A comparative study of lumbar traction and straight leg raising in the management of sciatica.

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Running Title

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ABSTRACT

Background and Objective:

Traction is commonly used for the treatment of low back pain, predominately with nerve root involvement; however its benefits remain to be established. There is ongoing confusion surrounding the used of traction in the management of low back pain. Some authors noted that evidence regarding the use of traction due to the lack of high quality studies, the heterogenecity of study populations & lack of power some recommendations says that traction continues to be commonly used by physiotherapists in the management of low back pain. A recent UK wide survey indicated that 41% of therapists used traction with 5% of low back pain patients exclusively presented with nerve root problems.

Straight leg raising is one of the neural mobilization be viewed as another form of manual therapy similar to joint mobilization. In this regard, the treatment of signs and symptoms based on severity, irritability, and nature of the impairment must be kept in mind at all times. Neural mobilization is that it be seen as a technique rather than as a comprehensive system involving clinical reasoning, problem solving and a thorough understanding of the anatomy, physiology, and pathophysiology of neurological structures this study is designed to examine the effectiveness of traction and straight leg raising in patients with sciatica

Setting: Outpatient Department, Saveetha college of Physiotherapy, Thandalam - 602105

Outcome Measures: Qualitative parameters : Visual analog scale

Method: Experimental study design was used for this study. Inclusion criteria- Patient with sciatic nerve course pathology. Exclusion criteria- Trauma, Pregnancy, Fractures, Renal problems, Postural back pain. 50 individual divided in to two groups ie. Group A received Lumbar traction, and Group B were received straight leg raising. Visual analog scale for the Pain was used as a outcome measure .The data's obtained were statistically analyzed.

Result: Group A mean pre treatment lumbar traction was 8.68, (S.D-1.02), mean of post treatment was 2.76, (S.D-2.40). Group B mean pre treatment straight leg raising was 8.60, (S.D-

1.08), mean of post treatment was 6.44, (S.D-2.98). There is a significant difference in between the groups.

Conclusion: The statistical results of this study conclude that there is a significant decrease in pain using traction therapy than straight leg raising in patients with Sciatica.

Key Words: Traction, SLR, Sciatica.

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Introduction

Traction is commonly used for the treatment of low back pain, predominately with nerve root involvement; however its benefits remain to be established. There is ongoing confusion surrounding the use of traction in the management of low back pain, with differences between recommendations in clinical guidelines. Some authors noted that evidence regarding the use of traction due to the lack of high quality studies, the heterogeneity of study populations & lack of power Some recommendations says that traction continues to be commonly used by physiotherapists in the management of low back pain. A recent UK wide survey indicated that 41% of therapists used traction with 5% of low back pain patients exclusively presented with nerve root problems. Between 3 – 10 % of low back pain patients will experience “sciatica” or “nerve root” pain, with or without neurological signs with 90% recovering, but a further 10% requiring surgery.[1]

Straight leg raising is one of the neural mobilization be viewed as another form of manual therapy similar to joint mobilization. In this regard, the treatment of signs and symptoms based on severity, irritability, and nature of the impairment must be kept in mind at all times. Neural mobilization is that it be seen as a technique rather than as a comprehensive system involving clinical reasoning, problem solving and a thorough understanding of the anatomy, physiology, and pathophysiology of neurological structures, using manual methods in order to restore the mechanical function of impaired neural tissues (intra neural and extra neural impairment) in the lumbar- pelvic-lower limb complex. As with all manual therapy procedures, the goal remains the same i.e., to restore maximal pain free movement within postural balance.[2]

The sciatic nerve is the largest nerve in the body, but actually consist of two nerves the common peronial and tibial, which are tightly bound together by connective tissue. The common peroneal is posterior branch of the sacral plexus originating from the lumbo sacral trunk (L4 to S2) the tibial nerve is an anterior branch of sacral plexus originating from the ventral rami of L4 toS3. Sites of potential proximal compression include the lower lumbar spine(eg-intervertebral disc, spinal canal, lateral recess, intervertebral foramina etc..,) Sciatic nerve runs posterior to the hip and knee joints, the optimal means of inducing longitudinal tension is through the straight leg raise first described by leseague 1864. The leg lifted upward, as a solid lever, while maintaining extension at the knee. To induce dural motion through the sciatic nerve, the leg must be raised past 35 degrees in order to take up slack in the nerve. Since the sciatic nerve is completely stretched at 70 degrees, pain beyond that point is usually of hip, sacroiliac, or lumbar spine origin. The unilateral Straight leg raise causes traction on the sciatic nerve, lumbo sacral nerve roots, and the dura mater. Adverse neural tension produces symptoms from the low back area extending in to the sciatic nerve distribution of the affected lower limb. To introduce additional traction (sensitization) in to the proximal aspect of the sciatic nerve, hip adduction is added to straight leg raise. This is because the sciatic tract is lateral to the ischial tuberosity; therefore, adduction causes further tensing of its proximal aspect.[2]

Lumbar traction is the application of a mechanical force to the body in a way that separates the joint surfaces and elongates the surrounding soft tissues. Sciatica is a set of symptoms including pain that may be caused by general compression or irritation of one of five nerve roots that give rise to the sciatic nerve or by compression or irritation of the sciatic nerve itself. In light popularity of neural straight leg raising and lumbar traction the lack of research investigating their influence on decreasing pain due to sciatica, it was the aim of this study to determine the use of neural mobilization technique and lumbar traction to decrease pain due to sciatica. The results of the previous study regarding the effect of straight leg rising in the management of sciatica were not conclusive.

Methodology

Total of 50 subjects were selected and subjects were recruited for this study based on the inclusion and exclusion criteria. The subjects were randomly allocated in to group A and Group

B using Block randomization method. The patient was clearly explained about the procedure and informed consent was obtained.

Group A had 25 subjects Group B had 25 subjects. As per pre test measure severity of pain at rest was assessed using Visual analog scale (VAS) to all subjects.

Individuals in group A were given intermittent lumbar traction. The subjects were position in fowler's position. The thoracic segments were stabilized using the thoracic belt. The Traction forces were applied to the lumbar region via the lumbar belt. The amount of weight applied to the traction was 1/4 th of the subject's body weight. Traction was applied for 7 days with one treatment session per day. Traction fore was applied with 20 seconds of hold time and 5 seconds of rest time for 20 minutes. Traction was given under the supervision of the principle investigator.

Individuals in Group B were give Straight leg raising(SLR) of sciatic nerve. The patient was positioned in supine lying. The leg is lifted upward, as a solid lever, while maintaining extension at the knee. To induce dural motion through the sciatic nerve, the leg was raised past 35 degrees in order to take up slack in the nerve and raised till 70 degrees up to tolerable pain levels of the patient. The unilateral straight leg raise causes traction on the sciatic nerve, lumbo sacral nerve roots, and dure mater. Both the tibial and peroneal component of the sciatic nerve was mobilized. This treatment procedure was done for 30 seconds. End of treatment session of 7 days by the end of treatment session of 7 days Pain severity at rest was again assessed using visual analog scale (VAS) as post measure.

Data Analysis and Results

All the mean of traction and straight leg raising data's were analyzed using Mann Whitney U Test to find the mean of traction and straight leg raising, and with use of Wilcoxon Signed Rank Test comparing in between the groups.

In MANN WHITNEY U TEST (between the groups) group A mean pre treatment traction was 8.68(S.D = 2.40, t – test value = 0.35), mean of post treatment traction was 2.76(S.D=2.40,t-test value = 4.00). Group B mean pre treatment straight leg raising was 8.60, (S.D = 1.08,t-test value= 0.35, mean of post treatment straight leg raising was 6.44 (S.D = 2.98, t-test value = 4.00(Table1,3)

In WILCOXON SIGNED RANK TEST (within the groups) group A mean pre treatment traction was 8.68, (S.D = 1.02) mean of post treatment traction was 2.76, (S.D = 2.40), t-test value = 4.27(Table-1, 6). Group B mean pre treatment straight leg raising was 8-60(S.D= 1.08), mean of post treatment straight leg raising was 6.44,(S.D = 2.98), t-test value = 3.30 (Table-1,9)

There is significant difference in traction than straight leg raising (p> 0.001)

Discussion

This study advances previous work on traction with low back pain patients with 'nerve root' symptoms in the acute/sub acute phase. A number of previous randomized controlled trials have examined the effectiveness of lumbar traction with this group of patients; however many of these failed to define 'nerve root' adequately, and many have included patients outside the acute/sub acute phase. Only two previous studies adequately defined nerve root involvement and included patients in the acute/sub acute phase: both of these were rated as low quality studies: one with positive and one with negative results. However the Larsson study did not employ clinically appropriate treatment parameters, which is an important issue as it can be lead to serious performance bias in a trial.

The current study has attempted to address these issues, by establishing treatment parameters from expert and clinical opinion, but it is not possible to state that these are the 'best' treatment parameters available as treatment does are difficult to establish. However these parameters are important in that they are currently being used by therapists who feel it is an effective treatment in the absence of 'best' treatment dosed it is a reasonable starting point.

None of the neurodynamic mobilization strategies evaluated in the earlier study (ankle, knee, or hip strategies) produced significant displacement of the nerve roots. Stated differently, the neurodynamic mobilizations used in this study did not appear to create significant movement of the **roots**. Clinically the results of this study refute the idea that neurodynamic mobilizations of the LE resolve/prevent nerve root adhesions through movement (i.e., breaking or preventing scar tissue). Increased nerve root tension has been shown to Decreased root microcirculation (Redevik et al. 1984) secondary to continued insult in the lateral recess (Sizer et al. 2002).Mechanical and chemical irritation leads to :intraneural edema and fibrosisperpetuates irritable cycle with disc protrusion, prolapsed and subsequent degeneration (Redevik et al. 1984; Sizer et al. 2000; Sizer et al. 2001; Holm, 2002; Sizer et al. 2002)results in motor or sensory loss

(Redevik et al. 1984)These specific effects may include:Change in blood flow (Rydevik 1992, Igarashi et al 2005);Flushing of metabolites (Chen 1997; Butler 2000);Restoration of axoplasmic transport (Rydevik 1984; Dahlin and Rydevik 1991),etc…..

Evidence-Based Practice (EBP) "is an approach to care wherein professionals use the best evidence possible, (i.e. the most appropriate information available), to make clinical decisions for individual patients. EBP promotes the collection, interpretation, and integration of valid, important and applicable patient-reported, clinician-observed, and research-derived evidence. The best available evidence, moderated by patient circumstances and preferences, is applied to improve the quality of clinical judgments and facilitate cost-effective care." the LS roots move very little with LE SLR testing the LS roots move more during LE SLR testing without preposition of the foot than with preposition of the foot Clinically: Symptom provocation from LE SLR testing is likely due to tension Clinicians may need to vary their testing strategies to effectively examine their patient studies suggest the following: the LS roots do not move substantially during conservative LE neural mobilization the LS roots move the most with hip mobilization but it may require substantial ROM to get the roots to move much. In present study outcome measure was qualitative parameters. Neurodynamic mobilizations may be effective at reducing patient symptoms…however in the LS roots, it is not likely that these mobilizations help due to the abolition of scar tissue (Gilbert et al., unpublished submitting to JMMT 2008)

Conclusion

The present study shows there is a significant decrease in pain using traction therapy than straight leg raising in patients with sciatica

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Tables

T-Test (Table-1)

GROUP	N	Mean	Std.Deviation	Std. Error mean
Pre Treatment Group A(Traction)	25	8.68	1.02	.20
Group B(SLR)	25	8.60	1.08	.21
Pre Treatment Group A(Traction)	25	2.76	2.40	.48
Group B(SLR)	25	6.44	2.98	.59

Independent Samples Test (Table-2)

	Levene's test for equality of varieances		T-test for equality of means						
								95% confidence interval of the difference	
	F	Sig.	t	df	Sig. 2tailed	Mean diff.	Std. error Diff.	Lower	Upper
Pre treatment-Equalvariances Assumed	.26	.61	.26	48	.79	.080	.298	-.520	.6800
Equalvariances not Assumed			.26	47.8	.79	.080	.298	-.520	.6800
Post treatment-Equalvariances Assumed	2.8	.09	-4.8	48	.000	3.68	.766	5.22	2.13
Equalvariances not Assumed			-4.8	45.8	.000	3.68	.766	5.22	2.13

Npar Tests

Mann-Whitney Test (Table-3)

	Pre Treatment	Post treatment
Mann-whitney U	295.00	108.50
Wilcoxon W	620.00	433.50
Z	.35	4.00
Asymp.Sig.(2-tailed)	.72	.000

Group A T-Test

Paired samples statistics (Table-4)

	Mean	N	Std.Deviation	Std.Error Mean
Pair Pre – Treatment 1 Post - Treatment	8.68 2.76	25 25	1.02 2.40	.205 .480

Paired Samples Test (Table-5)

	Paired differences					t	df	Sig (2-tailed)
	Mean	Std.Deviation	Std.Error Mean	95% Confidence intervel of the Diff.				
				Lower	Upper			
Pair Pre – Treatment 1 Post - Treatment	5.92	2.75	.550	4.78	7.05	10.75	24	.000

Npar Tests

Wilcoxon Signed Ranks Tests Test Statistics (Table-6)

	Post – Treatment- pre – Treatment
Z	4.27
Asymp. Sig. (2-tailed)	.000

a. Based on positive ranks
b. Wilcoxon Signed Ranks Test

Group B T-Test

Paired samples statistics (Table-7)

	Mean	N	Std.Deviation	Std.Error Mean
Pair Pre – Treatment 1 Post - Treatment	8.60 6.44	25 25	1.08 2.98	.216 .597

Paired Samples Test (Table-8)

	Paired differences					t	df	Sig (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence intervel of the Diff.				
				Lower	Upper			
Pair Pre – Treatment 1 Post - Treatment	2.16	2.51	.50	1.12	3.19	4.30	24	.000

Npar Tests

Wilcoxon Signed Ranks Tests Test Statistics (Table-9)

	Post – Treatment- pre – Treatment
Z	3.30
Asymp. Sig. (2-tailed)	.001

a. Based on positive ranks
b. Wilcoxon Signed Ranks Test