

Prognosis of stroke in children after three months of regular physical therapy in Lahore

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Abstract

Objective: To evaluate the effects and significance of Proprioceptive Neuromuscular Facilitation exercises on stroke patients.

Methods: The prospective follow-up study was conducted from January, 2012, to June, 2012, and comprised randomly-selected patients at the Department of Neurology, Children Hospital and Institute of Child Health, Lahore. Using systematic sampling the patients were divided into two groups. Patients in group I were subjected to Proprioceptive Neuromuscular Facilitation therapy, while those in group II were treated by passive range of motion exercises only. All patients were followed up at months 1, 2 and 3. Data was collected through a questionnaire, while muscle strength was evaluated through Medical Research Council scale. All data was analysed using SPSS 20.

Results: There were 50 patients in the study who were all below 15 years of age. Muscle strength of affected side at baseline in the experimental group I was 2.36 ± 0.49 and in the control group II it was 2.60 ± 0.50 . At the end of the three-month follow-up, it had considerably increased to 4.76 ± 0.43 in group I while it was 3.80 ± 0.50 in group II ($p < 0.0001$)

Conclusion: Proprioceptive Neuromuscular Facilitation technique was an effective method in terms of pain relief, stiffness reduction and functional improvement.

Keywords: PNF technique, Stroke, Cerebrovascular accident (CVA), Ischaemic stroke, Haemorrhagic stroke. (JPMA 65: 54; 2015)

Introduction

The chances of stroke among children are very uncommon. The problems in the blood vessels of the brain and the clots travelling from the heart are thought to be the causes of stroke, but major reasons are still unknown. Loss of speech, fits and paralysis are the main symptoms of stroke in children. When a stroke occurs due to the loss of blood supply to a particular part of the brain, the cells in that area die and those in the surroundings are affected due to reduced blood supply. This causes a permanent damage to that area, reducing its ability to perform normally¹ and it is believed that every two children out of 100,000 all over the world are affected every year.²

In recent years, stroke has been extensively identified amongst children. The diagnosis and management is difficult due to the excessive risk factors involved and less uniformity in treatment approaches. The type and effects of stroke vary greatly with age and the overall presentation of stroke is quite different in the elders compared to children. In Western countries, 55% of the

children and 80-85% of the adults suffer from ischaemic stroke.³

The Proprioceptive Neuromuscular Facilitation (PNF) (Hold-Relax, Contract-Relax and Agonist Contract) is the technique in which functional therapy approach is used for gradual restoration of patient's motor abilities and is used as one of the methods in post-stroke treatments.⁴

The current study was planned to evaluate the effects and significance of PNF exercises on young stroke patients.

Patients and Methods

The prospective follow-up study was conducted from January to June, 2012, and comprised randomly included patients at the Department of Neurology, Children Hospital and Institute of Child Health, Lahore. It was a time-based study and all patients presenting in the first 3 months aged 0-15 years with weakness of one side of the body were included. Initial data was obtained through questionnaire. Systematic sampling was used to divide the study population into experimental and control groups. All odd-numbered patients were placed in group I and were treated with PNF technique of physical therapy. All even-numbered patients in group II were treated by passive range of motion (ROM) exercises only.

Physiotherapy management included infra-red

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application (dry heat) for 10 minutes, warm-up ROM exercises for 5min, daily stretching and ROM exercises to improve flexibility, isometric exercises to improve strength, and isotonic exercises for a maximum of two days per week.

Patient evaluation was done using Medical Research Council (MRC) scale at months 1, 2 and 3. Muscle power was graded as: Grade 0: unable to move; Grade I: flicker of movement; Grade II: moves in gravity-assisted position; Grade III: move against gravity; Grade IV: move under sub-maximal resistance; and Grade V: move under maximum resistance (normal power).⁵ An improvement of muscle power from baseline and at months 1, 2 and 3rd was compared between the two groups and improvement was defined in terms of increase in strength of the affected muscles.

Data was analysed using SPSS 20. Mean \pm Standard Deviation (SD) was used to present quantitative data, while qualitative data was presented in form of frequencies and percentages. Independent sample t-test was applied to compare muscle strength of the affected side. Repeated measurement analysis of variance (ANOVA) was applied to compare mean muscle strength of the affected side within the groups over different time periods. P value less than 0.005 was considered significant.

Results

There were 50 patients in the study who were all below 15 years of age. Muscle strength of the affected side at baseline in the experimental group I was 2.36 ± 0.49 and in the control group II it was 2.60 ± 0.50 . Muscle strength after

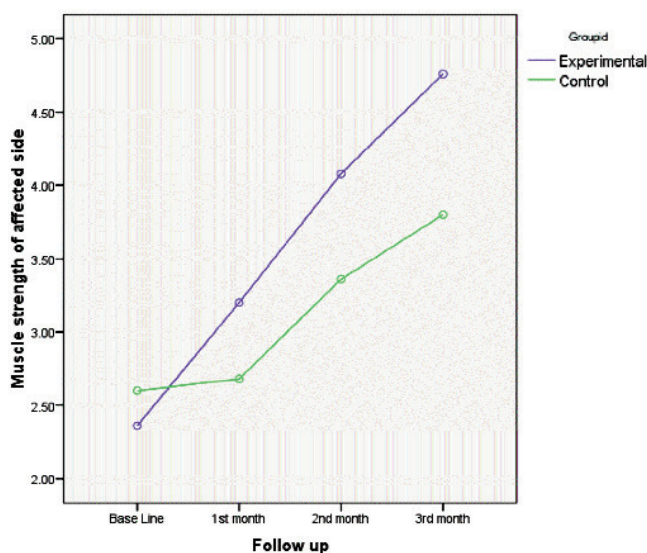


Figure: Comparison of experimental and control groups in terms of muscle strength [p-value (overall) = < 0.0001 ; p-value (comparison of both groups) = < 0.0001].

Table: Comparison of muscle strength of affected side in experimental and control groups in 50 children from Department of Neurology, Children Hospital and Institute of Child Health, Lahore.

		Mean	Std. Deviation	p-value
Muscle strength of affected side	Experimental	2.36	0.49	0.093
	Control	2.60	0.50	
	Total	2.48	0.50	
Muscle strength after one month	Experimental	3.20	0.57	0.002
	Control	2.68	0.55	
	Total	2.94	0.62	
Muscle strength after two month	Experimental	4.08	0.77	< 0.0001
	Control	3.36	0.57	
	Total	3.72	0.75	
Muscle strength after three month	Experimental	4.76	0.43	< 0.0001
	Control	3.80	0.500	
	Total	4.28	0.671	

one month for experimental and Control groups was (3.20 ± 0.57) and (2.68 ± 0.55) respectively. Muscle strength after two months for experimental and Control groups was (4.08 ± 0.77) and (3.36 ± 0.57). After treatment muscle strength gradually improved after one, two and three months. After three months of treatment it had increased considerably (Mean 4.76 ± 0.43). Maximum improvement was achieved after three months in muscle strength from 2.36 ± 0.49 to 4.76 ± 0.43 which is almost closer to 5 and showed normal Muscle strength according to MRC scale. Repeated measurement ANOVA was applied to compare mean muscle strength of affected side with in groups over different time periods [$p < 0.0001$] (Table and Figure). P-value < 0.005 was considered as significant.

Discussion

The study had set out to compare the effectiveness of PNF technique with Passive ROM exercise in the management of children with stroke. The treatment with PNF technique was an effective method in terms of patient's relief of pain, stiffness reduction and improvement in function.⁶

The study was the first to assess independently the effect of a systematic programme of ROM on standardised measures of stroke severity using a randomized control trial format.⁷

According to the literature, PNF is the most popular and effective tool used in the post-stroke management. In other physical therapy tools there is a gradual restoration of the patient's motor control. At first, it was part of neuromuscular dysfunction treatment (NDT) in which the flow of information was facilitated by stimulating the proprioceptors. Hence on the basis of neuro-physiological

process, PNF is the most effective tool in treating patients with stroke. This method is effective for both adults and children and helps in the prevention of recurrence of the disease.⁸ Initially it was designed for the treatment of children with cerebral palsy (CP) but now it is considered the treatment of choice in patients with both neurological as well as orthopaedic problems. PNF techniques are also appropriate in the treatment of a spectrum of neurological problems.

Research in support of the treatment and management of children with stroke is limited and clinicians need more credible evidence base to decide on their interventions. As such, further large-scale research is required. Management of Stroke in children was a lengthy process, which started on day one and involved a continuum of care. It involved a dedicated multidisciplinary team of professionals and the full participation of the children.⁹

Conclusion

PNF technique was found to be successful in the treatment and management of children with stroke. It was effective in terms of pain relief, stiffness reduction and functional improvement.

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