

Effectiveness of McKenzie with core muscle stabilization exercises versus McKenzie with Brunkow's exercises in Lumbar Disc Herniation : A Pilot Study.

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Abstract : Background and Purpose : Physiotherapy in cases of lumbar disc herniation is helpful. McKenzie method is well known treatment for such condition, but for long relief strengthening of surrounding musculature is crucial. Core and Brunkow's exercises are known for strengthening. But, effectiveness or single proper exercise treatment for disc herniation is not present. This pilot study was done towards the fulfillment of main study with same purpose i.e. to see the effect of Core and Brunkow's with McKenzie in common. **Subjects :** Initial 10 subject from each of two groups were taken for this pilot study. **Methods :** Intervertebral disc patients, pre assessment was taken by outcome measures - for back and abdominal strength checked by manual muscle testing, spinal movement by modified Schober's method, pain was checked on Visual Analog Scale while disability on quebec scale. After 4 weeks of treatment and 1 month follow up outcomes were remeasured. **Results :** There was improvement in both groups post outcome score when compared to baseline. During follow up improvement was maintained. Significant improvement was found in group A i.e. Core muscle group. **Conclusion :** Comparing both groups McKenzie with Core muscle stabilization exercises is slightly more effective than McKenzie with Brunkow's exercises. But no significant difference was found in between these two groups. Due to pilot study and small sample size result cannot be generalized. But the main study's result in right way can justify.

Introduction : Low Back pain is a common problem all over the world. The lifetime prevalence ranged from 11% to 84%^[1]. Recurrent back pain is a common occurrence prior to the first appearance of radiating leg pain, which could be a sign of lumbar disc herniation.^[2] Pain due to lumbar disc herniation is often known to be more severe than pain in other orthopedic diagnosis^[3].

Discogenic low back pain is a serious medical and social problem, and accounts for 26%-42% of the

patients with chronic low back pain.⁴ It is seen at L4-L5 and L5-S1 level with a rate as high as 98%. It frequently develops in the weakest part of the disc which is the posterolateral side. Although it can occur at any age, it is most frequently encountered in ages between 30-50.^[5]

Treatment of LDH is primarily conservative^[6]. The purpose is to relief from pain and inflammation, increase function, to enable early activity, to turn back to life. Physical therapy as a conservative approach is helpful for treatment and prevention of disc herniation^[7].

One common physiotherapy management method for patients with low back pain and sciatica is Mechanical Diagnosis and Therapy (MDT), also known as the McKenzie method, which aims to eliminate or minimize pain.^[8] A systematic review says patients of low back pain treated with MDT reported a greater, more rapid reduction in pain and disability compared with NSAIDs, educational booklets, back massage and back care advice, strength training, spinal mobilization and general exercises.^[9]

Core muscles are protective system of spine. Function of the core muscle is to maintain the postural alignment, reduce load and stress during functional movement.

Brunkow's exercises aims at strengthening back extensors or flexors and increasing back flexibility to reduce injury risk, improving mood and pain perception to reduce the impact of injury^[10]. Brunkow's exercises are type of "pushing exercises" and they can be done in all starting positions. They are starting with dynamic contraction of hands and feet with fixed point on the wrist or/and heel^[11]. These exercises are isometric exercises, strengthens paravertebral muscles^[11].

There is hardly any study on lumbar disc herniation treatment to assess McKenzie in common effect of core stabilization verses Brunkow's exercises for lumbar disc herniation. Hence, this pilot study as a part of main study was undertaken to assess the combined effect of above mentioned physiotherapy treatments. Information obtained from this study would be beneficial to other patients with lumbar disc herniation.

Material and Methodology

Research Setting :- PDVVPF'S, at COPT's department of musculoskeletal science OPD, Ahmednagar

Study Design – Pilot study of a Randomized Controlled Trial

Sampling method :- Simple Random sampling by

lottery method

Blinding : Single Blinded

This pilot study was done towards complication of a RCT in PDVVPF's, COPT, Ahmednagar. For the main study both Male & Female patients between age of 30 to 50 years with acute (>3 weeks to <6 weeks), sub-acute (>6-12 weeks) were included. Patients with symptoms of - pain, paraesthesia or both in lumbar spine, with symptoms extending from gluteal fold to distal of knee/till ankle. Patients with any 3 of following symptoms as Painful heel and toe walk, showing 5, 6 or 7th derangement symptoms, Flexion limited to reaching 2/3 of thigh, Straight leg raising angle less than equal to 60 degree with leg pain 7 were included in study.

Participants were excluded if they underwent any lumbar surgery within 6 month of baseline examination, had any serious spinal pathology such as spondylolisthesis, spinal canal stenosis or inflammatory condition, Severe active medical, neurological disorder /psychiatric co-morbidities osteoporosis due to specific infection as T.B or prior h/o of T.B, take of steroids for > 3-4 month or analgesics/ nerve blocking injectable or drugs for LDH condition and if were pregnant^[12].

Outcome measures - Quebec Back Pain Disability Scale^[13], Manual muscle testing Lumbar range of motion by schober's method VAS scale for pain level were measured at baseline and after 4 weeks.

Initial 10 patients of both groups were taken for this pilot study.

The ethical clearance for this study was obtained from institutional ethical committee. Instruction was given to participant about study, its benefits and risk. The written informed consent was taken from participant.

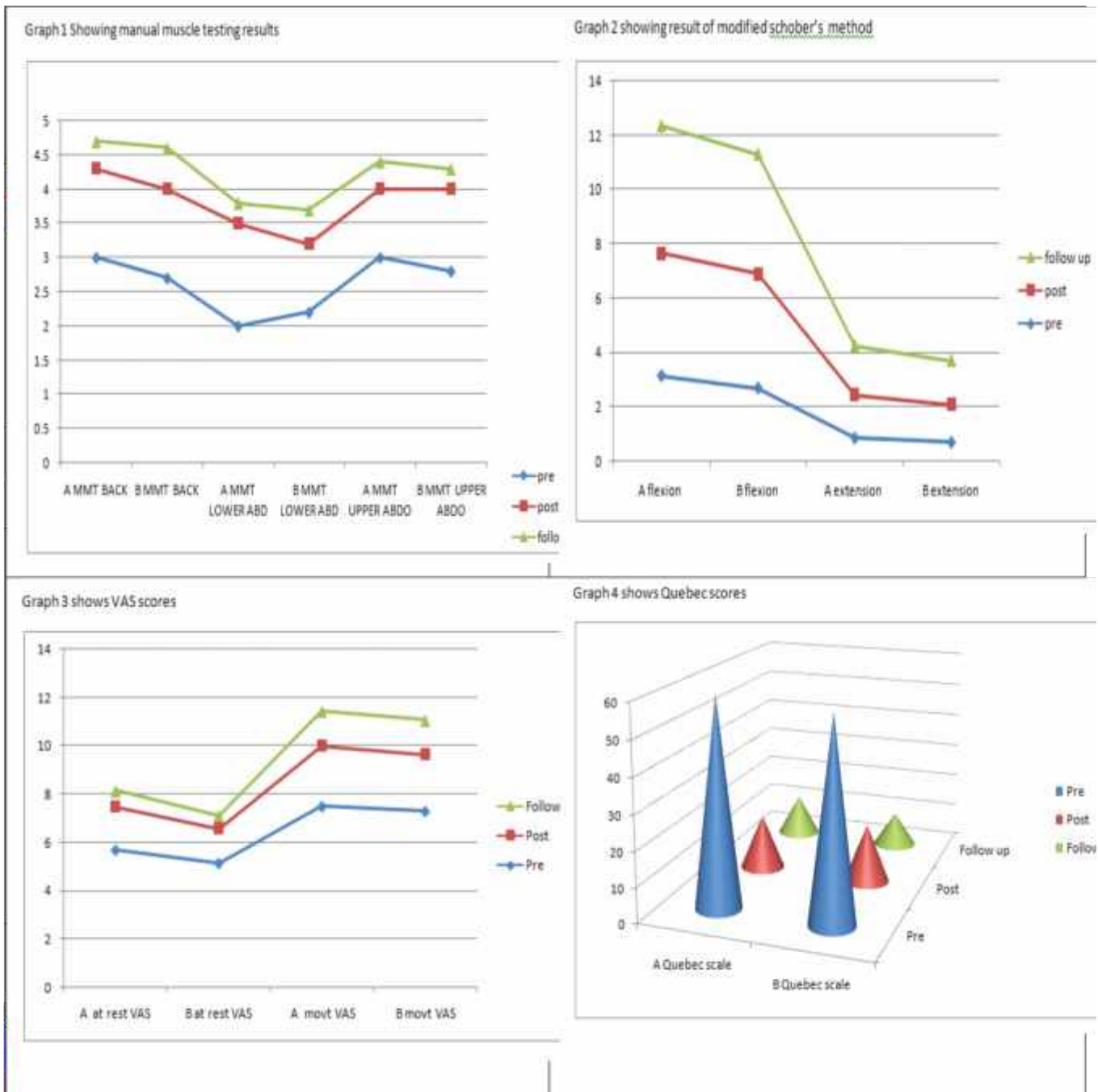
PROCEDURE

For the main RCT study pibd patients were taken	
52 sample based on selection criteria	
Divided randomly by lottery method into two groups	
Patients assessed with outcome measures at baseline, after 4 weeks duration & follow up	
Initial 10 patient taken for pilot study	
Pilot study being the minor replica of RCT study groups, exercises was same as the main study for 4 weeks	
Group A 26 patients	Group B 26 patients
McKenzie exercises7 and core muscle stabilization	McKenzie & Brunkow's exercises

	Procedure	
sessions	Participants in both groups received 5 individual sessions per week, lasting an average of 45 minutes to an hour each. Treatment was provided in accordance with the direction of the preference of movement.	
supervision	The subjects were supervised in order to ensure that the exercises were performed correctly.	
intensity	The intensity of the exercises was at the subject's tolerance level, and the subjects were encouraged to report any problems immediately.	
Common to both groups	McKenzie Extension Exercises Level 1 - lying prone Level 2 - lying prone in extension Level 3- sustained extension Level 4 - extension in standing McKenzie Flexion exercises Level 1 - flexion in lying Level 2 - flexion in sitting Level 3 - flexion in standing	
	Group A	Group B
	Core muscle stabilization exercises	Brunkow's exercises
Annexure 1 for exercise		

Result : Outcome measures

Table showing outcome measures average, of 10 patients			
		Group A	Group B
MMT BACK	Pre	3	3
	Post	4.3	4
	Follow up	4.7	4.5
MMT LOWER ABD	Pre	2	2.2
	Post	3.5	3.2
	Follow up	3.8	3.7
MMT UPPER ABDO	Pre	3	2.8
	Post	4	4
	Follow up	4.4	4.3
Modified schober's flexion	Pre	3	2.8
	Post	4.5	4.2
	Follow up	4.7	4.4
Modified schober's extension	Pre	0.86	0.7
	Post	1.6	1.4
	Follow up	1.8	1.6
at rest VAS	Pre	5.7	5.15
	Post	1.79	1.43
	Follow up	0.7	0.6
Movt VAS	Pre	7.5	7.3
	Post	2.5	2.36
	Follow up	1.43	1.7
Quebac score	Pre	60.17	52.2
	Post	16.21	17.46
	Follow up	9.25	12.64



Discussion : The patients of group 1 were prescribed McKenzie and core stabilization exercises; whereas group 2 received McKenzie and Brunkow's exercises. Outcome measures after treatment showed improvement than baseline measure in both the groups. Therefore, it is implied that the results obtained in the course of this study could have been largely due to the effects of the treatment regimens.

In both groups McKenzie exercises were common. These are active directional preference exercises i.e. (extension – flexion type) that lead to centralization of

protruded disc, thus helps to release of impinged nerve. R. A. McKenzie in his book “The lumbar spine Mechanical diagnosis and Therapy” said reversal of symptoms occur during centralization. When the protrusion reduces in size, it releases first the nerve root and then the duramater, which results in cessation of pain and paraesthesia below the knee followed by a reduction in thigh pain^[6].

In our study patients showed evidence of restricted ROM before the treatment, this might be mostly because of pain limitation (graph 2 and 3). Results

showed in both groups there were reduction in VAS measure in post treatment analysis. This might be also due to centralization phenomena when compared with baseline outcome measures. Vroomen et al., 2002 in his study shown that one third of the patients with sciatica recovered within two weeks and approximately 75% within three months by McKenzie use^[14].

But this effect may be altered as the pain aggravating position is re-achieved. Stability won't be maintained without regaining muscle strength. Hence we can say that though pain score reduction was due to combined effect of centralization and strengthening exercises in form of core stability and Brunkow's exercises.

Strong muscle contractions activate muscles' ergo-receptors (stretch receptors)^[10]. The afferents from the receptors cause endogenous opioids to be released and also cause the release of beta-endorphin from pituitary. These secretions may cause both – peripheral and central pain to be blocked. So we can say that exercises leads to muscle contraction leading to increase strength and reduction of pain.

Graph 1 shows Post treatment strength improvement was visible in all patients. Our result on strength improvement matches with the results of Emela Muji where there was improvement in patients back and abdominal strength with mckenzie exercises.

Superiority of stabilization exercises to decrease of pain is in accordance with several studies which supported stabilization exercises are more effective to reduce intensity of pain and improve functional ability in patients with CLBP. Core muscle strengthening is important to maintain the stability. This study result also supports that stabilization exercises are effective^[15].

Graph 1, 2 and 3 shows slightly more improvement in group A then group B. This is because core muscle exercises led to strengthening the core i.e. deep spinal muscle thus to stability. In group B Brunkow exercise increased strength of paraspinal muscles but improvement in stability that lead to long term pain reduction and spinal range improvement was less but this difference is insignificant.

Disability during ADL's in patients with PIVD is mainly, due to extreme pain that increases and radiates with bending activities that lead to impingement 10, 16. As reduced pain lead to increase in lumbar range,^[15] thus activity level with Brunkow's exercises that strengthens paravertebral muscles thus maintains the stability. These in all reduce the disability.

Conclusion : Comparing both groups McKenzie with

core muscle stabilization exercises is slightly more effective than McKenzie with Brunkow's exercises. But no significant difference was found in these two groups post and follow up values. Due to pilot study and small sample size result cannot be generalized. But the main study's result in right way can justify.

There is no conflict of interest in these study.

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Annexure

