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EFFECT OF NEURODYNAMIC TECHNIQUES IN DIABETIC NEUROPATHY PATIENTS ON WEIGHT BEARING ASYMMETRY OF LOWER EXTRIMITY

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ABSTRACT Diabetes is a long-term (chronic) disease in which the body cannot regulate the amount of sugar in the blood. Diabetic peripheral neuropathy (DPN), a microvascular complication of diabetes, is associated with considerable mortality, morbidity and diminished quality of life. The aim of this study is to measure effect of Neurodynamic techniques on weight bearing asymmetry of lower extremity in diabetic neuropathic patients. Method: - We have screened 35 patients and out of that 28 were fulfilled the inclusion criteria that deemed fit as a sample. However, 20 patients were randomly selected as subjects using simple random sampling technique (Lottery method). In the subject experimental (A=10) patients were treated by sciatic nerve mobilization with conventional physical therapy. In the control (B=10), only conventional physical therapy was applied to diabetic neuropathy patients and both group assess weight bearing by foot print and ROM (flexion and extension). Group A and B were treated 5 days a week for 4weeks. **RESULT:** The mean differences in Clarke's Angel, Chippaux-Smirak and Staheli indexes at left and right sides of diabetic neuropathy patient of experimental group between pre and post administration of modality were statistically highly significant ($p<0.001$).

Conclusion: Sciatic nerve mobilization with conventional physical therapy was more effective for lower limb function than conventional physical therapy alone in patient with diabetic neuropathy patients

KEYWORDS : Sciatic nerve mobilization, Neurodynamics, diabetic neuropathy, conservative physical therapy, weight bearing, ROM

INTRODUCTION

Diabetes mellitus (DM) is considered a public health problem of major significance with high social and economic burden. Blindness, kidney failure, nephropathy and peripheral neuropathy (PN) are among the most common complications. The PN seems to manifest as an autonomic and sensory disorder and as a progressive and irreversible motor disease, which is depending on its stage.

Diabetes mellitus (DM) is a group of metabolic disorders that are characterized by hyperglycemia. (Cameron NE, et. al., 2001) Chronic hyperglycemia has adverse metabolic and vascular consequences for the peripheral nervous system. (Forsblom C, et. al., 2005)

NEED OF THE STUDY

According to this study it is now proven Neurodynamic techniques can improved weight bearing asymmetry of lower asymmetry in diabetic neuropathy patients.

OBJECTIVE OF THE STUDY

1. To assess the weight bearing asymmetry and ROM (Flexion and Extension) in experimental and control group at baseline stage. (per intervention)
2. To assess the weight bearing asymmetry and ROM (Flexion and Extension) in experimental and control group at post intervention.
3. To compare weight bearing asymmetry and ROM (Flexion and Extension) in experimental and control group between baseline and post intervention.
4. To know the effect of neurodynamic on weight bearing asymmetry and ROM Flexion and Extension) between experimental and control group at baseline and post intervention

HYPOTHESES:

NULL HYPOTHESIS:

1. There will be no significant difference in effect of neurodynamic technique in weight bearing asymmetry in experimental group compare to control group in diabetic neuropathy patient.
2. There will be no significant difference in effect of Neurodynamic technique in weight bearing asymmetry in control group compare to experimental group in diabetic neuropathy patient.
3. There will be no significant difference in effect of Neurodynamic technique in ROM asymmetry in experimental group compare to control group in diabetic neuropathy patient.
4. There will be no significant difference in effect of Neurodynamic technique in ROM asymmetry in control group compare to experimental group in patient

ALTERNATIVE HYPOTHESIS:

1. There will be significant difference in effect of Neurodynamic technique in weight bearing asymmetry in experimental group compare to control group in diabetic neuropathy patient.
2. There will be significant difference in effect of Neurodynamic technique in weight bearing asymmetry in control group compare to experimental group in diabetic neuropathy patient.
3. There will be significant difference in effect of Neurodynamic technique in ROM asymmetry in experimental group compare to control group in diabetic neuropathy patient.
4. There will be significant difference in effect of Neurodynamic technique in ROM asymmetry in control group compare to experimental group in diabetic neuropathy patient

1. METHODOLOGY

We have screened 35 patients and out of that 28 were fulfilled the inclusion criteria that deemed fit as a sample. However, 20 patients were randomly selected as subjects using simple random sampling technique (Lottery method). In the subject experimental (A=10) patients were treated by sciatic nerve mobilization with conventional physical therapy. In the control (B=10), only conventional physical therapy was applied to diabetic neuropathy patients and both groups assess weight bearing by foot print and ROM (flexion and extension). Group A and B were treated 5 days a week for 4weeks.

DISCUSSION

In this study, we find out the in effectiveness of Neurodynamic techniques on ROM (flexion & Extension) & weight bearing asymmetry of lower extremity in diabetic neuropathic patients. In addition, both ROM & weight bearing are improved between before and after the intervention. It has been observed that the intervention significantly improved Hip ROM (Flexion& Extension), knee flexion & ankle ROM as evaluated using the goniometry ($p<0.001$), resulting in a significant increase in ROM.

Group & Parameter		Sampling Stage	Scatter (◦) Mean ±SD	Mean Diff	t-statistic	LOS
Experimental	Flexion of knee at left side(◦)	*Base line*	127.60±2.72	4.90 degree	6.39	p<0.001
		Post	132.50±2.07			
	Flexion of knee at right side(◦)	*Base line*	123.70±3.30	7.30 degree	9.99	p<0.001
		Post	131.00±2.67			

Control	Flexion of knee at left side(◦)	*Base line*	126.00±2.31	1.20 degree	9.00	p<0.001
		Post	127.20±2.30			
	Flexion of knee at right side(◦)	*Base line*	122.70±3.73	1.30 degree	6.09	p<0.001
		Post	124.00±3.94			

TABLE-1:- MEASUREMENT OF CHANGE IN ANGLES OF FLEXION AT RIGHT AND LEFT SIDE OF KNEE BETWEEN BASELINE AND POST ADMINISTRATION IN GROUPS

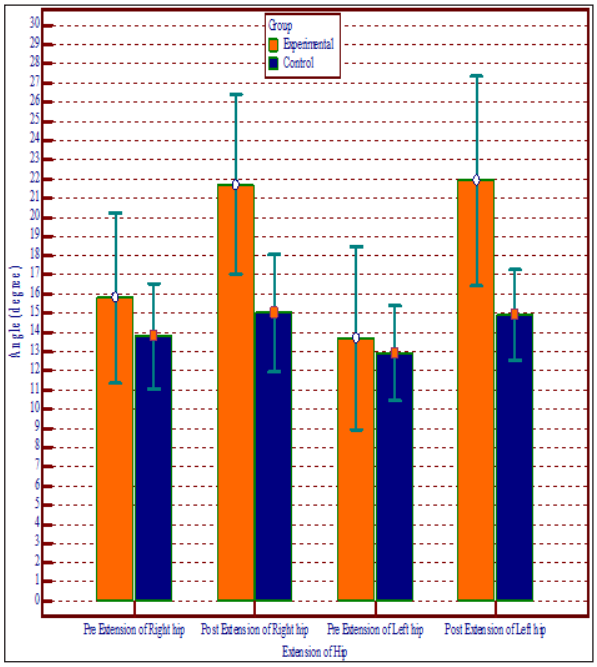

FIG.1: COMPARISON OF ANGLE OF FLEXION OF HIP AT RIGHT AND LEFT SIDESAT BASELINE AND POST ADMINISTRATION BETWEEN EXPERIMENTAL GROUP AND CONTROL GROUP

The neural mobilization is characterized by mechanical stretching of the nervous system, which occurs through passive active oscillatory movements with the purpose of decreasing neural tension, reducing pain, improving muscle flexibility endurance. Neural mobilization improves the elasticity of nervous system and musculoskeletal tissues due to the increase in the intra neural blood flow and improvement of the axoplasmatic flow. (ShackLock et al,2007 & butler DS 2003)

Jaemyoung Park et al,2014, applied a neurodynamic technique on enhancing hamstring flexibility and postural balance in healthy adults. (p<0.05).The increase in ROM indicates improved flexibility of the knee joint .(Mendez-Sanchez et al.,2010)

The sciatic nerve mobilization technique increases the flexibility of the peripheral nerve and activates neurotransmission fibers related to motor function and sensory disorders, thus improving the movement and motor ability of the lower limbs. (Butler DS:2000).

RESULTS

In this study we found, the Chippaux-Smirak and Staheli indexes at both the sides of patients with diabetic neuropathy of experimental group were significantly improved. Average (Mean ± Standard Deviation) Chippaux-Smirak index of left side (28.96±5.54 points), Chippaux-Smirak index of right side (29.08±5.74 points), Staheli index of left side (38.84±8.96 points) and Staheli index of right side (44.40±8.03 points) of patients with diabetic neuropathy of experimental group found to be significantly extended as compared to average angle of Chippaux- Smirak index of left side (38.26±5.68 points), Chippaux- Smirak index of right side (35.26±7.17 points), Staheli index of left side (48.70±11.21 points) and Staheli index of right side (53.30±8.94 points) of patients with diabetic neuropathy of control group.

The mean difference of angle of Chippaux- Smirak index of left side (9.30 points), between diabetic neuropathy patients of experimental and control groups post intervention could reach at highly significant level of significance and were statistically strongly significant. But, the mean difference of 6.18 pointsin Chippaux-Smirak index of right side (p<0.05), of 9.86 pointsin Staheli index of left side (p<0.05) and of 8.90 pointsin Staheli index of right side (p<0.03) between diabetic neuropathy patients of experimental and control groups post intervention could satisfy the limit of statistical significance and were statistically significant.

CONCLUSION

According to this study it is possible to verify that neural mobilization can present good result diabetic neuropathy patients on weight bearing asymmetry of lower limb. Neurodynamic techniques had significant improvement in weight bearing asymmetry and decreased ROM due to diabetic neuropathy than those treated with conventional physiotherapy alone.

LIMITATIONS

This study has limitations. It was conducted over a short period of four weeks, so the long-term effects were not evaluated. There is also a limitation in quantifying the power exerted during stretching in each subject. Therefore, future studies should overcome the present limitations and research the long-term effects of the nerve mobilization technique.

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