EPH-International Journal of Medical and Health Sciences
Volume 12 Issue 01 April 2026
ISSN- 2456 - 6063
DOI: https://doi.org/10.69980/7qwdyb02

STUDY OF EFFICACY OF ADDITION OF KINESIOLOGICAL TAPING WITH CONVENTIONAL PHYSIOTHERAPY IN CASE OF TRAUMATIC BRACHIAL PLEXUS INJURY A CASE REPORT

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Received:- 03/03/26	Revised:-15/04/26	Accepted:-23/04/26	Published:- 30/04/26

Abstract

Rationable-
Adult traumatic brachial plexus injury is a serious and difficult to treat peripheral nerve injuries, it leads to multiple physical disabilities ,sensory and motor deficit .It is devastating, and occurring with increasing frequency. Physical therapist does Patient evaluation concentrating over upper limb sensory and motor function with radiologic studies.
This study discusses conservative management and addition of kinesiological taping to comprehensive Rehabilitation Protocol for Brachial Plexus Injury. Kinesiological taping helps in pain management, improved circulation selective immobilization of the soft tissues and at the same time correction of biomechanics of the joints and the muscles involved. It provide proprioceptive sensory stimulation through the soft tissue. To ensure the efficiency of the protocol, therapist documented progress using MMT modified oxford grading, and validated functional outcome scales (e.g., DASH score) with nerve conduction test pre and post rehabilitation.
Patient concern-
Intense neuropathic pain, especially of the neck and shoulder
Sever Sensory and motor deficit. Tenderness over affected tissues.
Weakness or heaviness in the extremity, loss of function ,psychological distress.
Diminished pulses .
Intervention-
One adult patient with traumatic BPI underwent with kinesiotaping , with muscle stimulation and specialized exercise prescription .kinesiotaping once in a week and muscle stimulation alternate days.
Record the patient's MMT MRC grading with VAS and DASH score pre rehab and 2 weeks,1 month,2months,and 6,month after rehab.
Diagnosis- Adult with traumatic brachial plexus injury preganglionic .
Outcome-After kinesiotaping Marked improvement in VAS scale, MMT , and improved DASH score. However exercise protocol was being followed by the patient with taping.
Abbreviation-MMT,NCV, BPI, DASH score.

Keywords- BPI- brachial plexus injury, MMT- Manual muscle testing, MRC grading- medical research council, VAS –visual analogue scale, DASH-Disability of ARM, Shoulder and hand.

Introduction

Brachial plexus lesions most commonly lead to prominent physical disability, psychological and socioeconomic concerns. Etiology includes birth injuries, falls, penetrating injuries, and motor vehicle trauma. These are mainly closed injuries involving the supraclavicular region. The roots and trunks are more commonly affected than the divisions, cords, or terminal branches.

Conservative rehabilitation plays crucial role to BPI .The possibility for a brachial plexus injury is much higher for severe shoulder-girdle injuries, Mainly motor vehicle accidents (MVAs). According to one report approximately 70% of traumatic brachial plexus injuries happens due to motor vehicle accidents, out of these approximately70% involved motorcycles or bicycles. Out of all the cycle riders, approximately 70% had multiple injuries, total of 70% had supraclavicular involevement; out of those, 70% had at least oneroot avulsion injury. 70% of patients with a root avulsion also have avulsions of the lower roots (C7, C8, orT1). Out of all the patients with lower root avulsion, nearly 70% use to experience persistent pain.

The mechanism of injury should be considered; it helps in consideration of polytrauma. The presence of other injuries needs sedation and due to this late examination and intervention of brachial plexus injury happens. Delayed detailed follow-up examination of the upper extremity may affect the prognosis of Brachial plexus injuries. The same patient can have injury of several different nerves of the brachial plexus in varying severity if early intervention is not possible to the particular case.

Once the nerves are damaged early immobilization of soft tissue is needed otherwise the nerve goes to degeneration process which can leads to permanent damage to the nerves in future and gives poor prognosis. Biomechanical correction is one of the method of selective immobilization which can be done in the earliest phase of injury when other methods like stimulation or ecercisescan not be possible , it not only drastically improves the prognosis but at the same time helps in healing of injury , prevents secondary damage due to gravitational pull and poor posture,it also prevents post injury complication , like restriction of joints , atrophy and contracture of muscles.

Kinesiology tape works on a combined effect of mechanical support, circulatory benefits and neurological feedback, ,the elastic properties of the tape gently elevates the top layers of skin, creating voids or gap between the epidermis and the underline tissues leads to reduced mechanical pressure over pain receptors and allows for better lymphatic drainage. These activated channels improves blood flow and lymphatic drainage, improving the removal of inflammation by products like lactic acid and cellular debris. At the same time the tape stimulates receptors in the skin that stimulates central nervous system through proprioception and helping to correct posture or movement dysfunctions. It stimulates the fascial layers underneath the skin, it can facilitate more efficient muscle contractions and reduce friction between tissues by enhancing circulation and lymphatic drainage. Same time the property of selective immobilization reduces inflammatory changes and secondary damage of tissues with mechanical and gravitational forces.

Overall, these beneficial effects over soft tissues make kinesiology tape a effective and efficient tool for both prevention of injury and rehabilitation post injury in case of BPI.

Patient concern-patients presents with loss of sensation and flaccidity to involved upper limb, inense neuropathic pain and loss of function. LM N type of paralysis with scapular muscle sparing.

Diagnosis- A retrospective analysis of an adult patient with traumatic brachial plexus injury post RTA conservatively managed, from October 2025 to April 2026. male patient.

Inclusion criteria- Age -25 years, traumatic Brachial plexus injury left side with neuropathic pain , acute case of injury, sever sensory and motor deficit of involved side upper extremity, MRI suggests post traumatic neuroma high grade nerve injury.

Exclusion criteria – BPI with multiple fracture and open wound injury, Associated head injury, upper motor neuron involvement, chronic traumatic Brachial plexus injury after more than 3months of injury.Post surgical cases, sever mental illness.

Methodology

Patient signed informed concent ,esic Rajajinagar approved the study, First step for application of tapes the skin should be cleanedwe make sure the skin is free from oil or any kind of lotion. We need to shave the area if hair if present at the treatment site. After this Measurement and cutting of tapes comes as a second step ,we measured the length of tape we need to cover the area we wanted to support or the muscle we wanted to target. Cut the tape, rounded the corners of the tape to prevent the corners from coming up. After this we have to activate the adhesive, there may be specific instructions for activating the adhesive. we need

to rub the tape with our hands or apply light heat to activate the adhesive before applying. Application of tape Gently to the desired area, stretching it as required It's essential to follow specific taping patterns or techniques required for the condition or goal,then we want to Smooth the tape onto the skin using our hand, starting from the centre and moving outward. Rub the tape.
Patient placed in sitting position, first two "I' strip kinesiological tapes was cut measuring the neck below the occiput up to the spinus process of scapula, keeping no stretch at the ends with neck flexed in forward flexion ,down to up placement of kinesiotapes with 25% stretch parallel to paraspinal muscles of neck and upper thorax. Activation of tapes with rubbing over the surface was done.
Next "I' strip placed over two vertical strips in horizontal direction, with 50% stretch at the level of C7 vertebra extending both side up to supraspinatus muscle covering up to 3/4th of medial clavicular area.
Starting with deltoid muscle insertion in anatomical position, anchor of the tape placed, now putting the shoulder in horizontal adduction position tape placed along the posterior deltoid muscle with 50% stretch to the origin of deltoid lateral 3rd of clavicle.
With the same insertion point one more tape will start and the arm will get placed in outer rotation with 50% stretch the tape will be placed along the anterior deltoid to the origin of the deltoid muscle anchor placed.
Now for elevation of scapula one "I' strip starting from the inferior angle of scapula to the lateral part of clavicle with 25% stretch, and frommedial border of scapula to the Lateral part of clavicle will be placed for correction of biomechanics of scapular and rotator cuff musculature.
For assistance of supination and elbow flexors assistive taping was done.

The VAS, MMT,,and DASH score was noted before tharapy and after 1, 2,and6, month after tharapy.

VAS score
It is a pain score (visual analogue scale, [VAS]), corrective effect and patients satisfaction before and after 2 weeks and 1, 2, and 6months after therapy were recorded.
zero score indicates no pain; score of 1 to 3 indicates mild pain; score of 4 to 6 shows moderate pain; and score of 7 to 10 depicts severe pain.

Patient VAS score during his treatment was as follows;

Duration	**Before**	**After 2weeks**	**After 1 month**	**After 2 months**	**After 6 months**
VAS score	8	4	1	0	0

MRC grading-

Grade	Grade for %MRC	Definition
0	0	Nothing, no muscle contraction
1	1	"Flicker" – palpable contraction, no movement
2-	2	Part ROM with gravity counterbalanced
2	2	Full ROM with gravity counterbalanced
2+	2	Full ROM with gravity counterbalanced and a little resistance, no antigravity movement
3-	2	Antigravity movement through part ⇨ most of range
3	3	Full range antigravity movement
3+	3	Full antigravity ROM with some resistance through part of range
4	4	Full antigravity ROM with some resistance through the whole range
4+	4	Full antigravity ROM with normal power in part of range
5	5	Full ROM with full normal resistance throughout range

MMT grading

	Before	After 2 weeks	After 1 month	After 2 months	After 6 months
SHOULDER					
Flexion	**0**	**0**	**2**	**2+**	**2+**
Extension	**0**	**0**	**2**	**2+**	**2+**
Adduction	**0**	**0**	**2**	**2**	**2**
Abduction	**0**	**0**	**1**	**1+**	**2-**
Inte-rot	**0**	**0**	**2**	**3**	**3**
Out-rot	**0**	**0**	**1**	**2**	**2**
ELBOW					
Flexion	**0**	**0**	**2**	**3**	**3**
Extension	**0**	**0**	**2**	**3**	**4**
Supination	**0**	**0**	**1**	**2**	**3**
pronation	**0**	**0**	**2**	**3**	**4**
WRIST					
Flexion	**0**	**0**	**2**	**3**	**4**
Extension	**0**	**0**	**2**	**3**	**4**
Radial deviation	**0**	**0**	**2**	**3**	**4**
Ulnar deviation	**0**	**0**	**2**	**3**	**4**
HAND **MP flexors(lumbricals) IP flexors1st flex digit sup**	0	1	2	3	5
IP flexors(2) flax digit profundus	**0**	**2-**	**2**	**3**	**5**
MP extensors (Ext. digi com)	**0**	**1**	**2**	**3**	**5**

Adductors palmar interossi	**0**	**1**	**2**	**3**	**5**
Abductor digitiminimi	**0**	**1**	**2**	**3**	**5**
Thumb					
MP flexors	**0**	**1**	**2**	**3**	**5**
IP flexor	**0**	**1**	**2**	**3**	**5**
MP extensor	**0**	**1**	**2**	**3**	**5**
IP extensor	**0**	**1**	**2**	**3**	**5**
Abductorrs	**0**	**1**	**2**	**3**	**5**
Aductor	**0**	**1**	**2**	**3**	**5**
opponent	**0**	**1**	**2**	**3**	**5**

- DASH score- It depicts the disability of arm, shoulder , and hand. The questionnaire gives a numerical score, commonly known as the DASH score. It requires proper DASH score interpretation to determine the degree of functional limitation.

Interpretation of scores

0% to 20%: minimal disability:	The patient can cope with most living activities. Usually no treatment is indicated apart from advice on lifting sitting and exercise.
21%-40%: moderate disability:	The patient experiences more pain and difficulty with sitting, lifting and standing. Travel and social life are more difficult and they may be disabled from work. Personal care, sexual activity and sleeping are not grossly affected and the patient can usually be managed by conservative means.
41%-60%: severe disability:	Pain remains the main problem in this group but activities of daily living are affected. These patients require a detailed investigation.
61%-80%: crippled:	Back pain impinges on all aspects of the patient's life. Positive intervention is required.
81%-100%:	These patients are either bed-bound or exaggerating their symptoms.

It gives the clear picture of recovery in the patients of BPI or other disabling disorders like stroke, arthritis etc. In our case the DASH score was as follows;-

TIME	**Before treatment**	**After 2 weeks**	**After 1 month**	**After 2 months**	**After 6 months**
DASH score	90%	85%	72.5%	58.5%	35%

Outcomes-

During therapy the patient was followed up regularly and data recorded at before treatment, after 2 weeks, after 1month,2 months, 6 months. VAS, MMT and DASH score were used to evaluate the pain , muscle power,and functional outcome respectively after 2 week , 1month, 2,months.VAS score of patient were significantly reduced at one month after kinesiotaping with conventional physiotherapy, with increase in muscle power and range of motion, there was also a significant improvement in DASH score, patient became independent in most of his functional activities. There were no complications such as swelling, fluid exudation, pain tenderness, andmuscle atrophy in patients.

Patient showed gradual improvement within 6 month of time period. Patient was satisfied with the outcome, he was regular with exercises in addition to that Kinesiotaping was given.

6. Discussion

patient got a very good improvement in muscle power range of motion except Deltoid muscle, the C4 and C5 dermatome was showing delayed sensory integrity compared to other dermatomes but after 6 months the C4 andC5 dermatome came back with normal sensation .We usedKinesiology taping in this case as an additional rehabilitation technique to improve upper-limb function, reduce pain, facilitate muscle activity, and enhance proprioceptive feedback. The evidence is limited and heterogeneous, May be due to the improper use of Kinesiological taping , and not combining exercises and other conventional therapies with it . Even then several studies and clinical reports suggest that kinesiology taping may provide short-term functional and symptomatic benefits when combined with conventional physiotherapy.

As in this case injury results in motor weakness, sensory deficits, pain, and functional disability of the upper extremity, in acute stage patient presented edema, and neuropathic pain in later stage of rehabilitation experienced shoulder instability, muscle imbalance, scapular dyskinesia,. Rehabilitation therefore focuses on pain reduction, approximating damaged soft tissue, restoring muscle activation, preventing secondary complications, and improving functional independence. In this case kinesiology taping played a crucial role as a supportive intervention due to its proposed neuromuscular and sensory effects.

The mechanism of action of kinesiology taping is based on lifting the skin microscopically, thereby improving local circulation, reducing pressure on nociceptors, and facilitating sensory stimulation through cutaneous mechanoreceptor as explained earlier. These effects may contribute to pain reduction and improved proprioception Facilitation techniques are often used to promote weakened muscle activity, whereas inhibitory techniques may reduce muscle overactivity or compensatory pattern.

kinesiology taping in this case was also used for shoulder stabilization which at the same time approximated the tissues and promoted fast healing,it raised comfort and confidence while performing activities of daily living after taping. It Improved postural awareness and joint positioning and in this way it contributed to better motor control during rehabilitation exercises.

In this case we managed pain very effectively with kinesiology taping. Sensory stimulation produced by the tape might activated the gate control mechanism of pain modulation, thereby decreasing pain perception. Reduced pain might subsequently enhance participation in therapeutic exercises and functional training.

In addition, kinesiology taping may improve circulation and lymphatic drainage, helping reduce edema in the affected limb. Improved blood and lymphatic flow can potentially support tissue healing and reduce discomfort. Some clinicians also report that taping enhances proprioceptive feedback, which may assist patients in relearning movement patterns during motor recovery.

We noticed potential benefits of kinesiological tapes in this case but current evidence regarding kinesiology taping in brachial plexus injury is limited. It might be because the most available studies involve small sample sizes, case studies, or short-term interventions. No sufficient high-quality randomized controlled research are available which targets specifically traumatic brachial plexus injuries. At the same time improvements observed with taping are often temporary and may depend on proper application technique, patient compliance, and concurrent rehabilitation interventions.

One more matter of concern is, kinesiology taping should not be considered a standalone treatment. In traumatic BPI recovery depends on nerve regeneration, and comprehensive rehabilitation including strengthening exercises, sensory re-education, range-of-motion training, and functional retraining. Taping should be an additional modality that may support these interventions rather than replace them.

Finally we can conclude that kinesiology taping seems to be a safe, non-invasive, and relatively inexpensive additional measure in the rehabilitation of brachial plexus injury. It may help reduce pain, improve proprioception, imbalances, stabilizes shoulder joint and restores the scapula humeral rhythm by biomechanical correction and facilitate functional movement. However, more high-quality research is needed to maintain standard taping protocols, determine long-term effectiveness, and getting better insight in various neurological conditions.

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