



COMPARISON OF THERAPY BALL EXERCISES AND THERAPY BALL EXERCISES WITH ADDED RESISTANCE IN PATIENTS WITH ANKYLOSING SPONDYLITIS.

Dr Sonam Rajbhar Masters In Occupational Therapy In Musculoskeletal Sciences

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ABSTRACT **BACKGROUND:** Ankylosing spondylitis is classified under Seronegative Spondyloarthropathies and it is a systemic and chronic inflammatory rheumatic disease. The disease causes inflammation and pain in the spine and joints. which reduce physical activity and spinal mobility and causes fatigue, stiffness, sleep disorders and depression, because of this patient's quality of life affects along with functional performance Enabling activities are used in occupational therapy for rehabilitation. Enabling activities are considered as a non-purposeful, because it does not have any inherent goal, through may they engage the mental and physical participation of the patient. If enabling activities are performed with a therapy ball and resistance is also added, it may show beneficial effects to Ankylosing spondylitis patient.

OBJECTIVES: To assess the pain, Quality of life, Functional performance of patients with Ankylosing Spondylitis.

METHOD: Subjects were screened using the Visual analogue scale ,EASi-QOL, Range of motion, Manual muscle testing, Bath ankylosing spondylitis functional index (BASFI), Bath ankylosing spondylitis disease activity index (BASDI). 30 individuals with both sexes in the age group of 18 to 45 years were included and randomly allocated in two groups (control and experimental). Each participant was evaluated for ROM and MP on 1st day, 3rd week and 6th week and for BASFI , BASDI AND ES-QOL went for evaluation on first day and 6th week. Exercises were performed twice in a week for 6 week period under supervision of therapist. Each session lasted for 45 to 60 mins.

RESULT: The study showed that there was significant difference in pre and post score of both the groups in pain, quality of life domains, Bath Ankylosing spondylitis functional index , Bath Ankylosing disease activity index.

CONCLUSION: Resistive exercises with therapy ball improves quality of life, bath ankylosing spondylitis disease activity, bath ankylosing spondylitis functional index and pain in patients with ankylosing spondylitis.

KEYWORDS : Ankylosing spondylitis, Therapy ball exercises , Resistive exercises Enabling activities.

INTRODUCTION:

Ankylosing spondylitis (AS) is classified under Seronegative Spondyloarthropathies and it is a systemic and chronic inflammatory rheumatic disease. A disease of the axial skeletal chiefly in the lumbar and sacroiliac joints, progressing in the ascending fusion to involve the thoracic and cervical vertebrae, followed by the limited motion of the lumbar spine, atrophy of the trunk muscles also occurs therefore may seek to ease back pain by assuming bent a kyphotic posture.

Peripheral joints are also affected in 25% cases, primarily affecting hips knee and shoulder. The disease causes inflammation and pain in the spine and joints which reduce physical activity and spinal mobility and causes fatigue, stiffness, sleep disorders and depression because of this patient's quality of life affects along with functional performance Exercises, along with pharmacological treatment helps to improve the quality of life and functional performance of the patients with AS are usually a combination of, muscle strengthening, range of motion, flexibility and cardiorespiratory exercise.

Resistive exercises have also been used in several studies. They can be performed by using free weights, resistance, band, weight machines. Enabling activities are used in occupational therapy for rehabilitation. Enabling activities are considered as a non-purposeful, because it does not have any inherent goal, through may they engage the mental and physical participation of the patient . If enabling activities are performed with a therapy ball, and resistance is also added it may show beneficial effects ankylosing spondylitis patient. Hence this study was carried out.

NEED FOR THE STUDY:

The Various authors studies have been evaluated to see efficacy of exercises in ankylosing spondylitis. There exists various opinion of the various authors in systemic review. Many of the studies are focused on movements, muscle strengthening, resistive training with use of equipment like weighted machines, dumbbell's and Thera Band.

Resistive exercise with the aid of therapy ball are hypothesized to bring about improvement in functional performance in the patient with ankylosing spondylitis. It is likely that this improvement in ROM and muscle strength will lead to Improvement in functional performance will, in turn, improve QOL.

Studies have shown that Resistance training helps in improvement in walking performance in patients with ankylosing spondylitis. There are not much studies which have the effect of resistance training on therapy ball. Hence this has been performed to understand that whether resistive training (with the use of enabling activities) combined with therapy ball exercises had any added benefits in patients with ankylosing spondylitis. Hence this study was undertaken.

AIMS: To compare therapy ball exercises and therapy ball exercises with added resistance in patients with Ankylosing spondylitis.

OBJECTIVE: To assess the pain, Quality of life, Functional performance and compare effect of therapy ball exercises and therapy ball exercises with added resistance in patients with Ankylosing spondylitis.

METHODOLOGY:

Study design: Comparative, Prospective, Interventional and a randomized controlled ,clinical trial. sample size 32, both male and female in the age group of 18 to 45 years was included in the study. 30 out of 32 subjects completed the protocol, The study was approved by the Institutional ethics committee. After informed consent, 32 participants were randomly allocated to 2 groups. 2 dropped out due to travel issues. All other (n=30) participants followed up with therapist regularly twice a week for 45 to 60 min of session.

Group A: Therapy Ball group included 15 subjects, of which 13 were male and 2 were female.

Group B: Therapy Ball with the added resistance group included 15 subjects in which 13 were male and 2 were female,

INCLUSION CRITERIA : A patient diagnosed with Ankylosing Spondylitis between age group of 18 to 45 years with both sexes male and female on appropriate medical treatment and capable of sitting on chair with hip and knee flexed to 90 degrees

EXCLUSION CRITERIA:

1. Subjects with VAS score above 5,
2. Any surgery performed

- 3. Patients with neurological complication.
- 4. Patients with any kind of diagnosed cognitive issues.
- 5. Patients with psychiatric illness

STUDY PROCEDURE:

All 30 subjects were explained in detail about the study procedure. Informed consent were taken from each patient participating in the study. Subject was evaluated using the Visual analogue scale, EASI-QOL, Range of motion, Manual muscle testing, Bath ankylosing spondylitis functional index (BASFI), Bath ankylosing spondylitis disease activity index (BASDI). 30 individuals with both sexes in the age group of 18 to 45 years were included and randomly allocated in two groups (control and experimental). Each subject was evaluated for ROM and MP on day 1, 3rd week and 6th week. Scores for BASFI, BASDI AND ES-QOL were obtained on day1 and 6th week of evaluation. Exercises were performed twice in a week for 6 week under supervision of therapist. Each therapy session lasted for 45 to 60 mins.

Occupational Therapy Intervention:

Exercise protocol for both the GROUP A and GROUP B:

Sitting position: Sitting on a therapy ball, trunk erect, a patient looking forward, hip and knee flexed to 90 degrees with both the feet touching the ground.

Exercise protocol week wise:

1. Week 1 and 2- exercises were performed with support of wall (corner of the wall)
2. Week 3 and 4- exercises were performed without wall support.
3. Week 5 and 6- exercises performed, (gentle side tilt was given by the therapist)

Exercises for upper extremity:

Shoulder Flexion, abduction, extension and elbow flexion and extension with the help of Pegs transfer along with self-stretching.

Exercises for lower extremity:

1. Hip flexion in sitting and knee 90 degrees of flexion.
2. Knee flexion and extension with the help of medicine ball.

Exercises for Trunk:

1. Reach out in forward, upward, side to side and trunk rotation with the help of pegs transfer (Unilateral and Bilateral reach)

Exercises for whole body:

1. Back extension on therapy ball (in a prone position.)
2. Standing with the back to the wall and spine held in a neutral position. Ball which is held in behind the back have the patient slide his or her back up and down on the wall in a partial squat and hold the neutral position of starting point.

Exercise protocol was same for both the groups (A and B), however, in group B therapy ball exercises along with added weighted cuff was given. Weighted cuff was given according to patients physical capability (1/4 kg, 1/2kg and 1 kg)



Images Showing Exercises On Therapy Ball With Weighted Cuff For group B.

RESULTS:

Table no. 1: Comparison of VAS within Group A & Group B

VAS	Group A				Group B			
	Mean	SD	Z value	P value	Mean	SD	Z value	P value
PRE	5	0	-3.44	0.001	4.866667	0.351866	-3.45	0.001
POST	2.334	1.112697			0.866667	1.060099		

Since p value is less than 0.05, we conclude that, there is a significant difference in pre-post score in both groups.

Table2: Comparison of VAS score between Group A & Group B

VAS	Control		Experimental		Z value	P value
	Mean	SD	Mean	SD		
	2.3333	1.11270	0.8667	1.06010	-3.086	0.002

Graph 1: showing pre and post values of VAS score in both group groups

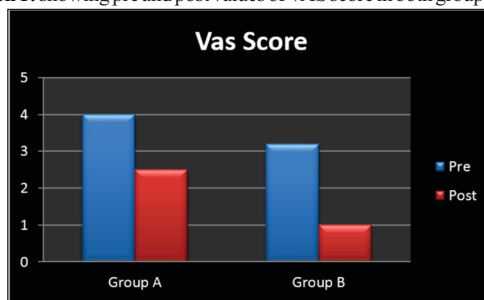


Table no 3: Comparison of pre and post BASFI in Group A & Group B

BASFI	GROUP A				GROUP B			
	Mean	SD	Z value	P value	Mean	SD	Z value	P value
PRE	3.8267	1.47477	-2.89	0.004	4.0867	1.70246	-3.42	0.002
POST	2.43334	1.44749			1.14667	1.11025		

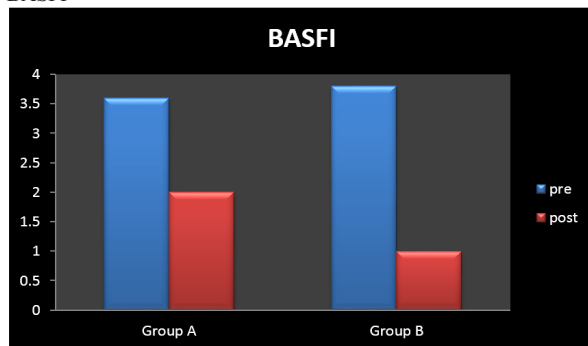
Since p value is less than 0.05, we reject the null hypothesis.

The above table showed that, there is a significant difference in pre and post score in both the groups in BASFI.

Table 4: Comparison of BASFI scores between group A and group B

BASFI	Control		Experimental		Z value	P value
	Mean	SD	Mean	SD		
	2.4333	1.44749	1.1467	1.11026	-2.915	0.004

Graph 2: showing comparison between Group A and Group B in BASFI



Images Showing Exercises On Therapy Ball Without Weighted Cuff For Group A.

Table 5: showing pre and post BASDAI scores in group A and Group B

BASDAI	GROUP A				GROUP B			
	Mean	SD	Z value	P value	Mean	SD	Z value	P value
	PRE	4.133333	1.218117	-3.13	0.001	3.673333	1.46017	-3.30
POST	2.446667	1.009149			1.126667	1.097703		

Table 6: Comparison of BASDAI between group A and group B using a Mann Whitney test

BASDAI	Group A		Group B		Z value	P value
	Mean	SD	Mean	SD	-3.431	0.001

Graph 3: showing pre and post BASDAI scores in group A and Group B

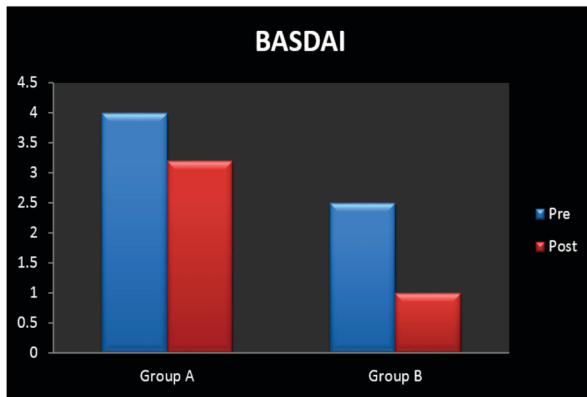


Table no7. Comparison **QUALITY OF LIFE** within Group A & Group B

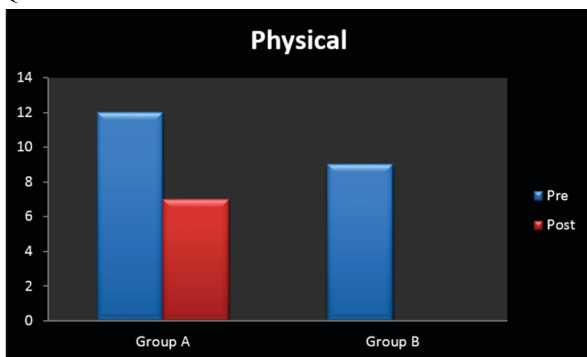
		GROUP A				GROUP B			
		Mean	SD	Z value	P value	Mean	SD	Z value	P value
Physical	PRE	10.34	4.7308	-2.970	0.003	10.2667	6.14662	-3.30	0.001
	POST	5.14	3.1817			2.66667	3.99404	6	
Disease activity	PRE	8.6	2.8735	-2.820	0.005	8.26667	3.59497	-3.413	0.001
	POST	4.47	2.231			2.2	3.68781		
Emotional well being	PRE	11.8	5.3345	-3.044	0.002	8.5334	3.58302	-3.41	0.001
	POST	6.67	5.2053			1.4667	2.41621	6	1
Social participation	PRE	11.34	4.3039	-3.256	0.001	9.4667	4.01544	-3.41	0.001
	POST	5.94	2.9390			2.2	3.89505	7	

The P value is less than 0.05 in both the groups, therefore, there is a significant difference in pre and post values of QOL in both the groups.

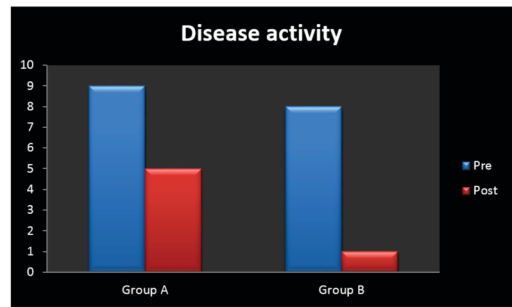
Table 8: Comparisons of QOL between group A and group B

	GROUP A		GROUP B		Z value	P value
	Mean	SD	Mean	SD	-2.392	0.017
PHYSICAL	5.1333	3.18179	2.6667	3.99404	-2.841	0.004
DISEASE ACTIVITY	4.4667	2.23180	2.2000	3.68782	-2.634	0.008
EMOTIONAL WELLBEING	6.6667	5.20531	1.4667	2.41622	-3.435	0.001
SOCIAL PARTICIPATION	5.9333	2.93906	2.2000	3.89505		

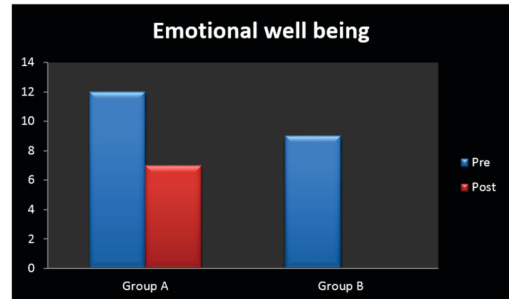
Graph 4: showing physical improvement in both groups according to QOL



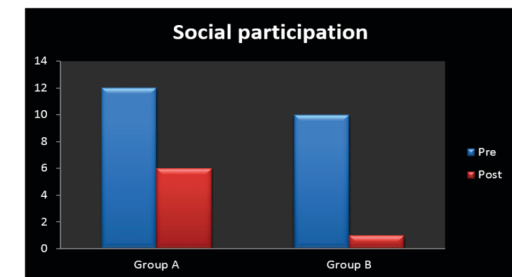
Graph 5: showing disease activity improvement in both groups according to QOL



Graph 6: showing emotional wellbeing in both groups according to QOL



Graph 7: showing social participation in both groups according to QOL



DISCUSSION:

The present study was undertaken to compare the 2 therapy techniques i.e. Therapy ball exercises and therapy ball exercises along with added resistance in subject of ankylosing spondylitis in terms of reducing pain, improving quality of life, disease activity and functional performance. The outcome measures used in this study were pain (VAS), quality of life(ESI-QOL), functional performance (BASFI, BASDAI). Study conducted by Hactice bodur entitled study on quality of life and related variables in patients with ankylosing spondylitis” in this study it is concluded that in patients with Ankylosing spondylitis, the most significant variables associated with QOL were BASDAI, BASFI, FATIGUE and PAIN. Hence, we used these scales, which are used to study these variables.

In our study we found significant difference in **pain scores** in each of the groups, that is, group A and B, however pain relief was better in group B. This could be attributed to fact that muscle strengthening may reduce pain. These result is consistent with the studies by Ingvild Kjekken et al. which proved efficacy of exercises in reducing pain in Ankylosing spondylitis. Better result was found in group B i.e. therapy ball along with added resistance.

In our study Positive difference in **Bath ankylosing spondylitis functional index (BASFI) and Bath ankylosing spondylitis disease activity index (BASDAI) score** in group A and group B pre and post therapy. The improvement was better in group B as compared to group A. Group B received strengthening exercises in addition to the enabling activities. These resistive exercises could have contributed to better results obtained in group B. In the study performed by Ingvild Kjekken , there was significant improvement in BASDAI scores, however, there was no improvement in BASFI scores.No enabling activities were incorporated in their study, hence, probably the disease index showed improvement, however functional index did not

The study showed that significant improvement in **quality of life**

components i.e.physical, disease activity, emotional wellbeing and social participation in both the group. These results are consistent with studies performed by Hale karapolat²⁶, which concluded that Group based and home based exercises are efficient in improving symptoms and mobility and have impact on quality of life with ankylosing spondylitis patients. There was significant difference in post score of all the domains of quality of life i.e. physical, disease activity, emotional wellbeing, and social participation in both the groups. However, there was better improvement in domains of quality of life in group B as compared to group A, especially in physical and emotional wellbeing. This could be again because of fact that we added external resistance in our therapy program. This resistance training may be important factor towards improving muscle strength which improves daily performance which in turns improves domains of quality of life i.e. physical, disease activity, emotional wellbeing, social participation.

CONCLUSION :

Resistive exercises with therapy ball improve quality of life, both ankylosing spondylitis disease activity, both ankylosing spondylitis functional index and pain in patients with ankylosing spondylitis. This improvement is significantly more than that seen using a therapy ball alone. Though both the exercise programs are helpful in improving/ maintaining ranges of the extremities, improvement is however seen in spine ROM in the study group.

Limitation of the study:

Due to fear of fall patient did not perform prone ball extension exercises.

Patients with VAS score beyond 5 they were not included in the study.

Recommendation:

The study can be performed on patients with more severe presentation of disease and for longer duration.

Conflict of interest : None

Funding: None

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