

EFFECTS OF A MULTIPROFESSIONAL REHABILITATION PROGRAMME FOR PATIENTS WITH FIBROMYALGIA SYNDROME

Monika Gustafsson, Jan Ekholm and Lisbet Broman

From the Division of Public Health Sciences, Department of Rehabilitation Medicine, Karolinska Institutet, Stockholm, Sweden

The present study sought to evaluate the efficacy of a 12-week multidisciplinary rehabilitation programme mainly emphasizing physiotherapy, for patients with either fibromyalgia syndrome or chronic, widespread pain. Forty-three non-randomized female patients with fibromyalgia syndrome or chronic, widespread pain were assigned to the programme or served as waiting-list controls. The outcome was assessed with the Body Awareness Scale-Health, the Multidimensional Pain Inventory, the Quality of Life Scale, the Visual Analogue Scale and a pain drawing. Both groups were reassessed after 3 and 6 months, the treatment group also after 1 year. The treatment group improved in quality of movement and in vegetative disturbances according to the Body Awareness Scale-Health after the programme. At the 3-month and 1-year follow-ups the improvements were partly sustained. The control group showed deterioration after 3 and 6 months in three of the main scales of the Body Awareness Scale-Health. This clinical trial of a rehabilitation programme, proved beneficial for improving quality of movement and reducing the experience of vegetative disturbances.

Key words: clinical trial, multidisciplinary rehabilitation programme, fibromyalgia syndrome, quality of movement, physiotherapy, body awareness therapy.

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Correspondence address: Monika Gustafsson, Division of Public Health Sciences, Department of Rehabilitation Medicine, Norrbacka Bldg 1 floor, Karolinska Institutet/Hospital, SE-171 76 Stockholm. E-mail: monika.gustafsson@ks.se

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INTRODUCTION

The fibromyalgia syndrome (FMS) is a pain disorder which seriously affects the quality of life for about 3.4% of the female population (1, 2). Though FMS is a common problem, no effective treatment has been universally successful. The present study aims to evaluating an outpatient rehabilitation programme.

The symptoms of FMS have severe consequences for the patients' abilities to manage everyday life activities (3, 4). Patients with widespread pain according to the American Colleague of Rheumatology (ACR) criteria, but without all the 11 tender points required for the diagnosis FMS, are commonly

seen in the clinic (1). They may benefit by being treated like patients meeting all the criteria for FMS (5).

The treatment of FMS is aimed at reducing symptoms and teaching patients more effective ways of coping with pain. The combination of education, physical exercise, and some type of psychological intervention in multidisciplinary treatment programmes is generally accepted and appears to be efficacious (6–13). Large individual differences are reported in the response to treatment, suggesting that identification of subgroups may be useful for maximizing treatment efficacy (11).

Different literature reviewers present different conclusions about treatment. Rossy et al. (14) conclude that the optimal intervention for patients with FMS would include exercise and cognitive-behavioural therapy, in addition to appropriate medication management, whereas Karjalainen et al. (15) in a Cochrane analysis, conclude that the level of scientific evidence regarding multidisciplinary rehabilitation for patients with FMS and widespread musculoskeletal pain is limited.

Multidisciplinary programmes (9–11, 13) emphasizing behaviour modification, stress reduction techniques and strategies to improve fitness have shown positive impact in pain, life interference, sense of control, affective distress and depression. Improvements in perceptions of self-efficacy, global ratings of outcome and walk distance are reported after programmes combining education and exercise (6, 16–18). Wigers et al. (12) compared aerobic exercise (AE), stress management (SMT) and traditional treatment in a 4-year follow-up study. AE and SMT had positive short-term effects. However, at the 4-year follow-up no differences were found between the groups.

Fitness training has a positive but varying impact in pain scores and aerobic fitness. Some studies have indicated that pacing is of importance. Moderately intense exercise programmes, producing heart rates at 60–75% of age-adjusted maximum reported a more positive result (17, 19 20) than programmes with low intensive exercise (21, 22). Häkkinen et al. (23) showed increased strength and EMG activity after progressive strength training. Body awareness therapy (BAT) according to Roxendahl (24), is used in rehabilitation programmes in different groups of patients with chronic pain conditions (25–28). There are few studies evaluating the impact of BAT in treatment of chronic pain patients. Aspegren et al. (26) compared treatment of FMS patients with BAT or with Mensendieck system (MS), which is a more individually oriented body awareness treatment approach. After 20 weeks the MS group showed the most improvements, the BAT group had improved in global health. Malmgren-Olsson et al. (28)

compared treatment of patients with non-specific musculo-skeletal disorders with BAT, Feldenkreis or treatment by physiotherapist as usual. All groups improved after treatment, but the result indicated that the group treatment using BAT and Feldenkreis might be more effective than treatment as usual.

The present aim was to evaluate the effects of a multimodal, multidisciplinary outpatient rehabilitation programme by comparing a treatment group of female patients with FMS or chronic and widespread pain, with a waiting list control group, on the variables pain intensity, spread of pain recorded on pain-drawings, quality of life, "quality of movement", and "consequences of pain".

METHOD

Subjects

Forty-three women referred to the Hospital for Rheumatology and Rehabilitation in Östersund for a rehabilitation programme were included in this study. They had been non-randomly referred by the local social insurance offices. The criteria for inclusion in the study were: (a) FMS according to the ACR-90 criteria, or widespread, chronic pain (b) well-analysed pain not depending on any injury or other diseases, (c) no misuse of drugs or serious psychiatric disease, and (d) considered by the social insurance office need rehabilitation for return to work. The treatment group consisted of 23 women. The waiting-list control group consisted of 20 women. During this waiting period the control group continued with the same treatment and training they had before entering the study. Most of them did fitness training in a warm water pool and some had regular massage and physiotherapy for pain relief. The clinical staff could not influence the choice of group for the women (Tables I, II).

The working ability of the women in the study was low (Table III).

Study design

The 43 patients, who met the inclusion criteria, all gave their informed

Table I. Descriptive data for the women included in the study, means and standard deviation

Variable	Treatment group n = 23		Control group n = 20	
	Mean	SD	Mean	SD
Age	43.8	10.7	47.0	6.4
Years of education	11.2	2.0	11.3	2.9
Pain drawing (%)	51.5	24.6	37.5	15.1
Years of symptoms	13.2	9.8	12.5	8.1
	%		%	
Diagnosed as FMS	48		70	

consent. They were assigned to the treatment group (n = 23) or the control group (n = 20) depending on when they were assigned to the hospital. The control group continued with their regular care during the study. The study design (Fig. 1) was approved by the Ethical Committee of Umeå University, Sweden.

Procedures and rehabilitation programme

Before entering the programme all the patients were physically examined by the physician and the physiotherapist, were interviewed about their actual life situation by the nurse and the social worker, and completed all the self-report inventories. The patients continued their prescribed medication during the programme. The rehabilitation programme started 2 weeks after the examination for 3 full days per week during the first 3 weeks. The participants were then expected to return to their work and attend the rehabilitation programme 1 full day every 2nd week on 5 more occasions. This means that the programme covered 12 weeks with 13 days at the clinic in all. When the rehabilitation period was completed, the patient, the employer, the local insurance officer, and the team members met at a conference and discussed plans for each patient. Three months later the patient took part in a 3-day follow-up which ended with a conference with the same participants. The aim of the rehabilitation programme was to provide the participants with adequate knowledge of FMS and chronic, widespread pain, and if possible help them to see the pain in a more understandable context. It was designed to enable the participants to cope with pain, fatigue, and stressful situations and to help them feel active, resourceful and competent in their own rehabilitation. During the programme the patients were strongly instructed to continue their exercises and to apply the coping strategies they learned also after the programme. This was assumed to improve the women's working ability and their quality of life.

The patients in the treatment group formed 3 groups with 7 or 8 women in each. Each day of the programme consisted of education, group discussion, physical training and individual guidance. The

Table II. Pre-treatment values between the groups in demographic and registered variables (n = 43)

Variable	Assessment I p value
Grounding/centre-line index	0.088
Centring/breathing index	0.669
Flow index	0.179
<i>Single reported items</i>	
Reported pain	0.542
Reported muscle tension	0.061
Reported sensibility disturbances	0.791
Reported vegetative disturbances	0.990
<i>Quality of life</i>	
QLS	0.330
<i>Measure of pain</i>	
Present pain, VAS	0.544
Least pain, VAS	0.418
Worst pain, VAS	0.367
Pain drawing	0.330

Table III. Working situation and sick-listing status of the women included in the study

Variable	Treatment group		Control group	
	Employed n = 16	Unemployed n = 7	Employed n = 13	Unemployed n = 7
Not sick-listed	5	1	4	0
25–75% sick-listed	6	0	7	0
100% sick-listed >1 year	1	0	1	1
100% sick-listed 2–5 years	2	2	1	4
100% sick-listed 6–11 years	2	4	0	2

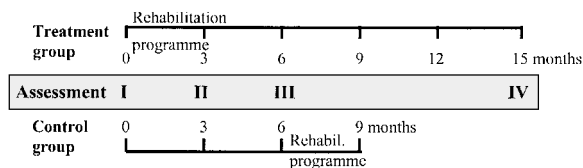


Fig. 1. Time schedule in combination with the design of the assessment occasions (I–IV).

education and group discussions had different themes focusing on pain, stress, coping, working situations, medication and how to improve the quality of sleep. The link between emotions and bodily reactions was often highlighted, explained and discussed by all the team members. The physical training provided by the physiotherapists consisted of BAT (24), relaxation training and fitness training in a warm water pool. BAT is a physiotherapeutic treatment modality introduced and validated in psychiatric care by Roxendal (24). It is now frequently used also in the rehabilitation of patients with pain and musculoskeletal disorders (25–28). BAT consists of movements during mental awareness used to normalise postural control, co-ordination, breathing and muscular tension. The aim is to increase mental awareness and perception of dysfunctional movement patterns and to increase locomotor control, by increasing grounding, stability in the centre line, centring, breathing and flow (24). During the programme the exercises focused on a stable relation to the ground, posture, gait and integrated breathing technique. The relaxation training was performed as a modified autogenous muscle relaxation technique. The fitness training in a warm water pool was moderately intense and guided with music. All the women were given an individual programme for walking and stretching. This was continually evaluated and improved. The physiotherapists also introduced pain-relieving methods such as TNS, heat and acupuncture. The individual guidance by the social workers was aimed mainly at supporting the patient in finding new coping strategies.

The rehabilitation team

The rehabilitation team consisted of a physician with speciality in rheumatology, a registered nurse, two physiotherapists and two social workers. The physician examined the participants before they entered the programme and was available if medical consultation was needed during its implementation. The registered nurse administered the course as well as contacts with the employers and the social insurance offices. She took part in the teaching and the group discussions. In addition to what is described above, the physiotherapists also took part in the teaching and group discussions. The social workers had individual, supportive guidance with the participants. All the team members had earlier experience of chronic pain management.

Data collection

The first author of this article, not involved in the group management, was responsible for the administration of the data collection. She was not “blinded” to the patient’s group membership. Data from the treatment group was assessed when the subjects met the team members for examination before and after the programme (12 weeks), and at the 3-month follow-up. Data from the controls were assessed at specially arranged visits to the hospital. The self-report questionnaires were completed at the clinic for the first assessment, and were subsequently mailed to the subjects with instructions to complete them and bring them on their next visit to the clinic. After 1 year, the treatment group were assessed with the questionnaires and the BAS-H at a planned hospital visit.

Measurements

The Body Awareness Scale-Health (BAS-H) is intended to assess different qualities of movement in patients with psychosomatic or psychiatric symptoms (29). BAS-H is a structured test of everyday movements, where the physiotherapist observes the patient’s ability, pattern of motion and general behaviour. Twenty-one items are rated and

scored following a detailed manual, with a 7-grade scale, from 0 to 6, 0 representing health, harmony and integration and 6 representing a frequent pattern of the symptom/behaviour. The items are summarized into four sub-indices: grounding/centre-line index (10 items); centring of movement /breathing index (4 items); flow index (8 items) and additional items (3 items). The additional items were not assessed. Example of an item included in the sub-index “grounding/centre line” is the item “relation to the ground in walking”. The patient is walking in different ways while the physiotherapist assess the ability to direct movements towards the floor. Example of an item included in the sub-index “flow” is the item “muscular tension”. The degree of muscle tension is observed and assessed during the entire movement test in posture, movements and facial expression. The BAS-H is based on the BAS (Body Awareness Scale) (24), developed by Roxendal for use in psychiatric physiotherapy, but has lately also been used on patients with chronic pain (25). The BAS consists of observations and rating of everyday movements and a structured interview. The scoring of the BAS is 0–3 in 7 steps (24). Using BAS-H the examiner freely chooses interview questions from the BAS to suit the current group of patients. In this study questions concerning pain, fatigue and vegetative disturbances were chosen. The validity and reliability of the BAS in psychiatric care has been shown by Roxendal (24). Gyllensten et al. (30) showed in her study that the construct validity of the BAS-H is in accordance with the theoretical expectations.

Pain drawing involves the patient in marking on a figure of a woman all parts of the body where she feels pain at the time. The drawings were scored for the presence or absence of pain in each of 45 body areas, weighted according to the percentage of body surface that each area covered (31).

The Visual Analogue Scale (VAS) is a continuous scale of 100 mm with the extremities “no pain” and “intolerable pain” (32). In the present study three VAS scales were used at each examination: the pain at the time the form was filled in (VAS 1), the least pain felt (VAS 2), and the worst pain felt (VAS 3).

The Quality of Life Scale (QLS) is a 16-item scale with a 1–7 point rating scale (1 = terrible and 7 = delighted). Each item includes an important domain of life. The scores of each item are summed to a total life satisfaction score, with a range from 15 to 105. The scale has been validated and tested for populations with chronic illness (33).

The Multidimensional Pain Inventory (MPI) is a self-administered questionnaire that measures psychological, social and behavioural aspects of chronic pain. The instrument has been validated (34). It comprises 13 items on a 0–6 rating scale, forming three sections. Part one assesses patients’ chronic pain. Part two assesses how significant others respond to their displays of pain. In part three patients rated the frequency that they perform common, everyday activities.

Statistical methods

Pre-values were compared between the treatment group and the control group to investigate pre-treatment differences. To investigate differences within the groups after the programme (I–II), at 3 months follow-up (I–II–III) and within the treatment group at 1-year follow-up (I–II–III–IV), Friedman’s ANOVA by Ranks, a nonparametric test for several dependent samples (overall) were conducted in the BAS-H, the VAS, the MPI and the QLS. Mann-Whitney-U test were conducted to investigate differences in the pain drawing. Friedman’s Anova by Ranks for two dependent samples were conducted in the VAS, the MPI, the QLS and the pain drawing (I–III) (I–IV). To further investigate differences found in the BAS-H, non-parametric rank-invariant methods developed by Svensson (35–37) were used. This method is further described in the Appendix.

RESULTS

Effects of the group rehabilitation programme and group differences (assessments I–II–III, I–II–III–IV)

Of the 44 women assessed, 43 were included in the study. One woman in the treatment group participated only in the first half of the programme due to personal problems, and was therefore

not included. The attendance rate was high. Forty-three women participated in assessment I, 41 (93%) in assessments II and III, and 18 (75%) in assessment IV. Reasons for dropping out were interfering medical conditions—one deceased, cancer, pregnancy, change of residence, and inability or unwillingness to participate in the follow-up evaluations.

BAS-H—temporal changes

Analyse with Friedman's test for several dependent samples (overall), when comparing pre-test values with the test values at the 3-month follow-up (assessment I–II–III) and 1-year follow-up (assessment I–II–III–IV), the treatment group revealed trends towards changes in a positive direction in one of the sub-indices of the BAS-H "Flow" index $p=0.030$ and $p=0.031$, respectively (Table IV). An improvement was also shown in the single reported item "Vegetative disturbances" ($p=0.005$) in the 1-year follow-up. However, in the control group changes were shown towards a negative direction in all three sub-indices of the BAS-H at the 3-month follow-up: "Grounding/centre-line" index ($p=0.006$), "Centring/breathing" index ($p=0.008$) and "Flow" index ($p=0.010$). There were no changes in the other measurements.

Temporal changes in each individual in the "Flow" index were analysed in Fig. 2. Most of the patients in the treatment group have the filled circle (assessment I) on top, while most of the patients in the control group have the filled circle at the bottom. This illustrates the decrease in measurement values, showing improvement in the treatment group, and the opposite change in the control group.

An ROC curve illustrates the systematic change in marginal distribution between two occasions by plotting two sets of cumulative relative frequencies for the marginal distributions against each other in the "Grounding/centre line" index of the BAS-H in Fig. 3. A systematic change towards lower values in the BAS-H scoring (= improvement), will result in a ROC curve that deviates above the diagonal of unchanged distributions. The greater the deviation, the stronger the systematic change between the two occasions. In the figure the ROC curve illustrating the temporal change within the treatment group between assessment I and III shows a small deviation above the diagonal. The ROC curve illustrating the temporal change

between assessments I and IV deviates much closer to the diagonal, illustrating that the values of the BAS-H scoring changed towards pre-treatment values in the 1-year follow-up. The change within the control group is illustrated with the ROC curve showing the temporal changes between assessments I and III. The ROC curve has a greater deviation in the opposite direction than the comparable ROC curve of the treatment group. This indicates more negative change in the control group than positive change in the treatment group, which corresponds with the systematic change over time within the groups shown with the relative position (RP) and the results from Friedman's test (Table IV). The observed pattern of change for the individual beyond the systematic group changes shown with the relative rank variance (RV) show that the individual differences are small in all of the assessments.

The ROC curve in Fig. 4 indicates a change towards lower scoring in the "Centring of movements/breathing" index of the BAS-H at the 3-month follow-up, which was still lower (improvement) at the 1-year follow-up. This corresponds with the RPs. The RVs show that the individual differences within the group are large. The curve indicates that the control group changed more in a negative direction than the treatment group changed in a positive direction, which corresponds with the RPs and the results from Friedman's test. The RV shows that there are no great individual differences in the control group.

The ROC curve in Fig. 5 indicates a change towards lower scoring in the "Flow" index of the BAS-H at the 3-month follow-up, which was still lower (improvement) at the 1-year follow-up. This corresponds with the RPs. The change within the control group indicates that the control group changed more in a negative direction than the treatment group changed in a positive direction, which corresponds with the RPs and the results from Friedman's test. The RV shows that there are no great individual differences in the control group.

The ROC curve in Fig. 6 illustrates that the change in the single reported item "Reported vegetative disturbances" of the BAS between assessments I and IV shows a greater deviation than that for I–III. This indicates a change towards lower scoring in the item at 3-months follow-up, which was still lower (improvement) at the 1-year follow-up. This corresponds with the RPs. The RVs show small individual differences within the

Table IV. p-values from overall Friedman's test within both groups after 6 months: at the 3-month follow-up for the treatment group (I–II–III) and within the treatment group at 1-year follow-up (I–II–III–IV). $p=0.01$ as limit for statistical significance, $p=0.05$ was set as limit for tendency

Variable	Treatment group Assessment		Control group Assessment
	I–II–III ($n=22$)	I–II–III–IV ($n=17$)	I–II–III ($n=17$)
Grounding/centre-line index	0.264	0.637	0.006
Centring/breathing index	0.155	0.386	0.008
Flow index	0.030	0.031	0.010
Single reported items			
Reported vegetative disturbances	0.110	0.005	0.423

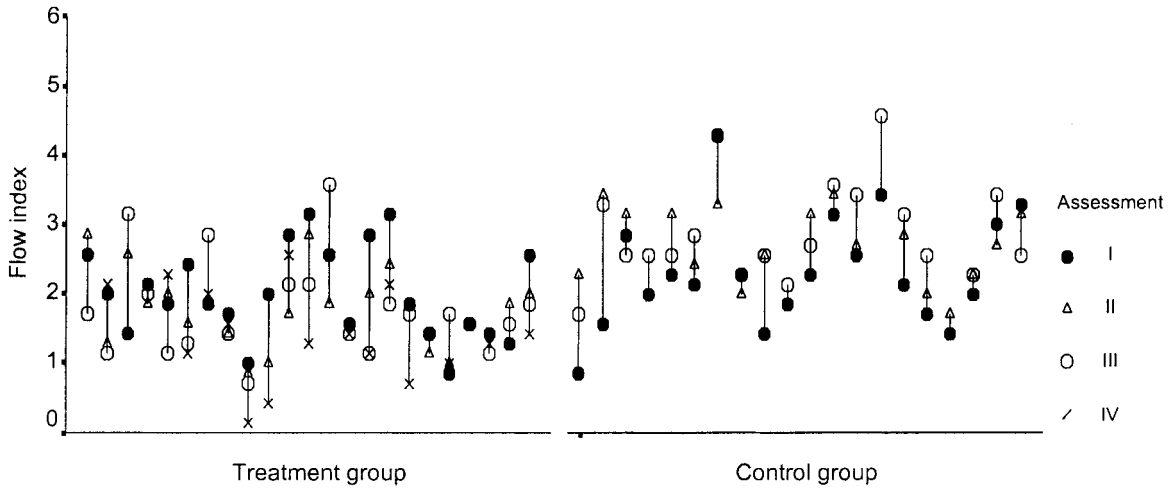


Fig. 2. Individual changes in the "Flow index" in the treatment group and the control group. Y-axis shows the assessed values of the index, X-axis shows each individual in the different assessments. Note that in the treatment group most patients have the filled circle on the top, while in the control group the filled circles are at the bottom.

group. The change within the control indicates that the control group changed less in a negative direction than the treatment group changed in a positive direction. This corresponds with the RPs and the results from Friedman's test. The RVs show no large individual differences in the control group.

Group differences

Group differences are shown in Figs 3–6. The figures show how the changes within the groups develop in different directions.

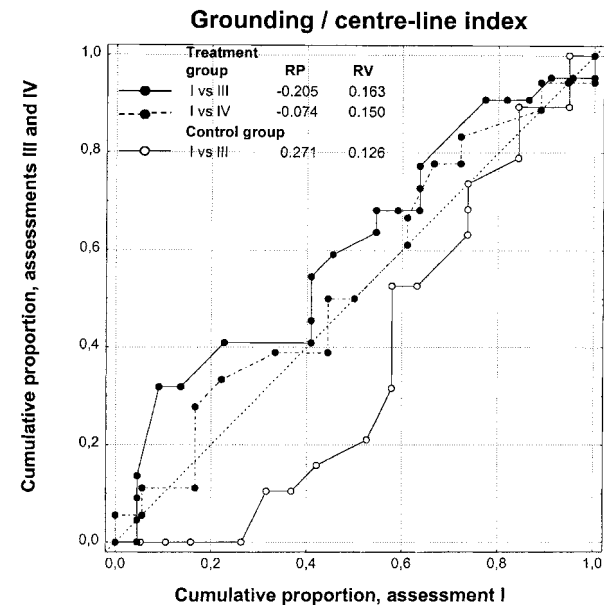


Fig. 3. The ROC curves for the systematic change in grounding/centre line index within the groups, comparing the cumulative proportion of assessment I (X-axis) and that of assessment III in both groups, with assessment IV in the treatment group (Y-axis). RP and RV are shown for each comparison. RP = relative position; RV = rank variance.

The treatment group shows changes in a positive direction at the 3-month follow-up, and this is maintained at the 1-year follow-up. The control group shows changes in a negative direction, and this negative development is the main difference of the outcomes.

QLS

The QLS scale measuring a total life satisfaction score, showed a tendency towards less satisfaction, in the treatment group at 1-year follow-up (I–IV $p = 0.04$) and in the control group after 6 months (I–II–III $p = 0.08$).

VAS

The VAS, for pain at the first examination (VAS 1), least pain (VAS 2) and the worst pain experienced (VAS 3) showed no differences within the groups.

Pain drawing

The pain drawing, showing the percentage of the body surface affected by pain showed no differences within the groups, but the number of pain affected body parts showed a tendency to decrease in the treatment group at the 3-month follow-up (I–III $p = 0.04$). This tendency was not observed at the 1-year follow-up.

MPI

The MPI showed no changes in any of the scales. The control group had a clear tendency after 6 months (I–III $p = 0.02$) in a negative direction on the pain scale, in the item measuring the patients' perception of how pain interferes with their lives.

DISCUSSION

This study shows that women with FMS or widespread, chronic pain, benefit from a multidisciplinary, multimodal treatment

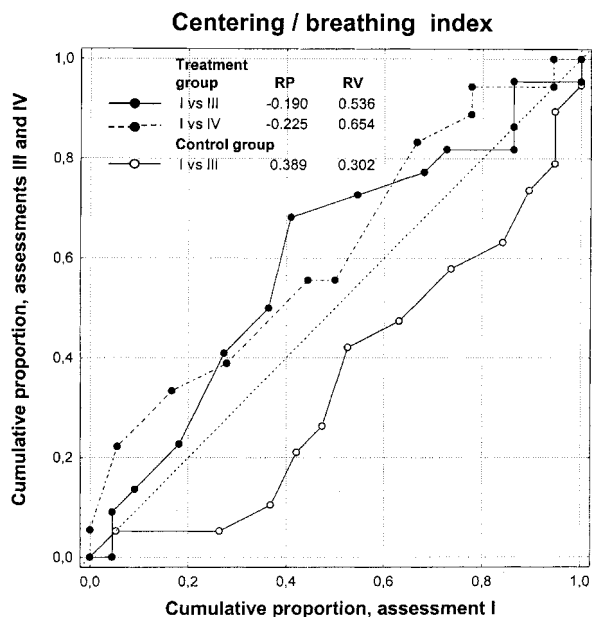


Fig. 4. The ROC curves for the systematic change in centring/breathing index within the groups, comparing the cumulative proportion of assessment I (X-axis) and that of assessment III in both groups, with assessment IV in the treatment group (Y-axis). RP and RV are shown for each comparison. RP = relative position; RV = rank variance.

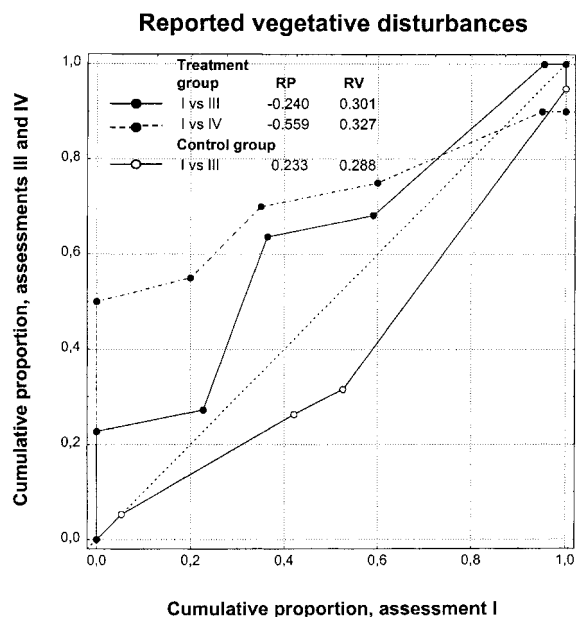


Fig. 6. The ROC curves for the systematic change in “Reported vegetative disturbances” within the groups comparing the cumulative proportion of assessment I (X-axis) and that of assessment III in both groups, with assessment IV in the treatment group (Y-axis). RP and RV are shown for each comparison. RP = relative position; RV = rank variance.

programme, in some movement activities. The tendencies towards improvements in quality of movement seen at the end of the programme, were partly maintained at the follow-ups after

3 months and after 1 year. The control group, which was followed for 6 months, showed a continuous deterioration during this period. The main finding was temporal differences in movement quality measured with the BAS-H. The treatment group showed tendencies improved in two sub-indices, comparing 3-month follow-up with pre-treatment. At the 1-year follow-up, the treatment group still showed a tendency improving in sub-index “Flow”. The control group showed deterioration in all three sub-indices in the assessments after both 3 and 6 months. In one self-reported item (“vegetative disturbances”) of the BAS, the treatment group showed a tendency towards improvement at 3-months, which increased to significance at the 1-year follow-up. The other measurements show no significant changes within the groups, but there were a few positive tendencies indicating benefits for the treatment group and negative changes in the control group. The main difference between the groups was increased disability in the control group.

When planning the programme, we wanted the patients to get tools to improve their physical functioning. Increased muscle tone and a dysfunctional pattern of movement, is often a result of chronic pain. We assumed that the patients could affect this with increased body awareness and knowledge of pain mechanisms. Therefore the emphasis in the treatment programme was on BAT, relaxation training, education and pain coping. There was a tendency towards effects of the BAT and relaxation training at the 3-month follow-up in the “Flow” index. During the programme, the importance of regular self-practice was emphasized, to support the patients in continuing to practise at home. The skills they learned during the

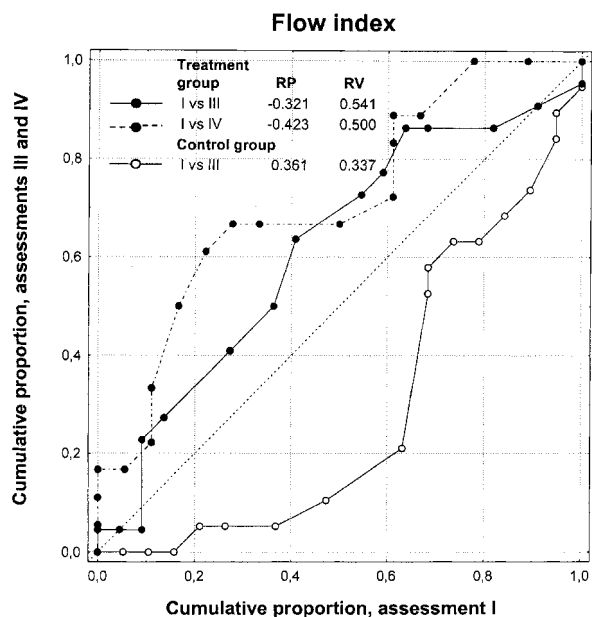


Fig. 5. The ROC curves for the systematic change in Flow index within the groups, comparing the cumulative proportion of assessment I (X-axis) and that of assessment III in both groups, with assessment IV in the treatment group (Y-axis). RP and RV are shown for each comparison. RP = relative position; RV = rank variance.

programme seemed to be partly maintained when the sessions of BAT, led by a physiotherapist, were changed to self-practice, which the participants were expected to carry out after completion of the rehabilitation programme. At the 1-year follow-up, these skills were partly still maintained and visible as improvements in "Flow index". The "Flow index" includes visible vegetative reactions, area of comfort and different aspects of muscular tension. The improvements in "Flow index" indicate that the patients increased their awareness of how to use their bodies with less muscle tension and a more functional pattern of movement. This could also be seen as a result of the patients being able to decrease the negative consequences of chronic pain, of which increased muscle tension is one.

The improvement in the sub-index "Flow" which assesses items like "visible vegetative reactions" and "area of comfort", as in the single reported item "vegetative disturbances" pointed towards an increased sense of self-comfort and a decreased stress-level. Gyllensten et al. (30) showed in their work, validating the BAS-H, that it correlates with the Arthritis Self-Efficacy Scale (ASES). The ASES measures the cognitive concept of self-efficacy and the belief in one's own capacity. According to this, one may suppose that if the ASES had been used as an assessment instrument, changes seen in the BAS-H would have been visible in the ASES also.

The positive development in the reported item "vegetative disturbances", which continued to improve up to the 1-year follow-up, is interesting. Neuro-endocrine axis dysfunction is today viewed as an important element in the development of FMS (38, 39). At the 1-year follow-up the treatment group patients showed a decrease in symptoms such as palpitation of the heart, sweating, dizziness, cold hands and feet and stomach disturbances. Bodily reactions were often highlighted and explained by the team during the programme. There is reason to believe that the increased understanding of these reactions decreased the anxiety among the patients. This added to the described decrease of other sources of stress, could in a longer perspective result in decreased vegetative stress reactions.

The validity and reliability of the BAS-H have been shown in only two studies (24, 40). Its use is still interesting, since measurements developed by physiotherapists which evaluate the qualities of movement, are rare. Other functional tests commonly used in physiotherapy practice are, for example "the Chair-Test", where the patient is requested to sit down and stand up as many times as possible during 1 minute, or "the Walk-Test 6 min" where the patient walks as fast as possible without running, and the distance covered in 6 minutes is measured. These tests depend on the patient's cooperation and may be affected by pain, motivation etc. (41). A common general clinical experience is that the patient with FMS tested before treatment often forces herself to endure more pain—more repetition or further distance, than in post-treatment measures, in which she has learned to respect her limits. To measure the quality of movement instead of the numbers of movements gives an opportunity to evaluation in a deeper dimension. The choice

of BAS-H as a measurement, in spite of its lack of scientific merits, is explained by the way it measures the quality of movements. When the patient with FMS is examined physically, the range of motion is mostly normal (42). When the quality of movements is considered, the pattern of motion is not normal. Elert et al. (43) showed how the EMG activity in patients with FMS increased in short pauses between the dynamic contractions, instead of decreasing as it did in healthy controls. This increased muscle tension shows in the pattern of movements, and is possible to score with the BAS-H. The primary aim of the BAT and the relaxation training in this rehabilitation programme was to make the participants aware of how they used their bodies. The BAS-H made it possible to assess these interventions.

Did the patients benefit from the rehabilitation programme, when they showed such limited improvements? The assessments of pain, consequences of pain and quality of life showed no major changes beneficial to the treatment group.

To draw any conclusion concerning the possible benefits of the programme, the results have to be seen in a wider perspective. It has previously been considered difficult to prove the occurrence of major benefits of rehabilitation programmes for patients with FMS (14, 15). FMS is a chronic illness, resulting in considerable impairment both generally and in work tasks (4, 44). Henriksson (3) found that 50% reported worsening of symptoms after 5 years. One study by Kennedy & Felson (45) reports some improvements in symptoms after 15 years. Of those patients studied, 77% were working. This may be compared with the women in the present study, of whom 23% were working full time, 30% were on partial sick leave, while 47% were fully sick-listed.

The patients present had a long duration of symptoms, the pain had extended to most parts of their bodies, and their working capacity was low. Twelve weeks of rehabilitation was a short time in which to influence the consequences of such a chronic illness. The programme may have been too short to produce more extensive improvements. The fact that the main difference was seen in physical functioning, might be a result that the physiotherapists, focused on improved physical functioning, lead most parts of the programme. Psychologists would have been needed as a part of the team to strengthen the psychosocial interventions, as exercising and cognitive-behavioural therapy seems important for optimizing interventions for patients with FMS (14).

The differences in epidemiological studies of FMS (2–6%) could probably be related to how the diagnosis is set (46). In the present study the population contain both patients with the diagnosis FMS and patients with chronic, widespread pain. This is clinical reality: the programme was appropriate for both groups, the patients were referred from the social insurance offices, and not from primary care. It is suggested in the literature (1, 5, 46) that FMS is one end of a continuous spectrum where chronic pain could extend from regional to widespread pain ending up in FMS. In such a continuity, the choice of treatment ought to be made after considering the patients'

abilities. Clinical experience has shown that this kind of programme is suitable for patients unable to benefit from more strenuous exercising.

CONCLUSION

This clinical trial of a multidisciplinary, rehabilitation programme with main emphasis on physiotherapy, showed benefits for the patients in improving quality of movement and reducing the experience of vegetative disturbances.

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APPENDIX

The following text is based on Sonn & Svensson's article (36), but adapted to the present study. The methods are valid for all types of ordered data without assumptions regarding distribution (36). In the present study, two basic measures for systematic and individual changes were used. The overall systematic change in the values of the BAS-H and the VAS was evaluated by analysing of the change in the distribution of individuals on the BAS-H and VAS-scales on the different assessment occasions. A change in the marginal distribution indicated a systematic change over time in the BAS-H and VAS levels for the group. This can be illustrated by plotting the two sets of cumulative relative frequencies for the marginal distributions against each other, yielding a ROC (relative/receiver operating characteristic) curve. A systematic change towards a lower value in the ratings of BAS-H and VAS will result in a ROC curve that deviates over

the diagonal of unchanged distribution. The greater the deviation, the stronger the systematic change between the two occasions. Accordingly, an improvement in BAS-H and VAS will give an ROC curve above the diagonal (36). A measure of systematic change over time is theoretically defined by the difference between two probabilities: the probability of the value of the first assessment, here denoted X, being distributed in lower categories than the value of the second assessment Y, and the probability of the assessment Y being distributed in lower categories than at X. The empirical measure of the systematic shift in position between the two occasions is called relative position (RP). Possible RP values are in the interval -1 to 1 . A value of RP close to zero indicates unchanged distribution of values over time for the group. Decreasing BAS-H level, which means a more functional pattern of motion at the second measurement, implies a negative RP value, and the corresponding ROC curve will deviate from the main diagonal in the upper direction. The observed pattern of change for individuals is compared with this rank-transformable pattern of change for the group. The dispersion of observations from the rank transformable pattern of change can be explained by the individual changes beyond the systematic group changes measured by RP. The empirical measure of this additional dispersion is called the Relative Rank-Variance (RV): Possible values for RV are in the range from 0 to 1. The smaller the RV, the more homogeneous is the measurable change for the group. It can be shown that $RV_0 \leq 1$, and this upper limit depends on the number of categories, m . In general RV_{max} is determined by uniformly distributed observations on the contingency table, and is 0.80 for $m = 10$ and 0.98 for VAS assessments (35).