

## Effectiveness of biofeedback therapy in patients with chronic constipation

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**ABSTRACT: Purpose:** The purpose of this study was to evaluate the effect of physical therapy in women diagnosed with chronic constipation using functional training of the pelvic floor (biofeedback). **Patients and Methods:** From March 2009 to March 2010, 67 women with chronic constipation were prospectively evaluated. The patients were evaluated and the constipation score proposed by Agachan et al. was applied. Then, they were sent to biofeedback. These patients were divided into 2 groups: with anismus (group I: mean age of 46.90 years old) and without anismus (group II: mean age of 44.89 years old) and diagnosed by anorectal electromanometry. The treatment was performed with different exercises for each group, associated with some hygieno-dietetic directions. At the end of treatment, the constipation score was reapplied. **Results:** Pre-biofeedback constipation score in group I was 15.04 (standard deviation – SD=2.48) and post-biofeedback constipation score was 3.39 (SD=1.62) ( $p<0.0001$ ). Pre-biofeedback constipation score in group II was 14.82 (SD=2.401) and post-biofeedback constipation score was 2.90 (SD=1.64) ( $p<0.0001$ ). Besides, a significant difference ( $p<0.005$ ) was observed between the groups regarding the number of biofeedback sessions. **Conclusion:** Thus, the authors conclude that biofeedback is effective in the treatment of constipation.

**Keywords:** biofeedback; constipation; pelvic floor.

**RESUMO: Objetivo:** Este trabalho objetivou avaliar o efeito do tratamento fisioterapêutico, em mulheres diagnosticadas com constipação crônica, utilizando treinamento funcional do assoalho pélvico (*biofeedback*). **Casística e Método:** No período de março de 2009 a março de 2010, foram avaliadas, prospectivamente, 67 mulheres com constipação intestinal. As pacientes foram avaliadas e o escore de constipação, proposto por Agachan et al., foi aplicado; então, foram encaminhadas ao *biofeedback*. Essas pacientes foram divididas em 2 grupos: com anismus (56 pacientes do grupo I: média de idade 46,90 anos) e sem anismus (11 pacientes do grupo II: média de idade 44,89 anos), diagnosticadas pela eletromanometria anorretal. Para o tratamento, foram estipulados exercícios diferentes para cada grupo, associados com orientações higienodietéticas. Ao fim do tratamento, foi reaplicado o escore de constipação. **Resultados:** O escore de constipação do grupo I, na avaliação pré-*biofeedback*, foi 15,04 (desvio padrão – DP=2,48) e, no pós-tratamento, foi 3,39 (DP=1,62) ( $p<0,0001$ ). O escore de constipação do grupo II, na avaliação pré-*biofeedback*, foi 14,82 (DP=2,401) e, no pós-tratamento, foi 2,90 (DP=1,64) ( $p<0,0001$ ). Além disso, em relação ao número de sessões de *biofeedback* entre os grupos, houve diferença significativa ( $p<0,005$ ). **Conclusão:** Concluiu-se que o *biofeedback* é eficaz no tratamento da constipação intestinal.

**Palavras-chave:** *feedback* de eletromiografia; constipação intestinal; diafragma da pelve.

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## INTRODUCTION

In the last 20 years, great concepts have been established regarding the functional disorders of pelvi-perineal musculature in constipation. Constipation is neither a disease nor a sign, but a symptom, and as such, it is associated with disorders of intestinal motility or pelvic floor, or both<sup>1,2</sup>. Epidemiological studies have consistently shown elevated prevalence of constipated patients, reaching up to 20–30% of the adult population in the Western hemisphere<sup>3,4</sup>.

Constipation is defined as a delay in fecal elimination or abnormal fecal retention into the bowel. The clinical presentation does not have a single definition, widely accepted and helpful from the clinical perspective, but, according to the Rome III Criteria, it is characterized by persistent frequency of evacuations less than three times a week, difficult evacuation at least 25% of the times, sensation of incomplete evacuation and intestinal obstruction in more than 25% of the evacuations, hard and dry stool and digital stimulation to help stool removal in more than 25% of the evacuations<sup>5</sup>.

When evaluating constipation, first, secondary systemic and intestinal causes that can alter and/or block the intestinal flow should be excluded. The exclusion of secondary causes defines the group of patients with functional intestinal constipation, colonic constipation (colonic inertia and intestinal dysmotility) and rectal constipation (obstructed evacuation) or the association of these types. This group presents multifactorial etiology, involving anatomical, functional, psychological and sociocultural aspects.

Agachan et al.<sup>6</sup> proposed a constipation questionnaire, in which they consider the following information as priority for constipation diagnosis: pain during evacuation, abdominal pain, attempt to evacuate within minimum time in the toilet, unsuccessful attempt to evacuate within 24 hours, duration of years of constipation, assistance, intestinal frequency and sensation of incomplete evacuation.

For many years, constipation was treated with no worry about knowing the physiological behavior of the anal canal. During defecation, the pelvic diaphragm musculature and the anal sphincters need to relax to enable the perineum to move downwards and the anal canal to open. In the presence of any anatomi-

cal or functional dysfunction, this relaxation will not be insufficient or absent<sup>7,8</sup>.

The pelvic floor rehabilitation through biofeedback is a technique that uses perianal electrodes associated with a graphic representation that promptly and continuously shows some of its internal, normal and abnormal physiological events, in the form of visual and/or hearing signs. This is a device that measures, evaluates and treats neuromuscular dysfunctions. And it efficiently evaluates the pelvic floor muscles by monitoring the pelvic floor force and stiffness. It mainly favors the relaxation training, consequently improving mobility, flexibility and muscle coordination<sup>7,9-11</sup>.

## OBJECTIVE

This study has the purpose to evaluate the effect of physical therapy in women diagnosed with chronic constipation using functional training of the pelvic floor (biofeedback).

## PATIENTS AND METHODS

From March 2009 to March 2010, a prospective study was conducted with 71 women with intestinal constipation from the Outpatient Clinic of Coloproctology at Gastroclínica, in Cascavel (PR).

The patients were evaluated by colonoscopy, anorectal electromanometry and the constipation score proposed by Agachan et al.<sup>6</sup> was applied; after that, they were sent to biofeedback. These patients were divided into 2 groups: with anismus (group I) and without anismus (group II) and diagnosed by anorectal electromanometry.

The mean age in group I was 46.90 years old (ranging from 28 to 67 years old) and in group II was 44.89 years old (14 to 73 years old). All of them signed the Free Consent Term and accepted to participate in this study approved by the Medical Ethics Committee of the Universidade Estadual do Oeste do Paraná (UNIOESTE).

The anamnesis, physical evaluation and biofeedback treatment were performed at Gastroclínica by a single physical therapist.

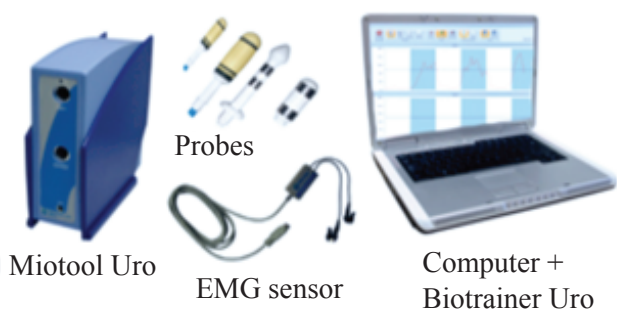
First, the physical exam was performed with the patient in left lateral decubitus, without rectal preparation, to evaluate the anal-cutaneous reflex and perform the rectal digital inspection and examination, for

a functional assessment of the pelvic floor (FAPF). According to Ortiz<sup>12</sup>, the assessment is scored 0 to 5, being: 0, no objective perineal function, neither at palpation; 1, absent objective perianal function, recognized at palpation only; 2, deficient objective perianal function, recognized at palpation; 3, objective perineal function, without opposing resistance to pal-

pation; 4, objective perineal function and opposing resistance not maintained at palpation; 5, objective perineal function and opposing resistance maintained at palpation for more than 5 s. After that, the patient was placed in dorsal decubitus position and the analysis of clitoral sensitivity and reflex was performed.

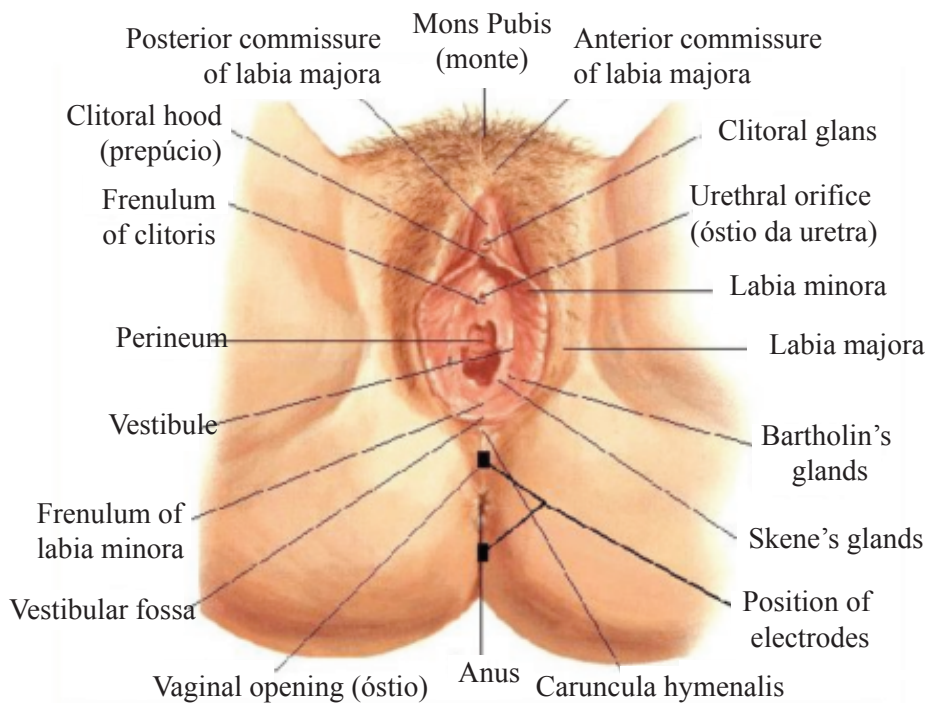
After these evaluations, the treatment was conducted with biofeedback using an electromyographic device – Miotool 400 (Miotec Equipamentos Biomêcanicos® (Porto Alegre, RS, Brazil) (Figure 1). This device has a 4-channel system with up to 8-fold gain each, 14-bit resolution and sampling frequency of 2000 Hz per channel. Only one channel is used, with 2 differential surface sensors SDS500, connected with disposable electrodes (1.9 cm diameter). The surface electrodes were placed anteriorly and posteriorly to the anus (Figure 2), and one reference electrode (earthing electrode) was placed in a bony surface, in this case, in the anterior superior iliac spine.

Both groups were submitted to a protocol of exercise created by the authors that consisted in the following:



Biofeedback device produced by MIOTEC

Figure 1. Electromyographical device – Miotool 400.



Source: Vetter, Frank H. Atlas de Anatomia Humana. 2ed. Porto Alegre: Artmed; 2000

Figure 2. Locations of surface electrodes placed in the perineal region.

- group I: exercises of sustained contraction for 40 s, followed by relaxation for 8 s and evacuation effort. The number of repetitions during the session varied according to the patient's muscular resistance;
- group II: exercises of sustained contraction for 40 s, followed by relaxation for 8 s and evacuation effort, followed by 10 repetitions of sustained contraction for 2 s and relaxation for 5 s. This sequence was performed twice.

Both groups were instructed to not contract accessory muscles, such as abdominal, gluteal and adductor muscles<sup>13</sup> and encouraged to perform the exercises daily.

In the beginning of the treatment, the patients received recommendations to be observed at home, during all the treatment, such as increase the intake of fibers – such as fruits, vegetables and cereals<sup>14,15</sup>; keep the daily water intake above 1 L<sup>14,15</sup>; never ignore evacuation reflexes, never hesitate to evacuate if feeling so<sup>16</sup>; perform physical activities<sup>17</sup>; respect the correct evacuation position, i.e., legs wide apart, elbows on the knees, making abdominal force to help the evacuation<sup>8,13</sup>.

The number of sessions ranged from 4 to 29 (mean of 13.25). At the end of the treatment, the constipation score proposed by Agachan et al.<sup>6</sup> was applied again.

## RESULTS

Group I had 56 patients. From these, 22 had had vaginal births and 20 some type of orificial surgery, with mean time of constipation of 20.18 years (0.6–56). Forty-five patients presented soiling associated with constipation before biofeedback, and only one in after biofeedback. The constipation score proposed by Agachan et al.<sup>6</sup> was 15.04 (standard deviation 2.48) at the pre-biofeedback evaluation and 3.39 (standard deviation 1.62) at the post-biofeedback evaluation – Chart 1 ( $p < 0.0001$ ). The number of biofeedback sessions in this group was 13.85 weeks.

Group II had 11 patients. From these, 8 had had vaginal births and 5 some type of orificial surgery, with mean time of constipation of 18.22 years (0.5–37). Nine patients presented soiling associated with constipation before biofeedback, and none of them pre-

sented this symptom after biofeedback. The constipation score proposed by Agachan et al.<sup>6</sup> was 14.82 (standard deviation 2.401) at the pre-biofeedback evaluation and 2.90 (standard deviation 1.64) at the post-biofeedback evaluation – Chart 2 ( $p < 0.0001$ ). The number of biofeedback sessions in this group was 10.27 weeks.

No significant difference was observed between the analyzed groups in relation to pre-biofeedback and post-biofeedback score ( $p = 0.44$ ) (Charts 3 and 4); however, a significant difference ( $p < 0.005$ ) was observed in the number of biofeedback sessions between the groups.

The colonoscopy exams of all participants did not show alterations that justified constipation. Regarding the sensitivity, reflex and functional assessment of the pelvic floor performed at the evaluation, all patients presented preserved items.

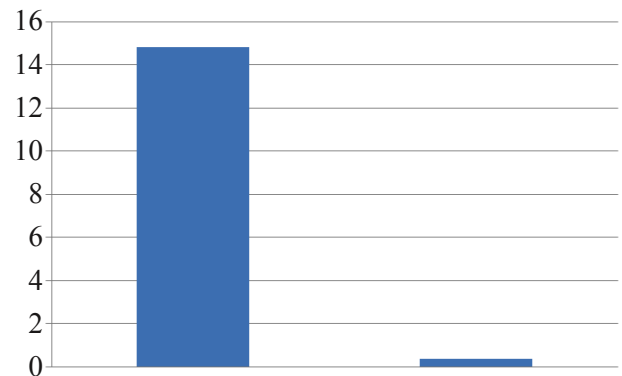


Chart 1. Constipation score proposed by Agachan et al.<sup>6</sup> in group 1.

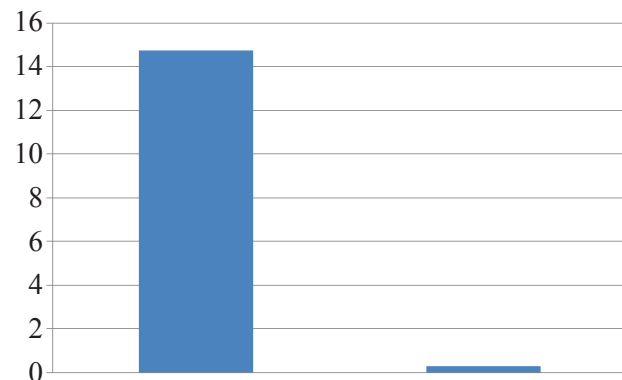
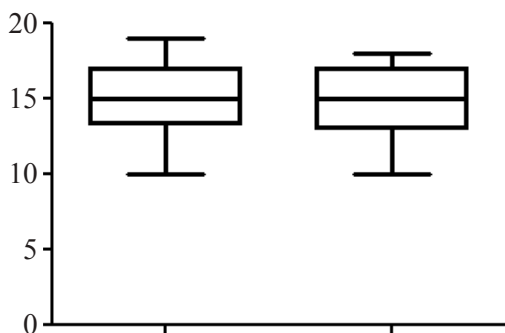


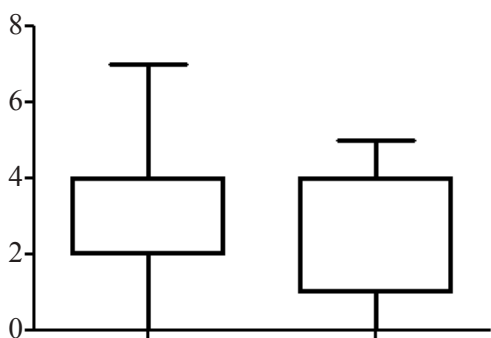
Chart 2. Constipation score proposed by Agachan et al.<sup>6</sup> in group 2.





$p > 0.05$

**Chart 3.** Comparison of pre-biofeedback constipation scores between groups I and II.



$p > 0.05$

**Chart 4.** Comparison of post-biofeedback constipation scores between groups I and II.

## DISCUSSION

Data on the subject have shown that constipation considerably interferes in many aspects of the quality of life, affecting the individual's routine, mood, and professional and leisure activities<sup>18-20</sup>.

According to the literature, biofeedback for the pelvic floor is an important resource used to treat evacuation dysfunctions, with positive results regarding restored force and relaxation<sup>21,22</sup>.

The pelvic floor rehabilitation includes exercises to normalize the muscle tone, and it is used to strengthen the hypotonic areas and relax the hypertonic areas<sup>21,22</sup>. The success of a treatment depends on the patient's motivation and capability to understand the instructions provided by the therapist. In addition, the structural integrity of the sphincter muscle should be preserved.

In the past, there was no consensus on the definition of pelvic floor dysfunction and obstructed defecation, and then some criteria started to be developed, defining that, in assisted evacuation, patients should not have inadequate contraction or failure to relax the pelvic floor muscles, inadequate propulsive force and incomplete evacuation force. Although presumably acquired, these dysfunctions are usually caused by behavioral disorders<sup>11,23,24</sup>.

The treatment with biofeedback is based on pelvic floor training, using manometry or electrical stimulation<sup>25,26</sup>, associated with sound or visual stimulation. The purpose is to obtain a more adequate muscle response with active exercises of contraction and relaxation and enable the patient's proper perception of the mechanisms involved in evacuation. Then, it will involve changes to improve and coordinate the various stages of evacuation through directions provided by the therapist and the active participation of the patient.

Gilliland et al.<sup>27</sup>, in a study that included 194 constipated patients submitted to biofeedback, did not observe any difference in the results from the utilization of electromyography or electromanometry and suggest at least 5 sessions of biofeedback in the treatment of anismus. The various series of studies in the literature report success rate in 25–70% of the cases<sup>28,29</sup>. According to the general result obtained by the authors in this study, the physical therapy using biofeedback in patients with constipation was satisfactory. A reduction was observed in the constipation score from 15.04 (pre-biofeedback) to 3.39 (post-biofeedback) in group I and from 14.82 (pre-biofeedback) to 2.90 (post-biofeedback) in group II. The comparison of pre-biofeedback and post-biofeedback scores between the groups did not show a statistically significant difference. However, regarding the number of biofeedback sessions between the groups, a significant difference was observed, indicating that the patients in group I required more sessions for rehabilitation.

It should be noted that constipation rarely occurs alone and is frequently associated with other pelvic floor problems, such as urinary disorders (bladder alterations), sexual dysfunctions and chronic pain<sup>30</sup>. The authors observed reduced pain in these patients (reduced constipation score) and improvement in associated soiling.

One of the aspects that should be taken into account is that a realistic evaluation of the patient's

physical and mental capabilities is required for a successful therapy like this one<sup>31</sup>

Many authors suggest that the biofeedback treatment for constipation has limited therapeutic effect<sup>32</sup> and, because of that, the authors suggest a re-assessment six months after the end of the treatment mentioned above.

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## CONCLUSION

The results obtained in this study confirm that biofeedback was effective in the treatment of constipation and associated pelvic floor disorders, such as soiling. Thus, the authors conclude that biofeedback is effective in the treatment of intestinal constipation.

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