Commentary

Biofeedback, relaxation training, and cognitive behaviour modification as treatments for lower functional gastrointestinal disorders

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Summary

Biofeedback, relaxation training, and cognitive behaviour modification are being increasingly proposed for the treatment of numerous functional disorders of the gastrointestinal tract. Among these, those related to the lower part of the gut seem to be more likely to benefit from this therapeutic approach. We examine and discuss the literature studies adopting such techniques.

Introduction

Biofeedback, relaxation training, and cognitive behaviour modification are increasingly recognized as helpful treatment strategies for functional gastrointestinal disorders in which stress plays an important role in eliciting or exacerbating symptoms. This is particularly true of functional disorders of the colon, rectum and anus, which represent about 50% of the overall functional disorders observed in the population.\textsuperscript{1} Biofeedback is appropriate when specific pathophysiological mechanisms are known and the control of relevant responses can be achieved by systematic information about a function that is not usually monitored consciously.\textsuperscript{2} Relaxation training involves teaching the patient a technique for countering the effects of stress; it does not require a knowledge of the pathophysiological mechanism for the symptom. Cognitive-behaviour therapy is also a stress-reduction technique which does not require a knowledge of the pathophysiology.

Irritable bowel syndrome

Irritable bowel syndrome (IBS) is a disorder characterized by abdominal pain or discomfort, relieved by defaecation, associated with a change in the frequency of consistency of stools and a varying pattern of defaecation (altered stool frequency, altered stool form, altered stool passage, passage of mucus) at least 25% of the time.\textsuperscript{3} IBS is a very common disorder, being present in 8–20% of the general population,\textsuperscript{4–6} and accounts for up to 50% of consultations to the gastroenterologist.\textsuperscript{7,8}

Several factors make IBS a candidate for psychological treatment: (i) more than 70% of IBS patients have significant psychological symptoms, the most frequent being somatization disorder, depression, and anxiety;\textsuperscript{9} (ii) about 85% of IBS patients complain of exacerbation of symptoms under stress;\textsuperscript{10} and (iii) available medical treatments are often ineffective.\textsuperscript{11}
The above considerations prompted several researchers to try alternative therapeutic approaches.

Published studies suggest that relaxation training is effective in reducing pain and diarrhoea associated with IBS. One study compared behavioural stress-management training alone with medical management in newly-diagnosed IBS patients. The behavioural intervention included education about normal variability in bowel function, stress-management training based on progressive relaxation exercises, and training in self-instruction techniques to cope with stress. Medical management consisted of a bulking agent, an anticholinergic, and a drug with both anxiolytic and antidepressant properties. Both treatments reduced abdominal pain and diarrhoea; however, psychological symptoms decreased significantly more in the relaxation group.

Another study compared conventional medical treatment with relaxation training, and showed that the latter was associated with a significantly greater reduction of pain episodes and number of medical consultations. These results were maintained during 40 months follow-up period.

In a third study, Rumsey reported an advantage for a 6-week group intervention with cognitive behavioural stress management as compared to 6 weeks of conventional pharmacological treatment (phenothiazine and tricyclic antidepressants). Behavioural stress management emphasized information about IBS, progressive muscle relaxation, diet, fitness, problem-solving, and long-term management. An assessment was made at the end of the treatment period and after 6-month follow-up. Medical therapy and cognitive behavioural stress-management training reduced pain, bloating, anxiety, depression, and subjective stress to a similar degree by the end of treatment, although at follow-up the psychological management showed a substantial advantage. A controlled study compared six sessions of brief psychotherapy (with relaxation as a major component) combined with medical therapy to medical therapy alone in a large group of IBS patients. The group receiving psychotherapy displayed greater short- and long-term improvements.

Other authors have combined biofeedback to teach relaxation with cognitive therapy techniques. Blanchard and colleagues emphasized four components: (i) education concerning the relationship between exacerbation of bowel symptoms and psychological stress; (ii) progressive muscle-relaxation training through audiotaped instructions; (iii) relaxation training by means of thermal biofeedback; (iv) cognitive-coping skills training to replace self-defeating thoughts with more positive thinking. Outcomes in patients treated with this protocol were compared to changes observed in patients awaiting treatment. Since patients awaiting treatment have negative expectations about improvement, this study design maximizes the probability that placebo effects contribute to differences between experimental and control groups. An improvement of at least 50% of symptom severity was reported in 52% and 64% of IBS patients receiving active treatment. After a 1-year follow-up, 57% of patients in the first study group still showed improvement of symptoms. A similar multicomponent therapeutic approach was used in another study, in which the authors employed assertiveness training instead of thermal biofeedback training in addition to patient education, progressive muscle-relaxation training, and cognitive coping-strategies training. Bowel symptoms improved significantly more in the treated IBS patients than in a control group awaiting treatment. This difference was maintained during a 5-month follow-up period. In another study by Blanchard and colleagues, IBS patients were randomized to three groups: (i) the multicomponent behavioural treatment group, described above; (ii) a waiting-list control group; and (iii) an active placebo group whose member received a fake treatment intended to elicit positive expectations without providing effective treatment. The placebo involved two components paralleling progressive muscle relaxation and biofeedback in the active treatment: pseudomeditation (patients were instructed to attend to muscle tension, but not to relax) and biofeedback to decrease alpha EEG activity. Analysis of results showed no difference between the placebo and treatment groups.

Other psychological treatments have been reported to be of value in IBS syndrome, including cognitive-behavioural therapy, relaxation alone, relaxation alone, and interpersonal psychotherapy. One recent review concluded that the efficacy of psychological treatment for IBS has not been established because of methodological inadequacies, but other reviews suggested that psychological interventions are useful in IBS.

The first attempts to use biofeedback to treat IBS aimed at modifying colonic motility patterns. In a study, an electronic stethoscope was used to teach a small group of patients with diarrhoea-predominant IBS to alternately increase and decrease bowel sounds. All patients reported symptom relief. However, further investigations suggested a rather weak treatment effect. Other authors used a balloon probe to provide visual feedback on rectal contractile activity, and reported that 14/21 IBS patients could learn to decrease rectal motility. A follow-up study from the same laboratory, however, showed that a simpler stress-management technique, progressive relaxation training and systematic desensitization training to anxiety-arousing stimuli yielded better clinical results as compared to pressure biofeedback. Therefore, biofeedback aimed at modify-
ing colonic motility cannot be recommended for the treatment of IBS.

**Pelvic floor dyssynergia**

A normal defaecatory act involves relaxation of two usually contracted muscles, the puborectalis and the external anal sphincter, to allow the rectum to funnel into the anal canal and stool to pass. However, some chronically constipated patients display a paradoxical contraction of the puborectalis and the external anal sphincter during attempts to defaecate.\(^{31}\) This ‘obstructed’ defaecation was named ‘anismus’, in analogy to ‘vaginaismus’, although a more appropriate definition is pelvic floor dyssynergia.\(^{32}\) Pelvic floor dyssynergia is associated with symptoms of straining and feelings of incomplete evacuation, and it has been suggested that it may contribute to complaints of constipation in about 50% of chronically constipated patients.\(^{33}\) Straining and feelings of incomplete evacuation are also frequently found in patients with anxiety and other types of psychological distress.\(^{34}\)

Pelvic floor dyssynergia, characterized by inappropriate contraction of striated muscles, is particularly suitable for biofeedback.

**Studies in children**

The first controlled study was carried out in encopretic children.\(^{35}\) Half of patients with dyssynergia and half of those with normal pelvic floor responses to straining were randomly assigned to biofeedback training, in which they were instructed to relax and to decrease the pressure in the external anal balloon while straining to defaecate. The remaining patients were given daily doses of mineral oil. Although outcomes were similar for the two groups at the end of treatment, at 6- and 12-month follow-up, patients with pelvic floor dyssynergia prior to training tended to benefit more from biofeedback than from mineral oil. Patients with other causes of encopresis had more benefits from mineral oil than from biofeedback.\(^{36}\) A second controlled study in encopretic children showed more definitive results. Encopretic children with pelvic floor dyssynergia were given either conventional laxative treatment (milk of magnesia) or biofeedback plus laxative therapy.\(^{36}\) After an average of three biofeedback training sessions, 86% of the children receiving this treatment learned to relax the external anal sphincter during attempts to defaecate. At 7- and 12-month follow-up, the percentage of children judged to be recovered was significantly greater for the biofeedback group than for the laxative-only group. It was thus suggested that most children with pelvic floor dyssynergia can learn normal sphincteric response during defaecation, and that this learning is associated with a better clinical outcomes than those related to the laxatives alone. The same authors also evaluated anorectal and psychological factors associated with treatment failure,\(^{37}\) and concluded that correcting abnormal contractions of the pelvic floor by biofeedback treatment cures patients with normal or mildly impaired recto-anal sensitivity, but not those in whom sensitivity is severely impaired. The success of biofeedback was attributed to restoration of normal defaecation dynamics.\(^{38}\) Another uncontrolled study in encopretic children reported a success rate of 100% by the end of the study, with no relapses during a follow-up period of up to 22 months.\(^{39}\) In a controlled study, Cox and colleagues\(^{40}\) reported a significant greater improvement in children with additional biofeedback compared to laxative treatment alone. However, the above studies all included relatively small groups of patients.

In a recent controlled study in a large group of patients,\(^{41}\) additional biofeedback training compared to conventional therapy did not result in higher success rates in chronically constipated children. Moreover, achievement of normal defaecation dynamics was not associated with success. The authors concluded that abnormal defaecation dynamics seem not to play a crucial role in the pathogenesis of chronic constipation.

**Studies in adults**

An uncontrolled study investigated 16 constipated adults, who were asked to defaecate a simulated faecal bolus while seated on a commode chair.\(^{42}\) Pressure recordings were displayed on a computer screen, and patients were instructed to bear down several times on the bolus without excessive effort while either not increasing anal pressure or decreasing it. Looking at the computer screen while performing constituted visual reinforcement, and verbal reinforcement helped patients to understand pathophysiology and paradoxical striated sphincter contraction. The patients were then instructed to relax the sphincter during expulsion and to avoid straining at home. This treatment was effective in 11/16 patients, and the gains were maintained at 12-month follow-up in 9 patients. The remaining 7 reported easier defaecation than before training. This and other studies\(^{43–46}\) suggest that biofeedback is often effective for the treatment of pelvic floor dyssynergia and other forms of constipation.\(^{47}\)

More recently, a few controlled investigations were available for adult patients also. In one study, 11 patients received electromyographic (EMG) biofeedback and 9 balloon biofeedback.\(^{48}\) The results suggest that EMG biofeedback is the more effective for treating this condition. Another study on 60 patients
with intractable constipation compared the outcome of muscular training without any biofeedback device with the same training supplemented by an EMG record visible to the patients.59 The outcome was similar in the two treatment groups. The authors concluded that muscular coordination training using personal instruction and encouragement without visual display may be a potentially successful treatment suitable for outpatient use by paramedical personnel.

Levator ani syndrome and proctalgia fugax

The levator ani syndrome is defined by a vague, dull ache or sensation of pressure localized high in the rectum, associated with difficult defaecation, straining, and feelings of incomplete defaecation.50,51 The prevalence of levator ani syndrome in the general population is about 7%.52 and symptoms are more frequent in women than in men in the age range 40–60 years.53,54 Diagnosis relies on clinical grounds, and the diagnostic yield increases if posterior traction on the puborectalis reveals tight levator ani muscles and tenderness or pain. Psychological tension, stress, and anxiety are sometimes associated with this syndrome,55 although no systematic psychiatric evaluation has been reported.

Proctalgia fugax is an idiopathic disorder characterized (in the absence of any other anorectal disease) by recurring attacks of intense anorectal pain, occurring at irregular intervals—typically <6 episodes/year—and lasting several seconds to 20 min.56 In about 30% of patients, proctalgia fugax is triggered by flatus or defaecation, and in about 6% by sexual intercourse.57 Prevalence rates of proctalgia fugax are 8–14% in healthy adults,58,59 and this condition is twice as frequent in women compared to men.60 The short duration of the pain attacks and the infrequent occurrence of the disorder have limited identification of physiological mechanisms responsible for proctalgia fugax.61 Sporadic reports have implicated a lax anal sphincter, a band of tense tender muscle above the anal shelf attributed to spasms of the levator ani or pubococcygeus muscles, and increased sigmoid motility.62–65 Early reports emphasized the role of anxiety, stress, and neuroticism as precipitating factors.66–68

Most proctalgia patients have functional gastrointestinal disorders and chronic pain, and the absence of such symptoms in proctalgia fugax and levator ani suggests suggest that psychological intervention may be effective in these syndrome. So far, no controlled study of the efficacy of relaxation training, biofeedback, or cognitive behaviour modification for either syndrome has been reported. However, there are some promising although uncontrolled studies, such as that of Grimaud and colleagues.69 By means of a visual biofeedback technique, these authors taught patients with levator ani syndrome to reduce anal canal pressures. After a 2-month treatment period, pain relief was obtained for all patients investigated, and it was maintained in 11/12 patients after a 16-month follow-up. It is worth noting that pain relief was accompanied by decreased resting pressure in the anal canal.

Conclusions

From this review of literature, it is suggested that biofeedback may constitute a valid alternative therapeutic approach for the treatment of patients with constipation related to an inability to relax the striated pelvic floor muscle during attempts to defaecate. It remains to be demonstrated whether biofeedback will prove to be generally useful in treating constipation related to dyssynergia, or whether its utility will be limited to those patients with normal or mildly impaired rectal or anal sensitivity. Further studies are also needed to show whether biofeedback may represent a first-line therapeutic approach to levator ani syndrome and proctalgia fugax. Biofeedback does not seem to be useful for the treatment of IBS, but relaxation training and cognitive behaviour therapy do appear to be helpful.

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