

SHORT AND LONG TERM EFFECTS OF KINESIO TAPING ON PAIN ALONG WITH FUNCTIONAL STATUS IN NON-SPECIFIC NECK PAIN

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ABSTRACT

Background: In many societies Non-specific Neck pain (NSNP) is a sensitive period of life where dysfunction in the activities of daily living is prevalent. It is considered a costly public health issue both in short and long terms.

Objective: The aim is to find short- and long-term effects of Kinesio taping on pain along with functional status in NSNP.

Methodology: This was a randomized controlled trail with a sample size of 26 participants. The control and experimental groups received hot pack, TENS, stretching exercises and home plan of self-stretching, active range of motion and neck isometrics. Kinesio tape (KT) was applied in experimental group on upper trapezius from insertion to origin with 25 to 50 % stretch. Outcome measure was taken through Numeric Pain Rating Scale (NPRS) and Neck Disability Index (NDI) at base line, 3rd visit and 6th visit.

Results: The mean age of participants was 42.5±12.0 with 9 males and 17 females. Baseline measures for both groups showed no significant difference as the P value > 0.05. The paired t-test within the control and experimental groups showed significant difference at baseline and 3rd visit as well as in baseline and 6th visit in NPRS and NDI. Independent t-test for NPRS and NDI at baseline and 6th visit between treatment groups was also significant i.e., P< 0.05.

Conclusion: It is concluded that patients with NSNP exhibits statistically significant improvements in NPRS and NDI through KT application for short (3rd visit) and long term (6th visit).

Keywords: Functional Status, Kinesio Tape, Neck Pain, Neck Disability Index, Pain Measurement

INTRODUCTION

Non-Specific Neck Pain (NSNP) is characterized by cervical pain with indefinite underlying cause (1). Cervical joint position, postural and motor control of head could be altered from neck muscles proprioceptor, which places a huge burden on human health (2). It is estimated that globally 90% people experience pain in neck region once in their life (3). Neck pain is in between superior nuchal line, inferior spinous process of the Thoracic first vertebra (T₁) and oblique sagittal line of the neck (4). The neck pain over a period of few weeks may resolved itself spontaneously but with reported reoccurrence (5). The female population is more effected than male with physical and psychological symptoms due to non-specific Neck Pain (6). It is a root cause of a person's pain and dysfunction in working status (7). There are multiple treatments for the management of non-specific chronic neck

pain which included analgesics, manual therapy techniques, kinesio taping, electrotherapeutic modalities application and exercises (8).

The kinesio tape application improved the functional status of the ankle performance in different types of sports (9). It is reported that kinesio tape produces immediate balance, strength and performance improvement (10). Kinesio taping for pain reduction and functional improvements benefited people in clinical practices (11). The creator of the kinesio taping provided the clinical evidences for use in facilitation and restriction of the movement, removal of the edema, joint and muscle position corrections (12). The techniques of applying the tape included I shape, Y shape, X shape, Octopus shape, donut shape and star shape applications. (13). Its use stimulates blood and lymph circulation along with cutaneous mechanoreceptors on the skin tissues, which comforts pain via pain gate theory and improve muscle performance (14). In a survey 74% of health care professional use kinesio taping for post injury treatment while 67 % for pain modulation (15).

It is noted that pain reduction increases the functional status of patients having neck pain which can be measure by functional assessment scales like Neck Disability index (NDI) and Oswestery Disability Index (ODI) (16). In the systemic review of Mansour Alotaibi et al they concluded Kinesio taping techniques increases the functional activities of the upper trapezious myofascial pain syndrome patient (17). The immediate effect of kinesio taping was consider to be more effective in condition of chronic low back pain (18). The effects of kinesio taping are also noted in wrist and finger grip as well as strength in cerebral palsy children (19). This randomized controlled study was designed to evaluate the short- and long-term effects of Kinesio taping on pain along with functional status in Non-specific Neck pain.

MATERIAL AND METHODS

This was Randomized controlled trail with consecutive sampling technique and randomization was done with sealed enveloped method. The study was conducted at Pakistan Railway General Hospital Rawalpindi, Pakistan. The ethical approval was taken under the letter number 00378 from the research ethical committee Riphah International University. The trail is registered on the clinical trail.gov website (NCT04733248). All participants were informed about the objectives of the study and signed the consent form after understanding the written information about the study aims, potential benefits and risks, length and commitment required for the study. All the procedures are in accordance with the consort diagram and followed as per Declaration of Helsinki ethical standard, as revised in 2008 (20).

A Sample size of 26 participants was calculated by using open epi tool (21). Patients were considered for inclusion in the study if they were aged between 25 and 55 years with decrease ROM, pain value of 3 on Numeric Pain Rating Scale (NPRS) and Neck Disability Index (NDI) level of moderate and severe. Patients outside the age range and with history of radiculopathies, malignancy, infection and trauma were excluded. Following the baseline examination, patients were randomly assigned to control group and experimental group using sealed envelope method as shown in the consort labeled as figure 2. The intervention protocols to both groups were given thrice a week for total duration of two weeks. Treatment protocol of experimental group included application of hot pack and Transcutaneous electrical nerve stimulation (TENS) for 10 minutes, stretching exercises with hold time of 2 seconds (10 reps 3sets), then 15 to 20 cm long with a width of 5 cm and a thickness of 0.5 mm Kinesio tape was applied on upper trapezius from insertion to origin manner (22). The skin was cleaned with

alcoholic swab and the tape was applied in I band shaped with a stretch of 25 to 50 % as shown in figure 1 (23). The tape was applied and renewed thrice a week (24).

The control group included only application of hot pack, TENS and stretching exercises. The home plan was also given to both treatment groups and included self-stretching of 10 repetitions with 3 sets, active range of motion (AROM), neck isometrics of 10 reps and 3 sets withhold time of 10 seconds in all directions (i.e. flexion, extension and bilateral side bending). The outcome of the study was neck pain intensity and functional status of the patients and measured via NPRS and NDI respectively at baseline, 3rd and 6th visits. Pain Intensity: The NPRS indicates the level of pain intensity using 11point scale ranging from 0 to 10. The reliability of the NPRS is 0.78 in condition of neck pain (25). Functional status: The NDI is most commonly used in clinical research setting addressing 10 sections of physical activities i.e. Pain intensity, personal care, lifting, work, headaches, concentration, sleeping, driving, reading and recreation. The can be six possible responses for each section (from 0 no disability to 5 complete disability) (26). Its ranging from 0 to 50 in which higher score is indicative of increased disability (27). The data was analyzed through SPSS version 22. Descriptive statistics was used for age and gender. Normality test applied and P values were noted through parametric tests on NPRS and NDI that include independent T tests for comparison between groups and paired T tests for within group comparison.



Figure 1 Kinesio taping for upper trapezius

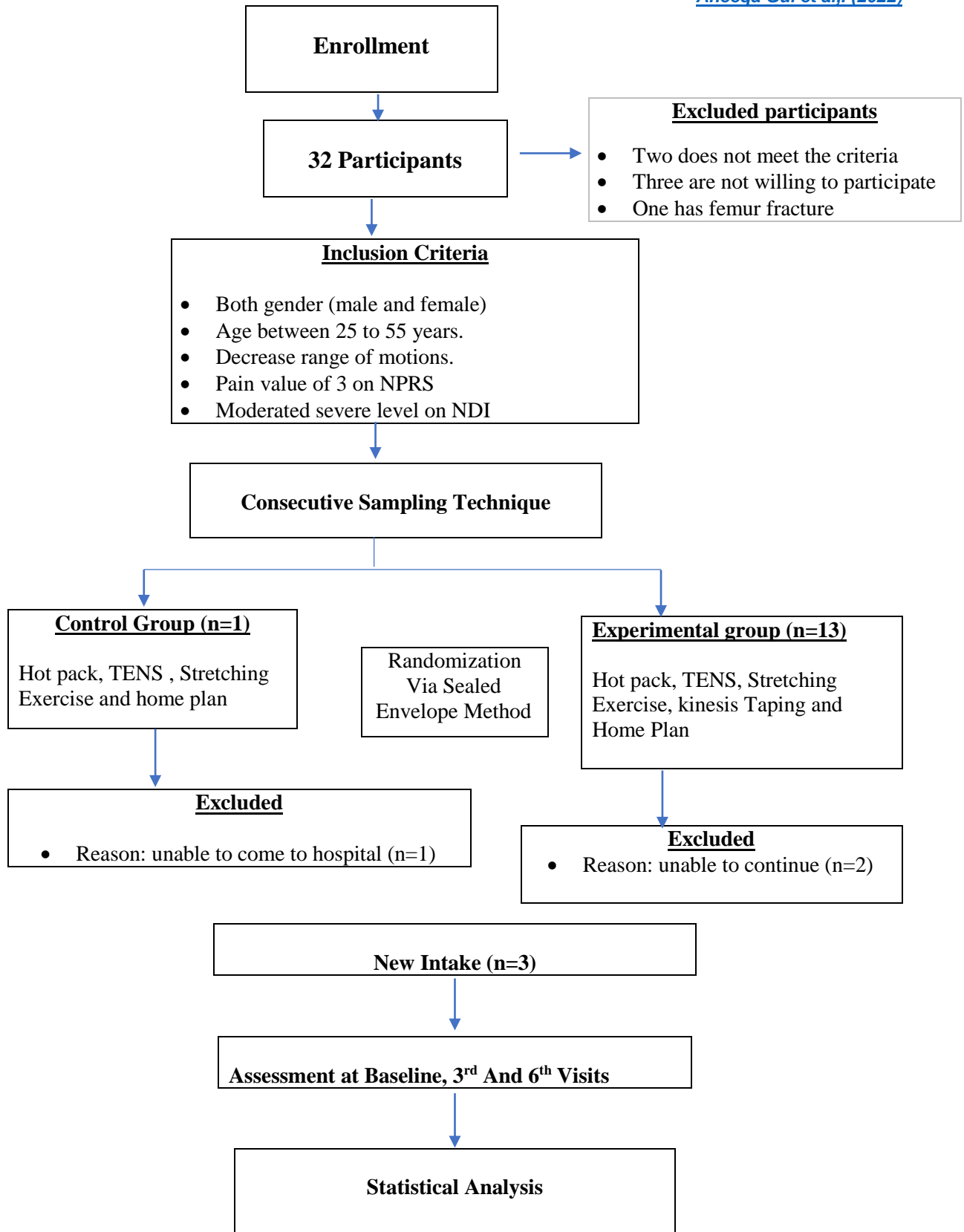


Figure 2 Consort Diagram

RESULTS

The results were analyzed in terms of pain and improving functional status with Kinesiotaping in Non-Specific Neck Pain (NSNP). The NPRS and NDI were employed to access the pain and functional status at baseline and after 3rd and 6th visits to find the effectiveness of Kinesiotaping. There were a total of 26 participants 13 in each group i.e. Control group (n=13) and Experimental Group (n=13). Mean age of participants was 42 years. Out of 26 participants 9 (35%) were males and 17 (65%) were females. History of onset of pain mentioned as 3 months ago, 6 months ago, more than 1 year and from 9 months ago is given in Figure 3. Patients reported that their pain status was improving and remain unchanged is given in Figure 4. Pain involvement and Pain duration is given in Figure 5 and 6.

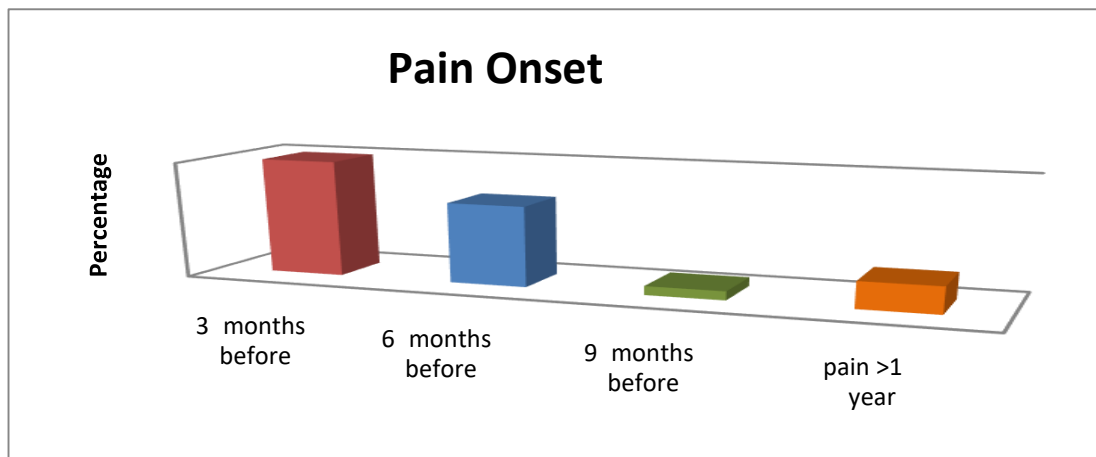


Figure 3 onset of pain

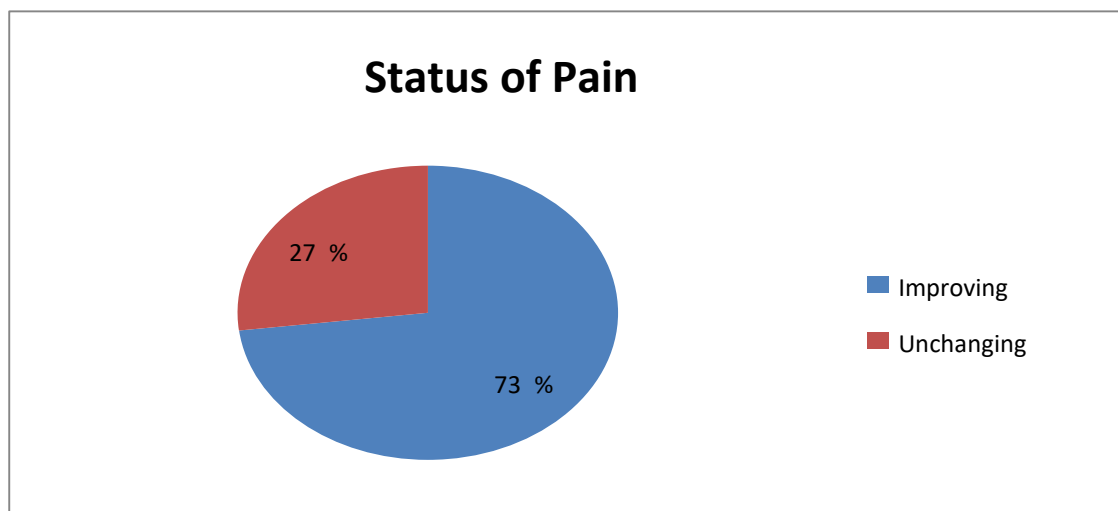


Figure 4 Status of Pain

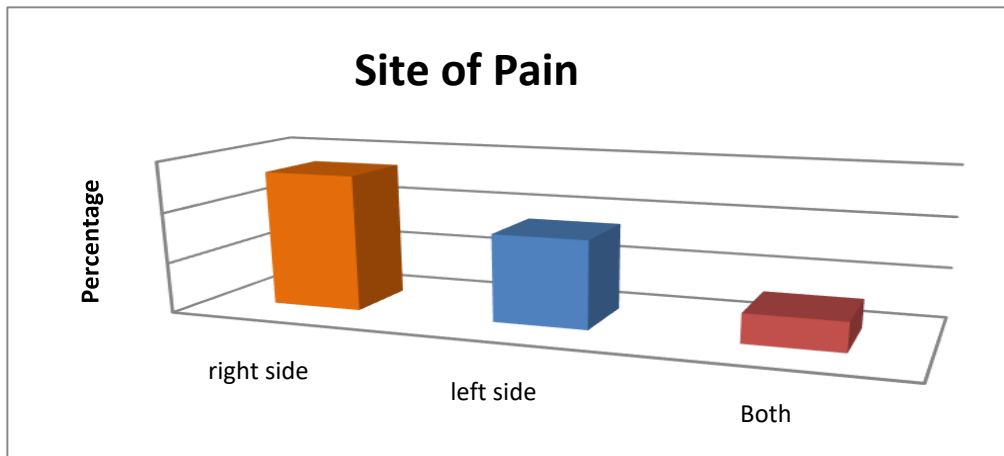


Figure 5 Site of Pain

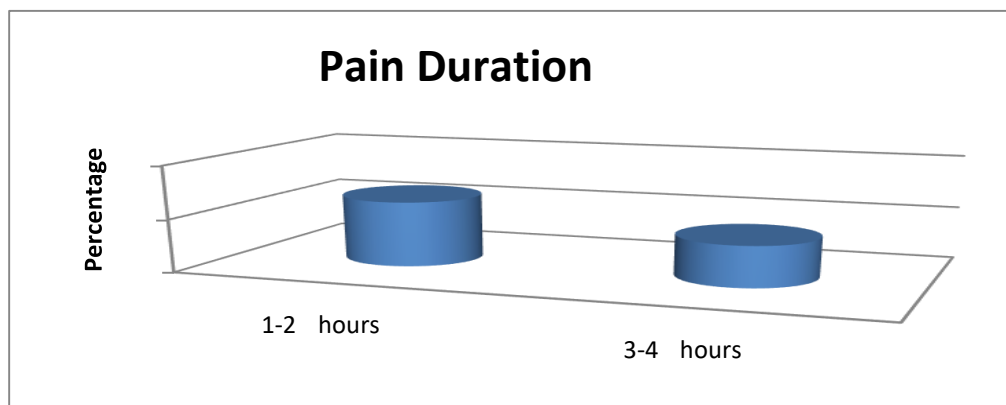


Figure 6 duration of pain

Independent T test was applied to compare the mean of both groups at baseline and after intervention. The mean NPRS of control group was 8.73 ± 0.87 and for experimental group was 8.66 ± 0.70 with a $p=0.777$ at baseline. For NDI of control group was 57.5 ± 7.81 and for experimental group was 58.75 ± 7.72 with a $p=0.568$ at baseline. Results showed that there was no statistically significant difference found in both groups. The value for NPRS was measured with paired sample T test at baseline and 3rd visit of intervention. The values for NPRS of control group at baseline was 8.73 ± 0.874 and at 3rd visit of intervention was 6.80 ± 0.98 with $p=.001$. The values for NPRS of experimental group at baseline was 8.66 ± 0.70 and at 3rd visit of intervention was 5.45 ± 0.72 with $p=.001$. The p value shows statistically significant difference between baseline and 3rd visit of intervention indicating that both treatments was effective in reducing pain in both groups as shown in Table 1.

Mean value of baseline and 6th visit for NPRS of both groups was measured with paired sample T test. The values for NPRS of control group at baseline was 8.73±.874 and at 6th visit was 5.03±.95 with p=.001. The values for NPRS of experimental group at baseline was 8.66±.70 and at 6th week of intervention was 1.87±.61 with p=.001. The p value shows statistically significant difference between 1st and 6th visit indicating that both treatments were effective, but mean difference of experimental Group shows that this intervention was more effective in reducing pain as compared to control Group as shows in Table 1.

Table: 1 Paired sample T test for Statistical analysis of baseline, 3rd and 6th visit for NPRS.

Variable	Groups	Baseline	3 rd Visit	6 th Visit	P Value
NPRS	Control	8.73±.874	6.80±.98	5.03±.95	.001
	Experiment	8.66±.70	5.45±.72	1.87±.61	.001

The value for NDI was measured with paired sample T test at baseline and 3rd visit of intervention. The values for NDI of control group at baseline was 57.5±.7.81 and at 3rd visit of intervention was 41.69±7.56 with p=.001. The values for NDI of experimental group at baseline was 58.7±.7.55 and at 3rd visit of intervention was 27.29±5.68 with p=.001. The p value shows statistically significant difference between baseline and 3rd visit of intervention indicating that both treatments was effective in in improving functional status in both groups as shown in Table 2

Table: 2 Paired sample T test for Statistical analysis of baseline, 3rd and 6th visit for NDI.

Variable	Groups	Baseline	3 rd Visit	6 th Visit	P Value
NDI	Control	57.5±.7.81	41.69±7.56	32.5±3.00	.001
	Experiment	58.7±.7.55	27.29±5.68	12.5±4.03	.001

Mean value of baseline and 6th visit for NDI of both groups was measured with paired sample T test. The values for NDI of control Group at baseline was 57.5±.7.81 and at 6th visit was 32.5±3.00 with p=.001. The values for NDI of experimental Group at baseline was 58.7±.7.55 and at 6th visit was 12.5±4.03 with p=.001. The p value shows statistically significant difference between baseline and 6th visit indicating that both treatments were effective, but mean difference of experimental Group shows that this intervention was more effective in improving functional status compared to control Group as shows in Table: 2

For end value comparison, Independent T test was applied to compare the mean values of both groups (control and experimental) showed, mean value NDI for control group 32.5 ± 3.06 and for experimental group it was 12.5 ± 4.12 with a p value of 0.001. At the end patient's functional status was significantly different and improved. For NPRS mean value for control group $5.03 \pm .95$ and for experimental group it was $1.87 \pm .61$ with a p value of 0.001 shows a significant improvement in pain reduction as shown in Table 3 and 4.

Table: 3 Independent T Test for Baseline and End value comparison of NDI.

Variables	Groups	Mean \pm S.D	P Value
NDI Baeline	Control	57.5 \pm 7.81	0.568
	Experiment	58.75 \pm 7.72	
NDI 6 th visit	Control	32.5 \pm 3.06	.001
	Experiment	12.5 \pm 4.12	

Table: 4 Independent T Test for Baseline and End value comparison of NPRS.

Variables	Groups	Mean \pm S.D	P Value
NPRS Baseline	Control	8.73 \pm .87	0.777
	Experiment	8.66 \pm 7.0	
NPRS 6 th visit	Control	5.03 \pm .95	.001
	Experiment	1.87 \pm .61	

DISCUSSION

Considering the properties of kinesio taping with reference to their application in the clinical setups of physical therapy, it is a very important to know the clinical evidence of the kinesio tape usage. The main purpose of the study was to find out the true short- and long-term effects of Kinesio tape on pain along with functional status in nonspecific neck pain. The short- and long-term effects of the kinesio taping are taken on the second and third assessments. Pain intensity can be measured via different scales i.e. Numeric Pain Rating Scale (NPRS), Visual Analogue Scale (VAS) and Verbal Rating Scale (VRS). The NPRS and VAS are considered to be similar and valid measures for pain level intensity (28). For this reason, the current study used NPRS for pain measurement. As per result of the study the application of kinesio taping decreased pain on NPRS of nonspecific neck pain patients. The results of pain alleviating characteristics of KT of the current study are in accordance with the following mentioned literatures. The effects of kinesio tape on decreasing pain via VAS is also reported in patients with lateral epicondylitis (29). Its use along with other exercise maneuvers improved the pain status on VAS in women with fibromyalgia (30). The pain reduction characteristic of the kinesio tape is evident statistically in a systematic review and meta-analysis on myofascial pain syndrome (31). The use of kinesio taping reduced pain intensity on NPRS as well as different pharmacological management for pain in knee osteoarthritis patients (32). In the randomized control study of Seyda Toprak et al on

primary dysmenorrhea patients Kinesio Taping application was beneficial in decreasing menstrual pain on VAS, anxiety level on State-Trait Anxiety Inventory (STAI) and other menstrual complaints (33). The literature also suggested short term pain relief through patellar kinesio taping in patellofemoral pain syndrome (34). It has been proven in the research about the short-term improvement via kinesio tape in the pain on VAS and functional status on ODI of the chronic low back pain patients (35). The study of aslihan et al on effectiveness of Kinesio taping in chronic nonspecific low back pain provided significant rationale about the short-term effects in decreasing pain and increasing functional status on VAS and ODI respectively (36). Kinesio taping is reported to have long term effects in terms of pain, range of motion and neck disability index. In the research study Zabih Allah et al treated myofascial pain syndrome with kinesio taping and found long term effect on pain reduction, increase cervical ROM and decreased NDI (37).

The functional status in the results of the current study is also improved in terms of Neck Disability Index for duration of short and long terms. The systemic review on effectiveness of kinesio tape along with conventional physical therapy treatments in carpal tunnel syndrome are found to be effective in increasing pinch and grip strength in hand for short as well as longer terms (38). In case study of non-specific low back pain, the ODI of a 60-year-old male decreased from 70 % to 0 % with the application of kinesio taping on latissimus dorsi, internal oblique, quadratus lumborum, upper and lower trapezius, rectus abdominal and external oblique muscles (39). A double-blind randomized-controlled study on effectiveness of kinesio taping in Chronic Low Back Pain (CLBP) indicated pain alleviation and decreased disability score using the ODI and Roland Morris Disability Questionnaire (RMDQ) for shorter term (40). The Meta analysis on effectiveness of Kinesio Taping with other physical therapy treatments for Chronic Low Back Pain (CLBP) for at least 2 week delivered better results in pain reduction via VAS and NPRS and decreased degree of disability via ODI and Roland Morris Disability Questionnaire (RMDQ) (41). The efficacy of KT in cervical spondylosis along with multi-angle isometric resistance training improved the pain level as well as percentage of NDI in experimental group when compared with only multi-angle isometric resistance training control group (42).

CONCLUSION

It is concluded that patients with nonspecific neck pain receiving an application of KT exhibited statistically significant improvements in NPRS and NDI assessments on 3rd and 6th visits. The 3rd and 6th visits assessment are considered the short and long terms effects of kinesio taping respectively.

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