

Kinesiology taping: A Significant Potential for Stroke Patients with Hemiplegic Shoulder Pain

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ABSTRACT

Background: This study aims to assess the effectiveness of Kinesiology Taping therapy in managing hemiplegic shoulder pain and enhancing functional ability in stroke patients. It is hypothesized that the application of Kinesiology Taping will significantly reduce shoulder pain and contribute to better mobility and overall functional improvement in affected individuals.

Methodology: This 12-month experimental study was conducted at the Department of Neurology, Pacific Medical University, Udaipur, with ethical approval (PMU/PMCH/IEC/2024/293). Sixty stroke patients (≥ 40 years) with hemiplegic shoulder pain and subluxation received kinesiology taping therapy (3 times/week, 30 min/session for 2.5 months). Pain and disability were assessed using VAS and SPADI. Informed consent and confidentiality were ensured.

Results: Paired t-test analysis revealed a statistically significant improvement ($p < 0.05$) in shoulder pain and functional mobility among participants when comparing pre- and post-intervention scores. The results indicate a notable reduction in pain levels and enhanced functional ability following kinesiology taping therapy, confirming its effectiveness in managing hemiplegic shoulder pain in stroke patients.

Conclusion: Kinesiology Taping Therapy helps reduce hemiplegic shoulder pain in stroke patients by improving proprioception, joint support, and muscle relaxation.

Keywords: Kinesiology taping, stroke, hemiplegic shoulder pain, Visual Analogous Scale

1. INTRODUCTION

The abrupt onset of a persistent localized neurological dysfunction brought on by a vascular lesion is the hallmark of stroke, a clinical condition.¹ The leading cause of serious impairment among the aging populations of developed nations is stroke.² The primary symptom of stroke is unilateral upper and lower limb paralysis. One of the leading causes of death for adults in developed nations is stroke. Stroke ranks as the second or third leading cause of death in most nations.¹ 102.2 million people are disabled as a result of the many forms and levels of impairment that many stroke survivors endure, as well as the

possibility of dying too soon adjusted years of life.^{3,4} More than 70% of stroke patients experience upper extremity disability; 5% of these people recover normally, and 20% or so regain some upper extremity function. About 85% of stroke patients who experienced hemiparesis survived, and 55-75% of them experienced functional restrictions in their upper limbs.⁵ The upper limb recovers functionally the fastest in the first month following a stroke, and 20% of patients return to normal upper limb function three months later.⁶

Hemiplegic shoulder pain can be caused by a variety of conditions, such as shoulder subluxation, flaccid upper limb, rotator cuff lesion, shoulder hand syndrome, spasticity, and impaired sensory and cognitive function.^{7,8} Muscle weakness or imbalance, poor postural control, muscle spasticity, poor voluntary control, body malalignment, shoulder pain, and scapular dyskinesia are common symptoms of stroke patients, particularly hemiplegics. As a result, all of these issues reduce the affected upper extremity's function and capacity in hemiplegics⁹. The Kinesiology tape is a thin, elastic cotton tape that can stretch up to 140% of its initial length when applied to the skin. The tape can lessen mobility limitation and mechanical retention. KT's effects include improved blood and lymph circulation as well as easier muscular activation. For a single application, the recommended wear period is typically three to four days. Post-stroke patients' posture control and balance have been the subject of numerous studies.¹⁰ Additionally, during exercise, KT regulates muscular tension, stimulates elastic fibers, and influences the fascia.⁵ Kinesiology tape helps treat a number of neurological disorders, such as shoulder subluxation after a stroke, since it affects the sensorimotor and proprioceptive systems.¹¹ KT is affordable, simple to apply, and has been shown to help persons with hemiplegia with their upper extremity functionality and shoulder pain.¹² A bandaging technique called Kinesiology Taping (KT) can be used to stimulate muscle fibers. Research has demonstrated its effectiveness in delivering afferent impulses to weak muscles, resulting in increased motor unit recruitment, contraction, and neuroplasticity. There have been no reports of paraesthesia hand benefits.¹³ This study aims to evaluate the effectiveness of Kinesiology Taping therapy in reducing hemiplegic shoulder pain and improving functional disability. We hypothesize that Kinesiology Taping will lead to a significant reduction in shoulder pain among affected patients.

2. METHODOLOGY

The experimental interventional type of study was conducted in the Department of Neurology, Pacific College of Physiotherapy, Pacific Medical University, Udaipur, Rajasthan in the duration of 12 months. The present study was approved by Institutional Ethical Committee, Pacific Medical University (PMU/PMCH/IEC/2024/293). The present study has enrolled total of 60 patients of stroke with hemiplegic shoulder pain (Experimental group). The experimental group of patients were put for intervention with treatment session of kinesiology taping therapy three times a week, 30 minutes per session, for a duration of 2.5 months. The present study utilized the Visual Analogue Scale (VAS) to assess generalized shoulder pain, while the Shoulder Pain and Disability Index (SPADI) was employed to evaluate shoulder pain during movement and functional disability. Additionally, a goniometer was used to measure changes in shoulder range of motion (ROM). A total of 60 patients with age group of ≥ 40 years of age of either gender with more than 6 months of unilateral ischemic or hemorrhagic stroke attack diagnosed with HSP accompanied by shoulder subluxation were included in this study. Subjects with any type of vulnerable diseases, allergic to kinesiology tape and have history of shoulder fracture were excluded from this study. Written and verbal consent were taken prior to enrolment. Patient confidentiality was maintained.

3. RESULTS

Table-1: Goniometer assessment values for shoulder range of motion stroke patients with hemiplegic shoulder pain.

Goniometry Assessment value					
Variables	Pre - Test (Mean \pm SD)	Post - Test (Mean \pm SD)	t Value	P Value	REMARKS
Shoulder Flexion	75.32 \pm 24.7	153.92 \pm 15.76	24.34	<0.001	Significant
Shoulder Extension	26.82 \pm 9.27	51.78 \pm 5.81	32.66	<0.001	Significant
Shoulder Abduction	47 \pm 7.21	70.87 \pm 8.13	21.84	<0.001	Significant

Shoulder Internal Rotation	33.25 ± 7.17	56.57 ± 6.54	25.28	<0.001	Significant
Shoulder External Rotation	39.95 ± 10.02	70.85 ± 10.08	21.41	<0.001	Significant

Table-2: Comparative assessment of Pre and Post treatment values for pain Based on VAS

VISUAL ANALOGOUS SCALE					
Variables	Pre - Test (Mean ± SD)	Post - Test (Immediate (Mean ± SD)	W Value	P Value	REMARKS
Pain	6.62 ± 1.08	2.83 ± 1.03	0	<0.001	Significant

Table-3: Comparative assessment of Pre and Post treatment values for Stroke with HSP (Pain & Disability) Based on SPADI

SPADI					
Variables	Pre - Test (Mean ± SD)	Post - Test (Mean ± SD)	t Value	P Value	REMARKS
Pain Scale	76.75 ± 4.93	28.1 ± 6.16	-48.23	<0.001	Significant
Disability Scale	80.82 ± 3.61	29.88 ± 6.64	-54.78	<0.001	Significant

4. DISCUSSION

The present study analysing the effectiveness of Kinesiology Taping by enrolling total 60 patients with Hemiplegic Shoulder Pain (HSP) to evaluate impact of Kinesiology Taping followed by general exercise to assess its effect on parameter like pain, range of motion and functional disability in shoulder pain in stroke patients.

The present study involved a single-group design to evaluate the effectiveness of Kinesiology Taping followed by general exercise in improving shoulder range of motion in patients with Hemiplegic Shoulder Pain (HSP). Range of motion was assessed using a goniometer both before and after the intervention. Pre-treatment measurements showed limited mobility, with mean values as follows: shoulder flexion at 75.32 ± 24.7°, shoulder extension at 26.82 ± 9.27°, shoulder abduction at 47 ± 7.21°, internal rotation at 33.25 ± 7.17°, and external rotation at 39.95 ± 10.02°. Following the intervention, a statistically significant improvement was observed in all parameters (P < 0.001). Post-treatment values increased to: shoulder flexion 153.92 ± 15.76°, shoulder extension 51.78 ± 5.81°, shoulder abduction 70.87 ± 8.13°, internal rotation 56.57 ± 6.54°, and external rotation 70.85 ± 10.08°.

Lin Yang et al. conducted a study involving 19 patients with Hemiplegic Shoulder Pain (HSP), divided into two groups: 10 patients in the taping group and 9 in the control group. The study aimed to evaluate the effect of Kinesiology Taping on pain levels using the Numeric Rating Scale (NRS), based on weekly responses at different time points. On the first day of treatment, the taping group showed a shoulder flexion of 28.5° and shoulder abduction of 26.7°. After four weeks of intervention, these values improved to 40.1° for flexion and 33.4° for abduction. In the control group, initial measurements showed a shoulder flexion of 31.7° and abduction of 26.0°, which increased to 37.9° and 29.8°, respectively, by the end of

the fourth week.¹⁴

A Visual Analogue Scale (VAS) score of 4 is commonly used as a threshold to diagnose Hemiplegic Shoulder Pain (HSP) in stroke patients. The VAS is a self-reported measure of pain intensity, where individuals rate their pain on a 0 to 100 mm scale 0 representing no pain and 100 indicating the worst imaginable pain.¹⁵

In the present study, pain intensity was measured using the Visual Analogue Scale (VAS), a widely used and validated tool for assessing subjective pain levels. The pre-treatment VAS score was 6.62 ± 1.08 , indicating a moderate to severe level of pain. Following the intervention, the VAS score significantly decreased to 2.83 ± 1.03 , reflecting mild pain intensity. This reduction represents a mean difference of 3.79 points on the VAS scale, which exceeds the minimum clinically important difference (MCID) commonly accepted in pain research (typically around 1.5–2.0 points).

The effectiveness of Kinesiology Taping (KT) was evaluated using the Visual Analogue Scale (VAS), Fugl-Meyer Assessment for Upper Extremity (FMA-UE), Modified Barthel Index (MBI), and Stroke-Specific Quality of Life Scale (SSQOL). In their study, the control group had a VAS score of 3.4 before treatment and 3.2 after treatment. In contrast, the experimental group had a VAS score of 2.3 before treatment, which slightly increased to 2.6 after treatment.¹⁶

The Shoulder Pain and Disability Index (SPADI) is a widely used tool for assessing shoulder-related pain and functional disability in individuals with Hemiplegic Shoulder Pain (HSP) following a stroke. The total SPADI score is expressed as a percentage, where 0% represents no pain or disability and 100% represents maximum pain or disability. In the present study, SPADI was used to evaluate the effectiveness of Kinesiology Taping as a treatment intervention.²

Yen-Chang Huang et al. conducted a study to evaluate the effects of two different intervention methods i.e., Kinesiology Taping (KT) and sham taping and have suggested that Kinesiology Taping is effective in reducing shoulder pain and disability in stroke patients with HSP, with greater improvements observed in the KT group compared to the sham taping group after three weeks of intervention.¹⁴

In the present study, a single-group design was employed involving a stroke patient with Hemiplegic Shoulder Pain (HSP). A single intervention, i.e., Kinesiology Taping (KT), was applied to assess its effect on pain and disability in a stroke patient with Hemiplegic Shoulder Pain (HSP). Pre- and post-treatment outcomes were measured to evaluate the effectiveness of the intervention. Pain intensity, assessed using a standardized scale, showed a significant reduction from 76.75 ± 4.93 before treatment to 28.1 ± 6.16 after treatment. This reduction reflects a clinically meaningful improvement, as it exceeds the commonly accepted Minimal Clinically Important Difference (MCID) for pain scores in rehabilitation settings, which is typically around 20–30% of the baseline value. In this case, the reduction was over 60%, indicating not only statistical but also practical significance. The substantial decrease in pain is likely to contribute to improved shoulder function, enhanced participation in daily activities, and increased compliance with rehabilitation exercises factors that are essential for recovery in stroke patients with HSP. These findings support the hypothesis that KT can be an effective modality for managing shoulder pain and improving functional outcomes in this population.⁸

Similarly, the SPADI (Shoulder Pain and Disability Index) score for shoulder disability significantly decreased from 80.82 ± 3.61 before treatment to 29.88 ± 6.64 after treatment. This reduction represents a 63% improvement, which is well above the commonly accepted MCID for SPADI, typically ranging between 8 to 13 points. Such a substantial change strongly indicates that the improvement is not only statistically significant but also clinically meaningful, reflecting real-world benefits for the patient. The findings thus support the conclusion that Kinesiology Taping (KT) effectively reduces pain and improves functional outcomes, contributing to better overall recovery and quality of life in stroke patients with HSP.

5. CONCLUSION

Kinesiology Taping Therapy shows therapeutic potential for stroke patients with hemiplegic shoulder pain by reducing pain, improving proprioception, supporting joints, and decreasing abnormal muscle tension.

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