Comparison of Kinesio Tape and Dry Needling in the Management of Rotator Cuff Tendinopathy: A Randomized Control Trial

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ABSTRACT
Rotator cuff (RC) tendinopathy is the most debilitating musculoskeletal condition in general population and is considered to be the third commonly encountered musculoskeletal (MSK) disorder. After getting approval from ethical review committee (ERC) of Rawal Institute of Health Sciences, this Randomized control trail was initiated at Rawal General & Dental Hospital. The duration of this study was 6 months from March 10, 2023 to August 09, 2023. Forty patients of both genders between the age of 25 and 50 years who were suffering from RC tendinopathy were included in this study. Those who had any kind of cardiac complications, neurological disorders, or diabetes mellitus were excluded from this study. Two equal groups (n = 20 each) were formed. Group A was given kinesio tape (KT) and group B was treated with dry needling (DN). Totally six sessions of each intervention were given to each patient at the rate of two sessions per week along with 10 min of interferential therapy and 10 min of moist packs to each patient. Statistical package for social science (SPSS) version 21 and Microsoft excel were used for the analysis of data. The mean ± standard deviation (SD) of age in group A was 35.30 ± 8.07 and in group B it was 31.51 ± 2.46. The median and interquartile range (IQR) of SF-36 [quality of life (QoL)] at the baseline was 37.64 (1.75) in group A and 37.38 (1.31) in group B, respectively. Md (IQR) postinterventional improved with 91.31 (8.20) in group A, and in group B it was 90.37 (15.78) with P < 0.05. Within-group analysis showed a significant difference (P < 0.05) in each group. Between-group analysis depicted a significant difference (P < 0.05) on the Pain Numeric Scale score and an insignificant difference (P > 0.05) on the basis of QoL (SF-36). It was revealed that KT is more effective in the reduction of disability in terms of pain as compared to DN whereas both interventions are equally effective in improving the QoL in RC tendinopathy.

KEYWORDS
rotator cuff tendinopathy, PNS, QoL, SF-36

INTRODUCTION
Rotator cuff (RC) tendinopathy is the third most common musculoskeletal impairment in the general population (Walker-Bone et al., 2004). Tendinopathy of RC depicts in the form of pain and weakness in the shoulder region with external rotation and elevation of the arm. Signs and symptoms of this condition varies from patient to patient. The exact location of symptoms, causes, and structural failure made the collection of epidemiological data difficult. This condition is commonly diagnosed as subacromial impingement (SAI) syndrome (Lewis, 2009; Witten et al., 2023). The primary cause of RC tendinopathy is subacromial irritation of its bursa. The main function of RC muscles is to perform the internal as well as external rotation of shoulder. Stability is another role of RC muscles by controlling the humeral head translation during flexion, extension, and abduction of arm at the shoulder joint (Phadke et al., 2009).

Neer postulated that this pathology arises from subacromial irritation in 95% of cases and named this pathology as “SAI syndrome” (Singh et al., 2017). However, there is ambiguity among clinicians to term this condition SAI syndrome. There are various factors that play a role in the initiation of this pathological condition (Millar et al., 2021; Dong et al., 2022). First is the intrinsic factors which arise due to aging, altered mechanics, biology and microvascular supply of these muscles, degeneration, rupture in muscle tendon, overuse, overload, and trauma. All these factors contribute to the alteration of cellular mechanism of RC tissues (Lui and Wong, 2020). Second one is extrinsic factors which arise due to alteration in the anatomy of RC muscles as reported

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by Seitz et al., which results in impingement in the acromial region and is considered as SAIS in 64-66% of patients (Seitz et al., 2011).

Various surgical and nonsurgical interventions are used in the management of RC tendinopathy (Toliopoulos et al., 2014; Simpson et al., 2020). Many clinicians consider that surgical intervention such as acromioplasty is the best option for this condition (Medancic et al., 2021), whereas others consider medical and conservative management as safe and cost effective. NSAIDs, opioids, and tizanidine are first-line drugs that are prescribed by physicians for RC tendinopathy (El-Tallawy et al., 2021). In conservative management, rest, immobilization, and cryotherapy are done; whereas, in physiotherapy, various modalities such as interferential currents, ultrasound, transcutaneous electrical nerve stimulator, short wave diathermy, cold laser, and various techniques such as kinesio tape (KT), dry needling (DN), stretching and strengthening exercises (SE) are employed by physiotherapists (Desmeules et al., 2016). KT is an innovative technique in which an elastic bandage is applied over a muscle, which helps in the reduction of spasm and inflammation in the specific muscle (Kim et al., 2014; Desjardins-Charbonneau et al., 2015). DN is also used to reduce the muscle spasm and pain by breaking the tight fibers in spastic muscles (Stoychev et al., 2020).

The null hypothesis of this study was that KT is more effective in the disability management of RC tendinopathy as compared to DN, and the alternative hypothesis was the opposite of it. The purpose of this study was to compare the effectiveness of kinesio taping and DN in the management of RC tendinopathy.

METHODOLOGY

Current study was commenced after getting approval from the ERC of the “Rawal Institute of Health Sciences.” After getting the informed consent of patients current Randomized Control Trial (RCT) was performed at the Rawal General & Dental Hospital, Islamabad. The duration of this study was 6 months from March 10, 2023 to August 09, 2023. The sample size of this study was 40 as calculated using Epitool.

Inclusion criteria

Those patients who were between the age of 25 and 50 years with no any cardiac complications, neurological disorders, or diabetes mellitus were included in this study regardless of the gender.

Exclusion criteria

Those patients who had any heart condition or Parkinson’s disease, pregnant females, and those who refused to participate were excluded from this study.

Two equal groups (A and B) of 20 patients each were formed. Tools employed for the collection of data were patient’s level of pain measured by using the Pain Numeric Scale (PNS) and patient’s QoL measured by using SF-36. Questionnaires were filled at the initiation of this study and at the end of study. Totally six sessions of each intervention were given to each patient at the rate of two sessions per week along with the 10 min of interferential therapy and 10 min of moist packs to each patient as mentioned in Figure 1. SPSS version 21 and Microsoft excel were used for analysis of data. Normality of data was checked by the use of Shapiro–Wilk test as P > 0.05 which depicted that our data were nonnormally distributed for between-group analysis and for SF-36 within-group analysis but for SF-36 within-group analysis and parametric test for PNS within analysis. Therefore, we employed nonparametric test for both parameters for between-group analysis. Descriptive statistics was mentioned in the form of frequencies, percentages, mean, median interquartile, and standard deviation (SD). Level of significance was kept at <0.05 with confidence interval (CI)=95%.

RESULTS

Totally 40 patients who had RC tendinopathy were included in the current study. The mean ± SD of age in group A was 35.30 ± 8.07 and in group B it was 31.51 ± 2.46. The frequency of patients between the age of 25 and 35 years was 11 (55%) in group A, whereas in group B the frequency of participants in this age group was 14 (70%). In group A, the frequencies of patients between the age of 36-45 and 46-50 years who had RC tendinopathy were 07 (35%) and 02 (10%), while in group B the frequencies of patients in these age groups were 04 (20%) and 02 (10%), respectively. There were 06 (30%) females and 14 (70%) males in group A whereas in group B there were 11 (55%) females and 09 (45%) males. When the frequency of patients on the basis of marital status was evaluated, it was found that there were 08 (40%) single and 12 (60%) married patients in group A while in group B this frequency was 15 (75%) single and 05 (25%) married (Table 1).

When normality of data was checked using the Shapiro–Wilk test, it was found that data nonnormally distributed for both variables PNS and SF-36 QoL. Therefore, we employed Wilcoxon rank test for within-group analysis and Mann–Whitney U test for between-group analysis. In group A, preinterventional median and IQR of PNS was 7 (3), while post intervention it was found that there was a significant reduction in Md (IQR) of pain in RC tendinopathy sufferers to 3.5 (4) in group A and 6 (3) in group B along with P < 0.05. This showed a significant difference in both variables on within-group analysis. Therefore, both interventions are equally effective in disability management of RC tendinopathy in terms of pain reduction and QoL enhancement. The median and IQR of SF-36 (QoL) at the baseline in group A was 37.64 (1.75) and was 37.38 (1.31) in group B, respectively. Md (IQR) postinterventional improved with 91.31 (8.20) in group A and in group B it was 90.37 (15.78) with P < 0.05. It was found that there was a significant difference within each group as P < 0.05 (Table 2).

When between-group analysis was done it was found that preinterventional median and IQR of PNS was 6.5 (3).
Postinterventional Md (IQR) was 2 (3) with a U value of 125 along with \( P < 0.05 \) which means that our null hypothesis was rejected and alternate hypothesis was accepted that there was a significant difference between groups on the basis of pain. It means KT is more effective in pain reduction in rotator cuff tendinopathy (RoCT) sufferers. When between-group comparison was made on the basis of QoL (SF-36) it was found that postinterventional median (IQR) improved in both groups with \( P > 0.05 \) which also proved that there was no significant difference between groups on the basis
of QoL. Hence, both interventions were found to be equally effective in the management of RC tendinopathy in improving QoL but KT is more effective in alleviation of pain on the PNS score as compared to DN (Table 3).

DISCUSSION

Current study was executed to evaluate the effectiveness of kinesio taping and DN technique in the management of RC tendinopathy. For the evaluation of both techniques, we had employed PNS and SF-36 QoL questionnaires. It was found that both techniques are equally effective in the management of RC tendinopathy.

Desjardins-Charbonneau et al. conducted a systemic review to evaluate the efficacy of nonelastic tape (NET) and KT alone and in combination with NET and found that the KT technique demonstrated a significant reduction in shoulder pain in flexion and abduction movement alone as compared to other techniques. Therefore, they concluded that KT technique is effective but evidence is not sufficient to conclude that KT alone is a very effective technique. Our results are positively reinforced by this research that KT is effective in improving the QoL and in reduction of patient’s pain scores (Desjardins-Charbonneau et al., 2015).

Miccinilli et al. conducted an RCT to evaluate the efficacy of real KT technique and Sham KT technique in patients of RC tendinopathy. They used numeric rating scale (NRS) for pain evaluation, MRC for muscle strength, and Constant–Murley Score and found that the real kinesio tape (RKT) group showed significant improvement in pain parameter at rest and also during activities along with functional improvement during all kinds of shoulder and elbow movements as compared to the sham kinesio tape (SKT) technique. They concluded that RKT is an effective technique in RC tendinopathy management and their results are coherent with ours that KT is efficient in patients pain reduction and QoL enhancement (Miccinilli et al., 2018).

Gianola et al. conducted a systemic review to analyze the effectiveness of KT technique in RC tendinopathy. They included totally 23 RCTs (1054 participants) out of which 9 studies were of those in which KT was compared to sham therapy and 14 were of those in which KT was compared to conventional treatment. Age of the participants was 18-50 years, but, in our study, it was 25-50 years. They found that KT is more effective as compared to sham and conventional techniques in RoCT in pain reduction and functional improvement. Our study results on the basis of pain reduction and QoL improvement are supported by this systemic review (Gianola et al., 2021).

Martins da Silvia et al. conducted an RCT on 60 patients of RC tendinopathy to compare the efficacy of KT alone and in combination with the exercise group (EG). They formulated three groups in their study: first group was of EG, second was the KT group and third was the exercise KT group (EKTG). They found that all groups depicted an improvement in pain and functional parameter but EKTG had demonstrated much better results as compared to other two groups (Martins da Silva et al., 2020). Our study is also coherent with these results.

Saylor-Pavkovich conducted a retrospective case series on eight patients with RC tendinopathy. They compared DN technique to SE in combination and alone DN. They gave total 16 sessions at the rate of two sessions/week and found that both techniques are effective but DN in combination is more superior to SE or DN alone in pain and disability reduction and also QoL improvement (Saylor-Pavkovich, 2016). Our study results are also in coherence with this study that DN in combination with conventional therapy protocols is an efficient technique in improving patient’s QoL and pain alleviation.

Rha et al. carried out an RCT to compare the DN with platelets rich plasma protein in chronic RC tendinopathy. They found that there was more improvement in patient’s pain and functional outcomes in the plasma rich protein (PRP) group as compared to the DN group after 6 months of interventions and is a safer technique as well (Rha et al., 2013).

Settergren conducted a study on a 40-year-old female with RC (supraspinatus) tendinopathy diagnosed via sonography. He used a DN technique to the injured area and after 10 days of intervention evaluated via ultrasonography that those area showed hyperechoic activity in RC. The patient presented with pain reduction with more and more activities. It was concluded that DN is an effective technique in RC tendinopathy management (Settergren, 2013). Our study results are also coherent with this study in terms of pain reduction and QoL improvement.

CONCLUSION

It was revealed that KT is more effective in the reduction of disability in terms of pain as compared to DN whereas both interventions are equally effective in improving the QoL in RC tendinopathy.

RECOMMENDATIONS

A larger scale RCT with double blind should be carried out to manifest better outcomes of these techniques in RC tendinopathy management.

CONFLICTS OF INTEREST

The authors declare no conflicts of interest in association with the present study.

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REFERENCES


