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Kinesio Taping Versus Instrument Assisted Soft Tissue Mobilization on Upper Trapezius Myofascial Trigger Points: A Randomized Controlled Trial

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ABSTRACT

Background: Myofascial trigger points (MTrPs) are hypersensitive nodules of contracture that are palpable to affected muscles and produce localized pain in and around the affected muscle or referred pain.

Objective: This study was designed to investigate the effects of Instrument assisted soft tissue mobilization versus Kinesio Taping on upper trapezius myofascial trigger points.

Methods: Fifty-one subjects with active trigger points at both side (38 females and 13 males) were divided randomly into three equal groups. Group "A" received traditional therapy three times/week while group "B" received Kinesio Taping twice/week for four weeks. Group "C" received Instrument Assisted Soft Tissue Mobilization three times/week. Visual analogue scale, Pressure pain threshold, Cervical range of motion and Arabic neck disability index were used to evaluate subjects at two intervals (pre-treatment and post-treatment).

Results: Statistical analysis shown that there was a significant change within-group of all variables pre-post treatment at groups A, B and C as ($p<0.05$). Between-group analysis there was no significant change in pre value of all variables as ($p>0.05$) while post-treatment there was a significant change in all variables as ($p<0.05$).

Conclusion: Instrument assisted soft tissue mobilization and Kinesio Taping are the most effective methods in the management of subjects with active trigger points at upper trapezius myofascial trigger points with superiority for Instrument assisted soft tissue mobilization.

Keywords: *Instrument assisted soft tissue mobilization, Kinesio Tape, Myofascial Trigger Points, Upper trapezius.*

1. INTRODUCTION

Myofascial trigger points (MTrPs) play a significant role in the context of mechanical neck pain **(Ghulam et al.,2023)**. Myofascial trigger points (MTrPs) are hypersensitive nodules of contracture that are palpable to affected muscles and produce localized pain in and around the affected muscle or trigger distant referred pain (**Zhou et al., 2023).** Muscles with MTrPs have lower amplitude at maximum voluntary contraction and activate

later than healthy muscles. Myofascial trigger points were categorized as either active or latent. Active myofascial trigger Points could be distinguished by spontaneous signs like anesthesia, local and referral pain while latent has no symptoms before touching **(Hoseininejadet al., 2023).**

Commonly, MTrPs occur in the neck and shoulder muscles**.** Trapezius muscle is the most frequently involved

muscle. It was estimated that 85% of people who came to clinics have neck trigger points and it occurs in women more than in men. Myofascial trigger points are classified clinically into active and latent; active trigger points cause constant pain at rest and are associated with referred pain pattern while latent trigger point produces pain when palpated and causes restriction of movement **(El-Hafez et al., 2020).**

Several management strategies for MTrPs are available. These range from non-invasive approaches like massage, pressure release, ischemic compression, spray and stretch and assisted soft tissue mobilization (IASTM) **(Basu et al., 2019** and **Kim et al ., 2017).** Instrumented assisted soft tissue mobilization is the use of a specially designed instrument to mobilize soft tissue, with the aim of reducing pain, improving range of motion and function **(Mohamed et al., 2020).**

Kinesio Taping (KT) has been developed by Dr. Kenzo Kase and widely used for the treatment of musculoskeletal problems including MPS and neck pain. It is water resistant, lightweight, elastic and has a capacity for stretching. Some of the major effects of KT are decreasing pain, reducing edema by providing drainage of local blood and lymph fluid, relaxing the muscles, and improving proprioception **(Alghadir et al., 2020).**

Aim:

The current study investigated the effect of IASTM versus KT on pain intensity level, pain pressure threshold, cervical ROM and functional disability level in subjects with myofascial trigger points.

2. MATERIALS AND METHODS

Study Design: A Randomized Controlled Comparative Design.

Subjects: Fifty-one subjects (38 females and 13 males) were assigned randomly using by random generator and permuted blocks of same size into three equal groups in number: **Group (A)** (**Control Group**): This group received traditional therapy (three sessions per week for 4 weeks). **Group (B)** (**Experimental Group**): This group received KT in addition to Traditional physical therapy program (two sessions per week for 4 weeks). **Group (c)** (**Experimental Group**): This group received IASTM in addition to Traditional physical therapy program (three sessions per week for 4 weeks). These subjects were recruited from the outpatient clinic in faculty of physical therapy at Nahda University.

Inclusion criteria:

Subjects included in this study had all the following criteria: Fifty subjects with age ranged from 18 to 23 years old **(Formen et al., 2014),** From both genders with normal BMI ranges between 18.5:24.9 kg/m2 and had MTrPs of unilateral UT muscle **(Shamseldeen et al., 2023).**

Exclusion criteria:

Subjects with history of whiplash injury, head, neck, cervical spine or shoulder surgery, cervical radiculopathy, malignancy, Cervical spine fractures, Myelopathy **,** undergone physical therapy within the past three months before the study, multiple sclerosis, thyroid dysfunction , chronic infection, poly-articular osteoarthritis, rheumatoid arthritis , advanced cervical spine degenerative diseases, skin diseases and pregnancy were excluded **(Shamseldeen et al., 2023, Emshi et al., 2021 and Luz Júnior et al., 2015).**

Instrumentation: All variables were assessed before and after 4 weeks

1. **Visual analogue scale (VAS):** It was used to assess pain intensity level which is considered a valid and reliable tool for measuring pain intensity level **(Joshi, 2022).**
2. **Pressure algometer (White Plain,New York 10602 USA):** It was used to asses pain pressure threshold (PPT) , which was a valid and reliable tool for gauging active MTrP tenderness.
3. **The cervical range of motion goniometer (CROM):** measured the cervical range of motion for flexion, extension, lateral flexion, and rotation using separate inclinometers. Measurements were expressed in degrees with a high degree of validity **(Tousignant et al., 2000)** and reliability **(Johnson, 2022).**
4. **Arabic neck disability index (ANDI):** It would be used to assess neck functions, which was widely regarded as a valid and reliable tool to measure neck functions **(Shaheen et al., 2013)**. It contains 10

classes/categories; in each category, six choices were presented (0–5) **(Ibrahim et al., 2020).** Score from zero to four no disability, from five to 15 this was mild, from 15 to 24 this was moderate, from 25 to 34 this was severe, more than 34 this was a complete disability **(Macdermid et al., 2009).**

Interventions:

1. **Traditional Therapy,** which involved

Instructions: Ask the subject to Change the neck position regularly, avoid lifting heavy weight on head or shoulder, educate subject about ergonomic of disk and chair and instruct subject to correct posture by making chin in and retraction of shoulders **(El-hafez et al., 2020).**

Hot packs: Hot packs were kept in a hydrocollator, which was a container of water usually kept at a temperature between 70°C and 75°C and placed on the patient neck and upper back muscles for 20 minutes **(Palmer et al., 2021).**

Deep transverse Friction Massage: With the treatment time of total 10 minutes. The participant was in a relaxed sitting position on a chair and both feet firmly planted on the floor. The position of therapist was behind the patient. Thereafter, a gradual gentle friction was applied for 2 minutes followed by 8 minutes' friction massage to the trigger point using the right thumb which was followed by stretching 3 reps 90 sec **(Zutshi et al., 2021).**

Self-stretching exercises for upper trapezius muscle (slow, 5 repetitions per session, 10-second hold and 10-second relaxation between two repetitions) **(Alghadir et al., 2020).**

Neck isometrics conducted according to **(Liyanage et al., 2014).** Patients were in a sitting position on the working chair, **Isometric flexion**: They were taught to place their dominant hand flat on the forehead Next, they were told to firmly push the forehead against the right hand and hold for 5 seconds and were told to repeat it 5 times. **Isometric extension**: Patients were taught to place their dominant hand behind their head, over the occipit. Next, they were told to firmly push the head backwards against the hand and hold for 5 seconds and repeat 5 times. **Isometric side flexion:** Patients were taught to place the right hand flat on the right side of the head. Next, they were told to firmly push the head against the right hand and hold for 5 seconds and repeat 5 times. The same exercise was repeated with the left hand against the left side of the head. **Isometric neck rotation**: Patients were taught to place their right hand on the right cheek. Next, they were told to firmly turn their face against the right hand and hold for 5 seconds and repeat 5 times. The same exercise was repeated with the left hand on the left cheek. Scapular retraction exercises: The subjects were instructed in the resisted scapular retraction at each shoulder abduction angle (0, 45, 90, and 120); this exercise was carried out 3 times with 5 seconds' rest between repetitions. A 2- minute rest was given between exercises to minimize the effect of muscle fatigue. All exercises were performed with 90 of elbow flexion except during the retraction exercise at 120 (**Kara et al.,2021)** (5 s hold for 10 repetitions) (**Gohil et al., 2020).**

Scapular retraction exercises: The subjects were instructed in the resisted scapular retraction at each shoulder abduction angle (0, 45, 90, and 120); this exercise was carried out 3 times with 5 seconds' rest between repetitions. A 2-minute rest was given between exercises to minimize the effect of muscle fatigue. All exercises were performed with 90 of elbow flexion except during the retraction exercise at 120 **(Kara et al.,2021)** (5 s hold for 10 repetitions) **(Gohil et al., 2020).**

2. Kinesio Taping:

The sensitivity test was examined before applying the KT. 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 was 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). Kinesio Taping 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 rotating to the same side with slight flexion. The Kinesio Taping was taped with 10% tension over the muscle to the point of origin. The tape was rubbed in the elongated muscle position, could be worn on skin for three-five days **(Abd El-Azeim et al., 2018).**

3. Instrument-assisted soft tissue mobilization:

For IASTM, the subject was seated in a comfortable position. The subject's forehead would be rested on his/her forearm on a table in front of him/her. A lubricant (Vaseline) was applied to the skin around the neck area prior to treatment and the M2T blade was cleaned with an alcohol pad. First, the M2T blade used to find the exact areas of restriction in the RT upper trapezius. Then the M2T blade was used, at an angle of 45° and applied slow strokes along the muscle, without causing any discomfort or pain, from the muscle origin to its insertion (sweeping

technique), for approximately 3 min. This procedure was repeated three times a week for four weeks. Subjects was instructed to put an ice pack on the area if they feel any burning sensations after the session **(Kim et al., 2017).**

Sample size calculation and statistical analysis

The size of the sample has been determined using G*Power software version 3.1.9.7(Heinrich-Heine-Universität Düsseldorf, Düsseldorf, Germany), which is a valid and objective method in power analysis as reported by many researchers (Cohen, 1994; Kang, 2021). This calculation was based on F test. Alpha-level was 0.05. The effect size (0.4) was calculated on pain intensity of upper trapezius measured by Visual Analogue Scale (VAS) a generated sample size is 50 subjects (approximately 17 in each group). Data were screened, for normality assumption test and homogeneity of variance. Normality test of data using Shapiro-Wilk test was used, that reflect the data was normally distributed (P>0.05) after removal outliers that detected by box and whiskers plots. Additionally, Levene's test for testing the homogeneity of variance revealed that there was no significant difference (P>0.05). So, the data are normally distributed and parametric analysis is done. The statistical analysis was conducted by using statistical SPSS Package program version 25 for Windows (SPSS, Inc., Chicago, IL). Quantitative data variables are expressed as mean and standard deviation for subject clinical general characteristics, pain intensity level, pain pressure threshold, cervical range of motion and functional disability level. Qualitative data variables are reported as frequency (percentage) for gender and dominant. One-way analysis of variance (ANOVA-test) used to compare among 3groups for clinical general characteristics variables (age, weight, height, and BMI). Chi-square test used to compare among 3 groups for subjects' gender and dominant variables. Mixed design 3 x 2 MANOVA-test was used, the first independent variable (between subject factors) was the tested group with 3 levels (group A, group B, and group C) and the second independent variable (within subject factor) was measuring periods with 2 levels (pre- and post-treatment) for dependent variables pain intensity level, pain pressure threshold, cervical range of motion and functional disability level. Bonferroni correction test was used to compare between pairwise within and between groups of the tested variables which P-value was significant from MANOVA test. All statistical analyses were significant at probability ($P \leq 0.05$).

3. RESULTS AND DISCUSSION

In the current study, a total of 51 subjects with upper trapezius myofascial trigger points from both gender (13 males and 38 females) was participated in this study and assigned randomly into 3 equal groups (17 subjects / group). No statistically significant differences (P<0.05) in clinical general characteristics (Table 1) of subjects age (P=0.165), weight (P=0.815), height (P=0.827), BMI (P=0.058), gender (P=0.485), and dominant (P=0.862) among groups A, B, and C.

Table 1: Clinical general characteristics of subjects among groups

Items	Group A (n=17)	Group B (n=17)	Group C (n=17)	*P*-value
Quantitative variables	Mean ±SD	Mean ±SD	Mean ±SD	
Age (year)	19.24 ±1.03	20.41 ±1.66	20.88 ±1.57	0.165
Weight (kg)	64.18 ±8.26	63.35 ±8.86	62.41 ±6.82	0.815
Height (cm)	166.94 ±7.69	167.06 ±8.15	168.41 ±7.23	0.827
BMI (kg/m^2)	22.99 ±1.40	22.64 ±1.41	21.90 ±1.10	0.058
Qualitative variables	Number (%)	Number (%)	Number (%)	
Gender (males: females)	6 (35.30%): 11 (64.70%)	4 (23.50%): 13 (76.50%)	3 (17.60%): 14 (82.40%)	0.485
Dominant (Right: Left)	15 (88.20%): 2 (11.80%)	14 (82.40%): 3 (17.60%)	14 (82.40%): 3 (17.60%)	0.862

Group A: received traditional therapy program; Group B: received kinesiotaping in addition to traditional physical therapy program; Group C: received instrument assisted soft tissue mobilization in addition to traditional physical therapy program. Quantitative data are expressed as mean ±standard deviation (SD) and compared statistically by ANOVA test. Qualitative data are expressed as number (percentage) and compared statistically by Chi-square test. P-value: probability value P-value>0.05: non-significant

Statistical multiple pairwise comparison tests for pain intensity (VAS), pain pressure threshold (PPT) and functional disability level (ANDI) within each group are presented in Table (2). There were significantly (P<0.05) decreased in VAS and ANDI at post-treatment compared to pre-treatment within group A (P=0.0001 and P=0.0001, respectively), group B (P=0.0001 and P=0.0001, respectively), and group C (P=0.0001 and P=0.0001, respectively). Moreover, there were significantly (P<0.05) increased in PPT at post-treatment compared to pre-treatment within group A (P=0.0001 and P=0.002, respectively), group B (P=0.0001 and P=0.0001, respectively),

and group C (P=0.0001 and P=0.0001, respectively). These significant differences in VAS, PPT and ANDI at post-treatment are favor of group C, followed by group B and then group A. Moreover, the patients in group C improved higher VAS, PPT and ANDI (73.35, 94.01 and 58.20 respectively) followed by those in group B (68.84, 89.99 and 56.45% respectively) and then those in group A (54.22, 35.34 and 45.31%, respectively).

Statistical multiple pairwise comparison tests for VAS, PPT and ANDI among groups A, B, and C are shown in Table (2). No statistically significant differences (P>0.05) at pre-treatment in VAS (P=0.166), PPT (P=0.669) and ANDI (P=0.336). However, there were significant differences (P<0.05) among group A, group B, and group C at post-treatment in VAS (P=0.0001), PPT (P=0.0001) and ANDI (P=0.001). Post-hoc test (Table 2) revealed that there were significant differences (P<0.05) at post-treatment in VAS, PPT and ANDI between group A versus group B (P=0.001, P=0.0001, P=0.004, and P=0.001, respectively) and group A versus group C (P=0.001, P=0.0001, P=0.002, and P=0.0001, respectively), but no significant differences (P>0.05) between group B versus group C (P=0.574, P=1.000, P=1.000, and P=0.937, respectively). Post-hoc test and mean differences between groups showed that the IASTM program (Group C) followed by KT program (Group B) gave the highest response for VAS, PPT and ANDI compared to traditional physical therapy program (group A).

Table 2: Within and between group comparisons for Pain Intensity, Pain Pressure Threshold and Neck Disability Level

Variables	Items	Groups (Mean ±SD)			Effect size	*P*-value[2]	Post-hoc test (post-treatment)		
		Group A (n=17)	Group B (n=17)	Group C (n=17)			Pairwise groups	MD	P-value[3]
Pain Intensity	Pre-treatment	7.71 ±0.77	8.12 ±0.85	8.18 ±0.80	0.037	0.166			
	Post-treatment	3.53 ±0.62	2.53 ±0.62	2.18 ±0.95	0.222	0.0001*	Group A *vs.* Group B	1.00	0.001*
	MD (Change)	4.18	5.59	6.00			Group A *vs.* Group C	1.35	0.001*
	95% CI	3.64 – 4.70	5.05 – 6.12	5.46 – 6.53			Group B *vs.* Group C	0.35	0.574
	Improvement %	54.22%	68.84%	73.35%					
	Effect size	0.716	0.819	0.839					
	P-value[1]	0.0001*	0.0001*	0.0001*					
Pain Pressure Threshold	Pre-treatment	9.65 ±1.27	9.29 ±1.57	9.18 ±1.38	0.008	0.669			
	Post-treatment	13.06 ±1.56	17.65 ±1.80	17.71 ±1.86	0.454	0.0001*	Group A *vs.* Group B	4.59	0.0001*
	MD (Change)	3.41	8.36	8.63			Group A *vs.* Group C	4.75	0.0001*
	95% CI	1.33 – 5.49	5.27 – 11.45	6.44 – 10.8			Group B *vs.* Group C	0.16	1.000
	Improvement %	35.34%	89.99%	94.01%					
	Effect size	0.491	0.790	0.823					
	P-value[1]	0.0001*	0.0001*	0.0001*					
Arabic Neck Disability Index	Pre-treatment	23.24 ±1.92	22.41 ±3.64	22.94 ±2.19	0.022	0.336			
	Post-treatment	12.71 ±2.08	9.76 ±2.84	9.59 ±2.34	0.141	0.001*	Group A *vs.* Group B	2.95	0.004*
	MD (Change)	10.53	12.65	13.35			Group A *vs.* Group C	3.12	0.002*
	95% CI	8.77 – 12.28	10.89 – 14.39	10.60 – 16.1			Group B *vs.* Group C	0.17	1.000
	Improvement %	45.31%	56.45%	58.20%					
	Effect size	0.598	0.671	0.682					
	P-value[1]	0.0001*	0.0001*	0.0001*					
	Post-treatment	2.56 ±0.64	4.08 ±0.21	4.19 ±0.19	0.203	0.0001*	Group A *vs.* Group B	1.52	0.001*
	MD (Change)	0.35	1.82	1.89			Group A *vs.* Group C	1.63	0.0001*
	95% CI	0.17 – 0.53	1.07 – 2.57	0.95 – 2.83			Group B *vs.* Group C	0.11	0.937
	Improvement %	15.84%	80.53%	82.17%					
	Effect size	0.094	0.411	0.455					
	P-value[1]	0.002*	0.0001*	0.0001*					

Group A: received traditional therapy program; Group B: received Kinesio Taping in addition to traditional physical therapy program; Group C: received instrument assisted soft tissue mobilization in addition to traditional physical therapy program. Data are expressed as mean ±standard deviation MD: Mean difference CI: confidence interval P-value: probability value S: significant * Significant (P<0.05) NS: non-significant

Statistical multiple pairwise comparison tests for cervical range of motion variables within each group are presented in Table (3). There was significantly (P<0.05) increase in flexion and extension at post-treatment compared to pre-treatment within group A (P=0.001 and P=0.005, respectively), group B (P=0.0001 and P=0.0001, respectively), and group C (P=0.0001 and P=0.0001, respectively). There were significantly (P<0.05) increased in right and left bending at post-treatment compared to pre-treatment within group A (P=0.017 and P=0.001, respectively), group B (P=0.0001 and P=0.0001, respectively), and group C (P=0.0001 and P=0.0001, respectively). moreover, there were significantly (P<0.05) increased in right and left rotation at post-treatment compared to pre-treatment within group A (P=0.0001 and P=0.0001, respectively), group B (P=0.0001 and P=0.0001, respectively), and group C (P=0.0001 and P=0.0001, respectively). These significant differences in cervical range of motion variables at post-treatment are in favor of group C, followed by group B and then group A. Moreover, the patients in group C improved higher cervical range of motion variables followed by those in group B, and then those in group A.

Statistical multiple pairwise comparison tests for cervical range of motion variables among groups A, B, and C are shown in Table (3). No statistically significant differences (P>0.05) at pre-treatment in flexion (P=0.158), extension (P=0.869), right bending (P=0.650), left bending (P=0.568), right rotation (P=0.263), and left rotation (P=0.995). However, there were significant differences (P<0.05) among group A, group B, and group C at post-treatment in flexion (P=0.001), extension (P=0.002), right bending (P=0.039), left bending (P=0.001), right rotation (P=0.0001), and left rotation (P=0.001). Post-hoc test (Table 3) revealed there were significant differences (P<0.05) at post-treatment in cervical range of motion variables between group A versus group B and group A versus group C, but no significant differences (P>0.05) between group B versus group C. Post-hoc test and mean differences between groups showed that the IASTM program (Group C) followed by KT program (Group B) gave the highest response for cervical range of motion variables compared to traditional physical therapy program (group A).

Table 3: Within and between group comparisons for Cervical Range Of Motion variables

Variables	Items	Groups (Mean ±SD)			Effect size	*P*-value[2]	Post-hoc test (post-treatment)		
		Group A (n=17)	Group B (n=17)	Group C (n=17)			Pairwise groups	MD	P-value[3]
Flexion	Pre-treatment	25.59 ±5.26	23.53 ±5.80	22.94 ±5.32	0.040	0.158			
	Post-treatment	33.53 ±2.34	43.53 ±2.34	44.12 ±1.96	0.142	0.001*	Group A *vs.* Group B	10.00	0.001*
	MD (Change)	7.94	20.00	21.18			Group A *vs.* Group C	10.59	0.001*
	95% CI	5.09 – 10.79	17.15 – 22.84	18.33 – 24.03			Group B *vs.* Group C	0.59	1.000
	Improvement %	31.03%	85.00%	92.33%					
	Effect size	0.320	0.670	0.695					
	P-value[1]	0.001*	0.0001*	0.0001*					
Extension	Pre-treatment	29.47 ±4.92	27.35 ±5.03	27.65 ±5.62	0.003	0.869			
	Post-treatment	37.00 ±3.59	44.41 ±1.66	45.89 ±2.47	0.118	0.002*	Group A *vs.* Group B	7.41	0.005*
	MD (Change)	7.53	17.06	18.24			Group A *vs.* Group C	8.89	0.001*
	95% CI	3.98 – 11.08	14.51 – 19.60	14.80 – 21.68			Group B *vs.* Group C	1.48	0.527
	Improvement %	25.55%	62.38%	65.97%					
	Effect size	0.537	0.648	0.656					
	P-value[1]	0.005*	0.0001*	0.0001*					
Right bending	Pre-treatment	31.18 ±6.50	29.12 ±7.12	29.06 ±4.69	0.011	0.650			
	Post-treatment	37.94 ±2.53	43.82 ±2.18	44.41 ±1.66	0.065	0.039*	Group A *vs.* Group B	5.88	0.028*
	MD (Change)	6.76	14.70	15.35			Group A *vs.* Group C	6.47	0.023*
	95% CI	3.60 – 9.92	11.54 – 17.86	12.19 – 18.51			Group B *vs.* Group C	0.59	1.000
	Improvement %	37.72%	50.48%	52.82%					
	Effect size	0.163	0.471	0.554					
	P-value[1]	0.017*	0.0001*	0.0001*					
Left Bending	Pre-treatment	24.41 ±6.82	26.18 ±6.73	25.88 ±6.43	0.012	0.568			
	Post-treatment	31.82 ±2.18	43.82 ±3.32	44.70 ±4.16	0.135	0.001*	Group A *vs.* Group B	12.00	0.0001*
	MD (Change)	7.41	17.64	18.82			Group A *vs.* Group C	12.88	0.0001*
	95% CI	5.89–8.93	14.13–21.16	14.42–23.22			Group B *vs.* Group C	0.88	1.000

	Improvement %	30.36%	67.38%	72.72%				
	Effect size	0.208	0.516	0.556				
	P-value[1]	0.001*	0.0001*	0.0001*				
Right rotation	Pre-treatment	45.00 ±5.30	43.62 ±6.15	42.65 ±6.15	0.027	0.263		
	Post-treatment	60.65 ±3.58	72.35 ±2.57	73.24 ±3.93	0.145	0.0001*	Group A *vs.* Group B	11.70	0.0001*
	MD (Change)	15.65	28.73	30.59			Group A *vs.* Group C	12.59	0.0001*
	95% CI	10.37–20.93	26.43–31.03	27.31–33.86			Group B *vs.* Group C	0.89	1.000
	Improvement %	34.78%	65.86%	71.72%					
	Effect size	0.745	0.772	0.782					
	P-value[1]	0.0001*	0.0001*	0.0001*					
Left rotation	Pre-treatment	40.59 ±5.55	40.18 ±5.73	40.47 ±5.80	0.000	0.995			
	Post-treatment	62.65 ±3.58	74.12 ±4.04	75.59 ±3.90	0.133	0.001*	Group A *vs.* Group B	11.47	0.001*
	MD (Change)	22.06	33.94	35.12			Group A *vs.* Group C	12.94	0.001*
	95% CI	15.74–28.38	24.63–43.25	25.30–44.94			Group B *vs.* Group C	1.47	1.000
	Improvement %	54.35%	84.47%	86.78%					
	Effect size	0.594	0.843	0.851					
	P-value[1]	0.0001*	0.0001*	0.0001*					

Group A: received traditional therapy program; Group B: received Kinesio taping in addition to traditional physical therapy program; Group C: received instrument assisted soft tissue mobilization in addition to traditional physical therapy program. Data are expressed as mean ±standard deviation MD: Mean difference CI: confidence interval P-value: probability value S: significant * Significant (P<0.05) NS: non-significant

The outcomes of the current work demonstrate that Group C (IASTM) showed the greatest reduction in pain intensity (73%), followed by Group B (KT) with 68%, and Group A (traditional therapy) with 54%, as measured by the Visual Analog Scale (VAS). The most significant improvement in pain pressure threshold with a 94.01% increase, followed by KT (89.99%), and traditional therapy (35.34%). Group C demonstrated a 58.20% reduction in disability, while KT achieved 56.45%, and traditional therapy showed 45.31% improvement. Across all cervical movements (flexion, extension, right/left bending, and right/left rotation), Group C consistently showed the highest post-treatment mean values, followed closely by Group B, and then Group A. So, there is no significant difference between IASTM and KT, but there is a superiority of IASTM in improving pain intensity, pain pressure threshold, and Arabic neck disability index (ANDI). These findings corroborated a study by **Halski et al. (2015)** showed that all tape types (including KT) reduced VAS scores but did not affect muscle bioelectrical activity. Similarly, **Noguera et al. (2019) and Kalichman et al. (2018)** confirmed that KT's moderate effects on pain but questioned its efficacy on muscle tone and PPT. Several studies **(Arias-Buría et al., 2020 and Alahmari et al., 2020)** reported no significant improvement in ANDI following KT, supporting the current study's results. **Genç et al. (2018)** also found no significant ROM or ANDI differences with KT compared to sham treatments. Multiple studies corroborate the superior performance of IASTM. **Ali et al. (2024), Aryal et al. (2024) and Gulick (2017)** found that IASTM significantly reduces pain and increases PPT. Additionally, **Elagamawy et al. (2023)** and **Emshi et al. (2021)** confirmed IASTM's positive effects on pain, ROM, and disability. But other studies contradict these findings like **Dogan et al. (2018)** Found KT, when added to conventional physiotherapy, significantly improved PPT and disability in patients with chronic neck pain, unlike the current study. The difference may be attributed to participant age (40–55 years vs. younger participants in the current study). **Vardiman et al. (2014)** noted no benefit of IASTM in altering inflammation markers and reported increased pain post-treatment. The contradiction could stem from their use of healthy participants and absence of an injury model. **El-Hafez et al. (2020)** reported no superiority of IASTM over stripping massage, with both treatments producing equal improvements in pain and function. **Agarwal et al. (2023**) found both IASTM and manual myofascial release (MFR) equally effective in reducing pain and improving PPT, ROM, and function. The study concluded that neither technique was superior, potentially due to a brief one-week treatment duration.

So, this study might have some limitations. First, the variability in Kinesio taping application might impact the generalization of the results. In addition, Confounding variables such as medication use, exercise habits, and stress levels, could influence the outcomes of the study. Finally, differences in trigger point severity among participants might also influence outcomes.

4. CONCLUSION

IASTM and KT are effective methods in the management of subjects with active trigger points at upper trapezius myofascial trigger points with superiority for IASTM on VAS, PPT, CROM and ANDI.

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