

Original Article

COMPARISON BETWEEN DYNAMIC MUSCULAR STABILIZATION TECHNIQUE (DMST), YOGA THERAPY AND HOT PACKS IN IMPROVING GENERAL HEALTH STATUS OF POSTURAL LOW BACK PAIN PATIENTS

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ABSTRACT

Background: Different interventions can reduce the burden of postural low back pain. For example the use of Dynamic Muscular Stabilization Technique(DMST), Yoga Therapy and Hot Packs, which aids patients by muscle strengthening and relaxation. This study is aimed to evaluate to what extent the above techniques can improve the quality of life in those who suffer from the condition.

Materials and Methods: This was a randomized controlled trial. Thirty subjects (15 male and 15 females) with postural low back pain (n=30) were randomly divided into three groups. Group A (DMST Group; n = 10), Group B (Yoga Group; n = 10) and Group C (Control Group; n = 10). Then General Health Status using SF – 36 QOL was assessed at 0, 1st and 2nd week. The values were compared between the three groups.

Results: The Dynamic Muscular Stabilization Technique was effective in improving general health status; significant differences were found on both physical and mental health components of SF – 36 QOL. Yoga Therapy was found effective over Hot Packs. The mean improvement overall on general health status was significantly better to Dynamic Muscular Stabilization Technique.

Conclusion: The Dynamic Muscular Stabilization Technique is an effective intervention improving general health status over a period of 1 month in patients who experience postural low back pain.

KEY WORDS: DMST, Yoga Therapy, General Health Status, SF – 36 QOL questionnaire, Postural low back pain.

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INTRODUCTION

Chronic low back pain is a common health problem in many countries. Individuals suffering from chronic low back pain experience major physical, social, mental, and occupational disruptions. It is argued that the impact of low back pain includes: loss of physical function; deterioration of general health and deconditioning (loss of muscle tone and weight gain); constant or episodic pain or increase in the level of pain; loss of social functioning

manifested as decreased participation in social and leisure activities, family stress, or loss of group and community relatedness (often associated with decreased income and/or job loss); and disruption of psychological functioning manifested through insomnia, irritability, anxiety, depression and somatic complaints[1].

It has been shown that different interventions can reduce the burden of the disease. For example the use of interventions like Dynamic Muscular Stabilization Techniques, yogasanas

and hot packs. These techniques basically work on muscle strengthening and relaxation to bring about reduction in back pain, decreases the time lost from work and improves patient functioning leading to improved quality of life [2, 3, 4]. There is a consensus that clinical trials designed to assess the efficacy and effectiveness of treatments for chronic pain should consider outcomes in six core domains: pain, physical functioning, emotional functioning, patient global ratings of satisfaction, negative health states, and adverse events, and patient disposition [5]. The purpose of this study was to examine whether Dynamic Muscular Stabilization Techniques, yogasanas and hot packs could improve patient's health-related quality of life in patients with postural low back pain.

MATERIALS AND METHODS

Selection Criteria: Inclusion Criteria: Students of SBSPGI of age 18 – 25 yr, Postural low back ache without any history of injury, fall or disease [6], Low back pain with duration more than 6 weeks [2]. Exclusion Criteria: If the subject was receiving concurrent treatment from another practitioner for their, low back ache. Including Physical Therapy and Medication, if the subject was diagnosed as having a tumour, infection or inflammatory disease affecting the spine, Had spinal or lower limb surgery, Had spinal fracture or structural deformity such as spondylolsthesis and spondylosis, Had sign of nerve root compression, defined as decreased reflexes, sensory loss and motor deficits and hyper laxity of muscles.

Sampling Method: By random sampling subjects were divided into three groups with 10 subjects each.

Variables: Independent Variable: Dynamic Muscular Stabilization Technique [2], Yogasanas: Pawanmukt Asan, Setubandh Asan, Bhujang Asan, Shalabh Asan, Tad Asan, Makar Asan [3] and Hot Packs [4]. **Dependent Variable:** SF 36 Quality of life questionnaire [7].

Instrumentation: Plinth and mattress for performing Dynamic Muscular Stabilization Technique & Yogasanas, Printed format of SF 36 QOL questionnaire and hot Packs.

Study design and data collection: The study

was an experimental study – Comparative in nature. The study was conducted at Physiotherapy department of SBSPGI, Dehradun, Uttarakhand, India. Eligible patients were patients in Girls hostel and Boys hostel of SBSPGI, Dehradun, Uttarakhand, India. Selection criteria were students of SBSPGI of age 18 – 25 yr. with postural low back ache without any history of injury, fall or disease and Low back pain with duration more than 6 weeks. Patients were excluded if they were receiving concurrent treatment from another practitioner for their low back ache, were diagnosed as having a tumor, infection or inflammatory disease affecting the spine, had spinal or lower limb surgery, had spinal fracture or structural deformity such as spondylolsthesis and spondylosis, had sign of nerve root compression, defined as decreased reflexes, sensory loss and motor deficits, Hyper laxity of muscles or any systemic disorder in the body. Physicians confirmed the inclusion and exclusion criteria through a complete and exact clinical assessment before the participants were enrolled in the study. To participate, patients had to be willing to comply with the entire study protocol. Therefore, the procedures were described, the purposes of the study were explained and written consent was sought before any part of the study procedure was administered or any medication or intervention was dispensed. The ethics committee of Sardar Bhagwan Singh Post Graduate Institute of Biomedical Sciences and Research approved the study.

30 Students of SBSPGI with mean age (20.03 ± 1.21) were taken and SF - 36 QOL Questionnaire score was taken to assess General Health Status. Three groups were divided with 10 subjects in each group, namely Group A (mean age 20 ± 0.81), Group B (mean age 19.7 ± 0.94) and Group C (mean age 20.4 ± 1.71).

To the Group A, Dynamic muscular stabilization technique were given with 3 repetitions and 10 second hold for each exercise; to the Group B, Yoga Asanas were performed with 3 repetitions of each asana and to the Group C Moist heat packs were given for 15 minutes. Each technique given 5 times a week in a 2 week protocol. At 1st and 2nd week the score of SF 36 QOL questionnaire was measured again.

Study measures

1. Basic Assessment: This form covered age, weight, socioeconomic status and some risk behaviors regarding low back pain and was completed during interviews with the patients.

2. The Short Form Health Survey (SF-36): This is a well known general quality of life questionnaire that measures health-related functioning in eight subscales: physical functioning (PF), role limitations due to physical problems (RP), bodily pain (BP), vitality (VT), general health perceptions (GH), social functioning (SF), role limitations due to emotional problems (RE) and mental health (MH). The SF-36 reports the patients' perceived quality of life by scores ranging from 36 to 149, where 149 is the best and 36 is the worst score[8].

Study Interventions

Dynamic Muscular Stabilization Technique

1. Isolation and facilitation of target muscles:

(a) Abdominal Bracing: Patient lying in crook lying position and is instructed to draw the navel up and in towards the spine or feeling the muscle tighten at the waist. From the beginning patient learns to breathe normally while activating or holding the muscular contraction.

(b) Abdominal Hollowing: Patient is in supine hook lying position and is instructed to perform abdominal hollowing by making the lower abdomen cave in with both arms elevated. (Fig. 1 (a) & 1 (b))

2. Training of trunk stabilization under static conditions of increased load: Maintaining the above position and concentration pattern the patient is instructed to hold the position while load is added via the weight of lower limbs being moved passively into loaded positions like:-

(a) One leg with knee extended.

(b) Both legs with knees flexed. (Images 2 (a) & 2 (b))

3. Development of trunk stabilization during slow controlled movement of the lumbar spine: Once the stability is trained through static procedure, the movement of the trunk with appropriate activation of the supporting muscles. The first step is to produce and explore

lumbo-pelvic movements and learn abdominal hollowing or bracing in quadruped position and second step is controlled loading by

(a) Movement of trunk with one lower limb elevation.

(b) Movement of trunk with elevation of one upper limb with the diagonal lower limb. (Images 3 (a) & 3 (b))

Yoga Therapy

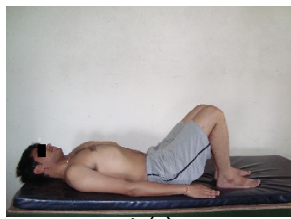
1. Pawanmukt Asan (Knee to chest posture): Lie down on the mat. Breath out, while breathing in lift both the legs, bend them and bring them up to the abdomen. Let the knee touch the nose, with rest of the thigh touching the chest. Press down on the leg, so that abdomen and chest receive pressure. Remain in this position as long as you can hold the breath. Then breathe out slowly and straighten your legs.

2. Setubandh Asan (Bridge Posture): Lie flat on the back; bend the knees placing sole of the feet on the mat with heels touching the buttocks. While breathing in raise the buttocks and arch the back upwards, remain in this position as long as you can hold the breath, then breathe out slowly and come to the starting position.

3. Bhujang Asan (Cobra Posture): Lie on the abdomen with legs straight, knees and feet together and toes pointing backwards. Place the palm at the level of the shoulders by side of the chest. Breathe in and slowly raise the head, neck, chest and upper abdomen till the level of the navel. Remain in this position as long as you can hold the breath, then breathe out slowly and come to the starting position.

4. Shalabh Asan (Locust Pose): Lie on the abdomen with legs straight, knees and feet together and toes pointing backwards. Place the palm beneath the thighs. Breathe in and slowly raise the head, neck, chest and upper abdomen along with both lower limbs straight together and stretching them as far as possible without bending the knees. Remain in this position as long as you can hold the breath, then breathe out slowly and come to the starting position.

5. Tad Asan (Palm Tree Posture): Stand with feet apart and arms by the side. Breathe in and raise your arm over the head, interlock the fingers and turn the palm upwards, stretch the



1 (a)



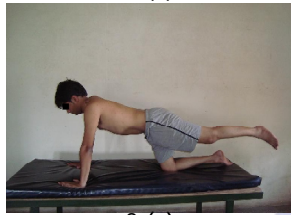
1 (b)



2 (a)



2 (b)



3 (a)



3 (b)



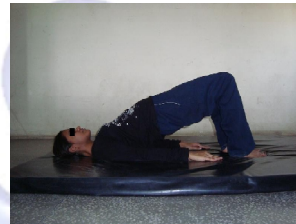
Bhujang asan



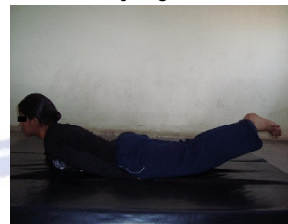
Makar Asan



Pawanmukt asan



Setubandh asan



Shalabh Asan



Tad asan



Hot Pack Application



Hot Pack

arm shoulders and chest upwards, raise the heel coming up on to the toes. Remain in this position as long as you can hold the breath, then breathe out slowly and come to the starting position.

6. Makar Asan (Crocodile Posture): Lie flat on the abdomen, spread your legs with toes facing inwards. Move the shoulders up and by bending the elbows keep the palm on dorsum of other hand place the forehead on the hands. Relax and breathe normally for 2 – 3 minutes and concentrate on the breathing pattern.

Hot Packs

Patient lying supine in crook lying position, hot pack is placed under the lower back of the patient for 15 minutes.

Study Outcome: The outcome of study was Quality of life score in the 3 groups for General Physical and Mental Health status. The mean increase in quality of life score above the baseline was used as the main outcome measure of the patient's responses to the intervention.

Statistical Analysis: Kruskal-Wallis Test was done to compare the mean value SF-36 Quality

of Life Questionnaire score at 0 week, 1st week and 2nd week between Group A, Group B and Group C to know the extent of improvement. Jonckheere's Trend Test was used to compare mean value of SF-36 Quality of Life Questionnaire score at 2nd week between Group A, Group Band Group C to find the trend in effectiveness amongst the treatment techniques. The Significance level (p) was taken as 0.05.

RESULTS

A total number of 30 subjects with mean age 20.03 ± 1.21 were taken and divided into three groups with 10 subjects in each group, namely Group A (mean age 20 ± 0.81), Group B(mean age 19.7 ± 0.94) and Group C(mean age 20.4 ± 1.71), (Table 1). According to Kruskal wallis test, the difference in final mean scores of General Health (GH), Physical Health (PH) and Mental Health (MH) Status came to be significant at 2nd week. ($p < 0.05$), (Table 2).

The use of Jonckheere's trend test to find out the trend in difference in final and initial scores of General Health (GH), Physical Health (PH) and Mental Health (MH) status and the trend came significant as DMST > Yoga Therapy > Hot Packs. ($p < 0.05$), (Table 2).

Table 1: Comparison between General, Physical and Mental Health Status scores in DMST, Yoga & Control group at 2nd Week.

Group	General Health (2nd week)	Physical Health (2nd week)	Mental Health (2nd week)
DMST	129.7 ± 8.74	66 ± 2.16	59.8 ± 6.76
YOGA	117.8 ± 8.65	60.8 ± 5.05	53.3 ± 5.12
CONTROL	119 ± 8.57	60.2 ± 4.7	54.6 ± 4.47
H - Value	9.001	10.069	7.343
Significance	S	S	S

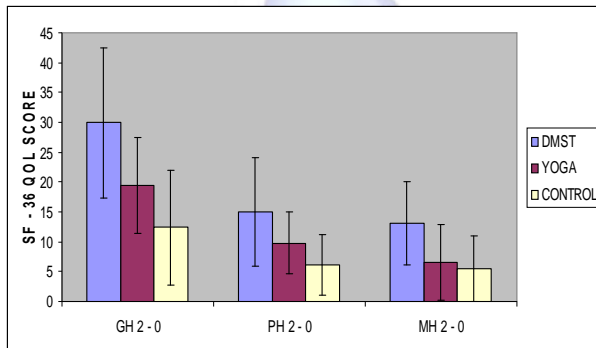
S = Significant (p < 0.05)

Table2: Comparison between General, Physical and Mental Health Status scores in DMST, Yoga & Control group, for estimation of trend in difference of final & initial scores of each group.

Trend	GH ₂₋₀	PH ₂₋₀	MH ₂₋₀
1. DMST	29.9 ± 12.67	15 ± 9.10	13.1 ± 6.96
2. YOGA	19.4 ± 8.08	9.8 ± 5.22	6.6 ± 6.29
3. CONTROL	12.4 ± 9.62	6.2 ± 5.07	5.5 ± 5.4
S - Value	164	134	114
Significance	S	S	S

S = Significant (p < 0.05)

Graph: Comparison between General, Physical and Mental Health Status scores in DMST, Yoga & Control group, for estimation of trend in difference of final & initial scores of each group.



DISCUSSION

This randomized trial showed that DMST using patients improved significantly on all quality of life subscales. In the Yoga Therapy group, although improvements were seen on all subscales, they were much less than those in DMST group but were more effective than Control Group. A recent study on the topic has found that the health related quality of life of patients with low back pain depends on functional status and psychological factors more than simple physical impairment [11]. Thus, in this respect it seems that DMST is a very relevant regimen to improve both patients' physical and psychological status. As we have

already seen that main cause of postural low back pain is the weakness and wasting of the postural muscles leading to impairments in Physical and Mental functions and thus affecting General Health as a whole [12]. DMST was more effective as it emphasizes specifically on muscle strengthening and spinal stabilization component which once gained leads to relief from physical and thus mental symptoms [13].

Adding to efficacy of DMST over other two techniques Suraj Kumar et al, 2009, said that in DMST the more improvement may be due to restoration of muscle strength in combination with balance, posture and coordination due to presence of pain and functional disability [2]. Usually postural back pain is due to muscle weakness leading to hyper mobility and according to Fritz JM et al, 2005, Those who have hyper mobility of spine are more benefitted from DMST [12, 2].

As we have seen Postural Low Back Pain is relieved much by muscle strengthening and stabilization than muscle stretching and relaxation. Yoga Therapy does not concentrate specifically on strengthening and moreover has a very less role in it. It basically concentrates on breathing patterns and relaxation of muscles [3, 13]. So, it can be said that there are temporary benefits in mental functions by yoga but the physical problems persists due to which psychological problems reappear. Hot packs have least effect as it has a temporary relaxing or placebo effect on back pain. Hot pack in conjunction with exercises is more effective than hot pack alone [14].

CONCLUSION

Data analysis says that Dynamic Muscular Stabilization Technique (DMST) is more effective in improving General Health Status in Postural Low Back Pain patients, than Yoga Therapy and Hot Packs. And Yoga Therapy is more effective than hot packs.

ABBREVIATIONS

DMST – Dynamic Muscular Stabilization Technique
 GH – General Health
 MH – Mental Health
 PH – Physical Health

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Conflicts of interest: None

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