



EFFECTS OF KINESIO TAPING ON PAIN AND FUNCTIONS OF CHRONIC NONSPECIFIC LOW BACK PAIN PATIENTS

Ahmed A. Abd El Rahim¹, Hebatallah Mohamed Said Zaghoul², Asmaa Foad Abdelmonem³, Mona Mohamed Taalat Abdelkhalek⁴, Marian M. Fayez⁵.

¹Lecturer of Physical Therapy, Department of Basic Science, Faculty of Physical Therapy, Merit University, Sohag, Egypt.

²Lecturer of Physical Therapy, Department of Musculoskeletal Disorders and its Surgery, Faculty of Physical Therapy, Benha University, Egypt.

³Lecturer of Physical Therapy, Department of Biomechanics, Faculty of Physical Therapy, Cairo University, Egypt.

⁴Lecturer (Fellow) of Physical Therapy, Department of Burn and Surgery, Cairo University Hospitals Cairo University, Egypt.

⁵Lecturer at Department of Physical Therapy for pediatrics, Faculty of Physical Therapy, Egyptian Chinese University, Egypt

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ABSTRACT

BACKGROUND: Low back pain (LBP) is enormously common health problem & most of subjects experience it at some point of their life. Kinesio-taping is one of therapy methods introduced for studied cases with nonspecific low back pain.

OBJECTIVES: to look at how Kinesio-taping affects studied cases with non-specific low back pain in terms of discomfort, range of motion, & back muscular strength. **SUBJECTS:** 40 mechanical LBP patients aged 20-40 years had been assigned haphazardly into two groups, They had been selected from out patient clinic, Kasr Al-Aini Hospital, Cairo university.

Methods: Group A: 20 patients received the I-shape KT longitudinally & conventional physiotherapy program. Group B: 20 studied cases received application of the KT Horizontally & conventional physiotherapy program. Pain had been measured by visual analog scale, Range of motion had been measured by Roland Morris Disability Questionnaire (RMDQ), & strength had been measured by an isokinetic dynamometer before & after therapy. Therapy sessions had been three times weekly for four weeks.

RESULTS: Groups (A & B) discovered decrease in pain & disability and rise in their flexion, extension ROM & peak torque of trunk extensor after end of 4 weeks of program. Mean values of pain scale after therapy had been 3.7 and 5.04 in groups A & B. Mean values of Disability scale after treatment had been 7.87 and 9.35 in groups A & B. Mean values of ROM of flexion had been 28.06, and 24.53 in groups A & B. Mean values of ROM of extension had been 13.43 & 10.73 in groups A & B. Mean values of Peak torque of lumbar extensors were 65.43 and 63.22 in groups A & B. Though, participants who received the I-shape KT longitudinally as well as conventional physiotherapy program (group A),



discovered more reduction in pain&disability and more improvement in ROM of flexion, extension, and Peak torque of lumbar extensors value ($P<0.001$) after therapy program

CONCLUSION: Therapeutic longitudinal Kinesio-taping application with conventional physiotherapy will be more valuable than Therapeutic horizontal Kinesio-taping application with conventional physiotherapy when treating nonspecific low back pain studied cases.

KEYWORDS: Kinsiotaping, pain, functions chronic low back pain

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INTRODUCTION

Low back pain (LBP) is very common health problem & most of subjects experience it at some point in their life¹. If pain persists, mobility & stability are compromised, muscular strength & coordination are weakened, & proprioception is altered, leading to variety of issues, including somatic illnesses². Nonspecific low back pain is described as low back pain that is not caused by identifiable, well-known specific disease, such as infection, tumour, osteoporosis, or fracture, & accounts for eighty five to ninety percent of low back pain diagnoses³.

Thirty nine percent of people in population experience LBP at some point in their lives. Back discomfort had been 2nd most common health condition, after systemic arterial hypertension, according to Brazilian National Survey⁴. It is crucial to provide early & timely therapies throughout acute phase to provide better long-term outcomes because pain & accompanying impairment may last for months⁵.

At 13.5 percent of population, spinal pain (cervical, thoracic, & lumbar) had been ranked as 2nd most common complaint. Chronic lower back pain is described as episodes of pain lasting more than twelve weeks, & it relates to significant therapy expenditures & absenteeism from work⁶.

Principal stabilisers of lumbar spine & trunk throughout movement are deep-trunk muscles, which include multifidus, transverse abdominis, & internal oblique muscles⁷. Spinal stability is diminished in LBP studied cases because pattern & intensity of deep-trunk muscular activation are improperly produced. studied cases with LBP have uncontrolled movement in lumbar spine as result of these

alterations, which creates cycle of escalating pain & dysfunction⁸.

For studied cases with chronic low back pain, there are variety of therapy alternatives available, such as educational programs, medicine, electro-physical agents, manual therapy, exercises, etc. More efficient therapies are required for people with low back pain because these therapies only have moderate effect at best⁹.

Kinesiotaping (KT) is rehabilitation method that supports muscles & joints without limiting their range of motion. It helps body's natural healing process. It is used to treat range of neuromuscular & muscle-skeletal issues. longitudinal flexibility of strips allows for proper mechanical functioning of skin, whereas waved adhesive allows for this. There are no chemicals, medicines, or latex in kinesiotape. It is made entirely of cotton fibres, is temperature-sensitive, & is water-resistant¹⁰. joint can move through its full range of motion with kinesiotape. Additionally, it is reportedly shown to improve lymphatic & blood flow, which lessens discomfort. KT deforms & stimulates large-fiber cutaneous mechanoreceptors, that could block proprioceptive impulses in spinal column & lessen pain via ascending pathway, according to certain another research¹¹.

Active lumbar flexion is increased by KT when it is applied to studied case's trunk. use of KT on lumbar paraspinal muscles of LBP studied cases had been anticipated to affect movement patterns & back pain by interfering with muscle function. Therefore, goal of present research had been to determine how kinesiotaping affected individuals with non-specific low back pain in terms of pain, muscular strength, & functional impairment¹².

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MATERIALS AND METHODS:

Patients: 40 man patients, aged 20 to 40 years old, suffering from non-specific low back pain(LBP), the signs and symptoms must last more than 3 months without any intervention or physical therapy treatment.patients selected from outpatient clinic, KasrAl-AiniHospital, Cairo university.Therapy sessions had been three times weekly for fourweeksThe researchhad been conductedamong April & August2022.The cases were randomly assigned into 2 groups.

Group A:20patients who receivedthe I-shape KT longitudinally,in addition to conventional physical therapy programs, whichincluded using hot packs (twenty minutes), ultrasound (five minutes), & electrotherapy usingTENS (fifteen minutes) as well as stretching exercises for back, iliopsoas, & hamstring muscles& strengthening exercises for abdominal muscles for thirty minutes¹³.**GroupB:**20 patients who received KThorizontally,in addition to conventional physical therapy programs, which included using hot packs (twenty minutes), ultrasound (five minutes), & electrotherapy usingTENS (fifteen minutes) as well as

stretching exercises for back, iliopsoas, & hamstring muscles & strengthening exercises for abdominal muscles for thirty minutes¹³.

Criteriafor exclusion had been tumor, infection, fractures in the spine, cauda equina syndromes that require urgent surgery, &studied cases with previous lumbar surgery.Research received approval from EthicsCommitteeofFaculty of PhysicalTherapy, CairoUniversity with NO: P.T.REC/012/004022

Assessment procedures

1- Demographic data:

Initially, demographic data including height (cm), and weight (kg) using standard weight and height scale had been collected and recorded (table 1).

2- Assessment of pain:

visual analogue scale had been used to measure intensity of the pain. It is valid & trustworthy instrument for determining degree of pain. VAS was ten-cm line, with right extremity denoting "severe pain" & left extremity denoting "no pain." Throughout painful tasks, participants had been asked to rate their present level of pain on this scale (figure 1)¹⁴.



Fig 1: The visual analog scale.

3- LBP dysfunction assessment: **RolandMorris DisabilityQuestionnaire** is an accurate measurement for LBP dysfunction. The scale includes 24 items. Questionnaire had been scored by adding up number of 'yes', which variedfromno disability (0) to severe disabilities (24)¹⁵.

4- Assessment of back range of motion: **Back ROM (flexion and extension)assessment:** The back Range (BROM)instrument is reliable, objective approach for measuringLBRat all levels regardless of thoracic or hip movement. It is a modified protractor goniometer in all three levels to quantify lumbar spinal movement¹⁶.The BROM had been used to measure

spinal flexion. patient had been erecting about shoulder-width apart with his feet.

T12 & S1 vertebrae's spinous processes had been used as anatomical landmarks for measurements. Whereas I BROM had been placed on spinous process of S1 vertebra, upper inclinometer had been placed on skin that covered spinous process of T12.

Readings had been taken at rest, forward flexion & back extension.

- Palpate and mark S1 and T12. Mark on bare skin.

- The examiner placed BROM on spinal processS1& requested studied case to connect straps over lower abdominal area. The examiner then confirmed if inclinometer had been fixed on reference & positioned it on right

side of volunteer with a view of right side of bod shaft ofBROM had been placed onT12so that shaft line had beenlocated in middle of markings made by marking pen".

- examiner carried out reading
- patient was then asked to bend the trunk, slide their hands along legs & hang their arms at finish of movement. Again, examiner read BROM angle and called on studied case to return to original position.same methods for the extension have been repeated.

5- Assessment of isokinetic parameters:

Using isokinetic dynamometer, trunk extensors' torque & power had been measured (Biodex Corporation, New York, USA). torque of muscle throughout movement of joint at constant angular velocity is measured throughout isokinetic strength test, which is

frequently used to objectively quantify muscular strength¹⁷.To gauge torque of trunk extensors, BiodexSystemfour (BiodexMedical Systems, NewYork, NY, USA) had been employed (figure 4). On day of test, subjects had been instructed to dress comfortably in loose-fitting attire.

individuals' backs & thighs had been strapped to testing chair. studied case 's anterior superior iliac spine served as dynamometer's axis of rotation. Trunk extensors' maximum isometric strength had been determined. It had been noted when force measurement reached its apex. studied cases had been told to perform maximum effort back flexion & extension 3 times at angular velocity of Sixty °/ sec for isokinetic strength test.maximum torque was given in Newton metres (Nm).



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Figure2: patients were assessed torque & power of trunk extensors by an isokinetic dynamometer (BiodexCorporation, NewYork, USA).

Treatment procedures:

Kinesiotaping procedures:

First, we started by choosingthe posterior superior iliac spine& placing point on it. Then, we continued till we reached T12 & set another point, defining T12by placing hand on iliac crest & where 2 thumbs meet among L4& L5. After identifying KTmode's points, we chopped KT's edge to prevent studied case from falling

& then applied it according to group of studied cases.

For group A:TheKTwasin form of Ishape& from posterior superior iliac spine toT12. We put part ofKTon posterior superior iliac spine & asked studied case to do trunk flexion & we stretched KT ten percent to fifteen% of its original length then putting last part ofKT onT12.,in addition to conventional physical therapy programs, whichincluded using hot packs (twenty

minutes), ultrasound (five minutes), & electrotherapy using TENS (fifteen minutes) as well as stretching exercises for back, iliopsoas, & hamstring muscles & strengthening exercises for abdominal muscles for thirty minutes¹³

For group B (placebo): The KT was located horizontally with putting it on posterior superior iliac spine. We put part of KT on right posterior superior iliac spine & fifteen percent to

fifteen percent stretch until we reached to left posterior superior iliac spine (figure 5)¹⁸. In addition to conventional physical therapy programs, which included using hot packs (twenty minutes), ultrasound (five minutes), & electrotherapy using TENS (fifteen minutes) as well as stretching exercises for back, iliopsoas, & hamstring muscles & strengthening exercises for abdominal muscles for thirty minutes¹³



Figure 3: patients who received the application of KT (longitudinal and horizontal)

Result:

Version 22 of SPSS for Windows had been used for the statistical analysis (SPSS Inc., Chicago, Illinois, USA). Significance is measured by P value. Significant results were defined as those with P value of 0.05 or below. unpaired t-test had been used to compare means of various parameters among 2 groups. paired t-test had

been used to compare pretreatment & posttreatment data from same group.

Table 1: Subjects' Demographic Characteristics. average years old, weight, height, and BMI of participants in 2 groups did not significantly differ from one another (p <0.05) when these general parameters were compared.

Table 1. Descriptive statistics & test-t for mean years old, weight, height, & BMI of both groups (groups A & B).

	Group A (N=20)	Group B (N=twenty)	t-value	P-value	Level of significant
Years old	28.1±4.12	27.8±4.37	0.656	0.274	N.S
Weight (kg)	67.75±7.81	71±8.41	0.746	0.482	N.S
Height (cm)	161.5±7.25	165.6±8.23	1.227	0.173	N.S
BMI (kg/m ²)	26.018±2.56	25.16±1.45	0.359	0.534	N.S

Visual analog scale before & after treatment for both groups (A & B):

Table 2: Mean values for visual analog scale before & after treatment for both groups (A & B)

Pain scale	GroupA	GroupB	t-value	p-value
	$\bar{X} \pm SD$	$\bar{X} \pm SD$		
Pre-treatment	8.5± 0.857	8.35± 1.061	0.42	0.23
Post-treatment	3.7 ± 0.763	5.04 ± 0.689	0.23	0.001
% improvement	56.47%	39.64%		
t values	12.765	22.80		
P values	0.001	0.001		

RolandMorris DisabilityQuestionnaire before & after treatment for both groups (A & B):

Table 3: RolandMorris DisabilityQuestionnaire before & after treatment for both groups (A & B)

Disability scale	GroupA (Mean ±SD)	GroupB (Mean ±SD)	t-value	p-value
Pre-treatment	19.06 ±3.44	19.66 ±2.31	0.42	0.261
Post-treatment	7.87±1.63	9.35 ±1.6	0.237	0.001
% improvement	58.70%	52.44%		
t-value	0.251	0.32		
p-value	0.0001*	0.0001*		

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Back Range (BROM) instrument for assessment ROM of trunk flexion before & after treatment for both groups (A & B):

Table 4: Back Range (BROM) instrument before & after treatment for both groups (A & B)

ROMof flexion (degrees)	GroupA (Mean ±SD)	GroupB (Mean ±SD)	t-value	p-value
Pre-treatment	20.4± 2.53	19.13± 2.05	0,254	0.131
Post-treatment	28.06 ± 2.81	24.53± 2.35	0.135	0.001
% imp0rovement	37.54%	28.22%		
t-value	0.240	0.62		
p-value	0.0001*	0.0001*		

Back Range (BROM) instrument for assessment ROM of trunk extension before & after treatment for both groups (A & B):

Table 5: Back Range (BROM) instrument before and after treatment for both groups (A & B)

ROMofextension (degrees)	GroupA (Mean ±SD)	GroupB (Mean ±SD)	t-value	p-value
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Pre-treatment	8.16±1.74	6.06±1.55	0,282	0.242
Post-treatment	13.43±1.03	10.73±1.86	0.235	0.001
% improvement	87.56%	77.06%		
t-value	0.263	0.43		
p-value	0.0001*	0.0001*		

Isokinetic device for assessment of Peak torque of lumbar extensors before & after treatment for both groups (A & B):

Table 6: Isokinetic device for assessment of Peak torque of lumbar extensors before & after treatment for both groups (A & B):

DISCUSSION

exercise significantly reduces pain & improves

Peak torque of lumbar extensors	GroupA (Mean ±SD)	GroupB (Mean ±SD)	t-value	p-value
Pre-treatment	59.16±1.74	59.22±4.27	0,242	0.242
Post-treatment	65.43±1.03	63.22±4.25	0.265	0.001
% of change	10.59%	6.75%		
t-value	0.253	0.93		
p-value	0.0001*	0.0001*		

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Present research sought to determine how KT affected non-specific low back pain in terms of pain, muscle strength, & functional impairment. According to research's findings, pain & functional impairment significantly decreased within groups. However, interaction & group dynamics did not significantly improve. Additionally, outcomes showed that there had been no appreciable change in muscle strength in, within, or across groups.

Sarkar et al. (2018)¹⁹ evaluated efficacies of KT in participants with chronic mechanical low back pain to that of structured exercise regimen alone. Their research included 30 studied cases. At baseline, after the 2nd week, & after the fourth week of the intervention, functional impairment had been assessed by the ODI, lumbar spine range of motion by the Modified Schober's test, & pain severity by the VAS. After 4 weeks of intervention, there was improvement in both groups' functional impairment, range of motion, & pain severity. Therefore, KT combined with structured

function in CMLBP patients.

Kachanathu et al. (2014)²⁰ examined effectiveness of KT with conventional treatment for nonspecific low back pain. They enrolled 40 patients—40 male & female—in their research. Roland-Morris Disability Questionnaire, VAS, & modified Schober's test had been used to measure results for activities of daily living, pain intensity, & ranges of motion of trunk flexion & extension. Measures of discomfort, ADL, & trunk flexion & extension ROMs post-intervention varied significantly across each group. Comparatively, there had been no variations between groups in terms of measures of pain, ADL, & trunk flexion & extension ROMs after intervention. They came to conclusion that physical therapy programmes comprising abdominal muscle strengthening exercises & back, hamstring, & iliopsoas muscle stretching activities, with or without KT, were helpful in therapy of chronic low back pain.

Added et al. (2013)³ was to evaluate effectiveness of adding KT to



conventional physiotherapy that had been recommended by guidelines for treating studied cases with chronic nonspecific low back pain. At baseline, five weeks, three months, & 6 months after randomization, clinical results (pain intensity, disability, & overall perceived impact) had been recorded. findings of their research added fresh knowledge on value of KT in studied cases with chronic nonspecific low back pain as supplement to physiotherapy regimen recommended by guidelines.

Kelle et al. (2016)²¹ examined how KT application affected acute, non-specific low back pain. control group only received information & reassurance, whereas intervention group received information & reassurance plus KT. For total of 12 days, kinesio tape had been put to low back's most uncomfortable region. At baseline, following twelve-day intervention, & at 4-week follow-up, worst pain & level of disability had been evaluated. KT group's improvements had been noticeably better. KT group had pain relief more quickly & used less paracetamol. Even though KT group's pain intensity had greatly decreased by 4th week, there had been no variations in terms of impairment. They came to conclusion that KT significantly reduced pain & impairment, making it supplemental treatment for people with non-specific acute low back pain.

Li et al. (2019)²² wanted to investigate how KT affected those with persistent low back pain in terms of pain & impairment. Data sources: From their origin until February 13, 2018, PubMed, Embase, & Cochrane Central Register of Controlled Trials had been searched for English-language articles. Review techniques: most important search terms had been "kinesiotape" & "kinesiotaping" & "kinesiotape" (low back pain). Kinesiotape's impacts on pain & impairment had been researched. Since KT is simple to administer, it may be utilised for people with chronic low back pain in some situations, particularly if they are unable to receive other forms of physical treatment.

Luz Júnior et al. (2015)²³ assessed efficacy of KT in studied cases with nonspecific persistent low back pain to control group & placebo tape. Randomization was used to assign 60 individuals with persistent, non-specific low back pain to 1 of 3 groups. various kinds of tape were used by studied cases assigned to KT group & placebo group for total of forty eight hours. control group received no treatment at all. Disability & pain intensity had been results evaluated (assessed using eleven-point numerical rating scale) (measured by twenty-four-item Roland Morris Disability Questionnaire). results were measured by blinded assessor at beginning, two days, & 7 days following randomization. After 2 days, there had been no variation when comparing KT group to placebo group, however there had been variation among KT group and control group. There had been no variations found for other results. They came to conclusion that in studied cases with chronic low back pain, KT was no better than placebo.

Jung et al. (2021)²⁴ aimed to assess how KT & core stability exercises affected studied cases with lower back pain in terms of pain, stamina, & balance. For 8 weeks, all participants engaged in forty minutes of core stability exercises 5 times per week, & additional KT had been applied to lower backs. VAS had been used as primary result measure for pain intensity, & Biering Sorensen test & force plate had been used as supplementary result measures for trunk endurance & balance. This research discovered that performing core stability exercises was helpful in lowering pain & improving balance in individuals with LBP, & it showed that adding more KT enhanced these results.

Azab et al. (2020)²⁵ investigated whether use of KT could improve results of physical therapy in treating adolescents with haemophilia who have low back discomfort by reducing pain, enhancing muscle endurance, & increasing functional ability. 45 haemophiliac teenagers had been divided into 3 therapy groups at random; group KT used paraspinal coupled with 3 times per week exercise regimen for

3 consecutive months. Pre- & post-treatment assessments of lower back pain, back muscular endurance, & functional capacity. KTgroup experienced much less lower back discomfort than control group, but not as much as placebo group. Compared to placebo or control groups, KTgroup's back muscle endurance dramatically increased.

Xue et al. (2021)²⁶ evaluated effectiveness & safety of KT in therapy of low back pain throughout pregnancy. Methods: To gather RCTs on effectiveness of KT intervention on low back pain in pregnant women, databases such as PubMed, Web of Science, Cochrane Library, Scopus, Embase, WanfangData, CNKI, & VIP had been searched. database can only be retrieved between day it was created and April 2021. The meta-analysis had been carried out with RevMan 5.3. Kt intervention might considerably reduce low back pain & dysfunction when compared to control group.

CONCLUSION:

When treating individuals with non-specific low back pain, kinesio-taping is more effective than traditional physiotherapy alone.

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