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Therapeutic effects of Kinesio taping on pain and ADLs in the patients with mechanical low back pain

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ABSTRACT

Objective: *The aim of present study was to observe the therapeutic effects of kinesio taping on pain & ADLs in the patients with mechanical low back pain.*

Methods:*A total 30 patients with mechanical low back pain were included in the current study with age group between 25-55 years. All the patients received the treatment for three times per week for six weeks. Outcomes measures were assessed using visual analogue scale for pain, Ronald-Morris Questionnaires for ADLs and modified Schober's test for trunk flexion & extension ROM.*

Result: *There was significant decrease in pain severity& improvement in ADLs on VAS and RMDQ scores.*

Conclusion:*A physiotherapy program involving stretching exercises for back, hamsrings & iliopsoas muscles and strengthening exercises for trunk muscles with kinesio taping was effective in the management of mechanical low back pain.*

INRODUCTION :-

Low back pain (LBP) is an extremely common musculoskeletal problem, about 80% of people experience low back pain at some point in their life.[1] It is one of the major problem that lead to activity limitation, work absenteeism and significant impact on subject's physical, psychological and social functioning.[2] Prevalence of LBP in general population ranges from 12% to 33%, one year prevalence ranges from 22% to 65% and lifetime prevalence ranges from 11% to 84%.[3]

In India, approximately 35% of people suffer from chronic low back pain. Nachemson in 1976 defined LBP as acute, sub-acute or chronic episode which occur slowly or suddenly rather than sharp pain with or without radiating pain over buttock or slightly down the leg with concomitant movement restriction. The pain will be little less severe and continue for more than two months when progress to

chronic type. Approximately 85-90% LBP is due to mechanical causes and source of pain is the spine or its surrounding structures.[4]

Nonspecific low back pain is mechanical pain of musculoskeletal origin in which symptoms vary with the nature of physical activities. Nonspecific low back pain patient represents approximately 85% patients presenting to primary care facilities. Mechanical back pain manifests as pain, muscle tension or stiffness that is localized below costal margin and inferior gluteal fold and is not attributed to specific pathology with or without radiculopathy.[5] It is considered to be a self-limiting health problem. It is estimated that 85-90% of the patients with acute LBP recover within six weeks and only 10-20% of acute LBP progress to chronic one. Once LBP becomes chronic it can be a significant source of long term disability and consequently represents a high socioeconomic burden on health care systems in developed countries.[6]

The shift of low back pain from acute to chronic may occur due to various factors like obesity, low educational level, distress, depressive mind and occupational factors like job dissatisfaction, heavy lifting work and heavy duty which require prolonged sitting.

Commonly used conventional physiotherapy such as short wave diathermy, therapeutic ultrasound, transcutaneous electrical nerve stimulation, LASER therapy, lumbar traction and lumbar support have little or no evidence to support their use.[7] None of the above intervention can truly offer a solution to the problem of mechanical LBP.

Several types of tapes are available with different mode of action. A new approach for treatment of mechanical back pain is to support the affected area, relax the muscles and is referred to as Kinesio tape (KT). Unlike the conventional tape KT is thin and has elastic mechanical properties similar to skin to allow range of motion, KT was originally developed in Japan by Kase and Wallis and its use has increased suddenly. KT has multiple functions : 1) improvement of muscle function, 2) Activation of blood and lymph circulation, 3) gathering fascia to align the tissue in desired position, 4) deactivation of pain system by stimulating mechanoreceptors 5) supporting the function of joint by stimulating proprioceptors, &6) correcting the direction of movement and increasing stability.[8]

The main aim of present study was to observe the therapeutic efficacy of kinesio taping in the management of mechanical low back pain.

MATERIALS AND METHODS :-

SETTING :

The present study was conducted in the out patient physiotherapy department of university institute of health sciences CSJM university Kanpur.

SAMPLES:

A total number of 30 patients with mechanical low back pain diagnosed by the orthopaedician were referred to the UIHS out patient physiotherapy department of age group between 25-55 years. The inclusion criteria was a duration at least three months with no other pathological problems. Subjects were excluded if they had spinal pathologies like fractures, tumors, ankylosing spondylitis, nerve root compression (disc herniation, spondylolisthesis with radiculopathy, spinal stenosis etc.), prediagnosed cardiorespiratory diseases. Informed consent was taken from all the subjects who agreed to participate in the study.

STUDY DESIGN:-

The study design was a randomized, single blinded clinical trial with pre-test and pot-test design. Conventional physical therapy and kinesio taping was applied to all the subjects for study. The outcome measures were recorded before and after six weeks of treatment.

INSTRUMENTS:-

1)A visual analogue scale (VAS) was used to measure the intensity of pain on a continuous scale. It consists ofhorizontal straight line of 100 mm length;100 mm represents ‘worst pain’ whereas 0 mm represents ‘no pain’.[9]

2)To measure pain-free active trunk flexion and extension ROM modified Schober’s test was used. The modified Schober test was performed with the subject standing erect, knees extended, arms relaxed at the sides and body weight centered. Marks on the skin were made using a pen. The first mark was made at the

lumbosacral junction, as indicated by the posterior superior iliac spines; a second mark was made 10 cm above and a third mark was made 5cm below the lumbosacral junction. The subject was asked to bend forward as far as possible until the onset of the pain and the new distance between the second and third

marks was measured. Similarly, the distance between the superior and inferior marks was measured as the subject extended the spine as far as possible. The initial length (15 cm) was subtracted from the final length of trunk flexion to obtain the extent of trunk flexion, while the final length of trunk extension was subtracted from the initial length (15cm) to obtain the extent of trunk extension.

3)The Roland Morris Disability Questionnaire (RMDQ) is a dependable and valid instrument for assessing LBP disability.[10]The RMDQ consists of 24 items from the Sickness Impact Profile, adapted for LBP. There are no specific subscales. The questionnaire was scored by adding the number of 'yes' answers, varying from 0 (no disabilities) to 24(severe disabilities).

INTERVENTION:-

The patients who were diagnosed with mechanical low back pain by their orthopaedician or family physician referred to the department of physiotherapy of university institute of health sciences, CSJM University Kanpur.
During the treatment procedure patients performed stretching exercises for back, hamstrings and iliopsoas muscles and strengthening exercises for trunk flexors using KT. Four sets of stretching exercises, each involving 30 seconds hold and a 20 seconds rest period repeated for four times given three sessions per week over six weeks. One set strengthening exercises were performed consisting of 10 repetitions with 5 seconds hold, for three sessions per week over six weeks.

All the subjects were assessed for severity of pain, activities of daily living and ROM of trunk flexion and extension before and after the six weeks of treatment.

Kinesio taping technique:Cure-tape (tape concept Ltd.,Larnaca, Cyprus) was used in this study.The two I-Tapes were applied from the origin of the lumbar erector spinae (iliocostalis lumborum) to its insertion. The area to be treated was

cleaned, free of hair, grime and the tape was measured while the lumbar spine was flexed to the maximum. In the case of flexion disturbances, the patient was able to support himself/herself during flexion. The base of the tape was applied to the sacrum in the neutral position. The patient was asked to perform a maximum flexion of the spine and the paper backing of the tape was removed, except for the final 4 cm to 5 cm and the tape was used on one side paravertebrally in the direction of the cranium, under slight traction. Finally, the final 4 cm to 5 cm of the tape was applied without traction. The same procedure was then applied to the other side. The tape was rubbed by hand several times to warm the adhesive film to achieve adhesion.[11]

DATA ANALYSIS:-
Statistical analysis of data was performed using SPSS version 16. Means, SDs, t values and p values were determined from the collected data. Paired t test was done to compare pre and post measures following six weeks of treatment. $P<0.05$ was considered significant for all analysis.

RESULTS:-
Data were analyzed for 30 subjects participated in this study. All the subjects were received physiotherapy exercises (stretching and strengthening) using KT. There were substantial differences in pre and post measures of pain, ADLs and trunk flexion and extension range of motion after the treatment. There wassignificant improvement in pain severity on VAS.

Pre and post treatment scores pain (VAS) and activities of daily living (RMDQ)

VAS RMDQ

	Pre	Post	Pre	Post
Minimum				
Maximum				
Mean				
SD				

T value
P value

DISCUSSION:-

LBP is a main cause of disability in the present time and is the second most common cause for the individuals to seek medical help from a physician. The present study investigated that physical therapy intervention program along with KT was effective in the treatment of mechanical low back pain.

For mechanical LBP syndrome, exercise can be useful in a) improving back flexibility, strength and cardiovascular endurance ;b) reducing back pain intensity when it is performed regularly; c) reducing back pain-related disability in turn it may be used as a tool to mitigate excessive fear and concerns regarding back pain and alter stifling pain attitudes and beliefs.[12]

Kenzo Kase (2003) suggested that application of KT alleviates pain, facilitates lymphatic drainage by microscopically lifting the skin. KT creates a convolution in the skin that increases interstitial space. The results are that pressure and irritation are gradually taken off the neural and sensory receptors that help to alleviate pain. Pressure on the lymphatic system is also taken off so it allows draining more freely.[13] Another possible mechanism suggested by Kase et al.,(2003) that KT induce these changes which may be due to neural feedback received by the subjects, which may improve their ability to reduce the mechanical irritation of soft tissues when moving the lumbar spine.

A recent study conducted by Paloni et al. found that there is effect of a combination of exercises and kinesio taping. Our findings were reliable with the result of Paloni et al., who observed a greatly significant reduction in pain, measured on VAS after six weeks of treatment with KT in conjunction with exerciseprogram. It is hypothesized that KT applies pressure to the skin or stretch the skin and this applied external load may stimulate cutaneous mechanoreceptors and thus inhibit the pain by gate control theory. Melzack and Wall proposed gate control theory, which suggests that the spinal cord contains a neurological “gate” that either bock the pain signals or allow them to reach the brain.

In contrary to the study by Paoloni et al, we observed a highly significant decrease in disability, measured using the RMDQ, in the KT group. This reduction in disability could be recognized to the younger age subjects of the KT group (34.45 years) in our study, when compared to the age

group of the subjects (62 years) taken by Paoloni et al. It is also assumed that the skin will be lifted due to the flexibility of the tape, creating a wider space between

the skin and the muscle, leading to improvement of blood circulation and drainage of lymphatic fluids in the taped area, thereby intenselydecreasing pain, increasing ROM and improving ADL. An association between Proprioceptive deficits and LBP has been reported.Previous studies have suggested that KT may enhance Proprioceptive afferent feedback.[14]The improved trunk ROM may be due to increased recruitment in the motor units of the lumbar erector spinae muscles to perform the activity due to an increased Proprioceptive stimulus. Proprioception could be enhanced through increased cutaneous feedback supplied by KT. Applying pressure and stretching the skin at extremes of motion, similar to joint mechanoreceptors, can stimulate cutaneous mechanoreceptors and signal information of joint movement or joint position. When applied to mechanical LBP patients, KT leads to pain relief and lumbar muscle function stabilization after its application.

CONCLUSION:-

The results of this study conclude that patients with mechanical low back pain experienced significant decrease in pain, improvement in ADLs after receiving the treatment with Kinesio tape.

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