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Original Research Article

Biofeedback pelvic floor exercise therapy for pelvic floor dyssynergia: an observational study

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ABSTRACT

Background: Pelvic floor dyssynergia (PFD) is one of the commonest subtypes of constipation and treated conservatively but is often unsatisfactory. Biofeedback Pelvic Floor Exercise Therapy (BFT) has been introduced as an alternative treatment.
Method: A prospective study was conducted at Healing Hands Clinic, Pune. Total 35 patients diagnosed as having pelvic floor dyssynergia confirmed by MR defecography (MRD) enrolled in to the study. All patients trained for pelvic floor muscle exercise. Patient performed exercise 20 minutes per day for 12 weeks. Data have been collected using a standardized questionnaire (Longo's obstructed defecation syndrome (ODS) score, Patient Assessment of Constipation Quality of Life (PAC-QOL) and Bristol stool score and performed anal manomentry test (3-D HDAM) at every 4 weeks.
Result: Study result demonstrated a statistically significant improvement in the mean resting pressure, maximum squeezing pressure and average of 10 seconds hold (from 69.83±6.40 to 39.87±5.51, 98.67±17.23 to 128.67±26.92, 78.70±15.41 to 109.00±22.23, P = 0.005 at week 12). The mean total ODS decreased significantly ($p<0.0005$) from baseline to 22.92±4.03 to 11.46±6.76 at week 12. Also, individuals ODS score items were significantly improved at week 8 and week 12. Bristol stool score significantly improved from 2.12±1.14 to 4.04±0.96 at 12 weeks ($p<0.0005$). Significant improvements were recorded in all four individual score domains (physical discomfort, psychosocial discomfort, worries and concerns, satisfaction) and total score of PAC-QOL at week 12.
Conclusion: Biofeedback therapy provides improvement in bowel symptoms, anorectal function and reduces use of aperients in constipated subjects with pelvic floor dyssynergia

Keywords: Anal manomentry, Behavioural therapy, Constipation, PFD, Quality of life, Resting pressure

INTRODUCTION

Constipation is a common disorder seen in family practice among the elderly and women. It affects nearly everyone in the general population at different points in their lifetime. Currently, constipation has a profound impact on adult patients' quality of life and has been considered a major social and psychological disability. According to a survey the average population across the globe suffering from chronic constipation is around 10%. But as per Indian statistics it is about 14% of the Indians suffer from chronic constipation, higher than the world average. According to large scale epidemiological research by Talley et al, some of these patients can be managed with conservative treatments such as a high fiber diet, laxatives, suppositories, or oral polyethylene glycol, others are not sensitive to these options. Conservative medical treatment is ineffective in 39% of

adult patients with chronic functional constipation. In most people with condition an inappropriate (paradoxical) contraction or a failed relaxation of the puborectal muscle and of the external anal sphincter often occurs during attempts to defecate. This paradoxical contraction of the pelvic floor muscles during straining at defecation is considered a form of maladaptive learning and is generally defined (without specifying the underlying pathophysiological mechanism) as outlet dysfunction constipation or, more precisely, pelvic floor dyssynergia (PFD). Treatment is based on pelviperineal re-education (PPR). There are 3 essential aspects involved: muscular biofeedback, rectal biofeedback, and behavioural therapy/evacuation techniques. The aim of biofeedback is to correct abdominal, rectal, and pelvic floor dyssynergia and also improve rectal sensitivity. There have been no reports patients of adverse effects for using biofeedback. As a result, the level of evidence and recommendation in using biofeedback for PFD type of chronic constipation is good except for trial designs. Objectives of the study were to assess the usefulness of Pelvic Floor Exercise Therapy (BFT) in PFD, to educate patients about biofeedback and study its impact on quality of life.

METHODS

A prospective study with purposive sampling was planned after obtaining approval from hospital ethical committee. During the period from September 2015 to April 2016, a cohort of 35 patients aged more than 18 years and diagnosed with pelvic floor dyssynergia were enrolled for the study at Healing Hands Clinic, Pune. The diagnosis was confirmed by MR defecography. Appropriate consent was obtained from all the study subjects. A pre-designed, pre-tested, valid questionnaire was administered for collection of data. Data was collected at every 4 weeks using three standardized questionnaire and anal manometry. Symptoms of PFD were assessed using Longo's Obstructed Defecation syndrome (ODS) score and Bristol stool score. Quality of life was assessed using Patient Assessment of Constipation Quality of Life (PAC-QOL). Anorectal manometry by using three-dimensional high-definition probe (3-D HDAM) was done to measure the pressures of the anal sphincter muscles that are needed for normal bowel movements. Patients were called once a week for 12 weeks for manometric biofeedback assisted pelvic floor muscle training. Prior to training session patients were explained about pelvic floor anatomy along with importance of coordinated action of both pelvic floor and abdominal muscles to successfully carryout the process of defecation. They were also educated about paradoxical contraction or inadequate relaxation of the pelvic floor muscles during attempted defecation, which is believed to be the main cause of PFD. Each patient was prescribed an individualized home exercise programme depending on strength and endurance of patient to improve the same. They were also taught to contract pelvic floor muscle by emphasizing on relaxation of accessory muscles. Baseline manometric rectal pressure was measured using a rectal sensor and muscle tension was measured through electro myography (EMG). EMG activity is visually displayed or monitor connected to rectal sensor. In BFT assisted pelvic floor muscle training visual feedback was provided to stimulate their correct performance in addition to positive verbal cueing from physiotherapist. This encourages patients in learning of abdomino-pelvic muscular coordination.

Each BFT assisted training session was divided into 3 sections.

Muscle relaxation training

After insertion of sensor, the subject was asked to completely relax pelvic for muscle intentionally along with abdominal muscles which on contrary is in contracted state usually. This continues for at least 5 minutes.

Strength training

Subjects were asked to perform maximum number of flick like pelvic floor muscle contractions. This set is repeated at least thrice with relaxation of at least 1 minute.

Endurance training

Subjects were asked to hold pelvic floor muscle contraction at submaximal level for increasing longer period of time. This set is also repeated at least three times with relaxation for at least 1 minute.

On an average 20-25 minutes was committed to BFT session. The time spent on BFT session was dependent on patient’s response, like contractions of pelvic floor muscles began to show fatigue or usage of abdomen muscle to compensate were signs to end session.

Data analysis

Statistical analyses were performed using SPSS version 21.0 for Windows and the results are presented as Mean±SD. P-value <0.05 is considered to be statistically significant. P-value obtained using paired t test and wilcoxon signed ranks test.

RESULTS

Total 35 patients were evaluated out of that 16 (45.71%) were male and 19 females (54.29%) with a mean age of 39±15 years old, ranging from 18 to 68 years. A significant ($p<0.0005$) reduction was observed regarding the total ODS score. Prior to treatment the mean was 22.92±4.03 and after treatment 11.46±6.76 at week 12.

Table 1: The individual Longo's obstructed defecation syndrome score.

ODS score items	Baseline mean (SD)	Week 4 mean (SD)	Week 8 mean (SD)	Week 12 mean (SD)
Defecation frequency	1.96 (0.66)	1.35 (0.63)	0.85 (0.67)	0.38 (0.70)
Intensive straining	1.77 (0.43)	1.38 (0.50)	1.04 (0.53)	0.88 (0.59)
Time spent on defecation	1.96 (0.20)	1.92 (0.27)	1.19 (0.40)	1.19 (0.40)
Feeling of incomplete defecation	2.54 (0.58)	2.42 (0.64)	1.65 (0.69)	1.46 (0.71)
Pain	2.62 (0.64)	1.79 (0.66)	0.92 (0.98)	0.88 (0.99)
Impact on daily activity	1.81 (0.40)	2.31 (0.55)	2.27 (0.83)	2.65 (0.69)
Use of laxatives	6.38 (1.10)	5.58 (1.84)	3.92 (2.28)	3.00 (2.19)
Use of enemas	0.96 (1.68)	0.35 (1.02)	0.65 (1.62)	0.65 (1.62)
Digital assistance	2.92 (1.85)	0.50 (1.07)	0.35 (0.98)	0.35 (0.98)
Total score: mean (SD)	22.92 (4.03)	17.60 (3.70)	12.85 (5.88)	11.46 (6.76)

Wilcoxon signed ranks test and paired samples *t* test, both $P < 0.0005$

Table 2: The individual PAC-QOL score.

PAC-QoL score domains	Baseline mean (SD)	Week 4 mean (SD)	Week 8 mean (SD)	Week 12 mean (SD)
Physical discomfort	2.19 (1.21)	1.34 (0.84)	0.94 (0.74)	0.86 (0.62)
Psychosocial discomfort	1.47 (1.01)	0.98 (0.67)	0.73 (0.65)	0.54 (0.56)
Worries and concerns	2.93 (1.04)	1.14 (0.88)	0.84 (0.81)	0.74 (0.78)
Satisfaction	2.78 (1.15)	1.49 (0.75)	0.93 (0.81)	0.79 (0.65)
Total score: mean (SD)	2.00 (1.12)	0.97 (0.61)	0.89 (0.71)	0.69 (0.61)

Wilcoxon signed ranks test and paired samples *t* test, both $P < 0.0005$

Table 3: Anal manomentry.

	Baseline mean (SD)	Week 4 mean (SD)	Week 8 mean (SD)	Week 12 mean (SD)
Resting pressure	69.83±6.40	53.83±8.32	44.20±6.98	39.87±5.15
Maximum squeezing pressure	98.67±17.23	106.40±20.73	116.13±20.73	128.67±26.92
Average of 10 seconds hold	78.70±15.41	87.37±13.79	95.17±17.37	109.00±22.37

Wilcoxon signed ranks test and paired samples *t* test, both $P < 0.005$

Individuals ODS questionnaire items findings revealed highly significant improvement with treatment with regard to defecation frequency (P=0.002), intensive straining (P=0.004), use of laxatives (P=0.029), use of enema (P=0.024), and digital assistance (P=0.0005) while not significant in time spent on defecation (P=0.56), feeling of incomplete defecation (P=0.45), presence of abdominal pain (P=.12), impact on daily activity (P=0.52) at week 8 and week 12 (Table 1). Stool consistency on Bristol stool scale significantly improved from 2.12±1.14 to 4.04±0.96 at 12 weeks (p<0.0005) (Figure 1).

There was significant improvement in the mean resting pressure, maximum squeezing pressure and average of 10 secs hold (from 69.83±6.40 to 39.87±5.51, 98.67±17.23 to 128.67±26.92, 78.70±15.41 to 109.00±22.23, P = 0.005 at week 12 (Table 2).

Significant (p<0.0005) improvements were recorded in all four individual score domains (physical discomfort, psychosocial discomfort, worries and concerns, satisfaction) and total score of PAC-QOL at week 12 (Table 3).

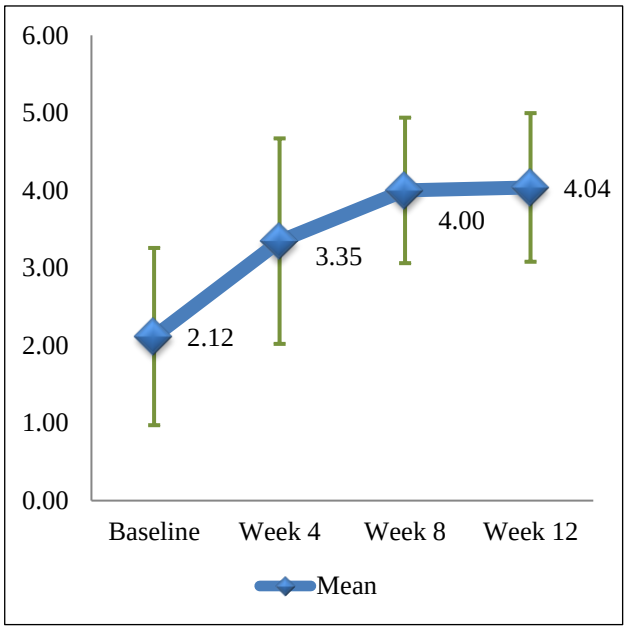

Figure 1: Bristol stool score (n=35).

DISCUSSION

The first application of biofeedback therapy for the treatment of chronic constipation due to dyssynergic defecation was in 1987 and study result shows positive response. Biofeedback provides a retraining of the sensation and control of the anorectum and pelvic floor, thereby eliminating paradoxical contractions during the process of defecation in Pelvic Floor Dyssynergia type of chronic constipation. Its value has been shown both in uncontrolled trials and in recent randomized, controlled trials (RCTs), for improving both psychological and clinical outcome measures. In the present study, we observed a significant reduction in symptoms typically related to obstructive constipation and improvement in quality of life. The superiority of biofeedback was also shown by anal sphincter muscles and neural reflexes that are needed for normal bowel movements. Most studies on biofeedback training report good short term efficacy, mirrored by an improved psychological state and quality of life. Literature reviews conclude that more than 70% of adult patients complaining of pelvic floor dyssynergia are likely to benefit from biofeedback training. In the present study, pelvic floor electromyography during straining significantly reduced.

Heymen et al, stated that the decreased pelvic floor electromyography during straining in biofeedback patients was significantly more than the patients on diazepam.[14] A study conducted by Şahin M et al, showed the effectiveness of biofeedback as a treatment for constipation due to pelvic floor dyssenergia and overall improvement in quality of life in these patients.[15] Similarly present study result shows improvement in quality of life. Overall present study results support for the effectiveness of biofeedback therapy in treatment of constipation due to pelvic floor dyssynergia.

CONCLUSION

Biofeedback therapy improves bowel symptoms, anorectal function and reduces use of aperients in patients with constipation due to pelvic floor dyssynergia. It also improves their quality of life.

Recommendations

Comparing the results with the studies conducted before, our case series emphasizes the merits of biofeedback therapy. With modern diagnostic techniques, the diagnosis of dyssynergic defecation has become easy. Research has proved that biofeedback therapy is the most cost-effective treatment as it changes the causal pathophysiology.

We, here recommend that the coloproctologist should implement this inexpensive biofeedback therapy and home base biofeedback programs as treatment of dyssynergic defecation.

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