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Study on Effectiveness of Intermittent mechanical traction among the Patients with Lumbar disc herniation

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Abstract

The low back pain is common problem shown in lumbar disc herniation. It produces pain in the lower back or leg especially in adult person. The disc loses its own structure and herniates outside due to disc compression. The purpose of this study was to find out the Effectiveness of intermittent mechanical traction among the patients with lumbar disc herniation. It was an experimental study design with 30 participants were included with selected Lumbar disc herniation and study was conducted in Gonoshasthaya samaj vittik medical college hospital, OPD of physiotherapy, Dhaka, Bangladesh. Non-randomize sampling technique & semi-structured questionnaire was used to collect the data. Subjects were divided into equal 2 groups. (Group-A. applied intermittent mechanical traction) and (Group-B. Applied Manual traction) The mean age of the respondents was (14 ± 8.485) and (30-49) year's age group felt more pain and most of the respondents (83%) were male and weight were 66-70 kg. Day labour worker groups were 50% and worked daily average 5-8 hours and more of the respondent 67% carried over weight objects around 30 kg. most of the respondent 67% was no history of trauma and 43% of the respondent felt moderate types of pain and 44% of the respondents feels radiating nature of pain. More of the respondent 40% felt pain least 6 months Most of the respondent 67% felt pain during work and 83% visited doctor and 63% taken self-treatment before doctor visit. The statistical analysis of paired t test with14 degrees of freedom and 5% as level of significant. The pre and post test value value for VAS scale showed in intermitten mechanical traction group "t" value were 16.60 and manual traction group "t" value were 3.27 and tabulated t value were 2.145. The mean ± SD of pre and posttest value of Group A were 7.73±1.38 & 1.35±0.57 and Group B were 7.87±1.40 & 5.45 ± 2.50. Analysis of data showed that within-group comparison both groups showed significant improvement for all the parameters, whereas between-group comparison revealed higher improvement in Group A compared to the Group B. In this study the treatment of patients with signs of lumbar disc herniation the intermittent mechanical traction of lumbar spine seem more useful for the reduction of pain and improve functional activity.

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Introduction

Background

A disc is the fibrocartilaginous structure positioned in between each of the vertebrae of the spine. The vertebral disc maintain as a spacer, shock absorber and part of the cartilaginous joints that allow movement in the spine (Disc, 2020). it is has two parts: a tough outer annulus fibrosus and a softer inner nucleus pulposus. Disc herniation is most commonly occurring in low back. Disc herniation process starts from failure in the inner rings (annulus fibrosus) and progresses radially outward. The nucleus pulposus loses its pressure and annulus fibrosus bulges outward when disc is compressed (Disc herniation, 1993). Disc degeneration was buildup due to some environmental factors, injury, and smoking, atherosclerosis, and disc degeneration due aging (Taha et al, 2017). The mechanical effects of traction are vertebral separation and widening of intervertebral foramen as a result relief pain by reducing pressure on discs or nerves (Kobayashi et al, 2014). Lumbar traction is commonly used treatment that can relief pain. Positive clinical outcomes have recently been shown with use of intermittent traction in the prone position for 12 minutes applied at a force equal to 40% to 60% of the patient's body weight (Cavagnaro, L. (2014). Abnormal posture can cause the intervertebral disc to tear or damaged. Sometimes Pain medications may be prescribed to alleviate acute pain and allow the patient to begin exercising and stretching (Olson, 2016). Mechanical Intermittent Traction is one of a non-surgical treatment. It helps relieve pain by decompression of lumbar or cervical discs and joints. Intermittent traction therapy can apply the traction force and time are altered to make the therapy more effective(Kanamiya et al 2002) Intermittent traction therapy are commonly used treatment that can assist in pain relief and allow progression to an exercise program (Lumbopelvic Spine Disorders. 2009)

Research Hypothesis

H_0 -There is no significance effectiveness of intermittent mechanical traction among the patients with lumbar disc herniation.

H_1 -There is significance effectiveness of intermittent mechanical traction among the patients with lumbar disc herniation.

Methods and Materials

It was experimental study design**.** The sample were consisted of male and female who complained of disc herniation in lumber region and study was conducted gonosasthya samajvittik medical collage hospital, Dhaka. Study duration was 1 year and sample size were 30 are selected by exclusion and inclusion criteria, The outcome measure pain and functional activity, a pre-tested, modified-semi structure questionnaire was used to collect data, Data was entered in to the SPSS software and student t test. Finally the data was interpreted on the basis of study finding.

Literature Review

Yu-Hsuan Cheng et al in the year of 2020 to conduct a study in Taipei, To evaluate the effectiveness of traction in improving low back pain, functional outcome, and disk morphology in patients with herniated intervertebral disks. I it an experimental study, We included randomized control trials which (1) involved adult patients with low back pain

associated with herniated disk, (2) compared with lumbar traction or no traction (3) provided quantitative measurements of pain and function before and after intervention. 403 participants were included for quantitative analysis. Analyzed with the control group and the participants in the traction group showed significantly greater improvements in pain and function in the short term, with standard mean differences of 0.44 (95% confidence interval (CI): 0.11-0.77) and 0.42 (95% CI: 0.08-0.76) respectively. The standard mean dissimilar were not significant to support the long-term effects on pain and function nor the effects on herniated disc size.

Asiri F et al in the year of 2020 to conduct a study in Kingdom of Saudi Arabia, The objective of the study was to find out the effect of patient specific three dimensional lumbar traction on pain and functional disability in individuals with lumbar intervertebral disc prolapse. Original article and Experimental design. 25 participants (age range: 34–67 years) diagnosed with lumbar intervertebral disc prolapse were included in this study. Patient-specific three-dimensional lumbar traction was given as 3 sessions per week for the duration of 1 month. All participants completed a 10-cm visual analog pain scale and pain pressure threshold to assess pain and the Oswestry disability index to assess the functional disability. On pre & posttest in significant change in mean values were found for visual analog scale pain score, pain pressure threshold, and Oswestry disability index ($P < 0.001$). The pain potency was reduced from 8.5 to 3.2 and pain pressure threshold increased from 0.7 to 1.6 kg/cm2, and functional disability was reduced from 53.5% to 31.3%.

Marinella Gugliotta et al in the year of 2016 to conduct a study in Neurosurgery and Rheumatology Departments of the Cantonal Hospital in Aarau, Switzerland, Evidence compared the effectiveness of surgical & conservative treatment of symptomatic lumbar disc herniation is controversial. A prospective cohort study consisted of 370 patients. End result measures were the North American Spine Society questionnaire (NASSQ) and the 36 Item of short form health survey to assess patient reported back pain, physical function, neurogenic symptoms and quality of life. Primary end result were back pain at 6 and 12 weeks. Open micro discectomy was assessed versus conservative interventions at 6, 12, 52 and 104 weeks. Operative treatment patients reported less back pain at 6 weeks than those receiving conservative therapy (−0.97; 95% CI −1.89 to −0.09) were more likely to report ≥50% decrease in back pain (BP) symptoms from baseline to 6 weeks (48% vs 17%, risk difference: 0.34; 95% CI 0.16 to 0.47) and reported less physical function disability at 52 weeks (−3.7; 95% CI −7.4 to −0.1). Dohrmann G.J. and Mansour N. in the year of 2015 to conduct a study in Chicago, USA. To analyze the long term investigates of the various operations for lumbar disc herniation in a large patient population. Patients who had micro discectomy, endoscopic micro discectomy and the ‘classical operation', i.e. laminectomy/laminectomy with discectomy) were collected from the world literature. Patients who had investitates for at least 2 years were analyzed relative to the outcome. The outcome was graded by the patients themselves, and the operative groups were compared to one another. 39,048 patients collected from the world literature had had lumbar disc operations for disc herniation. The mean investigates period was 6.1 years, and 30,809 (78.9%) patients reported good/excellent results. Micro discectomy was performed on 3,400 (8.7%) patients. The mean

investigates was 4.1 years with 2,866 (84.3%) good/excellent results, while 1,101 (3.6%) patients had endoscopic micro discectomy. There, the mean follow-up was 2.9 years with 845 (79.5%) good/excellent results. The standard operation was performed on 34,547 (88.5%) patients with a mean follow-up period of 6.3 years, and 27,050 (78.3%) patients had good/excellent results. Prisca Moeti and Gregory Marchetti in the year of 2001 to conduct a study in Pittsburgh, Pennsylvania area. To describe the clinical outcomes of 15 patients with cervical radiculopathy treated with mechanical intermittent cervical traction. 15 respondents (45.5 ± 13 years) completed a course of treatment using mechanical intermittent cervical traction. 11 patients presented at benchmark with radicular symptoms of 12 weeks duration or less, and 4 patients had long-standing radicular symptoms lasting more than 12 weeks. Consequence was measured using the Neck Disability Index (NDI) and the Numeric Pain Rating Scale (NPRS). 8 out of 15 cases (53%) in this series indicates complete pain resolution; these patients had symptom duration of 12 weeks and less. 7 of these 8 cases displayed a final NDI of 10% or less. 3 out of 4 of the patients with symptom duration less than 12 weeks showed no reduction in pain or increased pain rating, with minimal change in perceived disability of 12% or less.

STATISTICAL ANALYSIS

Table-01: Distribution of respondents by average weight lifting by hand (n=30)

Average weight lifting by hand	Frequency	Percentage
1-10 kg	5	17
10-30 kg	15	50
Above 30 kg	10	33
Total	30	100
Mean ± SD	**8 ± 6.083**	

The table-01 revealed that the mean of average weight lifting by hand were 8±6.083 and more of the respondents 50% carry weight around 10 to 30 kg.

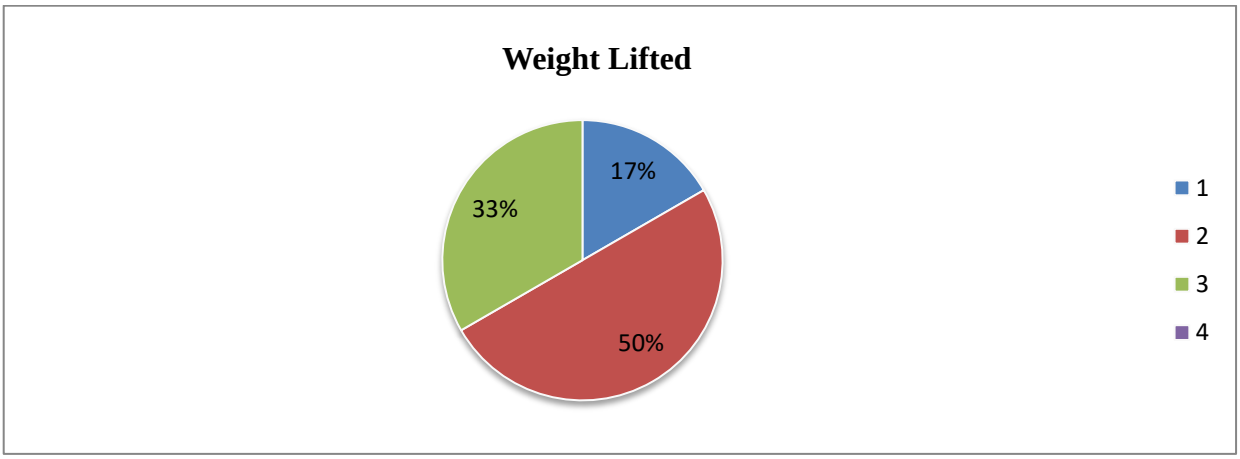

Fig-01 Distribution of respondents by average weight lifted by hand.

TABLE-2: DISTRIBUTION OF RESPONDENTS BY PATTERN OF PAIN (n=30)

PATTERN OF PAIN	FREQUENCY	PERCENTAGE
Tingling	6	20
Radiating	13	44
Burning	4	13
Numbness	7	23
Total	30	100
Mean ± SD	**7.50 ± 3.873**	

The table-2 revealed that the mean of pattern of pain were 7.50 ± 3.873 and more of the respondents 44% feels radiating pattern of pain.

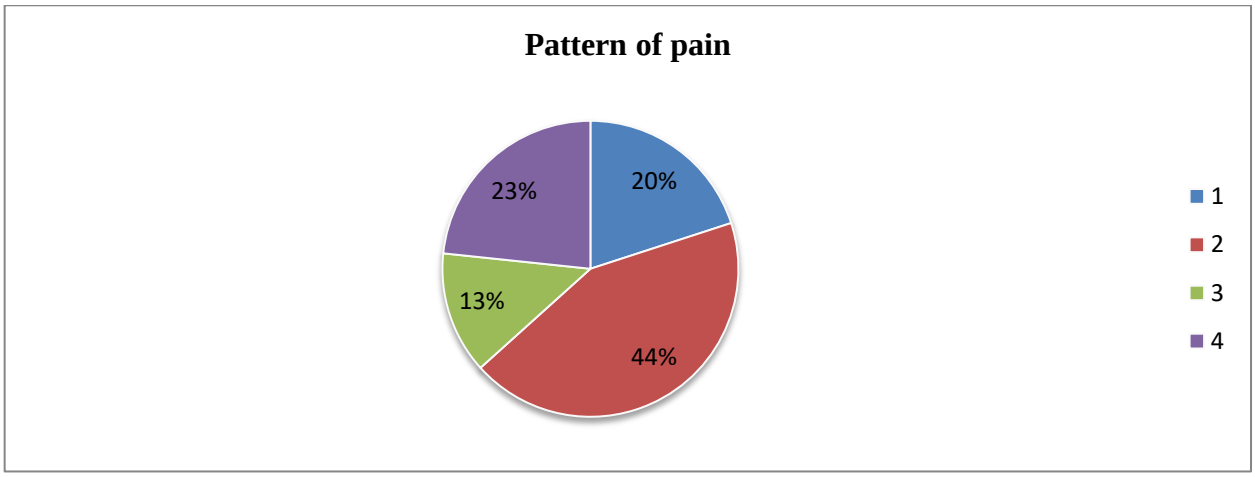

Fig-2 Distribution of respondents by the pattern of pain.

TABLE-3: DISTRIBUTION OF RESPONDENTS BY FELT OF PAIN (n=30)

SUFFER OF PAIN	FREQUENCY	PERCENTAGE
Near about 3 months	2	7
Near about 6 months	12	40
Near about 9 months	10	33
More than 9 months	6	20
Total	30	100
Mean ± SD	**7.75 ± 4.349**	

The table-3 revealed that the mean of felt pain were 7.75 ± 4.349 and more of the respondent 40% felt pain near about 6 months.

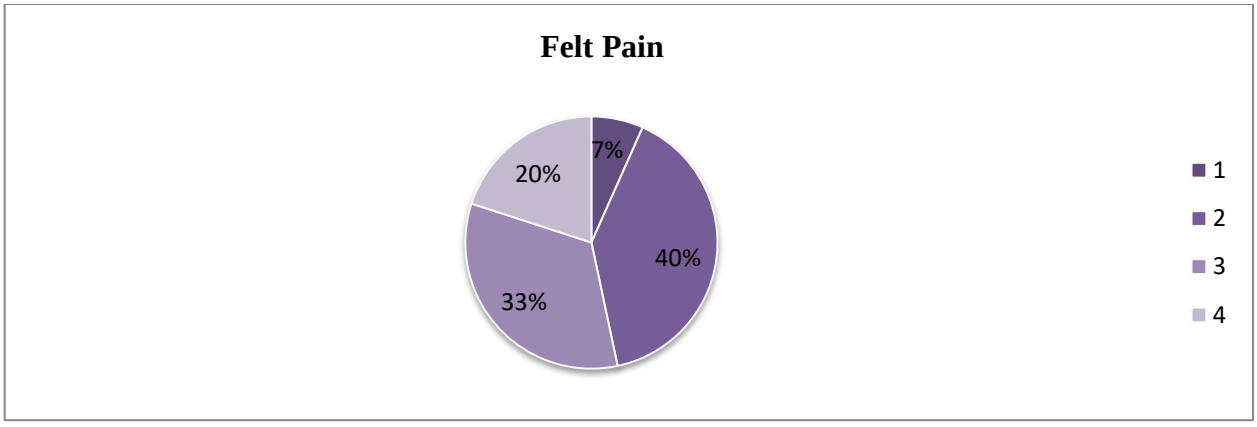

Fig-3 Distribution of respondents by suffer of pain.

TABLE-04: VISUAL ANALOGUE SCALEV FOR LUMBER DISC HERNIATION (n=15)

PAIRED "t" TEST-GROUP A (INTERMITTENT MECHANICAL TRACTION).

GROUP	MEAN	STANDARD DEVIATION	"T" VALUE
Severity of pain (Before Treatment)	7.73	1.38	16.60
Severity of pain (After Treatment)	1.33	0.57	

The table-4: Used Paired "t" test with 14 degrees of freedom and 5% as level of significance, the tabulated "t" value is 2.145 which was lesser than the calculated "t" value 16.60 . The mean ± SD pre and posttest value were 7.73 ± 1.38 and 1.33 ± 0.57.

TABLE-5: VISUAL ANALOGUE SCALEV FOR LUMBER DISC HERNIATION (n=15)

PAIRED "t" TEST-GROUP B (MANUAL TRACTION).

GROUP	MEAN	STANDARD DEVIATION	"t" VALUE
Severity of pain (Before Treatment)	7.87	1.40	3.27
Severity of pain (After Treatment)	5.45	2.50	

The table-5 Used Paired "t" test with 14 degrees of freedom and 5% as level of significance, the tabulated "t" value is 2.145 which was lesser than the calculated "t" value 3.27. The mean ± SD pre and posttest value were 7.87 ± 1.40 and 5.45 ± 2.50.

DISCUSSION

Non-surgical methods of treatment are usually attempted first and allow the patient to begin traction. The present study was designed to know the effectiveness of intermittent mechanical traction among the patients with lumbar disc herniation 30 subjects was included who fulfilled the predetermined inclusive and exclusive criteria. The subjects were divided into two groups. The first group were Group-A 15 subjects and the second group are Group-B 15 subjects. We have applied the intermittent mechanical traction Group-A and manual traction in Group-B. The mean age of the respondents was 14 ± 8.485 and 30-49 years age group felt more pain and the mean sex of the respondents was 15.50 ± 7.778 and most of the respondent 70% were male. The mean of marital status of the respondents was 17±11.314 and It also found that married (83%) have pain. The mean weight of the respondents was 10 ± 2 and 66-70 kg weight group felt more pain. The mean of started of pain were 8.33 ± 5.859 and (50%)of respondent felt more pain, The mean of daily work duration of the respondents was 10.67±3.786 and it also found that 5-8 hr group felt more pain. The mean type of work doing regularly of the respondents were 10±8.718 and it also found that heavy weight lifting group 67% feel more pain. The mean average weight lifted by hand of the respondents were 8 ± 6.083 and it also found that 30 kg group felt more pain The mean of history of trauma of the respondents were 15±7.071 and it also found that no history of trauma groups (67%) were more affected. The mean severity of pain were 9.50±4.950 and it also found that 43% of

respondent felt moderate types of pain .The mean pattern of pain were 7.50 ± 3.873 and it also found that radiating types of groups were 44%. The mean suffer of pain were 7.75 ± 4.349 and it also found that near about 6-months groups were 40%. The mean time of more pain were 12±7.211 and it found that working time groups 67% were more pain. The mean of visit any doctor were 15±14.142 and it also found that visited doctor groups were 83%. The mean taken of any type of self-treatments were 12±9.899 and it also found that yes groups 63% were more the statistical analysis of paired t test with14 degrees of freedom and 5% as level of significant. The pre and posttest value value for VAS scale showed in intermitten mechanical traction group "t'' value were 16.60 and manual traction group "t'' value were 3.27 and tabulated t value were 2.145. The mean ± SD of pre and posttest value of Group A were 7.73±1.38 & 1.35±0.57 and Group B were 7.87±1.40 & 5.45 ± 2.50.

CONCLUSIONS

Patients of lumbar disc herniation with nerve root compression presented low back pain and difficulty of functional activity, Statistical analysis of both group showed significant improvement after taken treatment with intermittent mechanical traction and manual traction, within the both group discussion alternative hypothesis (H_1)is more effective than null hypothesis (H_0)

Recommendation

Base on the study findings use of the treatment plan and the following recommendations are made with view to prevent and minimize the lumbar disc herniation. Adequate bed rest, Use of a lumbar roll for sitting, Use lumbosacral brace, Avoid lifting heavy weight or bag and Avoid hyperflexion and extension.

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