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Review Article

A Narrative Review on Various Therapeutic Approaches Used by Physiotherapists in Stroke Patients

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HIGHLIGHTS

1. ART- Autogenic relaxation training
2. PNF- Proprioceptive neuromuscular facilitation
3. NDT- Neurodevelopmental treatment
4. MRP- Motor relearning programme
5. EMG- Neurodevelopmental treatment
6. NMES- Neuromuscular electrical

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ABSTRACT

Background and purpose – Stroke is similar as fleetly developing of clinical signs of focal or global disturbance of cerebral function, lasting further than 24 hours or leading to death, with no apparent cause other than that of vascular origin.[1] Evidence suggests that the prevalence of stroke in India ranges between 105 and 152/100000 people per year. Therefore, the aim of this review is:
1) To identify different types of manual therapeutic techniques used by Indian physiotherapists among stroke patients
2) To provide modalities to stroke patients as per the need.
Methodology- The search for the relevant journal was carried out referring through many different data bases such as: PubMed, PubMed Central, Stroke, Neurology, European Journal of Medical & Health Sciences, scientific reports and form other internet sources. **Discussion** It was found that various conventional therapeutic treatments go hand in hand with stroke patients, but the authenticity of therapeutic care is lacking. This article examines different evidence-based physical therapy approaches used by physical therapists on stroke patients. **Conclusion** In this review article, after looking at the problems of the patient in stroke, we have use of the various types of effective physiotherapy techniques such as autogenic relaxation training, proprioceptive neuromuscular facilitation, bobath concept, motor relearning programme, mirror therapy, suspension therapy, electromyography biofeedback, neuromuscular electrical stimulation, which had a positive effect on stroke patients.

INTRODUCTION

Stroke is also known as neurological deficiency by acute focal injury of the central nervous system from vascular cause, including intracerebral hemorrhage and subarachnoid hemorrhage. According to World Health Organization (WHO) description of stroke is similar as fleetly developing of clinical signs of focal or global disturbance of cerebral function, lasting further than 24 hours or leading to death, with no apparent cause other than that of vascular origin.[1] Stroke is gaining instigation in India. Stroke is considered to be the fourth leading cause of mortality and fifth leading cause of disability in India. Evidence suggests that the prevalence of stroke in India ranges between 105 and 152/100000 people per year[2]. Grounded on the Global Burden of Disease database between the years 1990 to 2019, the estimated number of deaths worldwide from Ischemic Stroke (IS) has increased from 2.04 million- nearly 3.29 million.[3] strokes can beget palsy or weakness on one or both sides of body with difficulty in speaking, getting up, walking, and doing everyday activities. Physiotherapy plays a vital role in conditioning the body system in order to improve functional competence and activities of daily living, but the question arises whether the stroke patients have access to physiotherapy treatment, and whether this is possible due to the lack of resources available.

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Overview of model physiotherapy

Several literatures reveal differences of opinion regarding best treatment for stroke patients. Intervention to stroke is a dynamic process with the overall aim of reducing stroke-related disability. Table-1 demonstrate various therapeutic approaches used by physiotherapists globally.

Table-1 Therapeutic practices among stroke patients

Characteristics	Author	Year	Country	No of subject involved	Type of research	Conclusion
Effects of neuromuscular electrical stimulation(NMES) in spastic muscles after stroke	Cinara Stein [4]	2015	Brazil	Total of 29 randomized clinical reviews were included with 940 subjects. NMES provided reductions in spasticity n=14 randomized clinical trials and increase in range of motion when compared with control group n=13 randomized clinical trials after stroke	Systematic review and meta-analysis of randomized controlled trials	NMES combined with other intervention modalities
The immediate effect of PNF pattern on muscle tone and muscle stiffness in chronic stroke patient	joong-San Wang [5]	2016	Korea	30 subjects were divided into two groups. Group A (15) chronic stroke patients Group B (15) healthy persons	Randomized controlled trial	The stroke group showed insignificant decreased muscle tone and stiffness in lower extremity muscles
The effects of active shoulder exercise with a sling suspension system on shoulder subluxation, proprioception, and upper extremity function in patients with acute stroke	Kyeoung Man Jung [6]	2019	South Korea	Total 36 post stroke patients study group (n=18) and a control group (n=18)	A single-blind, randomized and controlled design	A significant differences in outcome scores were seen after the intervention with significant gain, when compared with the control group
The effect of surface electromyography (EMG) biofeedback on the activity of extensor and dorsiflexor muscles in elderly adults: a randomized trial in elderly adults: a randomized trial	Ana Belén Gámez [7]	2019	Spain	Total 28 randomized patients control group = (n=14) sEMG-B group = (n=14)	A randomized trial	Increase the muscle activity of the extensor muscles of the hand and the dorsiflexor muscles of the foot in the hemiparetic limbs of elderly patients with brain damage resulting from a stroke.

Effectiveness of autogenic relaxation training in addition to usual physiotherapy on emotional state and functional independence of stroke survivors	Deepak Thazhakkattu Vasu [8]	2012	Malaysia	Total 70 post stroke patients, ART-added physiotherapy(experimental group) =35,Usual physiotherapy(control Group) = 35	Randomized controlled trial	Autogenic relaxation program can be used in the rehabilitation of stroke patients with emotion disturbances.
The bobath concept (NDT) as rehabilitation in stroke patients: a systematic review	Abhishek Pathak[9]	2012	India	Total 425 articles but 19 articles were selected according to eligibility criteria	A systematic review	No strong documentation supports its efficacy in the rehabilitation of stroke with motor disability, when compared with other therapeutic techniques
Comparison of effects of motor relearning programme (MRP) and mirror therapy on upper extremity functions in post-stroke patients				Group B (15) mirror therapy Group C (15) upper extremity		extremity motor function, functional ability and sensorimotor impairment in post stroke patients when compared with mirror therapy.

DISCUSSION

It was found that various conventional therapeutic treatments go hand in hand with stroke patients, but the authenticity of therapeutic care is lacking. This article examines different evidence-based physical therapy approaches used by physical therapists on stroke patients. For this purpose, several studies were reviewed to determine the basic regime for stroke patients.

Cinara Stein et.al, (2015) in his systematic review and meta-analysis of randomized controlled trials on studies involving NMES or NMES combined with other treatment techniques on spastic stroke patients were assessed. The outcome measurement used was 6-level modified ashworth scale and found that NMES combined with other treatment techniques is an additional treatment option that provides improvements in spasticity and increase in range of stir in stroke cases.

Whereas, **Wang JS et.al, (2016)** in his randomized trial on (n=30) the chronic stroke patients had hemiplegia for at least six months after their stroke diagnosis via CT or MRI and Brunnstrom stage IV or above on the LE, and grade 2 on the Modified Ashworth Scale (MAS) and found widely PNF treatment, for the therapeutic exercise of stroke patients, can decrease the abnormally increasing muscle tone and stiffness of the in lower extremity muscles on the affected side.

Whereas, **Jung KM et al. (2019)** used a single-blind, randomized, and controlled design with (n=36) acute stroke and shoulder subluxation patients randomly assigned into two groups. The study group (n=18) underwent active shoulder exercise using a sling suspension device, whereas the control group (n=18) received bilateral arm training for 40 minutes, five days a week, for four weeks. Before and after the intervention, shoulder subluxation distance, shoulder proprioception, the Fugl-Meyer assessment (FMA) scale, and the manual function test (MFT) were measured to determine the outcome.

When **Gámez, A.B. et al (2019)** in their randomized trial (n = 40) and all patients of both sEMG-B and control groups initially had average muscle activity or strength assessed by electromyography. The control and sEMG-B groups followed an intervention based on isokinetic exercises with a rubber band and stretching exercises. In the control group, the exercises were arranged so that 30 minutes of recovery exercises were performed on the arms and another 30 minutes on the legs, for a total of 1 hour per exercise. In the SEMG-B group, physical therapy rehabilitation sessions lasted 15 minutes for the arm and 15 minutes for the leg. The sEMG-B intervention was then performed in similar 15-minute sessions for the hemiplegic arm and leg, for a total of 1 hour per session. Physical performance was assessed using the FM assessment test. Fugl-Meyer upper extremity (FMA-UE) and lower extremity (FMA-LE) tests were used. Stroke cases with better physical performance had advanced scores.

Whereas **Vasu DT et al., (2021)** in his randomized trial on (n=70) stroke patients for 12 weeks uses Hospital anxiety and depression scale for evaluating emotional status, Barthel index, and EuroQol-5 dimensions-5 levels for the measurement of functional independence and found that evidence-based physiotherapy program can be used in the rehabilitation of stroke patients with emotion disturbances.

According to **Pathak A et.al, (2021)** systematic review on qualitative

effects of the bobath concept compared to other stroke rehabilitation approaches. 19 RCTs conducted up to 2021 were studied and analyzed. A systematic review was published in 2019, and they confirmed that overall the bobath concept is not as beneficial as other treatment. Only 3studies have shown that the bobath technique is useful across all outcome variables used in those studies with excellent significance value. 1 study found a small difference in favor of bobath, but clinically insignificant. The other 2 studies reported improvements in bobath treated patients but only in balance and gait velocity. 3 studies show that bobath is equally useful to movement science based therapy, PNF techniques for improving movement abilities and functional independence. Another 10 studies showed that bobath was not effective compared to other therapeutic techniques such as MRP Forced Use Therapy, Robot Therapy, POWM, Gait training etc.

In contrast, **Narang A et al. (2023)** conducted a randomized trial on (n=45) patients aged 40-65 years, both males and females, diagnosed with ischemic and hemorrhagic stroke, with unilateral stroke, duration between 1-6 months. In the experimental group (Group-A), all patients received a motor relearning program in addition to conventional physiotherapy (Group-B), mirror therapy in addition to conventional physiotherapy and Group C served as a control group, with all patients receiving only traditional physiotherapy. All the 3 groups received the session for 8 weeks, with 5 sessions per week lasting 1 hour every day. It was discovered that motor relearning programs have a considerable impact on functional impairment in the upper extremity. He concluded that when MRP is combined with conventional physiotherapy, upper extremity functions improve in post-stroke patients, and that physiotherapy should be used as an early intervention to improve functioning in everyday activities. It can be used in both rehabilitation and community-based rehabilitation settings.

Research data on the different treatment approaches used by physical therapists for stroke patients vary by symptoms. Setting a specific treatment approach requires monitoring and examination of the patient before treatment. Further research is needed to clarify the optimal rehabilitation needed at the site of stroke injury for prevention and to validate the effectiveness of treatment program.

Conclusion

In this review article, after looking at the problems of the patient in stroke, we have use of the various types of effective physiotherapy techniques such as autogenic relaxation training, proprioceptive neuromuscular facilitation, bobath concept, motor relearning programme, mirror therapy, suspension therapy, electromyography biofeedback, neuromuscular electrical stimulation, which had a positive effect on stroke patients.

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