

## PHYSICAL EXERCISES FOR DIABETIC POLYNEUROPATHY

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**ABSTRACT. Introduction:** Chronic sensorimotor neuropathy is the commonest of the diabetic neuropathies, although at any one time only approximately 50% of patients will experience symptoms and 10-20% have symptoms severe enough to warrant specific therapy. A structured exercise program with active and passive movements to reduce muscle tension and prevent muscle wasting. **Material and methods:** In this study, 28 patients received a structured exercise program: 14 with treatment and physical program exercises and 14 without. Pain relief was measured by the patient's global assessment of efficacy, using a visual analogue scale (0-10). Treatment goals include restoring function and improving pain control. Patients were randomly selected, the common factor being the presence of painful diabetic non insulin-dependent neuropathy. Patients of either sex with type 2 diabetes, aged between 25 and 83 years, who were on stable glucose-lowering medications during the preceding 3 months and who had PDN for at least 1 month were begin to be treated. Patients who had a pain score of >5, as assessed by visual analogue scale (VAS), were enrolled in our observation. **Results:** Our study shows the results of physiotherapy for painful diabetic non insulin-dependent neuropathy after 6 months of exercise program improving stability, gait and coordination. Another aspect is the reduction in depression symptoms caused by unsuccessful therapy before using the physiotherapy used in this study. The study shows how the physiotherapy is efficient in reducing muscle cramps and pain. Pain relief was measured by the patient's global assessment of efficacy, using a visual analogue scale (0-10). Treatment goals include restoring function and improving pain control. **Conclusions:** The current study compared the efficacy of physiotherapy in patients with painful diabetic non insulin-dependent neuropathy. Numerically, more patients have pain relief after physiotherapy program than the group without physiotherapy.

**Keywords:** *polyneuropathy, physical exercises, pain control*

**REZUMAT. Exercițiul fizic în polineuropatia diabetică. Introducere:** Realizarea unui program de exerciții fizice cu mișcări active și pasive cu rolul de a reduce

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tensiunea musculară și a preveni apariția atrofiilor musculare. **Materiale și metode:** este un studiu realizat pe 28 pacienți cărora li s-a aplicat un program de exerciții fizice (14 au avut un program structurat de exerciții fizice și terapie medicamentoasă, iar 14 au primit doar terapie medicamentoasă). Reducerea intensității durerii a fost măsurată în baza eficienței clinice a tratamentului pacienților și în baza scalei vizuale (0-10). Ținta tratamentului include restabilirea funcțiilor motorii și îmbunătățirea din punct de vedere al controlului durerii. Pacienții au fost randomizați selectiv, factorul comun fiind prezența neuropatiei diabetice noninsulinodiabetice. Pacienții selectați indiferent de sex, cu vârste cuprinse între 25 și 83 ani, aflați pe doze stabile de medicamente antidiabetice orale în ultimele 3 luni și care au diagnostic de polineuropatie diabetică de cel puțin 1 luna. Pacienții incluși au avut un scor al durerii sub 5 pe scala vizuală. **Rezultate:** studiul nostru arată rezultatele tratamentului fizic pentru pacienții cu polineuropatie diabetică dureroasă după 6 luni de exerciții fizice cu îmbunătățirea stabilității, mersului și coordonării. Alt aspect este reducerea depresiei cauzate de terapia medicamentoasă inefficientă înainte de inițierea programului de exerciții fizice. Acest studiu arată eficiența terapiei prin exercițiu fizic în reducerea crampelor musculare și a durerii. Durerea a fost măsurată prin eficiența clinică a tratamentului pacienților și în baza scalei vizuale (0-10), ținta fiind restaurarea funcționalității și controlul durerii pacienților. **Concluzii:** Acest studiu a comparat eficacitatea exercițiului fizic la pacienții cu polineuropatie diabetică non-insulinodependentă. Numeric, mai mulți pacienți au prezentat o scădere a intensității durerii după programul de exerciții fizice.

**Cuvinte cheie:** polineuropatie, exerciții fizice, controlul durerii

## Introduction

Chronic sensorimotor neuropathy is the commonest of the diabetic neuropathies, although at any one time only approximately 50% of patients will experience symptoms and 10-20% have symptoms severe enough to warrant specific therapy.

A structured exercise program with active and passive movements reduces muscle tension and prevents muscle wasting.

## Objective

The aim of this study was to compare the efficacy of physical exercises in painful diabetic neuropathy (PDN). Sensory, motor as well as autonomic neuropathy all contribute to development of the diabetic foot syndrome.

## Material and methods

In this observational trial, 28 patients received pregabalin, 150 mg orally twice daily in the morning at 8 a clock and at the bedtime, each for 6 months with optional dose uptitration (divided in two groups, each group has 14 patients both groups has the same medication for pain and the first group receive a program of physical exercise). Pain relief was measured by the patient's global assessment of efficacy, using a visual analogue scale (0–10). Treatment goals include restoring function and improving pain control. Patients were randomly selected, the common factor being the presence of PDN. Patients of either sex with type 2 diabetes, aged between 25 and 83 years, who were on stable glucose-lowering medications during the preceding 3 month and who had PDN for at least 1 month were begin to be treated. Patients who had a pain score of >5, as assessed by visual analogue scale (VAS), were enrolled in our observation.

PDN was confirmed by 1) the patient's medical history, 2) a diabetic neuropathy symptom and increased thresholds on the vibration perception test and monofilament test. Patients were excluded if they had any clinically significant or unstable medical or psychiatric illnesses. Patients with other causes of neuropathy; renal dysfunction, liver disease; psychiatric illness; uncontrolled hypertension; those taking anticonvulsants, antidepressants, local anaesthetics, or opioids; those who were pregnant; lactating women; or those being treated with any investigational drug within the last 30 days were excluded from this observation.

All patients underwent 6 months of treatment with one drug and, at the end of 6 months, patients underwent clinical evaluation.

One dose 75 pregabalin twice daily were used in the study for both groups. The primary end point of the study was the reduction of the average pain score from initial results, as assessed by the patient's global assessment of efficacy by the VAS (0–10 points). Secondary end points included the 24-point Hamilton Rating Scale for Depression; and patient self-evaluation of overall change on the basis of patient global impression of change scale.

Demographic characteristics were noted and all the parameters were measured before and after treatment with all four drugs and compared. Patients were not allowed any other pain medication.

## Results and discussion

Impairment of sensory innervations often results in the numbness of the feet, and minor trauma or persistent pressure lead to severe complications

rapidly. Motor neuropathy is also common in the diabetic foot syndrome. In addition to reflex loss, electrophysiological testing of the peroneal provides quantitative information on the severity of motor impairment. For the group with pregabalin with physical exercise program we choose a controlled exercise program of 20 minutes, with various exercises picked from aerobic, stretching and strengthening disciplines, repeated three times a week.

The study was conducted between January 2014 and June 2014.

Population and samples: Total population was 28 participants randomly selected, divided into 2 groups of 14. Age varies between 25 and 83 years old, mean age 53.42 (SD 15.75), 12 male patients and 16 female patients, with duration of diabetes between 3 and 17 years, mean duration 3.90 (SD 11.03).

Gathered data analysis

**Table 1.** Values reported on visual analogue scale (VAS) by patients measuring pain.

	Group I with medication and physical program		Group II with medication without physical program	
	Before	After 6 month	Before	After 6 month
Patient 1	8	2	6	5
Patient 2	9	1	7	6
Patient 3	10	3	8	6
Patient 4	8	3	5	5
Patient 5	7	2	9	8
Patient 6	10	4	8	7
Patient 7	8	8	7	6
Patient 8	9	5	5	3
Patient 9	8	2	6	5
Patient 10	7	1	5	3
Patient 11	6	3	7	7
Patient 12	7	5	6	6
Patient 13	9	5	9	8
Patient 14	10	3	8	8

All data collections in above table have been tested for normality of distribution using Shapiro-Wilk normal distribution test, and Normal Q-Q Plots. All data collections have been found to have normal distribution.

Mean reduction of pain on VAS was calculated for each of the two groups and found 58.24% improvement in pregabalin group without exercises program and 72.82% improvement in pregabalin group with exercises program. Differences between mean values of pain on VAS for each group were tested with t-test for paired samples and were found statistically significant and non-accidental. We based differences found on medication treatment for the past six months. Differences were however statistically significant between pregabalin group with exercises program and also between pregabalin group without exercises program.

**Table 2.** Depression scores on Hamilton Scale

	Group I with medication and physical program		Group II with medication without physical program	
	Before	After 6 month	Before	After 6 month
Patient 1	11	5	10	6
Patient 2	10	4	9	8
Patient 3	11	6	10	9
Patient 4	12	4	11	10
Patient 5	9	4	8	7
Patient 6	8	4	8	7
Patient 7	10	5	10	5
Patient 8	11	4	10	4
Patient 9	13	4	12	4
Patient 10	12	4	13	5
Patient 11	12	4	15	4
Patient 12	10	4	9	4
Patient 13	10	4	8	5
Patient 14	10	4	11	5

Initial assessment showed normal distribution of scores. The 6 months visit showed statistically significant reduction of depression score for all patients.

**Table 3.** Overall perception of change

	Group I with medication and physical program		Group I with medication without physical program	
	Before	After 6 month	Before	After 6 month
Patient 1	1	4	1	2
Patient 2	2	5	2	3
Patient 3	1	4	1	2
Patient 4	1	5	1	3
Patient 5	1	5	1	2
Patient 6	1	5	1	2
Patient 7	1	5	1	2
Patient 8	1	4	1	2
Patient 9	2	4	2	3
Patient 10	1	4	1	2
Patient 11	2	4	1	2
Patient 12	1	4	2	3
Patient 13	1	4	1	2
Patient 14	1	4	1	2

Overall perception of change, being a patient self-reported measure, like the VAS, showed similar results as the VAS after data analysis.

### Conclusions

The current study compared the efficacy of exercises program at patients in treatment with pregabalin with PDN with patients without exercises program at patients with PDN. Numerically, more patients have pain relief after combination of drug and exercise.

In the present observational study, more than 72% improvement in pain score was observed in first group, and 58% with second group. Improvement in pain was significant and as a result, a significant reduction in depression scores was also observed. The overall self evaluation of patients is consistent with this result.

### REFERENCES

- Melzack, R. (1987). The short-form McGill Pain Questionnaire. *Pain*; 30, 191–197.  
 Snaith, R.P. (1977). Hamilton rating scale for depression. *Br J Psychiatry*; 131, 431–432.