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Compare the Effect of Mckenzie Protocol & Back School Program in Mechanical Low Back Pain Individual

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Abstract

Background and Purpose: Mechanical Low Back Pain is a common musculoskeletal disorder which interfere with quality of life and work performance. There is no specification of which exercise has to be followed according to patient requirement. Mckenzie protocol has been prescribed in past few decade in a large scale even the Back School Program. But there is no proper clarification of which exercise has to be given in Back School Program apart from ergonomic advice. So the purpose of study is to compare the Mckenzie protocol and Back School Program in mechanical low back pain individual.

Method : 35 subjects randomly assigned into two group – Group A Mckenzie protocol and Group B Back School Program. The baseline variable for pain intensity is Visual Analog Scale and functional limitation is Modified Oswestry Disability Index were taken on 1st, 12th and 21st day of treatment session for 3 week of duration.

Result: Using one way ANOVA there was significant improvement in Visual Analog Scale and Modified Oswestry Disability Index score for both groups.But unpaired t-test did not show any significant difference in exercise program between groups.

Conclusion: On statistical basis there is no significant difference in Mckenzie protocol and Back School Program exercises, but patient felt better relief in their functional limitation by following Back School Program exercises.

Key words: Mechanical Back Pain; Back School Program; Mckenzie Protocol; Modified Oswestry Disability Index.

Introduction

According to World Health Organization low back pain(LBP) is a leading cause of disability. It occurs in similar proportions in all cultures, interfere with quality of life & work performance. It usually a self limiting that tends to improve spontaneously over time. [1, 2]

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Mechanical low back pain consist of unspecific injury of lumbar colum, could be related to other causes of lumbar pain. It affect 60-90% of population at any time in their lifes. [3]

Exercise therapy is found to be more effective in treating LBP. Two potentially useful treatment for patient are Mckenzie & Back School Program. These programs have good biological plausibility & have modest cost so that patient are better able to understand their condition & how to change their behaviour towards an episode of LBP.[4]

In 1981 Robin Mckenzie proposed a classification system & individualized treatment regimen for low back pain. It is a method based on movement pattern of spine with sustained position performed in specific direction. For any condition certain movement

aggravate pain and other movement relief pain. [5]

Back school method was developed in 1969 in Sweden by Mariane, Zachrisson, Forssin, with goal of preventing and avoiding recurrent episode of LBP. The program is composed of theoretical component which include : anatomy & spinal biomechanics, epidemiology, physiopathology of most frequent back disorder, posture, ergonomic, common treatment modalities & a practical component i.e. exercise for maintenance of healthy back.[6]

The aim of the study is to compare Mckenzie protocol and Back School Program for treating patient to reduce pain and get healthy back and thus improve quality of life.

Objective

To find out the effect of Mckenzie protocol in decreasing functional limitation in mechanical low back pain individual.

To find out the effect of Back School Program in decreasing functional limitation in mechanical low back pain individual.

To compare the effectiveness of the Mckenzie and Back School Program exercises.

Scope

Studies on Mckenzie protocol & Back School Program for mechanical low back pain are limited in Indian patient population. Based on this study, exercise which are more effective can be practiced for better out come in LBP patient.

Methodology

35 no. of subjects recruited from Subharti College of Physiotherapy OPD & Subharti Medical College and Hospital.

Inclusion criteria

1. Age 18 to 40 years
2. Gender : both (M & F)
3. History of back pain more than 3 month
4. Modified Oswestry Disability index (MODI)> 10% [7,8]

Exclusion criteria

1. History of any inflammatory spinal disease
2. Severe Deformity of spine – scoliosis, kyphosis
3. History of spinal surgery
4. History of spinal malignancy
5. Any sign of nerve compression
6. Hypertension.
7. Pregnancy /breast feeding
8. Referred pain from viscera.

Sampling

The study included 35 individuals whom informed consent was obtained. On the basis of inclusion criteria patient were randomly assigned into two groups. The subject were informed in detail with the specific sets of exercises. Group A – Mckenzie protocol, Group B – Back School Program.

MODI and Visual Analog Scale(VAS) was collected as a baseline data on 1st day, 12th day and 21st day of treatment session with the total duration of treatment is 3 weeks.

Procedure:

On the basis of inclusion criteria 35 participants were taken in that 20F and 15M. The protocol was followed according to week wise.The patient were asked to come thrice a week. Out of 35 patient 3 patient did not turn back after 1 week of treatment session, so out of 32 participants 15 attended Back School Program and 17 attended Mckenzie protocol. All the participants were given instruction to follow exercise at home daily and report the change in pain or discomfort on next treatment session. [6,9,10]

Detail exercise program has given in table 1A and 1B with description of exercise in table 2A & 2B.

Statistics

SPSS software version 16.0 was used to analyze the result. One way ANOVA was done to get the mean value for both group at 1st, 12th and 21st day for VAS and MODI. Unpaired t-test was used to compare MODI and VAS in Mckenzie and Back School Program.

Result

Out of 35 patients only 32 were participated in this study they divided into two groups. Group A – Mckenzie Protocol and Group B – Back School Program.

Table 1A: General information about Mckenzie method, basic assessment, strengthening exercises and home care advice

	Mckenzie Protocol
1st week	- History & general information about Mckenzie method
	- Indication of preference of exercise i.e. flexion, extension
	- Educational component basic information about lower back and its structure
	- How and why to do exercise.
	- Guidance of completing exercise at home
	- Principal treatment modalities.
2nd week	- Progression of exercise after 1st week towards other position in line with response of patient
	- Educational component basic information about common cause of LBA
	- Emphasize posture when seated for prolong time and maintain back lordosis in its position.
	- Guidance continue exercise at home
3rd week	- Progress exercise after 2nd week towards other

Table 1B: Basic guideline about the back anatomy,ergonomic advise at work station,strengthening exercise and home care advice

	Back School Program
1st week	- General information about back school method
	- Anatomy & biomechanical concept of spine
	- Muscle function & its influence on spine
	- Pathology of main disorder that affect back
	- Principle treatment modality
2nd week	- Guidance on position in back ergonomics
	Posture correction advice in lifting object, Sitting, standing & sleeping.
	Proper working environment i.e. use of proper chair, kitchen standing habit, mattress.
	- Exercise like
	isometric abdominal strengthening
	Stretching of erector spine muscle
	Stretching of quadriceps & hamstring
	- Guidance on completing exercise at home twice/day
3rd week	- Practical application of all exercise and learned technique.

Table 2A: Description of exercise in flexion as well as extension type with number of repetition

Exercise	Procedure	Duration
Flexion exercise	1. Lying down : Supine position with knee & hip flexed & feet supported on plinth. The patient is instructed to raise knees towards the chest applying extra pressure with hands towards knee.	Beginning 5 to 6 repetition for 5to 10 seconds hold.
	2. Seated : seated in chair with knees and hip at 90^0 patient shifts forward until head in between knees & hands are as close as possible to floor.	Progress 3 sets for 10 repetition
	3. Standing : with feet placed shoulder - width apart, the patient placed his hands on front of thigh gliding them as much as possible in direction of floor keeping knee extended	
Extension exercise	1. Prone lying : lie on patient stomach with arms along both the sides and head turned to one side	5 to 10 minutes hold with 10 repetition
	2. Prone lying on elbow : lie prone position with the weight both elbows and forearm and the hip straight and touching the floor. Relax the lower back remain this position for few minutes and repeat the exercise.	5 to 10 minutes hold with 10 repetition
	3. Prone full press up : lying in prone position slowly push the shoulder up keeping hips on the surface and letting the back and stomach sag fold it for few seconds and then repeat	Beginning 2 seconds hold with 10 repetition Progress 5 to 10 second hold
	4. Standing extension: while standing placed the hands in the corner of back and lean backward maintained it for few seconds and return back	20 seconds hold with the 10 repetition

Table 2B: Stretching and strengthing exercise for back and abdominal muscle with appropriate duration

Exercise	Procedure	Duration
Stretching of erector spina muscle	Supine position with flexed knees & supported feet, bring 1^{st} one knee and then other towards thorax, joint hands across thigh, push them in direction of thorax.	30 second with 10 repetition.
Stretching of posterior lower limb muscle	Supine position with one of leg supported on mattress and other flexed approximately 90^0 at hip and knee extended maintain with help of other therapist or against the wall.	30 second with 10 repetition.
Strengthening of abdominal muscles	In supine position with both hip and knee is band and a towel roll is placed under the patient's low back and then asked to press the towel with the back and hold the position for few seconds.	10 second with 10 repetition.
Kinesthetic training	In Seated, move pelvic making a front & back pelvic inclination at comfortable range	One set for 10 repetition.

Statistical analysis of data revealed that initial analyses done with one way ANOVA to see the F value within the group and between the group for VAS and MODI at deferent time period givn in table 3 shows significant improvement in pain and disability index.

Further using one way ANOVA mean value ± S.D. was done at different days i.e. 1^{st}, 12^{th} & 21^{st} day (table 4 and figure 1 & 2. As a

result shows there was not much difference in VAS score between 12 & 21 day though it was significant, but MODI score was much batter by the end of 21 day.

Comparison of group were done using unpaired t-test showed in table 5. In which VAS and MODI score was compared for justifying that the MODI was highly significant than VAS.

Table 3 shows one way ANOVA at different time point for F and P-value which is significant in both groups for VAS and MODI.

Table 4 shows mean and standered deviation for VAS and MODI in each group. MODI shows better result in Back School group as compared to Mckenzie group.

Table 5 shows unpaired t-test to comparison of groups for VAS and MODI score at different days. At the end of 12th and 21st day VAS was significant and not much changes in score, where as MODI showed excellent recovery.

Table 3: One way ANOVA F value for significant difference in Mckenzie & Back School Program for VAS and MODI at different time point

Group	Variable	Source of Variation	SS	DF	MS	F	P-value
Mckenzie Protocol	VAS	Between group	88.5454	2	44.2727	67.6388	7.6489 P<.05 (sig.)
		Within group	19.6363	30	0.6545		
	MODI	Between group	2363.879	2	1181.939	47.427	5.1378 p<.05 (sig.)
		Within group	747.6364	30	24.9212		
Back School Program	VAS	Between group	121.0769	2	60.5384	57.5853	6.0677 P<.05 (sig.)
		Within group	37.8461	36	1.0512		
	MODI	Between group	4424.205	2	2212.103	83.5429	2.99 P<.05 (sig.)
		Within group	953.2308	36	26.4786		

Table 4: Mean & S.D. for VAS and MODI at different days in Back School Program and Mckenzie Protocol

Group	Variable	1st day	12th day	21st day
Mckenzie protocol	VAS	6.4545 ± 1.0357	4.7272 ± 0.7862	3.5909 ± 1.333
	MODI	32 ± .0605	22 ± .0535	17 ± .0665
Back School Program	VAS	6 ± 1.2247	3.615 ± 1.043	2.6538 ± 1.3249
	MODI	34 ± .0647	18 ± .0552	13 ± .0657

Table 5: Using probable value of unpaired t-test

Variable	1st day	12th day	21st day
VAS	.3353 (p>.05)NS	.0071 (p<.05) sig	.0081 (p<.05) sig
MODI	.6090 (p> .05) NS	.0906 (p>.05)NS	.0044 (p<.05) sig

Discussion

Mechanical back pain is a common feature which originate from abnormal functional pattern of soft tissue that could be mechanical, biomechanical, psychological and neurological. Once low back pain occurred it will impact on quality of life of the individual in family. Popularity of Mckenzie method since past few decade has made it known throughout spine community and most surgeon and physical Physiotherapist. Previous study has shown that Back School Program is not very effective chronic back pain but in mechanical back pain it has shown a positive result.

Andrade et al evaluated the efficacy of Back School Program for non specific base. They evaluated 3 baseline variable i.e. pain intensity (VAS), functional disability (Roland Morris disability questionnaire) and spinal mobility. On the basis of analysis they observe statistically significant difference in functional disability and spinal mobility. [11]

Some other author claimed that using Back School Program which included brief education and active back exercises in comparison with medical assistance observe significant improvement in disability score along time ($p<.001$) in back school group. Moreover pain perception on VAS score showed a reduction in both groups but it was significantly lower in back school group. [12]

The perception of a exercise as a conservative treatment for lumber pain are effective but prescribed without adequate evaluation of the individual characteristic like posture, muscular force and extensibility. The divide in two group with similar age, weight and gender characteristic and found that group who received specific exercise significantly reduce their level of pain and disability. Thus clinician should prescribe on basis of individual muscular deficit rather than most commonly prescribe exercise program. [13]

Another study also done on the same theory, they said that Mckenzie method is grounded

Figure 1 & 2: ANOVA applied for comparing the initial, mid and last reading of VAS and MODI

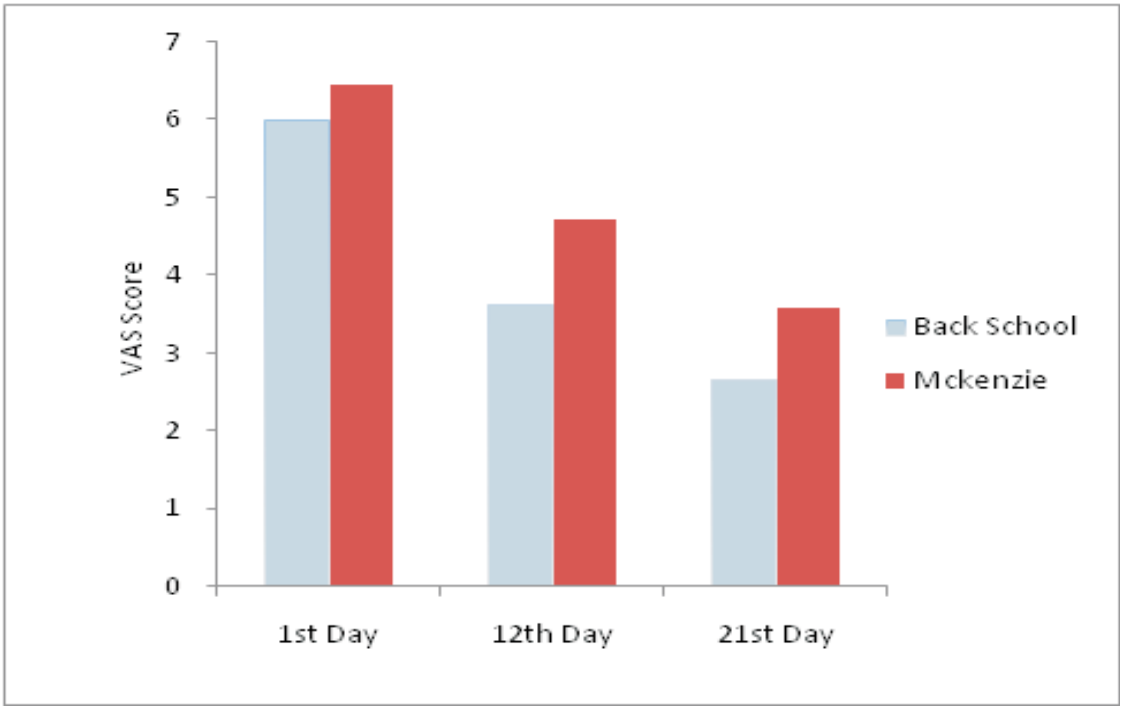
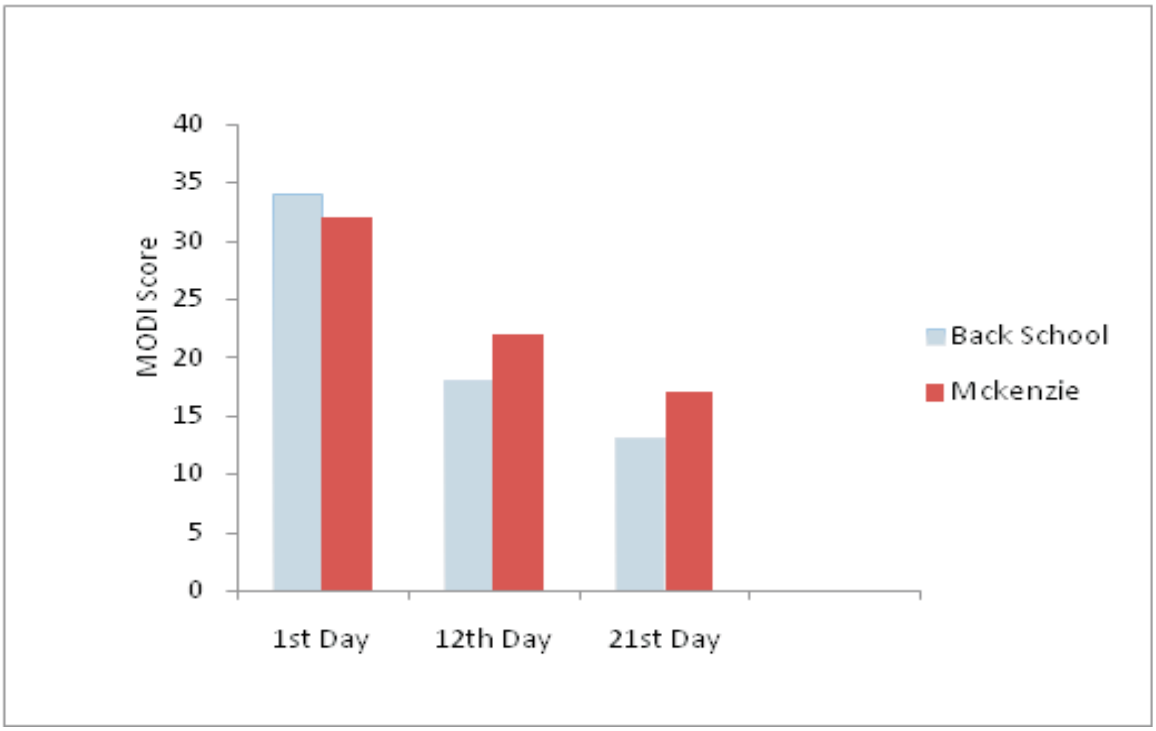


Figure 1 both the group shows improvement in VAS

Figure 2 In Back School Program MODI score shows more Improvement as compare to Mckenzie group



in finding a cause effect relationship between position of the patient usually assume while sitting, standing or moving and generation of pain as a result of those position and attitude or activity. The therapeutics approaches require a patient to move through series of activities and test movement to gauge the patient response. The approach then uses information to develop an exercise protocol design to centralize or alleviate pain. [10]

Many studies claim the suitability and usefulness of using active back school management which include health education, skill development, theoretical session to minimize the recurrency of episode of LBA. And improvement pain, vitality and mental health which improve total quality of life. [14, 15]

Another study in which subject were assign into two groups - back school and control group. In which back school included cognitive learning strategies and practice correct lifting. There were a significant difference between the group which indicated that Back School Program is an effective tool for influencing lifting posture but it may not be effective means of preventing low back injury. [16]

Julia et al compared Modified Oswestry Disability Index and the Quebec back pain disability scale. The test retest reliability over a four week period was higher for Modified Oswestry disability scale than for Quebec disability scale. [17]

Two randomized trial was done by Nwguga found that Mckenzie therapy provide better result than Back School Program in respect of less sick leave, fever reoccurrence and medical consults with increase ROM of lumbar spine. [18]

Mckenzie is successful with treating acute low back pain with benefit is that it is standardized approach to both assessment and treatment of LBP which is simply a set of exercise to define algorithm that serve to classify the spinal problem so that it can be adequately treated. [19]

Our study bear the same idea to introduce such exercises which suitable according to

person need and lifestyle with respect of either Mckenzie or Back School Program.

Limitation of study

1. Limited trial of three weeks where undertaken; a longer duration of trial phase is required in future.
2. Study was done on a small sample size.

Future Scope

1. Prolong study duration may yield a significant result of same study.
2. The study address the requirement of correct exercise prescription.
3. Study can be done in large group of patient to have a better result.

Conclusion

While comparing Mckenzie and Back School Program it emerged that both program has significantly improved. But improving functional limitation on basis of MODI score was better gain by Back School Program in mechanical back pain individual which further help in reducing functional limitation and thus improving quality of life.

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