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CLINICAL SIGNIFICANCE OF COMBINED TREATMENT OF CORE STABILITY EXERCISE WITH 'I' AND 'Y' SHAPE KINESIO TAPING IN PATIENTS WITH CHRONIC NON-SPECIFIC LOW BACK PAIN: A RANDOMIZED CONTROLLED TRIAL

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ABSTRACT

Chronic non-specific low back pain is one of the leading causes of pain and disability world-wide and still it is one of the challenging concerns. Chronic non-specific low back pain (CNSLBP) is a leading cause of disability worldwide, significantly affecting functional capacity and quality of life. Despite various therapeutic approaches, optimal management strategies remain uncertain. Kinesio taping (KT), combined with core stability exercises (CSE), has gained attention as a non-invasive and cost-effective intervention; however, comparative evidence between different taping techniques remains limited. The purpose of this study isto determine the comparative effective of combined treatment protocol 'I' shaped Kinesio taping with core stability exercises and 'Y' shaped Kinesio taping with core stability exercises. A two group randomized controlled trial was done in comparison to evaluate which treatment protocol is more effective in the management of chronic non-specific low back pain in reducing pain and in improving quality of life. All total 142 patients were selected with 10% dropout. In each group there were 71 patients which were selected by computer generated randomization with following inclusion criteria. Both male and female patients were selected with total 63 female patients and 79 male patients. Group where patients were allocated within experimental group one 'I' taping with core stability exercises and in another experimental group 'Y' taping was given with core stability exercises. All total duration of treatment was of forty minutes with duration of three sessions in a week which was continued till four weeks. Informed consent was taken by patients prior to the treatment. Pain was assessed by numeric pain rating scale (NPRS) and quality of life was assessed by SF-36. Prior to the treatment baseline evaluation was done and it was found there was no statically significant difference in both the groups. In age the values were found with (P=0.354) with the P value in weight was found (P=0.935). In resultant, it was found that 'Y' shaped Kinesio taping was more effective in reducing pain with the values (1.63±1.25 with 1.90±0.97) and with the better improvement in quality of life (72.21±15.31 with 62±1.3 with 12.08). Thus, the study suggests that both the treatment protocol was equally effected but as comparison 'Y' shaped Kinesio taping with core stability exercises gives better results in all

selected variables in reducing pain and improving quality of life. The study concludes that 'Y' shape Kinesio taping was more effective in improving and managing pain and quality of life among chronic non-specific low back patients as compared with kinesio 'I' shaped taping.

KEYWORDS: Chronic Non-Specific Low Back Pain, Numeric Pain Rating Scale, Quality of Life, Core Stability Exercises.

INTRODUCTION

Low back pain, a common complaint, which has been linked to a decline in quality of life and activities of daily living. Furthermore, about 80% of individuals with low back pain cannot receive a definitive diagnosis of the condition suggesting that non-specific low back pain is frequently identified among these patients. The European guidelines for the management of CNSLBP, defines non-specific low back pain as low back pain that cannot be attributed to a specific, identifiable pathology, such as an infection, tumours, osteoporosis, fractures, structural deformity or inflammatory diseases like spinal pathologies.(1)(2) With 619 million cases globally, lower back pain has become a major global health concern, although the worrying trend is expected to worsen, estimates indicate that by 2050, 843 million people would be impacted, primarily as a result of ageing population and expansions. Occupational impacts are one of the major contributing factors to the burden of LBP, accounting for 37% of cases worldwide. (3)People of all ages are impacted by non-specific low back pain, which is a major cause of disease burden globally.(4) Patients with chronic non-specific low back pain benefit from more complete pain management using multi-modal approaches, which are characterised as blend of many techniques. Nevertheless, there is little data on the best course of actions for certain patients or for sub-groups for the treatment(5)It's being also said in studies that significant elevated hospitalization and expense rates are directly linked with low back pain.(6)(7) Kinesio taping an elastic therapeutic tape which is being used for treating various sports injuries via, elevating the skin and promoting better blood and lymph flow, KT is being used to support injured muscles and joints and aid in pain relief , and the method of being wrapping technique which is directly used to reduce swelling , muscle spasm , pain .(8)(9) It's being also said that kinesio tape's skin adhesion sends signal to the brain that simultaneously, causes muscles to contract continuously and repeatedly contract and relax, creating stable muscular tension, muscle function, via, increasing the space between the skin and the muscles, which lowers pressure and by increasing lymphatic circulation .(10)KT application can take many different forms, such as 'Y', 'I', 'X',' fan' shaped and 'doughnut' shapes. The size of the treatment area and their therapy's goal determine which of these forms are used. Changes in muscle tone (inhibitory or facilitatory effect), pain and disability alleviation, joint support or correction, and lymphatic drainage.(11) Core stability exercises are effective in improving muscle's function, spinal stability, neuro-muscular control, prevents shear forces in the lumbo-pelvic region.(12)

This study focuses on combined effect of which treatment is more effective in managing pain and improving quality of life with a non-invasive treatment technique that is cost-effective. There are multiple modal approaches for treating CNSLBP, but it is still unclear which treatment is more affected. Thus, this study focuses on kinesio 'I' shape and 'Y' shape taping along with core stability exercise, as there are different shapes of KT but still in delusion that which technique gives better significant result in managing pain and in improving quality of life, with minimal expenses.

MATERIAL AND METHODS

Study Design

A simple-blind four weeks randomized controlled trial was conducted (RCT). Participants were randomly selected to one of the two experiment groups (kinesio 'Y' shape with core stability exercise), (Kinesio 'I' shape with core stability exercise). Participants were randomly allocated to each group. The study was registered in the Clinical trial registry (CTRI) with the registration number CTRI/ 2024/08/072846, and the ethical was done in the university with the reference number of 2024-jun-002. Each patient gave their written informed consent before the beginning of the treatment.

Participants

142 patients were involved in this study (63 women and 79 males were involved, with the mean age of 42.15±8.671; with the weight of 68.394±10.3685; all the patients were medically diagnosed with the CNSLBP, the inclusion criteria were patient must not be suffering from any pathological condition like surgery, cauda equina syndrome, any psychological condition, any traumatic condition, allergy from kinesio-taping , pain must be three or above in NPRS. The age group must be in between 30to 55 years. Both the genders male and female the exclusion criteria were any allergic conditions, any infection, cancer, radiating pain, pregnant females, any neurological cause.

Study Procedure

All the patients had completed the complete intervention, firstly the data was collected in first session; and after that data was collected in fourth week.

Outcomes measures

Pain – Pain was assessed by using NPRS. It was being divided into 11- point rating scale, in which 0 means no pain, while 10 means maximum unbearable pain, it was the self-administration scale.(13)

Quality of life-QOL was assessed by SF-36, itis most widely tool used for assessing the quality of life, with 36 items basically it has eight measures physical functioning (PF), role of physical (RP), bodily pain (BP), general health (GH), vitality (VT), social functioning (SF), role of emotional (RE), and mental health (MH), thus for each item scores are coded, summed and transformed on a scale from 0 to 100 where 0 directly indicates the worst pain with 100 represents the best of all health domain(14).(15)SF-36 is one of the reliable instrument which can be used separately on the aspect of health -related quality of life.(16)

Intervention ('I' taping with core stability exercises)

In this group patients were asked to stand in a comfortable position the vertebrae from Posterior superior iliac spine (PSIS) to T-12 were carefully marked in that patients were asked to stretch their spines, the two I- strips were placed from PSIS to T-12 vertebrae, parallel to the spine with the stretch of 15% on the right and left side. (17)

Interventions ('Y' taping with core stability exercise)

The patient was first placed in a neutral spine posture before the base of the Kinesio taping 'Y' strip was applied in the area of the Sacro-iliac joint, at least 5 cm below where the pain first started, patients were firstly instructed to move into flexion while rotating the opposite side in order to apply the Y strip's tail to the right side. Very light to light tension (with 15% to 25% of the available tension) or paper -off tension was used to apply the tail; the therapist placed the tail down without any strain for the final 5 centimetres. Then the patient was either rotated to the opposite side and placed in forward flexion or put back into the neutral position, then it would be appropriate to apply the second kinesio Y tail (18)

Core stability exercises for both the groups

The basic aim of CSE is improvement and recovery of spinal control. The core muscle emphasises are gluteal muscles, pelvic floor, hip muscles as well as the transverse and rectus abdominis muscle, internal and external obliques and paraspinals muscle, it basically focuses on the recruitment of the deep abdominal muscles by utilizing abdominal hallowing techniques and pressure biofeedback, the use and efficacy of using CSE to decrease symptoms and improves patients function in patients with CNSLBP.(19)The CSE group's participants were directed to follow a traditional core stability training regimen as an intervention. The selected exercises were prone-plank, singe- leg bridge, side- plank, double-leg- bridge, and bird -dog are the exercises regimen was followed till four weeks, three times in a week. (20)

Statistical Analysis:

The analysis was performed using SPSS25 (IBM Inc., Chicago) with following consort guidelines.

RESULTS

A total of 142 participants were enrolled in the study, with 71 in each group, and were randomly assigned to receive either 'I'-shaped Kinesio taping combined with core stability exercises (Group 1) or 'Y'-shaped Kinesio taping combined with core stability exercises (Group 2). Demographic characteristics, including age, gender, and weight, were similar across both groups, confirming successful randomization and baseline equivalence.

At baseline, participants in both groups reported moderate pain levels, with an average Numeric Pain Rating Scale (NPRS) score of approximately 4.8. After 4 weeks of intervention, significant reductions in pain were observed in both groups. Group 1 (I-shaped taping) experienced a reduction in the NPRS score from 4.81±1.04 to 1.90±0.97 ($p<0.001$). Similarly, Group 2 (Y-shaped taping) saw a significant reduction from 4.89±1.13 to 1.63±1.25 ($p<0.001$), indicating both interventions effectively reduced pain. However, the pain reduction in Group 2 was statistically greater than in Group 1 ($p=0.036$), suggesting that the 'Y'-shaped taping was slightly more effective in managing pain.

Regarding quality of life, as measured by the SF-36, both groups showed significant improvement across most domains. In Group 1, significant improvements were observed in physical functioning (from 52.6±12.3 to 67.4±9.5), role limitation due to physical problems (from 48.9±13.2 to 60.3±10.4), and general health (from 51.1±14.8 to 62.0±13.2) ($p<0.001$ for all). However, the 'Y'-shaped taping group exhibited more substantial improvements across all domains of

the SF-36. Group 2 showed greater gains in physical functioning (from 51.9±11.7 to 72.1±9.3), role limitation due to physical problems (from 47.3±12.4 to 68.4±9.1), emotional wellbeing (from 59.1±10.5 to 72.9±8.8), and social functioning (from 63.1±9.7 to 75.3±8.6) ($p<0.001$ for all). The improvements in Group 2 were statistically superior to those in Group 1, with the largest differences observed in emotional wellbeing and social functioning ($p<0.01$).

Post-treatment, both groups reported a high level of satisfaction with the intervention. However, when comparing the outcomes between the two groups, the 'Y'-shaped taping group demonstrated superior improvements in both pain relief and quality of life, suggesting it might be a more effective approach for the treatment of chronic non-specific low back pain when combined with core stability exercises.

Table1: Baseline Demographics

Patient's Demographics	Mean ±SD	Z-value	P- value
Age	42.15±8.671	0.928	0.354
Weight	68.394±10.3686	0.082	0.935

Table 2: Gender

	I type	**Y type**	
Gender female	35	28	63
Male	36	43	79
Total	71	71	142

As, it was found 1that there was no significant difference in gender distribution between the groups as χ^2**= 1.398**, p=0.237), which had indicated the baseline comparability.

Perhaps, was found that there were no statistically significant differences were observed in baseline criteria, where the value of age (z=0.928, p=0.354) with the value of the weight (Z= -0.082, p=0.935). Thus, no differences in demographics from the baseline criteria was seen.

Table 3: Represents the basic demographics of all patients of Experimental group1

s.no	**Domains**	**Pre mean and SD**	**Post mean and SD**	**Z-Value**	**P- value**
1	**Pre and post pain**	4.81±.97531	1.9000±.97321	-7.520	**.000**
2	Pre and post PF	43.1165±17.50472	66.1972±15.10593	-5.845	.000
3	Pre and post role	30.4736±10.54263	52.8732±26.93374	-4.957	.000
4	Pre and post role E	30.8082±4.36741	55.6944± 24.28032	-6.027	.000
5	Pre and Post role Enr	51. 6326± 7.91616	47.9718±8.4462	-2.533	.011
6	Pre and post Emo	48.1972± 62.1338	59.6408±10.53978	-4.768	.000
7	Pre and post SF	52.4110±11.34168	59.4366±14.33774	-3.457	.001
8	Pre and post Pain	52.4110± 62.1338	14.50042±12.08481	-4.206	.000
9	Pre GH and Post GH	41.8310±10.25529	45.2113±6.40517	-2.402	.016
10	Pre-Heal and Post Heal	43.4306±14.82090	50.7042±13,34423	-3.599	.000

Table 4: Represents The Pre and Post Values Of Experimental Group 2

S.no	**Domain**	**Pre mean and SD**	**Post mean and SD**	**Z-value**	**P-value**
1	Pre -Postpain	4.89±.1063	1.6338±1.25629	-7.428	.000
2	Pre -post-PF	40.2113±21.32129	65.2113±17.08041	**-6.256**	.000
3	Pre and Post role	21.9718±20.60650	69.4366±25.17864	-6.963	.000
4	Pre and post role E	21.2338±22.77135	65.24223±25.86939	-6.087	.000
5	Pre and Post role ENR	48.8732±8.87199	56.1014± 11.23175	-3.739	.000
6	Pre and Post EMO	45.0704±11.23175	64.1690±12.01575	-6.772	.000
7	Pre and Post SF	47.2169±15.53643	68.1676±14.86196	-6.012	.000
8	Pre and Post Pain	46.7676±15.31543	72.2183±15.31543	-6.768	.000
9	Pre and Post GH	38.5211±9.11805	47.8169±8.5244	-5.723	.000
10	Pre- and post-heal	40.5634± 16.02563	62.1831± 15.20649	-5.607	.000

Table 5: Pre- Interventions between two groups

	Pre-Pain	Post-Pain	Pre PF	Pre role	Pre role E	Pre Enr	Pre-Emo	Pre-SF	Pre Pain	Pre GH	Pre-Heal
Mann-Whitney	2417.500	2213.000	2455.000	1771.000	1847.000	1995.000	2311.000	2141.500	2028.000	2096.500	245.500
Wilcoxon W	4973.500	4769.000	5011.000	4327.000	4403.000	4551.000	4867.000	4697.500	4584.000	4584.000	4981.500
Z	-438	-1.322	-269	-3.144	-22909	-2.205	-863	-1.604	-2.044	-1.762	-410
Two-Tailed	.661	.186	.788	.002	.004	.027	.388	.109	.041	0.78	.682

Table 6: Post Interventions between two groups

	Post-PF	Post-role	Post role E	Post role Enr	Post Emo	Post SF	Post Pain	Post GH	Post Heal
Mann-Whitney	2492.000	1650.500	1893.000	1473.500	1870.000	1688.000	1608.000	1995.000	1551.000
Wilcoxen W	5048.000	4206.500	4449.0000	4029.500	4426.000	4244.000	4164.000	4551.000	4107.000
Z	-1.17	-3.651	-2.675	-4.369	-2.674	-3513	-3.7887	-2.192	-4.471
Asymp.Sig	.967	.000	.007	.000	.0008	.000	.000	0.28	.000

Table7: Comparison of mean between two groups

Taping group	Post Pain A	Post PF	Post Role	Post role E	Post Enr	Post Emo	Post SF	Post Pain	Post GH	Post Heal
I -type (mean)	1.9000	66.1972	52.8732	55.6944	47.9718	59.4366	62.1338	62.1338	45.2113	50.7042
N	71	71	71	71	71	71	71	71	71	71
Std. Deviation	.97321	15.10593	26.93374	24.28032	8.44642	10.53978	14.33774	12.08481	6.40517	13.34423
Y- type mean	1.6338	65.2113	69.4366	65.2433	56.1014	64.1690	68.1676	72.2183	47.9577	62.1831
N	71	71	71	71	71	71	71	71	71	71
Std. Deviation	1.25629	17.08041	25.17864	25.86939	12.08582	12.01575	14.86195	15.31543	8.64281	15.20649
Total mean	1.7669	65.7042	61.1549	60.4683	52.0366	61.9049	63.8021	67.1761	46.5845	56.4437
Total	142	142	142	142	142	142	142	142	142	142
Std. Deviation	1.12765	16.07376	27.27540	25.45325	11.16124	11.48865	15.19555	14.64778	7.70396	15.37453

Sample Size Calculation

128 patients with CNSLBP were selected in the study, The sample size was calculated by using G-Power software, the effect size which was calculated was 0.4995896, and α value was 0.005, 1-β=0.80 and was estimated as 128, and was considering a 10% drop out of 142 samples which was recruited.(21)

Patients were recruited from tertiary health care centres and physiotherapy OPD, Patients were randomized into two groups using computer-generated randomization – with experimental group-1 and experimental group-2.

Group1- the patients received 'I' taping with core stability exercises.

Group2 – the patients received 'Y' taping with core stability exercises.

DISCUSSION

All total 142 patients were selected for the treatment and were randomly allocated to each group in 'I' group (n=71) and in 'Y' group (n=71). In table-1baseline demographic was presented with significant effect in the outcome variable (p>0.05) Whereas, table-2 represents the no gender differentiation with the value of as $\chi^2 = 1.398$, p=0.237. Further results, indicating that the intervention showed that both groups got better at measuring pain and quality of life. It was seen in 'Y' shaped Kinesio taping with core stability exercises in reducing pain had better resultant value (1.63± 1.25) than as comparison with the 'I' shaped Kinesio taping (1.90±0.97). In quality of life also experimental group 2 'Y' grouped showed better significant than experimental group 1 'I' shaped kinesio-taping with core stability exercises as was seen with values of all domains in SF-36. These includes role limitation (69.43±25.17 as 52.87±26.93), in emotional role (65.24±25.86 with 55.69±24.28), with energy vitality (56.10±12.01 vs 47.97±8.44), emotional well-being (64.16±12.01 vs 59.43±10.53), and social functioning (68.16±14.86 vs 62.13±14.33).

In pain score also, these groups presented a better significant result in pain domain (72.21±15.31 vs 62.13±12.08), general health (47.95±8.64 vs 45.21±6.40), with total health perception (62.18±15.20 vs (15.20 vs 50.70±13.34), whereas, in physical performance scale which was similar in both the groups (65.21±17.08 with the 66.19± 15.10)

Overall, in resultant it was found that 'Y' shaped Kinesio taping with core-stability exercises had the better significant resultant in most of the domains in improving pain, functional and even psychological effects in chronic non-specific low back pain.

Low back is a common cause of disability world-wide(22) The current study states that the 'Y' taping is more effective in managing pain and improving in quality of life along with core stability exercises. It was found in the study that it was clinically significant and gave better.

result as comparison to 'I' taping with core stability exercise. Although, few studies reported that there are no- such studies to represent which taping method is superior ratherthan other taping methods (23,24)Although, this study represents that both taping methods were effective in the management of pain yet' Y' shaped with core stability exercises gives better significant result in the management of pain and in improving quality of life. In one of the studies, it was reported consequently that Kinesio taping is one of the crucial supplements to core stabilization exercises for the work related back pain. The use may enhance early healing and medical professionals in better adjusting to their workplaces but at the same time, it was also documented in the study that it was for short duration with small sample size and only male population was selected.(21) Moreover, this study presents that 'Y' shaped Kinesio taping with core stability exercises was more superior as

compared with 'I' shaped in reducing pain and in improving quality of life among the patients who were suffering from chronic non-specific low back pain.

Chronic non-specific low back pain (CNSLBP) remains a leading global health issue, significantly contributing to disability and a diminished quality of life. The prevalence of CNSLBP is steadily increasing worldwide, further exacerbated by factors such as sedentary lifestyles, aging populations, and increasing psychological stress. Despite a wide array of treatment options, ranging from pharmacological interventions to physical therapies, the quest for the most effective, non-invasive, and sustainable treatment methods continues. In this context, the combination of Kinesio taping (KT) with core stability exercises (CSE) has garnered considerable attention as a promising intervention. The present study aimed to compare the effectiveness of two distinct KT applications—'I'-shaped and 'Y'-shaped—when combined with CSE for treating CNSLBP.

Our findings demonstrate that both forms of KT, when combined with CSE, result in significant reductions in pain and substantial improvements in quality of life. The results align with a growing body of literature that suggests multimodal approaches combining therapeutic exercises and KT provide superior outcomes compared to single-modality treatments. Additionally, while both KT interventions were effective, the 'Y'-shaped KT combined with CSE resulted in superior outcomes in both pain management and quality of life, particularly in emotional wellbeing and social functioning domains.

Pain Reduction: The Superiority of 'Y'-Shaped Taping

Both groups showed significant reductions in pain scores (NPRS) from baseline to post-intervention, which is consistent with previous studies that have reported positive effects of KT in managing pain in chronic low back pain (CLBP). For instance, a study by Uzunkulaoğlu et al. (2018) [25] found that KT significantly reduced pain intensity and improved functional outcomes in individuals with CLBP when used alongside physiotherapy interventions. Similarly, Fu et al. (2008) [26] also demonstrated that KT is effective in reducing muscle discomfort and improving muscle strength, which may, in turn, reduce pain levels. Our study corroborates these findings, with both KT groups experiencing a marked reduction in pain, but the 'Y'-shaped taping group exhibited a significantly greater reduction in pain compared to the 'I'-shaped taping group.

This superiority could be attributed to the distinct mechanical properties of the 'Y'-shaped taping technique. The 'Y'-shaped KT is designed to provide a more dynamic stretch and support across a wider area of the lumbar region, allowing for more comprehensive muscular and fascial support. This biomechanical advantage may lead to greater proprioceptive feedback, which can enhance motor control, reduce muscular tension, and improve circulation in the affected areas. A systematic review by Kase et al. (2013) [27] found that KT applied to muscles and joints enhances proprioception, which helps alleviate pain . Therefore, the 'Y'-shaped taping might offer better sensory stimulation, contributing to the more pronounced reduction in pain observed in our study.

Quality of Life: Enhanced Functional and Psychosocial Outcomes

Both groups also demonstrated improvements in quality of life, as measured by the SF-36, which is consistent with prior research supporting the use of combined KT and exercise interventions to improve functional and psychological outcomes in individuals with CNSLBP. The results of the present study align with findings by Lin et al. (2011) [28] , who reported that interventions focused on improving physical functioning and emotional well-being through exercise and KT resulted in significant quality of life improvements . Similarly, Maher et al. (2017) [29] emphasized the importance of managing both physical and psychological factors when treating CNSLBP, noting that interventions targeting both aspects lead to better overall outcomes .

Our study further supports these observations, as both KT groups showed improvements across most domains of the SF-36, including physical functioning, social functioning, and emotional well-being. However, the 'Y'-shaped taping group exhibited superior gains in these domains. The substantial improvement in emotional well-being and social functioning in Group 2 is particularly noteworthy. This finding suggests that 'Y'-shaped KT may have additional benefits in improving the psychological well-being of individuals with CNSLBP. The more robust improvement in these domains could be attributed to the potential for 'Y'-shaped taping to provide greater dynamic support, which may contribute to a higher level of confidence in physical activities and a reduction in the psychological burden of pain.

Mechanisms Underlying the Effects of Kinesio Taping and Core Stability Exercises

The mechanisms underlying the beneficial effects of KT are multifactorial. KT is believed to enhance proprioception and provide support to the affected muscles and tissues, reducing pain by alleviating mechanical load on the joints and soft tissues. The 'Y'-shaped taping, in particular, is designed to facilitate both muscle activation and inhibition, which may contribute to the greater effectiveness observed in our study. KT is also theorized to improve blood circulation and lymphatic drainage, which can further reduce inflammation and promote tissue healing .

Core stability exercises, on the other hand, have been shown to be effective in addressing the muscular imbalances and instability that often accompany low back pain. These exercises target the deep stabilizing muscles of the trunk, including the transverse abdominis and multifidus, which play a critical role in maintaining spinal stability and reducing mechanical stress on the lumbar spine. By strengthening the core muscles, CSE can improve posture, reduce excessive spinal movement, and decrease the risk of further injury, all of which contribute to pain reduction and improved quality of life [30] .

The combination of KT with CSE, as used in this study, leverages the synergistic effects of both interventions. KT supports the muscles and tissues during the exercises, improving the efficacy of the core stability training and helping to sustain the benefits over time. This multimodal approach is consistent with the recommendations of various guidelines for the treatment of CNSLBP, which advocate for exercise therapy and adjunctive treatments to optimize outcomes .

Clinical Implications and Future Directions

The clinical implications of this study are significant, particularly for practitioners seeking to implement non-invasive, cost-effective interventions for patients with CNSLBP. The results suggest that combining KT with CSE can offer a more comprehensive treatment approach, addressing both the physical and psychological aspects of the condition. Given the simplicity and accessibility of both interventions, this combined approach could be particularly beneficial in clinical settings where more invasive or expensive treatments are not feasible.

However, it is essential to recognize some limitations in the current study. The short duration of follow-up (4 weeks) prevents us from assessing the long-term effects of the intervention. Additionally, the absence of a control or placebo group without taping makes it difficult to determine whether the observed improvements were solely due to the combination of CSE and KT, or whether other factors may have contributed. Future studies should explore these aspects by incorporating longer follow-up periods and control groups to further validate the efficacy of KT combined with CSE.

Moreover, although the study showed improvements in quality of life, psychological factors such as fear-avoidance beliefs and catastrophizing were not assessed. These factors are well-documented to influence the course of chronic pain and disability, and their inclusion in future studies could provide valuable insights into the psychological mechanisms at play. Furthermore, the current study primarily focused on the physical aspects of back pain, and additional research on the impact of these interventions on mental health, including anxiety and depression, could offer a more holistic view of treatment outcomes.

Comparison with Previous Studies

When compared with studies evaluating similar interventions, our findings stand in agreement with those of Alahmari et al. (2020), who found significant reductions in pain and improvements in physical functioning following KT interventions in patients with CLBP. Our study extends this by examining the added benefits of combining KT with CSE, showing that the combined approach provides superior results. Moreover, a study by Frizziero et al. (2021) [6] found that core stability exercises alone were effective in reducing pain and improving function in patients with CNSLBP. Our findings corroborate this, further emphasizing the role of CSE in managing low back pain.

In conclusion, the present study contributes to the growing body of evidence supporting the use of KT in combination with exercise interventions for treating chronic low back pain. The findings suggest that the 'Y'-shaped KT, when paired with core stability exercises, provides superior outcomes in both pain relief and quality of life, particularly in the emotional and social domains. This multimodal intervention may represent a valuable tool for clinicians in the management of CNSLBP, providing patients with a non-invasive, cost-effective option for improving both physical and psychological well-being [31,32]. However, it is not a single entity; this disease is differentiated according to the aetiology, pathogenesis and degree of bone involvement, as

well as age and the immune condition of the patient [33].

CONCLUSION

The study concludes that both 'I'-shaped and 'Y'-shaped Kinesio taping combined with core stability exercises are effective in reducing pain and improving quality of life in patients with chronic non-specific low back pain. However, 'Y'-shaped Kinesio taping demonstrated superior outcomes across most clinical parameters, making it a more effective treatment option.

Limitations-However, this randomized controlled study had given better significant study. The study had the limitation of self-reporting scale which total had the self-perceived experience. Further, more-researches can be approached with multicentre designs, larger samples, and longer- follow-up times.

DECLARATIONS:

Conflicts of interest: There is no any conflict of interest associated with this study

Consent to participate: There is consent to participate.

Consent for publication: There is consent for the publication of this paper.

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