Digestive and Liver Disease 46 (2014) 237–242

Contents lists available at ScienceDirect

Digestive and Liver Disease

journal homepage: www.elsevier.com/locate/dld

Alimentary Tract

# Perineal retraining improves conservative treatment for faecal incontinence: A multicentre randomized study

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ARTICLE INFO

*Article history:*
Received 5 August 2013
Accepted 1 November 2013
Available online 17 January 2014

*Keywords:*
Anal incontinence
Biofeedback
Quality of life
Randomized clinical trial

ABSTRACT

*Background:* Anal incontinence is a frequent complaint that profoundly affects quality of life. Our aim was to determine whether perineal retraining gives additional benefits to standard medical treatment.
*Methods:* Patients with anal incontinence and a Wexner score >4 were randomly assigned to standard conservative treatment (control) or perineal retraining, including biofeedback, in addition to standard treatments (biofeedback). Diaries, self-administered questionnaires and satisfaction scores quantified the benefits. Self-evaluated improvement was the primary outcome measure. A score ≥3 (in an improvement scale from −5 to +5) defined success.
*Results:* Overall, 157 patients were included; 80 in the control group (75% females, mean age 60.1 ± 13.2 years) and 77 in the biofeedback group (79% females, mean age 61.9 ± 10.2 years). After a 4-month follow-up, the success rate was significantly higher in the biofeedback group (57% versus 37%; $p < 0.021$). In the biofeedback group, daily stool frequency, leakage, and faecal urgency significantly decreased, and daily non-urgent perception of stool increased. Conversely, symptomatic scores and quality of life scales did not significantly differ between groups. In a multivariate model, the adjusted odds ratio showed that perineal retraining was significantly associated with a higher chance of self-rated improvement (adjusted Odd Ratio [95%CI]: 2.34 [1.14–4.80]; $p = 0.021$).
*Conclusions:* Perineal retraining offers a moderate but significant benefit for patients suffering from anal incontinence.


## 1. Introduction

Anal incontinence (AI) is a frequent complaint with potentially devastating consequences for quality of life. A recent study confirmed the high prevalence of this symptom in the general population (8.3% of subjects complain of anal leaking at least once a month), which increases with age (affecting 15.3% of adults older than 70 years) [1]. It has been repeatedly shown that AI results in considerable embarrassment and anxiety [2,3]. Moreover, several studies showed a significant correlation between the severity of AI symptoms and decreased quality of life [2,4].

The non-surgical treatment of AI relies on both dietary counselling and drugs to modify stool consistency, and on behavioural interventions such as biofeedback [5,6]. The efficacy of behavioural management has been advocated in many retrospective or uncontrolled studies [5,7]. AI is not a well-defined pathology but a

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http://dx.doi.org/10.1016/j.dld.2013.11.002

syndrome that groups common symptomatic features, such as faecal leakage and urgency. Bowel habits, stool consistency, cognitive functions, autonomy, locomotion, psychological status, and social considerations may impact AI as much as anorectal physiology [8]. Moreover, these events may induce daily variations of continence that make evaluation of treatment effect more difficult. Several clinical profiles have been defined that imperfectly correlate with anal physiology, such as faecal urgency (associated with decreased squeeze anal pressures) and passive incontinence or soiling (associated with low anal resting pressure) [9,10]. Both conditions may occur in association with each other, and perineal retraining might be more useful in the former condition than in the latter. Unfortunately, no previous study was able to identify specific profiles that might benefit from perineal retraining [9,11,12]. For all these points, there are inter-individual variations in the recorded items and, consequently, large dispersion around the mean values. This may have limited the demonstration of a significant effect of the treatment.

A Cochrane systematic review of all randomized trials evaluating biofeedback and/or anal sphincter exercises was recently published, and concluded that the limited number of trials and their methodological weaknesses did not allow the assessment of the efficacy of these treatments [13]. Recent randomized controlled studies showed discrepancies in the relative efficacy of biofeedback per se, pelvic floor exercises, and supplemental advice and education [12,14–16]. Furthermore, all trials were performed in single referral centres and did not take into account the variability of the biofeedback techniques used in clinical practice.

The goal of this study was thus to conduct a multicentre randomized controlled trial to determine whether a standard medical treatment associated with standardized perineal retraining (including biofeedback) was more effective than standard medical treatment alone.

## 2. Materials and methods

### 2.1. Patients

The ORALIA Trial was conducted between September 2006 and March 2010 (recruitment period), and all data were gathered by March 2011. Candidates for inclusion in the trial were patients referred for AI to 8 centres in France (Lyon, Rennes, Nice, Grenoble, and 4 centres in Paris). All patients aged between 18 and 85 years who attended the outpatient clinics of these departments for AI were invited to participate in the trial. AI was defined as involuntary and/or uncontrolled gas and/or stools through the anus. Symptoms had to have been present for at least the last 6 months (i.e. at least a gas or liquid leak once a week for at least 6 months with impact on quality of life), and patients had to have a Cleveland Clinic Faecal Incontinence score (CCFI, Jorge & Wexner score) ≥5 [17]. Exclusion criteria were past perineal retraining sessions, vaginal delivery or perineal surgery within the last 6 months, active inflammatory bowel disease, indication of a surgical treatment for AI (e.g. rectal prolapse), and ongoing sacral nerve stimulation. All patients underwent an initial examination to determine eligibility for the study, and recto-anal manometry and endo-anal ultrasound (EUS) were performed before all eligible patients were randomized into treatment groups.

### 2.2. Ethics

An Ethics Committee (CPP Sud-Est III on August 6th, 2006) approved the study, which was declared on ClinicalTrials.gov (NCT00387439). Written informed consent was obtained from all patients. All authors had access to the study data and reviewed and approved the final manuscript.

### 2.3. Therapeutic interventions

Before the start of the study, a preliminary meeting brought together all the investigators in order to standardize diagnostic procedures and therapeutic options. These options were based on the French Guidelines for therapeutic management of faecal incontinence [18]. The investigators' group proposed to adapt bowel management with dietary counselling (dietary book support) and stool transit-modifying drugs according to the quality of bowel transit (normal, constipation, or diarrhoea). Osmotic laxatives, bulking agents, and loperamide were the main options [18]. The physiotherapists involved in the trial were part of a national network and could be either hospital-based or in private practice. Thus, a preliminary step also included the agreement on and the writing of a standardized perineal retraining protocol and the formal training of the physiotherapists. The standardized protocol was based on 20 sessions of 30 min with the physiotherapist, all performed within a 4-month period at an initial rate of 2–3 sessions per week for the first 4 weeks, and 1–2 sessions per week thereafter. These 20 sessions included 5 initial sessions dealing with education, optimization of rectal evacuation (anal relaxation, body position, and gentle squeezing pressure), and rectal sensitivity (rectal isovolumic distension testing in order to decrease the first sensation threshold into normal ranges). The retraining of anal voluntary squeeze and abdominal and pelvic coordination completed them. The following 15 sessions aimed at acquiring competence at anal voluntary squeeze and at abdominal and pelvic coordination (manual techniques, BFB with anal device, and abdominal breathing). The squeezing exercises combined long-duration contractions and short-duration contractions using a biofeedback device. Each series of contractions was separated from the other by a resting period of which the duration was twice as long as the squeezing period. These sessions were completed by daily home-based anal exercises combining short and long contractions [14,19].

### 2.4. Standardized measurements

Standardized interviews and self-administered questionnaires were based on the CCFI, and a validated constipation score (KESS) [17,20]. Quality of life was assessed by a specific Faecal Incontinence Quality of Life scale (FIQL) and by a non-specific Quality of Life scale (SF12) [21,22]. At home, patients filled out daily diaries of stool, gas or liquid leaking events, and the number of pads used. A diary of the home-based rehabilitation training was also completed. To independently quantify their own clinical improvement, patients were invited to evaluate the evolution of their AI symptoms using a scale ranging from −5 (significant aggravation) to +5 (significant improvement), with 0 meaning no significant change [14]. This assessment was obtained before the follow-up visit with the physician in order to minimize the impact of the patient–doctor relationship.

### 2.5. Randomization

Patients were randomly assigned to 1 of the 2 groups: standard medical conservative treatment alone (SC group) or perineal retraining treatment including biofeedback (BFB group). Both groups received counselling with the delivery of dietary recommendations and adapted treatments to control their bowel movements. For all patients, modification of laxative dose and/or loperamide dose was continued throughout the study. Randomization was centralized at the public health department of the University Hospital of Lyon and was stratified by centre in blocks of 6.

### 2.6. Outcome measures

No single tool was found in the literature that was considered satisfactory for the purpose of this study. Given the lack of a gold standard of evidence, we decided to evaluate the outcome using both subjective and objective measures. As suggested by Norton et al. [19], the patient's own view of the effectiveness of the treatment was used as the primary measurement of outcome. Each patient rated his view of the treatment's effectiveness as a change on an ordinal scale from −5 to +5 [14]. A success was defined as a rating ≥+3.

Secondary outcome measures included: the self-rated effectiveness score as "worse", "same", "improved", or "very improved"; the change in bowel symptoms as recorded by a bowel symptom questionnaire and a bowel diary; the change in continence as measured by the CCFI score; and the change in quality of life scales (SF-12; FIQL). Scores were calculated only if more than half of the items were answered.

The form for the self-assessed change scores (both qualitative and quantitative scales) was filled out at the patient's 4-month visit. A research nurse who was blind to group assignment collected the forms. The same procedure was used for all other questionnaires and diaries. Thus, all outcome measures were self-completed by patients without the presence of a physician.

### 2.7. Sample size

With a statistical power of 80% and a two-sided alpha of 0.05, the sample size needed to detect a 22% absolute difference in the patients' rating of the changes between the intervention and the control arms was 158 (arcsin approximation method), with an estimated 35% proportion of success in the control group.

### 2.8. Statistical analyses

All statistical analyses were performed with the Statistical Analysis System (SAS®) software version 9.2 (SAS Institute, Cary, NC). Patients who withdrew or dropped out between baseline and the 4-month follow-up visit were excluded from the outcome analysis.

Continuous variables are expressed as means (standard deviation) or medians (range), as appropriate; categorical variables are presented as frequencies and percentages. The chi-squared test or the Wilcoxon rank sum test (as appropriate) were used to compare the baseline characteristics of the patients, as well as the primary and secondary outcomes between the BFB group and the SC group.

A logistic regression analysis was performed to predict a self-assessment score of a change ≥+3 after controlling for the perineal retraining and adjusting by individual covariables. Explanatory covariables included the following: perineal retraining therapy, age, gender, history of anorectal surgery, the maximal voluntary anal squeeze duration and amplitude, the threshold and constant rectal sensations to volume distension, the presence of an anal sphincter defect on EUS, the number of daily stools at baseline, and the CCFI score at baseline. Mean substitution values were used to replace missing values (7 cases for the squeeze duration variable, 5 for the squeeze pressure increment, 3 for the threshold rectal sensation, 8 for the constant rectal sensation to volume distension, and 2 for the number of daily stools at baseline). Variables were stepwise selected according to the statistical significance affecting the discrimination between groups. The results are given as adjusted odds ratios (OR) with associated 95% confidence intervals. A Wald statistic was used to test the significance of each variable in the model. All statistical tests were two-sided with a $p$-value less than 0.05 regarded as significant.

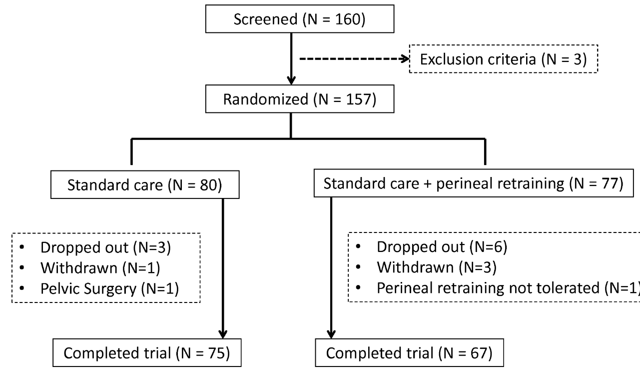


**Fig. 1.** Study flow chart.

## 3. Results

One hundred and sixty patients consented to participate in the study, of which 157 met the inclusion criteria and were randomized into either the SC group or the BFB group. In the SC group, 3 patients dropped out, 1 withdrew and 1 had pelvic surgery. In the BFB group, there were 6 withdrawals (Fig. 1). No relevant unintended effects were observed in both groups. After a 4-month follow-up, 75/80 patients from the SC group and 67/77 from the BFB group completed the evaluation. At baseline the 2 groups were similar with regard to duration of symptoms, history of pelvic surgery, and magnitude of AI symptoms. Anal squeeze duration and anal squeeze pressure increment (anorectal manometry data) were higher in the SC group, and a past history of anorectal surgery was more frequent in the SC group (Table 1).

At the end of the 4-month follow-up, the proportion of success, as measured by improvement scoring (main outcome criterion ≥+3), was significantly higher in the BFB group than in the SC group (57% versus 37%, respectively; $p = 0.021$). The self-assessed score of treatment effectiveness (ranging from −5 to +5) was higher in the BFB group (2.3 (1.5) versus 1.7 (2.0)), although the difference did not reach statistical significance ($p = 0.059$). After biofeedback

**Table 1**
Baseline patient characteristics according to treatment group.

| | Standard care | Biofeedback | $p$ |
|---|---|---|---|
| Number of patients | 80 | 77 | |
| Mean age (years) | 60.1 ± 13.2 | 61.9 ± 10.2 | 0.739 |
| Female gender, $N$ (%) | 60 (75) | 61 (79) | 0.529 |
| Duration of anal incontinence (years) | 6.3 ± 6.5 | 7.4 ± 7.3 | 0.267 |
| History of anorectal surgery, $N$ (%) | 19 (24) | 8 (10) | 0.027 |
| History of bladder surgery, $N$ (%) | 14 (18) | 15 (19) | 0.749 |
| History of bowel surgery, $N$ (%) | 34 (43) | 36 (47) | 0.592 |
| Gynecologic past history, $N$ (%) | 22 (37) | 26 (43) | 0.503 |
| Obstetrical history, $N$ (%) | | | |
| Forceps | 18 (30) | 25 (41) | 0.226 |
| Menopause | 49 (82) | 49 (82) | 0.684 |
| Diabetes, $N$ (%) | 4 (5) | 9 (12) | 0.129 |
| Antidepressant treatment, $N$ (%) | 11 (14) | 15 (19) | 0.369 |
| Antidiarrhoeal treatment, $N$ (%) | 51 (64) | 47 (61) | 0.687 |
| Mean CCFI score | 11.5 ± 3.4 | 11.2 ± 3.5 | 0.486 |
| Endoanal ultrasound results, $N$ (%) | | | |
| Defects | 30 (38) | 27 (35) | 0.798 |
| Atrophy | 19 (24) | 15 (20) | 0.573 |
| Anorectal manometry results | | | |
| Mean resting pressure (cm $H_2O$) | 49.7 ± 26.3 | 58.1 ± 60.3 | 0.694 |
| Mean squeeze duration (s) | 30.6 ± 52.9 | 19.4 ± 14.9 | 0.018 |
| Mean squeeze pressure increment (cm $H_2O$) | 63.6 ± 48.9 | 49.7 ± 46.5 | 0.030 |
| Threshold perception volume (ml) | 18.9 ± 15.9 | 17.6 ± 13.2 | 0.925 |
| Constant perception volume (ml) | 73.2 ± 34.9 | 75.6 ± 38.5 | 0.445 |

Results are expressed as man ± standard deviation. CCFI, Cleveland Clinic Faecal Incontinence score.

**Table 2**
Changes in stool diary with regard to treatment group.

| | SC group ($n = 52$)[a] | | | BFB group ($n = 40$)[a] | | | $p$-Value |
|---|---|---|---|---|---|---|---|
| | Baseline | 4-Month follow-up | Difference | Baseline | 4-Month follow-up | Difference | |
| No. of daily stools | 2.0 (2.0) | 1.6 (0.9) | −0.4 (1.9) | 2.4 (1.9) | 1.7 (1.5) | −0.6 (0.8)*** | 0.002** |
| No. of daily leaks | 0.7 (1.6) | 0.4 (0.5) | −0.4 (1.7)* | 0.8 (0.7) | 0.5 (0.9) | −0.3 (0.8)** | 0.385 |
| No. of daily faecal urgency | 0.4 (0.3) | 0.3 (0.3) | −0.1 (0.3) | 0.5 (0.4) | 0.3 (0.3) | −0.1(0.03)* | 0.488 |
| No. of daily normal stool perception | 0.5 (0.3) | 0.6 (0.3) | 0.1 (0.3) | 0.4 (0.4) | 0.5 (0.4) | 0.1 (0.4)* | 0.400 |
| No. of daily pads | 0.8 (0.8) | 0.6 (0.6) | −0.2(0.6)** | 0.6 (0.9) | 0.5 (0.6) | −0.1 (0.7) | 0.694 |

Results expressed as the mean (standard deviation); SC, standard care; BFB: standard care + perineal retraining.
[a] No. of patients with baseline and 4-month daily diary data.
* $p < 0.05$.
** $p < 0.01$.
*** $p < 0.001$.

retraining patients self-reported to be very improved in 15 cases (22%), improved in 35 (52%), and stable in 17 (25%), but none reported to have worsen. These changes did not significantly differ from those of patients in the SCF group (very improved in 13 cases (17%), improved in 34 (45%), stable in 23 (31%), and worse in 5 (7%); $p = 0.134$).

Table 2 shows the changes reported in stool diaries by the 2 treatment groups. In the BFB group daily stool frequency, daily stool leakage, and daily faecal urgency significantly decreased during the 4-month follow-up, and normal stool perception increased. In the SC group daily stool leakage and use of pads significantly decreased. There was a greater reduction in number of stools per day in the BFB group. There was no significant difference between groups in the evolution of daily stool leakage, faecal urgency, normal stool perception, and number of pads used. Seven patients modified their anti-diarrhoeal treatments during the 4-month follow-up: 3/66 (5%) in the BFB group and 4/75 (5%) in the SC group ($p = 1.0$).

The scores did not improve after treatment in both groups and there was no difference between groups. As compared to the SC group, the BFB group did not significantly improve the incontinence score (CCFI score: 10.1 (3.9) versus 10.7 (3.8); $p = 0.410$) or the constipation score (KESS score: 7.0 (7.5) versus 10.1 (7.7); $p = 0.380$). As compared to the SC group, the BFB group did not significantly improve the different subscales of quality of life (data not shown).

Table 3 shows the results of the univariate and multivariate regression models of the variables describing the self-assessed scores of symptoms. In the univariate model, the variables that were associated with success (i.e. score ≥+3) were older age and BFB treatment. None of the usual prognostic variables (gender, duration of faecal incontinence, previous anorectal surgery, obstetrical past history, BMI, constipation, and sphincter defect) were significantly associated with a successful treatment [23]. In the multivariate model, the OR adjusted for gender, age, past history of anorectal surgery, and manometric anal squeeze duration showed that BFB was still significantly associated with a higher chance of self-rated improvement.

## 4. Discussion

This randomized study indicates that perineal retraining increases the efficacy of AI management compared to standard care alone. The positive impact of perineal retraining was apparent on both self-evaluation of symptoms improvement and symptoms diaries. Using a pragmatic approach and a multicentre assessment, the conclusion of the study may be extrapolated to "real life". The retraining method was in fact standardized but the physiotherapists belonged to a primary care network.

This contrasts with a previous randomized study performed in a tertiary care centre, despite considering a similar sample size and similar evaluation tools [14]. This discrepancy not only puts into question the real benefit of perineal retraining, but also emphasizes the restrictions placed upon definition of AI as a pathological concept by the tools used to evaluate it [19].

Similarly to the study of Norton et al. [14] we failed to include the adequate number of patients. We clearly encountered difficulties to enrol patients in the study, especially when access to a participating physiotherapist was complex due to patients' handicap or remoteness. In contrast with the London experience, our study reached a statistical power of 80% to detect a difference of 23% between groups, which was higher than our primary expectation. The non-blind nature of both studies and the optimization of the bowel transit may also explain the limited differences found between the groups. This bias is difficult to eliminate because retraining requires the active participation of the patient. The high satisfaction rate reported by the patients may be partially related to this non-blind assessment [11,12,14]. However, we hoped that allowing the patient to self-assess the efficacy without any external influence

**Table 3**
Univariate (crude Odd Ratio) and multivariate (adjusted Odd Ratio) logistic regression analysis of factors associated with the success of treatment (improvement score ≥+3).

| | Score ≥3 $n = 66$ | Score <3 $n = 76$ | $_{crude}$OR [CI95%] | $_{adj}$OR [CI95%] | $p$-Value* |
|---|---|---|---|---|---|
| Perineal retraining | 38 (58) | 29 (38) | 2.20 [1.12–4.31] | 2.34 [1.14–4.80] | 0.021 |
| Age (years) | 64 ± 9 | 60 ± 12 | 1.04 [1.01–1.08] | 1.05 [1.01–1.08] | 0.015 |
| Female (%) | 55 (83) | 56 (74) | 1.79 [0.78–4.07] | 2.40 [0.97–5.95] | 0.058 |
| History of anorectal surgery | 10 (15) | 14 (21) | 0.67 [0.28–1.60] | – | |
| No. of daily stools at baseline | 1.9 ± 1.5 | 2.0 ± 1.6 | 0.95 [0.77–1.18] | – | – |
| CCFI score at baseline | 11.7 ± 3.5 | 11.4 ± 3.2 | 1.02 [0.93–1.13] | – | – |
| Anorectal manometry results | | | | | |
| Squeeze duration (s) | 23 ± 13 | 20 ± 15 | 1.02 [0.99–1.04] | 1.03 [1.00–1.05] | 0.043 |
| Squeeze increment (cm $H_2O$) | 57 ± 49 | 54 ± 45 | 1.00 [0.99–1.01] | – | – |

CCFI: Cleveland Clinic Faecal Incontinence score. Crude OR, crude Odd Ratio (univariate analysis); Adj OR, adjusted Odd Ratio (multivariate analysis); CI95%, confidence interval 95%.
* $p$-Value associated to the Wald test for the logistic regression model.

from either the therapist or the physician could ameliorate this bias.

Because AI is defined on a symptomatic basis, there is no satisfying objective marker to evaluate the effect of the treatment. Anorectal physiology measurements also suffer from wide inter-individual variations and do not appear to be sensitive enough to detect a sustained treatment effect [10]. For that reason, the present study did not take into account the effect of treatment on anorectal manometric results. Thus, symptomatic scales, scores, and diaries, which are somewhat subjective, were used to evaluate the effects of treatment. This approach may, however, explain the large intra- and inter-individual variability, the high level of improvement in open-labelled studies, and the high placebo response [24,25].

Several other biases may also interfere with the conclusions of studies testing the effect of perineal retraining in AI. Anal manometry results were clearly more altered at baseline in the BFB group: this difference may have impacted the results, although it appears difficult to determine in which direction. The voluntary squeeze duration at baseline was indeed associated with a better response in our study, but the voluntary squeeze pressure was not. In the literature, pre-treatment anal sphincter pressures have not been shown to predict the outcome of BFB retraining [26]. On the other hand, better anal function at baseline in the standard care group may have been responsible for the lack of detectable effects of BFB therapy. Conservative treatments such as laxatives and loperamide are often first line treatments of AI patients [27–29]. In studies testing the therapeutic efficacy of surgery or medical devices, the failure of conservative approaches is usually considered among the inclusion criteria, but such conservative treatments are rarely analyzed as confounding biases because both patients and physicians may pursue local laxatives, oral laxatives, or loperamide during the evaluation period [11]. In fact, these treatments may modify motility and the physiological action of the internal anal sphincter. In BFB studies, this crucial point has generally been underreported [30,31], with the notable exception of the study from Norton et al. [14] The type of intervention and the nurse–patient and/or physician–patient relationship may also enhance the patient's satisfaction and success rate [32].

Patients with anal sphincters' lesions were included in the study, although some reports have shown that an intact anal sphincter may be associated with improved outcomes after BFB [26]. These patients were included because the EUS-detected anal sphincter defects were not indicated for surgery. Although the percentage of anal sphincter defects detected by EUS was similar in both groups, these anatomical lesions, as well as others such as levator ani avulsions [33] (not detectable by EUS), may have impacted the results of our study in one way or another.

Retraining sessions imply frequent outpatient visits during which physiotherapists will give behavioural advice regarding, for example, dietetics and lifestyle adaptation. This may help patients to better cope with their symptoms [19,32]. In the present study, visits were less frequent in the control group, and this aspect may have biased the higher patients' satisfaction in the BFB group. This may explain the discrepant results of the study by Norton et al. [14] the control group had several lengthy visits with a study nurse. By contrast, frequent visits may also have lowered the compliance rate; the number of patients lost to follow-up was twice as high in the BFB group compared with the SC group.

The findings from previous randomized trials for AI treatment and the results from our study emphasize the need to consider the intervention effect when assessing treatments for this disorder [24]. Moreover, the sham treatment also had an unexpectedly lasting positive effect on patients' symptoms and quality of life in several controlled studies where both patients and evaluators were blind to the type of treatment [24,25]. In the present study a symptomatic improvement was clearly present in the SC group, with almost 40% of the patients responding with "very satisfied" at the final visit.

A score is a summation of several semi-quantified complaints that may underestimate the effect of a treatment. Quality of life scales also summarize and quantify several items that have been grouped in defined dimensions. They reduce different dimensions of AI to a numeric value that summarizes the whole symptoms to a number. Not surprisingly, these items appear to be not sensitive enough to detect a significant effect, in the present study as well as in previous randomized controlled studies [24,25]. Furthermore, the short duration of the study (4 months) may have limited the possibility to detect a longer-term effect, especially on quality of life results.

Diaries are very useful in evaluating treatment effects, and they reflect the "real life" of patients. They allow patients to record daily variations in their AI, but also represent a constraining task for the patient. As such, data are frequently missing. With regard to the data recorded in the diaries, in the present study the BFB group improved more items than the SC group; this may partly explain the better subjective improvement rate reported by the patients of the intervention group.

The results of this multicentre nationwide study invite the conclusion that standardized perineal retraining, together with monitoring diet and drugs to improve bowel movements and stool consistency, offers a moderate, but significant benefit in patients suffering from AI. Considering the high prevalence of AI in the general population, such conclusions suggest the necessity to better define and disseminate retraining techniques, which no longer can be restricted to tertiary referral centres.

## Conflict of interest

None declared.

## Acknowledgement

The study was sponsored by a grant from the Programme Hospitalier de Recherche Clinique regional (HCL/P/2006.429/22).

## Appendix A

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