



Original Article

Comparison of Kinesio-Tapping and Endurance Training in Improving Quality of Life in Knee Osteoarthritis

Irum Nosheen¹, Shumaila Tahreem², Aroosha Akbar², Sairish Sairien^{3*}, Kiran Haq⁴ and Muhammad Talha⁵

¹Railway General Hospital, Islamabad, Pakistan

²Northwest Institute of Health Sciences, Peshawar, Pakistan

³Institute of Rehabilitation Sciences, Shaheed Zulfiqar Ali Bhutto Medical University, Islamabad, Pakistan

⁴Rawal Institute of Health Sciences, Islamabad, Pakistan

⁵Holy Family Hospital, Rawalpindi, Pakistan

ARTICLE INFO

Key Words:

Osteoarthritis, Kinesio Tape (KT), Endurance Training(ET), Quality of Life

How to Cite:

Nosheen, I. ., Tahreem, S. ., Akbar, A. ., Sairien, S. ., Haq, K. ., & Talha, M. . (2023). Comparison of Kinesio-Tapping and Endurance Training in Improving Quality of Life in Knee Osteoarthritis: Kinesio-Tapping and Endurance Training in Improving Quality of Life. *Pakistan Journal of Health Sciences*, 4(06). <https://doi.org/10.54393/pjhs.v4i06.893>

***Corresponding Author:**

Sairish Sairien

Institute of Rehabilitation Sciences, Shaheed Zulfiqar Ali Bhutto Medical University, Islamabad, Pakistan

Sehariraja9@gmail.com

Received Date: 1st June, 2023

Acceptance Date: 24th June, 2023

Published Date: 30th June, 2023

ABSTRACT

Osteoarthritis is the most debilitating condition more commonly effecting the knee of its sufferers. **Objective:** To compare the effects of Kinesio Tape and endurance training in improving the quality of life of knee OA. **Methods:** This was a single blinded randomized control trail (RCT) in which 30 participants were included between age of 40-70 years who had OA of grade II-IV (K & L grade) and had no serious comorbidity. Simple convenient sampling technique was used for recruitment of participants. Two equal groups were made (n=15 each). Group A participants was incorporated endurance training at a rate of 2x/week for 4 weeks by use of therapeutic band along with conventional therapy and group B was given Kinesio-tape 2 session/ week for 4 weeks in combination with conventional therapy. Data were collected at baseline and after 4 weeks of intervention by use of NPRS and Sf-36 quality of life questionnaire. Man Whitney U test was performed for between groups analysis by use of SPSS version 21.0. Level of significance was kept $p < 0.05$. **Results:** The mean age of participants in group A was 54.30 with standard deviation (SD) of 5.61 whereas of group B Mean \pm SD of age was 53.45 \pm 7.73. There was no significant difference between groups as $p > 0.05$. **Conclusions:** It was concluded from this study that both techniques are equally effective in improving the quality of life in knee osteoarthritis sufferers.

INTRODUCTION

Osteoarthritis is a debilitating arthritic condition of joints, more precisely defined as the disease of synovial joints with involvement of articular cartilage, SM (synovial membrane) along with subchondral bone degeneration [1, 2]. Activities of daily livings are most commonly affected as OA sufferers experience pain while movements such as sitting to standing, walking, stairs climbing [3]. As the knee joint bears most of the weight of human body while doing functional activities, it is the most susceptible joint of the body affected by OA [4]. In 2010, it was reported that more

than 250 million individuals are affected by knee OA worldwide which constitutes 3.6% of the population of world and it was supposed that in year 2020 OA will become the fourth leading cause of disability [5, 6]. The exact treatment with respect to the stage of OA is not confirmed yet. Due to this reason today's intervention are carried out to alleviate the pain and manage the symptoms of OA sufferers [7]. At present various interventions are available in literature for the treatment of OA such as pharmacological, non-pharmacological as well as surgical

[8]. In pharmacological intervention various NSAIDs, muscle relaxants and opioids are the main drugs which are prescribed while in non-pharmacological intervention physiotherapy is the main option for the management of OA [9]. In surgical interventions many techniques are available which depends on the stage of OA, choice of surgeon e.g. total knee replacement or arthroplasty, hemi-arthroplasty and joint resurfacing etc. [10]. In Physiotherapy various modalities are used as an adjunct therapy to exercises for the pain management and in improving the quality of life of osteoarthritis sufferers. In modalities, interferential currents, ultrasonic therapy, SWD and low laser therapy are the most suitable options. While in exercises, strength training, stretches of short muscles, endurance training and joints mobilizations are used [11]. In 1979, a scientist name kanzo kase developed an elastic cotton made tape and used it for therapeutic purposes. KT is made up of non-allergic material and is a waterproof tape which can be used for up to 5 days on the required region of body. kinesio- tape intervention has found to be very beneficial for the pain management is a technique in which a stretchable tape is applied on the weaker muscles which stimulates or facilitates those muscles and also stabilizes the joint where applied. It reduces the pain symptoms and helps in gaining the pain free ranges of motion to greater extent [12, 13]. Endurance training is used to increase the ability of muscles to perform their action at their maximum without any exhaustion. In such training repetition of exercises are done at maximum rate with the use of minimum weight. This training intervention was developed by Saeed Alshahrani et al. By use of endurance training the work efficiency of training muscle is enhanced which in turn reduce the joint loading as a result of which patient's level of pain is diminished to a greater extent and their function ability enhances along with quality of life [14]. Purpose of current study was to compare the efficacy of Kinesio-tape and endurance training for improving the quality of life of OA sufferers.

METHODS

Current RCT (Randomized Control Trail) was commenced after taking approval from the REC of The Neurocounsel Clinic, Islamabad. 30 participants were recruited in this Randomized clinical trial. The technique used for sampling was simple convenient sampling. Duration of this RCT was 3 months from March 07, 2023 to June 06, 2023. Following participants were included in this research; a) 40-70 years old, b) OA of stage II-IV, c) both genders, d) no other serious comorbidity, e) pain ranges from 4-8 on NPRS scale. And following participants were excluded from this study; a) tumors, b) CVA previously. C) Parkinson disease patients, d) NRPS range 9-10. Two equal groups were made by use of

lottery methods. Group A participants was incorporated endurance training at a rate of 2x/week for 4 weeks by use of therapeutic band in combination with conventional therapy (10-minute inferential therapy plus isometric exercises) and group B was given Kinesio-tape 2 session/ week for 4 weeks plus conventional therapy (10-minute inferential therapy plus isometric exercises). Data were collected at baseline and after 4 weeks of intervention by use of NPRS and Sf-36 quality of life questionnaire. SPSS version 21 was used for data analysis. Normality of data were checked by the use of Shapiro Wilk test. As it was $p < 0.05$ which revealed that our data were non normally distributed so, we employed non-parametric test for data analysis. Descriptive statistics was illustrated in the form of mean, standard deviation an in the form of frequencies as well as percentages. And for inferential statistics illustration median, interquartile ranges (IQR), U, F & p-values were employed. Mann Whitney U test was employed for between groups analysis. The level of significance was set $p < 0.05$ and CI=95%.

RESULTS

Total 30 patients who were suffering from knee OA included in this study. The participants were randomized into two equal groups $n=15$ each. The Mean \pm SD of age of participants in group A was 54.30 ± 5.61 whereas of group B Mean \pm SD of age was 53.45 ± 7.73 (Table 1).

Table 1: Descriptive statistics of Age

Age	Mean \pm SD+
Group A	54.30 \pm 5.61
Group B	53.45 \pm 7.73

The frequency of participants in group A with age 40-55 was 11(36.67%) and between age 56-70 it was 19(63.33%). While in group B the frequency of patients between age 40-55 and 56-70 was 16(53.33%) & 14(46.67%) respectively. The frequency of participants with respect to gender was 22(73.34%) males and 08(26.66%) females in group A while in group B frequency of male participants was 13(43.33%) and of female's it was 09(30%). With respect to the side of knee OA in group A, there were 13(43.33%) with left knee OA, 08(26.67%) with right knee OA and 09(30%) with bilateral OA. In group B, there were 07(23.33%) participants with left knee involvement, 10(33.34%) with right knee OA and 13(43.34%) with bilateral knee OA (Table 2).

Table 2: Descriptive statistics

Variable	Group A	Group B
	Frequency (%)	Frequency (%)
Age		
40-55	11(36.67)	16(53.33)
56-70	19(63.33)	14(46.67)
Gender		
Male	22(73.34)	13(43.33)
Female	08(26.66)	17(56.67)

Variable	Group A	Group B
	Frequency (%)	Frequency (%)
Leg involved		
Left	13(43.33)	07(23.33)
Right	08(26.67)	10(33.34)
Bilateral	09(30)	13(43.34)

When analysis was made between groups on the basis of patient's level of pain on numeric pain-rating scale (NPRS); it was found that at baseline the median and interquartile range (IQR) of pain in group A participants was 3(2) where as in group B it was 5(4). When NP statistical test (Man Whitney U test) was employed for between groups comparison then it was found that there was no significant difference in patient's pain as $p > 0.05$. After 4 weeks of intervention it was found that the Md (IQR) in group A was 2(1) and in group B it was 2(3) which depicted an improvement in median and IQR value in both groups and $p > 0.05$. This p-value confirmed that both groups showed improvement and no technique is superior to other with respect to patient's pain reduction (Table 3).

Table 3: Between group analysis of Pain (NPRS)

Intervals (Weeks)	Groups	MD (IQR)	U	p-value
0	A	3(2)	158.0	0.36
	B	5(4)		
4 th	A	2(1)	160.0	0.41
	B	2(3)		

On the basis of patients quality of life (SF-36), it was found that the median & IQR value at baseline (0 week) was 37.82(1.75) in group A whereas in group B it was 36.89(21) with $p > 0.05$ which depicted that there was no significant difference between both group on the on SF-36 QoL at baseline. After 4th week of intervention, it was demonstrated that in Group A MD (IQR) was 92.56(3.47) and in group B it was 90.62(3). Both groups median value of SF-36 QoL improved and when inferential statistics was employed to depict the difference it was revealed that there was no significant difference between group as $p > 0.05$ which depicted that both interventions were equally effective in improving the OA patients' quality of life (Table 4).

Table 4: SF-36 Between Groups QoL (SF-36) Analysis

Intervals (Weeks)	Groups	MD (IQR)	F	p-value
0	A	37.82 (1.75)	0.31	0.78
	B	36.89 (21)		
4 th	A	92.56 (3.47)	2.51	0.12
	B	90.62 (3)		

DISCUSSION

Current research was carried out to compare the efficacy of endurance training and Kinesio-tape for improving the quality of life of Osteoarthritis sufferers. It was concluded from the results of this study that both techniques are equally effective in improving the QoL of OA patients.

Kocygigit et al., conducted an RCT to compare the efficacy of KT (Kinesio tapping) in combination with conventional exercises. They formulated two group in their research just like ours. They gave KT plus conventional exercises to group A and just exercises to group B. They evaluation at baseline, 2nd and 3rd week and found that the KT group has more significant effects ($p < 0.05$) in improving pain and QoL of patients as compared to just exercises. This study also supports our results that KT is an efficient technique in enhancing OA patients QoL and in managing pain [15]. In 2021, Danazumi et al., conducted an RCT to compare the effects of Kinesio tape in combination with chain exercises to chain exercises alone. They revealed that both techniques are effective but group A who had received KT plus chain exercised showed a more significant improvement in patients' symptoms, ROM, flexibility and Quality of life as compared to the chain exercises alone. Our results are also positively reinforced by this study [16]. A systemic review was conducted by Melese et al., from 2014-19 to evaluate the efficacy of kinesio tape in knee OA. Total 876 patients were included from high quality research in this review and they concluded that KT has beneficial effects in improving the knee pain on VAS and functioning on WOMAC and knee ranges as compared to other traditional interventions. This study is in coherence with ours that KT is effective in improving QoL of osteoarthritis [17]. A systemic review and meta-analysis were conducted by Li et al., to evaluate the efficacy of resistance exercise in knee OA patients. They revealed that such exercises are beneficial in reducing patients' pain, improving functions and quality of life. This review also supports our results that the endurance exercises have significant effects in improving functions and QoL along with pain alleviation [18]. An RCT was conducted by Khruakhorn et al., to evaluate the efficacy of hydrotherapy exercises and land-based exercise on knee OA. They formed two groups in their study as we did in ours. They evaluated data at baseline and at 6 weeks on the basis of functions, WOMAC, sit to stand, five times sit to stand test and stairs climbing test. Results of their study revealed that both techniques are effective in improving mobility and quality of life in patients of knee OA. Our results are also positively reinforced by this study [19]. Ihza et al., conducted a literature review to compare the effectiveness of kinesio-tapping and hydrotherapy in osteoarthritic patients. They revealed that when KT in combination with conventional exercises are used for OA management has beneficial effects on patients' quality of life and same results were for hydrotherapy (a form of resistive exercise to enhance the endurance and strength) along with conventional therapy. This review also in coherent with current study results that KT and ET are effective in improving QoL of OA patients [20].

CONCLUSIONS

It was concluded from this study that both techniques are equally effective in improving the quality of life in knee osteoarthritis sufferers. Duration of study was small, just pre-test and post-test evaluation was done. A triple blind RCT should be conducted in which sample size is also large enough to generalize those results in general population.

Authors Contribution

Conceptualization: IN, AA

Methodology: MT

Formal analysis: IN, SS, KH

Writing-review and editing: IN, ST, AA, SS, MT

All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

The authors declare no conflict of interest.

Source of Funding

The authors received no financial support for the research, authorship and/or publication of this article.

REFERENCES

- [1] Salman M, Naeem A, Umar M, Asif S, Haq K, Hasan MS. Effects of Combined Glucosamine/Chondroitin With Structured Physical Therapy Program On Knee Osteoarthritis: A Randomized Control Trail: Effects of Combined Glucosamine/Chondroitin on Knee Osteoarthritis. *Pakistan Journal of Health Sciences*. 2022 Dec; 3(7): 83-7. doi: 10.54393/pjhs.v3i07.410.
- [2] Salman A, Shabana AI, El-Ghazouly DE, Maha E. Protective effect of glucosamine and risedronate (alone or in combination) against osteoarthritic changes in rat experimental model of immobilized knee. *Anatomy & Cell Biology*. 2019 Dec; 52(4): 498-510. doi: 10.5115/acb.19.050.
- [3] Aydoğdu O, Sari Z, Yurdalan SU, Polat MG. Clinical outcomes of kinesio taping applied in patients with knee osteoarthritis: a randomized controlled trial. *Journal of Back and Musculoskeletal Rehabilitation*. 2017 Jan; 30(5): 1045-51. doi: 10.3233/BMR-169622.
- [4] Chen KH, Chen PC, Liu KC, Chan CT. Wearable sensor-based rehabilitation exercise assessment for knee osteoarthritis. *Sensors*. 2015 Feb; 15(2): 4193-211. doi: 10.3390/s150204193.
- [5] Pourcho AM, Smith J, Wisniewski SJ, Sellon JL. Intraarticular platelet-rich plasma injection in the treatment of knee osteoarthritis: review and recommendations. *American Journal of Physical Medicine & Rehabilitation*. 2014 Nov; 93(11): S108-21. doi: 10.1097/PHM.0000000000000115.
- [6] Mahir L, Belhaj K, Zahi S, Azanmasso H, Lmidmani F, El Fatimi A. Impact of knee osteoarthritis on the quality of life. *Annals of Physical and Rehabilitation Medicine*. 2016 Sep; 59: e159. doi: 10.1016/j.rehab.2016.07.355.
- [7] Bhatia D, Bejarano T, Novo M. Current interventions in the management of knee osteoarthritis. *Journal of Pharmacy & Bioallied Sciences*. 2013 Jan; 5(1): 30. doi: 10.4103/0975-7406.106561.
- [8] Santos EJ, Duarte C, Marques A, Cardoso D, Apóstolo J, da Silva JA, et al. Effectiveness of non-pharmacological and non-surgical interventions for rheumatoid arthritis: an umbrella review. *JBI Evidence Synthesis*. 2019 Jul; 17(7): 1494-531. doi: 10.11124/JBISRIR-D-18-00020.
- [9] Wollheim FA. Current pharmacological treatment of osteoarthritis. *Drugs*. 1996 Sep; 52(Suppl 3): 27-38. doi: 10.2165/00003495-199600523-00006.
- [10] de l'Escalopier N, Anract P, Biau D. Surgical treatments for osteoarthritis. *Annals of Physical and Rehabilitation Medicine*. 2016 Jun; 59(3): 227-33. doi: 10.1016/j.rehab.2016.04.003.
- [11] Page CJ, Hinman RS, Bennell KL. Physiotherapy management of knee osteoarthritis. *International Journal of Rheumatic Diseases*. 2011 May; 14(2): 145-51. doi: 10.1111/j.1756-185X.2011.01612.x.
- [12] Molle S. Kinesio taping fundamentals for the equine athlete. *Veterinary Clinics: Equine Practice*. 2016 Apr; 32(1): 103-13. doi: 10.1016/j.cveq.2015.12.007.
- [13] Hörmann J, Vach W, Jakob M, Seghers S, Saxer F. Kinesiotaping for postoperative oedema-what is the evidence? A systematic review. *BMC Sports Science, Medicine and Rehabilitation*. 2020 Dec; 12(1): 1-4. doi: 10.1186/s13102-020-00162-3.
- [14] Saeed Alshahrani M, Reddy RS, Asiri F, Tedla JS, Alshahrani A, Kandakurti PK, et al. Correlation and comparison of quadriceps endurance and knee joint position sense in individuals with and without unilateral knee osteoarthritis. *BMC Musculoskeletal Disorders*. 2022 May; 23(1): 444. doi: 10.1186/s12891-022-05403-9.
- [15] Kocyigit F, Turkmen MB, Acar M, Guldane N, Kose T, Kuyucu E, et al. Kinesio taping or sham taping in knee osteoarthritis? A randomized, double-blind, sham-controlled trial. *Complementary Therapies in Clinical Practice*. 2015 Nov; 21(4): 262-7. doi: 10.1016/j.ctcp.2015.10.001.
- [16] Danazumi MS, Ibrahim SU, Yakasai AM, Dermody G, Bello B, Kaka B. A comparison between the effect of combined chain exercises plus kinesio taping with combined chain exercises alone in knee osteoarthritis: A randomized clinical trial. *American Journal of Physical Medicine & Rehabilitation*. 2021 Nov; 100(11): 1070-7. doi: 10.1097/PHM.0000000000000000

001705.

- [17] Melese H, Alamer A, Hailu Temesgen M, Nigussie F. Effectiveness of kinesio taping on the management of knee osteoarthritis: a systematic review of randomized controlled trials. *Journal of Pain Research*. 2020 May; 13: 1267-76. doi: 10.2147/JPR.S249567.
- [18] Li Y, Su Y, Chen S, Zhang Y, Zhang Z, Liu C, et al. The effects of resistance exercise in patients with knee osteoarthritis: a systematic review and meta-analysis. *Clinical Rehabilitation*. 2016 Oct; 30(10): 947-59. doi:10.1177/0269215515610039.
- [19] Khruakhorn S and Chiwarakranon S. Effects of hydrotherapy and land-based exercise on mobility and quality of life in patients with knee osteoarthritis: a randomized control trial. *Journal of Physical Therapy Science*. 2021 Jan; 33(4): 375-83. doi: 10.1589/jpts.33.375.
- [20] Ihza AA. Literature Review: The Effectiveness of Kinesiotaping and Hydrotherapy in Improving The Quality of Life of The Elderly With Osteoarthritis. *Gaster*. 2021 Aug; 19(2): 195-204. doi: 10.30787/gaster.v19i2.730.