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Tapping Application Reduces pain intensity and Increases Range of Motion on Upper Trapezius Myofascial Trigger Points: A Randomized Clinical Trial

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ABSTRACT

Purpose: This study was designed to inspect the effects of kinesiotape (KT) on pain intensity and range of motion at upper trapezius myofascial trigger points.

Methods: pre and post randomized clinical designed on forty subjects with active trigger points. They divided randomly into two equal groups. Group "A" received KT for 72 hours while group "B" (control group) didn't receive any treatment but follow instructions. Pain intensity and range of motion were measured before and after completion of treatment.

Results: Statistical analysis (t-test) shown that there was a significant difference at pain intensity and range of motion at group "A" as ($p<0.05$) but there was no significant difference at pain intensity and range of motion at group "B" as ($p> 0.05$).

Conclusion: KT is an effective method in treatment of subjects with active trigger points at upper trapezius myofascial trigger points.

Keywords: Kinesiotape, pain intensity, Range of motion, Myofascial trigger points.

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INTRODUCTION:

Myofascial pain syndrome (MPS) is current musculoskeletal pain disorder that affects the majority of chronic pain population [1,2]. The existence of trigger points identifies it. According to Shah et al., (2016) trigger points were described as" hyper-excitable points within a rigid line of skeletal muscles" [2] this syndrome usually associated with tenderness, spasm, movement limitation and referral pain. These active points are usually seen in the upper fiber trapezius as a result of overload and micro trauma [3,4]. Trigger points can be classified according to pain intensity into active and latent depending on the characteristic of pain. Active trigger points refer pain at rest without any pressure and during activity while latent trigger points refer pain only during direct pressure [2]. Trigger points perpetuated by abnormal posture and emotional disorders [5]. The most widespread management approaches that are used for handling of this points are needling therapies [6] , Integrated Neuromuscular Inhibition (INIT)[7] , Muscle Energy Techniques (MET)[7], Strain Counter Strain (SCS)[8], LASER[9], Ischemic Compression (IC)[10], Kinesiotape (KT)[11] and spray and stretch technique [12].

In the current period, KT strongly entered in the management of this points due to its role in increasing blood supply, improve lymphatic fluid flow and restore muscle function[13,14]. Numerous researchers confirmed a weighty role of KT on decrease pain intensity[15,16,17]. Improve range of motion and neck function [16,17] There is a lack in scientific evidence that support a particular treatment approaches for subjects with trigger points. So, the physical therapist has a difficulty and interruption in choosing the most appropriate method of treatment for each individual subjects[18]. Additionally, there is a lack in clinical trials that determine the true influence of KT on active trigger points due to the combination of KT with other therapy modality or compare KT with active control group in management of trigger point [18]. So, this research was conducted to focus on the efficacy of KT in reducing pain and improving range of motion with upper trapezius active trigger points.

MATERIALS AND METHODS

This pre and post randomized clinical trial was performed at the outpatient clinic at the Faculty of Physical Therapy, Cairo University during the period of two months from September 2017 to December 2017. This research was approved by research ethics committee of Faculty

of Physical Therapy (NO: P. T. REC/012/001517).

Determination of sample size

The number of subjects were calculated by using G*Power (version 3.1.9.2) (Franz Faul, Uni Kiel, Germany). A calculation was based on t test, the type I error rate was set at 5% (alpha-level 0.05), and the effect size was 1.02 of the main outcome variable "pain intensity" obtained from a pilot study performed on ten subjects and type II error rate was at 80% power. The estimated number was 40 subjects in the two groups.

Subjects

Forty subjects were recruited from undergraduate and postgraduate students of Faculty of Physical Therapy (Cairo University- Egypt). Their ages ranged from 19-25 years[19]. During assessment of eligibility (figure 1) two subjects excluded because they received treatment at past three months. Thirty subjects received verbal and written explanation for the purpose of this study, if they agreed to participate they signed the consent form which approved by the Faculty of Physical Therapy. Then the allocation performed randomly by sealed envelopes to two groups:

Group (A): they received KT for two times/ week for 72 hours on upper trapezius unilaterally in addition to instructions.

Group (B): didn't receive any treatment but they follow instructions for one month and all of them ethically treated after completion of study.

Inclusion and exclusion criteria

The subjects were involved in this research if they had active trigger points in upper trapezius muscle unilaterally. The subjects had pain at rest, jump sign at pressure, limited ROM and referred pain [20]. The Subjects were excluded if they had allergy to KT, a history of whiplash injury, cervical spine surgery and any degenerative disease[21].

Outcome measurements

1-pain intensity:

The pain was assessed by a valid and reliable tool (VAS). It's a line has two ends. One has no pain, and the other has worst pain. To determine the pain intensity each subject was instructed to put a point on the line[22].

2- Range of motion

Side bending motion: Left and right side bending were assessed by (CROM) (deluxe version- Performance Attainment Associates, Roseville, MN, USA). This equipment has a good to excellent inter-rater reliability (ICC 0.73–0.89) The subject was sitting in upright position, and both hands rested on the thigh. Hip and knee in flexion 90º,

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CROM was strapped around the head. The subject was requested to relax both shoulders then side bending the neck to one side within the limit of pain then back to starting position then bend to the other side while the investigator at the front of the subject [23].

Intervention

Treatment instructions

Group (A) and group (B) were given the following instructions[24].

1-Be aware of your posture and change the neck position regularly.

2-Avoid maintaining the neck in a fixed position (prolonged static work).

3-Avoid lifting heavy weight on head or shoulder.

Kinesiotape

Group "A" received an adhesive tape that is waterproof and porous (Kinesio Tex; Kinesio USA, Albuquerque, New Mexico). KT had a width of 5 cm and a thickness of 0.5 mm.

Application of KT

The sensitivity test was examined before applying kinesiotape. A small part of the tape was applied on the inner aspect of the arm for a day. Next day the tape was removed and if there was a reaction the subject was excluded but if no reaction the tape was applied. The subject would be seated in a comfortable position. The part to be taped was exposed, and the skin was shaved and cleaned with alcohol. For applying the Kinesio tape on upper trapezius, the tape was measured from the origin of muscle at the hairline to the insertion at the center of the acromion (I strip). Kinesiotape was taped firstly at the insertion at the acromion in the resting state. Then the subject was asked to stretch upper trapezius by applying side bending to opposite side and rotation to the same side with slight flexion. The Kinesiotape was taped with 10% tension over the muscle to the point of origin [11].

Statistical analysis:

Shapiro wilk test was used to assess the normality of data. The variables (age, weight, height, BMI, pain intensity and range of motion) were normally distributed so all variable tested with parametric test (t- test: paired and un-paired) we used (SPSS version 23) (IBM Corp, New York, United States) to test the data. The level of significance was set at 0.05.

Results:

Demographic data: the characteristics of subjects demonstrated in table (I). Un- paired t- test found no significant difference between two groups at age, weight, height, BMI as ($p > 0.05$).

Table I. Demographic data.

	Group "A" Mean ± SD	Group "B" Mean ± SD	T value	P value	sig
Age (years)	22±1.8	22±2.6	-0.66	0.50	NS

Weight(kg)	65±6.9	65±7.3	-0.18	0.77	NS
Height(cm)	171±5.1	168±5.5	-0.66	0.62	NS
BMI(kg/m2)	23±1.72	22±1.73	0.49	0.51	NS

Sig.: Significance, N.S: Not significant, S.D: Standard deviation, P: probability value.

The results of outcome measurements:

Table (II) represented Mean ± SD of pre-treatment and post-treatment, percent of change of pain intensity and range of motion within groups and between group analyses.

The results of pain intensity

Paired t-test was used to determine the difference within each group. The value of Mean ±SD for group (A) at pre was 7.35±0.67 while post was 4.2±0.35. The difference between pre and post was 3.15 and the percent of change was 42%. Paired t test shown that there was significant decrease in pain as (p =0.001) and t= -3.85.

The value of Mean ±SD for group (B) at pre was 7.02±0.34 while post was 5.25±0.22. The difference between pre and post was 1.77 and the percent of change was 25 %. Paired t test revealed that there was no a significant decrease in pain as (p=0.075) and t= -1.5.

Un-paired t test shown that there was no significant difference between pre values of both group at pain intensity as p=0.88 and t=0.35 but there was a significant difference at post treatment as p=0.02 and t=2.3

The results of side bending range of motion

Paired t-test was used to determine the difference within each group. The value of Mean ±SD for group (A) at pre was 31.25±3.27 while post was 40.65±2.64. The difference between pre and post was 9.4 and the percent of change was 30%. Paired t test shown that there was significant increase in range of motion as (p =0.01) and t= -2.39.

The value of Mean ±SD for group (B) at pre was 32.7±5.1 while post was 34.9±2.6. The difference between pre and post was 2.2 and the percent of change was 6 %. Paired t test revealed that there was no a significant increase in range of motion as (p=0.08) and t= -0.33.

Un-paired t test shown that there was no significant difference between pre values of both group at range of motion as p=0.056 and t=0.96 but there was a significant difference at post treatment as p=0.001 and t=3.5

Table II. Percent of change, within group and between groups for pain intensity and range of motion at upper trapezius

pain	Group "A"	Group "B"	t-value between groups	P-value
Pre (Mean± SD)	7.35±0.67	7.02±0.34	0.35	0.88 **
Post(Mean± SD)	4.2±0.35	5.25±0.22	2.3	0.02 **
Percent of	42%	25%		

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change				
t-value - within group	-3.85	-1.5		
p-value	0.001*	0.75 **		
Range of motion	Group "A"	Group "B"	t-value between groups	P-value
Pre(Mean± SD)	31.25±3.27	32.7±5.1	-0.96	0.056 **
post(Mean± SD)	40.65±2.64	34.9±2.6	3.5	0.001 *
Percent of change	30%	6%		
t-value - within group	-2.39	-0.33		
p-value	0.01*	0.08**		

*: Significance,**: Not significant, S.D: Standard deviation, P: probability value.

DISCUSSION:

The aim of this study was to clarify the effects of KT on pain and range of motion at upper trapezius myofascial trigger points. The results of this study showed significant improvement at KT group but there is no significant difference at control group but there is percent of change at control group. KT plays a major role in inhibiting myofascial pain and increase range of motion by lifting skin which in turn leads to improvement in circulation, lymphatic drainage and decrease pressure on nociceptors [25].

The results of this study come in agreement Abdelfattah et al., (2016) investigated the effects of KT on upper trapezius myofascial trigger points. The consequences of this study informed refinement in pain intensity (VAS and PPT) [11].

In the same line, Ay et al., (2017) investigated the efficacy of KT and shame kinesio on pain, PPT in upper trapezius myofascial pain syndrome. At the end of this study there is a significant improvement in pain and PPT with superiority to KT[17].

The results showed that the control group had no significant difference at pain and range of motion but there is a percent of change between pre and post. The improvement may be due to the following of subjects to instructions that had been given to them to perform the daily activity within the limit of pain. This results supported by Simons (2004), who found that the muscle overload is the most common cause for trigger points formation because it leads to motor endplate damage and increases production of acetylcholine. So, when the subjects follow the instruction, the possibility for trigger points formation may be decreased[25].

Limitation: No follow up and short duration of treatment.

CONCLUSION: KT is an effective method in decrease pain and increase range of motion in subjects with upper trapezius myofascial trigger points.

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