Neurostimulation AND Fecal Incontinence	33	0.033
Neurostimulation AND Anal Incontinence	6	0.006
Biofeedback AND Fecal Incontinence	<b>133</b>	<b>0.133</b>
Biofeedback AND Anal Incontinence	94	0.094
Pelvic Floor Muscle Training AND Fecal Incontinence	52	0.052
Pelvic Floor Muscle Training AND Anal Incontinence	45	0.045
<b>TOTAL</b>	<b>998</b>	<b>100</b>

consultations, and women often avoid seeking medical attention.

The present review included 4 studies<sup>28-30,36</sup> regarding the effectiveness of physiotherapy treatments on the symp-

toms of AI in adult women (aged between 18 and 65 years) after obstetric trauma, with a total population of 242 patients. The literature provides little guidance for physiotherapists and patients on rehabilitation for AI, and few studies have examined the same treatment-result combination within similar timeframes, making it impossible to perform a meta-analysis.

Regarding the initial number of articles found, most did not present titles related to the proposed topic. This is due to the lack of practice in searching for suitable descriptors using the keywords query registered in the DeCS and MeSH.<sup>21</sup>

Andalia et al. (2010)<sup>22</sup> performed a review on the Scopus database and showed that it contains the highest number of citations and high-quality studies related mainly to the clinical sciences. These findings corroborate those of the present study, since the Scopus yielded the highest percentage of scientific articles found (45.7%).

Of the four articles<sup>28-30,36</sup> included in the present review, three performed biofeedback training using different modalities (sensory biofeedback, audiovisual biofeedback, and intraanal electromyographic biofeedback). Biofeedback is a treatment to monitor physiological activities based on visual or auditory signals.<sup>23</sup> According to Damin et al. (2017),<sup>24</sup> it is recommended as the first-line treatment for patients with AI. It acts to improve the contraction of the external anal sphincter and the PFMs, increasing the perception and response capacity to rectal distension. According to Norton and Cody (2012)<sup>25</sup> and Van Koughnett and Wexner (2013),<sup>26</sup> biofeedback has a variable efficiency, ranging from 0% to 80%, which justifies the choice of this treatment by most authors of this study.

Although there are two different devices to perform biofeedback, the objectives of both include sensory training and compliance, strength training, coordination, and resistance of the pelvic floor and sphincters.<sup>20</sup> One is the manometer, in which it is possible to record the contraction of the external anal sphincter with pressure sensors applied to the anal canal; and the electromyographic device, which uses sensors near the anal region to detect the electromyographic activity of the pelvic floor.<sup>27</sup>

Most of the articles included in the present review used electromyographic biofeedback. Heymen et al. (2001),<sup>27</sup> in a comparative study on the effectiveness of types of biofeedback, found an improvement in 74% of the patients undergoing treatment with electromyographic biofeedback, and 64% among those who used the manometer, contrary to the findings of Naimy et al. (2007),<sup>28</sup> in who only observed a subjective improvement in the control of incontinence, without significant results. The multicenter study performed by Van Koughnett and Wexner (2013)<sup>26</sup> showed better results from biofeedback when associated with electromyography and electrostimulation for a period longer than 3 months, which is in agreement with the studies by Mahony et al. (2004)<sup>29</sup> and Fynes et al. (1999).<sup>30</sup>

Of the three studies involving biofeedback, those by Fynes et al. (1999)<sup>30</sup> and Mahony et al. (2004)<sup>29</sup> associated rehabilitation with perianal exercises, showing significant improvement in fecal continence scores and increased average

**Table 4** Comparative effectiveness of physiotherapeutic treatments for anal incontinence in women

References	Study aim	N = randomized; n = analyzed; y = mean age in years;	Etiology of the fecal incontinence; treatment; duration of the follow-up	Study groups (n per group)	Results
Fynes et al. (1999) <sup>30</sup>	To compare the effects of augmented biofeedback with those of sensory biofeedback alone on fecal incontinence and anorectal manometry after obstetric trauma	N = 40; n = 39 y = 32	<b>Etiology:</b> obstetric trauma; <b>treatment:</b> sensory biofeedback, Kegel exercises, sensory biofeedback, and electrical stimulation <b>follow-up:</b> once a week (30 minutes) for 12 weeks	<b>G1 (n = 19):</b> sensory biofeedback + Kegel exercises; <b>G2 (n = 20):</b> audiovisual biofeedback + electrical stimulation	There was a significant improvement in the fecal incontinence scores in both treated groups ( $p < 0.0001$ ); a significant improvement in maximum resting pressure ( $p < 0.01$ ), sphincter contraction pressure ( $p < 0.001$ ), and increased pressure in the anal canal ( $p < 0.002$ ) in the biofeedback + electrical stimulation group
Mahony et al. (2004) <sup>29</sup>	To compare the effectiveness of intraanal electromyographic biofeedback with intraanal biofeedback associated with electrical stimulation of the anal sphincter in the treatment of postpartum symptoms of fecal incontinence	N = 60; n = 54; y = 35 (G1) and 32 (G2)	<b>Etiology:</b> postpartum; <b>treatment:</b> intraanal electromyographic biofeedback, intraanal electrical stimulation, and Kegel exercises; <b>Follow-up:</b> once a week (30 minutes) for 12 weeks	<b>G1 (n = 26):</b> intraanal electromyographic biofeedback + Kegel exercises; <b>G2 (n = 28):</b> intraanal electromyographic biofeedback + intraanal electrical stimulation + Kegel exercises	There was a significant improvement ( $p < 0.001$ ) in the coping/behavior domain of the FIQL questionnaire. Both groups presented a significant improvement in the continence score ( $p < 0.001$ ), as well as in the average compression pressure (G: $p < 0.4$ ; and G2: $p < 0.004$ )
Naimy et al. (2007) <sup>28</sup>	To evaluate the effect of biofeedback and electrical stimulation in the treatment of patients with postpartum fecal incontinence	N = 320; n = 40; y = 36	<b>Etiology:</b> postpartum; <b>treatment:</b> biofeedback and electrical stimulation; <b>Follow-up:</b> 30-minute sessions twice a day for 8 weeks for the biofeedback group, and 20-minute sessions twice a day for 8 weeks for the electrical stimulation group	<b>G1 (n = 19):</b> biofeedback; <b>G2 (n = 21):</b> electrical stimulation	Both treatments resulted in an improvement in the subjective perception of incontinence control. There was a significant difference in the reduction of the St. Mark's score in the intervention group from baseline to posttreatment ( $p < 0.05$ ). There was no significant pretreatment and posttreatment differences in the Wexner score, reduced quality of life scale, and FIQL scale scores in the groups treated with biofeedback and electrical stimulation
Johannessen et al. (2017) <sup>36</sup>	To evaluate the effect of exercises for pelvic floor muscles in patients with postpartum anal incontinence	N = 570; n = 109; y = 29,7 (G1) and 30,6 (G2)	<b>Etiology:</b> postpartum; <b>treatment:</b> exercises for the pelvic floor muscles; <b>follow-up:</b> daily for 6 months	<b>G1 (n = 54):</b> exercises for the pelvic floor muscles; <b>G2 (n = 55):</b> control group (patients received written information by the physiotherapist about exercises for the pelvic floor muscles)	There was a significant difference in the reduction of the St. Mark's score in the intervention group from baseline to posttreatment ( $p < 0.05$ ). There was a significant reduction in gas leakage after treatment in both groups ( $p < 0.001$ ). There was a reduction in fecal urgency after treatment of the group treated with exercises for the pelvic floor ( $p < 0.005$ )

sphincter pressure respectively. For Jelovsek et al. (2015),<sup>19</sup> anal sphincter exercises with biofeedback increase the compression strength of the anal sphincter through strength training and, when combined with sensory training, may increase sensory thresholds in patients with urge incontinence (hypersensitivity).

Electrical stimulation is another therapeutic approach for the treatment of AI, which aims to provide sensorimotor stimuli for the PFMs. The application of excitomotor currents improves muscle tone and motor awareness, enabling an increase in the contraction capacity of the anal canal.<sup>31</sup> This modality was applied intracavitary by Naimy et al. (2007)<sup>28</sup> in isolation, and by Fynes et al. (1999)<sup>30</sup> and Mahony et al. (2004)<sup>29</sup> combined with audiovisual and electromyographic biofeedback respectively.

Regarding the choice of intracavitary electrical stimulation, it is noted that, unlike electrostimulation of the sacrum nerve and percutaneous tibial nerve, the sphincter is directly stimulated, improving the stability of the pelvic floor, which facilitates and can promote a better voluntary muscle contraction, avoiding the use of accessory muscles.<sup>32</sup>

There is little scientific evidence to prove the therapeutic potential of electrical stimulation in AI, which makes it difficult to apply it in isolation, as was the case of the study by Naimy et al. (2007),<sup>28</sup> in which there was no significant improvement after the isolated application in the group treated by endo-anal electrical stimulation. However, Mahony et al. (2004)<sup>29</sup> and Naimy et al. (2007)<sup>28</sup> showed significant improvement associating biofeedback with electrostimulation, corroborating the review by Hosker et al. (2000),<sup>33</sup> who reported benefits of both treatments together in the short term in cases of AI after obstetric trauma.

Rehabilitation of the PFMs is a term that incorporates different approaches, including PFM training performed under the guidance of a pelvic physiotherapist. Physiotherapy aims to improve strength, tone, resistance, and muscle coordination, in addition to promoting perineal awareness and improving sensitivity.<sup>34</sup> García López (2002)<sup>35</sup> reported that perianal exercises improve the coordination and strength of the pelvic floor, as well as the functional tone in the voluntary contraction of the external anal sphincter and muscle mass of the pelvic floor, without interfering with the internal anal sphincter.

Exercises for the PFMs are effective in preventing and treating AI in pregnant women and in those in the postpartum period, as evidenced by Johannessen et al. (2017),<sup>36</sup> with a significant reduction in the incontinence score, gas leakage and fecal urgency. In addition, one of the fundamental factors for the success of rehabilitation is the sensorymotor awareness of the pelvic region and a good patient-therapist relationship to provide information and instructions on the treatment. This could also be observed in the study by Johannessen et al. (2017),<sup>36</sup> in which the control group, who received only written information by the physiotherapist about exercises for the PFMs, did not achieve any significant improvement.

## Conclusion

In the present review, we recorded the following techniques for the treatment of AI and FI: pelvic floor exercises; muscle strength and endurance training guided by biofeedback; rectal sensitivity guided by biofeedback; and coordination and electrical stimulation training. The average score on the PEDro scale of the four articles included in the present study was of 6.25; therefore, it was not possible to assess the real cost-benefit ratio in relation to the techniques used. However, it is necessary to emphasize that the results of the application of these techniques were promising regarding the improvement of the symptomatic framework. There is an evident need for studies with better frameworks to validate the effectiveness of the techniques used in the treatment of AI and IF.

## Conflict of Interests

The authors have no conflict of interests to declare.

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