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Darshna Agrawal
MPT Scholar, Department of Rehabilitation Sciences, Manikya Lal Verma Shramjeevi Evening College Janardan Rai Nagar Rajasthan Vidyapeeth (Deemed to be University), Udaipur, Rajasthan, India

Satya Bhushan Nagar
Dean, Department of Rehabilitation Sciences, Manikya Lal Verma Shramjeevi Evening College Janardan Rai Nagar Rajasthan Vidyapeeth (Deemed to be University), Udaipur, Rajasthan, India

Corresponding Author:
Darshna Agrawal
MPT Scholar, Department of Rehabilitation Sciences, Manikya Lal Verma Shramjeevi Evening College Janardan Rai Nagar Rajasthan Vidyapeeth (Deemed to be University), Udaipur, Rajasthan, India

To Study the Comparison Between Effectiveness of Core Stability Training Versus PNF Approach to Improve Balance and Mobility in Stroke Patients

Darshna Agrawal and Satya Bhushan Nagar

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Abstract
Background: Stroke a medical emergency condition that is caused to sudden blockage and burst of the arteries supplying the part of the brain it could be due to secondary medical condition or underlying medical emergency. There are two types of strokes, intracerebral hemorrhage (ICH) and subarachnoid hemorrhage which is the major cause of the stroke and use of core stability training & PNF for improving balance and mobility in patient with Stroke
Objective: To identify the effectiveness of core stability training versus PNF approach to improve balance and mobility in stroke patient
Methodology: 30 Participants after being selected as per the criteria of the undergoing study 2 groups were created and each group was allotted 15 participants summing up to 30 participants in total 2 groups by using random sampling method. Group 1 received intervention in the form Core stability training, Group 2 received PNF over the course of 12 weeks. Effectiveness outcome measure used were Berg Balance Scale (BBS) & Manual Muscle Testing (MMT). Pre & Post data was examined using SPSS computer software version 26 & by using t test and ANOVA.
Result: In this Study there was significant difference in results in all the groups from starting to and end of the study ($p<0.001$). PNF group was more effective in change of the outcomes like in Berg Balance Scale & Manual Muscle Testing
Conclusion: The result of this study demonstrates that Bobath statistically improves balance and coordination in patient with cerebral palsy

Keywords: Cerebral palsy, Berg Balance scale, conventional physiotherapy, Manual muscle testing (MMT)

Introduction
Stroke is an acute neurological condition caused by a vascular disturbance to the brain, resulting in focal or global neurological deficits that may lead to death or long-term disability [1, 2]. It is broadly classified into ischemic and hemorrhagic stroke, with ischemic stroke accounting for nearly 85% of all cases [3, 4]. According to established classifications, ischemic stroke includes large vessel atherosclerosis, small vessel disease, cardioembolic, and cryptogenic stroke subtypes [5, 6]. Hemorrhagic stroke occurs due to rupture of cerebral blood vessels, leading to intracerebral or subarachnoid hemorrhage [7]. Globally, stroke remains one of the leading causes of mortality and long-term disability, contributing significantly to the global disease burden [8]. Major risk factors include hypertension, diabetes mellitus, dyslipidemia, smoking, obesity, and cardiac conditions such as atrial fibrillation [3, 4]. Early diagnosis, rapid medical management, and timely initiation of rehabilitation are crucial for improving outcomes. Stroke rehabilitation aims to prevent secondary complications, reduce impairments, and maximize functional independence through evidence-based, multidisciplinary interventions [6, 8].

Methodology
Thirty hemiplegic patients aged 45-70 years with lower and upper extremity impairments were noted. The patients were selected as per the criteria and allocated into two groups, A and B. The consent forms taken and teach the interventional protocol to each participants. Both groups received conventional physiotherapy. Group A received core stability training

program along with conventional physiotherapy protocol designed to address multiple aspects of physical recovery, including muscle strengthening, flexibility, balance, and functional training. Group B received treated with P.N.F. training program along with conventional physiotherapy Each Session lasted between 45-60 minutes for 5 days a week for up-to 12 weeks outcome measures used were Berg Balance Scale (BBS) and Manual Muscle Testing (MMT). Baseline outcome Measures were recorded and noted on day one of the study and noted till 12 weeks. All data were securely stored for analysis and interpretation.

Table 1: Demographic Characteristics of Subjects

Variable	Group A (n=15) Mean ± SD	Group B (n=15) Mean ± SD
Age (years)	31.33 ± 5.13	29.67 ± 6.60
Gender (Male: Female)	3: 2	7: 8

Table 2: Within-Group Comparison of Outcome Measures (Group A)

Outcome	Pre-test Mean ± SD	Post-test Mean ± SD	t-value	p-value
MMT	6.06 ± 2.26	4.53 ± 3.40	6.60	0.01*
BBS	62.66 ± 20.95	45.00 ± 34.90	14.76	0.01*

Table 3: Within-Group Comparison of Outcome Measures (Group B)

Outcome	Pre-test Mean ± SD	Post-test Mean ± SD	t-value	p-value
MMT	5.73 ± 4.60	4.53 ± 3.40	6.65	0.00*
BBS	62.00 ± 21.70	45.30 ± 34.00	12.76	0.00*

Table 4: Between-Group Comparison

Group	Mean	SD	t-value	p-value	Result
Group A	35.33	1.26	−1.776	0.03*	Significant
Group B	16.66	2.38	−1.987	0.03*	Significant

Discussion

This study included 30 post-stroke subjects randomly allocated into two groups: Group A received core stability training with conventional physiotherapy, while Group B received Proprioceptive Neuromuscular Facilitation (PNF) with conventional physiotherapy. Both groups underwent intervention for 12 weeks, five sessions per week. The sample consisted of both genders (11 males and 19 females). Significant improvements were observed within and between groups in Manual Muscle Testing (MMT) and Berg Balance Scale (BBS) scores ($p < 0.05$). Although both interventions were effective, Group B demonstrated comparatively greater improvement, particularly in balance outcomes. PNF enhances neuromuscular coordination, proprioceptive feedback, strength, and motor control by stimulating muscle spindles and Golgi tendon organs, thereby promoting neuroplasticity and functional recovery. Previous studies support the effectiveness of PNF in improving muscle strength, balance, and activities of daily living in stroke patients, indicating its superiority over conventional and core stability training alone [8-12].

Conclusion

Both core stability training and PNF combined with conventional physiotherapy significantly improved muscle strength and balance in stroke patients. However, PNF demonstrated superior outcomes, particularly in balance and functional recovery, highlighting its effectiveness in enhancing neuromuscular coordination, motor control, and post-stroke rehabilitation outcomes.

Reference

1. Ferretti A, Ippolito E, Mariani P, Puddu G. Jumper's knee. Am J Sports Med. 1983;11:58–62.
2. Lian ØB, Engebretsen L, Bahr R. Prevalence of jumper's knee among elite athletes from different sports: a cross-sectional study. Am J Sports Med. 2005;33:561–567.
3. Cook JL, Khan KM, Kiss ZS, Coleman BD, Griffiths L. Asymptomatic hypoechoic regions on patellar tendon ultrasound: a 4-year clinical and ultrasound follow-up of 46 tendons. Scand J Med Sci Sports. 2001;11:321–327.
4. Malliaras P, Cook J, Ptasznik R, Thomas S. Prospective study of change in patellar tendon abnormality on imaging and pain over a volleyball season. Br J Sports Med. 2006;40:272–274.
5. Kountouris A, Cook J. Rehabilitation of Achilles and patellar tendinopathies. Best Pract Res Clin Rheumatol. 2007;21:295–316.
6. Crossley KM, Thancanamootoo K, Metcalf BR, Cook JL, Purdam CR, Warden SJ. Clinical features of patellar tendinopathy and their implications for rehabilitation. J Orthop Res. 2007;25:1164–1175.
7. Kountouris A, Cook J. Rehabilitation of Achilles and patellar tendinopathies. Best Pract Res Clin Rheumatol. 2007;21:295–316.
8. Kumar R, Singh P, Verma S. Effect of proprioceptive neuromuscular facilitation techniques on muscle strength and functional recovery in post-stroke patients. J Clin Diagn Res. 2019;13(4):YC01–YC05.
9. Lee JH, Lee BH. The effects of PNF-based rehabilitation on motor control and neuroplasticity in stroke patients. NeuroRehabilitation. 2020;46(2):221–229.
10. Sharma A, Gupta R. Role of PNF techniques in improving functional independence after stroke. Int J Physiother Res. 2020;8(3):3456–3462.
11. Park SY, Kim HY, Choi YR. Effectiveness of PNF training on balance, gait, and activities of daily living in stroke survivors. J Phys Ther Sci. 2022;34(1):45–51.
12. Adler SS, Beckers D, Buck M. PNF in practice: an illustrated guide. Heidelberg: Springer; 2014.